ACCIDENTAL
OR
INCENDIARY?

ABOUT THE AUTHORS

Richard D. Fitch served over 20 years with a police department in the state of Maryland. He spent 4 years in the United States Navy during World War II in the 1940s where he many times went through the Navy fire fighting school. Author Richard D. Fitch attended an aviation school in New York City and is an electronics school graduate. He also was a contributing editor for a leading electronics magazine for six years. His knowledge in this field was a great plus in the investigations and in the writing of this book. Richard also has 10 years experience in the automotive industry giving him experience that was invaluable when a motor vehicle was involved in a fire. He also is a past licensed electrician.

Edward A. Porter is currently employed by the Halifax Community College as chairman of the Criminal Justice Department, and he is now serving as Assistant Chief of the Gaston Volunteer Fire Department in North Carolina.

Doctor Porter has an Associate Degree in Fire Science, a Bachelor's degree in Criminal Law, and one in Biblical Studies, a Master's degree in Religious Education, and a Doctorate degree in Theology. Doctor Porter is certified by the North Carolina Fire and Rescue Commission as a Level 4 Instructor with specialties in Hazard Materials, Incident command and Driver training. He is also certified by the North Carolina Criminal Justice Standards Division as a School Director and Instructor which allow him to run and teach their school programs. He is also certified by the North Carolina Sheriff's Standards Division as a School Director and Instructor to run and teach in their school programs.

Doctor Porter has been a member of the Volunteer Fire service since 1953 serving first in the Rosedale Volunteer Fire Department in Baltimore County, Maryland, and now in the Gaston Volunteer Fire Department in Northampton County, North Carolina. He served with the Baltimore County, Maryland Police Department for 20 years retiring with the rank of lieutenant.

Doctor Porter is a member of the North Carolina Fire Instructors Society, The North Carolina Law Enforcement Training Officers Association, The North Carolina State Fireman's Association, The Law Enforcement Alliance of America, The Baltimore County retired Fire and Police Officers Association and the Fraternal Order of Police.

Second Edition

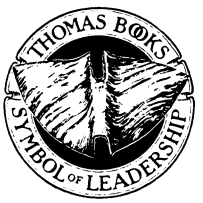
ACCIDENTAL OR INCENDIARY?

By

RICHARD D. FITCH

and

EDWARD A. PORTER



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PREFACE

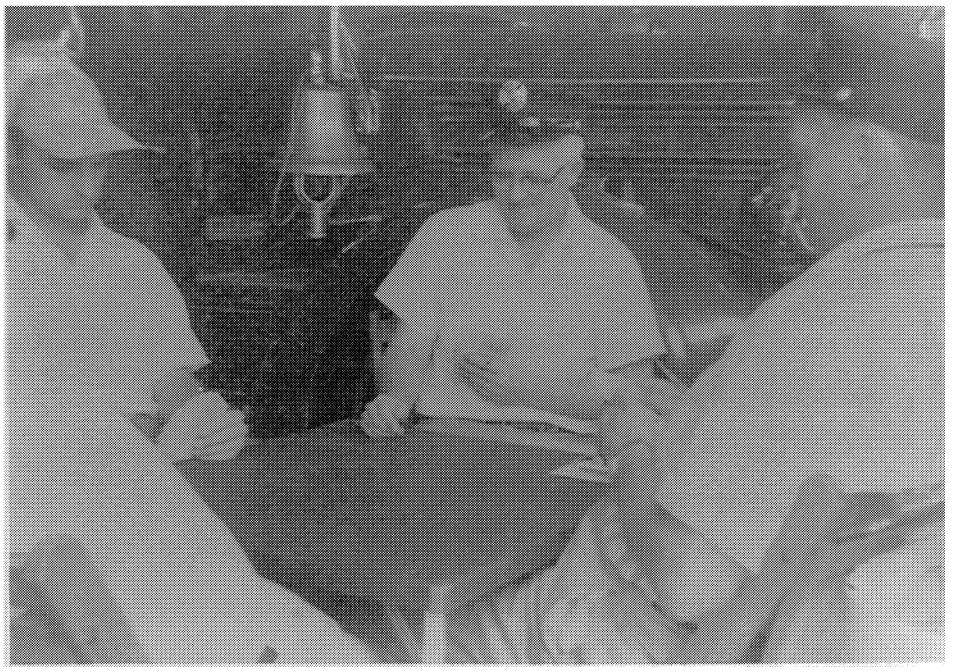
We know it would be of interest to the reader to know something about the background of the authors and how they came to write *ACCIDENTAL OR INCENDIARY.* As any law enforcement officer knows, men who want to break the law always manage to find each other and get together for the common purpose. Other men with common interests are no different and will often get together to form a successful business by combining different perspectives on one common interest.

