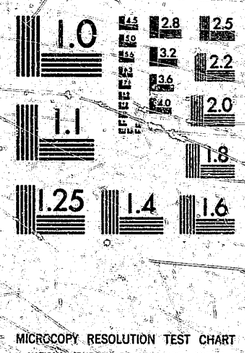

SELECTED BIBLIOGRAPHY

Arson

Our most recent crime data indicate that arson is increasing at a rate exceeding all other serious crimes. This bibliography is one of several LEAA efforts to focus attention on the nature, causes, and controls of arson.

Paul Cascarano, *Assistant Director*
National Institute of Law Enforcement
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ARSON

A Selected Bibliography

compiled by

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National Criminal Justice Reference Service

January 1979

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INTRODUCTION

Arson--the willful and malicious burning of property--has increased dramatically in recent years. In fact, data published for the years 1965-1975 indicate that incendiary building fires increased by 325 percent during that decade.* Increased losses and two television documentaries aired in 1978 have contributed to the growing public awareness of this crime and its impact on society.

There are several factors that make combating arson more difficult than other crimes. First, an investigation must be conducted to establish the fact that a crime has been committed. Furthermore, arson cases, characterized by the usual lack of witnesses and devastation of the crime scene, are difficult to prove legally. The motives for arson are varied--revenge, spite, jealousy, intimidation, crime concealment, psychopathy, profit--and the most rapidly growing cause as well as the most difficult to prove legally is arson-for-profit.

The cost of arson--$1.4 billion in 1975*--is borne primarily by insurance companies, but the public shoulders the cost indirectly through increased fire fighting, court, insurance, and health care costs, and through reduced tax bases and unemployment. Growing public concern about these costs and the indeterminable costs of dislocation and disruption have precipitated the creation of special arson forces at all levels of government.

The community organization formed by Boston residents (see entry no. 32) is a prime example of how an aroused citizenry can contribute to curbing an obvious crime problem. When residents of the Fenway and Symphony Road area realized that their neighborhood had experienced an inordinate number of suspicious fires, they formed the Symphony Tenants Organizing Project (STOP) to halt the threat to their lives and property. Intensive investigations by Project STOP demonstrated the need for a special task force of the Massachusetts Attorney General's Office. This group, partially funded by LEAA, achieved phenomenal results: a grand jury secretly returned 121 indictments against 33 people with charges ranging from arson to fraud to murder. Those indicted, including the chief investigator of the Boston office of the State fire marshal, were thought to be members of a $5 million organized arson ring. To date, 23 of those indicted have been convicted, and

*Survey and Assessment of Arson and Arson Investigation, entry no. 29.

preliminary figures indicate that fires of suspicious origin in the area have decreased by 35 percent.

At the Federal level, a variety of actions are being taken to combat arson. The U.S. Fire Administration and various agencies of the Department of Justice are participating in a task force to determine the most effective arson countermeasures. The U.S. Fire Administration also maintains a clearinghouse of information about arson. The Department of Justice and the Bureau of Alcohol, Tobacco, and Firearms have successfully cooperated in prosecuting arson cases under Federal laws concerning illegal use of explosives. Arson itself is not a Federal crime, but some arson cases have also been prosecuted in Federal courts under statutes directed against racketeering. At both State and Federal levels there are efforts to enact stricter laws regarding insurance claims and to improve interagency cooperation. Other proposals for action against arson include the creation of computerized arson investigation data systems to help identify repeaters, professional "torches," and arson rings; the provision of training for judges and prosecutors; and the establishment of cooperative programs with insurance companies.

One of the difficulties in taking remedial measures against arson stems from the dearth of national data. In 1978, however, Congress directed the FBI to add arson to the seven serious offenses reported in its Uniform Crime Reports Index, and it is anticipated that future legislation will provide for continuing collection of arson data at the national level. Such nationally aggregated data will make possible more effective analysis and prevention of arson and contribute to even greater public awareness of this crime.

This bibliography has been compiled to focus attention on the crime of arson and to provide law enforcement professionals with a resource that highlights the methods used to prevent and investigate arson. The citations are presented in three sections:

- Nature and Extent of the Problem. The impact of arson and studies of the characteristics and psychological profiles of arsonists.
- Proactive Measures and Controls. Examples of attempts to prevent and control arson through such strategies as special task forces, pattern analysis, and interagency cooperation.
- Reactive Measures and Controls. Studies of arson investigative procedures and fire scene analysis.

All of the documents cited have been selected from the data base of the National Criminal Justice Reference Service. Information about how to obtain these documents can be found on the following page.

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ACKNOWLEDGMENTS

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NATURE AND EXTENT OF THE PROBLEM

1. ARSON: A STATUS REPORT. Los Angeles, California, League of California Cities, 1977. 37 p. MICROFICHE (NCJ 46682)

A survey of the arson problem is presented in a report directed primarily at city officials in Los Angeles County, California. The report covers the nature of the crime of arson, the impact of arson on society, factors that have impeded efforts to reduce the incidence of arson, and the status of arson detection and investigation in California and Los Angeles County. The growing problem of arson is attributed to the following factors: ignorance about the impact of arson on the environmental and economic structure of communities; problems in combining police and fire resources to detect and investigate arson; complex arson laws and legal requirements for prosecution; and inability to apprehend arsonists. To improve arson investigation, particularly in Los Angeles County, recommendations are presented relative to the following: enlightenment of municipal lawmakers, public safety administrators, and the public with regard to the severity of the arson problem; development of alternative funding sources for antiarson programs; clarification of California arson statutes; increased attention to the arson problem on the part of the district attorney's office; improvement of coordination and transfer of arson information; establishment of an arson index reference system in Los Angeles County; and enhancement of cooperation between fire departments and insurance companies.

2. ARSON: SOME PROBLEMS AND SOLUTIONS. Boston, Massachusetts, National Fire Protection Association, 1976. 152 p. (NCJ 48459)

A compilation of articles published between 1970 and 1975 in Fire Journal, Fire Command, and Fire Technology is presented to aid fire, police, and investigative authorities fight this crime. Trends in arson between 1955 and 1974 and related costs are examined. Special investigative problems in arson cases are discussed, and investigative techniques for identifying the cause, duration, and intensity of fires are presented. Components of an arson evidence package are listed. The role of the intelligence unit in the investigation of arson, particularly that associated with organized crime, is discussed. The role of insurance companies in preventing and detecting arson fraud is explored, and tips for underwriters, claims adjusters, claims management, legal staff, and public relations staff which may help cut arson losses are suggested. Police and fire department coordination in investigative efforts is recommended. An eight-agency arson task force in Seattle, Washington, consisting of representatives from the fire department, police department, mayor's office, prosecutor's office, the public safety committee, the insurance industry, sheriff's office, and chamber of commerce is described. Psychological characteristics of arsonists, arson for profit or revenge, and revenge and the psychopathic and child firesetter are examined. The relationship between drug abuse and arson is considered. Ap-

plication of a pattern-recognition method in arson investigations is delineated. Fire prevention for small communities and a program for child firesetters are described. Also discussed are the hidden costs of employment loss involved in arson. In part 2, 23 major fires, all arson-related, in hotels, taverns, office buildings, businesses, and institutions are described. Many resulted in substantial loss of life. Cases are accompanied with descriptions of containment and rescue operations, photographs, and brief investigative analyses.

3. EARLAY, S. Firebugs and Their Fearless Victims. Top Security, v. 2, n. 6:195-197. October 1976. (NCJ 37792)

Although the number of arson cases in England grew from 34 in 1966 to 302 in 1976, the public refuses to protect itself against this crime. This article discusses types of arsonists, their motivations, and public apathy. People generally believe that arsonists are mentally unbalanced persons who set fires at random without provocation, but arsonists practice their skills and carefully choose their sites and methods. School children often burn down schools to destroy records, pass the time, or cover up petty offenses. Political dissenters increasingly use arson as a terrorist tactic. Many criminals start fires to disguise their original crime, usually burglary or murder. However, police and fire brigade investigators in England suspect that more and more criminals specialize in firesetting as a professional service. Arson has a high ratio of success since evidence often is thoroughly obliterated. These arson professionals set fires to obtain insurance money for themselves or for a contractor. They are acquainted with arson investigation techniques and will assess their chances of detection using certain methods on a specified site. If insurance companies would require clients to take reasonable precautions against fires (such as removal of dangerous, unnecessary flammables) and provide tighter plant and building security, criminals would find it more difficult to arrange insurance payoffs. Potential true victims of sabotage, vandalism, and arson attack would be better protected.

4. COOK, J. L. and E. H. COOK. Arson, for Insurance and Protest: A Bibliography, 1965-1977. Monticello, Illinois, Council of Planning Librarians, 1978. 12 p. (NCJ 45253)

Books and articles indicative of the scope of the crime of arson are cited. The bibliography encompasses written materials concerned with arson committed for insurance or as a protest. Many of the references address motivational, legal, and prevention-related aspects of arson. Approximately 170 listings are included. Publication dates range from 1965 through 1977.

5. HEATH, G. A., W. F. GAYTON, and V. A. HARDESTY. Childhood Firesetting. Canadian Psychiatric Association Journal, v. 21, n. 4:229-237. 1976. (NCJ 54150)

Focusing predominantly on literature since 1940, this paper reviews studies of the dynamics of childhood firesetting and identifies areas in need of further research. The review is divided into three parts: (1) an examination of the historical development of existing theories regarding childhood firesetting, (2) a review of the major articles concerned specifically with firesetting in children, and (3) an examination of papers of related interest. The review illustrates three assumptions which are best understood in a historical perspective. First, Freud's comments about an association between firesetting and enuresis have greatly influenced subsequent writing. Four major studies on childhood firesetting present data by which percentage figures for enuresis can be determined. The prevalence ranges from 9 to 46 percent, with an average for all four studies of 14 percent. A second assumption suggested by the review of the historical background concerns the relationship between firesetting in adolescence and decreased intellectual development. German and French writers have frequently concluded that firesetting is most prevalent in retarded, adolescent girls. However, this assumption is difficult to examine since several authors did not look at intellectual functioning, and at least one excluded mentally retarded children from the sample. A third assumption underlying much of the thinking on firesetting is its association with sexual problems. Early psychoanalysts saw firesetting as related to a regression from a genital to phallic-urethral mode of functioning. This early emphasis made sexual problems appear primary; but later analytic writings, although not denying the influence of sexual factors, have also emphasized the importance of an aggressive component in firesetting. A comprehensive epidemiological study is needed to provide data regarding the incidence and prevalence of childhood firesetting and to clarify its relationship to such demographic variables as sex, age, socioeconomic status, race, and family size. References are included.

6. HERSHBARGER, R. A. and R. K. MILLER. Impact of Economic Conditions on the Incidence of Arson. Journal of Risk and Insurance, v. 45, n. 2: 275-290. June 1978. (NCJ 57278)

The relationship between the movement of several economic indicators and arson losses are examined using the null hypothesis, 4 dependent variables, and 320 predictor variables for the years 1950-1975. The dependent variables related to fires of an incendiary origin are estimated loss by incendiary and suspicious fires, number of incendiary and suspicious fires, estimated loss by unknown causes of fires, and number of unknown causes of fires. The number of predictor variables in the data set was reduced first to 18 by discarding variables having a correlation coefficient of less than 0.6 with at least 1

dependent variable, then by applying principal components analysis to eliminate redundant variables. These variables were analyzed using the maximum R-square improvement technique found in stepwise procedures of the statistical analysis system (SAS) and consolidated in these subsets: (1) financial conditions of the insured, (2) labor costs of firm insured, (3) Federal Government surplus and deficit, and (4) other variables associated with the balance of payments, wholesale price index, and money supply. Models generated by the technique were used as input into the general linear model procedure of SAS to obtain the Durbin-Watson statistic for autocorrelation and plots of residuals. The study found a statistical relationship between arson losses and selected economic indicators. However, it is impossible to conclude that arson losses are directly related to economic recessions and depressions, as these economic phenomena never have been defined precisely. Some of the economic indicators traditionally associated with arson losses are less significant than a smaller set of variables. "Bankruptcy-Other" was the best single indicator. Implications for the insurance industry are that they should be aware of the insured's financial condition; use extensive methods to detect and avoid fraud during both the underwriting and the claims adjusting phases of the operation; and expand efforts to improve the reporting, investigating, and prosecuting of possible arson-caused fires. References and tabular data are provided.

7. ILLINOIS ADVISORY COMMITTEE ON ARSON PREVENTION. Torch's Reward: What Insurance Claims People Should Know About Arson. Bloomington, Illinois, undated. 22 p. MICROFICHE (NCJ 54514)

This booklet outlines what insurance adjusters should know about arson in terms of the how, when, where, what, and why of intentional incendiary incidents. In addition to discussing old and new attitudes about arson, insurer's interest in curbing arson, and the claim adjuster's general role, the material reviews the claim adjuster's interaction with local authorities in determining where and how a suspicious fire began, with attention to the point of origin, accidental causes, firesetting mechanisms, and protecting physical evidence. The motives for arson are examined with respect to noninsurance incentives and insurance fraud; the common signs of insurance fraud are considered, along with suggestions relating to arson investigation, libel and slander, bases for denying a claim, and direct versus circumstantial evidence. Tips on what to do if a claim goes to court and how to get more help are also briefly covered. Drawings are included.

8. ILLINOIS LAW ENFORCEMENT COMMISSION. Arson: A Report to the Illinois General Assembly. Chicago, 1978. 127 p. (NCJ 47792)

The extent of the arson problem in Illinois and methods of detection, investigation, and prevention are examined. In order to learn the dimensions of the arson problem, investigators interviewed police and fire officials, representatives from the insurance industry, prosecutors, State fire marshals, public adjustors, private arson investigators, crime lab technicians, medical examiners, and convicted arsonists. This report discusses the problem of arson in Chicago, throughout Illinois, and across the Nation. The lack of proper recordkeeping and incomplete statistics makes it difficult to measure the growth of the arson problem. The most prevalent forms of arson in Illinois are described: vandal-related arson and arson-for-profit schemes. The motives for committing arson are examined and a profile of a convicted arsonist is included. Investigators interviewed 18 convicted arsonists, and, although none could be considered prototype arsonists, the interviews provided much information on how a person hires an arsonist and the role of the middleman in an arson-for-profit scheme. A description is presented of the typical arson-for-profit. The report mainly analyzes the arson problem and the difficulty of getting an arrest and conviction. Jurisdictional questions, problems in gathering evidence, the lack of training for arson investigators, the role of insurance companies, the complex nature of arson-for-profit, problems in reporting and obtaining arson statistics, and board-up services and public adjusters are discussed. To develop a first-hand understanding of the difficulties inherent in an arson investigation, investigators checked out a suspicious residential fire in Chicago; their efforts are described in detail. The investigation demonstrated the cursory nature of the Chicago Police Department's bomb and arson unit investigation of the same incident. A catalog presents programs established to combat arson in the State. A number of professional organizations such as the State fire marshal's office and the State Department of Law Enforcement are involved in arson detection and prevention. Additionally, investigators traveled to Seattle, Washington, Houston, Texas, and New York City to learn how other major urban areas handle the arson problem; an arson unit comparison is provided. It is concluded that the arson problem requires a two-pronged attack: expanding prevention efforts and upgrading arson detection. Appended materials include information on dollar loss resulting from arson, Seattle's arson training program, and highlights of Houston's arson training project.

