ARSON CONTROL --
A Review of the State of the Art
with Emphasis on Research Topics

May 1978

(Second printing, with corrections, February 1979)

Prepared for:

National Institute of Law Enforcement and Criminal Justice
Law Enforcement Assistance Administration
Washington, D. C.

By:

Stephen J. Tauber
33 Baskin Road
Lexington, Massachusetts 02173

ARSON CONTROL --
A Review of the State of the Art
with Emphasis on Research Topics

May 1978

(Second printing, with corrections, February 1979)

Prepared for:

National Institute of Law Enforcement and Criminal Justice
Law Enforcement Assistance Administration
Washington, D. C.

By:

Stephen J. Tauber
33 Baskin Road
Lexington, Massachusetts 02173

ABSTRACT

An indicative survey of the state of the art of arson control, this report defines suggested research topics and other studies within the mission of the National Institute of Law Enforcement and Criminal Justice. No complete listing of anti-arson projects exists, but there are very few current research projects. There is disagreement over what "the arson problem" includes. The author proposes 31 studies in 5 major areas: (a) institutional factors, (b) law and law enforcement, (c) psychology and sociology, (d) statistics and models, and (e) technology. He also recommends support to publish technical results.

The roles of fire marshals, fire departments, police departments, insurance investigators, and prosecutors; the need for full-time arson investigators; the pros and cons of joint arson squads; the resources required for arson control; and measures of effectiveness are discussed. Federal agencies have become increasingly involved in arson investigation. Numerous states have arson task forces. Organizational changes are being introduced in many jusrisdictions.

Training, especially field training is agreed upon as centrally important. There is sharp disagreement on the adequacy of training available. Some of the existing training programs are indicated, and recommended scopes are cited. The special powers of insurance investigators and companies are mentioned. The value of pre-insurance inspection is cited.

Federal laws and agencies pertinent to arson control are mentioned. The wide variation in state laws relevant to arson and some of their effects are illustrated. Some statistics on arson in the criminal justice system are cited, with caveats on their interpretation.

A reluctance to prosecute arson cases persists. The types of evidence typically available in an arson case and its preservation are briefly reviewed.

The psychology and psychiatry of arson are little understood. A survey is under way of the state of the art of psychology of arson. Some of the psychology that is understood can be applied in investigation and for deterrence. Publicity campaigns and personal contact can improve public cooperation. Major differences exist in the incidence of incendiarism in superficially similar communities. Fire-setting behaviour has been related to historical land use practices and to population characteristics.

Data on fire incidence and cause are notoriously unreliable. The methods and completeness of collecting fire statistics vary markedly among jurisdictions. Even incomplete data support some useful conclusions. A Property Loss Insurance Register is being started to centralize information on insured fire losses. Analysis of the pattern according to which fires occur has aided investigation and suppression. Patterns in real estate records have been successfully used in a major investigation. Economic models have been constructed of fire control and of fire-setting.

Some forensic laboratory services are available to arson investigators nationally and in some states and localities. Forensic photography as it applies to arson seems well understood. Laboratory analyses heavily emphasize hydrocarbon fuels, with some attention to other types of accelerants and to electrical devices. Packaging of evidence so as to preserve hydrocarbons is a problem which has been studies to some extent. No hydrocarbon detectors have yet been designed specifically for arson work. Some systematic attention has been given to the array of equipment needed for arson field investigations. A handbook has been begun on the behaviour and properties of materials, but not on burn indicators.

Restricted access, trash removal, and sprinklers are known to be effective in controlling incendiary losses. Research on large scale building fires has implications for arson control.

(236 primary refs., 50 secondary refs. Lists of 118 individuals and 32 organizations active in arson control.)

TABLE OF CONTENTS

TABLE OF CONTENTS (Continued)

1. INTRODUCTION AND OVERVIEW

The title of this report accurately defines the charge given to the author. He was to identify and define topics in which the National Institute for Law Enforcement and Criminal Justice could conduct research with the reasonable hope of strengthening the fight to control rampant incendiarism. It was not particularly the author's purpose to reevaluate research topics proposed earlier by groups who have intensively studied the arson problem;(L10,L70) he rather sought to complement those proposals with definitions of specific projects which fall within the NILECJ mission.

As a survey of the state of the art this report should be accepted as indicative; it is neither definitive nor exhaustive. However, it is sufficiently extensive to show the aspects of the arson problem in which research or other types of studies should be undertaken to lay the foundation for ameliorative measures.

Direct contact was sought with representative individuals who appeared to be active in anti-arson work. Many of the individuals initially contacted suggested others to learn from. Virtually every person contacted was cooperative and helpful. Most of the individuals discussed arson almost exclusively in terms of structural fires. Vehicular fires were mentioned only occasionally, and wildland fires were almost totally ignored by those not in the Forest Service.

Some publications were provided by individuals. Most of the published information came from computerized abstract services and from the more recent portions of the holdings of the Law Enforcement Assistance Administration, National Fire Reference Service (National Fire Prevention and Control Admin-

istration), and Fire Research Information Services (National Bureau of Standards). The list of citations (Section 7) are references to information and opinions which are pertinent to defining the various aspects of arson discussed in this report. It is not an attempt to update the Battelle baseline collection.(L30)

The entire area of fire behaviour was deemed to be within the domain of the NFPCA rather than the LEAA. Consequently there are no recommendations here for research on matters such as behaviour of electrical devices or ignition by cigarettes.(L10h) There is also no separate consideration of arson in institutions such as prisons or mental hospitals, because the topic simply did not surface in any of the publications reviewed or the discussions held.

Although arson is now recognized as a major national problem, the full dimensions of the problem, the resources available to control it, and current efforts to solve it are only partially known.

The Oregon and New York arson task forces had to define the problem in their domains before proceeding to proposed improvements.(L19,P59) A study has recently been undertaken to determine what is known, published or not, about forest arson and its control.(P91) Another study is in progress to determine from publications what is known about the psychology of fire-setting.(P93)

The degree of frustration in determining what exists is exemplified by the fact that a small study had to be mounted in order simply to identify and to characterize all organizations with forest fire prevention objectives in Louisiana and Mississippi.(S1) A census of fire protection services in the

United States is incomplete after four years of sustained effort.(P77)

The General Accounting Office has conducted a thoroughgoing survey of on-going arson work at LEAA, NFPCA, and other Federal agencies.(P48,P76) The GAO report, however, is not available.(L102,L119,P14) LEAA does not have reliable information on what research or other special projects are performed with its own funds, since individual projects undertaken under block grants are not necessarily logged in.(P48) Even within the principal investigator's own organization there may be neither knowledge nor documentation of such work. The SSIE, despite its efforts, has not recorded all current arson research projects conducted with Federal funds.

There is not even a uniform terminology of incendiarism, thus hampering communication among professionals and the collection of comparable data from different jurisdictions. (L70j,H13) The NFPCA is, however, working on devising a standard terminology.

As meager consolation it may be stated that Canada appears to be even worse organized to deal with arson than is the United States. The problem is perceived as less severe, perhaps because Canada does not have as much of a core city slum problem and therefore not as many "convenience" fires. Even so, arson is estimated to be a $100 million per year "business" in Canada.(P88)

In Canada fire is a provincial responsibility. But arson, as a crime, is a Federal responsibility.(P88) The Ontario Fire Marshal has been quoted as saying that he does not know who is responsible for coping with arson. Fire services

in general are described as having abdicated their (moral) responsibility for dealing with arson, and police as not trained to do so. An attempt is being made for the first time to organize a Canadian fire investigators association.(P83)

Very striking to anyone seeking to identify ongoing research in arson is how little such research seems to exist. Of all the projects listed in LEAA's PROFILE data base which deal substantially with arson, none since the Moll study(L57) can be characterized as research. The NFPCA lists no research on arson,(L121) nor could a staff member of the National Fire Safety Research Office name any such NFPCA research project. (P79) The Smithsonian Science Information Exchange lists four arson projects by three principal investigators. These research projects are only meagerly augmented by a few which are not listed, such as the study on accelerant adsorption,(P85) compilation of properties of materials,(P41) establishment of calibration technology for hydrocarbon detectors,(P22) arson arrest profile study,(P10) and instrumented burning of vacant buildings.(P18) It should also be noted that some completed research projects and innovations have never been documented. (P3,P32,P57,P95)

There are some calls for overall systems studies of arson, running the gamut of psychology; criminology; sociology; fire technology; forensic science; investigative techniques; institutional interactions; interrelation of incendiary loss, suppression costs, and investigation costs; and interaction with politics, the economy, and the several parts of the criminal justice system.(L49,L70i,H14,P3,P59,P74,P82) To recite such a list underlines the enormity of the aggregate problem presented by arson more than it defines an approach to understanding or solving the problem.

It would be futile and presumptuous at this stage of knowledge to attempt any one effort with the intended purpose of "conquering arson". The participants in the 1976 Leadership Seminars for Developing a Coordinated Attack on Arson (convened by Battelle Columbus Laboratories under sponsorship of the National Academy for Fire Prevention and Control) cited nine needs, each articulated into components,(L70) and even these did not touch on all of the above topics. Research, as defined by these individuals, was just one of the nine needs: (a) definition of responsibilities, (b) reclassification of the crime, (c) public awareness, (d) training, (e) data reporting, (f) laws, (g) funding, (h) research and development, and (i) terminology.

A striking sign of the degree of frustration among people charged with doing something effective against arson is the prevalence of the stated need to define the problem or to study the entire system. Each group, however, has its own outlook on the domain over which the system extends.

The State of New York grapples with deciding "what the problem is" for a large state varying from rural and forested counties to the most populous city in the country. The California Forestry Service and the Center for the Study of Law and Society want to find out everything that is known or being done -- about fire-setting in forests. The National Bureau of Standards and the University of North Carolina are trying to determine everything that has been written -- about the psychology of fire-setting.

The National Fire Prevention and Control Administration appears to be concentrating most heavily on three of the nine areas defined in the Battelle seminars which it sponsored. It is tackling the dearth of trained investigators

and of arson training among firefighters by establishing a series of courses to be offered throughout the United States. It is working with state fire officials to improve the quality of available fire statistics so that, inter alia, measuring the results of anti-arson efforts becomes more feasible. It is developing a model arson law. It neither conducts nor sponsors arson research as such.

A system view is important to the extent that it serves to assure that all aspects of the overall problem remain in mind. There is no one implementation program that will bring arson under control nor one research project that will answer all of the outstanding questions. It is not even reasonable to attempt such a panacean approach to any major aspect: There is more than one training problem. There are many technical problems. Arson statistics come in numerous guises. There are legal problems all over the map.

What this author urges as the only sensible research approach is to define comparatively small, well-bounded projects on tractable topics within larger important areas. Progress should be expected from gradual solution of successive, constituent problems. The results of successful research on earlier topics, beyond their direct utility, may define the parameters of further problems or even expose the existence of problems not previously suspected. Success in research must be understood as meaning results that are definite and reliable, whether or not they upset pet hypotheses or are otherwise unpalatable.

Research into arson as a crime must be specific to arson, since studies of crime in the large do not lend themselves to the purpose. An analysis of data on prosecution and court operation relegates arson to a miscellaneous sub-sub-

category of a miscellaneous sub-category.(L31) In a study into the epidemiology of various crimes among juveniles, arson is being excluded because arson is too infrequent to be adequately treated statistically.(P27) Indeed arson arrests account for less than 0.4% of all arrests of persons under 18. For adults, only 0.012% of arrests are for arson.(L47c) One is left to wonder how many of the 175,000 arrests reported for vandalism were for fire-setting. Arrest figures are further confounded because an arrest for arson is not necessarily reported as such if there was a Part I crime committed in the same incident. More profoundly interfering with inclusion of arson in general crime studies is the extreme unreliability in most jurisdictions of currently available arson incidence data.

A topical organization of this report, from among the various possible arrangements, was chosen so as to group research areas logically. The five groupings are:

(a) Institutional Factors, covering organization of the arson control establishment and resources applied, training of professional personnel, and the impact of the insurance industry.

(b) Law and Law Enforcement, covering laws as such, arson in the criminal justice system, and evidence availability in arson cases.

(c) Psychology and Sociology, covering the psychology of fire-setters, the elicitation of active public cooperation, and the effects of micro-societies and micro-cultures on fire-setting behaviour.

(d) Statistics and Models, covering the reliability of arson incidence statistics, analysis of arson-related patterns, and the use of economic models.

(e) Technology, covering arson laboratory requirements, laboratory techniques, packaging of evidence, use and performance of equipment at fire sites, data handbooks, and making structures more resistent to arson.

Features of alternate arrangements of the material are perforce scattered in this report. Thus, for instance, fire and arson investigation are aspects of most of the sections. Economic considerations show up in the recommended research under organization and resources, insurance, psychology of fire-setters, public cooperation, pattern analysis, economic modeling (of course), packaging of evidence, and hardening.

Within each of the topical groupings the state of the art is presented as it has been gleaned from published and unpublished sources. This information is then the motivation for the research projects and studies recommended towards the end of each subsection. Briefly stated, these projects are:

Institutional Factors

Organization and Resources: Determine the extent of correlation between the mode by which arson investigation and prosecution are organized and the effectiveness of arson control activities.

Training: (a) Establish the content and structure of an arson course aimed at prosecutors. (b) Correlate features of training with arson unit performance.

Insurance: Determine the cost and effect of inspections of properties by insurance companies prior to issuing fire insurance.

Law and Law Enforcement

Law: Comprehensive compilation of statutes, case law, and regulations pertinent to arson.

Arson in the Criminal Justice System: (a) Determine the arrest rate for incendiarism in a spectrum of jurisdictions. (b) Determine the disposition of arson cases in various jurisdictions. (c) Study sentencing practices for arson convictions.

Evidence: Determine what evidence is available in arson cases and correlate such availability with the disposition of the cases.

Psychology and Sociology

Psychological Research: Support completion of the state-of-the-art review.

Psychology of Fire-Setters: Research into the psychology of fire-setters as it manifests itself in behaviour pertinent to arson investigation and interrogation.

Public Cooperation: Determine what incentives and what stimuli are successful to what degree in eliciting information.

Sociology: Determine what factors of local societies and cultures in an urban area are significant to fire-setting behaviour.

Statistics and Models

Arson Incidence Reliability: Systematic investigation of fires in selected study areas.

Pattern Analysis: (a) Determine the general applicability of the High Incidence Arson Area Assignment Program. (b) Support development of and test the arrest profile system in several jurisdictions. (c) Support development of the real estate record analysis method. (d) Support development of a business analysis model.

Economic Modeling: Create and test models which correlate incendiarism and arson losses with economic activity, economic incentives, psychological utility, and arson control activities.

Technology

Arson Laboratory Requirements: Compile as complete as possible an inventory of laboratories that do or can conduct forensic examinations of arson evidence.

Photography: Compile an inventory of forensic photo laboratories.

Composition of Matter: (a) Determine what types of chemicals need to be detected and identified and what methods exist for their analysis. (b) Determine what other materials need to be identified. (c) Determine what other characterizations may be required.

Electrical Devices: Catalogue electrical equipment, the types of examinations required, and available laboratory techniques and standards.

Packaging of Evidence: (a) Correlate known permeability data of commercial plastic films and determine the

hydrocarbon permeability of additional materials. (b) Conduct engineering and market studies of potential packaging materials.

Hydrocarbon Detectors: Develop technical performance criteria and ancillary engineering specifications for hydrocarbon detectors.

Equipment Requirements: Determine what specific equipment is used by arson investigators, for what purposes, to what extent, and at what cost.

Handbooks: Compile a handbook of burn indicators.

Hardening: Study the hardening of structures, with emphasis on cost/benefit aspects.

Each of the projects is defined in skeletal form, and the payoffs by successful completion are identified. In some instances the mode of conducting the project is also indicated.

This author recommends each one of the projects identified as probably useful in bringing arson under better control. Setting relative priorities among the projects suggested is however left to the NILECJ as a management prerogative. Once projects have been selected as serious candidates for investigation, they should be defined in considerably more detail. Information on each research area should be exhaustively gathered by a thoroughgoing literature search and generally by extensive discussions with the experts in the fire service, law enforcement, and the particular subject matter. The costs and schedules for the projects would have to be determined once the

detailed project definitions exist and the dimensions of directly relevant information are known.

Some of the recommended projects are inherently for the compilation of information. These compilations are recognized as useful in themselves or necessary in order even to define research projects. One such compilation effort is now in progress, for the psychology of fire-setters,(P92) and its completion should be assured.

One area tangentially related to research was identified in which LEAA activity is recommended: the publication of technical monographs and articles. No description has been published, for example, of the work by the highly regarded Ohio State Arson Laboratory -- for lack of time.(P32) The results of examining the permeability of plastic films have not been published -- because of more urgent matters.(P95) A formal speech exists describing observations and conclusions concerning the behaviour of fire-setters -- but no publisher will accept a technical book on the topic.(P3) A discussion of the utility of magnets in wildland fire investigations has never been committed to print.(P57)

This author recommends that LEAA sponsor competent technical write-ups and publication of new methodologies and findings pertinent to arson control. It might make one or more technical writers available for this purpose to work with some of the professionals mentioned above and with others to be identified. LEAA itself might publish monographs not suitable for journal publication. Any effort in these directions should be coordinated with the NFPCA Office of Information Services and the NBS Fire Research Information Services.

2. INSTITUTIONAL FACTORS

As with any major aspect of our society, there are parts of the Establishment which are most directly concerned with arson. There are the governmental agencies which are officially charged with detection, investigation, and suppression of arson and apprehension and punishment of arsonists plus welfare and housing authorities. There are the insurance, banking, and real estate industries, business, community action groups, and fire protection technology.

In this section that part of the official establishment is discussed which is specifically seized of arson, the training of its personnel, and the insurance industry.

2.1 Organization and Resources

The administrative home of fire marshals varies considerably. All but three states have State Fire Marshals, but these may be attached to a department of public safety, the state police, the insurance department, or the office of the attorney-general.(L69,L71,P66) Local fire marshals generally report to -- or are -- fire chiefs;(L69,P15,P52) they may be deputized by the State Fire Marshal. Whatever their organizational locus, fire marshals in many jurisdictions have police powers.(L55,L69,P3,P94)

The existence of a fire marshal however does not assure that there is an arson investigation unit. The Idaho Fire Marshal relies on the Department of Law Enforcement and local law enforcement officers for arson investigations.(P46) The Virgin Islands has no fire investigation or arson unit, relying on the police for arson investigations.(P42) Many suspected arsons are never investigated at all.

Police commonly enter arson investigations only if there is a death.(H6) Indeed deaths associated with fires are not even necessarily investigated. The Medical Examiner in New York City, for instance, does not respond to a fire and performs an autopsy only if requested to do so by the Fire Marshal.(P66) All fatal fire victims in Georgia, by contrast, are examined by medical examiners.(P7)

Insurance investigators, in protecting their companies' interests, complement the work of official investigators.(L14,L36,L60,L70c,L109,H5,H14,P77) The Insurance Crime Prevention Institute and INS Investigator's Bureau investigate arson and fraud cases referred by individual insurance companies. The ICPI turns its results over exclusively to the authorities;(P1) INS provides its results only to the client company.(L60) The ICPI tends to concentrate on showing fraud because this is usually a much easier case to prove than is arson. A landmark case of an insurance investigation in cooperation with the authorities was the 18-month, $1 million effort of the Massachusetts FAIR Plan Association in the Symphony Road fires, which led to the conviction of 31 individuals.(L36,P77)

Because of the idiosyncrasies and usual complexity of the legal cases there is also evident advantage to specialists as prosecutors for arson cases.(L8,L70a,e,g, L115,H6,H8) It is however rare, even for jurisdictions with highly competent, full-time arson investigators to have specialized arson prosecutors. There are a few localities, such as Detroit, New Haven, and Seattle, where prosecutors do work closely with investigators in arson control programs.(L55,L63,H8,P29) Progressively more prosecutors, however, are showing an interest and willingness for closer involvement in arson cases, in order to assure prosecutable

cases.(P7,P59) It has even been suggested that the state's attorney must be in charge of arson programs.(L115)

Despite varying opinions about whether arson investigation should reside in the fire service, with an independent fire marshal, or in the police service, there does however appear to be substantial agreement that arson investigations should be full-time on that assignment.(L18,L57,L96,H2,H6,H14, P59) In this way there are specialists available familiar with the idiosyncracies of arson, generally able to reach the scene in time to preserve evidence properly and to interview witnesses while still available, and not subject to abrupt reassignment to other types of cases.(H1,H8,H12,P10,P59,P71,P73)

Cooperation between fire and police services is urged as necessary for effective fire and arson investigations. Some professionals favour division of labour.(L26, L27,P71) However the NAFPC seminar participants recommended that, except where other arrangements are now succeeding, joint arson task forces should be instituted,(L70b) an arrangement also favoured by others.(L115,H13,H14) American Management Associations urge joint task forces of fire, police, and prosecution personnel.(L89a)

One argument against joint task forces is that the non-fire agencies lose interest after the initial manic phase, basically leaving the fire service again back on its own to combat arson.(P73) This was indeed the experience of Hartford, Connecticut, where a change of administration and austerity virtually wiped out the joint arson squad.(H6)

There are stated to be very few joint fire-police arson squads.(L71) Nevertheless there are at least 149,(L2) including those of Seattle, Detroit, Lynn (Massachusetts),

Madison (Wisconsin), and Yolo County (California).(L55,L96, H13,P29) In Detroit the joint arson task force operates in parallel with the fire department's arson squad.(P29)

Maricopa County, Arizona, has established a Major Felony Bureau, which works with the fire marshal on arson cases.(P17) Phoenix is contemplating a similar arrangement.

Wide-ranging cooperation can be achieved by bringing critics and skeptics into the program early and enabling them to influence the overall anti-arson program. Six months of weekly meetings were required in Seattle; but every action proposed by the joint task force was actually carried out. (P35)

Federal agencies have become increasingly involved in arson investigations. The FBI has been giving a higher priority to arson, especially when involving sophisticated fire-setting or organized crime, most particularly arson rings.(P78)

The ATF has entered progressively more deeply into arson investigations because of the increasing use of incendiary bombs.(P21) It will send a technician to the scene to help a state or local investigation and will characterize the destructive device from the physical evidence. It initiates action via surveillance and undercover work to get destructive devices off the street.(P81) When ATF does not have primary jurisdiction but its investigation finds evidence of violation, it recommends additional counts for the United States Attorney to add to the indictment. The USPS especially is cooperative in accepting such charges from ATF investigations.(P81) The FBI however takes complete control of investigations which turn out to lie within its primary jurisdiction.