This was the case with Richard D. Fitch and Dr. Edward A. Porter, the authors of *ACCIDENTAL OR INCENDIARY* who, being members of a Maryland Police Department, were assigned to the same patrol car for a number of years. Day after day, night after night, in winter, summer, and in all kinds of emergencies, you get to know your partner better than your family. Each one gets to know the other's fears, likes, dislikes, family situation, and problems. It did not take long for us to realize we both "shined" when on a case involving a fire, even to the extent of working overtime without pay on arson cases. There was never any question about whose car to use or how long we were going to work, as we were both obsessed with solving the case.

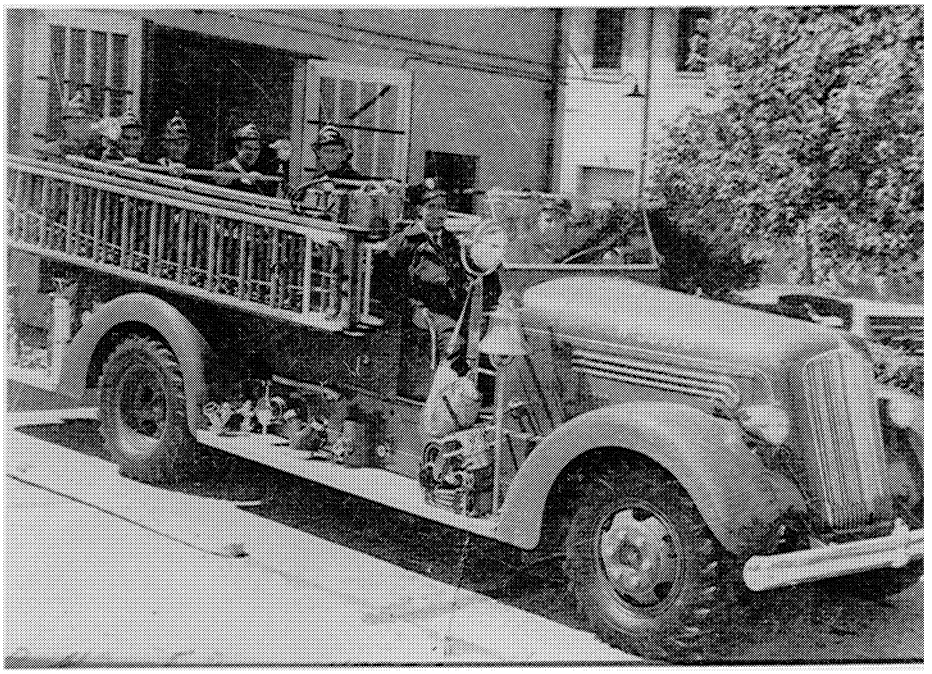
The authors often discussed the many books and literature they had read on fire investigation. It was during one of these discussions that the need for a book on investigating fires of all types, written by people who were there and had firsthand knowledge was decided upon. The book had to be written in plain terms so the prospective investigator would feel he was there with us, smelling the acrid smoke and splashing through the puddles left by the fire hoses. No big words or fancy phrases to confuse the reader, just straight talk and raw on the scene pictures. We decided this was what was needed in the fire investigation field and this was when we conceived *ACCIDENTAL OR INCENDIARY.* The next few years were spent in extensive research and recording of facts pertaining to this subject. The end result was well worth the effort as it resulted in the first edition of *ACCIDENTAL OR INCENDIARY.* The authors have