9. KARCHNER, C. L. Arson and the Mob: Special Report. Firehouse, p. 22-27, 68-69. August 1977. (NCJ 43011)

Arson-for-insurance is a lucrative crime that is often difficult to prove. This article traces the involvement of the Mafia in arson-

for-hire, and details the law enforcement crackdowns on these activities. Organized crime groups have entered the arson-for-hire market by offering such activities (package deals), starting with the fire and ending with complete arrangements for the insurance settlement. Often a Mafia member or associate serves as the broker for the fire. The article mentions several organized crime figures involved in the arson-for-hire business, and describes several arson cases known to be part of the Mafia's arson-fraud activities. Finally, efforts of the Federal organized crime forces to investigate and halt these activities are detailed.

10. LEVIN, B. Psychological Characteristics of Firesetters. Fire Journal, v. 70, n. 2:36-40. March 1976. MICROFICHE (NCJ 53889)

The psychological characteristics of firesetters are examined in a review of past literature on arson. Arsonists may be classified into three major groups: (1) arson-for-profit firesetters; (2) solitary firesetters; and (3) group firesetters. Very little is known about those involved in arson for profit. It is argued that both the businessman who sets fire to his own business to collect insurance and the paid arsonist are engaging in rational acts. There are many types of solitary firesetters. There is the solitary firesetter who burns out of revenge or spite, and there is the pyromaniac who derives sensual satisfaction from his act. There is also the individual who wants to be a hero and sets fires in order to help put them out. Finally, there is the psychotic. Group firesettings are classified into three categories: (1) political fires, (2) vandalism fires, and (3) riot fires. Most arsonists are viewed as psychopaths possessing three major characteristics: (1) they often appear normal and lead reasonably normal lives; (2) they appear to lack feelings of concern for others; and (3) they often do not respond to punishment. The personal backgrounds of arsonists frequently include the following: (1) they often come from broken or disruptive homes, and have lived under harsh or frustrating conditions; (2) they have committed other crimes. Low intelligence and lack of achievement often are associated with an arsonist personality. Sexual and social inadequacies and childhood enuresis also are correlated with firesetting. More current information on arsonists is needed because most literature is based on studies conducted 25 years ago. Footnotes are included throughout the text.

11. MADISON, A. Arson. Danbury, Connecticut, Franklin Watts, Inc., 1978. 85 p. (NCJ 56761)

Characteristics and motivations of arsonists (e.g., teenage firesetters, pyromaniacs, professional arsonists) are discussed, as well as methods of starting fires and aspects of arson investigations. The

text begins with a review of several famous historical cases of arson, including the Reichstag fire during Hitler's regime in Germany and the 1976 fire in a New York City Puerto Rican social club which caused the deaths of 25 people. The major motives for arson are outlined. They include financial gain (probably behind 40 percent of deliberately set fires); indirect financial gain (a third party, rather than the structure's owner, profits from the destruction by eliminating a competitor's business, obtaining a contract to build a new structure, or selling a new insurance policy); revenge for a quarrel, intimidation (threatening arson to frighten others into an agreement); concealment of another crime; for fun; and a psychological need to set fires (pyromania). Arson rings, groups of two or more persons engaged in arson for profit, are loosely connected groups that set fires for clients who usually are personally unknown to them. A strong correlation exists between pyromaniacs and drug or alcohol use, an unhappy home life, unemployment, or an unsatisfactory sex life. Pyromaniacs usually stay to watch their fires and are often identified in fire scene photographs. Teenage firesetters burn to relieve boredom and have fun. The typical tools of arsonists are devised mechanisms such as candles set in combustible materials, chemicals such as white phosphorus and thermite, and various types of explosives such as mercury fulminate, nitroglycerin, and gunpowder. To detect the source of the fire, firefighters should be alert to the smell and color of the flame and smoke, drawn shades or covered windows, and evidence such as equipment left at the scene. All stages of the fire and spectators at the scene should be photographed. Investigators probing fire debris should determine where the fire started, check fire protection systems, and pay particular attention to charred areas. An index and photographs are provided.

12. McDONALD, J. M. Bombers and Firesetters. Springfield, Illinois, Charles C. Thomas, 1977. 252 p. (NCJ 56628)

A comprehensive review of bombing and arson crimes, this book explores subjects such as bombs and their effects, arsonists and bombers and their motives, victims and targets of these crimes, and bomb threats and disposal. Similarities occur in arson and bombing incidents: they often are motivated by anger, hatred, revenge, envy, political beliefs, jealousy, or desire for financial gain or recognition; they are likely to be committed by compulsive offenders who return to the scene to watch the effects of their work; and they are difficult to investigate since evidence is usually destroyed. This volume deals with bombing and arson in turn, beginning with discussions of bomb types, incendiary materials, triggering methods, bomb manufacture, transportation and placement of bombs, and bombs' effects. The psychology of various types of bombers is explored

next, including the compulsive bomber who bombs out of need for excitement, the psychotic bomber who feels persecuted or paranoic, and the sociopathic bomber who is legally sane but lacks moral judgment and guilt feelings. Special attention is given the urban guerrilla and the bombing campaigns in Northern Ireland, and a psychiatric study of an airplane bomber is presented. The material in these chapters is derived in part from bombers' personal accounts of their crimes and focuses on their motivation. Typical victims and targets and their friends and relatives, who may or may not be accidental victims, government and law enforcement officials who are involved in bomb disposal functions, and citizens who find suspicious explosive devices are covered. General information is presented on bomb disposal, instructing lay readers on what to do if a bomb is discovered and what procedures professional bomb disposal units use to approach, handle, and dispose of a bomb and react to a bomb threat. The arson section covers similar subjects: arsonists' tools, types of firesetters, firesetting motivations, and arson victims. The case history of a psychopathic firesetter is presented. The final sections deal with criminal investigations of arson and bombings, and discuss evidence at the crime scene, evidence interpretation, and arson and bombing convictions. Security measures being taken in several locations, particularly Northern Ireland, to prevent bombings are covered. An index and references are provided.

13. MIKSIC, T. L. Arson: A Dilemma for the Criminal Justice System. Master's Dissertation, Huntsville, Texas, Sam Houston State University, 1978. 114 p. MICROFICHE (NCJ 51854)

Reasons why arson investigation is a problem for police agencies, current thinking about arson investigation, and case studies from three Texas communities are discussed, and arson statistics are reviewed. This study is based on interviews conducted with the fire marshals of Houston, Beaumont, and Huntsville, Texas, and surveys of arson statistics for both the State of Texas and the United States. The first section of the report examines the differences in perception concerning arson, the problem of role definition existing between fire and police departments, and the inadequacy of arson statistics. The study found that the smaller the city, the less arson is viewed as a significant problem. There appears to be no professional consensus concerning the organization of arson bureaus. The study also found that the criminal justice system, in general, has neglected the crime of arson. The study recommends that written guidelines be established to insure cooperation among various agencies involved in arson investigation, the gathering and reporting of arson statistics be improved; and State fire marshals play a more active role in the criminal justice system. It is suggested also that Federal funds be devoted to arson investigation. The study data are presented in tabular form. Descriptions are provided of the organization of arson investigation and reporting for the State of Texas,

training required for arson investigators, and the state of arson investigation in each of the three cities. Appendixes contain the questions asked during the fire marshal inteviews and summarize offenses investigated by the arson investigators for the Beaumont Police Department. A bibliography is included.

14. MILLIKEN, J. Up in Smoke. Law Enforcement Communications, v. 6, n. 1: 12-15. February 1979. (NCJ 54924)

The spread of arson in America is examined, with attention to the various types of arsonists, their motivations, and the efforts of selected cities across the Nation to combat the problem. Most fire investigators have come to recognize three categories of arsonists: (1) the pathological firesetter, (2) the general arsonist (including those who set fires for profit or revenge), and (3) the juvenile firesetter. Arsonists set fires for many reasons: to realize a profit, to further a cause or realize a goal, to conceal another crime, or simply because of a mental illness. Studies have shown that the major motivation is profit although in some locales, New York for example, revenge has been estimated as the motivation for at least 50 percent of some 8,000 cases the city fire department has processed. Although arson has been on the increase in most major cities, Boston, Massachusetts, has evidenced a decline, partly due to the widely publicized trials of 33 members of an organized arson ring. Seattle, Washington, also has reported a modest decline as the result of an intense effort by insurance organizations and public safety agencies to help each other and to seek community help. The first step in Seattle's fight against arson involved the establishment of an arson unit, under the jurisdiction of the fire department. The Washington Insurance Council subsequently sponsored a $20,000 mass media campaign promoting the use of the arson unit's hotline. To further encourage witnesses to come forward, the council established a $5,000 reward fund and supplied signs to be posted at arson sites. The signs inform the public that the fire was caused by arson and mention the name of a contact at the fire department as well as the existence of the reward fund. Photos are included.

15. MORETZ, W. J. JR. Psychology's Understanding of Arson: What Do We Know and What Do We Need To Know? Fire Arson Investigator, v. 28, n. 1: 45-52. 1977. (NCJ 50698)

Psychological research concerning the motivation of arsonists is reviewed, along with key issues for consideration by behavioral science researchers. An examination of existing research literature underscores three types of approaches to the arson problem. The "armchair deductive approach" allows researchers to begin with a particular psychological theory and deduce the arsonist's personality

structure and motivation from the standpoint of a specific theory. The "case-study/personal experience" approach enables authorities to draw conclusions based on a limited number of case studies or their own experience as fire protection professionals. Although both approaches suffer from the dangers of selective perception and sampling bias, criticism of such research is tempered by the realities of the social situation regarding arson: well-designed, programmatic research takes money and such research funds are in short supply. A third type of study, apparently more promising, involves some systematic effort to gather psychological data from large samples of appropriately-selected subjects through the use of validated psychological instruments. Two studies conforming to these more rigid research criteria have found a tendency among arsonists toward property crimes and such shared characteristics as previous offense records, poor school conduct, and poor family backgrounds. Future research must address the following issues: (1) a foundational taxonomy, that is, a more precise means of classifying arsonists; (2) longitudinal analysis of the demographics of arsonists; (3) systematic attention to the psychology of the arsonist; (4) effective treatment modalities; (5) research regarding public attitudes toward arson, arsonists, and the enforcement of arson laws; and (6) forensic participation by clinicians (i.e., psychiatrists, psychologists, and social workers). References are provided.

16. RIOPELLE, P. J. Wisconsin: The Growing Problem of Arson; Special Report. Madison, Wisconsin Council on Criminal Justice, 1978. 17 p. MICROFICHE (NCJ 54715)

The incidence of arson in the United States is examined, and the need for more adequate police and firefighter training to investigate the criminal nature of arson is stressed. Although there has been a dramatic increase in the number of arson incidents, arson is still one of the most neglected crimes in the country. This may be due to the difficulty associated with determining whether arson is a police problem or the responsibility of fire departments. In 1975, the estimated loss from arson was $1.4 billion, more than any offense on the Federal Bureau of Investigation Index of Serious Crimes; the 1976 figure was close to $2 billion. The estimated loss for 1975 included $1.3 billion lost in incendiary building fires, $80 million in incendiary motor vehicle fires, and $60 million in incendiary wild fires (forest and watershed areas). In addition to property losses, there were 1,000 deaths that included 45 firefighters and 10,000 injuries, and over the decade ending in 1975, incendiary building fires increased by 25 percent. Fire losses were incurred by schools and colleges, churches, storage facilities, offices and banks, restaurants, hotels, retail stores, apartment buildings, hospitals, nursing homes, industrial facilities, mobile homes, and family dwellings. Of persons arrested for arson in 1975, 59 percent were under 18 years of age, 90 percent were male, and 80 percent were white. A summary

of the arson problem in Wisconsin is presented. Factors contributing to the problem of arson are identified, including the shortage of trained investigators, the lack of witnesses, investigative difficulties due to destruction caused by fire and its extinguishment, confusion about responsibilities of the police and firefighters, and difficulties in prosecuting arson cases. Attachments contain information on arson-related penalties and the extent of arson in Wisconsin. Supporting data are provided.

17. SAPSFORD, R. J., C. BANKS, and D. D. SMITH. Arsonists in Prison. Medicine, Science, and the Law, v. 18, n. 4:247-254. October 1978. (NCJ 52186)

Variables relating to sentence length, sentence type, and reconviction are studied in a sample of 23 arsonists sentenced to life and two samples of arsonists serving determinate sentences. This British study was conducted in two parts. The first part compared the characteristics of the life-termers with a sample of 96 arsonists sentenced to 18 months or more who came up for parole review between April 1973 and April 1974. The second part studied 139 arsonists given similar determinant sentences and released from prison during the years 1970-1972, plus 8 arsonists who were sentenced to 5 years or more and were discharged in 1973. Five factors were found to enter into a multiple regression equation predicting type of sentence (fixed term or life): psychopathy, sexual abnormality, value of damage caused by the arson offense, history of arson, and perhaps history of crime in general. Only psychopathy and sexual abnormality were validated in the analysis of the larger second group. It was found that the men serving life sentences or long-term sentences (5 years or more) had many characteristics in common but that neither group resembled the short term men. None of the five identified factors proved predictive of either sentence length or recidivism. The best single predictor of future conviction was the number of previous convictions, a common finding in crime studies. The finding that diagnoses of sexual abnormality and psychopathy are more common among lifers than among men serving long determinate sentences may indicate that lifers are more dangerous. However, fixed-term releasees who exhibit these characteristics are not more likely to be rearrested than other releasees. Tables present study data. References are provided.

18. SOOTHILL, K. L. and P. J. POPE. Arson: A Twenty-Year Cohort Study. Medicine, Science, and the Law, v. 13, n. 2:127-138. April 1973. (NCJ 10515)

The 20-year followup studied 82 individuals who were brought before the higher courts of England and Wales in 1951 charged with arson

to determine the rate of recidivism. Of the 67 people convicted of arson, only 3 were reconvicted for the same crime by the end of 1971. Thirty-two were not subsequently reconvicted for a standard-list offense by the end of 1971. The study emphasized that the vast majority of those convicted of arson are not reconvicted for the same offense.