The Forest Service has long investigated arson within its domain. It interacts extensively with Canada and Mexico, as neighbours with comparable situations, and with Australia, which has a large wildland fire organization and mostly a temperate climate.(P8) The Defense Civil Preparedness Agency is concerned with arson only via plans for coping with arson by pulic safety officials who may have to cope with massive population movements.(P45)

An estimated 20 states have created task forces to formulate policy and action plans for arson control.(P7) At least some of these are broad-based, variously including representatives from police, prosecutors, investigators, fire service, insurance, community action groups, business, banking, and fire protection engineering.(L19,P59) A broad-based consensus is deemed necessary for coherent and concerted action in which undesired side effects do not pop up in an area which had not been represented during planning.(P59)

The Massachusetts group has recommended legislative changes aimed at increasing disincentives to arson. (Cf. Sec. 3.1, Law.) The Oregon task force is charged with presenting recommendations by January 1979 on how to improve and more clearly to coordinate fire reporting, investigation, and prosecution activities of all police and fire agencies.(L19) The New York task force was charged with defining the arson problem, identifying available resources and mobilizing and organizing those resources.(P59) After considering reorganizing the state's arson investigation establishment into regional teams, the group recommended instead that the proper role of the state is to provide technical assistance to the local fire and law enforcement authorities.(P59,P60)

Georgia is currently attempting to organize an Arson Advisory Council, with hoped-for representation to include news media and the judiciary.(P7)

Major organizational changes are being instituted or considered in several jurisdictions. Among these, Montana is organizing joint police and fire arson investigation teams in the 15 largest counties.(P69) Omaha is organizing a similar task force.(P86) Nebraska is organizing a new state arson unit. In Virginia the arson investigation unit will be transferred in July 1978 from the State Fire Marshal's Office to the State Police.(P94)

Georgia is negotiating to set up a joint arson strike force consisting of elements from the State Fire Marshal's Office, other state agencies, local authorities, ATF, and other Federal agencies.(P7) New Hampshire is considering establishing a separate arson investigation team in the Fire Marshal's Office.(P20) The Association of Prosecutors of the State of Texas has been approached to try to have one or two prosecutors in each municipality specialize and become familiar with the arson statues and characteristics of arson cases.(P62)

Arson control is singularly sensitive to budget constraints.(L49) The investigative aspect of the current arson control efforts makes the importance of the pervasive budgetary pressures quickly evident. One city loses its arson van, another city virtually loses its arson squad, an entire state cannot afford either a hydrocarbon detector or a gas chromatography apparatus, staffing levels for arson investigation are quite generally far below those for crimes causing lower economic loss and fewer deaths.

The resources required for a thorough investigation can be formidable. In the Symphony Road series of arsons

an eventual total of 15 teams of city and state investigators plus insurance investigators conducted a 16-month long investigation.(L81) One state fire marshal has expressed the feeling that the average time required per case is increasing. When a paid torch is involved, as is often in the increasingly frequent fraud and extortion fires, the case becomes very complicated, partly because of the interstate aspects.(P73) The pressure of ongoing work has, however, precluded analysis of the operation and verification of the apparent change in the nature of the workload.

The New York Task Force on Arson foresees funding as the major problem in upgrading the state's arson control program.(P59) Essentially urban Westchester County, New York, has one arson investigator; if he is not available, a fire is simply not investigated.(P66) Wyoming has one arson investigator on call to any fire or police department which has secured a suspected arson site.(P36) The state legislature declined to set up an arson division or a statistical analysis division.

South Dakota and Florida have allocated no funds for any arson program beyond continued investigations of incendiary fires and prosecution of arsonists.(P26,P33) Kansas has no arson prevention or public awareness program.(P23)

New York's Fire Prevention and Control Bureau in vain sought a $25,000 grant from LEAA for the preliminaries to the Governor's Task Force on Arson.(P59) With this experience and with anticipated slow reaction to another request, New York did not seek LEAA support for the actual task force.

Relative priorities are of course the key to budgets, and demonstration of the efficacy of certain strategies

as deterrents may persuade the keepers of the purse. More cogently, however, it is necessary to allocate resources from what actually is available under a prevailing budget. It would therefore be important to know -- on the basis of systematic studies rather than only intuition -- where the best balance is struck (i.e., cost-effectiveness evaluation) between universal investigation of fires to some extent and intensive investigation of selected fires, between surveillance and post-hoc investigation, between additional equipment and one more investigator.

As the organizational structures are "improved" there should be improvement in the results of fire and arson investigations, measured, e.g., by the decrease in fires merely deemed suspicious or whose cause remains undetermined. There may similarly be a decrease in the number of fires attributed to electrical causes and careless smoking, both categories having been brought into question as probably hiding a substantial amount of arson. The number of successful prosecutions would be another measure, but this obviously also depends on variables which are a function of the prosecutors.

Comparison should be possible among jurisdictions with responsibility for arson investigation variously assigned. A preliminary study in 1975 examined the question whether the effectiveness of arson investigation is a function of whether the investigation is conducted by police, by fire service, or jointly.(L2) The results were inconclusive, but according to the measure used joint investigations are less effective than investigations by either police of fire service alone. The question remains controversial.

This author recommends 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. The parameters of organization should include factors such as the organizational locus of the arson unit, whether there is a single line of authority or more, the size of the unit, the extent of police authority, the division of duties within the unit, the size and nature of the area covered, the size of the population covered, the level and type of training of the personnel, the length and nature of staff experience, the extent and type of duties other than arson control, and the nature of technical support. Measures of effectiveness might include the number of fires of undetermined origin, number of known arsons, extent of incendiary losses, number of arrests, and number of convictions. Data on pertinent intermediate variables which are neither organizational parameters nor properly effectiveness measures should also be collected, such as the number of fires investigated, time lags until initiation of investigation, personnel time per case, and duration of the investigations.

It may be possible better to evaluate certain organizational variables by examining jurisdictions in which reorganizations are planned or have recently been instituted. In any case, it would be instructive to determine the reasons for the reorganizations and the authorities' criteria for measuring improvements in effectiveness.

In view of the large number of variables it should not be expected that definitive evaluations will be possible of the effect of each aspect of organization. Reasonably reliable indications should, however, emerge of the conditions under which police arson units, joint arson units, or prosecutors, for example, can operate satisfactorily; of the marginal value of each additional fire investigators or police

detective; and of the resources needed to bring investigation and prosecution of incendiarism up to variously defined "satisfactory" levels.

Such a study would cover in gross outline the law enforcement portion of the overall system of arson control. It would indicate means to isolate and evaluate key policy features such as joint arson squads or dedicated arson prosecutors.

2.2 Training

A need for greatly improved training of professionals dealing with arson is widely recognized.(L10j,L18,L26,L29,L49, L70e,L71,L89b,L98,L115,H1,H5,H6,H8-H14,P11,P19,P28,P49) It has been bluntly stated that there are only a handful of people in the entire United States who are fully competent in arson investigation and that 90 percent of the country has no arson training program.(H1,P66)

So stark an evaluation is disputed by others.(P73,P98) Most of the country indeed is not without training programs. There are seminars, workshops, evening courses, college courses, and in-service training programs in, for instance, at least 16 states and a number of localities.(L13,L19b,L27,L29,L56,L63,H11, H12,P6,P7,P17,P20,P34,P44,P46,P47,P62,P69,P75,P97,P99) The Air Force includes a few hours on arson in both its basic course on property destruction and in its advanced criminal investigation course.(P80) The American Law Enforcement Officers Association has sponsored a home study course on arson.(P68)

It is the adequacy of the training compared to the magnitude of the arson problem that is questioned, though

some individual training programs seem fairly strong. Articulate dissatisfaction with available training methods, facilities, and opportunities was expressed, for example, by the chief arson investigator of the District of Columbia.(P56) Arizona conducts a college-accredited basic arson workshop and plans intermediate and advanced workshops.(P17) Arkansa conducts separate 9-hour introductory courses for firefighters and for policemen and a 24-hour school of arson crime scene search.(P97) A single arson course in California has been certified by the state for training peace officers.(P47) Georgia offers a one-day arson seminar several times a year and an annual one-week seminar.(P7) Idaho conducts occasional seminars on arson.(P46) Kentucky arson investigators receive an initial indoctrination period plus on-the-job training. (P34)

Maine sponsors an annual week-long conference on fire and arson for fire service personnel from New England and the Maritime Provinces.(L56,P6) Several 15-week courses on arson topics, based largely on NFPA material, are offered at all of Maine's vocational schools. Shorter versions of the courses are offered throughout the state to fire and police personnel.

Maryland operates an annual school for fire investigators, including classroom work, field scenarios, and mock courts.(L27) Attendance is required for recertification of fire inspectors.

Montana trains its local law enforcement officers in arson investigation, using NFPA training packages and with LEAA financial support.(P69) New Hampshire conducts a 40-hour course and night training courses on arson.(P20) The Oklahoma Office of State Fire Marshal conducts an on-going

training program; it has had little success, however, in getting police personnel to take the basic arson investigation training.(P75)

The Oregon State Fire Marshal's Office provided fire cause and arson investigation training to 1,200 fire fighters during 1977.(L19b) The State Police and local police and fire departments conduct additional training of their own personnel, and community colleges offer fire cause and arson investigation classes.

Pennsylvania conducts arson detection seminars throughout the state.(P99) Utah conducts, for the intermountain region, an annual arson workshop lasting just 12 hours.(P44) Virginia has had an arson training program for 23 years, emphasizing practical application areas.(P73)

In one example of a locality training its own personnel, Houston has trained all firefighting line officers in a 440-hour program covering detection of arson, cause of fire, and preservation of evidence.(P62) Twelve-hour training programs given for the firemen at all firehouses familiarized them with what to look for and gave an insight into the fire marshal's job. This training has been very effective and has promoted much stronger cooperation from the fire suppression service.

In order to make high quality training available in at least the basics, the NAFPC has initiated an 80-hour course for fire officers on investigation of incendiary fires and a 24-hour course for firefighters on arson detection.(L122) This is being offered in each of the 10 regions of the United States.(P66) A similar course on explosives and seminars for arson investigators are being planned or contemplated.

The opinion has been expressed that the vast majority of the effort needed to improve the arson situation should be expended on training in investigation and in detection of arson.(P66) The NFPCA can, and since early 1978 does, provide training sessions for investigators and firemen. But it cannot subsidize the costs of fire personnel to attend these courses. Such support by LEAA has been suggested.(H13)

The complaint has been voiced that the NFPCA approach to improved handling of arson investigation is better training for firemen, and that it was unreceptive to bringing police types into its program.(P71) This is surprising indeed, since the head of the arson program of the NFPCA is a long-time law enforcement officer.(P66)

Follow-up on training is urged to assure that what is learned is also applied.(L29g) This might be done by state agencies making unannounced spot checks within their jurisdictions. Federal aid might be tied to such a requirement.(P21)

Fully adequate training of arson investigators requires practical training in the field.(L29d,H6,H9,H11) Adequate training of an investigator is asserted to require five to six weeks of classes plus about six months of apprenticeship in an active arson investigation environment.(H11) The number of self-taught experts available assertedly suffice for an apprenticeship approach to teaching newcomers.(P19)

It is however evident that field training under expert tutelage is not readily available to all who might profit from such training. Training programs have been urged for police in fire work and for fire personnel in police work.(L18,L57,L70e) It has been suggested that these be "canned".(P2,P13)

To the relatively isolated fire marshal who is necessarily only a part-time investigator, training films and practical demonstrations of new techniques are useful. A particularly useful type of film would be a documentary showing a fire marshal at work on site, with commentary dubbed in.(P28) Practicing but relatively inexperienced investigators ask for practical pointers, covering what experts have learned from experience and tricks of the trade. The case study approach is said to be very useful.(L29a,f,P49) A plea has been voiced for the LEAA to issue booklets for law enforcement officers on various aspects of fire and arson investigation.(P58)

Regional training courses or conferences provide the side-effect of serendipidous synergism among professionals from different jurisdictions who had unknowingly been working on closely related cases.(P63,P66) There is of course also the usual exchange of notes on new developments and professional techniques.

Explosions, associated with fire or separately, require investigation somewhat as do fires. Investigation of arson, of explosives, and of accidental explosions, though related, are nevertheless distinct sciences.(P21) Arson investigation depends heavily on a knowledge of materials. Dealing with explosives requires knowledge of fuze systems, blast characteristics, appearance of devices, and model making. Investigations of accidental explosions tend to rely substantially on mechanical engineering and physics.

Arson investigators are in some jurisdictions full-fledged law officers,(L55,L105b,H1,P40,P62) and in at least some instances receive police training.(L27,P29,P62) Some investigators maintain that it is easier to teach fire fighers investigative techniques than to teach detectives all about fires.(H14)

Beyond the need for investigators and firefighters to be trained in recognition, collection, and packaging of arson evidence, investigators and prosecutors must know what experts can and cannot do.(P61) Firefighters should know why various types of evidence are important. Preserving and securing the scene of a fire has been known to culminate in conviction for pre-meditated murder by fire.(L60,P10)

The psychology and techniques of interrogation are important to investigators (cf. Sec. 4.1, Psychological Research). The polygraph and the voice stress analyzer can be among the best aids to the investigator in the hands of a full-time specialist.(H16) Hypnosis can also be useful with willing witnesses.

Investigators must be trained in organizing and presenting their findings. They must write proper reports and must be able to prepare court cases and to present evidence clearly and authoritatively.(L4,L13,H1,S4,P21) Many excellent investigators are weak on reports.(P21) Younger, more recently trained investigators tend to do better.(H1)

Of the three major types of fire investigations, wildland fire investigation is considerably different from investigation of structural or vehicle fires.(P57,P66) The most fundamental point to be made about wildland fires is that the point of origin and cause can normally be determined. (L4,P57)

Urban arson investigators have been shown that empty-lot and freeway-divider fires can be dealt with as well as structural fires.(P57) There are characteristic patterns, and fire behaviour is known. Wildland fire scenes are more easily damaged by suppression efforts than are structural fire scenes, making training in preservation of such scenes all the more important. When there is a fatal wildland fire,

by their very nature there are usually multiple fatalities. (P57)

Battelle Institute presented an analysis in 1975 of what is needed, under some 20 topics, in a training course for investigators.(L29) The NAFPC has taken the lead to become the national focus for designing, offering, and promulgating courses for firefighters and fire and arson investigators. The NFPCA is considering preparing and issuing an arson investigator's handbook.(H13) The National Wildfire Coordinating Group is active in training wildland fire investigators. (P8)

The need to train not only investigators of all types but also the various types of specialists in the application of their several fields to arson has been recognized. (L70e)

The Forensic Sciences Foundation conducts continuing education and certification programs for crime laboratory and medical examiner personnel. None of its workshops, research projects, or certification programs has however been specific to arson investigation.(P70)

Insurance claims adjusters have been identified as a distinct group requiring arson training.(L29h,L41,L76) The American Insurance Association has produced a sound film (shown to 5,000 people in 1977) intended to make good observers of insurance adjusters. Another version of the film has been prepared for volunteer firemen.(P87)

The Battelle Institute Human Affairs Research Center, in setting up a Center on White Collar Crime, has begun to identify what subject matter needs to be included in a

training program intended for investigators of all types (fire marshals, police detectives, insurance investigators) and for prosecutors.(P43) Arson, however, is within its scope only to the extent that insurance fraud or extortion are involved.

The one major group for whom training in arson is almost totally lacking, although the need has been recognized, are prosecutors -- not to mention defense attorneys, civil lawyers, and judges.(L19f,L70a,e,L89b,H13)

Of all the schools for prosecutors, none offers a course on arson.(H13) During 1978-'79 the National College of District Attorneys will include half a day on arson in its three- to four-day course on crimes against property and some arson material in the organized crime seminars.(P89) When students after each session of the NCDA courses are asked what else should be offered or expanded upon, arson is never mentioned. Indeed, when segments on arson have been included in the career prosecutors' and executive prosecutors' courses, students stated that they saw no need for including material on arson!

It is striking to note that a report presenting "a comprehensive assessment of existing arson training resources" deals with training the professional investigator and the trained observer but not with training the prosecuting attorney.(L29)

The lack of understanding of arson among prosecutors, their reluctance to prosecute, and the wrist-slapping attitude of the courts is widely decried by law enforcement and insurance personnel.(L18,L29b,H13,P7,P87)

Some arson seminars aimed at law enforcement and fire service personnel are drawing a few prosecutors.(P7) The

ATF trains United States Attorneys on a case-to-case basis in the technical aspects of destructive device and explosives cases. The prosecutor is coached on the questions to ask and the answers to expect from an expert witness; exemplar items, photographs, tests, and other exhibits are discussed with him. The examination of the expert witness in court then leads through a series of "In your opinion ... ?" questions to, "This is a destructive device under U.S. Code such-and-so."

Some attention has been given to organizing and presenting what is involved in conducting a civil defense against a fire insurance claim by alleging arson,(L14) but there seem to be no arson training sessions aimed at civil lawyers.

This author recommends that NILEJ conduct a study to establish the content and structure of an arson course aimed at prosecutors. This study should be undertaken in coordination with the National Academy of Fire Prevention and Control and the National College of District Attorneys. Such a course would be a complement to the NAFPC course for fire-fighters and investigators.

The study would have to establish what technical aspects of arson need to be included, the idiosyncrasies of arson cases which must be discussed, what needs to be said about dealing with masses of physical evidence and expert witnesses and about overcoming the suspicion of circumstantial evidence, how to train prosecutors in turn to train fire and police personnel in evidentiary requirements for an arson case, and what the optimum length of such a course is. Cognizance will undoubtedly have to be taken of the variations in statutes dealing with incendiarism.

The study should probably rely in large part on interviews with prosecutors who have acquired substantial experience with arson cases, with a selection of other prosecutors who have had to struggle through a few such cases, and with investigators and experts who have been substantially involved with preparing cases and testifying. It may well be that a significant part of existing firefighter/investigator curricula can be adapted to a prosecutor course.

The needs for such a course should be established on the specific assumption that the course will be implemented. The past experience of the National College of District Attorneys notwithstanding, it is reasonable to expect that the recent heavily increased emphasis on combatting arson will generate significant interest in the course among the intended audience. The needs identified for the course will of course have to be translated into a full syllabus and course content, and appropriate arrangements made for actual presentation. Suitable publicity will also have to be devised and disseminated.

As progressively more investigators (and firefighters) are adequately trained, better performance should be measurable according to the measures of the number of fires of undetermined origin, etc., noted in Section 2.1, Organization and Resources. Not only should it be possible to compare performance of arson investigation units differing in the type and amount of training and experience the investigators have, but it should be possible to determine the effect of training by a before-and-after approach. This author recommends a study to correlate particular features of training content and mode of presentation with arson unit performance.

Such a study would have to be coordinated with the NAFPC, which has taken the lead in improving investigator's and firefighter's training. The results of the study would augment the pragmatic basis for the content of formal training courses in the extensive experience of investigators with some experimental basis. It should be possible to determine residual problems and situations not addressed by the training and thus to evaluate the contributions of various aspects of training and to identify gaps.

2.3 Insurance

Fire insurance as an institution is certainly of central concern in any consideration of arson suppression. On the one hand arson for gain is most frequently an insurance fraud scheme. On the other hand fire investigations for insurance companies are an important adjunct to official investigations.

Certain restrictions which apply to law enforcement authorities conducting arson investigations do not apply to insurance companies, notably the Fourth Amendment and the Miranda decision.(L14,L87a,L101,H2,H4,H12) More significantly, perhaps, an insurance company has the right under the insurance contract to require the insured's cooperation and can thus demand access to bills and receipts, viewing of the damaged property, and examination under oath.(L14,L41,L43,H2,H4) Such examination can also be required of employees under the direct control of the insured and of a mortgagee named in the policy.

The law varies from state to state on whom an insurance investigator may question, particularly with respect to mortgagees, corporation officers, and visitors.(H2) Banks can

be very helpful, within the constraints of what they are allowed to divulge.

A civil case against a policyholder requires only the preponderence of the evidence.(L10d,L41,L43,H2) Furthermore matters such as falsification of records, witholding of pertinent facts, and increase in hazard can be brought to bear.

Damaging publicity and refusal to pay out on an insurance policy can be powerful deterrents.(L55,L73) After these actions happened in Seattle to one restaurateur who suffered a fire while in severe financial difficulty, no further major restaurant arson fire has occurred in that city. Insurance companies fear that failure to sustain a contention of arson can cause serious trouble under specific consumer protection laws or under libel laws (cf. Sec. 3.1, Law). However this fear is also viewed as exaggerated.(L29c)

As legal sanctions are lifted in various jurisdictions, insurance companies can more readily provide information to authorities investigating suspicious fires. In addition to passing on the results of their own investigation, insurance companies are urged to inform the authorities of the extent of coverage on burnt properties.(L10k,L18) The hope has been expressed that they might go one step further. Insurance companies are very efficient in informing state authorities when automobile insurance is cancelled. Perhaps they apply such techniques whenever noteworthy activity occurs concerning fire insurance.(P48) Such information would be a significant augmentation of a real estate record analysis system (cf Sec. 5.2, Pattern Analysis).

The one area which falls specifically in the insurance domain and in which marked improvement might be achieved

by reducing the monetary incentive for fraud arson is pre-insurance inspection.(L18,19e,H13,P55) A causal relationship has been attributed to the prevalence of pre-insurance inspections in Europe and the low arson rates reported there. (H13) At least one arson fraud scheme has depended specifically on selecting insurance companies which did not inspect properties in the geographic area of the fraud.(P55) The Oregon Task Force has tentatively linked lack of inspection to overinsurance and its attendant moral risk.(L19e) Some states now require such inspection, but the law is not necessarily well obeyed.(L36) Insurance companies in New York are now required visually to inspect and to photograph automobiles before issuing property-damage (including fire) policies.(L1) Insurance agents complained vehemently about this requirement because of costs and inconvenience, but very few complaints were voiced by consumers.

This author recommends that NILECJ conduct a study to determine the magnitude of the effect of property inspections by insurance companies prior to issuing fire insurance. The study could probably be conducted most readily by comparing the loss experiences of companies which do and do not conduct inspections prior to issuing polices in the same jurisdictions. Parts of the study might also compare results within individual companies of inspecting some properties and not others, both within a given jurisdiction and in distinct jurisdictions.

The study would have to characterize the inspections with regard to scope and thoroughness: what attributes are examined during physical inspections, what records are kept, what background checks are made of the parties at interest. Confounding factors must be identified and to the extent possible their effects separated out from that of inspections, certainly attributes of the properties being insured (type of

structure, type of occupancy, nature of the surroundings, etc.) but also extrinsic factors such as fire codes, insurance laws, and the general success of arson investigation and prosecution in the areas under study.

The extent to which incidence of arson and size of losses correlate with pre-insurance inspections and with the nature of the inspections will identify the values of various types of inspection. The costs of conducting the inspections should be determined as part of the same study to permit cost/benefit analysis.

3. LAW AND LAW ENFORCEMENT

The fundamental societal judgement against arson has been embodied in a number of laws prohibiting various form of incendiarism and related acts. In this section, the role of such laws, the relationship of other laws to arson, and some of the inconsistencies in laws are discussed. Next there is a discussion of the workings of law enforcement beyond investigation, and finally a discussion of the role of evidence.