continued their work and studies over the years which have allowed them to update this edition of *ACCIDENTAL OR INCENDIARY* which will provide the reader a measure of knowledge in the field of fire investigation which will be an asset to them in their chosen field.

The combining of the authors' different backgrounds gave wide coverage to the types of fires they could investigate, and it is this combination of backgrounds that made for the success of this writing effort.



Howard F. Porter, (center) the father of author Edward A. Porter, first fought fire in the 1930s when the Rosedale Volunteer Fire Department in Baltimore County, Maryland was formed. This photo was taken in the mid 1950s in front of a 1947 Mack pumper. During this period, the father-son team of Howard and Edward fought fires together with the Rosedale Volunteer Fire Department. Today the tradition carries on as the author, Edward Sr., is training officer with the same department where his son, Edward A. Porter, Jr., is Chief.



Interest in fires has long been in the family of author Richard D. Fitch. The photo shows his father, Harry E. Fitch, on board a 1930s pumper of the Edgewood Arsenal Fire Department in the early 1940s. This fire company fought many dangerous fires at this government installation in Maryland.

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Chapter 1

INVESTIGATING FIRES

Investigating a fire can be a complex operation, whether it be a small brush fire or a large building fire. In either case, upon completion of the investigation and filing of the report, the investigator is expected to have arrived at a reasonable explanation as to how the fire started. Arson squads, insurance companies, fire prevention bureaus and statisticians will read the investigators report to learn how the fire started. It is for this investigator who, in many cases, is not a specialist in fires that this book is written.

While the exact cause of many fires is never determined, if the investigator makes a complete investigation and determines the area where the fire started and mentions a possible cause, he will be "off the hook." If an investigator is not sure of the cause of a fire, they can make their initial report without committing themselves and continue their investigation later. It is because of this difficulty in pinpointing the cause of many fires that we stress the importance of arriving at the scene of the fire as soon as possible.

INITIAL ACTIONS OF INVESTIGATOR

The police and fire investigators usually arrive on the scene while the fire is still in progress and all fire fighters and equipment are still on the scene. This is the best time to investigate a fire because the fire fighters, onlookers and other witnesses can be questioned on the scene. After the fire is over, some of the witnesses may never be found. Of course, the first thing the investigator wants to learn is where the fire started. Then they can work to determine what type of fire it is and whether arson is involved. It is important to determine these facts immediately because they will guide the course of the investigation. The investigator can now begin by questioning any occupants who were in the building at the time the fire started. They can usually tell where the fire seemed to be coming from and, in many cases, tell how it started. This information can then be

clarified by the investigator. However, it is not always that easy to get to the origin of a fire. The investigator will often have to enter the burned building and search the ruins to determine where the fire began.

They can ask the first fire fighter who arrived on the scene where the fire was burning the fiercest when they arrived and how far it had progressed. This information and the locating of a heavily charred area will give some indication as to where the fire began. This heavily charred area, of course, is an area that is burning, or has already burned, upon arrival of the fire fighters and not an area that was consumed after the fire was in progress. After locating this area, the investigator then can look first for the easiest solution—*accidental* fire.

COMMON CAUSES OF ACCIDENTAL FIRE

An indication of accidental fire could be a charred space heater—oil, coal or wood. Check the wiring in the area and look for a badly burned fuse or electrical outlet box. In this connection it may help to determine if the electricity was operative after the fire started. If it was not, it is reasonable to assume that one of the first things to burn was an electrical circuit. In cases where there was no electricity (barns, sheds, garages and some houses), an overturned lantern or heavy charring in the area where the means of lighting was located may be a good clue as to how the fire began.