19. STEVENSON, C. Arson-To-Order in the Building Trades. Reader's Digest, v. 108:85-90. March 1976. (NCJ 46411)

Investigation of over 40 cases of arson involving buildings under construction in Colorado is reported. Work by the Colorado Bureau of Investigation (CBI) has linked these cases to retaliation by trade unions. Although local contractors, police, and fire officials suspected the Colorado arson epidemic between 1968 and 1974 was a punitive action by the building trade unions because of open shop practices, no proof was forthcoming. The Labor Department failed to take any action, and the Federal Bureau of Investigation gave up on the case. In 1971, the CBI began its investigative effort. Interviews with builders discerned a pattern of crime. Union representatives would ask builders to sign a closed shop contract; refusal to sign was followed by a fire just as the building was almost completed. A chief organizer of the Northern Colorado Building and Construction Trades Council told the Lynch Construction Company that nonunion jobs had been known to burn on the same day that 18 new Lynch apartments were set on fire. The first break in the CBI investigation came when a union member implicated the organizer and other union leaders in one of the arson incidents. Although 14 union people were ordered to appear before a grand jury for questioning, no arrests were made, and a new outbreak of arson began. CBI agents spent night after night investigating construction project fires throughout the State. False phone tips increased the workload. Arson damages in 1972 totaled $2.1 million and more than $2.7 million in 1973. High reward offers had failed to produce any information. A new approach was tried which involved compiling comprehensive profiles of all union members under investigation. One member was picked as a target, and contact was established with the target by a CBI agent masquerading as a Mafia member. To lure the organizer, the agent offered money through the targeted union member for arson jobs directed against the establishments of supposed gambling debtors. To prove the worth of prospective arson, the union member gave the CBI agent a tour of construction sites fired under the organizer. Using recordings of conversations with the union contact, indictments were handed down by the grand jury, and both the organizer and the contact were found guilty of arson and conspiracy to commit arson. Using the same technique, the man in charge of setting the fires was identified and eventually convicted of illegal possession of explosives. More investigation and further convictions are still needed. It is concluded that it is time for the Department of Justice and other Federal law enforcement agencies to continue these investigations.

20. TOPP, D. O. Fire as a Symbol and as a Weapon of Death. Medicine, Science, and the Law, v. 13, n. 2:79-86. April 1973. (NCJ 10514)

A historical overview of the religious significance of fire is presented with a discussion of its use today as a form of mob violence, personal or perverted vengeance, or protest. Included are recent events involving fire in English penal institutions. From statistics on arson and suicide by fire, the author concludes that the symbolistic regard and use of fire are largely reserved by certain delinquents as an aggressive weapon to be directed against others rather than against themselves. The callousness of premeditated suicide by fire appears to remain the prerogative of those idealistic detached personalities, or those with mental disease, involving some separation of feeling from consciousness.

21. U.S. COMPTROLLER GENERAL. General Accounting Office. Are Federal Programs Adequate To Deal With Arson Problems? Washington, 1978. 15 p. MICROFICHE (NCJ 48818)

This General Accounting Office report examines the need for research and development of arson detection techniques, arson investigator and prosecutor training, and funding for arson prevention programs. Arson is defined as the act of burning property for an improper purpose. It is difficult to prove arson because evidence is usually destroyed in the fire and normally there are no witnesses. Motives for committing arson include jealousy, spite, or a desire to profit, conceal crime, vandalize, get revenge, or intimidate. Pyromaniacs often commit acts of arson. The National Fire Prevention and Control Administration, created by the Federal Fire Prevention and Control Act of 1974, has emerged as the Federal focal point for funding arson intervention programs in States and local communities. The administrator's role is to reduce arson through education, training, research, public information, and data collection and analysis. Although there are no Federal programs specifically directed at funding State and local arson investigators and prosecutors, the LEAA grants to State and local governments include funds for arson-related activities. As part of the overall training of its agents, the Bureau of Alcohol, Tobacco, and Firearms covers fire bombing methods, bomb scene searches and investigations, and the recognition of incendiary devices. The Fire Research Center has studied psychological motivations of arsonists. It is recommended that the following be developed within the Federal Bureau of Investigation: Federal research and training programs on arson detection techniques and equipment, arson investigator and prosecutor training courses, and plans

for arson detection. Appendixes contain additional information on research needs relevant to the prevention of arson and on Federal grants and programs pertaining to arson detection and prevention.

22. U.S. CONGRESS. Senate Permanent Subcommittee on Investigations. Role of the Insurance Industry in Dealing With Arson-for-Profit: Staff Study. Permanent Senate Subcommittee on Investigation, 96th Congress, 1st Session, February 1979. Washington, 1979. 26 p.
MICROFICHE (NCJ 55071)

Results of a Senate Investigation Subcommittee survey on how insurance companies deal with arson-for-profit are presented, together with testimony of company representatives and subcommittee recommendations. Questionnaires were sent to insurance companies to find out their policies in areas such as underwriting, claims investigation, claims adjustor training, statistical recordkeeping, investigation and prosecution of suspicious claims, and their perceptions of organized crime involvement in arson-for-profit. Cumulating the data from survey responses and company representative testimony, the subcommittee discovered that most companies do not inspect buildings prior to coverage to assess their value, do rely on their agents in accepting or refusing risks, do not formally train their claims adjustors, and do not keep comprehensive records on numbers of structures lost to fire and the value of such structures. Companies report that overinsuring plays a large role in the arson-for-profit schemes, that most arsonists participate in all facets of the crimes including insurance money collection, and that organized crime is increasingly involved in arson-for-profit. Companies are reluctant to investigate or report suspicious claims to legal authorities because fair practice regulations require prompt payment and privacy laws restrict free exchange of information with authorities. Also, most companies lack sufficient information to investigate or report claims. The subcommittee recommends that companies require routine risk reviews of structures prior to coverage, formally train adjustors, develop in-house investigative expertise, examine current policy on claims challenge, and develop recordkeeping systems and share information on suspected arson.

23. U.S. DEPARTMENT OF AGRICULTURE. Forest Service. Youthful Firesetters: An Exploratory Study in Personality and Background. By E. Y. Siegelman and W. S. Folkman. Washington, 1971. 6 p.
MICROFICHE (NCJ 54899)

This study examined personality traits and backgrounds of young first offense firesetters and young, multiple firesetters to determine if the two groups were distinguishable. These broad hypotheses were posed for the study: (1) children identified as multiple firesetters are characterized by a group of associated problems including excessive activity, aggression, psychosomatic difficulties, learning problems, behavior problems, and family difficulties; and (2) the core problem in firesetting is the way in which rage is handled. For this California study, 30 children identified as multiple firesetters, 22 children identified as single firesetters, and 27 normal children were given a thematic apperception test, a personality questionnaire, and asked to complete a medical history form. Mothers of the subjects were contacted to gather further data on the subjects' personalities and family relationships and information on incidence of firesetting. Data were analyzed according to categories of subjects determined by firesetting behavior. Results indicate that the hypotheses are substantiated. Problem firesetting behavior is associated with a variety of other behavioral problems and occurs in a disturbed family setting. Among the most conspicuous factors related to multiple firesettings are those having to do with family characteristics and the child's relationship to family members. Problems associated with low family income, low educational attainment by parents, large family size, and marital discord were particularly associated with the multiple firesetter group. Firesetting may have different meanings for different types of children: it may be a means of revenge, attempt to gain attention, or a plea for adult authority to help deal with feelings. Single firesetters are potential multiple firesetters and should be identified and given counseling.

24. U.S. DEPARTMENT OF COMMERCE. National Bureau of Standards. Center for Fire Research. Psychology of Firesetting: A Review and Appraisal. By R. G. Vreeland and M. B. Waller. Washington, 1978. 58 p.
MICROFICHE (NCJ 54670)

This literature review (1952-1978) concerning the psychology of firesetting, discusses classifications of firesetters, organic factors, intervention strategies, and behavioral issues. Despite a large and diverse body of literature on firesetting, relatively little is understood about determinants of firesetting behavior and intervention strategy. Legal difficulties in accessing samples of arsonists, the manner of legal disposition of arson cases, and the fact that relatively few arsonists are apprehended makes it likely that research samples will be narrow and biased. Levin's 1976 classification of firesetters--arson-for-profit, solitary firesetters, and group firesetters--is used to examine research on arsonist types with the additional categories of female arsonists and youthful arsonists. Current knowledge about the characteristics of firesetters is then investigated under these headings: antecedent environmental conditions, organismic variables (firesetting and sexual problems, enuresis and firesetting; firesetting and associated patterns of deviance, genetic, physiological, and physical abnormalities, and intellectual and academic performance of firesetters), actual firesetting behavior,

and the consequences of firesetting. Psychoanalytic explanations of firesetting dominate the literature, but these explanations lack empirical support. Firesetting, associated antisocial behaviors, sexual, marital, and occupational maladjustment, and alcoholism can all be considered parallel indicators of lack of self-control, confidence, and social skills, and available data appear to support the picture of the typical adult firesetter as a person lacking control and social skills. References are provided.

25. U.S. DEPARTMENT OF COMMERCE. National Fire Prevention and Control Administration. Arson: A National Perspective. By D. A. Lucht. Washington, 1978. 32 p. MICROFICHE (NCJ 54873)

After a review of arson statistics, this report (delivered before the annual meeting of the Society of Chartered Property and Casualty Underwriters, Washington, D.C., September 27-28, 1978) discusses the criminal justice system, legal, and community changes which could help control and prevent arson. Annually, arson causes hundreds of millions of dollars loss in private property, 500 to 1,000 deaths, and 10,000 to 15,000 injuries. Several suggestions for checking the rapid increase in arson incidence are presented, some of which would require Federal investments, and some of which would require public agency and private sector funds and activity. Uniform crime reporting data on arson could be expanded to include comprehensive regional information. Arson investigation methods and tools could be improved and investigators trained in investigative methods. Insurance company regulations and housing and banking policies should be be reexamined and altered to remove the possibility for economic gain from arson. Model arson laws and antifraud legislation should be developed to deter arsonists, and the general public should be educated about the significance of arson and the motives of arsonists. If the community programs for arson prevention in cities such as Seattle, Washington, and Boston, Massachusetts, were documented, other cities might transfer the models to their communities. Charts describing arson rates and characteristics are provided.

26. U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT. Dimensions of Juvenile Arson and False Fire Alarms for the Urban Areas of San Diego. R. F. Vernon, Proj. Dir. Washington, 1972. 64 p. (NCJ 54430)
Stock No. PB-214-910

To determine trends in and characteristics of juvenile arson and false fire alarm offenses, data on 200 cases of juvenile fire offenses in San Diego, California, were collected and analyzed. The main thrust of the analysis is to describe selected aspects of juvenile arson such as similarities and differences between false alarms and fire offenses. The problems involved the location of the offenses

and characteristics of the offenders. The analysis results indicate that false alarm offenses are generally committed by white, male juveniles, that juvenile arson is not limited to any one socioeconomic group or ethnic category; that most fire offenses occur during the time when school is in session and at times when children have little supervision; and that a large percentage of the offenses occur on school grounds. There are two basic types of young arsonists: young children who play or experiment with fire, and other youths, usually in their early teens, who become involved in fire offenses while reacting to crises in the family, frustration in school, or other complicated factors. The older youths often have previous police contacts or behavior problems in school. Most fire offenses are fairly minor, usually involving play with matches and fireworks and trash burning. A four-part program for fire prevention education is proposed. Tabular data are provided.

27. U.S. DEPARTMENT OF JUSTICE. Law Enforcement Assistance Administration. National Institute of Law Enforcement and Criminal Justice. Arson Control: A Review of the State-of-the-Art With Emphasis on Research Topics. By S. J. Tauber. Washington, 1978. 156 p. MICROFICHE (NCJ 56056)

This NILECJ state-of-the-art report identifies important topics in arson research, discusses statistics and research models, and examines arson detection technology. The report data were gathered in a survey of local representatives active in antiarson work and from a review of literature. Research is divided into five groups: (1) institutional factors, covering organization of the arson control establishment and resources applied, training of professional personnel, and the impact of the insurance industry; (2) law and law enforcement, including laws, arson in the criminal justice system, and evidence availability in arson cases; (3) psychology and sociology, regarding the psychology of firesetters, the elicitation of active public cooperation, and the effects of microsocieties and microcultures on firesetting behavior; (4) statistics and models, covering the reliability of arson incidence statistics, analysis of arson-related patterns, and the use of economic models; and (5) technology, entailing arson laboratory requirements, laboratory techniques, packaging of evidence, use and performance of equipment at fire sites, data handbooks, and making structures more resistant to arson. It is recommended that arson research be done in comparatively small, well-bounded projects on tractable topics. Within larger areas of importance research must be specific to arson, since studies of crime in general are not relevant. Other recommendations include suggestions that NILECJ conduct research to determine the extent of the correlation between the mode by which arson investigation and prosecution are organized and the effectiveness of arson control activities, conduct a study to determine the magnitude of the effect of property inspections by insurance companies prior to issuing in-

surance on arson, and support the development of an arsonist arrest profile system and its testing in several jurisdictions. Additional recommendations, references, and a list of agencies and personnel active in arson investigation and prosecution are provided.

28. _____. Law Enforcement Assistance Administration. National Institute of Law Enforcement and Criminal Justice. Arson, Vandalism, and Violence: Law Enforcement Problems Affecting Fire Departments. By K. D. Moll. Washington, U.S. Government Printing Office, 1972. 190 p. MICROFICHE (NCJ 11547)
Stock No. 2700-00251

The study is based on a comprehensive statistical data base of metropolitan fire department problems related to violence. The data covering the period 1968 through 1971 were gathered through questionnaires, field visits, and a review of relevant literature. The six major areas of violence covered are building fires attributed to arson and suspected arson, false alarms, acts of physical violence against fire departments during riots and civil disorders, isolated acts of harassment directed against fire department personnel, equipment and facilities, and bomb threats and bomb incidents. The intention of the study was not to suggest general changes in the criminal justice system, but rather to find specific need for changes in local, State, or Federal government programs dealing with problems of violence affecting fire departments. Therefore, the study dealt specifically with each of the areas of violent behavior, attempting to identify the major contributions to the problem, extent of the problem, and possible avenues for alleviation of the effects of violent behavior on fire departments. Except for arson, violence is not presently an unmanageable burden to fire departments. Although fire departments have been relatively successful in adapting their internal operations to violence problems, it is emphasized that greater interservice cooperation with the police is needed. Government officials who oversee both police and fire functions are urged to promote this cooperation.

29. _____. Law Enforcement Assistance Administration. National Institute of Law Enforcement and Criminal Justice. Survey and Assessment of Arson and Arson Investigation: Equipment Systems Improvement Program. By J. F. Boudreau et al. Washington, U.S. Government Printing Office, 1976. 151 p. MICROFICHE (NCJ 39113)
Stock No. 027-000-00600-1

This 1976 report contains the results of a study of arson and of current methods and needs for improvement in arson investigation. Currently available arson statistics and studies of the characteristics of arsonists are presented, and their limitations are noted. Numerous tables illustrating this statistical information are integrated in the text. In order to obtain this information, a questionnaire survey was conducted using a selected group of leading arson investigators with the purpose of identifying needs in arson investigation. Another component of the study was a statistical analysis of data on arson, arson arrests, and arson convictions from 108 cities over a 4-year period. A review of the capabilities and needed improvements in the technical methods of arson investigation is presented. A number of recommendations for the reduction of arson and the improvement of arson investigation also are included. It was concluded that improvement in the arson investigation field should include increasing the number and the training of arson investigators, developing more effective equipment for their use, and improving cooperation with insurance companies. Also necessary to the improvement are establishing an automated data system for arson investigation and escalating scientific research on arson investigative methods. A bibliography of relevant material is included in the document.

