


1954

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Recommended Citation

Glenn D. Bennett, Physical Evidence in Arson Cases, 44 J. Crim. L. Criminology & Police Sci. 652 (1953-1954)

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PHYSICAL EVIDENCE IN ARSON CASES

Glenn D. Bennett

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In this paper we are going to discuss physical evidence as it relates to arson, but confine ourselves as far as possible to its recognition and its importance from the incendiary viewpoint. We shall accomplish this chiefly through the use of actual case histories, which illustrate three of the four basic types of incendiary fires and the evidence found in each, namely:

1. Revenge.
2. Fraud.
3. Concealment of other crimes.

When we speak of physical evidence, we are referring to specific objects, concrete things; physical, tangible, objective evidences of arson—the physical evidence of a crime. We are not going to concern ourselves with abstractions, inferences, theories, and imaginings although we know that these latter are important.

In an arson investigation we will be looking for something that will assist in solving this crime and also help us to prosecute the person criminally responsible. In other words, the subject of our search must have evidentiary value when considered in connection with the origin of the fire being investigated.

We will find this evidence at, or closely connected to, the point of origin of the fire. We must, therefore, exercise the greatest of care in the examination of the point of origin and its immediate vicinity.

Exceptional care must be taken to avoid the many pitfalls that shall be encountered. Bear in mind, at all times, that the person who started the fire has given considerable thought to the matter, and has done his utmost to arrange things so it will appear that what really happened, did not happen at all.

Keeping these facts in mind, how are we going to recognize physical evidence when we see it? How will it manifest itself? What do we look for?

Every case investigated, every fire inspected, will have its own peculiar, individual characteristics; but, we shall find that the recognition of physical evidence will be made because of its unusual aspect.

We are on safe ground when stating, in a broad sense, that everything combustible is capable of being used in some manner or method to commit the crime of arson. As can be readily understood, there are unlimited possibilities for causing a fire from the ordinary household fixtures, appliances, or utilities. Fires resulting from the misuse of these necessities of everyday life, frequently can and do occur accidentally. They may also be used as an effective means to start a fire by evil design, which, unless the investigator is vigilant and observant, may result in a clean bill of health for the perpetrator. The manner in which they were used or found will largely determine whether or not they were contributory factors in the cause of the fire.

They should be thoroughly inquired into and eliminated if possible. If it is found that they were a contributing factor in the fire and it is believed by the investigator they were used deliberately, then it will be necessary for him to show in what fashion they were used, with sufficient corroborative evidence to indicate the fire was incendiary. An exhaustive investigation, in most instances, will reveal whether the fire was caused accidentally or produced through an ulterior motive.

However, we will run into some situations where the cause of the fire is readily ascertainable. This may occur when the fire for some reason or other fails to progress, leaving intact or easily recognizable the device or means used in starting the fire.

We have found on numerous occasions, where a fire has not completely consumed or destroyed the materials used to start it, that we were dealing with the unusual, or something out of the ordinary. This may include trailers made of dynamite fuse; gasoline- or oil-soaked paper or rags; mechanical devices or contrivances; set-ups using matches, cigarettes, or candles.

In this category, we may also place the finding of electric heating elements placed in such a way as to ignite combustibles nearby; an electric iron left in an "on" position; deliberate overloading, fusing, or bridging of electrical circuits; deranging of heating appliances such as stoves, ranges, furnaces, and the pipes connected to them. Such matters are not impossible to recognize as physical evidence of arson.

In the arson case, the recognition of physical evidence carries with it an imperative rule that must be observed in every type of evidence that forms part of a chain in circumstantial cases. Namely, it must be consistent with the case; it must be incapable of explanation upon any other reasonable hypothesis than that of arson. For instance, it would not do much good to try and show arson by producing, shall we say, some rags soaked in linseed oil when it could be proven that the type of

business where the fire occurred called for the use of such oil-soaked rags. That would not be incapable of explanation, other than deliberate firing, because the rags could have ignited spontaneously, as is well known. So extreme care must be taken to insure that the evidence you are recognizing has evidentiary value, and that the courts are going to be able to recognize it as such.