Do not discount electric motors as a cause of fire even though they smoke, give off a distinct odor, and may blow a fuse before they do any damage. A motor in a congested area, especially if it is oil-soaked and dirty, can readily start a fire. In this connection again it would be good to talk to anyone in proximity to the fire in the early stages to determine if the unmistakable odor of an electric motor burning was present.

In severe weather one of the common causes of fire is overheated heating plants. The investigator can examine the walls around the chimney and flue outlet, also look for any trash or burned cans of flammables that may have been close to the heating plant. Once the investigator believes he has found where the fire began, it is usually not too difficult to confirm it by following the course of the fire, taking into consideration, of course, types of building materials, weather conditions and other flammables in other parts of the building that would cause the fire to burn hotter or mushroom in a different area even though the fire did not begin in that area. If there is no apparent cause of the fire, and all the

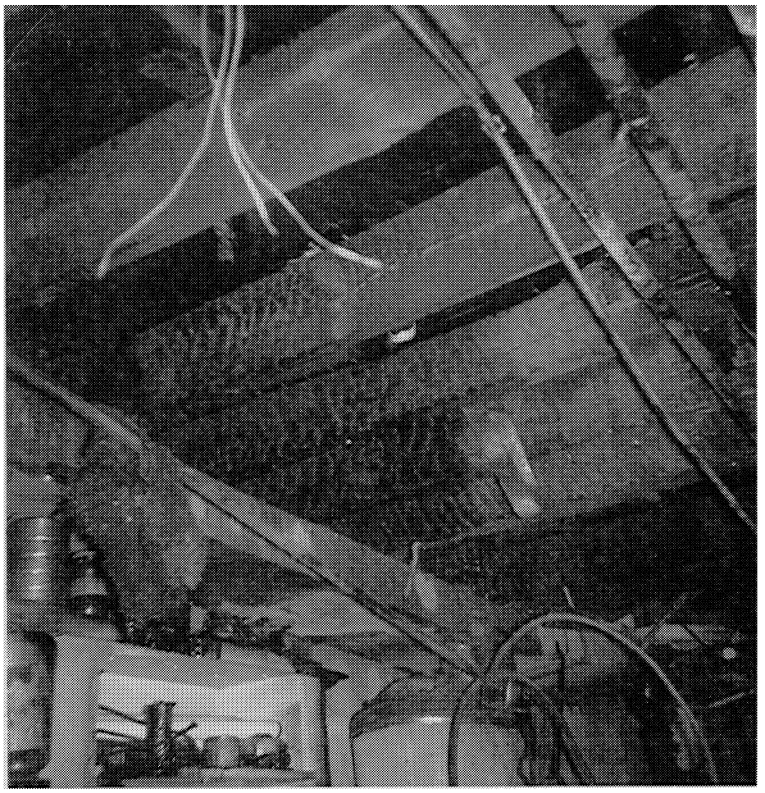

Figure 1. In this picture you see the floor joists of the first floor of a frame house as you would see them while standing in the basement. As you can see looking up in this area the flooring is burned away completely. The alligator pattern burned into the wood joists is deeper in the area near the wall. You can see in the picture some of the debris that has fallen through from the first floor. The firemen had already started their clean up work and had just about removed everything that was left in the room above where this picture was taken. By questioning the firemen it was found that a sofa had been located above the hole in the floor. A check in the debris outside of the home revealed one badly burned foam-rubber type sofa. It was later concluded that a cigarette was dropped on the sofa causing the fire.

common possible causes have been discounted then the investigation becomes more complex.