3.1 Law

Arson as such is normally a state offense. There are however several Federal statutes under which action related to arson are proscribed. Prominent among these are the Gun Control Act,(L94) the Explosives Control Act,(L108a) Interstate and Foreign Travel or Transportion in Aid of Racketeering Enterprises Act,(L100) Racketeer-Influenced and Corrupt Organizations Act,(L108b) and the mail fraud statute.(L118)

Three Federal law enforcement agencies have concurrent jurisdiction: the Bureau of Alcohol, Tobacco, and Firearms; the Federal Bureau of Investigation; and the U.S. Postal Service. The U.S. Postal Service generally has jurisdiction because of false claims sent to insurance companies through the mails or of attacks on postal facilities. The FBI covers the racketeering offenses and most attacks against Federal property. ATF entered the arson field under the provision of the Gun Control Act of 1968 covering destructive devices, which include firebombs and ignition devices,(P61,P81) and also acts under the Explosives Control Act. Other Federal agencies which investigate arson, against particular

types of property, are the Department of Defense, the U.S. Coast Guard, the Forest Service, and the Bureau of Reclamation. Thirteen Federal agencies have some form of authority in explosives matters.(L120)

The states currently operate under widely divergent arson statutes, other laws relevant to arson, and case law. One difficulty in dealing with arson is an absence of agreement among the states even on what constitutes arson. In Minnesota, for example, you could legally burn your own house down as long as you did not claim insurance reimbursement.(P9) In Colorado setting a fire in a trash bin is a felony.(P9) Vehicle incendiarism is not arson in New York, but criminal mischief.(P66) In North Dakota arson is setting a fire or explosion "with intent to destroy building or inhabited structure or another or a vital public facility";(L104a) a vehicle fire or wildland fire is endangering by fire -- provided pecuniary damage exceeds $5,000;(L104b) lesser damage makes the act criminal mischief.(L104c) In Texas an individual cannot be charged with arson for burning his own property if he makes no claim for insurance payment; if another person's property is burned, the owner must be the complainant.(P62) A person can avoid prosecution by withdrawing his insurance claim; a spite fire within the family cannot be prosecuted; and there can be no prosecution if the owner of derelict buildings destroyed brings no complaint. In Georgia insurance claims are not germane to arson prosecution, but a mortgage or other lien on a structure is.(L39) In Oklahoma if insurance is in force at the time a fire is set, arson is committed, regardless of ownership and regardless of whether a claim is filed.(L105a) Minnesota law was changed only a few years ago to include burning one's own property under arson.(L76)

There are open questions in some jurisdictions whether the Fire Marshal has the authority to conduct a

criminal investigation.(P61) In other jurisdictions fire marshals have either full police power or police power with respect to crimes involving fire, and they may have subpoena or swearing power.(L14,L55,L105b,H1,P29,P40,P62) In Connecticut a fire marshal, by law, must establish the cause of a fire.(H6) A policeman cannot testify as to cause. In Texas and Illinois state fire marshals are not allowed to testify in a civil fire insurance case.(L14)

The complexity of comparing state laws may be illustrated by the fact that a superficial analysis of those fire control laws pertinent merely to forests in 13 Southern states used 14 topical categories and 64 sub-categories.(L6)

Laws which do not overtly deal with arson nevertheless have major effect on the gross arson situation. Notable among such laws are those related to insurance. Here too there is rampant disarray among the states. Twenty-four states have been operating under some version of the Unfair Trade Practices Act which requires that insurance claims be settled expeditiously and fairly.(L65b) In Missouri, for example, an insurance company can be assessed punitive damages after an unsuccessful refusal to pay out on a policy.(P55) Nineteen states (not a subset of the above 24) have been operating under valued policy laws, which direct that in case of total loss the insurance settlement must be for the full face value of the policy.(L65b) Oregon, notably, prohibits fire insurance for more than the actual cash value of a property or for more than the insured's interest in the property. (L107)

Inspection of property prior to insurance may be theoretically required, as in Massachusetts, but it does not necessarily occur.(L36) Legislation prohibitng red-lining may

remove the option of not accepting a bad risk. It is now possible to insure a property under a binder, for any amount, sight unseen. If it burns down with a few days, the insurance company may not even know yet that it had insured the property -- nor could it determine the value prior to the loss.(L59)

Under privacy laws in several states, insurance companies risk being sued for damages if they report suspected arson to the authorities but the case is not proven.(L19e, H4,H14,P55,P65,P87) Insurance companies are described as not unwilling to pass information on to the authorities, but they need to protect themselves from lawsuits.(P65)

Ohio in 1976 enacted what is believed to be the first law granting insurance companies immunity from suit when they turn arson investigation information over to law enforcement officials.(L85) Maine now allows insurance investigators to pass information on without liability.(H17) Under a recently enacted Connecticut law insurance companies must supply all available information about an insured upon request by the State Fire Marshal (who must keep the information confidential). The state official is specified in order to control abuses.(H8) Georgia now actually requires insurance companies on their own initiative to notify the State Fire Marshal of any suspected incendiary fire.(P7)

The American Insurance Institute wants to encourage insurance companies to initiate contacts with the police when something does not look right. However, additional immunity laws may be needed before insurance executives feel free to comunicate suspicions of fraud to the authorities without fear of suit for libel, slander, and punitive damages. (P87) Efforts to enact such laws have been hailed as more worthwhile than attempts to have arson reclassified as a Part I crime. (H14)

In Vermont insurance companies must, upon request of the State Fire Marshal, supply information about claims paid. (L75) Insurance companies in North Dakota and in Idaho are required to report fire losses, with specifics, to the State Fire Marshal.(L97,L104d) Oregon requires that insurance companies file adjusters' loss reports. However these reports are not always filed.(L19e)

There are some restrictions on how data may be accumulated. Misouri law forbids insurance companies from compiling computerized files of bad risks.(P55) There appear to be no legal stumbling blocks to the Property Insurance Loss Register.(P87) However there has not yet been a study of the several state privacy laws, which often differ from the Federal Privacy Act, to determine their effect. It is to be noted that all claims (for amounts over $500) to member companies would be entered into the PILR, with no allegation or suspicion of fraud.

There is activity, to some extent at the Federal level and more extensively in the states, to modify laws pertinent to arson.

Concentrating his attention on arson for profit, (L86a-c) Senator John Glenn has introduced a bill which would specifically authorize the LEAA to make grants to States for programs to combat arson of urban buildings by (or at the direction of) the owners.(L80) The Fire Marshals Association of Northern America urges that state and local fire authorities be authorized to participate directly in arson detection and prevention programs under LEAA funding, that the domain of concern be extended beyond urban structure and beyond arson by the owners of the building burned, and

that fire, police, industry, and others all be involved in developing and implementing a uniform arson reporting system.(L92) By an amendment to the Criminal Code adopted by the U.S. Senate(L86d) the Federal Bureau of Investigation would be directed to classify arson as a major index crime (i.e., a Part I crime).(L90)

Massachusetts has established an Arson Commission with co-chairmen from the two houses of the legislature. This commission, with input from the NFPA among others, has recommended 16 sets of amendments to state law to realign authority and responsibility of fire service, fire marshal, and police to increase the disincentives for arson.(P77) It has been argued that the current incentives for different types of fire-setters must be examined separately and that appropriate disincentives must be introduced for each. Among the legal changes proposed are allowing insurance companies to give information to the authorities without liability, requiring payment of back taxes from insurance proceeds, requiring that insurance proceeds be used to tear down the fire ruin, and reclasifying arson as a violent crime (thus delaying eligibility for parole).(P77) In some foreign countries arson is a violent crime, in others, including France, it is treated as a property crime.(S16)

The recently formed New York Task Force on Arson, in contrast to its Massachusetts counterpart, concluded that no fundamental legislative changes are needed. It restricted itself largely to recommending clarification of the responsibility of fire chiefs in determining the cause of fire.(P59) By contrast, Oregon's arson and reckless burning laws are deemed inadequate.(L19f) New Jersey has a proposal to provide stiffer prison sentences for forest arson.(P16)

The insurance industry is pushing new legislation in order, as they see it, better to balance the ability of insurance companies and the authorities to combat fraud against the public's right to privacy.(P87) The Property Loss Research Bureau, in cooperation with the Alliance of American Insurers, is developing a model immunity law to enable insurance companies to provide information about policyholders to the authorities.(P96)

The participants in the NAFPC seminars recommended development of a new model state arson code;(L70g) the Fire Marshals Association of North American and other organizations have done likewise.(P84) The National Fire Prevention and Control Administration has drafted a complete new model arson code to replace the model code dating from 1928.(P66) The Property Loss Research Bureau has drafted, and submitted for NFPCA consideration, its own model arson code.(P66,P96) The NFPCA has submitted its draft to 26 interested parties for comment, including the American Bar Association, the National College of District Attorneys, and those state fire marshals who have a say in fire codes.

Canada's arson laws, which resemble those of some of our states, trouble Canadian professionals. The Canadian Association of Chiefs of Police and the Canadian Fire Marshals and Commissioners have jointly recommended that the Canadian arson law be amended to proscribe incendiarism of vehicles and and of wildlands and possession of incendiary bombs.(P72) The proposal is still under study by the Department of Justice and has not been submitted to Parliament.

Some efforts have been made to compile pertinent law. In connection with its development of a new model arson code,

the NFPCA has compiled a set of all state arson laws.(P66) In support of its own work the Insurance Crime Prevention Institute has also begun a compilation of state arson laws and has compiled the laws on insurance fraud in all states. (P1) These compilations are available to prosecutors and other interested parties. ATF has compiled those portions of state arson laws pertinent to explosives.(L120)

Some compilations have been prepared for individual states. North Dakota publishes a pocket-size compendium of all state fire laws.(L103) The Prosecuting Attorneys' Council of Georgia has prepared a brief legal digest for arson investigators, covering statutes, case law, and evidence.(L39) A retired fire investigator of very extensive experience, Laurence Dolby, is reported to have recorded a seven-hour disquisition on legal problems encountered by the fire marshal. This was made the basis of a course at the Southern Maine Vocational Technical Institute.(P77)

An extensive body of case law applies to arson investigation and prosecution. The laws of search and seizure aply in an arson case.(L39,H8) There is divergent case law governing the consitutional limits. It is not necessary to desist searching and to wait until a warrant has been obtained. (S50,H12) However, once you break off you need a warrant to restart. Nor may you remain on the scene for weeks without a warrant or consent. For a warrant the authorities must state what evidence they expect to find.(L87a) However exigent circumstances, such as the fear that the fire will rekindle, may permit warrantless search.(S50) Consent for access from the person in charge of the premises protects the admissibility of the evidence found.(L39,H8)

A dying declaration must be properly taken.(H8) A suspect's clothing may be seized immediately that he is taken into custody. Confessions should be in writing or tape recorded.

Refusal to submit to an examination under oath on Fifth Amendment grounds -- for example, during pendency of a criminal arson investigation -- has been held to be a valid defense in a civil case against an insurance claim because it violates the insurance contract.(L14) The ATF has been upheld in court in its right to examine the records of any licensed alcohol dealer. (P61).

It can be very important to select the proper statute under which to charge a suspect.(P21) Otherwise the defendent might be found not guilty, immune from further prosecution for the same offense under the appropriate law,(L87b) and possibly even in a position to sue for false arrest.

Some bad case law has grown up to hamper law enforcement forces. A court has held, for example, that a combination of dynamite, a blasting cap, and a fuse is not a destructive device! In another case a simulated grenade (loud noise without shrapnel) is an overgrown firecracker, not an incendiary device -- but simulated grenades are used specifically to start fires, including by the Forest Service in setting backfires.(P21)

Americans for Effective Law Enforcement has occasionaly researched points of law, e.g., on search and seizure and on personal liability, for police who have had problems arising from arson cases.(P83) However there appears as yet to have been no effort systematically to compile case law pertinent to arson,

Administrative regulations and practices are also significant. Most notable among these are the procedures by welfare

authorities -- now discontinued in at least some jurisdictions -- of providing a payment to replace belongings lost in a fire and of placing families whose dwellings have been damaged by fire at the top of the waiting list for housing.(L18,P66)

The preceding discussion indicates how complex, confusing, and unsettled the legal situation is concerning arson. The efforts to introduce a model arson law, to change civil liability exposure, to modify insurance law, and otherwise to change legislation underscores the importance which has been attributed to better law as a signifant weapon against arson.

This author recomends that the NILECJ prepare a comprehensive compilation of statutes, case law, and regulations pertinent to arson. Existing compilations, such as those by the NFPCA and the ICPI, should of course be used. Cooperation by these organization should be sought to identify material ultimately excluded from their compilations, but pertinent for the more comprehensive collection. Federal law certainly should be included. The compilation would have to range over criminal law, fire laws and regulations, administrative law, insurance law, building codes, and welfare regulations. Criminal and civil case law should be gathered from Federal and state appellate courts dealing specifically with incendiarism, with situations surrounding fires, and more general cases shown to be pertinent by citation. It may be worthwhile to include the laws of countries such as Canada and the United Kingdom, the origins of whose arson laws are shared with ours, in the coverage.

Such a comprehensive compilation would be a major anchor point for systematic reviews of areas of law, e.g., insurance law or tax law, as they pertain to arson in much the same way that the compilation of arson laws proper was

necessary in the development of the model arson law. The case law would be a rich source for training material on the legal aspects of arson investigation, prosecution, and control. Handbooks for fire and law enforcement personnel could be developed for each state, perhaps an alloy of the pure statute listing of North Dakota(L103) and the brief discussions of cases of Georgia.(L39) The compilation would furthermore support, and perhaps suggest, studies of comparative experience under the laws of different jurisdictions.

3.2 Arson in the Criminal Justice System

A considerable amount has been written about the detection and investigation of arson(L2-L4,L22,L43,L48,L60, S3,S22,S48,S49) Some discussions have been published about the legal adversary aspects of arson cases.(L14,L33) Beyond this there appears to have been very little consideration given as yet to the interactions of arson with the criminal justice system. The NILCJ itself is including arson among other crimes in an examination of sentencing practices.(P82) Otherwise what is known, or at least asserted, is episodic and emphasizes three aspects: prosecutors are reluctant to prosecute, juries are difficult to convince, and judges are too lenient.

There are wildly differing estimates of the percentage of arson cases resulting in arrest and conviction. At one extreme the Domestic and International Business Administration estimates an overall national average of 1% arrest and 1% conviction of those arrested.(L88) Sources closer to the problem cite a rate of 1 to 4.5% of arsons resulting in convictions(L19c,L34,L56, L57,L73,H14) Arrests and convictions for "woods arson" are characterized as notably infrequent.(S33) For some sizeable juris-

dictions, however, much higher estimates prevail: clearance of fires established as incendiary by arrest in 24 to 50% of the cases and conviction rates of 64 to 90%.(L50,L56,L63,H6, P33-P35,P73,P94) The national apprehension rate for arson has been stated to be 25%.(L50)

The warning has been stated, in another context, that conviction rates and arrest rates considered in isolation may be very misleading as over-all measures of law enforcement success.(L11a) A conviction rate of 88% for cases tried on top of an arrest rate of 72% for complaints filed may obscure a 7% overall conviction rate for actual offenses becase of intervening factors such as unreported offenses, cases not accepted for prosecutions, failure to obtain indictment, and post-indictment dismissal.

Each type of offense must be tracked through the criminal justice system separately in order to evaluate the function of the several parts of the system.(L11b) The data available for arson, in the District of Columbia, were so sparse that arson is subsumed in "property destruction", which itself is aggregated with several further crimes under the "other" category of "non-violent property" crimes; arson does not appear in an index of about 280 entries.(L31)

Statistics on disposition must in any case be accepted somewhat skeptically if the experience of one city is typical: the case files or court dockets could not anywhere be located for 22% of the arrests made during a 10-year period. (L112)

Arson is commonly characterized as difficult to detect, more difficult to prove, and still more difficult to convict for.(H14) A typical characterization of arson is "one of the least detectable, least prosecuted crimes ... extraordinarily difficult to combat."(L88)

Frustration has been expressed over the attitude of the courts, which tend to view arson too leniently.(H8, P56) Only when homicide is involved is sentencing viewed as more appropriate to the severity of the crime.(H8) The penalties can be so severe, however, (e.g., in New York arson I is classed with murder and kidnapping) that it is very difficult to obtain a conviction.(P59) This in turn leads to a considerable amount of plea bargaining. A change in this situation is foreseen if juries (i.e. the public) were convinced that arson is not a mild white-collar crime.

Prosecutors are noted as being at times reluctant to accept arson cases because of the circumstantial nature of the evidence, the length of the court proceedings, and the low conviction rate.(L19f,L57,P66) There is also the troublesome question in some jurisdictions of who is the complainant. Arson is a notoriously difficult crime to prosecute. Normally there is no eye witness. On the other hand, there is usually a virtual army of other witnesses and a mass of physical evidence. The significance and import of all the evidence must be made convincing -- first to the grand jury and then to the petit jury.(L4,L13) It is necessary to prove a negative: that no accidental cause could have resulted in the fire.(H8)

Arson investigators in some jurisdictions are acutely aware of the absence of prosecutors experienced in arson.(P56, P62) The U.S. Attorney's Office for the District of Columbia has been very unreceptive to informal overtures to assign a prosecutor to specialize in arson,(P56) as has been done in Detroit and Seattle for example.(P29,P35) Effective prosecution of arson is deemed an important deterrent to arson. At least one prosecutor has been quoted as saying that arrest and trial for arson is a disincentive even if there is no conviction in a given instance because it changes the percep-

tion of arson by the distressed businessman, his family, friends, and associates as a crime rather than as a desperate business maneuver.(P52)

A major portion of the overall system which must be understood and should be brought to near optimum in dealing with arson is the portion of the law enforcement estalishment centering upon the courts. Yet there appears to be even less reliable information available about arrests, convictions, and sentencing for arson than exists about arson incidence and loss. This author recommends a group of three studies of law enforcement as it applies to arson beyond investigation.

The arrest rate for incendiarism should be determined for a spectrum of jurisdictions. Consideration must be given to whether the incendiarism basis includes suspicious fires with unquestioned arson. Correlations should be made, to the extent the data permit, with systemic factors, (e.g., legal technicalities such as when incendiarism is not illegal and who must bring a complaint), organizational factors (e.g., whether there are full-time arson investigators and whether they have police and subpoena powers), and resources applied. In cases where there is no arrest, the reason should be determined, such as absent or inconclusive identification of the perpetrator, fugitive from justice, or defects in the evidence.

A companion study should determine the disposition of arson cases in various jurisdictions. A more limited study has been proposed focusing on the decision of whether to prosecute.(L89e) Distinctions would have to be made among the specific crimes with which the suspects were charged. Dispositions would range over refusal to prosecute, failure to indict, dismissal, not guilty verdict, guilty plea to the original charge or to a lesser charge, conviction on the

original or a lesser charge, and various types of disposition by juvenile authorities. The most important correlation to be sought is with the type of evidence available to the prosecutor, but systemic and organizational factors (e.g. whether the prosecutions are by specialists or whether the cases are passed from one prosecutor to another between arrest and trial) should also be considered.

One tool available for he disposition study is the Prosecutor's Management Information System.(S18) As a by-product PROMIS offers data on cases as they have made their way through court.(P25) A measure of the reliability of the data in the PROMIS systems is the fact that prosecutors actually feed data into and use the system. Arson cases are relatively rare,(L31,L47a,P82) but the data are available from those prosecutors' offices which use PROMIS.

The statistics themselves will help to define a major piece of the overall arson problem. Such correlations as can be made will highlight the factors which provide the best leverage in apprehending and convicting arsonists. Where the data are insufficient for determining correlations (in contra-distinction to data showing a lack of correlation), NILECJ will have identified areas where further, more detailed study is needed in order to identify the processes prevailing.

Finally, continuation and augmentation of the study of sentencing practices for arson convictions is recommended. Sentences should be examined for consistency within jurisdictions and across jurisdictions. Some correlation might perhaps be found with the judges' perceptions of the seriousness of the crimes as expressed when passing sentence.

Once reliable statistics are available on arrests, convictions, and sentences and also on arson incidence it will become possible to support or refute various hypotheses concerning disincentives to arson related to certainty of apprehension, probability of conviction, and severity of sentence.

3.3 Evidence

Circumstantial evidence is the hallmark of the arson case. It is precisely this aspect which makes many proecutors wary of arson cases and juries very skeptical. The question comes to mind whether there are any general statements which can validly be made about particular aspects of evidence and successful prosecution. There is the related question of what types of evidence are avialable and should be sought by investigators.

There is sharp disagreement on the extent to which modus operandi of arsonists is changing. Some people hold that there is very little sophisticated technology used by arsonists and that consequently not much is needed by investigators.(P29) Others insist that arsonists are constantly using new devices and that there are trends in arson methods.(L70h, H14)

"How to" manuals for explosives and incendiary devices are widely distributed.(P21) Originating largely in British and U.S. Army manuals they have appeared in Russia, China, Japan, and almost everywhere else. ATF maintains a library of revolutionary manuals, sabotage handbooks, literature on improvised incendiary devices, and the traditional Black Book of sabotage. Ironically, many manuals available on the street are still classified as Confidential or Secret by the military.

Organized crime is believed to be using arson extensively, for insurance fraud and to hide other activities. (L46,P71) Arson rings are characterized as being exceedingly tough to crack, the professional arsonist only rarely caught. (H12,P29,P78) Only extensive investigations depending heavily on intelligence work seem to be successful against mobster arson.(L46,L81,H11,P77)

The usual modus operandi of arson by organized crime (other than arson fraud rings) is to use vast amounts of gasolene.(H13) Arson is then obvious, but identifying and catching the perpetrators is very difficult. Fraud fires involving organized crime may well use accelerants less easily detected than hydrocarbons.(L46)

In about 25% of the cases involving explosives ATF chemists are unable to identify what explosive has been used. (P81) An experiment is in progress with identification of explosives after use via ceramic micro-tags incorporated at the time of manufacture. The identifying chips survive in sufficient number to be reliably recovered after an explosion. About 10 tons of tagged explosives were in commercial channels in early 1978, but no case had yet been reported in which investigators had found such microchips.(P81) Tagging is hoped to act as a deterent.

In setting wildland fires accelerants are rarely used because there is ample fuel, which is either dry enough to burn readily or will not burn regardless of accelerants.(P8)

Physical evidence must sometimes be stored for years before trial. A separate property room and evidence log for arson investigation are important.(H1,H6)

Films are admissible as evidence if they are true and accurate portrayals of what was to be seen.(H8) Photographs and films are sometimes available from witnesses such as newsmen, touists, or neighbours.(H12) Diagrams can be introduced to complement photographs. Photographs, diagrams, films, and video tapes, unlike witnesses, can enter the jury room.

Lay witnesses are best interviewed immediately, at the scene of the fire. Witnesses are often relucant to come in to an office, and they are in any case generally more willing to give evidence immediately than they are later.(P62)

Outside experts should be called in for skills not possessed by the arson investigator, as needed, e.g., electricians and furnace maintenance people.(P28) Testifying effectively is a valuable skill. In many parts of the country being a Federal Official helps vis-à-vis the jury, although at times the defense can utilize bias against outsiders.(P61) Expert witnesses can not only give opinions as do lay witnesses ("He was drunk," "It was Joe Blow on the 'phone," et sim.) but are also permitted to answer hypothetical questions. Even the results obtained from a hydrocarbon detector must be interpreted; in contrast the results of, e.g., a Breathanalyzer can be read directly and testified to by any traffic officer. The expert is urged to be careful to present his evidence understandably, e.g., "... analyzed according to the accepted technique," rather than a detailed description of the analysis.