30. _____. Law Enforcement Assistance Administration. National Institute of Law Enforcement and Criminal Justice. Survey of Arson and Prison Response Capabilities in Selected Jurisdictions. By S. H. Webster and K. E. Mathews, Jr. Washington, 1979. 46 p. MICROFICHE (NCJ 55792)

A survey of all fire departments in cities with populations of 50,000 or more collected data on arson incidence, the disposition of arson cases, the number of arson unit personnel, and support system uses. Of 435 questionnaires sent to fire chiefs, 174 were completed and returned. The survey, commissioned by LEAA's National Institute of Law Enforcement and Criminal Justice, covered four aspects of arson-related activity: the nature of the problem and magnitude of effort applied in jurisdictions, descriptions of the administration, personnel resources, equipment, program operations, training, and prevention techniques; use of support systems such as data processing programs, task forces, the legal environment, and outside investigative resources; and recommendations regarding future legislation and funding priorities. The responses indicate that many cities, particularly those with high arson rates, have implemented task forces to coordinate city resources against arson, that cities with declining populations have more building and arson fires, and that arson fires per capita have almost doubled between 1971 and 1977. The survey also reveals that motives for arson fires are vandalism (42 percent), revenge (23 percent), pyromania (14 percent), monetary profit (14 percent), and crime cover (7 percent). According to the response data, 18.5 percent of fires classified as incendiary were cleared by arrest, fire departments assign only one staff member to their arson unit for every $2.5 million in the budget, and 58 percent of all cities that have instituted arson task forces are pleased with the result. Fire chiefs suggested that arson be made a Part I Uni-

form Crime Reports Index crime, that the model arson code be revised and strengthened, and that insurance law or practice be restructured to make companies more responsible in writing policies, settling, sharing information, and setting the maximum value of insurance. Other survey findings, tabular data, and the questionnaire are provided.

MEASURES AND CONTROLS

PROACTIVE

31. ARSON: HOW TO DEFEND AGAINST THE MOST DESTRUCTIVE SCHOOL CRIME. School Security, v. 1, n. 4:1-8. December 1976. (NCJ 51426)

Guidelines for guarding against arson and minimizing fire damages are presented in a newsletter for educators and administrators concerned with school security problems. Arson is the most expensive of crimes inflicted on school systems, with the cost of school fires amounting to over $100 million annually. Arson strikes in all school districts, from the inner city to rural areas. Although arson causes great monetary loss, the loss from disruption to education may be even greater. Little is known about why vandals set fire to schools. A survey by the National Fire Protection Association (NFPA) revealed the following facts: 76 percent of school fires are caused by arson; the most popular place for starting a fire is the classroom, followed by storage rooms and offices; and the prime time for starting school fires is between 10 p.m. and 6 a.m. The NFPA's recommendations for guarding against school fires include keeping unauthorized persons out of the building, making certain that fire detection and sprinkler systems are working, immediately repairing or replacing faulty electrical wiring and equipment, properly maintaining all gas-burning equipment and appliances and gas piping, using good housekeeping practices, and informing the fire department of any special problems firefighters will face in the event of a fire. School officials should also be mindful of structural characteristics that contribute to the spread of fires. Protection against arson should incorporate both efforts to guard against intrusion and installation of fire protection equipment. Specific structural conditions relevant to fire safety are cited, with special attention to the problem of fire safety in school libraries. Two case studies of school fires are recounted. The newsletter also touches on school security trends, the use of two-way radios to avert school bus hijackings, and school security products.

32. ARSON PUZZLE: CAN THE PIECES BE PUT TOGETHER? Record, v. 55, n. 2: 3-9, March-April 1978. (NCJ 48660)

The arson situation on Boston's Symphony Road is examined with attention to what some government and private agencies did and how their struggle illuminates the arson problem in the United States. Between 1973 and 1976 the greater portion of the dated, low-income apartment buildings on Symphony Road burned down; officially, the fires were written off to smoking or other occupant-initiated accidents. However, the residents of Symphony Road knew or strongly

suspected that arson was the root cause of the continuing devastation, and they banded together to form the Symphony Tenants Organizing Project (STOP). This was in the fall of 1976, after a fire claimed the life of a 5-year-old and Symphony Road's 14th building. In the following months, STOP pursued its own vigorous investigation of the suspect fires, concentrating on the incident involving 37-41-43 Symphony Road. This building had been stable for over 35 years, but in the 3 years prior to the fire, it had changed hands seven times. Mortgages had increased from $220,000 to $545,000, while the actual worth of the building decreased and the cashflow dropped to zero. Then there were three fires in 2 weeks. STOP was able to convince the attorney general that arson was an integral part of a chain of decisions made in an effort to maintain the financial viability of the property. The indictment of a number of landlords and a city fire marshal resulted from STOP's concern. However, these indictments should be viewed as only a single battle in a continuing, stubborn war because arson is, in reality, the last step in a chain of both social and financial events. For many landlords faced with rising costs, deteriorating property, and dwindling rents, arson becomes the sole recourse in avoiding bankruptcy. Nationwide, it has been estimated that 40 percent of the deliberately set fires are economically motivated, and many of those affected by the arson problem believe that governments do not regard arson as a serious crime. Arson has yet to be included in the or Part I categories of the Federal Bureau of Investigation's Uniform Crime Index. However, both regionally and nationally, insurance underwriters and State and local governments are mobilizing to combat the arson problem. More comprehensive investigator training and the development of a computerized register of loss claims are seen as key factors in the war on arson. The register would alert both investigators and underwriters to recurring elements in often scattered patterns of fire loss. Photos are provided.

33. BATTELLE COLUMBUS LABORATORIES. Proposal To Design, Develop, and Implement the Arson Information Center for Professional Exchange, Education, Training, Public Awareness. Columbus, Ohio, 1976. 28 p. MICROFICHE (NCJ 53917)

An arson information center is proposed to meet Ohio's need for information collection and dissemination to professional law enforcement personnel and firefighters, volunteer firefighters, and the public. This study was instigated when the Ohio Fair Plan Underwriting Association commissioned a comprehensive survey of present activities relating to arson. Informal interviews with concerned professionals in the field were conducted to evaluate current needs in assessing arson. In a survey of fire department officials, it was found that only 2.2 percent of the departments had arson investigation units and only 2.5 percent had mandatory training for arson investigators. It also was found that there was a need for

quick responses to arson-related questions. Furthermore, volunteer fire departments, which make up about 92 pecent of all fire departments in the United States, have their own particular needs. Training and information must be made available to both the professional investigator and to personnel who must recognize the possibility of arson in order to initiate an investigation. An arson information center is proposed. This center should have the following objectives: (1) information collection, organization, and dissemination; (2) enhancing public awareness and understanding; (3) assisting professionals in developing specific training programs; (4) identifying gaps in the knowledge of arson; (5) answering specific questions from participating organizations; and (6) identifying trends in cases of arson. Sponsors are expected to benefit from the center through better identification of arson, leading to fewer insurance claims; better response to criminal arson; improved information resources for public understanding of programs; development of better training programs for all categories of personnel; and better trend identification, leading to better identification of arson cases. To implement this program, it is recommended that a minimum of 13 sponsoring organizations at $20,000 each be involved. Figures are included. No tables or bibliography are provided.

34. BORG, N. and L. DAVID. Arson: A Multidimensional Problem. Boston, Massachusetts, Society of Fire Protection Engineers, 1976. 8 p. (NCJ 45851)

Arson as a public policy issue is discussed, with reference to New York City's strike force response to the arson problem. Arson is the fastest growing and one of the most costly crimes in the United States. It is necessary to differentiate between profit-motivated arson and non-profit-motivated arson. Nonprofit motivations include vandalism, revenge, pyromania, and attempts to camouflage other crimes. Profit motivations include insurance payouts, relocation benefits, robbery, welfare benefits, rent decontrol, extortion, rehabilitation and urban renewal grants, and tax writeoffs. Profit-motivated firesetters include landlords, tenants, land speculators, members of organized crime, drug addicts, and even insurance adjusters. A great deal of profit-motivated arson can be controlled by removing the motive. Insurance companies should be more selective in writing policies and should resist payment of fire losses more frequently. Another essential aspect of arson reduction is neighborhood preservation. Vacant buildings must be demolished or sealed. Arson is a symptom of such social phenomena as poverty, a deteriorating housing situation, a poor investment climate, and an antiquated welfare system. Legal constraints on public policy alternatives must be altered to favor law-abiding tenants, landlords, and businessmen, not profit-oriented arsonists. This report originally was presented at the annual seminar of the New York Chapter

of the Society of Fire Protection Engineers, April 29, 1976, United Engineering Center, New York City.

35. BURTON, L. W. Model School Security System Cuts Crime. Security World, v. 12, n. 6:12-13, 40-41. June 1975. (NCJ 26267)

A description is given of the planning, method, and security equipment use for the pilot Alexandria, Virginia, school antiarson, burglary, and vandalism system. This school security demonstration project, begun in 1973, utilizes an audio intrusion detection system which uses the existing intercom system, closed-circuit television, direct telephone company "hot lines" to the police, and a neighborhood school trouble-reporting telephone.

36. CITIZENS LEAGUE OF MINNEAPOLIS. We Make It Too Easy for the Arsonist: A Proposal for Reducing the Incentives To Commit Arson Through Better Prevention, Detection, Investigation, and Insurance Practices; Citizens League Report. Minneapolis, Minnesota, Citizens League, 1978. 37 p. (NCJ 48153)

The Citizens League of Minneapolis, Minnesota, discusses the extent and nature of the State's arson problem and offers recommendations for combating arson. The report presents findings, conclusions, and recommendations with regard to the nature of arson in Minnesota, arson prevention, arson detection, criminal investigation of arson, prosecution of arson, insuring property, and reimbursing losses. Inadequacies in the system for reporting fires and arson are noted. To provide accurate and detailed information on arson, it is recommended that individual be required to report fires to fire departments before receiving insurance claims, that fire departments report all arson incidents to local law enforcement agencies for reporting to the State, that the State's Bureau of Criminal Apprehension develop a mechanism for identifying and recording motives for arson incidents, and that a sampling method be developed for gathering indepth information on the arson problem in metropolitan areas. The report also finds that resources to reduce arson have not been put to optimum use. Detection of arson has been limited by the noninvolvement of firefighters in the determination of the cause of the fire. Responsibility for investigating arson is not clearly allocated. Steps for reducing the likelihood that arson will go unprosecuted are suggested. Ways in which insurance practices create incentives to commit arson are pointed out, and suggestions for cutting back on exploitation of the insurance system by arsonists are offered. Supporting data are included.

37. EPSTEIN, S. LEAA and Arson Control. International Fire Chief, v. 45, n. 2:16-18. February 1979. (NCJ 54606)

LEAA-sponsored arson prevention and control programs and research are reviewed to illustrate the agency's efforts to make arson a priority. Research issues important to arson control are listed. In 1978, LEAA appropriated $1.3 million for arson-related project block grants, and funneled the largest part of this amount into training law enforcement and firefighting agencies in arson investigation techniques. In 1978, LEAA awarded substantial grants to four community organizations in the Bronx, New York, Chicago, Illinois, South Bend, Indiana, and Lowell, Massachusetts, to tailor programs to their arson problems. Chicago's neighborhood project participants formed arson control task forces that launch block watch programs, hold fire prevention workshops, and assist arson witnesses; the Bronx program assigns residents to special arson control tasks, including street watch projects and weekend hotlines; South Bend residents coordinate police, firefighters, and the insurance industry; and Lowell's citywide program participants' plan is to organize and educate tenants about arson. At the same time, the National Institute of Law Enforcement and Criminal Justice began examining arson research possibilities and identified 20 priorities. These include projects to determine causes and forms of arson, to examine laws and policies of insurance companies, privacy requirements, etc., that influence arson control, and to assess the costs and benefits of various antiarson efforts.

38. ICOVE, D. J. and H. J. CRISMAN. Application of Pattern Recognition in Arson Investigation. Fire Technology, v. 11, n. 1:35-41. February 1975. (NCJ 54192)

A discussion is presented regarding application of pattern recognition methods to the development of techniques that aid the arson investigator in determining trends in incendiary and suspicious fires. In an effort to provide comprehensive engineering analysis of these investigations, a set of algorithmic computer programs has been developed using pattern recognition methods. The emergence of the Fire Engineering Data Analysis Program (FEDAP) paralleled the implementation in Prince Georges County, Maryland, of the Modular Information Reporting System (MIRS). Designed by the National Bureau of Standards, MIRS is intended to become a nationwide standard for the computerized encoding of emergency incidents. Successful implementation of a supervised Arson Pattern Recognition (APR) system for the prediction and prevention of incendiary crimes requires a set of valid decision rules. Using labeled pattern samples of known arson trends, highly reliable decision rules can be derived. Each pattern sample consists of an individual arson-related fire numerically encoded by MIRS and defined by FEDAP as a partitioned row matrix. A seven-dimension pattern space describes the fire in terms

of the date of the incident, the location, type of fire, act or omission, the time the alarm was received, the day of the week, and the number of alarms. By so coding individual fires within a jurisdiction, computer batching or clustering is possible for fires sharing selected features. Feature selection is an acceptable technique for reducing the dimensionality of the pattern space arson data. The county uses a map consisting of 185 major map grids, each containing an additional 24 grids. Using feature selection, cluster classification, and the FEDAP algorithms, 11 adjacent major map grids have been identified as containing 37 percent of the 361 total arson-related fires. Using location and time data, the county has used the system to solve a series of arson incidents perpetrated by juvenile gangs in which the times of the multiple fires corresponded repeatedly to breaks in the school day. References and graphic data are included.

39. INTERNATIONAL SOCIETY OF FIRE SERVICE INSTRUCTORS. Recommendations on the Relationship Between the National Fire Prevention and Control Administration and the State-Level Fire Community: Final Report of a Working Seminar. Dover, Delaware, 1977. 128 p.
MICROFICHE (NCJ 56882)

The final report of a working seminar discusses cooperation between State agencies and the National Fire Prevention and Control Administration (NFPCA). The seminar was conducted by NFPCA and the International Society of Fire Service Instructors. The report begins with a description of the objectives and organization of the Society and its State Directors of Fire Service Training Section. State instructors and directors share an employee-employer relationship as they work with municipal, college, industrial, and Federal instructors for delivery of fire service training and education programs within a State. State-level training programs are conducted in all but two States and consist of seminars, courses, and other projects for advising and instructing in the area of fire service. The working seminar allowed representatives of the State Directors Fire Service Training Section and NFPCA to exchange ideas on fire training and education issues. The participants drew up a series of recommendations that include suggestions for developing single fire focus groups within States in order to end the fragmentation which hampers fire training and education programs and arranging a meeting between State fire marshals and State training directors to open lines of communication. The seminar report suggests that the National Fire Administration recognize the State focus group as the key fire-related group within a State, the instructors for the National Fire Academy be fully qualified both in their subject areas and instructional techniques, and that NFPCA provide financial and technical assistance to the States. States in turn should submit complete and accurate data on all fire incidents to NFPCA and conduct comprehensive needs assessments to serve as guides to administrative planning. Further recommendations are presented. Appendixes furnish workshop materials, professional qualifications for accreditation of State agencies, and legislation on fire training programs from several States.