Other Possible Causes

Spontaneous combustion would be a good possibility to check next. This is a chemical reaction in improperly stored and ventilated materials that generate heat and begin to burn. No outside spark is necessary for spontaneous combustion. Check with the owners of the building and

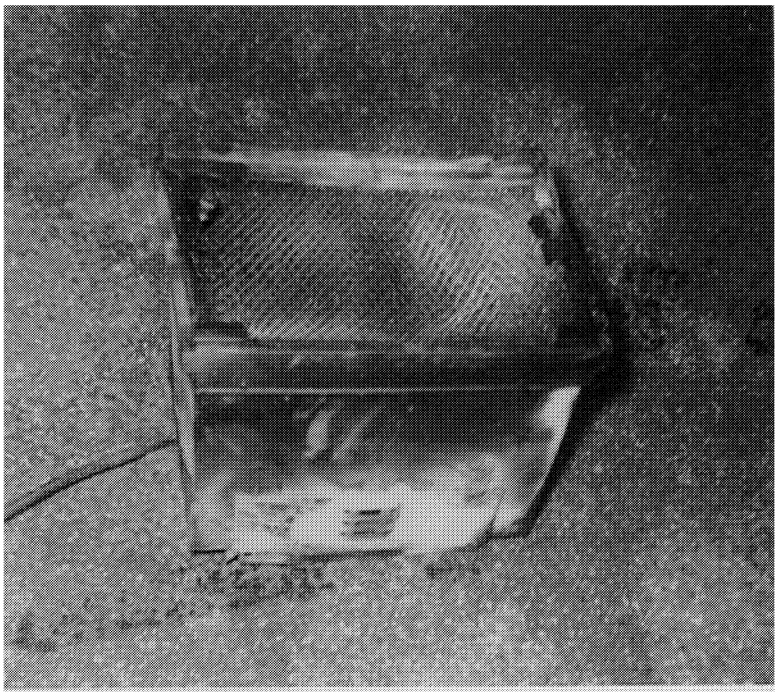

Figure 2. This is an exhaust fan taken from the kitchen of a home that had burned. The kitchen had the usual built-in wooden cabinets, built-in stove and a built-in oven. The fire did a great amount of damage to the kitchen and the firefighters had to tear out the kitchen cabinets to insure that the fire was completely out. This left the investigator with a pile of wood and assorted pieces of wooden cabinets piled in the yard of the home. With the assistance of the lady of the house, it was possible to reassemble the kitchen cabinets in the yard of the home. When this was complete, by studying the way the fire burned he was able to determine that the fire started in the area of the above exhaust fan. The accumulation of grease and dirt around the fan motor caused the fire.

determine what materials were stored in the area where the fire began. This is a very possible cause of fire in cases of barn fires at the time of year when hay is stored in the barn. Hay generates heat and when improperly stored can readily cause a fire which will have the sky well lit by the time the first firemen arrive. This is a difficult fire for the investigator and questioning witnesses is the best place to begin to determine if anyone was seen in the area of the barn before the fire. Fumes from flammable liquids and a pilot light or automatic electric switch make a good combination for a fire that will be hard to detect. Determine if any cleaning fluids were used in the building before the fire.

Lightning

Lightning is a common cause of accidental fire. It can be responsible for field and forest as well as building fires. Fires started by lightning may run in groups following the path across the district of an electrical storm. With this knowledge at hand, the investigator can suspect lightning as a cause immediately upon arriving at the scene of a fire, if there is, or has been, an electrical storm in the area. In the case of a building fire an experienced fire fighter or investigator, upon arriving at the fire can detect the distinct ozone odor left where lightning struck. This may be compared to an acidy chemical odor, possibly like sulphur. Normally, lightning will strike the highest part of a building such as the chimney or the peak of the roof, but it can strike anywhere and move through the building starting a fire anywhere inside. If it strikes the electrical wires entering the house, fire can result at any outlet box or along the wires in the house. In the case of field fires, a high tree will usually be struck and damaged, having the bark or a limb torn off. Also, the tree may be burned at the top and the trunk not burned at all, since fire does not burn down a tree as well as it burns up a tree. The same can be said of field and forest fires. The fire will spread up a hill faster than it will burn down a hill, helping the investigator determine where the fire began. Always remember to question witnesses even in the case of a suspected lightning fire in an isolated area. A person a considerable distance from where the lightning struck may be a good witness.