There assertedly is a lot of bad expert testimony given in this country, but it normally surfaces only if commented upon in an appellate court decision.(P61) Prosecutors are furthermore seen as ill-prepared to use expert testimony as defense attorneys are to attack it. Both deal infre-

quently with the types of experts of any given type. The good, experienced attorney knows what the expert can say and what not. At the other extreme is the attorney who asks his expert witness while walking to court, "What are you here to do?" Many attorneys don't appreciate the limitations of scientific evidence. This limitation can be further obscured by the very positive attitude displayed by some experts. Equally, a superb investigator or technician may be hopeless as a witness.(H12,P52)

A clearer understanding of what constitutes good evidence in an arson case may be very useful in overcoming the common reluctance of prosecutors to accept arson cases. Such understanding would also help in training investigators to build strong cases. This author recommends that NILECJ undertake a study to determine what evidence is available in arson cases and to correlate such availability with the disposition of the cases, beyond the simple field survey of physical evidence which has been proposed before.(L10a)

The study should review either representative or randomly selected files of arson investigations and cases dealt with by prosecutors. It should determine what physical evidence was recovered, what laboratory tests were performed and their results, what lay witnesses and expert witnesses were available and what they could or did testify to, any specific problems with evidence, verdicts in cases that went to trial, and the reasons given for not taking cases to trial. The cases should be selected from a spectrum of jurisdictions, as in the studies of arrest rates, conviction rates, and sentencing practices (cf. Sec. 3.2).

4. PSYCHOLOGY AND SOCIOLOGY

Fire-setting and arson control can validly be viewed as being in substantial part problems of behaviour and attitude of individuals and of groups. It has been asserted that the entire range of behavioral and societal approaches is being neglected as far as any research on arson is concerned.(P45) To a considerable extent this is still true.

In this section are discussed the motivations and behaviour of individuals, with emphasis on the behaviour of fire-setters and cooperation from the public, and the cultural matrix in which fire-setting occurs.

4.1 Psychological Research

Psychiatric considerations and behavioral psychology of incendiarism have received considerable attention for several decades.(L23,L40,L45,L51-L53,L58,L64,L68,H1,S10-S12, S15,S21,S24,S26-S30,S32,S36-S40,S42,S44-S46) The earliest publication on the topic dates back at least to 1905.(S14) Nevertheless the psychology and psychiatry of fire-setting are only little understood.(L49,L51,L64,L70i,S12,S28,S29)

Behavioral research has generally not used large samples, and essentially all studies have been biased in the sense that they deal with fire-setters who have been caught and frequently with those who have been institutionalized (prison or mental hospital) or otherwise adjudged literally abnormal. Of the few orthopsychiatric studies, most deal with children.(L9,S27,S42,S46)

How poor the understanding of the psychology of fire-setters is is underlined by the fact that, after extended consideration of what appears to be known, a group of psychologists has agreed that progress requires first a survey of the state of the art. A brief overview of the psychological characteristics of fire-setters points out that the most recent wide-ranging study of fire-setters was published in 1951, that little information has accrued during the subsequent quarter of a century, that there is very little information on the psychology of fire-setters for profit, and that -- axiomatically -- nothing is known about the psychology of fire-setters who are not caught.(L51)

The enabling legislation for the National Fire Prevention and Control Administration gives to the National Bureau of Standards responsibility for studying the psychology and motivation of arson. Under this authority NBS (Center for Fire Research) is sponsoring a comprehensive literature survey at the University of North Carolina (Chapel Hill) Psychology Department.(P52)

A comprehensive review has been undertaken of all psychological literature of arson and of related psychiatric, economic, and legal literature. The information so collected is to be put into the context of existing psychological theories so that hypotheses can be tested. The objective is to develop a functional typology -- in contrast to a legal classification -- and to develop models which will be useful in treating fire-setters.(P92,P93) The review will highlight contradictions and identify unexplored questions.(P52)

An examination of the approximately 100 studies initially identified as most pertinent has brought very little new to the fore. "The same old stuff turns up again and

again."(P92) The work is believed inherently not to be particularly applicable to arson for profit.

In the opinion of this author, the generally amorphous situation referred to makes any major attack upon "the psychology of fire-setting", broadly stated, not sufficiently likely of success to warrant undertaking research with such an aim at this time. It is first necessary to know what questions to ask. The study currently underway at UNCCH seems admirably suited to perform the first iteration articulating the questions. When results begin accumulating from this survey, then the NILECJ should reopen the question of what areas of the psychology of fire-setting can usefully be tackled in a fundamental fashion.

There is some doubt whether funding from the current source will continue for the second year of the state-of-the-art review.(P52) This author recommends that NILECJ assure sufficient funding to assure completion of the review.

Without waiting for completion of the comprehensive review, there are two areas of psychological research that do seem worth undertaking -- one an observational study of fire-setters, the other an experimental study of incentives for public cooperation in anti-arson programs.

4.1.1 Psychology of Fire-Setters

The motives for arson have been often recited: gain, spite, concealment of other crime, malicious mischief, political, compulsive -- with variations and shadings.(L4, L10b,L13,L45,L51,L52,L57,L60,L61,L64,L73,L93,H1,S6,S8,S16, S30)

Arson for profit is the most tractable motive to attack because it is -- in psychological terms -- rational. (L51) It has been held that the major damage by arson is caused in fraud fires, by those who have no psychological malfunction.(P40) From that point of view the problem is one of criminology, not psychology. Removing the profit from arson and increasing the likelihood of apprehension would, prima facie, introduce strong disincentives for this type of arson.(L51,L73,L76,L96,L115,P77)

Understanding the psychology of fire-setters whatever their motives is important to heading off their depradations and to dealing with suspects in investigations.

A four-year study of fire-setters who were caught in New York City, which however has not been published in print, seems to have established a number of characteristics of fire-setters the knowledge of which is useful during investigations on the scene and in interrogation of suspects. (H1,P3) Some attitudinal and behavioral characteristics have been pointed out that an investigator should be aware of when dealing with juveniles.(L40) A more abstract descriptive typology of fire-setters has been presented in which there is passing allusion to how some psychological characteristics of fire-setters pertain to investigative work.(L58)

The possibility has been broached of trying to construct a profile of an arsonist, comparable to that used by the Federal Aviation Administration in selecting individuals for thorough examination as potential hijackers or bombers.(P48) However nothing seems so far to have come of this notion.

The New York field study and the abstract typology disagree on some points, and part of the former's conclusions, notably concerning pyromaniacs, challenge conventional wisdom or go beyond previously published observations. According to those findings the pyromaniac never stays at the scene of the fire and does not want to be caught. Even though pyromaniacs account for only ca. 1% of the cases and use only fuel found at the scene, they are extremely dangerous because of their tendency to set fires in dwellings and during early morning hours.(H1)

A quarter of the juvenile fire-setters have above average (sic) intelligence.(H1) Work in the early 1970's found that children with a fire-setting problem are characterized by several associated problems, not by one distinguishing attribute.(L68) Subsequent work showed that "normal" children who set fires usually do so while experimenting with fire.(L9) Initial results from a small number of cases indicate that pre-adolescent boys can be broken of fire-setting by being held strictly accountable for their whereabouts and by being punished with a substantial session of work for getting into a situation where they are even accused.(P67)

Juveniles are responsible for a substantial number of arsons. About 55% of the arrests for arson (not necessarily of the cases cleared nor of the total number of incidents) are of persons under 18 years old.(L47b) In Prince George's County, Maryland, for instance, the biggest continuing arson problem is juveniles, who account for about 70% of the incendiary incidents.(P10) Among adults revenge is a major motive. In recent years fraud fires peaked at about 15% of the set fires, which declined after several successful prosecutions. The few known compulsive fire-setters are kept under control by overt surveillance. Perpetrators have been characterized

as having the "habit" of arson whether professionals or amateurs.(P90) This attribute has also been ascribed as more characteristic of wildland arsonists than of at least some structural arsonists.(P57) Paid torches have generally had prior criminal experience, but not necessarily as arsonists. (P10) Most professional arsonists are said to be ex-burglars. (P90)

By contrast to the situation with structural fires, wildland fires set by hired torches are rare.(P8) Arson for gain does occur -- to improve grazing for cattle, rooting for hogs, and to keep the woods open for hunting. There is the occasional fire set by someone seeking employment in fighting it. There are also a substantial number of grudge fires directed at a restrictive or "unfair" government or absentee landowner.(P8) There is very little arson of isolated buildings.(L25,S19,P8)

Some disincentives to arson are known, at least in the gross. Overt patrolling, covert surveillance, and direct contact with residents of high-incidence areas have been found to reduce the number of set fires during the period of patrol. (L27) Overt saturation campaigns of fire and arson investigation have been successful in sharply decreasing arson incidence. (H1,P3,P59) Investigations as such are asserted to reduce arson.(H13,P97) Indeed, vigorous and consistent investigation is stated to have led to reduced arson incidence in every case, whether urban or rural.(L49)

The American Insurance Association maintained, prior to 1971, an arson investigation service.(L57) After recognizing that their experts carried very little credence in court, because of the defense asking, "Who is it that you work for?" the insurance companies disbanded the service. At least some

persons ascribe the sharp increase in arson from about 1970 to this abandonment.(P59)

The stress of interrogation on a suspect is an inherent part of the interrogation itself. Persistent and skillful questioning has well-recognized utility, although in an arson interrogation the investigator may quickly run out of useful questions.(H1) Care and reasonable consideration are however required. Insensitive treatment of suspects in an arson case can bring civil suit against the individual investigators. (L66)

Both polygraphs and voice stress analyzers have been put forth as specifically useful as an aid in arson investigation.(L8,S41,H16) Evidence obtained from use of a polygraph has some limited acceptance in court,(H16) but only exculpatory evidence from a voice stress analyzer.(S41) The chief use of each of these devices is to elicit confessions via adverse results and to eliminate suspects from consideration. In one case where there were more than 800 suspects in a rash of fires, voice stress analysis immediately eliminated more than 80%.(L116)

Simply forcing a person to testify under oath, as in a civil proceeding, can exert remarkable psychological pressure. A good attorney can obtain an amazing amount of information in a deposition.(H2)

This author believes that investigation and related activities should be accepted as disincentives on pragmatic grounds without at this time investigating the psychology of disincentives. Any such study should be deferred until after the comprehensive review of the state of the art on psychology of fire setters has been completed.

By contrast, a behavioral typology of fire-setters promises some immediate benefits in arson investigation itself. Such knowledge has been successfully used to identify the type of person who set a particular fire or series of fires, and there are telltales which are useful during interrogation. It therefore seems eminently worthwhile to verify the reported observations, to determine their domain of applicability, and possibly to extend and to refine them.

A pragmatic, descriptive approach is recommended which specifically ties in with the experience of expert arson investigators and their ability to "read" a fire, e.g., to distinguish between an "aggressive" fire and a "dainty" one, to recognize a "main man", or to distinguish the pattern of an arson ring from that of a pyromaniac. It is significant to know reliably whether a pyromaniac stays on the scene of his fire, retires from the scene after the initial excitement,(S30) remains in a nearby hiding place,(L58) decamps immediately upon setting the fire,(H1) or all of the above. Is a fire in a child's bed really always deliberate? How reliable a distinguishing characteristic is the position of a wastepaper basket that has been set on fire? Will a pre-teen fire-setter shun even other troublemakers? How characteristic of fire-setters are exaggerated facial expressions? refusal to urinate in front of another man? refusal to confess in front of witnesses?(H1) Are there characteristics which tend to mainifest themselves differently in different settings, e.g., urban vs. rural, differing climates, homogeneous vs. in-migrant populations? Are there constellations of characteristics which are more reliably and more usefully associated with particular types of fire-setters than are the individual characteristics? Flatly contradictory statements have been made that arson interrogation procedures are just like or entirely different from other criminal interrogations.(L30,H1,H16)

This author recommends that NILECJ undertake research into the psychology of fire-setters as it manifests itself in behaviour which should be recognized and understood during arson investigations in general and during interrogations in particular. For such a study to be successful, in the sense of producing findings directly useful to arson investigators, the research team probably must include both research psychologists and experienced, successful arson investigators. Such a team can both structure and execute a reliable experimental design and maintain the needed link to the real world of arson control.

4.1.2 Public Cooperation

Public attitude and cooperation are significant in arson prevention in the first place and in investigations after the fact.

A sustained advertising and promotion campaign, developed and implemented by an advertising firm has given very satisfactory results in educating the public to the arson problem and in elicting public cooperation.(L54,P35) Extensive coverage of the arrest and successful prosecution of arsonists by the local media reinforces the public education.(L55,P10) News coverage of arson and its costs not only helps to make the general public more aware, but can also help to make prosecutors more cooperative.(P7)

It has been stated that there need to be ever new publicity approaches in order to retain public attention.(P35) Ideas can be developed at relatively low cost when an advertising agency donates a substantial amount of work, public agencies use

existing means for distributing material, and newspapers use Arson Alarm ads with each arson article.(L54,L77)

The effectiveness of fire prevention messages has been measured in terms of interpretation of specific messages given by respondents and in terms of recall of messages. The research findings have cast doubt on the effectiveness of mass media messages and posters in areas of high incendiarism, at least in forests.(L6,S17)

Youths have been found to accept their parents' attitudes towards fire. They tend to have a negative attitude towards government agencies. Changes in attitudes are therefore believed to require proselytizing the adult population. Effective control of forest incendiarism is deemed to require coopting the local establishment and implementing community development programs somewhat on the model of the Agricultural Extension Service.(L6) A program of systematic communication at the local level has been proposed, using a selected communicator.(S9)

In one area subject to singularly many incendiary forest fires, repeated low-key contacts on behalf of the Forest Service by a popular 70-year-old farmer plus controlled burning services are credited with 56% of the attained reduction in forest fires (from 199 to 89 per year). The cost of eliminating an estimated 310 fires during a five-year period was less than $7,500 (at 1968-'72 wages and prices) -- much less than the cost of just fighting that many fires.(L25)

If the theories now being evolved about rural fire-setting behaviour stand up to empirical test, (cf. Sec. 4.2, Sociological Research) they are the hoped-for basis for anti-fire-setting action programs in the rural South.(P24)

Emotion can be a key factor in eliciting information from witnesses. Spontaneous anger can be very helpful in collecting information, especially in a slum.(H12) Just a few hours later, the witnesses may have cooled off and retreated into their usual suspicion of and hostility to authority.

Systematic campaigns to obtain information about arson from the public have been mounted to good effect. Washington State (especially Seattle) and New York City have succesfully used well publicized telephone hot-lines to elicit tips on arson and arsonists.(L54,H1) The usage of the Washington hot-line one month after the publicity campaign began was about one legitimate call every two days.

The Washington Insurance Council offers a $5,000 reward to persons nominated by fire or law authorities as instrumental in the conviction of arsonists.(L63,L78) New Jersey is currently investigating the possiblility of a reward for information leading to the arrest and conviction of forest incendiarists.(P16) There appear to be no Federal reward programs related to arson: an attempt to identify any such program failed.(P30)

Reward money offered by insurance companies can be strongly counterproductive because of the suspicions raised that they want to avoid paying claims even when there may have been no arson -- or at least not with the connivance of the insured.(H1)

Seattle operates a continuing publicity campaign to urge public participation in the fight against arson.(L54, P35) Anchorage has inaugurated a program consciously patterned after the Seattle model.(P37)

There is quite evident utility in public participation in anti-arson efforts, notably in reporting suspicious circumstances, actions, or conversations. Some success in eliciting such participation has already been achieved in a few jurisdictions. This author recommends that NILECJ undertake a study to determine what incentives and what stimuli are successful to what degree in eliciting information. The incentives may be monetary or they may be rooted in a quest for greater security from fire. Various modes of publicity should be under study.

It may be feasible to run test and control cells by a suitable choice of distinct high incendiarism areas of a single city. Comparisons between jurisdictions would be essentially impossible because of the lack of intercomparability of fire data among jurisdictions.(L35,P35)

This study may perhaps best be set up as a group of demonstration projects in which several modes of eliciting public cooperation are tried out. Since reporting information to the authorities is useful only if it is reliably and competently followed up, only such jurisdictions should be selected to participate in the study which already have good arson investigation.

4.2 Sociology of Fire-Setting

Exploration of the epidemiology of fire-setting and of the social, cultural, demographic, value-judgment, and attitudinal profiles of people involved with fire-setting -- whether as fire-setters or as procurors of set fires -- has been strongly urged.(L49) The present author would go one step further, to include the social and cultural matrix within which fire-setting is endemic.

There are large differences in the incidence of incendiarism among different communities and regions. One 15,000 population city in Wyoming accounts for over 20% of the fire loss in the state.(P36) It has been characterized as a wild West mining town, where "they burn anything". The most extreme manifestation of wildland incendiarism is in the South.(L6) During 1968-'72 incendiarism caused 38% of all wildland fires and 52% of the fires on protected acreage. However, geographically close communities with similar socio-demographic characteristics may have distinct fire-setting patterns.(L6)

The sole sustained and well-articulated research dealing with fire-setting behaviour has dealt with the society and culture of a small part of the rural South which suffers high incendiarism.(L6) The results of this research have been applied with at least some success to reduce incendiarism.(L25)

The stages of sociological research into fire-setting behaviour in Louisiana and Mississippi were: (a) determining the serious trouble areas, from statistics, (b) identifying potential fire-setters by interviews, (c) determining the extent to which fire prevention messages reached the population, (d) how people reacted to such messges, and (e) determining what strategies are effective for transmitting the messages through an individual.(L6)

A 1970 study in rural Louisiana concluded that there was <u>not</u> any fire-setting subculture, but rather that the potential fire-setters are out of contact with information that might change their views.(L7) More recent studies have however led researchers to abandon the deviant behaviour hypothesis of fire-setting for the rural South.(P24) Case studies have been assembled over the past 4 to 5 years, and a study has been

proposed (but not yet approved by the Forest Service) to test a theory of fire-setting behaviour. Although fire-setting incidents are illegal acts, they are not being analyzed as such: Fire-setting constitutes normal behaviour, and residents talk openly of fire-setting.(L6,P24)

The history of wildland fire-setting in the South dates to the Indians, who used it for management of food resources.(L6) Many land usage practices were adopted from the Indians by the Caucasian settlers, and a subculture of fire is said to prevail in those parts of Louisiana and Mississippi which had an open range tradition from about 1900 to the 1930's. Culture is asserted to be the overriding factor in explaining incendiary behaviour.(L6) It is only recently that some (sic) people have come to consider woods-burning as deviant behaviour.(S20) Tree farming is still accorded a low status relative to other crops in Southern rural communties with high forest fire incidence.(S2) Some spite fires are set as revenge against timber companies and the government for having the effrontery to reforest or otherwise to restrict former open range.(S19) In one rural Louisiana region the largest number of incendiary fires were set by cattle owners seeking to improve grazing or to round up their cattle.(L25)

Demographic factors are cited as useful indicators of forest fire risk: Comparison of data from pairs of adjoining counties tended to show that forest fire occurrence increases with (a) population density, (b) proportion of Caucasian rural non-farmers, (c) older population, (d) urban population.(S25) Urban fringe areas tend to have a lower fraction of incendiary fires even though migrants bring fire-setting habits with them.

A person accepted in a small rural community worked with the residents to reduce incendiarism substantially.(L25)

There is no a priori reason to reject the possibility that an analogous approach might work in urban neighbourhoods. The society and culture are assuredly very different from those of the rural South and can furthermore be assumed to be different both between and within cities. An understanding of the factors which define the individual societies and cultures and how they interact with fire-setting behaviour is necessary if the "neighborhood spokesman" approach is to have a chance to succeed. The same understanding, specifically including an understanding of how fire safety and anti-incendiarism messages are perceived, is also necessary for consistently successful public education campaigns to reduce incendiarism.

The example of the sociological research dealing with forest fires in the rural South(L6) provides a first-order approximation of how similar research might be undertaken in other parts of the country and in urban areas. A research team is required which contains research-oriented professionals plus fire service professionals. The fire service professionals have the day-to-day responsibility of fire and arson suppression, and they necessarily maintain contact with conditions in the field as they actually exist. They know what and where the particular incendiarism troubles are. The research-oriented part of the team can maintain the continuity of the research without being subject to the operational demands of fire and arson investigations.

Some preliminary results indicate that fire incidence can be correlated with neighbourhood population characteristics within a given city.(L35) Other results show that arson incidence patterns within a given fire protection district can be promptly detected.(L12,L83,H1,P10,P35) These results, together with the results of the county-pairing approach used in rural Louisiana,(S25) suggest that comparisons of census

tracts within an urban area might lead to insights into what factors of local societies and cultures are significant to fire-setting behaviour and hence provide levers by which to discourage incendiarism.

No organization seems to have undertaken such research in an urban area nor in any rural area outside Louisiana and Mississippi. The chances for useful results of a rather fundamental nature seem sufficiently promising that this author recommends that NILECJ undertake research at least in an urban setting. Similar research might also be undertaken on high incendiarism rural areas outside the Deep South and on non-forest incendiarism in any rural region.

5. STATISTICS AND MODELS

Realization that a very large fraction of fires and an even larger fraction of fire losses are due to arson has forced recognition of arson as a serious national crime problem. The actual size of the problem is however known with only little precision. Data on fire incidence and cause are notoriously incomplete and unreliable.(L19d,L49,L65a,L70f,P34-P36, P57,P76)

The internal structure of the arson problem is even less well known than the overall size. The extent of forest arson and of structural arson are probably best known. The extent of other wildland arson, vehicle arson, and other arson (e.g. of outdoor storage depots) seem to be less well known. Special cases need to be considered separately, such as prisons and hospitals.(L49,P48) Work may be undertaken at the Center for Fire Research, NBS, to develop an index of fire hazard for prison buildings. Harold E. Nelson there has developed such an index for hospitals. The approach may be applicable to any type of institution which precludes normal evacuation.

Statistics about causes of wildland fires are atrociously bad from most sources, whether urban (so-called grass or brush fires), rural, or forest.(P57) The stated cause is often a pure guess because no one even tried to determine the cause. Examination of statistics prepared by the Forest Service shows wild swings in the percentages of fire causes among cigarettes, highway, and incendiary -- despite the asserted fact that cigarettes are virtualy incapable of causing a grass fire.

The cause to which wildland fires are attributed may be a function of local custom.(P8) In areas where incendiarism is a major problem, fires are in turn more likely to be attributed to incendiarism. Smoking, child-caused, and some industrial fires are the most likely to be confounded with incendiary fires. In the Northern Region (Montana, North Dakota, and parts of Idaho and South Dakota) the leading cause of fires is industrial, such as from exhausts of motor vehicles and chain saws.

Good statistics are asserted, reasonably enough, to be generally available from those areas where there are investigators trained in wildland fires.(P57) Where incendiarism is the largest problem is also where there are stated to be generally the best investigators.(P8) When procedures are first tightened, more fires are identified as incendiary.

Categorization of causes of incendiarism is aimed at helping to develop prevention strategies.(P8,P24) Where fire-setting is culturally rooted, education is a prime tool; where malicious arson is more common, traditional law enforcement methods are used. The U.S. Forest Service and the Center for the Study of Law and Society are analyzing individual fire investigation reports of various fire protection agencies concerning both structural and wildland fires in the Pacific Southwest.(P30) Reporting by the various agencies has been found to be inconsistent. A distinct effort is deemed necessary to define that region's arson problem before any substantive research on it can be undertaken.