Now much of the evidentiary value of the physical evidence you find will be recognized subsequent to the finding of it. For instance, you find a can in the debris of a dwelling and analysis of the residue proves it contained gasoline—the owner denies any knowledge of the can or its presence in the house—subsequent investigation traces his purchase of the gasoline in that specific can.

To better illustrate this point and present a more graphic picture of the physical evidence to be found at the scene of a fire, we will cite specific examples of these arson cases, one in each of the classes we mentioned before: revenge, fraud, and concealment of other crimes.

REVENGE FIRE

About 2:15 A. M. a fire was discovered burning at a grade door entrance to a two-family flat, and had extended through the door into the building causing extensive damage to the hallway and kitchen. The fire department called for the Arson Squad.

Upon arrival they noticed a strong odor of gasoline around the door. The irregular pattern of burning on the door and jamb indicated a flammable liquid had been used. A small rug in front of the door also smelled strongly of, and apparently was saturated with, gasoline. Questioning of the occupants in the building, a colored family, failed to reveal any reason for such a fire.

In searching the neighborhood a one-gallon, glass jug was found in the alley two doors away. This jug had a small amount of liquid which smelled like gasoline. The contents was taken to the arson laboratory for analysis, and it was identified as gasoline. The jug was taken to the identification bureau where a latent fingerprint was found.

The rug was subjected to vacuum distillation to extract the flammable liquid, and this liquid was also identified as gasoline.

Members of the squad made a canvass of all the gasoline stations in this area that were open late at night. They were fortunate in finding a station attendant several blocks away who recalled a colored girl with a glass gallon jug attempting to buy gasoline on the night of the fire, stating her car had stalled.

He refused to sell the gas in the jug, and she left but returned a few

minutes later to purchase one gallon of gasoline in a red can which he supplied. She reappeared within three minutes and returned the can for her deposit. She apparently had gone down the alley and poured the gasoline from the can into the jug.

A sample of gasoline was taken from the station tanks, analyzed and found to be identical to the gasoline contained in the jug found near the scene of the fire as well as the sample extracted from the rug.

With this information, the occupants of the house where the fire occurred were questioned further. It was found that they had a young man who roomed with them. Upon questioning him it was revealed that he had a quarrel with his girl friend the day before the fire.

This girl who was 22 years old was arrested. Her fingerprints proved to be the ones found on the glass jug. She was placed in a showup, and the gasoline station operator identified her as the purchaser of the gasoline.

In this case we had the following physical evidence :

1. Pictures of the scene of the fire showing an irregular pattern of burning similar in nature to that found when an inflammable liquid is used.
2. Glass jug.
3. Sample of gasoline from glass jug.
4. Photograph of latent fingerprint on glass jug.
5. Sample of gasoline from gas station.
6. Rug and material extracted by vacuum distillation.

This evidence coupled with the quarrel established a motive, and the laboratory analyses of the different samples made an excellent court case. The girl was found to be mentally incompetent and committed to an institution.

FRAUD FIRE

A fire occurred at about 10:00 P.M. in a one-floor, brick building occupied by a plastics fabricating company. Upon arrival, the fire department found that the door had apparently been forced open, and the Chief immediately radioed for the Arson Squad. A fog line was used in the extinguishment of the fire, and this left all the material in the building practically intact.

Investigation disclosed five separate fires and one set-up which failed to ignite.

In connection with one of the fires, a trailer had been made by means of unraveling six or seven feet of a roll of wrapping paper which set at the west end of a shelf, the end of the trailer reaching down to the floor where papers had been placed.

In addition to these actual fires, a large cardboard box filled with papers was found on the floor in an upright position just inside the

main entrance to the shop. On top of the papers contained therein was found an open packet of matches which had been soaked with fuel oil and a lighted cigarette placed between them. The cigarette had apparently gone out before reaching the heads of the matches.

A major portion of the floor of the shop had been saturated with fuel oil. Further examination of the premises disclosed that a fuel line extending from a reservoir tank to a small oil stove in the center of the shop, had been severed in two different places by means of a sharp cutting instrument. A wire support on the front of the tank had also been cut, allowing the tank to dip downward and facilitating the flow of oil through the severed portions of the fuel oil line.