BE THOROUGH

After a few on-the-scene investigations you will find it is not too difficult to locate the room in which a fire started, come up with some explanation as to how the fire started, and be able to make a report that will be satisfactory to all concerned. Being too hasty in your investigation, however, can lead you to believe a fire started in a room or section of a building in which it did not but which just burned more completely.

Such a case was where sheetrock wallboard was used in a room where a fire started, but an adjoining room, where the burning was more complete, had one-eighth-inch plywood paneling on the walls. In this case, in the room where the fire started the walls were blackened but still intact and the furniture was burned. The adjoining room was completely gutted and the studs were exposed. The studs are the $2 \times 4''$ uprights to which the wallboard is fastened and the plywood burned so completely there was no sign of any wallboard having been on the studs. It gave the appear-

ance that the house was just never finished. Closer examination of the studs showed the ends of small finishing-nails protruding. These small, headless, finishing-nails, of course, could have been used only to hold a thin flimsy wallboard and this was soon confirmed by talking to the tenants who lived in the house before the fire. The foregoing example shows the importance of taking into consideration the fire-resisting qualities of all the materials used in a building that has had a fire: the sections that did not burn as well as those that burned completely.

The glass in the building can reveal information helpful in locating the origin and travel of the fire. After heat has been applied to glass it will develop a cracking pattern that is known as crazing. A small crazing pattern will indicate a quick rise in temperature and intense heat. The large crazing will indicate a slower rise in temperature and a lower temperature. Keep in mind, if there are different makes of glass in different windows or there have been changes in the building and some windows are much older than others, this will make a difference in the crazing. A glass checkering which is a half-moon type pattern will result in the glass if the heated glass has been struck by the water from a fire hose and thus cooled quickly. This effect would suggest that the glass was in place at the time the fire fighters made their attack. The investigator must be thorough and gather all the information they can.

Even the common light bulb can provide information that points to the origin of the fire. The light bulb in a fire will tend to swell, pucker and point to the area of the greatest heat. Be thorough, do not pass up any clues that will help solve your case.

Many remodeled buildings will be found to have what is known as a false ceiling. This is a ceiling built below the original one either to cover it up or to make a modern appearance by creating a lower ceiling. When this is done, it is not uncommon, especially for do-it-yourselfers, to leave the old wiring in the original ceiling or just extend it to the new ceiling. A fire starting between these two ceilings can smolder for a while due to the lack of air, but will really begin to burn as soon as it finds a vent. This vent may be a hole around pipes, wires, or a support leading up through the ceiling. An investigator making a rapid conclusion will say the fire apparently started here. Of course, after the fire fighters tear down the false ceiling, which they certainly will, it will seem that the investigator could have made a mistake. One common type of business that is continually remodeling to impress the customers is a tavern or restaurant. When a fire in one of these establishments starts, especially after closing, it is