The American Federation of Police recently initiated a survey of its membership on the amount of arson encountered and what is being done about it.(P38)

The Postal Inspection Service began in January 1978 to collect statistics separately on investigations of arson-related fraud, as distinct from other cases of false claims against insurers.(P31)

The extent of arson as estimated by the authorities of various jurisdictions differs considerably. In 19 of Maryland's counties 30 to 40% of the 1,800 to 1,900 fires investigated annually are arson.(P73) Kentucky establishes about 500 fires annually to be arson, but estimates that there are a total of about 2,000.(P34) During the 1975-'77 biennium Wisconsin's Arson Bureau determined the cause of 91% of the 860 fires and explosions investigated.(L50) Of these, 300 were criminally caused. In Oregon the cause was determined for 93% of all 18,400 fires reported by fire departments during 1976. (19b) Of these 14% were determined to be incendiary. The Oregon Task Force however takes these figures with a grain of salt.(L19d) Alabama has an estimated 40 to 50% arson rate in forest fires.(L79)

Not every jurisdiction in the United States necessarily suffers from a serious arson problem. The two-county district around Barttlesville, Oklahoma, with 150,000 population, brought one prosecutor not a single arson case in two years.(P89) In at least one large city, Philadelphia, a community action group perceives the authorities as having arson well under control.(P51) The Air Force experiences relatively little arson.(P80) What arson does exist is usually structural fires. There are very few automobile arsons and essentially no insurance fraud fires. The Coast Guard investigates occasional arson cases at its installations but perceives no particular arson problem.(P74) The Bureau of Land Management, all of whose lands are in the West, has identified no

arson problem.(P4) Indeed only ca. 10% of its fires are man-caused, and no more than 1% are identified as incendiary.

Europe is asserted to have much less of a fire or arson problem than the United States, although they suffer more bombings by professionals and radical groups.(P66) The United States assertedly has the highest arson incidence, injury, and fatality rate in the world. Arson nevertheless is the second largest cause of fire in Tokyo.(H14)

It is asserted that there is essentially no incendiarism in Europe because there are detailed investigations of individuals and the property they seek to insure before a policy is issued.(H13) The notion of only few arsons in Europe is supported by Kammerer et al., who cite 0.8% of the fires fought by French fire services as being incendiary.(L45) There were however, in the mid-1960's, 38% fires of undetermined origin. London reputedly has a very small arson problem.(L17) Out of more than 49,100 fires during 1973, 91 were designated as malicious, 1,500 as doubtful, and 7,900 as unknown. The few foreign statistics cited above must be accepted only skeptically in the absence of a knowledge of what reporting biases may be involved.

The reporting of arson in particular and fires in general is known to be far from complete. To begin with, not all fires are reported to the authorities in the first place. A fire department is called to fewer than 10% of residence-related fires and to fewer than 30% of other fires.(L95)

Virginia collects no incident reports. The Fire Marshal's Office reports on cases only when requested.(P94) A study conducted in Southside Virginia found that more than 70% of the volunteer fire departments do not keep their records up to date, because of lack of time, of qualified personnel, and of perceived need for such records.(S35) In Connecticut only an estimated 45 to 50% of fires are reported by the local fire departments to the State Fire Marshal.(H10) During 1976 there were 31 towns and cities in Connecticut, including some sizable ones, which did not report fire data. Reasons included lack of help and of funds, but also fire prevention bureaus peopled by individuals put out to pasture. Of 37 fire districts in King County, Washington, only 30% send records of fire incidents to the state.(P35) Seattle, for instance, does not report to the state because reporting would cost too much. At ca. 1 hour per report to transcribe the information onto the state form, a full-time employee would be required for such reporting. Fire incident reporting in New York State is poor, with a few exceptions such as New York, Buffalo, and Syracuse.(P59) Only an estimated 20 to 25% of the incidents to which fire companies respond are reported. Many reports are incomplete, especially with respect to cause. When responsibility for arson investigation is transferred from a Fire Department to a Police Department, submission of statistics may suddenly cease, as in Chicago.(P66)

After 4 years' effort the NFPA has still not been able completely to characterize all of the fire protection services in the United States. Many departments keep no records. The area protected by a fire department is not always readily determined. In North Carolina, for example, the headquarters location is specified, but the boundaries are not. There are overlapping areas of joint protection as well as mutual aid arrangements.

In some jurisdictions active mutual aid arrangements actually lay departments open to suit for illegal expenditure of funds. (P77)

Most fire control agencies keep no records on the costs of fire prevention, fire damage, or individual fire-fighting costs.(L24) This then precludes economic evaluation of fire prevention programs.

Among the state fire incident record systems which do operate there are considerable differences. Many organizations, including the NFPCA,(P76) use the NFPA's 901 codes, (L117) but there is no one uniform reporting form in general use. (P35) New reporting forms are still being designed for individual states.(L8) Police troopers and clerks operate Connecticut's record system manually.(H10) Others, like Washington's, are computerized.(P35)

The coding system itself is rather formidable. The instructions for coding fire incident information take about 210 pages.(L117) The table of contents alone requires four pages! The Forest Service categorizes fire cause by a markedly different scheme from that used by the National Fire Data Center.(P8)

The suggestion has been made to introduce volunteer fire departments to incident reporting by first requesting about ten most basic items of information. Each year a few items more would then be requested until everything is being obtained that is necessary.(P35) Firemen have a tendency of not returning a form at all rather than returning incomplete a form which they cannot cope with.

Fire rates cannot be compared between cities because of large year-to-year fluctuations which do not correlate with any known city characteristics.(L35) Among areas within a given city there are strong correlations between fire rates and characteristics such as income, educational level, and family stability. No correlation, however, was found between the number of children and "playing with ..." nor between the number of youths and incendiary or suspicious fires.

Data as they now come to the NFIRS are assuredly incomplete and only partially reliable. Most departments which report at all, report only an unknown fraction of fires. Not all departments report in any one state. However, it is claimed that some questions can be answered with confidence even from these data.(P76) Lower bounds, for example, may be relied upon for most aggregated fire data -- but not upper bounds. The relative proportions of fire causes are believed to be reasonably correct, although there is a large fraction of "unknown cause". Arson assuredly is a leading fire cause. It is possible to get a reasonably good notion of the relative frequencies of arson fires by type of property or the frequency of various dollar losses by occupancy type.

The currently available data do not in general permit reliably tracking any variable over time. Within a single jurisdiction some data can be tracked in detail, e.g., number of arsons by occupancy type.(P76)

There is extensive agitation for -- and opposition to -- making arson a Part I crime in the Uniform Crime Reports of the FBI. Crimes included among Crime Index offenses, so-called Part I crimes, were selected because of their seriousness, frequency of occurrence, and likelihood of being reported to

police.(L47a) Reclassification of arson as a Part I crime has been urged, for example, by the Arson Committee of the International Association of Fire Chiefs, the International Association of Fire Fighters, the Alliance of American Insurers, the Ohio FAIR Plan, the NFPCA, and the participants in the NAFPC seminars in 1976.(L15,L16,L29 L44,L70d,L72,P50) The American Insurance Association is "yelling as loud as it can" to the FBI and IAPC to stop saying that the crime rate is going down, in view of arson statistics.(P87) It is seen as politically unacceptable to some to add arson statistics to crime totals. (L49,P71,P87)

Arson statistics are asserted to be actually not as bad as the statistics for many other crimes, including Part I crimes such as forcible rape and larceny.(P76) One area, however, about which singularly little is known is extortion fires. It is often difficult even to distinguish the victim of an extortion fire from the instigator of a fire for gain.(P43) Arson shares with crime statistics in general tremendous differences in definitions.

Some see the effort to make arson a Part I crime as pointless or even misguided.(P9,P57,P66,P71) Better training in detection and investigation of arson and uniform procedures and forms for reporting arson, are seen as more important.

Centralized record systems have been established at various levels for fire incidents, and other systems have been proposed.

As of January 1978 19 states were reporting data, or were preparing to do so, to the National Fire Incident

Reporting System; six states are reporting on a regular basis. (P76) All data entering the NFIRS nominally contain the same data items on a common form so that the data can be compared among jurisdictions. The quality of the data is however unknown.

NFPCA plans a so-called validation study to determine what causes garbling of fire incident reports.(P76) This will be an indicative rather than a definitive study. A trained investigator will observe on the scene to determine how reporting is done. NFPCA also wants to collect, in the NFIRS, in-depth data on arson fires which go beyond the data reported on other fires, going into factors such as motivation and characterization of the perpetrator.

Oregon has a computerized data system for fires reported by local fire departments plus another one for wildland fires.(L19a)

In Wyoming the Fire Marshal's Reporting Service submits to the state Fire Marshal records of all claims for fire loss in the state.(P36) The same service, operated by the American Insurance Association, is available to all states.(P73) These reports have been useful in identifying individuals with fire loss many hundreds of miles apart. Wyoming law requires fire departments to report on any fire causing more than $500 of damage. Some 80% of the fire departments actually do report, giving basic information such as type of building, cause of fire, and amount of loss. The stated cause must be viewed skepticaly, being the best guess of the firemen on the scene. There was a recent "electrical" fire to which the investigator obtained an arson confession and even an "electrical" fire in a building with power shut off.

Either centralized or cooperative computer analysis of fire incident data has been proposed to establish similarities among fires in different jurisdictions and to help to track down professional arsonists.(L12,P63,P79) The ATF hopes eventually to be able to support the agent in the field by compiling all cases in which devices of known characteristics have been used in the past.(P21) Correlation of modus perandi has been used to identify at least one nationwide conspiracy.

An analyst reviews all factors reported in New Jersey's Statewide Arson Network System, but there are as yet no systematic results.(P90) Data entered into the system are routinely disseminated to the participating local agencies. (L111)

In order to attack the major fraud problem, the American Insurance Association has implemented the Property Loss Insurance Register, now in pilot testing.(P87) In full operation about 300,000 cases annually are anticipated, covering about 70% of the fire insurance business in the country.

The PILR will include names of the insured, spouse, aliases, tenants, owners, partners, corporate officers, mortgagees, and others at interest; type of occupancy; cause of loss; date and time of loss; insurance carrier; and amount of insurance.(L84,L109,L110) The objectives are to identify the following types of fraud: multiple coverage and claims; inter-urban and interstate arson rings; overinsurance and recovery for part ownership; operation through straw ownership; and series of inflated claims. Each new claim entered into the PILR will trigger a search for other claims with similar characteristics. The information would be supplied to the insurance company, which would itself have to determine whether to

be suspicious of the claim.(L109) Easiest to detect will be duplicate claims for the same loss and numerous claims involving the same name in different roles.(P87) Even small claims become worth thorough investigation if they are part of a pattern.

Once operational, the PILR would ask for use feedback indicating the numbers of cases investigated and the amounts of payments reduced or eliminated through such investigations. (P87)

No overlap is seen between the PILR and the NFIRS, which is intended to elucidate what burns, why, what codes and standards are involved, what products are associated frequently with fires and what lessons are to be learned from repetitions. (P87) There may be some possibility of comparing loss data as reported by firemen with those reported by insurance companies.

5.1 Arson Incidence Reliability

The prime responsibility for fostering better reporting throughout the country has been assumed by the NFPCA. The Fire Data Center is working with state officials to improve fire incident reporting, advising on quality control which can be applied at various levels, especially for the person at the fire.(P76) The Fire Data Center hopes within one year to be receiving all specific data called for in the reports. The NFPCA will train the people who will train others to collect the data. To states which have (or will install) computerized data handling, the NFPCA will provide software to perform

validity checks. Some errors can be corrected at an intermediate processing stage before being submitted to the NFIRS.

The National Fire Protection Association collects fire statistics on a sampling basis. It used to send questionnaires to 2,500 fire departments. But these were selected on the basis of being the most likely to respond! NFPA is in the process of shifting to a random sample of 6,400 departments.(P77, P98)

The International Association of Fire Fighters, which is a labour union, has sent teams to investigate the integrity of reports as submitted by management, especially in incidents where there were deaths or serious injuries. They have determined that what fire departments report is all too often not what finds its way into central statistics, at least in part because of transcription errors. Furthermore suspected arson is assertedly often not reported as such in order to avoid embarrassment to the police (possible unsolved crime) and the property owner.(P50)

To the extent that arson is viewed as a specifically law-enforcement problem, the LEAA has an interest in obtaining a substantially more reliable estimate of the dimension of the problem than is presently available or can be anticipated soon from gradual improvement of data collection and reporting.

It is common for arson investigators to respond to a fire only if the fire suppression service deems the fire suspicious or definitely incendiary,(L2,L21,P5,P20,P36,P64,P69,P73) although this is not universally true.(H1,P8,P28) Systematic investigation of all fires or of randomly selected fires within selected study areas could provide much better estimates than now available of arson rates, at least insofar as the selected areas are representative.

This author recommends that the NILECJ undertake a study to determine such arson rates. Such a study has been suggested based on adjoining and socio-economically comparable counties in Maryland.(P73) In one county the current practice of investigating fires deemed suspicious would be continued; in the other county every fire to which a fire service responds would be investigated.

Actually the study need not be based on the county. It could use fire districts, census tracts, or any other area which permits pairing of comparable units. Indeed a study of fire rates by census tract has been performed by the NFPA and the NFPCA.(P98) Nor is it necessary to investigate every fire. In a region with a large number of fire service responses, a randomly selected sequence of responses might serve. If such a random sequence is used, then the categorization of fires into types (e.g., dwelling, warehouse, vehicle, etc.) must be determined beforehand, and false alarms and fires deemed suspicious by the fire suppression service must be allowed for in the experimental design. The experimental design would furthermore have to allow for the observer effect, i.e., for the accepted fact that the arson rate goes down in a community with overt intensive fire investigation.

Enough arson investigators would have to be assigned to the study in order to cover all of the fires. The investigators assigned would have to be expert, individually or collectively, in various types of structural fires, vehicle fires, and wildland fires.

The study might be conducted in phases or segments so as to cover the various contexts in which the investigations occur. Urban, suburban, and rural fire protection districts

should be investigated; paid and volunteer fire department areas; coverage by local or state investigators; normal investigation by full-time or part-time arson investigators. The study itself will need a statistician versed in experimental design in order to assure that all significant variables are taken into account in the initial design and in the analysis of the data.

5.2 Pattern Analysis

Patterns in data of several types have been demonstrated to be operationally significant in anti-arson work.

Incidence statistics specifically including times of occurrence have been very helpful in convincing the keepers of the purse. When the Fire Department demonstrated that the leading cause of fire in Prince George's County, Maryland, was arson and that 45% of the fires with major loss or fatality occurred between midnight and 8 a.m., the County Council authorized the resources to permit around-the-clock seven-day-per-week investigative operation.(P10)

Computer analysis of fire incidence data now supports a High Incidence Area Arson Assignment Program under which an area is saturated with investigators -- either covert to catch arsonists red-handed or overt to act as a deterrent, particularly useful with juveniles. The computerized data base also allows displaying all fires which have occurred in a given area, all individuals associated with specified fires, or particular modus operandi.(P10) Clusters of fires can be examined for commonality of numerous variables.(L12)

Certain crimes, e.g., burglary, often occur before, during, and after fire-related incidents.(L27,P10) The Fire Investigation Division remains informed on the incidence and geographic distribution of these "indicator" crimes.

Investigators associated with about half a dozen jurisdictions have discussed the pattern recognition techniques with the Prince George's County authorities, but none of these seem to have installed a similar system.(P10) It has been introduced in Tennessee by an arson investigator involved in the original development of the technique.(P40) Empirical recognition of the behaviour of fire-setters is assertedly sufficient, without understanding the etiology, to help to catch them. Lunacy -- in the original meaning of actions affected by the phase of the moon -- has been independently discovered in fire-setting in Prince George's County and in Cincinnati.(P40)

Initial experiments are now being conducted in Prince George's County with an arrest profile system.(P10) In it are recorded vital statistics and other information about apprehended fire-setters such as family situation, prior contacts with police or fire authorities, and distance between place of residence and location of the fire set. This system is still largely in the data base building phase. However, one striking result has emerged: a substantial number of the fire-setters live within two blocks of their fires. This is intepreted as consistent with the high percentage of juvenile and revenge fires. Once an adequate data base exists, it will be examined systematically for patterns which are characteristic of the fire-setters and which can be used operationally.

Some investigators call for a nationwide computerized intelligence system on arsonists, arsons, potential arson suspects, and the unscrupulous members of pertinent professions and occupations.(L10j) In the form suggested, such a system would clearly be unacceptable on civil liberties grounds. Part of the scope, concerning fires and the persons associated with the pertinent property, is being covered in the nascent Property Insurance Loss Register, but without the pejorative label of arson.

The PILR is predicated on the detection of attempted fraud in insurance claims. It has also been shown that analysis of real estate property records can finger properties that are carefully prepared candidates for arson fraud.(L36,L91) The one such analysis reported to date concerned apartment houses in a small urban community, with individual analysis of records in the registry of deeds. A proposal has been made to establish a computerized analysis system for the entire city of Boston based on 75 to 80 variables, including the frequency of ownership change, the number of mortagages on a property, the proportion of cash invested, and the fire experience of the current owners.

The proposal has been made to analyze businesses which have been burned in fraud arson in order to determine their tell-tale characteristics related to variables such as credit rating, geographic location, profit/loss experience, and ownership. These characteristics would then be used to identify businesses at moral hazard of fraud arson.(L89d) A combined approach has also been suggested for real estate and businesses, which would additionally include information on modus operandi and on individuals involved as witnesses, adjustors, and repair contractors.(L18)

This author recommends that the NILECJ undertake research to determine the general applicability of each of the pattern recognition methods mentioned above.

The HIAAAP is used successfully to allocate manpower and other resources for arson patrols and investigation preferentially to areas and times which are particularly prone to arson in one Maryland county. A version of this program has also been implemented in Tennessee. The basic principles should be transferrable, and perhaps even much of the computer programming may be. Analysis of the existing program and of the situations in several jurisdictions is however necessary in order to make the technique directly applicable and available to all jurisdictions. The variables and parameters must be so defined that the values for any given jurisdiction can be entered into one basic program. The reports and analyses available from the computer program must be defined in such a way that they can be conformed to the hazards and resources of each jurisdiction. Detailed documentation of the programs should be made available for use by fire law enforcement officers and by computer professionals serving their needs.

NILECJ should support the development of the arrest profile system and its testing in several jurisdictions. Such a system, if successful, would accelerate empirical understanding of arsonists in relation to the fires they set. It would further facilitate effective allocation of resources in arson prevention, detection, and investigation. The dimensions along which suspects and their fires should be characterized must be determined. These need not be the same ones in all jurisdictions. The computer program made available should be sufficiently general to include them all and to prepare reports and analyses highlighting any of them.

The results of using the arrest profile system in several jurisdictions would provide the basis to begin designing a nationwide arson intelligence system covering modus operandi of solved and unsolved arsons and personal informatio about known arsonists. Such a system in turn would be a weapon against arson rings.

The real estate record analysis method should be developed into an automated system which can be implemented for any urban jurisdiction. The Boston prototype, if not yet adequately funded, should be supported. Multiple sources of information should be added to real estate records, much as suggested by American Management Associations, especially financial and insurance organizations.(L89c) The availability of specific types of information from other than public records will have to be determined, with undoubted differences existing from state to state. Operation of the prototype will verify and perhaps expand the list of variables which serve as telltales for properties which are for burning. It will serve to flag specific properties in the jurisdiction as moral hazards for arson, to be closely watched for incipient arson or to be carefully investigated in case of fire. Patterns which become evident from the analyses will also help to identify incentives which exist for arson and to suggest modifications of legislation and of administrative regulations and procedures. After shakedown operation of the prototype, the method should be implemented in a few additional urban jurisdictions to determine the method's transferability and to detect differences in the best telltales in different communities. Community-specific anti-arson methods may thus emerge.

Finally, development of the business analysis method should be attempted to determine its feasibility. Equally as

CONTINUED

1 OF 2

important as the analytic model itself is a determination of how readily and how reliably the necessary data are available. Successful development of this analytic method would provide the means to identify businesses at moral risk, comparable to the real estate risk analysis method.

5.3 Economic Modeling

A limited amount of work has been done in developing economic models of fire loss control and fire-setting activities.

One model was developed to analyze possible wildland fire control activities. The model treats man-caused ignition generation. It is used with a model for fire damages and decision costs to determine prevention decisions which minimize expected total of fire prevention costs plus fire losses.(L38) Incendiarism is mentioned as one activity among many, but it is not specifically discussed.

In another instance a qualitative model of arson has been constructed based on applying the economists' expected utility theorem(L74) for representing the arsonist's decision on how much time to allocate to arson and related activity.(L37) Within the limits of the assumptions made, the author concludes that if fines were the only punishment for incendiarism, then an increase in wealth would induce an increase in incendiarism, although increasing the fine would be a deterrent. If punishment is by prison sentence only, then an increase in wealth would induce a decrease in incendiarism. An increase in the subjective evaluation of the probability of apprehension acts as a deterrent, regardless of whether fines and/or prison

sentences are used for punishment. This model might conceivable help to explain the counterintuitive result which was found in Seattle that many indicators of an improving economy showed strong positive (sic) correlation with the incidence of arson.(L63,L112)

A demand function has been hypothesized for arson, on the basis of which it is proposed to predict the number of arson cases per unit population.(L82,P54) The demand function is a composite of the expected value of arson for gain and the expected satisfaction of arson for psychic gain (revenge, political, etc.) Each component again is based on the expected utility theorem.(L74) The elaboration of this model is based on the gross national product, average real wage rate, unemployment rate, population, number of arrests for arson, number of convictions for arson, average prison sentence served for arson, and the proportion of the population aged 14 to 24 years.

The theoretical validity of any of these models has yet to be demonstrated. The practical utility is even more remote. However the hypotheses are plausible, and the value of successful models would be substantial in analyzing the expected values of various strategies of allocating available resources, of incremental increases in arson suppression resources, in gauging the effects of past and current interventions, and in estimating the precision with which statistics must be collected in order to determine such effects with satisfactory precision.

This author therefore recommends that NILECJ conduct research to create and to test models which correlate incendiarism and arson losses with measures of economic activity, economic incentives and disincentives, psychological utilities and disutilities, and arson control activities.

6. TECHNOLOGY

Probably the most tractable part of the overall problem of arson control is the technology of investigation and prevention, because it most nearly deals with tangible, directly observable matters. Under this rubric are to be found laboratory and field examinations, physical protection of evidence, properties of materials, and fire protection engineering.

In this section there are a discussion of what is needed for forensic laboratories oriented to arson, brief mention of forensic photography, and discussions of methodology in the arson laboratory, packaging of debris containing accelerants, requirements for hydrocarbon detectors and other field equipment, compilations of data for use in the field, and the physical protection of property against arson.