After taking pictures of the several different fires and overall views of the interior as well as the exterior of the building, the investigating officer gathered all the evidence available at this time, which consisted of:

1. Broken pieces of two 1-gallon glass jugs.
2. Three unbroken glass jugs—two of which were capped and contained fuel oil. The other was uncapped and had a residue of fuel oil.
3. A five-gallon metal can full of fuel oil.
4. Pieces of the severed fuel oil line from the space heater.
5. All books, bills, orders and papers, etc., pertaining to the business and its operation, including a new insurance policy increasing coverage from \$5,000.00 to \$10,000.00.
6. Part of the door showing the jimmy marks.
7. An oil-soaked cardboard carton of paper and plastics with the paper matches and cigarette.
8. The trailer composed of wrapping paper.

Before leaving the scene a police guard was established to keep out all unauthorized persons with instructions to arrest the owner if he appeared on the scene. The owner was apprehended about one hour later. At this time his shoes, which had several spots on them, were taken away, and a later chemical test proved them to be oil stains. He was found to be smoking the same brand of cigarettes and had matches in his pocket with the same advertising as those used in the set-up.

His car was searched and a small crowbar and a pair of cutting pliers were found and held for laboratory examination.

The next day the books of the business were audited, and at the same time an authority in the field of plastics and plastics manufacturing was called in. He made a complete physical inventory of the raw stock and finished material, and came up with a valuation figure of \$900.00.

A microscopic examination of the jimmy found in the car disclosed that it fit the depression in the door perfectly, showing the same markings on the tool as in the depressions. Flecks of paint on the tool were

examined spectrographically and were the same in composition as the paint on the door.

The same type of microscopic examination was made of the pliers, the cutting edges of which were rough and irregular. The marks on the tool corresponded to the marks made on the soft pipe in the cutting operation. Scrapings from the cutting edge were analyzed spectrographically, which disclosed that it had recently been used to cut copper. The copper scrapings and the copper in the tubing were identical.

During the trial the defense attorney tried to establish that the fire was set by competitors to put his client out of business, and that his client had been operating machinery day and night in the shop on production of finished items to fill a large number of orders.

The first part of this defense was easily disproved by the evidence already obtained; the latter part was rebutted by the presentation of a picture showing the electric meter and the position of the indicator dials. A representative of the electric company was called in. Their records disclosed that the amount of electricity used during the period claimed by the defendant, was not sufficient to keep a 75-watt bulb illuminated.

Needless to say the owner was found guilty by the jury and sentenced to prison.

CONCEALING ANOTHER CRIME

An explosion and fire occurred about 1:20 P.M. in a hat cleaning and shoe repairing shop located on one of the main thoroughfares of the city. The explosion shattered and blew the large plate glass windows clear out into the middle of the street.

One of our officers working in that area heard the alarm broadcast and went directly to the scene, arriving at the same time as the fire department apparatus. At this time the fire appeared to be centered in the rear part of the store.

When the fire was extinguished the investigator entered the building with the firemen where they found the body of a man lying on the center of the floor.

There were several things about the position and surrounding conditions of the body which attracted the investigator's attention:

1. The body was lying on its back.
2. It was lying in the center of a cement floor.
3. The clothing was all consumed by the fire.
4. The body was badly charred.
5. There was no evidence of any combustible material surrounding the body.

6. Under ordinary conditions, in a fire similar to this, the body would not have been so badly damaged.

The finding of a body in a fire is not in itself unusual, but the circumstances surrounding its discovery may make it so. It is well known that a person trapped in a fire will either make a desperate attempt to escape or will try to protect himself in some way against the flames by crawling in a corner, into a closet, or hiding under some object.

The exception to this will be found where the person has been asphyxiated and was unable to make any attempt to escape. Here was a body badly charred lying on a cement floor, no physical evidence apparent of any combustibles around it. The explosion preceding the discovery of the fire could be indicative of illuminating gas or flammables being present.

After the body was removed to the morgue, the investigator began digging in the debris where the body had lain and discovered the remains of the seat of the man's trousers containing his wallet. This part was not burned, indicating a possibility of the body having been on the floor before the fire. However, this material and contents of the wallet smelled strongly of naphtha. In the wallet were some identification papers, including an immigration card with a thumbprint.