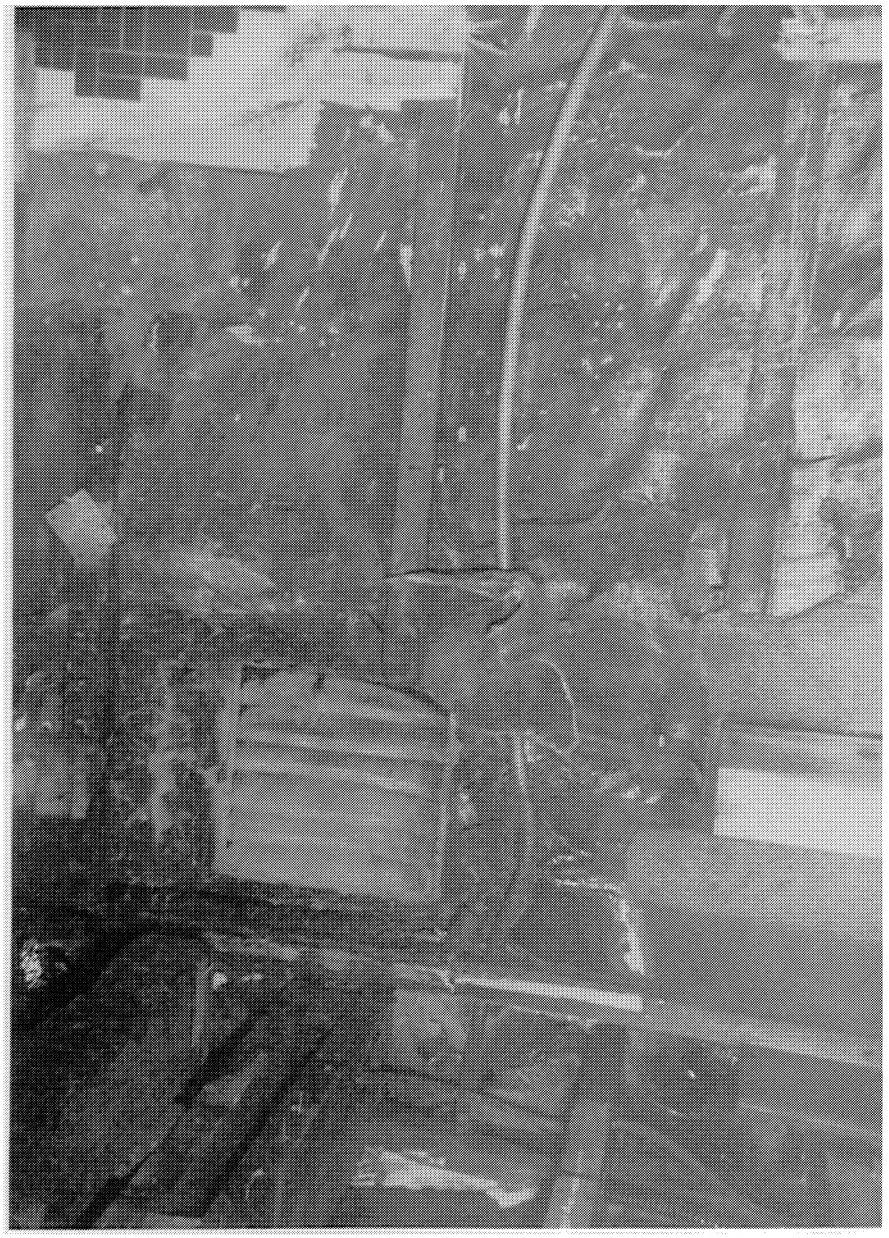

Figure 3. Be thorough in your investigation so you are not misled. This picture shows a piece of the wall framing that was cut and removed from the home as evidence. The way the fire had burned along the floor and under the wall supports gave the appearance that a flammable liquid had been used. Later investigation indicated a large amount of potato chips in bags were stored here. When the potato chips and their grease burned, it gave the same effect as a flammable liquid.