40. KARCHMER, C. L. Fight Against Arson: What the Government Is Doing. Firehouse, v. 2, n. 10:57, 61, 68, 72. October 1977. (NCJ 43514)

In spite of the fragmentation of Federal arson-fighting funds and authority, a few pioneering efforts show what can be done to fight the increasing number of fires set for profit. Arson rates have increased from roughly 40,000 reported cases in 1966 to an estimated 150,000 in 1976. The problem has grown so fast that State and local resources are unable to respond effectively. In addition, there is an increase in professional arsonists who travel interstate. To date, Federal enforcement has been ineffective because the Commerce Department, through the National Fire Prevention and Control Administration, has the authority to fight arson but commands a budget of only $12 million, whereas LEAA has the money to fight crime, including arson for fraudulent purposes, but not the authority. To date, United States Postal Service investigators have been the most effective, fighting cases in which the mail is used to transmit insurance claims. Since only the fraud involved in the insurance claim and not the suspicious nature of the fire itself must be proved, these cases have been prosecuted with some success. The Alcohol, Tobacco, and Firearms Administration has jurisdiction over incendiary and explosive devices used to destroy or damage property involved in interstate commerce. Unfortunately, this agency has so many demands on its resources it cannot respond to more than a few arson cases. The strongest weapon is a provision of the 1970 Organized Crime Control Act prohibiting the conduct of a business in a racketeering manner. This subsection, called the Racketeer Infiltrated and Corrupt Organizations (RICO) Act, has already been used to prosecute a Mafia-arson organization, a father-son landlord-arson team, and a host of arson-fraud professionals. A provision of this law allows for civil suit with triple damages when someone is injured by a pattern of racketeering activity. The city of Milwaukee is suing a father-son arson team for civil damages arising from the high costs of extinguishing incendiary fires. Special arson task forces, combining several agencies, both federal and local, are needed to strategically attack the problem. Federal officials could also help cities develop RICO suits to recover civil damages. A summary of Federal arson-related cases in major cities for 1971-77 is appended.

41. _____. How To Fight the Arson Racketeer. Journal of Insurance, p. 22-25. March-April 1978. (NCJ 50538)

The orientation of many law enforcement agencies toward prosecuting individual arsonists whose acts were motivated by anger ignores the increasing number of conspiratorial arsons-for-profit. An examination of the motives behind the arsons which cause over $2 billion in annual losses indicates that the largest and costliest fires are linked to insurance fraud schemes. Professional criminals, the arson racketeers, serve as supervisors of arranged arsons which are interconnected with crimes of real estate fraud and larceny. The typical scheme involves the establishment of concealed ownership of business and the systematic looting of the business, with the evidence of the larceny concealed by a fire. The total destruction of the property by a highly skilled group of criminal technicians also conceals the fraudulent nature of subsequent insurance claims which may themselves be supported by the testimony of corrupt public officials. The complexity of these crimes may explain, but not justify, the rarity of their prosecution. Where organized crime units have concentrated on arson fraud investigations, the arrest and conviction rate has been impressive. Such units ought to contain personnel qualified in investigative accounting who can trace the intricate financial transactions which form an arson fraud. Laws such as the Federal Racketeer Infiltrated and Corrupt Organizations Law ought to be used more frequently against arson-for-hire rings. The civil provision of the Federal statute requires a less stringent degree of proof than does the criminal provision, allowing victims of arson to recover damages from arsonists who may not have been convicted of their crimes. Several States have patterned their own legal remedies after the Federal statute providing individual victims, as well as insurance companies and municipalities, with possible means of recovering damages.

42. NEPOTE, J. Police and Insurance Companies in the Light of New Forms of Crimes. International Criminal Police Review, n. 301:206-215. October 1976. (NCJ 38934)

The kinds of offenses that have an impact on the insurance world, trends in those kinds of offenses, and the losses, the cause, and police efforts to prevent such offenses are discussed. Ways in which insurance companies can help reduce or prevent certain theft offenses, burglaries, accidents, various types of insurance fraud (including arson) are highlighted. It is suggested that the addition of certain preventive clauses and conditions in insurance contracts can affect the number target offenses as well as aid police investigations.

43. SUCHY, J. T. Arson: America's Malignant Crime; Final Report. Columbus, Ohio, Battelle Columbus Laboratories, 1976. 40 p. MICROFICHE (NCJ 43698)

Recommendations for a coordinated attack on arson are presented in a report on the proceedings of seminars sponsored in January and February 1976 by the National Fire Academy. The seminars brought together 36 representatives of fire and police agencies, insurance companies, and other concerned groups to define specific actions required to alleviate the arson problem in the United States. The seminar includes a brief overview of the crime of arson and separate discussions of each of the major areas of need identified by seminar participants. Needs and recommendations are set forth with regard to the following: (1) defining the responsibilities of those concerned with the arson problem; (2) reclassifying arson in crime reporting systems to reflect the true seriousness of the crime; (3) making the public aware of arson, the consequences of arson, and the need for action; (4) developing job-related training programs on arson for investigators and other personnel; (5) improving reporting, data collection, and data analysis procedures; (6) promulgating effective, uniform laws and regulations, particularly with regard to insurance; (7) finding adequate sources of funding to combat arson at all levels; (8) conducting research on tools for arson investigation and on social and behavioral causes of arson; and (9) establishing a uniform arson terminology. Appended materials include information on organizations mentioned in the report, excerpts from an Ohio senate bill intended to facilitate State use of insurance company data, and a list of seminar participants.

44. TARGET: ARSON. Journal of American Insurance, v. 53, n. 4:12-15. Winter 1977-78. (NCJ 54263)

Three proposals for tightening controls on arson are discussed: designating arson a Uniform Crime Reports Part I crime, establishing a penal code for arsonists, and permitting exchange of arson-related information. Statistics show that 36 percent of fires occurring annually are arson-related and that the cost of arson in 1975 was close to $1.2 billion. Arson incidence has jumped tenfold since the 1950's. The Glen amendment (Senate bill 1882) proposes moving arson from a Part II to a Part I Uniform Crime Reports crime so that it can be accurately analyzed on a nationwide basis. A group of national insurance organization representatives has developed a model arson penal code providing sanctions for acts that endanger both life and property, or cause damage to real and personal property by fire or explosion, conspiracy to cause a fire or explosion, making false reports concerning the placement of incendiary explosive devices, failure to report or control a dangerous fire, and other acts. Another group of insurance company representatives has structured a model reporting immunity law which would allow insurance

companies, arson investigators, and prosecutors to exchange information on arson freely. It stipulates that investigative authorities must be informed of fires with suspicious origins.

45. U.S. DEPARTMENT OF COMMERCE. National Bureau of Standards. Attacking the Fire Problem: A Plan for Action, 1976 Edition. F. B. Clarke and D. W. Raisher, Eds. Washington, U.S. Government Printing Office, 1976. 41 p. MICROFICHE (NCJ 54867)
Stock No. C13-10-416-1976E

This document lists current activities of the National Bureau of Standards Center for Fire Research directed at arson prevention and bibliographies of technical arson-related publications. The center consists of a fire science department, including a hazard analysis information program, chemistry program, toxicology of combustion products program, and physics and dynamics program, and a fire safety engineering department encompassing a fire prevention products program, fire control-furnishing program, fire control-construction program, fire detection and control systems program, and a design concepts program. Sample center activities include the following: experimental measuring of thermodynamic quantities associated with the pyrolysis and stepwise combustion of polymers; quantitatively determining the major components in combustion samples using gas chromatographic, infrared spectrosopic, and wet chemical techniques; studying the ability of corridor sprinklers to suppress fires in adjacent rooms; developing flammability test methods for use in creating standards for upholstered furniture; assessing the rate of heat release and total energy from small ignition sources; and testing all aspects of design usage, capabilities, and cost optimization of automatic sprinkler installations in low hazard occupancies such as hospital rooms, schools, or offices.

46. U.S. DEPARTMENT OF COMMERCE. National Fire Prevention and Control Administration. Fire Education Planning. Washington, U.S. Government Printing Office, 1977. 31 p.
MICROFICHE (NCJ 54613)
Stock No. 003-000-00544-5

This guide on developing fire education programs for the elderly, adults, and children offers ideas on approaches, activities, discussion material, and bibliographies to use with various groups. The pamphlet begins with a discussion of special problems of the elderly regarding fire safety. Elderly persons often live alone in substandard fire-hazardous conditions, and are not always as alert as younger people. (Most senior adults are involved in fires between 7 a.m. and 10 a.m. which may be due to grogginess when they wake up.) The elderly should be encouraged to use flame-retardant clothing, abstain from smoking early in the day, and learn and practice fire escape routes. Fire safety information should be distributed through local churches, social clubs, and public assistance offices. Adults are responsible for creating fire safe environments for themselves and their families. Educators should tell them the facts about fire hazards, appeal to their basic concerns according to the areas in which they live (e.g. rural areas--the dangers of brush fires), and be specific about hazards and appropriate behavior. Older children should be taught to identify firesetters (most firesetters are in this age group), recognize the hazards and consequences of setting fires, and learn appropriate attitudes towards firesetting. Fire safety education for younger children should take a developmental approach, emphasizing the different fire hazards particularly dangerous to children at different stages of growth. Workshop activities and discussion topics are provided for use in day care and nursery schools, kindergarten, and elementary and high schools.

47. U.S. DEPARTMENT OF JUSTICE. Law Enforcement Assistance Administration. Crimes Against Business: Preliminary Recommendations for Demonstration, Research, and Related Programs Designed To Reduce and Control Nonviolent Crimes Against Business. I. Elber, Ed. Washington, 1977. 170 p. MICROFICHE (NCJ 44919)

Businesses fail to utilize the criminal justice system, and persons in the system do not understand the magnitude of the problem. Measures to bring the two groups together and study this type of crime are suggested. Because management is reluctant to resort to prosecution when faced with nonviolent crimes such as embezzlement, insurance fraud by arson, computer crimes, employee pilfering, and shoplifting by juveniles, there are few reliable sources of data and little expertise available concerning the problem. Demonstration projects are suggested for the following: (1) training programs for commercial management; (2) establishing economic crime units; (3) training the units; (4) establishing an arson task force; (5) training the task force; (6) judicial education on economic crime; and (7) demotivation strategies, concentrating on programs concerning young people and the crimes of shoplifting and vandalism. These programs are part of three mutually supportive strategies: defense, deterrence, and demotivation. Proposals include objectives, site selection guidelines, and project organization. Since there is a lack of objective data concerning the magnitude of nonviolent crime against business, a number of research projects are recommended. They include an econometric study of the social costs of this type of crime; a program of speculation by computer experts on how computers may be used in crime, and how such a use may be deterred; research focusing on relevant laws and sentencing procedures; exploration of the proposed development of separate courts for crimes such as shoplifting; determining predictors of insurance fraud; improvement of cooperative efforts between business and the criminal

justice system, and between business and other business; and identifying management techniques that help deter employee theft. Two other recommendations are designed to increase the information available about this type of crime and disseminate it to the public, business community, and the criminal justice system: the development of a national data base (which would involve the solution of many of the data collection problems noted above and include much of the suggested research) and the establishment of an economic crime institute to disseminate information, initiate research projects in such areas as asset protection and criminal statistics, execute many of the other recommendations, and develop the public information and education packages suggested by the task force. Appendixes to the recommendations describe the terms of the LEAA grant, the process of planning to meet the grant objectives, a list of members of the Crimes Against Business Council, a summary of the indepth interviews conducted with a variety of specialists in economic crime, the concept papers concerning the demonstration projects, and a summary of American Management Association workshops for the projects.

48. U.S. DEPARTMENT OF JUSTICE. Law Enforcement Assistance Administration. National Institute of Law Enforcement and Criminal Justice. Social Response to Incendiary Fire: Equipment Systems Improvement Program. By S. Rottenberg. Washington, 1976. 55 p.
MICROFICHE (NCJ 36564)

This paper discusses the economic principles for designing a rational response by society to the occurrence of fires that are deliberately and maliciously set. The policy strategies discussed include nonspecific responses that apply to all fires, whether incendiary or accidental, and specific responses intended to confront incendiarism per se. The specific responses would diminish the rate of firesetting by making that activity more costly or less gainful for the firesetter. This can be done by employing more resources in detection and in the investigation of fires, and in the prosecution and punishment of firesetters. Firesetting also can be made costly for firesetters by cheapening the social cost of detecting that fires were deliberately set and the paper suggests, for this purpose, that fundamental research be undertaken into the physical and chemical properties of fire in the presence of petroleum distillate accelerants and into the miniaturization of low-cost and sturdy instruments of detection that would substitute for sensory perception. The paper also addresses the properties of the market for fire insurance and the behavior of insurance companies that make it difficult for insurance companies to reduce incentives for the setting of fires to collect fraudulent insurance payouts. It does suggest, however, some changes in insurance payout practices and in insurance contracts that might be feasible and might reduce insurance fraud firesetting.

REACTIVE

49. ALLETTO, W. C. Professional Approach to the Investigation of Fires and Explosions by the Fire Service. Chicago, undated. 53 p.
MICROFICHE (NCJ 17249)

This report discusses the needs and justifications for vesting complete authority and responsibility for arson and explosion investigations within the jurisdiction of the fire department. Following a legislative proposal for organizing the Chicago Fire Department Bureau of Investigation, the report gives reasons why the fire department is better equipped and educated to investigate fires and bombings. They include the following: (1) the police generally are disinterested in fires, (2) the fire department has great experience in dealing with fires and will notice clues that inexperienced investigators would overlook or disregard. The legal considerations of search and seizure laws and the exclusionary rule are presented as another reason for giving jurisdiction to the fire department in these matters. A list of training courses for fire investigators is also given.

50. ARSON INVESTIGATION: TRAINING KEY. Gaithersburg, Maryland, International Association of Chiefs of Police, 1971. 6 p. (NCJ 35970)

This training key provides guidelines for police officers in controlling and investigating arson. An important requirement for effective investigations is said to be close cooperation with the fire department. Techniques are suggested for recognizing telltale signs indicating arson, and arsonists methods are described. Procedures for collecting and preserving evidence are outlined.