6.1 Arson Laboratory Requirements

Laboratory examination of physical evidence is very important to arson investigation and to eventual prosecution. The good laboratory report strengthens the hand of the investigator and prosecutor, often resulting in a guilty plea.(P61)

All evidence must be so handled as to maintain the chain of evidence, and therefore the use of specifically forensic laboratories is strongly to be preferred. Numerous criminalistics laboratories exist and are used by arson investigators.(L10g,P5,P7,P12,P34,P35,P59,P62,P73,P94) However this arrangement is not satisfactory in many cases because the police laboratories are overworked, cannot give quick response, and are not oriented to arson work.(L10e,L47,H1,P59,P62,P94)

Quick turn-around by the forensic laboratory -- within a few hours to a few days -- is a strong incentive for the investigator to keep going.(P59,P62) Some investigators however have to wait typically 6 weeks to 3 months for laboratory results. Such a delay causes difficulties because it may not even be known whether a crime has occurred. A fire investigator may nevertheless prefer to use a captive forensic laboratory despite large backlogs, as in Virginia.(P94)

There are some laboratory procedures which are characteristic of arson investigations, notably gas chromatography for the detection and identification of hydrocarbon accelerants.(L20,S47) In particularly well-equipped laboratories chromatography may be used in conjunction with mass spectrometry, infrared, or ultra-violet spectrophotometry. (L10o,P95) X-ray spectroscopy and thin-layer chromatography have been used,(S7,P61) and luminescent spectroscopy may become useful.(L114)

Several other types of examinations are also associated particularly with arson investigations: those involving incendiary devices, explosives and explosive devices, and electrical devices.(L10f,H6,S43,P21) Beyond such examinations, arson cases are liable to deal with any type of physical evidence associated with other crimes, e.g., glass, paint, fibers, hair, match books, wrapping paper, documents, handwriting, particles, locks, tool marks, tire prints, footprints, firearms, soil, and even blood, bullets, and fingerprints.(L22, L29e,L42,L62,S34,P57,P61)

Some states and localities have their own arson laboratories.(L101,H1,P8,P32) Some have fire evidence specialists in criminalistics laboratories.(P7) Some are planning

to establish an arson laboratory,(P11) or are entertaining proposals to do so.(P52,P62) An arson laboratory represents a major investment of money and personnel. The establishment of the Ohio State Arson Laboratory is reputed to have required an initial investment of $750,000 and to have taken four years of effort.(P59) In one instance the State Fire Marshal's Office provided the necessary laboratory equipment to the State Police laboratory.(L8) A number of arson investigation authorities use the services of the ATF headquarters or regional laboratories(P10,P11,P61,P73) or of the FBI laboratory.(H1,P5,P11,P73)

The perceived need to improve forensic laboratory services available to arson investigators should be defined in terms of specifics. A comprehensive inventory of laboratories available to perform arson examinations should be compiled; their services should be specified; and their adequacy as perceived by users should be gauged.

This author recommends that NILECJ compile as complete as possible an inventory of laboratories that do or can conduct forensic examinations of arson evidence. Laboratories should be identified by asking investigators throughout the country which laboratories they regularly or occasionally use, via the affiliations of members of organization such as the Forensic Sciences Foundation, and via corporate authorship of articles such as appear in the Journal of Forensic Science. Each laboratory should then be characterized in terms of the types of examinations it performs (types of evidence examined and techniques used), the turn-around times for the various examinations, the user population normally supported, availability to outside users, size of staff, equipment available, equipment costs, test costs and fees, and source of funding.

When the investigators are polled on laboratories they use, they should also be queried on any laboratories they may have discontinued using (or otherwise specifically refrain from using) and on their reasons for not using them. The investigators should be queried on what examinations they have each of the laboratories perform, how many of each type, how long it takes to receive results, their degree of satisfaction with the service, and what additional types of examinations they would need to have available.

The inventory and survey here recommended would help the LEAA in gauging the extent of the gap which has been identified in the availability of forensic laboratory services to arson investigators; determining what specialized services might be provided centrally; the number, nature, and geographic distribution of arson laboratories needed to close the gap; and a very rough approximation of the costs implied. Publication of the inventory would furthermore improve access to the laboratory services covered.

6.2 Photography

Still and moving picture photography at the scene of a fire is well recognized as an important evidence collection technique.(L5,L41,L43,S34,H6,H8,H10,H12,H15,P7,P19) Aerial photography has been mentioned for elucidating geometric patterns associated with explosions and thus identifying the point of origin.(P21)

The photographer properly works under the direction of the arson investigator,(H15) and the knowledge of what to photograph is inherent in investigative expertise. The require-

ments for assuring that photographs accurately depict what could be seen and for maintaining the chain of evidence are reasonably clear.(L5,H8,H15) Photography is a well established part of criminal investigations in general, and there are no notable idiosyncracies of arson photography. Although some arson investigators take a contrary position,(L10i) this author therefore sees no requirement for research into photography pertaining to arson.

An inventory of forensic photo labs would however be useful, (cf. Sec. 6.1, Arson Laboratory Requirements) and this author recommends compilation of such an inventory.

6.3 Laboratory Methods

Analyses for the detection and identification of accelerants form a large fraction of arson-related laboratory examinations. Essentially all such analyses are geared to hydrocarbon fuels. Other types of tests include analyses for other types of accelerants and initiators, which appear to be infrequent; examination and modeling of incendiary devices; and examination of electrical devices, which is hampered by incomplete knowledge.

Gas chomatography seems to be by far the most common analytical method in use.(L10c,L20,H1) Over 95% of all forensic laboratories use gas chromatography for accelerant detection; over 74% of these found headspace sampling of the evidence container the most acceptable method.(L20) Coupling use of a mass spectrometer or of a photospectrometer with a gas chromatography column can distinguish among materials with similar column retention times.(L10p,P61) In particular the mass

spectrometer can readily distinguish the polycyclic hydrocarbons characteristic of gasolene and between hydrocarbons and the oxygenated species characteristic of pyrolysis products.(S31, P61) Infrared spectrophotometry is not nearly as sensitive, unless a Fourier-transform device is used. Either a mass spectrometer or a Fourier transform spectrophotometer is expensive and could put a forensic laboratory in the position of using a major fraction of its budget to handle perhaps 0.1% of the cases.(P95)

The type -- and even batch -- of gasolene can be determined via gas chromatography of a sufficiently large sample.(P61,P62) Different lots of motor fuel, lighter fluid, and some other consumer-oriented fuels can be distinguished by thin-layer chromatography of the dyes contained. Leaded gasolenes can be distinguished by the relative proportions of tetramethyllead and tetraethyllead.(P61) Because of the marketing patterns of such products, there is however limited practical significance to distinguishing among lots thereof.

X-ray dispersion spectroscopy has been found useful in detecting plumbous bromide in order to screen debris for the presence of leaded motor fuel.(S7)

Synchronous luminescence spectroscopy has been shown useful for determining what polynuclear aromatic hydrocarbons are present in a mixture, without prior separation. (L114) The method is considered to be of moderate complexity. It has already been used by forensic laboratories.

There allegedly is little use in the United States of accelerants brought to the scene of the arson other than of the commonly available hydrocarbons -- gasolene, kerosene, fuel

oil, lighter fluid, paint thinner, etc.(L10d,P61,P95) However the possibility must be recognized that other chemicals may not be showing up because they are not being looked for. Houston, e.g., has had a number of fires which were definitely incendiary but in which the presence of hydrocarbons could not be established.(P62)

Cases have been reported in which methanol, chlorates, and phosphorus have been used as accelerants or initiators.(L52) Chlorates, nitrocellulose, and various industrial solvents are available to arsonists.(H3) Even materials such a flour, paper, and cocoa powder have been used to blow up large buildings.(P21) Most chemicals used by arsonists leave their traces which can be detected if they are looked for.(H3,P61)

Organized crime has been associated with the use of accelerants which leave only water-soluable residues.(L46) The volatile low-molecular-weight alcohols are good fuels, readily available, and water-miscible. The last mentioned characteristic means that under normal conditions of fire suppression accelerant traces would be washed away by the firefighters' water hoses. Also, methanol is a pyrolysis product of wood; thus, even if its presence is demonstrated, its legal import would be questionable.

The analysis for, and of, hydrocarbon fuels is generally satisfactory.(L20) Possible improvements are under study. There appears to be no need for NILECJ to initiate research in this area. A major lack in the armamentorium of the arson investigator, however, is the absence of a national forensic laboratory system which can perform examinations beyond analyses for and of accelerants.(P73)

This author recomends studies by NILECJ to determine what types of examinations may be needed and what specific procedures are available for such examinations. At the least such a study should cover analyses for chemical compounds and other materials and examination of electrical devices. These are the peculiarly arson-oriented laboratory requirements.

This report stands mute with respect to whether a study of laboratory methodology related to explosives and bombs may be needed, since information related to bombs was collected only incidentally. If there is any NILECJ interest in this direction, consultations with ATF and FBI technical personnel would indicate whether such a study deserves serious consideration.

6.3.1 Composition of Matter

A study should determine what types of chemical compounds need to be detected and identified, what other materials need to be identified, and what other characterizations may be required.

Since there are trends in arson methods,(H14) what are rarely used accelerants now may become more common. Such a shift may result from a large scale appearance of a new fuel on the consumer market, by diffusion of pyrotechnic technology through the underground press, or in reaction to better anti-arson investigations which are geared to hydrocarbon fuels. Specific accelerants and initiators which it would be well to be prepared against could be identified by a survey of case reports in the literature, inquiry of leading arson investigators, and following the underground press.

Concurrent to identifying the substances which are potential threats, laboratory methods which have been used for their analysis in fire debris should be identified from the same sources. A further phase of the study could identify analyses which are useful in other contexts.

From this study the knowledge will be gained of what chemicals pose threats not currently covered, what analyses are available to meet these threats, and what laboratory methods might be developed into analyses useful in arson investigations involving such new threats.

Two companion studies should determine (a) what identifications of materials other than accelerants and initiators and (b) what types of characterizations of materials are needed. An example of the first type of determination might be identification of the species of wood recovered from the scene of a fire in order more reliably to correlate observed damage with known burn characteristics. Examples of the second type of determination might be comparison of the products of laboratory pyrolysis of recovered hydrocarbon plastic with the purported accelerant or determining whether a curtain had not caught fire because the worst of the heat had not reached it before extinguishment or because it had a fire retardent.

The results of these studies, when correlated with the inventory of laboratories (cf. Sec.6.1, Arson Laboratory Requirements) would identify specific area in which the capabilities of forensic laboratories need to be strengthened for arson work.

6.3.2 Electrical Devices

The need for substantial enhancement of current capabilities to examine electrical wiring and equipment critically has been recognized.(L10h,P61,P73) There is for example no setup at ATF to examine toasters, tape machines, etc., nor to determine whether a pair of wires shorted out or was burned into.

A typical requirement would be examination of electrical equipment, such as a heater, to determine whether it was defective before a fire and if so whether, on intrinsic evidence, it could have been a source of ignition. Irons, hotplates, clock-radios, door-bells, and telephone bells have been used to set fires.(L41,H14) It should be possible to determine the electrical condition of appliances, lamps, etc. prior to the fire from which they were recovered. The analogy has been made to determining whether automobile headlights were on before they broke.(P61) There are private laboratories which can perform such examinations, but funds to pay for such work may not be available in the fire marshal's budget.

This author recommends a study to catalogue the types of electrical equipment which it may be necessary to examine, the types of examinations required, and the laboratory techniques and standards available for such examination.

The results of this study, when correlated with the laboratory inventory would reduce to specifics the areas of electrical examination in which forensic laboratories need to be strengthened. Conversely it may identify areas in which other existing laboratories, e.g., Underwriters Laboratories or Consumer Union, might be coopted for forensic work.

6.4 Packaging of Evidence

The most common and most characteristic examination of physical evidence in arson investigations is the analysis for accelerants in debris. Because most accelerants are very volatile and because the investigators cannot rely on an immediate laboratory work-up, the evidence must be packed so as to seal in the accelerants.

The usual type of plastic evidence bag, consisting of polyethylene, allows hydrocarbon accelerants to escape rapidly. Within one day half the hydrocarbon may have evaporated out, and within a very few days no detectable amount remains. (H1,P61)

There appears to be very little reported on packaging of evidence for transmittal to the laboratory. The only discussion in the literature of the relative merits of modes of packaging seems to be in an article in which Hurteau discusses cans, plastic bags in general, and glass.(S23)

Tightly closing, clean metal cans are the container of choice(L10g,P61) or glass jars if they can be protected adequately against breakage.(H1,P61,P62,P95) However, not all evidence -- e.g., sections of flooring -- will fit into such containers. In addition an adequate supply of cans or jars takes up a lot of room in the investigators' cars. Some investigators submit large, irregularly shaped items of evidence carefully wrapped in aluminum foil and sealed at the overlap. This works, but the foil tears easily.(P61)

The FBI's pamphlet on handling physical evidence mentions inflammables in passing with reference to the mode of shipping.(L106) Its pamphlet giving packing instruction

mentions gasolene, clothing, and wood as separate items, but it gives no consideration to solid materials impregnated with volatiles.(L113)

It is important to recognize that, although in the consumer market one refers to plastic bags without much differentiation, there are important differences among plastics. Several plastics have been examined for permeability to hydrocarbons, but the results have not been written up because of the press of day-to-day activity.(P95) In order to be considered, the plastic had to be commercially available in film form and capable of being fabricated into bags.

Polyethylene, which is a good barrier to water and oxygen, is highly permeable to hydrocarbons. Polyvinyl chloride is almost as permeable to hydrocarbons as is polyethylene. A terephthalate-polyethylene film (e.g. Mylar) is tough and has low permeability. Vinylidene chloride-vinyl chloride copolymer (e.g. Saran) has very low permeability but is relatively easily punctured. A three layer film consisting of vinylidene chloride-vinyl chloride copolymer between two layers of polyethylene which has recently come onto the market (Saranex) seems to be both tough and of very low permeability. Nylon-11, in use to at least a limited extent in England and in Israel,(P95) has a permeability intermediate between polyethylene and Mylar. Polytetrafluoroethylene (Teflon) has been cited as a suitable material for packaging arson evidence, but without supporting data.(L14)

This author recommends that NILECJ undertake a study in cooperation with ATF to review its findings in detail, to correlate its work systematically with data in the literature (including promotional fact sheets) concerning permeabilities

of commercially available plastics, and possibly to extend the work to other candidate materials (e.g. foil-plastic laminates). The study should also include a determination of which materials that are acceptable in regard to permeability, outgasing of plasticizers or other contaminants, and toughness can readily be sealed in the field. Saranax Zip-Loc bags, now being test marketed, are not as large as might be needed by arson investigators. Mylar film is available as large bags and sleeves. These must however be heat sealed, which may be difficult at a fire scene. Satisfactory initial results have been reported with a roasting bag recently put on the market by Sears, Roebuck, but no systematic tests have been made.(P40)

Once a material has been identified which has the proper technical characteristics there is still a substantial problem of economics involved to assure that the material is available to arson investigators in the form of bags or tubes suitable to their requirements. If the market is limited to arson investigators, it may be too small to entice normal commercial production.

This author recommends that in a second phase a production engineering study and a market study be undertaken by NILECJ to determine whether any of the packaging materials which are satisfactory technically could be introduced at affordable prices, possibly with an initial subsidy. A small specialty fabricator may be in a better position to supply this limited market than would a consumer-oriented mass market manufacturer.

Pilot plant production might usefully be undertaken in order to test acceptance. Imaginative promotion might also mean the difference between a good idea withering on the vine and a

modest advance in arson technology. Certainly arson investigators would prefer to store a stack of flexible, flat bags in the trunks of their cars instead of dozens of empty one-gallon paint cans.(P3,P40)

6.5 Field Equipment

There is general agreement that detectors for accelerants are key items of field equipment. Yet the instruments available were intended for other purposes and are not optimized for arson work.(L10n,L70h) Considerable thought has been given to the equipment which investigators need in the field, particularly in the context of so-called arson vans, but there appears to be no comprehensive documentation of these considerations that is generally available.

6.5.1 Hydrocarbon Detectors

The accepted types of devices for detecting residues of accelerants have been briefly described.(L10m) A systematic survey of existing gadgetry which would be used to detect accelerant residues has been proposed.(P79) The NFPCA has not committed nor requested funds for such a survey.

This author can only concur with the recommendation of the NAFPC seminar participants and the Aerospace Corporation that a hydrocarbon detector be developed which is designed specifically for arson investigations.(L10n,L70i) Such development requires work on several aspects, of which one is already under study.

Evaluation of currently available hydrocarbon detectors is a stated need.(L70i,P48,P52,P95) Such evaluation is needed not only to determine the suitability of devices designed for mine safety inspection and gas leak detection. More to the point, such evaluation is needed in order to provide operational base lines for designing detectors specifically for use by arson investigators. The National Bureau of Standards has undertaken research, under NILECJ sponsorship, aimed at developing a method to calibrate hydrocarbon detectors.(P22,P48) The starting point for this work is the technique developed by the same workers for calibrating explosive detection devices.

This author recommends that both technical performance criteria and ancillary engineering specifications for hydrocarbon detectors be formulated for what constitutes a "good" detector. The dimensions along which specifications should be drawn include sensitivity, discrimination, deactivation time/sampling capacity, portability, ruggedness, reliability, ease of operation, and cost. The specifications must take into account observations such as: false positive readings with present equipment (discrimination), negative readings immediately after a fire but positive days later (sensitivity), and the fact that many arson investigators -- even at the state level -- have no access to detectors because of cost.(L115,P56,P62,P66,P94)

Even the imperfectly applicable hydrocarbon detectors which are available are very widely used by fire investigators aware of them and able to afford them(L10d) and coveted by those who cannot afford them.(P56,P94) Better detectors -- by whatever criteria "better" is defined -- would be a boon to arson investigators. Once the desiderata for a hydrocarbon detector have been adopted and methods worked out for measuring the performance of detectors, then it will become possible to engineer a detector for arson investigators.

6.5.2 Equipment Requirements

During investigation at the scene of a fire investigators' activities include search, identification, seizure, and documentation. They may have to rely on what they carry in their cars' trunk compartments or they may have the use of a well-equipped arson van.

When Connecticut began planning its fire investigation vans in 1974 there was no precedent for such vans, in contradistinction from general crime vans.(H10) Ohio has acquired and equipped 10 fire investigation vans to its own specification.(P32) Houston had a mobile crime lab, which was lost in a fiscal crunch.(P62) As part of the process of organizing its new arson unit, Nebraska is working on the specifications for the equipment the unit's personnel will need.(P86) A list has been compiled of what equipment is recommended for the wildland fire investigator's kit.(P57)

The types of equipment which have been mentioned as useful range rather widely: electric supply, lights, digging tools, cutting tools, still camera, video camera, TV monitor, hydrocarbon detector, gas collector, dust collector, magnet, fingerprint collection kit, winch, cable and rope, ladder, tape recorder, typewriter.(H10,P57,P62)

New devices are developed from time to time for field use. An instrument is reputed to have been developed which can be engineered to separate any fluid mixture, but which has not yet been demonstrated to a technically trained skeptic.(P22) (Could this be a portable gas chromatography device with interchangeable columns?)

Givens, in the Naval Investigative Service, is working on a device for collecting residues of volatile accelerants from the air.(P85) It adsorbs the accelerant from a large volume of air and can be made to desorb the accelerant in the laboratory. The device is still under development. Longacre has designed and constructed a device which can magnetically recover non-ferrous metals, e.g., aluminum or copper wires, bullets, or coins, by use of an induction current.(P57)

The Criminalistics Division of the U.S. Army Criminal Investigation Command monitors new equipment and techniques (without distinction between field and laboratory procedures) but assertedly has become aware of nothing recent which is applicable to arson.(P39)

This author recommends that NILECJ determine what specific equipment is used by arson investigators, for what purposes, to what extent, and at what cost. A survey for this purpose should include at least a representative sample of arson investigators and all proprietors of arson vans. The survey should seek to establish what equipment is used by type, make, or model; the acquisition and operating costs; the uses to which each item of equipment is put; the circumstances determining whether it is used; and the frequency of use. The survey should also identify the perceived advantages and disadvantages of the various equipment items in use and the perceived needs for additional equipment.

From the results of the survey, LEAA will be able to establish what arrays of equipment might be recommended -- and possibly financed -- for arson investigators. Alternate arrays could be formulated according to the circumstances under which the investigators must operate. The costs of adequately equipping arson investigation units would become clear.

6.6 Handbooks

Field guides to scientific techniques for arson identification, investigative techniques, and terminology were needs cited by the NFPCA seminar participants.(L70h,k) One can imagine brief descriptions -- somewhat in laboratory cookbook style -- of the use and limitations of hydrocarbon detectors, field gas chromatography columns, fluorescence, circuit tracing, magnetic metal collectors, et sim. It should also describe situations which should be examined by experts such as electricians, heating maintenance persons, or structural engineers and indicate what such experts can be expected to determine. (H6,P2)

Such guides would be useful to assist the occasional arson investigator through only partly familiar techniques. Compilation has also been suggested of a field handbook for use by key arson investigators to jog their memories when they get stumped on a fire or explosion cause.(P21) More significantly, such a handbook would collect into one place some information on techniques which even a full-time investigator may not be using. Such a field guide would have to be written and edited by persons who are thoroughly conversant with the technical aspects and who are oriented to training investigators.

A considerably different type of field guide is also needed -- handbooks of data. This author believes that two such handbooks are needed, one on properties of materials and another on burn indicators.

Preliminary work has begun towards assembling a handbook of materials data useful to arson investigators at the scene of a fire.(P41,P53) The types of information to be

included are generally on the behaviour and properties of materials, such as at what temperature light bulbs melt, how the pyrolysis of wood varies with the type of fire, ignition temperatures of home furnishing materials, the melting points of metals, heat conductivity of concrete, densities, and upper and lower explosive limits. The specific domain of the handbook and the question of how to deal with discrepancies found in the literature are still being formulated.

This author recommends that work be undertaken on a companion handbook of burn indicators. Such a handbook would cover matters such as how room configuration affects the radiative and convective spread of fire, the conditions under which a fire will spread downwards and the telltales of such conditions, the inflamability of materials as a function of orientation of the surface, the appearance of various types of wiring under various fire conditions, and alligatoring of various types of flooring under various fire conditions.

The burn indicator handbook would have to be based on the best information available. There would undoubtedly need to be numerous disclaimers such as "It is not certain whether ... ," and, "Some investigators have found that ... ." Nevertheless such a handbook would be a useful field reference work which would help the investigator in deciding what additional signs to seek, what physical evidence to seize, and what further references to consult afterwards for detailed discussions on specific points.

Beyond this, the very process of gathering information for the handbook would identify the specific gaps and contradictions in current knowledge of burn indicators.(H3,H7) The handbook should be compiled by individuals who understand burn indicators well enough to select the data for inclusion critically

and to know what disclaimers might be appropriate. Because of the close relationship to research on fire behaviour, which is very much the province of the NFPCA's National Fire Safety and Research Office and the NBS's Center for Fire Research, any move by NILECJ towards compiling a burn indicator handbook should be coordinated with those organizations.

6.7 Hardening

Physical protection of property can to a considerable extent control the incidence of arson and the extent of damage if a fire is started.

Fences, surveillance, and automatic sprinklers have been identified as particularly effective in controlling incendiary losses of industrial property.(L99) Sprinkler control valves should be locked full open to prevent malicious or other unauthorized disabling of the sprinklers. Locks should be changed if discharged employees or strikers had keys. Unattended commercial facilities can be protected by penetration alarms under continual central monitoring.(P49) Prompt response to alarms acts as a deterent against attempted vandalism.