The coroner's office refused to conduct an autopsy until the body had been identified, although it was burned beyond recognition. The left hand had been entirely burned away, but fortunately the right hand and a few fingers still remained, although hard and leathery. One of the fingers was amputated and placed in a solution to soften it, and an imprint was taken. A search of the identification files revealed a fingerprint arrest card on file, through which the man was identified. These prints also coincided with the print of the immigration card. The coroner's office accepted this as sufficient identification of the body.

Before starting the autopsy a curious unrecognizable bulge was noted around the victim's throat. At the investigator's request, the coroner began cutting it away and disclosed a length of rope wrapped several times around the neck. An examination of the skull showed depressions in it made by some round blunt object.

Contents of the stomach were examined and disclosed some undigested food. There was no carbon monoxide content in the blood stream, and the windpipe was clear.

Now the investigators realized they had a murder on their hands. Witnesses were interviewed who saw a man running away from the scene just before the explosion, apparently the victim's partner. Another witness, who left the store about twenty minutes before the

explosion, saw the victim seated at a bench at the rear of the store eating a sandwich and drinking a bottle of beer.

Several other witnesses stated that the two partners were having difficulties over the victim having paid attentions to the other partner's wife.

A further search of the building produced a roll of twine similar to that found around the victim's neck, a ballpeen hammer, the remains of a partly eaten sandwich, a half bottle of beer, and three cans which had contained naphtha.

An examination of the bills in the store showed that three gallons of naphtha had been purchased the day before. The supplier was contacted who stated that this was very unusual as previously the partners had only purchased one gallon at a time; the victim usually making the purchase. However, in this instance three gallons were purchased by the victim's partner.

The ballpeen hammer was taken to the Scientific Laboratory where traces of blood were found on the hammerhead even though the hammer handle had been charred by the fire and was found lying in the debris.

The seat of the trousers was subjected to vacuum distillation, and the material extracted was identified as naphtha. In the meantime, the partner had been arrested and identified by witnesses as the man seen running away from the scene.

In reviewing this case the important factors were the recognition, comparison, and tying together of the different pieces of evidence which enabled the investigator to reconstruct the crime; such as the rope around the neck with the twine found in the store; the hole in the skull with the ballpeen hammer showing traces of blood; the identification of the body through the immigration card and arrest file record and fingerprint of the victim; the uneaten food with the undigested food in the stomach; the naphtha in the containers compared with that extracted from the piece of trousers and leather wallet, the presence of which also explained the heavy charring to the body. This evidence coupled with the motive of jealousy was sufficient to obtain a verdict for first degree murder.

CONCLUSION

Many factors may be discovered in arson cases that we may term circumstantial physical evidence, and it will be recognized by the investigator through observation at the scene of the fire or through the questioning of witnesses and firemen. This evidence may be composed of

anything so arranged or devised as to delay the discovery of the fire, or to impede the efforts of the fire department in the extinguishment of the blaze.

In a dwelling this could be accomplished by the incendiary through pulling down the shades, boarding the windows, nailing the doors, or arranging the furniture in a manner as to prevent or delay the firemen from gaining entry. The same methods could be used in a store through the re-arranging of merchandise; or the warehouse or industrial plant by the use of packing boxes and machinery.

The investigator must also be aware that not all of his physical evidence will necessarily be what we might term positive evidence, but may be obtained in what might be termed the negative manner. By that is meant absence or reduced quantities of what we normally expect to find in the type of building burned. This is again largely circumstantial. For instance, we search a home following a fire and fail to find personal articles, such as jewelry, clothing, silverware, photos, letters, legal documents, insurance policies, etc.—any tangible thing that a person could have a personal attachment for or be of monetary or sentimental value.

In a business house, we may find absence of normal stock, or old and cheaper merchandise replacing it, and possibly all the business papers, orders, and books missing with perhaps the exception of the accounts receivable. Failure to find such things may be termed the negative establishment of physical evidence of arson.

By now we have at least established a trend of thought to follow in the recognition of physical evidence. We cannot pretend to have covered every possible type of evidence that could be recognized as physical evidence of arson, but have merely scratched the surface of a very broad subject.

The 1954 annual meeting of the International Association of Arson Investigators will be held in conjunction with the Arson Investigator's Seminar at Purdue University, Lafayette, Indiana, during the period May 3rd thru May 7th, 1954. The business meeting of the Association will be held on May 4th; at the annual meeting officers will be elected and general business will be transacted.