51. AUTO ARSON DETECTION: TRAINING KEY. Gaithersburg, Maryland, International Association of Chiefs of Police, 1974. 6 p. (NCJ 36405)

This training key discusses the steps an officer can take to determine the probability of automobile arson when conducting an initial evaluation at the scene. The paper discusses motives, proper conduct of a salvage examination, and proper fire scene search techniques. A discussion guide and supplemental reading suggestions follow the text.

52. BARRACATO, J. and P. MICHELMORE. Arson. New York, W. W. Norton, 1976. 239 p. (NCJ 55169)

The deputy chief fire marshal of the New York Fire Department's Division of Fire Investigation recounts his experiences, case by case, in fighting arson in New York City. Since 1967, this fire marshal has solved a record number of cases with his unique method of tracking down arsonists. Recognized as one of the Nation's top arson investigators, he tells about the life of a fire marshal: the long, irregular working hours, the dangerous situations, the frustration, and the infrequent rewards of the profession. The narrative focuses on the arson-prone areas of the city, Brownsville, the East Side, Bedford-Stuyvesant, Staten Island, and the Bronx, and traces his development from a marshal trainee fresh from the routine of a city firefighter to a skilled supervisor and trainer of the city's fire marshals. Emphasizing the law enforcement aspects of arson investigation (he carries and uses a gun), the author provides an episodic and anecdotal view of the fire marshal as a savvy street cop pursuing, with little or no recourse to the forensic aspects of fire investigation, the contemporary arsonist: the juvenile firesetter, the vengeful lover, the pyromaniac, and the businessman bent on insurance fraud. No statistics or references are included.

53. BATES, E. B. Elements of Fire and Arson Investigation. Santa Cruz, California, Davis Publishing Company, 1975. 171 p. (NCJ 32995)

A systematic method is presented for gaining basic knowledge about the nature and point of origin of a fire, developing evidence, incendiary devices, interview techniques, motives, and court testimony. Other topics include the utilization of the polygraph in criminal investigation, and the history and law of arson and the administration of justice. Two sample quizzes are included.

54. BATTLE, B. P. and P. B. WESTON. Arson-Detection and Investigation. New York, Arco Publishing Co., 1978. 319 p. (NCJ 56601)

Developed from law enforcement and insurance case files, this investigator's handbook outlines various types of arson and examines the statutory, crime detection, and evidence-gathering aspects of fire investigation. Characterizing arson as a neglected crime and charting its growth during the last decade, the text focuses on the legal and forensic aspects of arson law enforcement. Areas covered include common law arson and statewide codes; direct and circumstantial evidence, opinion evidence, the exclusionary rule, and the admissibility of electronic surveillance evidence; overt arson, firesetting mechanisms, motive, and intent; insurance fires; hate fires including those arising from racial, religious, or landlord-tenant

antagonisms; hate bombings; pyromaniacs including juvenile and mentally ill firesetters; and arson to facilitate such crimes as murder, burglary, and destruction of records. Securing and inspecting the crime scene, interviewing and interrogating witnesses and suspects, pursuing a continuing investigation, and detecting and breaking organized arson rings are also covered. Twelve case studies are also provided, dealing with killer fires, sufficiency of evidence, aggravated arson, search and seizure, expert arsonists, motive, motive and opportunity, pre-Miranda confessions, problems of unfocused investigations, suspicious fires, corpus delicti and identity, and determining the prime suspect. A glossary, references, selected bibliography, and index are included.

55. BEARD, P. Fire Investigators' Role. In Eckert, W. G., Ed., Investigation of Arson, Crime Scenes, and Vehicular Problems. Wichita, Kansas, Wichita State University, 1976. 4 p. (NCJ 44524)

Procedures used by fire investigators to determine whether a fire was of suspicious origin and whether victims died before or during the fire are described. The importance of leaving any bodies at the fire scene until investigators arrive is stressed. The fire investigator and pathologist can obtain important information from the position, condition, and location of the body. They must determine whether the victim was alive or dead before the beginning of the fire. First the fire investigator determines the source of the fire and its point of origin. To do so, he must have a knowledge of the physics of a fire, its development, and how it spreads. Sources such as spontaneous ignition, lightning, and human carelessness must be eliminated before he becomes suspicious of the fire's origins. It is easily determined if a child caused the fire from evidence left lying around; explosions are also obvious. In most cases investigators rely on the circumstantial evidence at the scene. It is recommended that an autopsy always be performed on fire victims, particularly if the fire's source is suspicious. The investigator should also take a complete set of photographs of the scene, have the body identified by the pathologist, and take great care to preserve the fire scene exactly as it was found. Common motives for arson are outlined, including pyromania, revenge, insurance fraud, intoxication, and covering up a crime.

56. CARROLL, J. R. Physical and Technical Aspects of Fire and Arson Investigation. Springfield, Illinois, Charles C. Thomas, 1979. 464 p. (NCJ 53972)

This textbook shows fire and arson investigators how to eliminate suspected fire causes in order to determine the true cause "beyond a reasonable doubt" as required for the conviction of arsonists.

Beginning with the basic determination of where the fire started to the final presentation of physical and opinion evidence in court, the text provides step-by-step details of all types of fire and explosion investigation procedures, with emphasis on recognizing, identifying, and preserving evidence. Chapter topics include requirements for a fire investigator, the physics of fire, the origin and cause of fires, incendiary fires, electrical fires, gas fires, explosions, appliance malfunction, motor vehicle fires, spontaneous ignition, miscellaneous fire causes, forensic photography, the types and use of evidence, the investigator as an expert witness, and reports and court appearance. Photographs, a sample report form, diagrams, tabular data, and graphs illustrate the text. An index is included.

57. CARTER, R. E. Arson Investigation. Beverly Hills, California, Glencoe Press, 1978. 286 p. (NCJ 51374)

Part of the Glencoe Press Fire Science Series, this guide to arson investigation is written for fire science students, firefighters and officers, inspectors, investigators, and insurance company personnel. After an overview of the contemporary arson problem, main topics such as motives for arson, the role of the fire department, and the chemistry of fire are discussed. These topics provide the background for the remainder of the study. Specific investigation techniques are discussed for determining the origin and cause of the fire, for conducting a fire-scene search, and for using technical aids such as the arson pattern recognition system and the combustible gas detector. Various types of investigation problems including electrical fires, rural fires, automobile fires, and explosions are examined. The juvenile firesetter is considered separately, with a commonsense approach used to study the juvenile arson problem. The investigator is guided in methods for conducting interviews, keeping notes and statements, and formulating reports. The importance of interrogation, and preparation for and procedures to use in interrogation, are considered. The final chapter contains information on presenting an arson case in court. Appendixes include a glossary of building construction and insurance terms. An index is provided.

58. CLODFELTER, R. W. and E. E. HUESKE. Products From Selected Burned Materials in Common Arson Accelerants. Journal of Forensic Sciences, v. 22, n. 1:116-118. January 1977. (NCJ 54440)

This study examines whether decomposition products from selected burned materials (e.g. carpet samples) could be confused with gasoline, diesel fuel, kerosene, or jet fuel, accelerants often used in arson. Samples of nylon, polypropylene olefin, polyester, acrylic, and modacrylic carpet, carpet padding, roof shingle and roof tar,

and asphalt floor tile were burned and steam distilled. Steam distillation products and samples of accelerants, gasoline, diesel fuel, kerosene, and jet fuel, were then injected into a gas chromatograph. Odor, specific gravity, color, and flammability of each distillate were determined. The chromatograms obtained from the various distillates and accelerants were compared, and the results of the comparison indicated that the distillate chromatograms were easily distinguishable from the accelerant chromatograms. Variations in color, odor, and specific gravity of the products were also noted. References and tabular data are provided.

59. CONNOR, J. A. Arson Investigation. Military Police Law Enforcement Journal, v. 1, n. 5:50-51. Winter quarter 1975. (NCJ 29382)

The importance of motive, aspects of interviewing witnesses, and locating evidence are examined. The most common reasons for arson are identified as fraud, revenge, concealment of crimes, mental aberrations, ruses, sabotage or civic disturbance, and extortion. The discussion of evidence collection centers on locating the point of origin of the fire and determining the methods that were used to spread combustion.

60. De HAAN, J. D. Laboratory Aspects of Arson: Accelerants, Devices, and Targets. Arson Analysis Newsletter, v. 2, n. 4:complete issue. August 1978. (NCJ 49273)

Laboratory case records and case file notes on 311 cases of suspected arson or arson-related crime were evaluated to provide controlled-environment information regarding the problems confronting forensic scientists. The procedure involved cases in which some type of flammable material was involved as evidence. Cases involving the examination of electrical components, appliances, or fixtures for mechanical or electrical failures were not included. Laboratory results pertaining to the presence or absence of an accelerant, the identity of the accelerant, and the nature of any devices involved were recorded and the referring law enforcement agencies were queried for data on the type of accelerant suspected; the type of device used; whether the arson attempt was successful; other physical evidence found; type of target--dwelling, business, or vehicle; location of set; and arrest and prosecution details. Information on a total of 147 case histories was returned. Types of targets selected for arson attacks varied from dwellings to Navy destroyers. There appeared to be little correlation between the target and the accelerant used. Gasoline appeared to be the universal choice, and was used equally on all classes of targets. More unusual accelerants were encountered in commercial, manufacturing, and home workshop scenes: lacquer thinners and enamel reducers in auto shop fires, dye solvents in

shoe stores, glues in schools and shops, copier toners in offices, and plastic resin in home workshops. It is concluded that: (1) gasoline is the most frequently encountered accelerant, (2) accelerants available at the scene frequently are used, (3) devices for time delay or ignition apear to be used very infrequently, (4) arrests and prosecutions for arson crimes are quite low, and (5) lab findings are apparently not crucial to the outcome of many cases. Tabular data are appended.

61. ECKERT, W. G., Ed. Investigation of Arson, Crime Scenes, and Vehicular Problems: The Proceedings of the Fifth Meeting of the Western Conference on Criminal and Civil Problems, May 19-20, 1976, Wichita, Kansas. Wichita State University, 1976. 98 p. (NCJ 44516)

Papers are presented concerning investigation of crime scenes, fires and arson, and vehicular problems. Articles in the crime scene investigation section of the volume deal with procedures and problems of the collection and processing of evidence and laboratory processing of evidence. Special problems encountered in the area of sex crimes are explored. The varying roles played by the toxicologist, pathologist, prosecutor, and defense attorney are each examined. The discussions of fires, arsons, and fire victims include roles of the fire investigator and the criminalist in the investigation of fires and arson; the anthropologist's methods of examining and identifying fire victims; and the forensic pathologist's investigation of fire victims. In the area of vehicular problems, topics considered include the following: field investigation of accidents, criminal aspects of vehicular problems, the role of the laboratory investigation, and the pathologist's investigation of vehicular fatalities.

62. FIRE AND ARSON PHOTOGRAPHY. Rochester, New York, Eastman Kodak Company, 1969. 12 p. (NCJ 31413)

Photographs and movies of fires can aid in determining causes and types of fire, as well as revealing the existence of arson evidence. Fire photography applications and photography techniques and equipment are discussed. Firefighting agencies depend on photographs as tools for training recruits and determining the effectiveness of firefighting techniques. Photographs also are useful to arson investigators for determining the speed of combustion and the manner and direction of fire spread, the type of material burning (indicated by the color and quantity of smoke and the color and size of flames), orientation of doors, rooms, and hallways within a burned building, and the area in which the fire or fires originated. Photographs record the progressive stages of burning from various angles and identify persons in the vicinity of the fire. A list of combustibles

and their corresponding smoke and flame colors is provided. All major fires should be photographed from the time of the firefighters' arrival at a fire scene to the time the fire is extinguished. Then photographs should be taken of the rubble, particularly of the areas that are most charred or burned. Photographers should look for and carefully photograph all types of incendiary devices, combustible materials, and evidence such as exposed business records and files, open doors and windows, and alterations in fire protection devices. Information is provided on getting a photography department started within a fire agency, selecting cameras and films, and maintaining photographic equipment. Techniques for photographing fires and fire scenes are discussed for simple nonadjustable cameras, adjustable cameras, and cameras with automatic flash-exposure control. Flash techniques for photographing interiors also are described.

63. FITCH, R. D. and E. A. PORTER. Accidental or Incendiary. Springfield, Illinois, Charles C. Thomas, 1974. 223 p. (NCJ 55257)

The police officer's role in investigating arson and accidental fires is discussed, with attention to various types of fires, arsonists, and approaches to typical and suspicious incendiary incidents. Although tips are provided on how to differentiate between accidental and nonaccidental fires, the narrative focuses primarily on pyromaniacs, arsonists, and the dynamics of arson investigation. Common types of firesetters are discussed (i.e., psychopaths, juveniles, females, attention seekers, and professional arsonists), along with their characteristic types of arson, including revenge fires, insurance fires, and fires set to obscure another crime. Investigatory approaches to selected fire sites--vacant buildings, motor vehicles, fields and woods, aircraft, ships, and small crafts--are discussed, as are safety precautions for the investigator, the principles of first aid for fire victims, the investigator's law enforcement function, and the role of post mortem examinations and scientific investigations, experiments, and illustrations. Investigating false alarms and electrical fires is also discussed. Photographs illustrate the text. A summary ends each chapter and a glossary and index are included.

64. FOX, R. Law Enforcement Laboratory. In Eckert, W. G., Ed., Investigation of Arson, Crime Scenes, and Vehicular Problems. Wichita, Kansas, Wichita State University, 1976. 7 p. (NCJ 44525)

Preservation of fire scene evidence for analysis in a crime laboratory and some analysis techniques are discussed. The first step in a fire investigation is to talk to fire department personnel to find out about smoke color, odor, size of flame, and other important information which cannot be discovered after the fire is out. It is

recommended that firemen be trained in the recognition, preservation, and collection of physical evidence, as they are the first persons on the scene. The investigator must record the arson scene through photographs, written reports of what was seen, sketches, and measurements. He then must search for physical evidence: sometimes fingerprints, indications of forced entry, and other important evidence are still present. Care should be taken in the preservation of volatile materials. If they are not carried in properly sealed containers, the substances may evaporate before they reach the laboratory. If necessary, makeshift containers may be made of coffee cans sealed at the top. One technique of the laboratory is the use of energy dispersive X-ray equipment to look for certain substances in the residue (e.g., gasoline used to start the fire). It is helpful to have an unburned sample for comparison, if possible.