In a bedroom community with relatively little industry, fires tend to be set in dwellings. Garden apartments, housing perhaps a dozen families each, or other multifamily dwellings are common arson targets because of their accessibility.(H1,P10) In rural areas back and front porches are frequent targets, also because of accessibility. Arsonists generally use fuel found on the premises, rather than bringing accelerants to the fire site. After buildings were required to be kept locked, trash required to be removed from the publicly accessible parts of the buildings, and protective devices required fire losses

in Prince George's County, Maryland, fell significantly during 1977 and seem to be still falling.(P10)

Security measures and equipment have been employed to improve the security of schools against arson, burglary, and vandalism.(S5) Making schools reasonably burglar-proof is urged to prevent the risk of arson. Fires started outside have a lower destructive potential and are more likely to be discovered early.(S13) Basic structural characteristics must however also be suitably considered. An old wooden building without firestops is vulnerable even to a fire set in a pile of leaves against an outside wall.(L67)

Research which has been underway for several years on large scale building fires, though not directed specifically at incendiary fires, inevitably has its arson ramifications. The thrust of the work has been towards decreasing buildings' fire vulnerability and developing building codes for that purpose.(P18) High rise building, atrium, and row frame house fires have been studied. Full scale fires have been studied in 30 to 40 vacant, instrumented buildings. These were left fully powered, cleaned, and furnished with abandoned furniture. More reliable burning characteristics are believed to be determined this way than with laboratory simulations which must use freshly painted surfaces and furnishings brought in for the purpose.

As many as 60 to 65% of row frame house fires in New York may be deliberately set (summing "incendiary", "malicious mischief", and "suspicious" and prorating "unknown").(P18) Incendiary rubbish fires are common. Such a fire set in a public hall can then shoot up the stairwell, both rapidly spreading the fire and cutting off the primary escape route.

In a typical experiment fire detectors and sprinklers were installed in a vacant building. When gasolene was thrown down and a torch tossed in, the fire started briskly, but a detector went off within 3 seconds, and a sprinkler went off in 12 seconds, bringing the fire under control.(P18)

Buildings with atria (generally hotels) present special problems because of the characteristic air circulation and the fact that all of the bedrooms open onto the large central space.(P18) A fire was set in such a hotel low in the building, where it burned for 10 minutes and involved 5500 square feet before being discovered. Then it burst devastatingly into the atrium. A different type of open space, a cockloft in a row of frame houses, allowed thirteen residences to become seriously involved during 4 minutes before firemen arrived on the scene.(L32,P18)

Arson is certainly sufficiently common that it should be taken into account in building design as well as in protecting existing buildings by retrofitting. Stair pressurization -- to counteract the stack effect -- plus compartmentalization are required in new high rise buildings in New York. Sprinklering is accepted as a second choice to stair pressurization for retrofitting.(P18)

Economics is a significant consideration in selecting hardening measures. Indeed, a New York Superior Court has held, in a case now on appeal, that monetary costs must be considered in deciding whether a law mandating retrofitting is constitutional.(P18)

This author recommends that NILECJ undertake a study of hardening of structures against arson with emphasis on

the cost/benefit aspects. The study should identify the various means available to decrease the vulnerability of buildings to arson losses and the different versions of implementing those means. The costs of such implementations should be determined for new construction, as part of rehabilitation, and in retrofitting specifically for decreasing fire vulnerability. Costs should be related to the type of structure, size, type of occupancy, and location. Benefits should be estimated both from experimental data on the extent to which damage from fire is limited in protected structures and from statistics comparing arson incidence, casualties, and monetary losses among structures with various types and degrees of protection.

Information related to non-structural industrial and commercial property should be collected at least incidentally. Decreasing the vulnerability of such property should certainly not be ignored. However categorization and intercomparison of different types of properties are likely to be more difficult than for structures, and the means for decreasing vulnerability are probably more limited.

The results of the proposed study would provide the information needed to evaluate one mode of controlling arson. The costs and the benefits would be explicitly identified and quantified within the universe covered by the study. In conjunction with more reliable arson statistics than now available the results could be extended to structures of all types in the entire country. Once the nature and magnitude of possible ameliorative measures have been determined, it will be possible to establish schedules for the designation and application of the resources required for implementing the measures.

7. CITATIONS

7.1. Primary References

L1. Edith Evans Asbury, "Car-Damage Inspection Program For Insurance Claims Is Assailed", The New York Times, 127, no. 43,794, City Edition, C35 (Dec. 19, 1977).

L2. Reed Adams, "Arson Investigation. A Preliminary Report" International Fire Chief, 42(8), 11 (1976).

L3. John Barracato with Peter Michelmore, "Arson!" (W.W. Norton, New York, 1976).

L4. Edward B. Bates, "Elements of Fire and Arson Investigation" (Davis Publishing Co., Santa Cruz, Calif., 1975).

L5. Elliott R. Berrin, "Investigative Photography", SPFE Technology Report 77-1 (Society of Fire Protection Engineers, Boston, 1977).

L6. Alvin L. Bertrand and Andrew W. Baird, "Incendiarism in Southern Forests: A Decade of Sociological Research" (Mississippi State University, Mississippi State, Miss.) Bulletin 838 (Aug. 1975).

L7. Alvin L. Bertrand, William D. Heffernan, G. Dale Welch, and John P. O'Carroll, "Attitudinal Patterns Prevalent in a Forest Area with High Incendiarism", Louisiana State University Agricultural Experiment Station Bulletin No. 648 (Nov. 1970).

L8. Donald M. Bisset, "Annual Report of the Maine State Fire Marshal's Office. 1976" (Department of Public Safety, Augusta, Maine (1977?)).

L9. Jeanne H. Block, Jack Block, and William S. Folkman, "Fire and Children: Learning Survival Skills", USDA Forest Service Paper PSW-119 (Pacific Southwest Forest and Range Experiment Station, Berkeley, Calif., 1976).

L10. John G. Boudreau, Quon Y. Kwan, William E. Faragher, and Genevieve C. Denault, "Arson and Arson Investigation. Survey and Assessment" (Law Enforcement Assistance Administration, Washington, (Oct. 1977)): (a) p. xvii; (b) p. 19; (c) p.60; (d) p. 62; (e) p. 65; (f) p. 66; (g) p. 67; (h) p. 69; (i) p. 70; (j) p. 71; (k) p. 73; (l) p. 74; (m) p. 80; (n) p. 84; (o) p. 86; (p) p. 87.

L11. Sidney H. Brounstein et al., "Highlights of Interim Findings and Implications", PROMIS Research Project Publication 1 (Institute for Law and Social Research, Washington, 1977): (a) p. 14; (b) p. 20.

L12. John L. Bryan and David J. Icove, "Recent Advances in Computer-Assisted Arson Investigation", Fire Journal, 71(1), 20 (Jan. 1977).

L13. Ward W. Caddington, "Arson Investigation. Course Content" (undated).

L14. Stephen F. Carmick, "Investigation of the Defense of an Arson Claim", presented at the American Bar Association Annual Convention, Montreal, Aug. 12, 1975.

L15. Dan J. Carpenter, testimony before the Subcommittee on Intergovernmental Relations Hearing on the Problem of Arson and Its Impact on State and Local Governments, Dec. 15, 1977.

L16. Dan J. Carpenter, et al., "Arson -- A Crime that Lost Prominence", presented at the International Association of Fire Chiefs' 104th Annual Conference, Denver, Sept. 25-29, 1977.

L17. John Carr, "Fire and Arson Investigation in London, England", New Jersey Arson Network Newsletter, 4(2) (Apr. 1977).

L18. Robert E. Carter, "Arson Fire Problem - A National Crisis", presented at the 48th Annual Fire Department Instructors Conference, Memphis, Tenn., March 16, 1976.

L19. Clyde W. Centers, "Task Force on Fire Cause and Arson Investigation. Report No. 1" (Office of State Fire Marshal, Salem, Ore., Jan. 3, 1978): (a) p. 3; (b) p. 4; (c) p. 6; (d) p. 10; (e) p. 11; (f) p. 12.

L20. Stephen Chesler and Stephen Wise, "Survey of Laboratory Methods for the Determination of the Presence of Arson Accelerants" (letter report, National Bureau of Standards, Nov. 21, 1977).

* Clark: cf. L121.

L21. Philip C. Culp, et al., "1976 Wisconsin Department of Justice. Division of Criminal Investigation. Arson Bureau. Annual Report" (Wisconsin Department of Justice, Madison, Wisc.), p. 2.

L22. H. T. DeArmond, "Automobile Arson Investigation", Fire and Arson Investigator, 25(3), 16 (Jan.-Mar., 1975).

L23. Myron S. Denholtz, "'At Home' Aversion Treatment of Compulsive Fire-Setting Behavior: Case Report", in Richard Rubin et al., eds., "Advances in Behavioral Therapy: Proceedings of the Fourth Conference of the Association for Advancement of Behavior Therapy" (Academic Press, New York, 1972), p. 81 ff.

L24. M. L. Doolittle, Francis Eller, and Robert S. Jackson, "Strategies for Reducing Incendiary Fire Occurrence in the South" (Forest Service, (New Orleans?), 1976).

L25. M. L. Doolittle and G. D. Welch, "Fire Prevention in the South: Personal Contact Pays Off", Journal of Forestry, 72(8), 488 (Aug. 1974).

L26. Dan Econ, "Arson Control Program", presented at the 81st Annual Conference of the International Chiefs of Police, Washington, Sept. 25, 1974.

L27. M. H. Estepp and Ward W. Caddington, "Organizing to Fight Arson", Fire Command, 44(5), 20 (May 1977).

L28. (Not used).

L29. Philip E. Fisher, Louis J. Hillenbrand, and J. F. Suchy, "Arson ... Not Recognized as a Class-1 Crime: ... Why? Resource Assessment for Arson Education and Public Awareness" (Battelle Columbus Laboratories, Columbus, Ohio, Dec. 2, 1975): (a) p. 3; (b) p. 11; (c) p. 12; (d) p. 15; (e) p. 34; (f) p. 36; (g) p. 38; (h) p. 41.

L30. Phillip E. Fisher, Louis J. Hillenbrand, and John F. Suchy, "Final Report on Arson Information Resources: A Baseline Collection and Survey" (Battelle Columbus Laboratories, Columbus, Ohio, Feb. 28, 1977), p. 36.

L31. Brian Forst, Judith Lucianovic, and Sarah J. Cox, "What Happens After Arrest?", PROMIS Research Project Publication 4 (Institute for Law and Social Research, Washington, Aug. 1977).

L32. Joseph P. Fried, "Fire Destroys Row of Proud Homes in East New York", The New York Times, 127 no. 43,875, City Edition, A25 (March 10, 1978).

L33. James A. Gamm, "Defense v. Offense or the Bad Guys v. The Good Guys", Fire and Arson Investigator, 27(4) 3 (Apr.-June 1977) & 28(1) (Jul.-Sept. 1977).

L34. John Glenn, opening statement before the Senate Governmental Affairs Subcommittee on Intergovernmental Relations Hearings on Arson-for-Profit: Its Impact on States and Localities, Dec. 14, 1977.

L35. John R. Hall, Jr., and Michael Karter, "Supplemental Technical Report: Fire Rates vs. Community Characteristics", draft working paper, to NSF-RANN (Apr. 1976).

L36. Ken Hartnett, "The Symphony Road Fire Murders", Nation's Cities, 16(2), 17 (Feb. 1978).

L37. J. M. Heineke, "Modeling Arson: An Exercise in Qualitative Model Building", IEEE Transactions on Systems, Man, and Cybernetics, 5(4), 457 (July 1975).

L38. J. M. Heineke and Stein Weissenberger, "An Analysis of Wildfire Prevention", IEEE Transactions on Systems, Man, and Cybernetics, 4(6), 513 (Nov. 1974).

L39. Tony H. Hight, Charles F. Shean, and J. Robert Sparks, "Georgia Manual for Arson Investigators" (Prosecuting Attorneys' Council of Georgia, Decatur, Ga., 1976).

L40. Philip Hogan, "The Adolescent Mind and Arson", presented at Sixth Annual Nebraska Arson Conference, Lincoln, Nebr., Apr. 21-25, 1975.

L41. David A. Hurst, "The Torch's Reward", Selected Articles for Arson Investigators, 1976 Update, Sec. 12, Art. 6 (Jan.-Mar. 1976).

L42. William K. Hurteau, "Was that an arson fire?", Fire Command, 44(8), 30 (Aug. 1977).

L43. Sol Morton Isaac, "The Fraud Fire Case", Fire and Arson Investigator, 25(3), 27 (Jan.-Mar. 1975).

L44. James E. Jones, Jr., statement before the Subcommittee on Intergovernmental Relations of the Senate Committee on Governmental Affairs on Arson for Profit -- Its Impact on States and Localities, Dec. 14, 1977.

L45. Th. Kammerer, L. Singer, and D. Michel, "Les Incendiaires. Etude criminologique, clinque et psychologique de 72 cas", Annales médico-psychologiques, 1(5), 687 (May 1967).

L46. Clifford L. Karchmer, "Arson and the Mob. The underworld turns fire into profit", Firehouse, 2(8), 22 (Aug. 1977).

L47. Clarence M. Kelley, "Crime in the United States. 1976. Uniform Crime Reports" (Federal Bureau of Investigation, Washington, Sept. 28, 1977): (a) p. 1; (b) p. 175; (c) p. 181.

L48. John Kennedy, "Fire, Arson and Explosion Investigation" (Investigations Institute, Chicago, 1977).

L49. James W. Kerr, "Incendiarism: An Overview and an Appraisal", International Fire Chief, 42(4), 6 (Apr. 1976).

L50. Bronson C. La Follette, "The Attorney General's 1975-77 Report to the Legislature" (State of Wisonsin Department of Justice, Madison, Wisc.), p. 14.

L51. Bernard M. Levin, "Psychological Characteristics of Firesetters", Fire Journal, 70(2), 36 (March 1976).

L52. John M. Macdonald with Robert B. Shaughnessy and James A. V. Galvin, "Bombers and Firesetters" (Charles C. Thomas, Springfield, Ill., 1977), chapt. 10.

L53. Lee B. Macht and John E. Mack, "The Firesetter Syndrome", Psychiatry, 31(3), 277 (Aug. 1968).

L54. Hugh M. Maguire, "Seattle Lights Fire Under Arsonists With Multimedia Plea for Citizen Help", Fire Engineering, 130(9), 26 (Sept. 1977).

L55. Hugh M. Maguire, "'Marshal 5'. Seattle's Elite Arson Squad", Firehouse, 2(10), 58 (Oct. 1977).

L56. Gerry Maraghy, "Maine fire fighters become sleuths", Fire Command, 45(2), 20 (Feb. 1978).

L57. Kendall D. Moll, "Arson, Vandalism and Violence: Law Enforcement Problems Affecting Fire Departments" (Law Enforcement Assistance Administration, Washington, Mar. 1974), Chapt. II.

L58. James Nichols, "Syndromes of Fire Setters", presented at 1976 Florida Arson Seminar, Orlando, Fla., Mar. 1-5, 1976.

L59. Joseph A. O'Keefe, testimony presented at (Massachusetts) Arson Commission Hearing, Boston, Mass., Oct. 19, 1977.

L60. R. G. Provencher, "Arson '76" (Society of Fire Protection Engineers, Boston, 1976).

L61. R. G. Provencher, "Was it Arson" (GAB, New York, undated).

L62. Louis Reneri, Jr., "Physical Evidence in Auto Fires", Fire and Arson Investigator, 25(3), 18 (Jan.-Mar. 1975).

L63. Randy Revelle, "Combatting Arson in Seattle", presented at 1977 Congress of Cities Special Workshop on Arson, San Francisco, Dec. 5, 1977.

L64. Edwin Robbins and Lilian Robbins, "Arson With Special Reference to Pyromania", New York State Journal of Medicine, 67(6), 795 (Mar. 15, 1967).

L65. S. Rottenberg, "The Social Response to Incendiary Fire", Aerospace Report no. ATR-76(7918-05)-3 (The Aerospace Corporation, El Segundo, Calif., Aug. 1976): (a) Chapt II; (b) p.III-9.

L66. Saundra Saperstein, "3-Year-Old Suit Opens in Fire that Took 3 Chidren's Lives", The Washington Post, 101(121), C1 (Apr. 5, 1978).

L67. Saundra Saperstein and Barbara J. Katz, "Fire Destroys Historic Olney Inn", The Washington Post, 101(115), C1 (Mar. 30, 1978).

L68. Ellen Y. Siegelman and William S. Folkman. "Youthful Fire-Setters ... an exploratory study in personality and background", USDA Forest Service Research Note PSW-230 (Pacific Southwest Forest and Range Experiment Station, Berkeley, Calif., 1971).

L69. Robert B. Smith, "Statement before the Senate Governmental Affairs Subcommittee on Intergovernmental Relations on the Subject of Arson", Dec. 14, 1977.

L70. John F. Suchy, Phillip E. Fisher, and Louis J. Hillenbrand, "Arson: America's Malignant Crime" (National Fire Prevention and Control Administration, Washington, Sept. 1976): (a) p. 9; (b) p. 10; (c) p. 11; (d) p. 12; (e) p. 16; (f) p. 18; (g) p. 22; (h) p. 25; (i) p. 26; (j) p. 27; (k) p. 28.

L71. Dick Sylvia, "Arson Program on Way to Fight Nation's Major Fire Problem", Fire Engineering, 129(8), 48 (Aug. 1976).

L72. Howard D. Tipton, testimony before the Senate Subcommittee on Intergovernmental Relations on the Problem of Arson and Its Impact on State and Local Governments, Dec. 15, 1977.

L73. Cass Vanzi and Joseph O'Brien, "Improved Organization Spells Trouble for Arsonists", Firehouse, 2(2), 30 (Feb. 1977).

L74. John von Neumann and Oskar Morgenstern, "Theory of Games and Economic Behavior", 3rd ed. (Princeton University Press, Princeton, N.J., 1953; reprinted Science Editions, John Wiley & Sons, New York 1964), Appendix.

L75. Lawrence A. Wade, "Arson Squad", internal memorandum to F. E. Lynch (Department of Public Safety, State of Vermont, Montpelier, Vt., Mar. 10, 1978).

L76. "Arson", Minnesota Fire Chief, 13(1), 18 (Sept.-Oct. 1976).

L77. "Arson Alarm", news release, Dick Marquardt, Washington State Insurance Commissioner and Fire Marshal, June 1, 1977.

L78. "Arson Award Nomination for 1977" (Washington Insurance Council, Seattle, Wash.).

L79. "Arson Blamed in Alabama", The Washington Post, 101(121), A10 (Apr. 5, 1978).

L80. "Arson Control Assistance Act", 95th Congress, 1st Session, S. 1882, a bill as introduced by Mr. Glenn, July 19 (legislative day May 18), 1977.

L81. "Arson for Hate and Profit", Time, 110(18), 22 (Oct. 31, 1977).

L82. "Arson (Its Generation, Deterrence, and Control)", internal document (Tecolote Research, Inc., Santa Barbara, Calif., undated).

L83. "Arson. Seattle Fights Back", International Fire Fighter, 60(3), 6 (Mar. 1977).

L84. "At last ... a system to reduce ARSON LOSSES", (American Insurance Association, New York, (1977?)), leaflet.

L85. "Bill Frees Insurers to Release Arson Information", Fire and Arson Investigator, 27(1), 49 (Jul.-Sept. 1976).

L86. Congressional Record: (a) 123, no. 122 (July 19, 1977); (b) no. 136 (Aug. 18, 1977); (c) no. 175 (Oct. 28, 1977); (d) 124, no. 3 (Jan. 23, 1978).

L87. Constitution for the United States of America: (a) Article 4 in Amendment; (b) Article 5 in Amendment.

L88. "Crime in Service Industries" (Domestic and International Business Administration, Sept. 1977), p. 91.

L89. "Crimes Against Business. Preliminary Recommendations for Demonstration, Research and Related Programs Designed to Reduce and Control Non-Violent Crimes Against Business" (American Management Associations, Aug. 27, 1977 draft): (a) p. 41; (b) p. 44; (c) p. 67; (d) Appendix 5, p. 12; (e) Appendix 5, p. 20.

L90. "Criminal Code Reform Act of 1978", 95th Congress, 2nd Session, S. 1437, as passed by the U.S. Senate, January 30 (legislative day January 24), 1978, Title III, Sec. 128.

L91. "Early-Warning Arson Strike System Developed by Boston Civic Group", Fire Control Digest, 3(12), 1 (Dec. 1977).

L92. "Fire Marshals Association of North America Statement. Senate Bill 1882" (Fire Marshals Association of North America, Washington, undated).

L93. "Fire Setters", (Film Communicators, Los Angeles, 1975), film. Viewing restricted to fire and law personnel.

L94. Gun Control Act of 1968, PL 90-618, 88 Stat. 1213.

L95. "Highlights of the National Household Fire Survey" (National Fire Prevention and Control Administration, Washington, 1976), p. 16.

L96. "How to Take the Profit Out of Arson", Record, 54(4), 8 (Jul.,Aug. 1977).

L97. Idaho Statute, Sec. 39-3508.

L98. "Incendiarism: An FM Survey", Record, 54(4), 12 (Jul.,-Aug. 1977).

L99. "Incendiary Targets -- Who You Are and What You Can Do", Record, 54(4), 16 (Jul.,Aug. 1977).

L100. Interstate and Foreign Travel or Transportation in Aid of Racketeering Enterprises Act, PL 87-228, 18 USC 1952, 75 Stat. 498.

L101. Miranda v. Arizona 384 U.S. 436 (1966).

L102. "Monthly List of GAO Reports", 11(10) (Nov. 1, 1977) to 12(1) (Feb. 1, 1978).

L103. "North Dakota Fire Laws" (North Dakota State Fire Marshal, Bismark, N. D., June 15, 1975).

L104. "North Dakota Century Code: (a) Sec. 12.1-21-01; (b) Sec. 12.1-21-02; (c) Sec. 12.1-21-05; (d) Sec. 18-01-05.

L105. Oklahoma Statutes 71: (a) Title 21, Sec. 1403; (b) Title 74, Sec. 324.9.

L106. "An Outline of the Rules for Handling Physical Evidence", revised (Federal Bureau of Investigation, Washington, Dec. 1971).

L107. Oregon Revised Statutes, Sec. 743.603 ff.

L108. Organized Crime Control Act, PL 91-452: (a) 18 USC 841-848, 84 Stat. 952; (b) 18 USC 1961, 84 Stat. 941.

L109. "Property Insurance Loss Register" (American Insurance Association, (New York?), Dec. 1977), 4 pp.

L110. "Property Insurance Loss Register", Fire and Arson Investigator, 27(4), 60 (Apr.-Jun. 1977).

L111. "Statewide Arson Network System" (New Jersey State Police, West Trenton, N.J., Jan. 1976).

L112. "Study Throws Light On Arson Problem", Fire Engineering, 130(2), 59 (Feb. 1977).

L113. "Suggestions for Handling of Physical Evidence. Identification. Preservation. Wrapping and Packing. Transmittal" (Federal Bureau of Investigation, Washington, April 1976).

L114. "Synchronous scanning boosts organic analysis", Chemical and Engineering News, 56(13), 31 (March 27, 1978).

L115. "Taking the Profit Out of Arson", Commerce America, 11(13), 4 (June 20, 1977).

L116. "Tongue-Tripper for Arsonists", Fire and Arson Investigator, 27(1), 48 (Jul.-Sept. 1976).

L117. "Uniform Coding for Fire Protection. 1976" (National Fire Protection Association, Boston), publ. no. 901.

L118. 18 USC 1341.

L119. "Work in Process -- Draft Reports and Other Materials" (as of 2-27 (1978)) and (as of 3-7 (1978)), on public display, Distribution Section, General Accounting Office, Washington, D.C.