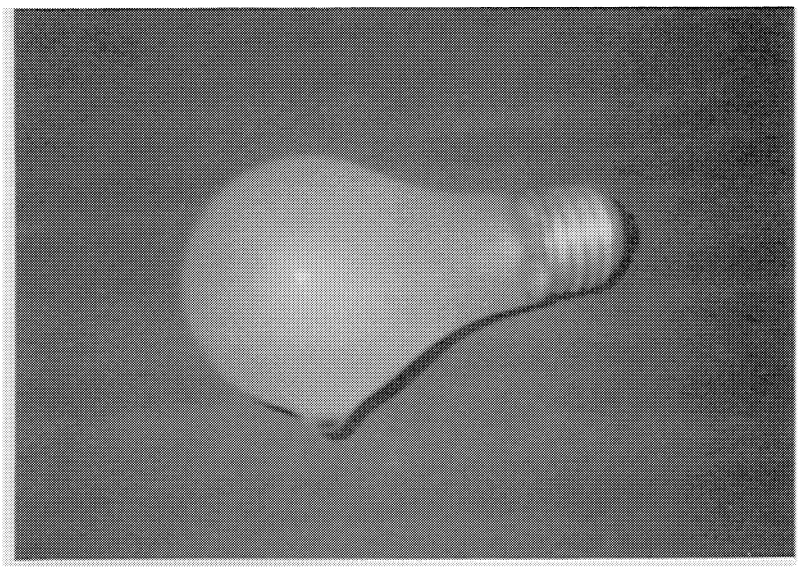

Figure 4. The light bulb will often swell, pucker and point to the area of greatest heat.

not uncommon for it to burn to the ground. There are the decorations, tables and chairs, and a greasy kitchen all of which add fuel to the fire. The common causes of this kind of fire are kitchen equipment being left on or a customer's cigarette left burning. After making an investigation at the scene, the best way to reach a conclusion in this type of fire is to question the employees and owner. They can tell you what was left on in the kitchen and what types of repairs were made recently or were needed. If you can locate any of the customers who were in the building before the fire, they may have noticed a burning odor or a faulty electrical fixture or piece of equipment. In this type of fire, once you have ruled out arson, whatever conclusion the professional investigator arrives at, using the clues from the ruins and his other investigating, will be sufficient to make a satisfactory report. There are many fires the causes of which have never been determined. Even the most experienced investigator can be stymied, but will still make an intelligent report.

Another common type of fire in a home or restaurant is the kitchen fire which seems to have started on an overhanging shelf or cupboard. You may feel sure the cook left a cigarette on the shelf when he went home and that it started the fire, only to find after questioning him that he does not smoke. Even if he did smoke, a cigarette left burning on a shelf would more than likely go out before starting a fire, unless the shelf

was covered with paper or some other easy-burning material. A better approach would be to examine the equipment under the shelf or cupboard and determine what may have been left on by examining the position of the switches and jets. This equipment will not necessarily have any appearance of having been near the fire since it is made to produce heat and after being left on all night would become hot enough to start a fire many inches above it. We can also examine the possibility of towels or clothes being strung across the kitchen to dry and left to dangle over cooking equipment. This could start a fire in one corner of the kitchen which may do the most damage in another corner. A fire in a bedroom, where the mattress was burned, is almost always attributed to a person falling asleep with a cigarette in his hand, but the authors know for a fact that a bed lamp or a lamp in which the bulb can come in contact with the bedding is a fairly common cause of bed fires. This need not be a lamp with faulty wiring but merely one in which the heat from the bulb was in close proximity with the bedding. While we do not discount the cigarette as a cause of fire, it is not to be overrated.

Explosions

Often a fire will be accompanied by one or more large or small explosions or an explosion will be accompanied by fire. It is important that we determine whether the fire was a result of the explosion or the explosion was caused by the fire. If an explosion preceded a fire, besides the broken windows, overturned furniture and an indefinite path of the fire, the flash may have started fire in other sections of the room or building, depending on the size and type of explosion. Curtains and other flammables may be burning in many parts of the building and no definite path of complete burning can be determined from any one location. On the other hand, some explosions can blow out a fire that was already burning and caused the explosion. In this case, you will have a charred path of the fire leading to the area where the explosion was. Sometime after a fire is in progress there will be a sudden combustion caused by a window breaking or some other ventilation or draft being created and this will give the appearance of an explosion. This is the reason fire fighters do not stand in front of a door or window before opening it to enter and extinguish the fire.

When an investigator arrives at the scene of a fire and learns there has been an explosion, he should consider what type of building is involved