65. HIGHT, T. H., C. T. SHEN, and J. R. SPARKS. Georgia Manual for Arson Investigators. Decatur, Georgia, Georgia Prosecuting Attorney's Council, 1976. 43 p. (NCJ 54076)

This manual for Georgia arson investigators discusses State law regarding elements of arson, burden of proof in prosecuting an arson case, arson investigation, and search and seizure limitations. Georgia law describes three degrees of arson and several arson-related offenses including criminal possession of explosives and incendiaries, criminal trespassing, criminal damage or destruction of buildings, fraudulent insurance claims and starting a fire in prohibited areas. To convict a person of arson, the prosecution must be able to prove that a crime occurred, establish that there is some nonaccidental damage done to property that is not owned by the defendants, and show that the damage was "knowingly" done. Types of evidence admissible in and necessary to arson conviction are discussed. Investigation of arson should begin as soon as possible after it is known that a fire or explosion has occurred. Firefighters should discover everything they can about the fire's origin, make notes of anything that appears unusual at or in the vicinity of the fire scene, and preserve anything which might be arson evidence. A checklist for fire investigators is provided. Georgia statutes describing the authority of the State fire marshal and other persons to enter and examine burnt buildings are outlined, and the law on the need for search warrants is presented. An arson indictment should contain a description of the damaged property and of the property's location, the name of the property owner, the suspects names, and the means by which the suspect started the fire. Indictment forms for the various arson offenses are provided.

66. HURTEAU, W. K. Arson Investigation and the Collecting of Evidence. Security World, v. 11, n. 3:18-19, 70, 73. March 1974. (NCJ 13323)

Information on procedures and needs of security personnel for uncovering crimes of arson are discussed. Detailed lists of physical and reference supplies needed for collection and maintenance of evidence in cases of suspected arson are provided, and procedures for tagging and storing evidence are discussed.

67. ILLINOIS ADVISORY COMMITTEE ON ARSON PREVENTION. Iceberg Crime: What Police Officers Should Know About Arson. Bloomington, Illinois, undated. 22 p. MICROFICHE (NCJ 54513)

This booklet outlines what the police officer should know about arson in terms of establishing motives, gathering evidence, and identifying, arresting, and trying a suspected arsonist. In addition to discussing common arson myths, combating apathy, and the police officer's general role in arson investigations, determining motives for intentional incendiary incidents is examined with attention to rational and irrational motives, burning for profit, spite and cover-up fires, and how pyromaniacs and juvenile arsonists operate. The value of the postincident interview is stressed; interviewing techniques, handling suspects, and protecting physical evidence are covered. Narrowing the list of suspects, making an arrest, and uncovering and presenting direct and circumstantial evidence are also discussed, along with how to arrange for more intensive training in arson detection and investigation. Drawings are provided.

68. _____. Touched Off by Human Hands. Bloomington, Illinois, undated. 22 p. MICROFICHE (NCJ 54516)

This booklet for firefighters reviews common arson techniques, investigatory approaches used to determe where and how a fire started, and the firefighter's role in searching out, locating, and preserving evidence. In addition to listing accidental and nonaccidental fire causes, this guide suggests ways firefighters can aid in arson investigations, from the moment they arrive on the scene, through the postfire cleanup. Firefighters are urged to look for suspicious faces in the crowds that gather around fires, to study the color of the flames at different stages of the fire, and to note any signs of forced entry or whether the involved structure is secured at the doors and windows. Tips are provided on determining how and where the fire started by studying charring patterns, eliminating accidental causes, and identifying firesetting mechanisms. Evidence necessary for catching and convicting the arsonist is also stressed, with attention to rational and irrational motives, signs of burning for profit, and the role of direct and circumstantial

evidence. Suggestions on how and where to get additional training are also provided. Drawings are included.

69. _____. Verdict: Guilty of Burning; What Prosecutors Should Know About Arson. Bloomington, Illinois, undated. 15 p.
MICROFICHE (NCJ 54515)

This booklet outlines what prosecutors should know about arson in terms of the signs pointing to arson, common methods and motives, and the logistics of successfully trying a suspected arsonist. The key elements of a prosecutor's investigatory approach are noted with respect to the initial interviews regarding a case of suspected arson. The first signs of an intentional incendiary incident--the color of the flames, the absence of food in the kitchen, clothes in the closets, furniture and other valuables--are covered, along with the common causes of fires, the favorite tools of arsonists, determining the point of origin, and identifying the motives and probable suspects. The legal pitfalls of arson investigation are discussed, as is the trial phase, including the role of expert witnesses and the use of experiments. Suggestions on how to learn more about arson are also included.

70. KENNEDY, J. Fire and Arson Investigation. Chicago, Illinois, Investigations Institute, 1962. 108 p. (NCJ 40369)

This comprehensive guide, reference, training aid, and instructional manual concerns fire and arson investigation for firefighters, police, attorneys, insurance investigators, adjusters, engineers, and fire experts. The textual material covers the prevention of fires; the study of fire causes; the effect of fires; the investigation of fires, explosion, subrogation, and related occurrences; and the prosecution and defense in criminal and civil litigation arising from these investigations. A compilation of State and Federal fire and arson laws is provided. Numerous reference tables and a glossary of terms also are included.

71. KIRK, P. L. Fire Investigation Including Fire-Related Phenomena: Arson, Explosion, Asphyxiation. New York, John Wiley and Sons, 1969. 255 p.
(NCJ 10845)

Elementary technical considerations of the combustion process of fuels, and of the investigative techniques utilized in examining cases of suspected arson are discussed. Fire investigation begins with an examination of the elementary chemistry of combustion and the nature and behavior of fire. The combustion properties of solid

and nonsolid fuels are defined. Fire patterns of structural and outdoor fires are delineated with special attention given to automobile, boat, clothing, and fabric fires. Practical guidelines for the investigation of structural fires are given. Specific factors related to the investigation and legal aspects of arson are considered. Also included are discussions of explosions associated with fires and building construction materials. The appendix includes illustrations of fire experimentation and fire origins.

72. KNIGHT, B. Pathologist's Role. In Eckert, W.G., Ed., Investigation of Arson, Crime Scenes, and Vehicular Problems. Wichita, Kansas, Wichita State University, 1976. 7 p. (NCJ 44527)

Techniques used by forensic pathologists in the investigation of fire victims to determine whether death occurred before or after onset of the fire are described. Determination of actual cause of death in fire cases is difficult because most of the evidence normally used has been destroyed. The pathologist must first determine the approximate time of death, particularly if the bones have been discovered at an old site with no signs of a recent fire. The coroner is usually interested in investigation if the skeleton is determined to be 50 years old or less. Once an investigation is initiated, the pathologist cooperates closely with the fire service and the forensic laboratory. The laboratory handles such items as clothing and photo documentation. The pathologist must have access to X-ray equipment, toxicologic testing, and laboratory facilities for microscopic examination of evidence. There are a number of characteristic changes which occur in the body when it is burned that can help identify the victim and determine time of death. Hair changes color when burned, often making the victim look older. Eyes tend to turn browner. Ante mortem and post mortem burns are often indistinguishable, however. Other evidence such as the presence of soot in the lungs may indicate that the victim was breathing when the burning occurred. Other signs that the fire started during life are a red froth around the nostrils due to irritation of the lungs and a pink coloring from inhalation of carbon monoxide. Skin shrinks when burned, and when stretched over a bone like the skull, splits. The pathologist must be aware that a large split in the skin is not necessarily the result of a severe cut before death.

73. LOWRY, W. T., I. C. STONE, and J. N. LOMONTE. Scientific Assistance in Arson Investigation: A Review of the State of the Art and a Bibliography. American Society of Crime Laboratory Directors, 1977.
23 p. MICROFICHE (NCJ 42555)

This state-of-the-art review indicates that while six arson investigation techniques exist, they are not fully developed or researched.

Better equipment and methods are needed; a bibliography also is included. The minimal research and development on arson that is being done today is sporadic, yielding little information for supporting and upgrading system performance. Almost all scientific apparatus used in arson investigation has been adapted to arson from some other discipline. Six arson investigation techniques are discussed here: (1) gas chromatograph-mass spectrometer analysis of headspace gas for type and distribution of hydrocarbons; (2) infrared spectroscopic analysis of extracts and distillates for identification of hydrocarbons, especially aromatics; (3) energy-dispersive X-ray analysis for detecting lead and bromine; (4) gas-liquid chromatography with capillary column for hydrocarbon identification by pattern matching; (5) nuclear magnetic resonance spectroscopy for aromatic-aliphatic hydrocarbon content and branching indexes; and (6) thin-layer chromatographic separation of gasoline dye components. These techniques have been only superficially researched. More and new basic information is needed for identifying and collecting residues and other evidentiary burning remains to keep pace with arsonists who are using new types of incendiary devices. The bibliography contains approximately 450 titles of English-language material published between 1934 and 1976. The entries, arranged alphabetically by author, refer to journal articles, books, and reports.

74. McKINNON, G. P. and K. TOWER, Eds. Fire Protection Handbook. Boston, Massachusetts, National Fire Protection, 1976. 1,185 p.
(NCJ 55313)

This 14th Edition of the National Fire Prevention Association Fire Protection Handbook represents a comprehensive reference text on fire hazards, protection systems, and prevention technology. An introductory chapter discusses the complexities of relationships between humans and fire and the status of human efforts to control the disastrous effects of fire. A subsequent section examines characteristics and behavior of fire, with a special note on smoke movement in buildings. The text covers these topics regarding fire hazards: fire hazards of specific materials such as wood, fibers, and explosives; industrial and process fire hazards (e.g. solvent extraction); special fire protection and prevention issues regarding indoor and outdoor storage practices, materials handling equipment, electrostatic ignition sources, etc.; fire safety in building design and construction, with attention to high rise structures; fire hazards in building services (e.g., air conditioning and electrical appliance systems); and the hazards of various types of occupied structures including residential, business, industrial, and educational. The role and responsibilities of public fire departments and private management in providing fire protection and water supplies and facilities for fire protection are examined. Several sections offer detailed discussions of fire protection devices and systems including fire alarms, detection devices, guard services, extinguishing agents,

water sprinklers, special systems, and portable fire extinguishers. A chapter on fire hazards in rail rapid transit systems is included. A list of procedures to follow in preparing property inspection reports and plans and six appendixes with technical material are provided.

75. MIDKIFF, C. R. Separation and Concentration of Flammable Liquids in Arson Evidence. Arson Analysis Newsletter, v. 2, n. 6:8-12. October 1978. (NCJ 52625)

The limitations and advantages of the steam distillation and solvent extraction methods for the separation and concentration of flammable liquids in arson evidence are discussed. The gas-liquid chromatography method is preferred for the detection and identification of flammable liquids in arson evidence; however, effective identification or comparison of known and questioned samples often requires prior separation and concentration. Methods for doing this present both limitations and advantages. In forensic laboratories, the most widely used flammable liquid concentration technique is steam distillation. Although particularly suitable for substrates, which are not readily extractable (e.g., wood), this technique is awkward and lengthy. A preliminary evaluation of the distillation approach in the laboratory showed that it offers no significant advantages over less cumbersome methods when a number of types of physical evidence are being examined. Some less frequently used distillation methods include vacuum distillation of arson debris and air flushing of the sample, then collecting the vapors in a cold trap. The second major approach to the separation and concentration of flammable liquids in arson evidence is solvent extraction. Well established in the study of pollution by spills and leakage of petroleum products, this method has extracted arson debris in a number of forensic laboratories, using normal hydrocarbons such as n-pentane, hexane, dodecane, and hexadecane. Halogenated solvents have also been used extensively, along with other solvents such as benzene, ethyl ethar, and carbon disulfide. The effects of using particular solvents are described. Although solvent extraction techniques are convenient for use with arson evidence, a considerable amount of additional evaluation is needed. An indepth study should be made with a range of flammable liquids of the types commonly encountered in arson cases. A major limitation of solvent extraction is the associated separation of substrate materials and degradation products which complicate the interpretation of the chromatographic pattern obtained. References are provided.

76. NATIONAL AUTOMOBILE THEFT BUREAU. Manual for the Investigation of Automobile Fires. New York, 1970. 54 p. MICROFICHE (NCJ 14532)

Recommendations are presented for the investigation of suspected arson in connection with automobile fires, including suggested procedures and specific methods. This manual includes suggested procedures for insurance adjusters and claims personnel, including investigative steps such as determining insurance coverage of the vehicle, checking the vehicle and the immediate vicinity for suspicious factors, and searching for witnesses. Suggested procedures for investigating law enforcement officers also are provided. Five phases for the investigation of a burned vehicle are listed, and include the exterior, the interior, the mechanical condition of the automobile, a fuel system examination, and the electrical system. Results of tests conducted in which attempts were made to burn cars at the points usually blamed as being the origin of reported fires, such as shorts, gasoline on the engine, or burning seat covers are also reported.

77. NATIONAL FIRE PROTECTION ASSOCIATION. Firefighter's Responsibility in Arson Detection. Boston, Massachusetts, 1971. 31 p. (NCJ 36789)

The purpose of this fire training program textbook is to familiarize firefighters with arson detection techniques and evidence protection and recording methods, and to prepare them for court appearances in arson cases. Firefighters are responsible for recognizing signs of arson at a fire scene and for preserving arson evidence until investigators arrive. General conditions in the vicinity of the fire (people, automobiles, road conditions) should be noted as well as conditions at the fire scene. Upon their arrival at a fire, firefighters should take mental notes of the number of separate fires, the intensity and speed of the fire, the color of the flames, and observe the behavior of persons near the burning building. Other items to investigate in determining arson intents are multiple fire starters, open doors and windows that might provide ventilation to speed fire buildup, the presence of foreign materials that could accelerate the fire's speed, unusual odors, localized heavy charring and uneven burning, holes made in walls and floors, inoperative sprinklers and firedoors, and tracks and footprints. Arsonists often use trailers between fires, candles, chemicals or flammable liquids, timing devices, electrical equipment, and firebombs. Look for any residue, debris, or salvage indicating the use of these materials. Firefighters should keep the evidence untouched and undisturbed until qualified investigative personnel arrive. Measures for protecting and guarding the evidence that must remain at the scene are discussed as well as methods for removing, protecting, and preserving evidence collected by the fire department. Procedures for recording and reporting observations made at the fire scene and for preparing oneself for court testimony in an arson case are outlined.

78. NOGUCHI, T. Role of the Pathologist. In Eckert, W. G., Ed. Investigation of Arson, Crime Scenes, and Vehicular Problems. Wichita, Kansas, Wichita State University, 1976. 7 p. (NCJ 44521)

The importance of having a pathologist present at crime scene investigations is discussed. The possible functions of various medical specialists at the crime scene investigation are described briefly. Depending upon the types of evidence found at the scene, police investigators may wish to call in a forensic anthropologist, odontologist, serologist, or even a forensic psychiatrist. Samples and specimens can get stale if collected by an inexperienced police officer and only later transported to and analyzed by a pathologist. For this reason, a medical examiner should be part of the crime scene investigation team. If he is present, he can determine which samples are important to analyze, collect the samples, and analyze them right away. In addition, the detective who is conducting the investigation should be present at the autopsy, so that he can begin interpreting the autopsy findings right away. The scene of the Sharon Tate murders is described in detail. The author explains how the types of wounds, their patterns, and other evidence may indicate how and when the murder took place and may even show something about the killers' motives, the type of weapons used, and possible connections with other cases. The importance of having a team work on the investigation is stressed; it should include at least police investigators, pathologists, and any other medical experts necessary.

79. RICHARDS, N. F. Fire Investigation: Destruction of Corpses. Medicine, Science, and the Law, v. 17, n. 2:79-82. April 1977. (NCJ 41247)

Relying on a time-temperature curve of room fire and forensic knowledge of human corpse destruction in fires, a fire official is able to determine whether or not a corpse discovered in a burnt building is a homicide victim. According to general forensic knowledge, an unclothed corpse burns more slowly than a clothed corpse, and a body must be exposed to heat radiation longer than 10 minutes before bones begin to show. The chest and facial bones are exposed at about the same time as the arm bones; the leg bones are exposed nearly 15 minutes later. A corpse discovered at a fire scene is clothed in pants; it shows burned skin exposing the arm and shin bones, but the chest and facial bones are not showing. After gathering information from witnesses and other fire department personnel, the official determines that the body could only have been exposed to violent heat for 10-12 minutes. A time-temperature curve of room fire indicates that fire burns for 8-10 minutes before reaching a flashover point and then the temperature climbs at a progressive rate for the next 55 minutes to about 770-780 degrees. This information suggests that the corpse must have been subjected to some substance, probably paraffin, to speed burning which would account for shin-bone exposure. This hypothesis was tested using a cremation oven. Results

showed that the damage to the original corpse was inconsistent with exposure to general radiated heat and more consistent with a very localized severe fire. Alternatively, the fire damage to the two areas of the body could have been "assisted," indicating homicide.

80. SEATTLE FIRE DEPARTMENT. Seattle: Arson Task Force; Implementation Program. Seattle, 1978. 389 p. (NCJ 54320)

This Seattle, Washington, arson task force report describes the accomplishments of the fire department and law enforcement agencies in the first year of an arson control and prevention campaign. In 1975, the task force reviewed the status of arson and arson control operations in the State and concluded that arson is a significant and growing crime requiring a comprehensive control program. The task force laid out recommendations for such a program, and this report documents the outcome of the fire department's and law enforcement agencies' efforts to implement them. The arson investigative unit now assigns a 10-person force to investigate all fires representing a loss of at least $1,000, including 2 additional investigators from the police detective unit. Arson investigators now receive 166 hours of basic training in arson investigation techniques and equipment use. Cooperation between the police and the fire departments has increased, and a police fire prevention patrol has been established. The patrol officers survey arson-risk areas and remain highly visible in the community. A public relations program was organized, and staff members disseminate information through local media and schools. A juvenile referral service was set up within a local service agency to help counsel children with "unusual interest" in fires. The fire department has also initiated an arson information retrieval system which covers 10 Washington cities. Statistics, after the first year of this intensive arson control program, indicate that the incidence of arson has decreased. A report on a series of studies concerning the incidence of arson in the Puget Sound area from 1965 to 1975 is provided as well as tabular data, charts, program forms, and lists of training curriculums.

81. SILJANDER, R. P. Applied Police and Fire Photography. Springfield, Illinois, Charles C. Thomas, 1976. 329 p. (NCJ 38181)

This text discusses not only what to photograph and how to photograph it, but also carefully explains why various items should be captured on film, thus linking investigation and evidence collection with photography. The first portion of the text deals with the fundamentals of photography--general principles, cameras, lenses, film, filters, care of photographic equipment, exposure determination and flash photography--as they apply to the investigative photographer. This establishes the proper base from which to advance into the

specific applications of forensic photography. Later chapters cover the more esoteric techniques of police and fire photography, both in the field and in the laboratory. Included are discussions of crime, arson and accident scene photography; photographing homicides and other deaths; surveillance and identification photography, impression, tool mark, fingerprint, and document photography; photomicrography; court exhibits; closeups; copying techniques; and polaroid shooting.

82. SNOW, C. Identification Problems: Anthropologist. In Eckert, W. G., Ed., Investigation of Arson, Crime Scenes, and Vehicular Problems. Wichita, Kansas, Wichita State University, 1976. 10 p. (NCJ 44526)

The article describes some of the difficulties encountered in the identification of victims found at a fire scene. Many of the techniques of identifying a body destroyed in a fire are the same as those for identifying unburned skeletons. The process used is osteobiography. By studying the bones, the anthropologist can tell a great deal about the victim's life history: nutrition, diseases, injuries, and genetic traits. The investigator first determines the general time of death of the victim, usually by studying artifacts surrounding the skeleton. Then the victim's age is estimated by examining the body for characteristic changes in the skeleton which occur during certain periods in a person's life. The anthropologist can usually estimate the age of an adult within 3 to 5 years. After age, he determines the sex. The shape of the pelvis is the best indicator: the female's tends to be shorter, shallower, and broader. The victim's race can often be established if a complete skull can be found. The size and shape of cheekbones, brow, nasal aperture, and sometimes even the shape of the teeth may show distinctive racial characteristics. The victim's stature is rather easy to determine simply by measuring the bones. With all of this information, the investigator then tries to reconstruct a face from the skull. There are models of the average depth of the skin over different parts of the skull, so that the shape of the face can often be reconstructed with striking success. Other clues can be obtained through records of individual deformities, e.g., old fractures and gaps between the teeth. Sinus patterns are also distinctive and can be useful if previous X-rays of victim's head can be found.

83. U.S. COMPTROLLER GENERAL. General Accounting Office. Arson-for-Profit: More Could Be Done To Reduce It; Report by the Comptroller General of the United States. Washington, 1978. 41 p. (NCJ 54542)

The extent to which the Federal Riot Reinsurance Program and Fair Access to Insurance Requirements plans of various States provide incentives for arson-related insurance fraud (i.e., arson-for-profit)

is evaluated. The General Accounting Office, in responding to a congressional request, assessed the adequacy of Federal programs dealing with the detection, investigation, and prosecution of arson offenses and the effectiveness of Fair Access to Insurance Requirements plans in minimizing the arson-related insurance fraud problem. Interviews were conducted with officials and written information was obtained from the Federal Insurance Administration, the National Fire Prevention and Control Administration, nine Fair Access to Insurance Requirements plans (Delaware, the District of Columbia, Illinois, Maryland, Massachusetts, New York, Pennsylvania, Rhode Island, and Washington), six insurance companies, and two insurance industry trade associations. Findings indicate that the amount of coverage provided by State plans varies. Some plans base the amount of coverage given to a property owner on the market value of the property using such values as the owner's purchase price. Although plans can refuse to insure for the full amount requested, three of the nine investigated do not. Of the nine plans, six refuse to insure for the full amount requested if it is more than the property value as determined by the plan. All plans can refuse coverage altogether, but there are limited reasons for refusing. Generally, depreciation (deterioration) is considered in paying claims. In four States, the basis used for determining the amount to pay under a claim is the property's actual cash value at the time of loss; actual cash value is defined as replacement cost less depreciation. The Federal Riot Insurance Program provides private insurance companies with insurance to protect them during riots against excessive losses on company-insured properties. To purchase riot reinsurance, a company must be participating in a Fair Access to Insurance Requirements plan. Both plan and insurance industry officials believe that arson for profit is a serious problem in plans and in the private insurance market. One of the major incentives for arson offenses is overinsurance, providing an amount of insurance exceeding property market value. Plans need greater underwriting authority to deny or limit insurance coverage to high-risk property owners. Detailed results of the General Accounting Office review, a list of organizations contacted during the course of the review, and data on plans are appended.

84. U.S. DEPARTMENT OF COMMERCE. National Fire Prevention and Control Administration. Arson Information Resources: A Baseline Collection and Survey. By P. E. Fisher, L. J. Hillenbrand, and J. T. Suchy. Washington, 1977. 59 p. MICROFICHE (NCJ 53716)

An assessment of the arson information center, a national resource center, is presented. The arson information center was designed to produce a national sampling of the arson documentation available in the United States. Several major cities were selected in an effort to achieve a representative national sample. Specifically, the arson information center sought information to be used in three ways:

(1) to enhance the professional knowledge of those who need and use information about combating arson both in industry and in government; (2) to provide useful bases for the development of training materials to combat arson; and (3) to provide useful bases for the development of public understanding of the arson problem. The collection now includes printed documents (e.g., books, reports, texts of speeches, seminar outlines and presentations, course outlines and instructional texts, and articles), audiovisual materials (e.g., slides, photographs, films, and video tapes), and representative case files selected by arson investigators. This collection shows the type of information presently available, not what should be available to meet the needs of potential users. Examination of the documents in the collection reveals shortages of information on the more sophisticated aspects of arson detection. There is also a lack of sufficient information on handling and laboratory analysis of evidence and case preparation and documentation. There is, furthermore, a lack of valid statistics on the occurrence and costs of arson. Future development of the arson information center is recommended to provide three benefits: (1) it should contain information on the cost effectiveness of a national effort; (2) it should serve as a spearhead for a meaningful attack on arson; and (3) it should provide a continuous flow of information based on problem recognition, definition, and solution. Flow charts are included.

85. U.S. DEPARTMENT OF JUSTICE. Law Enforcement Assistance Administration. South Carolina Law Enforcement ETV (Educational Television) Training Program: From Crime to Court; Basic Criminal Law, Part 10; Arson and Related Offenses, Section 1, Study Workshop. By C. T. Godsby, Jr. Washington, undated. 16 p. MICROFICHE (NCJ 17409)

This review and study workbook enlarges on the general topic of "basic criminal law" as it deals with arson, malicious burning, and related topics. The workbook is designed to be used both during the group discussion period following the ETV presentation and at home. The format is "fill in the blanks" with provision for answers below the question-statement. The answers are given in the back. The series is composed of NCJ 17285-17290 and 17391-17411.

86. U.S. DEPARTMENT OF JUSTICE. Law Enforcement Assistance Administration. National Institute of Law Enforcement and Criminal Justice. Laboratory Proficiency Testing Program: Report No. 14; Arson Examination. Forensic Sciences Foundation Press. Washington, 1976. 35 p. (NCJ 47535)

Test analyses of physical evidence from an arson case are reported in one of a series of forensic laboratory proficiency surveys. Participating laboratories (235 surveyed, 114 responses) were sent

three items: (1) 8 milliliters of leaded gasoline; (2) a piece of cloth containing 2 milliliters of the same gasoline; and (3) a second piece of the same cloth containing no gasoline. The laboratories were told only that (2) represented evidence found at the scene of an attempted arson and that (1) and (3) were from a vehicle observed fleeing from the scene. The laboratories were to determine whether (1) and/or (3) could have a common origin with (2), whether the evidence denoted a conspiracy, and whether an accelerant was present, and to indicate their methods of analysis. Of the responding laboratories, 80 (70.2 percent) correctly responded that both (1) and (3) could have a common origin with (2). An additional 12 responded that (3) and (2) could have a common source but were inconclusive about (1). All of the laboratories determined that an accelerant was present. The researchers decided not to report responses to the question about conspiracy. Details of the findings and methods of both referee and test laboratories are presented in six tables, including breakdowns of responses from individual laboratories. An explanation of survey methods and a copy of the questionnaire are included. Other proficiency tests are reported in NCJ 47522-47534 and 47536-47542.

87. _____. Law Enforcement Assistance Administration. National Institute of Law Enforcement and Criminal Justice. Needs in Arson Investigation: A Survey of Arson Investigators; Equipment Systems Improvement Program. By Q. Y. Kwan and G. C. Denault. Washington, 1976. 36 p. (NCJ 35140)

Results are given of a brief survey of arson investigators throughout the Nation, conducted to assess the status of arson investigation, the typical arson scenario, and the priority of problems needing to be solved. The survey was conducted by a questionnaire sent through the mail, augmented by telephone and personal interviews. A copy of the questionnaire and a list of respondents are given in appendixes 1 and 3 respectively. In addition, a query to arson investigators at large was published in the October 1975 Fire and Arson Investigator, the official organ of the 2,000-member International Association of Arson Investigators. To allow any investigator the opportunity to express his opinions, the query is reproduced in appendix 2. Compilation of the survey responses is given in the tables following the text of this document. The questionnaire was sent to 27 investigators. Eighteen completed questionnaires were received. The questionnaire solicited information on the following areas: type of agency, method of arson detection, frequency of clue material collection and submission to scientific laboratory, evidence preservation, types of fire accelerants found, most common methods of setting fires, frequency of physical evidence utilization, and problems to be solved in arson investigation. Based on the survey responses, the report discusses the typical arson scenario, and the need for improvement of investigator training, automated arson data systems, cooperation

from the insurance industry, and clarification of jurisdiction over arson cases.

88. _____. Law Enforcement Assistance Administration. National Institute of Law Enforcement and Criminal Justice. Scientific Method for Determining Point of Origin in Arson Investigation. By Q. Y. Kwan. Master's Thesis, Berkeley, University of California, 1970. 69 p. MICROFICHE (NCJ 32819)

A computer-aided method for quantitatively determining the point of origin and for ascertaining the time of ignition of a fire is presented. The method of solution relies on a computer program which regressively constructs the location of the previous fire perimeter which occurred on an arbitrarily chosen time unit prior to the one observed. This procedure is repeated obtaining a series of concentric burn perimeters. The program terminates when the burn perimeter converges to a suitable working area for the investigator. Future advancements can be made to take into account heterogeneous and time-varying conditions.

89. YIP, I. H. L. and E. G. CLAIR. Rapid Analysis of Accelerants in Fire Debris. Canadian Society of Forensic Science Journal, v. 9, n. 9: 75-80. June 1976. (NCJ 35391)

A gas chromatography method of identifying arson accelerants is described which can utilize small samples and can analyze them rapidly: gasoline, naptha, varsol, kerosene, stove oil, furnace oil, and diesel fuel.

APPENDIX—LIST OF SOURCES

1. League of California Cities
   Los Angeles County Division
   Criminal Justice Planning Unit
   Suite 702
   900 Wilshire Boulevard
   Los Angeles, CA 90017

2. National Fire Protection Association
   470 Atlantic Avenue
   Boston, MA 02210

3. 20th Century Security Education Ltd.
   293 Kingston Road
   Leatherhead, Surrey, England

4. Council of Planning Librarians
   P.O. Box 229
   Monticello, IL 61856

5. Canadian Psychiatric Association
   Suite 103
   225 Lisgar Street
   Ottawa, Ontario, Canada

6. American Risk and Insurance Association, Inc.
   1 State Farm Plaza
   Bloomington, IL 61701

7. Illinois Advisory Committee on Arson Prevention
   Box 614
   Bloomington, IL 61701

8. Illinois Law Enforcement Commission
   10th Floor
   120 South Riverside Plaza
   Chicago, IL 60606

9. Firehouse Magazine Associates
   33 East 53rd Street
   New York, NY 10022

10. Available only through NCJRS Microfiche Program and NCJRS Document Loan Program.

11. Franklin Watts, Inc.
    Sherman Turnpike
    Danbury, CT 06816

12. Charles C. Thomas
    301-327 E. Lawrence Avenue
    Springfield, IL 62717

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