L120. "Your Guide to Explosives Regulation 1976" (Bureau of Alcohol, Tobacco, and Firearms, Washington, May 1976).

L121. Joseph E. Clark, ed., "Catalog of Grants, Contracts, & Interagency Transfers" (National Fire Prevention & Control Administration, (Washington,) 1977).

L122. "Fire Education and Training Programs (FY1978)" (National Fire Prevention and Control Administration, Washington (1977)).

7.2 Secondary References

S1. Andrew W. Baird, "Local Organization for Forest Fire Prevention: A Study of Forest Fire Prevention and Related Organizations", unpublished report, (Southern Forest Experiment Station (New Orleans?), 1970) (cited in L6).

S2. Andrew W. Baird and Max L. Doolittle, "Rural Residents and Forest Fire Risk: Guides to Forest Fire Prevention" (Mississippi State University, State College, Miss.), Social Science Research Center Report No. 29 (1969) (cited in L6).

S3. Brendom P. Battle and Paul B. Western, "Handbook on Detection and Investigation of Arson" (Arco Publishing co., New York, 1975) (cited by P 68).

S4. R. Brown. "The Purpose and Importance of Written Reports in Arson Investigation", Fire and Arson Investigator, 25(1), 42 (1974) and 26(1), 48 (1975) (Abstr. Police Sci., 3(2), no. 445 (Mar.,Apr. 1975) and 4(1), no. 185 (Jan.,Feb. 1976)).

S5. L. W. Burton, "Model School Security System Cuts Crime", Security World, 12(6), 12 (1975) (Abstr. Police Sci., 4(3), no. 519 (May,Jun. 1976)).

S6. J. A. Connor, "Arson Investigation", Military Police Law Enforcement Journal, 1(5), 50 (1975) (Abstr. Police Sci., 3(4), no. 955 (Jul.,Aug., 1975)).

S7. E. L. Covey, "Application of Energy Dispersive X-Ray Spectroscopy in Fire Investigation", Journal of Forensic Science, 22(2), 325 (1977) (Abstr. Police Sci., 5(4), no. 967 (Jul.,Aug. 1977)).

S8. Danloy, "De brandstichtingen", Rev. Rijkswacht, 14(62), 27 (1975) (Abstr. Police Sci., 5(3), no. 599 (May,Jun. 1977).

S9. Max L. Doolittle, "Planning Fire Prevention Communications", Journal of Forestry, 70(10), 607 (Oct. 1972) (cited in L6).

S10. Richard M. Eisler, "Crisis Intervention in the Family of a Firesetter", Psychotherapy: Theory, Research and Practice, 9(1), 76 (Spring 1972) (Psychological Abstr., 50, no 5316 (1973)).

S11. J. Fleszar-Szumigajowa, "The Perpetrators of Arson in Forensic-Psychiatric Material", Polish Medical Journal, 8(1), 212 (1969) (Psychological Abstr., 47, no. 5112 (1972)).

S12. U. Füllgrabe, "Psychologische Aspekte der Brandstiftung", Polizei, 65(12), 351 (1974) (Abstr. Police Sci., 3(6), no. 1477, (Nov.,Dec. 1975)).

S13. J. Gardner, "Arson in Schools", Security Gazette, 17(2), 56 (1975) (Abstr. Police Sci., 3(3), no. 711 (May,Jun. 1975)).

S14. Gimbal, "Les incendiares", Annales médico-psychologiques, 2, 353 (1905), (cited in L45).

S15. L. Gold, "Psychiatric Profile of the Firesetter", Journal of Forensic Sciences, 7, 404 (1967) (cited by P52).

S16. P. Grapin, "Incendie et incendiaires", Rev. Sci. Crim. Droit pén. comp., 1974(1), Abstr. Police Sci., 3(1), no. 218 (Jan.,Feb. 1975)).

S17. B. Eugene Griessman and Alvin L. Bertrand, "Factors Related to Communication of Forest Fire Prevention Messages", Agricultural Experiment Station Bulletin no. 623 (Baton Rouge, La., 1967) (cited in L6).

S18. William A. Hamilton and Charles R. Work, "The Prosecutor's Role in the Urban Court System: The Case for Management Consciousness", Journal of Criminal Law and Criminology (June 1973) (cited in L11).

S19. Thomas Hansbrough, "A Sociological Analysis of Man-Caused Forest Fires in Louisiana" (dissertation, Louisiana State University, 1961) (cited in L6).

S20. Thomas Hansbrough, "Southern Forests and Southern People" (Louisiana State University Press, Baton Rouge, 1963), pp. 23-24 (quoted in L6).

S21. W. Hurley and T. M. Monahan, "Arson: The Crime and the Criminal", British Journal of Criminology, 9(1), 4 (1969) (Psychological Abstr., 43, no. 13094 (1969)).

S22. William Hurteau, "Arson Investigation and the Collection of Evidence", Security World, 11(3), 18 (Mar. 1974) (NCJRS).

S23. William K. Hurteau, Security World, 11, 69 (1974) and also Fire Journal, 67(7), 47 (July 1973) (cited by P95).

S24. J. A. Inicardi, "The Adult Firesetter: A Typology", Criminology, 8, 145 (1970) (cited by P52).

S25. Bruce F. Johnson, "Demographic and Socio-Economic Factors and Forest Fire in the Southeastern United States" (dissertation, Mississippi State University, 1968) (cited in L6).

S26. I. Kaufman, L. W. Heims, and D. E. Reister, "A Re-evaluation of the Psychodynamics of Firesetting", American Journal of Orthopsychiatry, 31, 123 (1961) (cited by P52).

S27. H. H. Knaape and E. Kurth, "Children and Juveniles as Pyromaniacs", Psychiatrie, Neurologie und medizinische Psychologie, 21(12), 463 (1969) (Psychological Abstr., 44, no. 12849 (1970)).

S28. Jacques Laplante, "The Pyromaniac", Laval Médical, 40(10), 1062 (Dec. 1969) (Psychological Abstr., 45, no. 8574 (1971)).

S29. David Lester, "Firesetting", Corrective and Social Psychiatry and Journal of Behavior Technology Methods and Therapy, 21(2), 22 (1975) (Criminal Justice Abstr., 7(4), S16069 (Dec. 1975)).

S30. Nolan D. C. Lewis, L. Yarnell, and H. Yarnell, "Pathological Firesetting (Pyromania)", Nervous and Mental Disease Monographs no. 82 (1951) (quoted in L64).

S31. M. H. Mach, "Gas Chromatography - Mass Spectrometry", Journal of Forensic Science, 22(2), 348 (1977) (Abstr. Police Sci., 5(4), no. 968, (Jul.,Aug. 1977)).

S32. D. W. McKerracher and J. I. Dacre, "A Study of Arsonists in a Special Security Hospital", British Journal of Psychiatry, 112, 1151 (1966) (Psychological Abstr., no. 4758 (1967)).

S33. Howard M. McLeskey, "The Enforcement of Forestry Law in Selected Mississippi Counties" (dissertation, Mississippi State University, 1968) (cited in L6).

S34. J. Meier, "Die Spurensicherung", Kriminalistik, 28(4), 151 and (5), 202 (1974) (Abstr. Police Sci., 3(6), no. 1418 (Nov.,Dec. 1975)).

S35. A. J. Miller, "A Study of Fire Hazards in Homes of Low-Income Families of Southside Virginia" (Oct. 1976), SSIE no. GY-64199-3.

S36. B. Nurcombe, "Children Who Set Fires", Medical Journal of Australia, 1964, 579. (cited by P52).

S37. M. Schmiedberg, "Pathological Firesetters", Journal of Criminal Law, Criminology, and Police Science, 44, 30 (1953) (cited by P52).

S38. E. Simmel, "Incendiarism", Yearbook of Psychoanalysis, 5, 261 (1949) (cited in L64).

S39. B. Sutton, "Pyromania and Psychopathic Firesetters", Fire and Arson Investigator, 25(2) (1974) (Abstr. Police Sci., 3(4), no. 958 (Jul.,Aug. 1975)).

S40. T. G. Tennent, A. McQuaid, T. Loughnane, and N. J. Hands, "Female Arsonists", British Journal of Psychiatry, 119, 497 (1971) (Psychological Abstr., 48, no. 3320 (1972)).

S41. M. W. Tobias, "The Use of the Psychological Stress Evaluator in Arson Investigations", Fire and Arson Investigator, 25(2), 4 (1974) (Abstr. Police Sci., 3(4), no. 913 (Jul.,Aug. 1975)).

S42. Thornton A. Vandersall, "Children Who Set Fires", Archives of General Psychiatry, 22(1), 63 (1970) (Psychological Abstr., 44, no. 10752 (1970)).

S43. H. R. Vliet, "The Fire Investigator and Electrical Fires", Fire and Arson Investigator, 26(24), 35 (1976) (Abstr. Police Sci., 5(2), no. 436 (Mar.,Apr. 1977)).

S44. Gerhard Wagner, "On the Motivation of Incendiarism", Psychiatrie, Neurologie und medizinische Psychologie, 26(3), 155 (Mar. 1974) (Psychological Abstr., 53, no. 3417 (1975)).

S45. R. S. Welsh, "The Use of Stimulus Satiation in the Elimination of Juvenile Fire-Setting Behavior" in Anthony M. Graziano, ed., "Behavior Therapy with Children" (Aldine Publishing Co., Chicago, 1971), p. 283 ff. (cited by P52).

S46. H. Yarnell, "Firesetting in Children", American Journal of Orthopsychiatry, 10, 282 (1940) (cited in L64).

S47. I. H. L. Yip and G. Claire, "A Rapid Analysis of Accelerants in Fire Debris", Canadian Society of Forensic Science Journal, 9(2), 75 (1976) (Abstr. Police Sci., 4(5), no. 1226 (Sept.,Oct. 1976)).

S48. "Course Outline for Fire Investigators: Fire Investigation: Origin, Cause and Recognition of Arson", Fire and Arson Investigator, 27(1) 10 (1976) (Abstr. Police Sci., 5(2) (Mar.,Apr. 1977)).

S49. "Fire Fighter's Responsibility in Arson Detection" (National Fire Protection Association, Boston, 1971) (NCJRS).

S50. United States v. Green, 5 Cir. 1973, 474 F.2d 1385, cert. denied 414 U.S. 829 (cited in L39).

7.3 Presented at "Arson! A Three-Day Seminar", sponsored by John Jay College of Criminal Justice, Hartford, Conn., December 7-9, 1977.

H1. John Barracato.

H2. Henry R. Cordes.

H3. Angelo DeCaprio.

H4. Robert L. Dee.

H5. Edward F. Fennelly.

H6. Steven R. Gleason.

H7. James G. Keelan.

H8. Arnold Markle.

H9. Ralph J. Marone.

H10. Frederick Moffett.

H11. Michael O'Connor.

H12. Joseph O'Dowd.

H13. Victor U. Palumbo.

H14. Charles T. Ryan.

H15. Gerald R. Staats.

H16. John Toth.

H17. Unidentified participant.

PROGRAM

Wednesday, December 7, 1977

8:00 A.M. Registration - Carlton Room - Hotel Sonesta
Hartford, Connecticut

8:45 A.M. Coffee Break

9:00 A.M. Welcoming Remarks - Hon. George Athanson, Mayor of Hartford

9:15 A.M. Arson Seminar Orientation - Interfacing with Field Forces
Professor Charles T. Ryan, Chairman
Fire Science Department, John Jay College of Criminal Justice

10:00 A.M. Survey of the Chemistry of Fire - Battalion Chief Angelo DeCaprio
New York City Fire Department - Professor, Fire Science Department
John Jay College of Criminal Justice

12:00 Noon Luncheon - Guest Speaker: ~~Major William F. Elkert~~
Lieut. Frederick Moffett, Conn. State Police

1:30 P.M. Fire Patterns of Structural Fires - Lieutenant James G. Keelan
New York City Fire Department - Professor, Fire Science Department
John Jay College of Criminal Justice

2:30 P.M. Establishing Point of Origin and Causes of Fire - Detective
Steven R. Gleason, Arson Investigation Squad - Hartford P.D.

3:30 P.M. Fire Setters - Professor Charles T. Ryan, Chairman
Fire Science Department, John Jay College of Criminal Justice

Thursday, December 8, 1977

8:45 A.M. Coffee Break

9:00 A.M. Motives and Profiles of Fire Setters: Criminal Investigation
Deputy Chief Fire Marshal John Barracato - New York City Fire Dept.
Professor, Fire Science Department - John Jay College of Criminal Justice

10:15 A.M. Role of the Prosecutor in Arson Investigation
Moderator: Arnold Markle, State Attorney's Office
New Haven, Connecticut
Panelists: Detective Steven R. Gleason, Arson Squad
Hartford Police Department
Robert L. Dee, Special Agent
INS Investigations Bureau, Inc.
Deputy Chief Fire Marshal John Barracato
New York City Fire Department
Supervising Fire Marshal Joseph O'Dowd
New York City Fire Department

12:00 Noon Luncheon - Guest Speaker: Chief Edward F. Fennelly
Hartford Fire Department

Thursday, December 8, 1977

1:30 P.M. Discussion of Responsibilities of Firefighters, and Police Officers Fire Marshals, at the Fire Scene - Supervising Fire Marshal Joseph O'Dowd New York City Fire Department

2:30 P.M. Recognition, Collection and Preservation of Physical Evidence
Moderator: Deputy Chief Fire Marshal John Barracato
New York City Fire Department
Panelists: Detective Steven R. Gleason, Arson Squad
Hartford Police Department
Robert L. Dee, Special Agent
INS Investigations Bureau, Inc.
Supervising Fire Marshal Joseph O'Dowd
New York City Fire Department

Friday, December 9, 1977

8:45 A.M. Coffee Break

9:00 A.M. The Insurance Arson Investigator - Henry R. Cordes
Chief Special Agent - INS Investigations Bureau, Inc.

10:00 A.M. Polygraph and Interrogation Techniques
Use of Hypnosis in Arson Investigation - Lieutenant John Toth
Commanding Officer - New Jersey State Police Arson Unit

12:00 Noon Luncheon - Guest Speaker: Victor U. Palumbo
National Fire Academy

1:30 P.M. How the Fire Investigation Van Can Assist the Arson Investigator at the Fire Scene - Lieutenant Frederick Moffett, Bureau of State Fire Marshal's Office - Connecticut State Police Department

2:30 P.M. The Use of Photography in Arson Investigation - Gerald R. Staats
Captain (Retired) New York City Fire Department

3:15 P.M. Establishment of a Local Arson Investigation Unit - Chief Fire Marshal Ralph J. Marone - Hartford Fire Department
Chief Fire Marshal Michael O'Connor - New York City Fire Dept.

4:00 P.M. Certificate Presentation - Dr. Dorothy H. Bracey, Executive Director - Criminal Justice Center of John Jay College of Criminal Justice

* * * * * * *

7.4 Personal Communications

Individuals not further identified are listed in Appendix B (Individuals Active in Arson Control Work). Titles of rank and academic titles are based on best information available (cf. comment in Appendix B).

P1. James Ahern.

P2. Chief Harry Audley, Fire Department, Westport, Conn.

P3. John Barracato.

P4. Mr. Arthur Belcher, Division of Fire and Protection Management, Bureau of Land Management, Washington, D. C.

P5. Chief Frank Berry, Fire Division, Canal Zone Government, Balboa Heights, C. Z.

P6. Donald M. Bisset.

P7. Clyde A. Bowden.

P8. Kenneth Bowman and Charles Hardin.

P9. Howard Boyd.

P10. Ward W. Caddington, Marion H. Estepp, and Raphael Nieves.

P11. Sgt. Ray E. Canahan, Arkansas State Police, Little Rock, Ark.

P12. Marshal Jack H. Carter, Office of the State Fire Marshall, Springfield, Ill.

P13. Det. Robert Carusone, Police Department, Westport Conn.

P14. Jonathan Cottin, Office of Senator Charles H. Percy, U. S. Senate, Washington, D. C.

P15. Leroy Cottrell, Fire Department, Hudson Falls, N. Y.

P16. James A. Cumming.

P17. Chief David L. Dale, Office of the State Fire Marshal, Phoenix, Ariz.

P18. Paul DeCicco.

P19. Robert L. Dee.

P20. Marshal Raymond T. Dewhurst, Department of Safety, State of New Hampshire, Concord, N. H.

P21. Robert Dexter.

P22. Jacob J. Diamond.

P23. Marshal Floyd H. Dibbern, State Fire Marshal Department, Topeka, Kans.

P24. Max L. Doolittle.

P25. Mr. Robert R. Duncan, National Institute for Law Enforcement and Criminal Justice, Law Enforcement Assistance Administration, Washington, D. C.

P26. Marshal Joe Egger, Office of State Fire Marshal, Pierre, S. Dak.

P27. Dr. Delbert S. Elliott, Behavioral Research Institute, Boulder, Colo.

P28. Mr. Donald Etherington, Fire Marshal, Washington Depot, Conn.

P29. Patrick Foley.

P30. William Folkman.

P31. Inspector Joseph Goeke, Fraud Branch, Postal Inspection Service, Washington, D. C.

P32. Mohammed M. Gohar.

P33. Mr. Olm L. Greene, Division of State Fire Marshal, Tallahassee, Fla.

P34. Officer-in-Charge Lowell H. Hamilton, Arson Unit, State Police, Frankfort, Ky.

P35. Richard Hargett.

P36. Mr. David Harrington, Department of Fire Prevention and Electrical Safety, State of Wyoming, Cheyenne, Wyo.

P37. Marshal Ronald A. Hendrie, Division of Fire Prevention, State of Alaska, Anchorage, Alaska.

P38. Dr. Lois Higgins, American Federation of Police, North Miami, Fla.

P39. Capt. James H. Hoffmeyer, Criminalistics Division, U. S. Army, Falls Church, Va.

P40. David J. Icove.

P41. Nora Jason.

P42. Chief Rudolph A. Jennings, Fire Division, Government of the Virgin Islands of the United States, Charlotte Amalie, V. I.

P43. Clifford L. Karchmer.

P44. Mr. Steve M. Kennedy, (Office of) State Fire Marshal, Salt Lake City, Utah.

P45. Mr. James W. Kerr, Defense Civil Preparedness Agency, Arlington, Va.

P46. Director Robert C. Kinghorn, Idaho Department of Labor and Industrial Services, Boise, Idaho.

P47. Mr. Bradley Kock, Commission on Peace Officers Standards and Training, Sacramento, Calif.

P48. Mr. Joseph Kochanski, National Institute for Law Enforcement and Criminal Justice, Law Enforcement Assistance Administration, Washington, D. C.

P49. Mr. Thomas Kubic, Long Lines, American Telephone and Telegraph Co.

P50. Mr. Walter Lambert, International Association of Fire Fighters, Washington, D. C.

P51. Mr. Ian Lennox, Citizens Crime Commission, Philadelphia, Pa.

P52. Bernard M. Levin.

P53. Dr. Richard S. Levine, Center for Fire Research, National Bureau of Standards, Gaithersburg, Md.

P54. Richard Lieberman.

P55. Det. Ronald Lingle, Metropolitan Police Department, St. Louis, Mo.

P56. Sgt. Littner.

P57. William Longacre.

P58. Chief Bruce Manell, Police Department, Hudson Falls, N. Y.

P59. Frank McGarry.

P60. William G. McMahon.

P61. Charles Midkiff.

P62. Leonard Mikeska.

P63. Ofcr. Ahmed Moustafa, Police Department, Falmouth, Mass.

P64. Chief Candido Ortiz Soto, Fire Prevention Bureau, Estado Libre Asociado de Puerto Rico, Santurce, P. R.

P65. Mr. Charles Packard, Aetna Insurance Co., Hartford, Conn.

P66. Victor U. Palumbo.

P67. Gerald Patterson.

P68. Mr. Frederick Pearson, American Law Enforcement Officers Association, Washington, D. C.

P69. William A. Penttila.

P70. Mr. Joseph L. Peterson, Forensic Sciences Foundation, Rockville, Md.

P71. Maj. Dean Phillips, Equipment Technology Center, International Association of Chiefs of Police, Gaithersburg, Md.

* Philpott: cf. P97.

P72. Mr. Bernard C. Poirier, Canadian Association of Chiefs of Police, Ottawa, Ont.

* Redden: cf. P98.

P73. James C. Robertson.

P74. Charles T. Ryan.

P75. Marshal Jack C. Sanders, Office of the State Fire Marshal, Oklahoma City, Okla.

P76. Philip Schaenman.

P77. Joseph Schwartz.

P78. Mr. Ed Sharp, Criminal Investigation Division, Federal Bureau of Investigation, Washington, D. C.

P79. Mr. Harry Shaw, National Fire Safety Research Office, National Fire Prevention and Control Administration, Washington, D. C.

P80. Capt. Ron Shell, Office of Special Investigations, U. S. Air Force, Arlington, Va.

P81. Robert Sherman.

P82. Mr. George P. Shollenberger, National Institute for Law Enforcement and Criminal Justice, Law Enforcement Assistance Administration, Washington, D. C.

P83. Mr. Wayne Smit, Americans for Effective Law Enforcement, Evanston, Ill.

* O. A. Smith: cf. P99.

P84. Robert B. Smith.

P85. Mr. Douglas Stewart, Naval Investigative Service, Alexandria, Va.

P86. Marshal Peter C. Sturner, State Fire Marshal's Office, Lincoln, Nebr.

P87. Walter D. Swift.

P88. Emile-J. Therian, Canadian Association of Fire Chiefs, Ottawa, Ont.

P89. Atty. Sandra Thomas, National College of District Attorneys, Houston, Tex.

P90. John J. Toth.

P91. Pamela Utz.

P92. Robert G. Vreeland.

P93. Marcus B. Walter.

P94. Mr. W. R. Wetherington.

P95. Phillip Wineman.

P96. Mr. Michael Zyrkowski, Property Loss Research Bureau, Chicago, Ill.

P97. Sgt. Owen Philpott, Fire Marshal Section, Arkansas State Police, Little Rock, Ark.

P98. Joseph Redden.

P99. Capt. Oliver A. Smith, Fire Marshal Division, Pennsylvania State Police, Harrisburg, Pa.

Appendix A. ABBREVIATIONS

AIA	-	American Insurance Association
ATF	-	Bureau of Alchohol, Tobacco, and Firearms
CSLS	-	Center for the Study of Law and Society
FAIR	-	Fair Access to Insurance Requirements
FBI	-	Federal Bureau of Investigation
FMANA	-	Fire Marshals Association of North America
GAB	-	General Adjustment Bureau
HIAAAP	-	High Incidence Area Arson Assignment Program
IACP	-	International Association of Chiefs of Police
ICPI	-	Insurance Crime Prevention Institute
LEAA	-	Law Enforcement Assistance Administration
NAFPC	-	National Academy of Fire Prevention and Control
NBS	-	National Bureau of Standards
NCDA	-	National College of District Attorneys
NCJRS	-	National Criminal Justice Reference Service
NFPA	-	National Fire Protection Association
NFPCA	-	National Fire Prevention and Control Administration
NFIRS	-	National Fire Incident Reporting System
NILECJ	-	National Institute of Law Enforcement and Criminal Justice
PILR	-	Property Insurance Loss Register
PROMIS	-	Prosecutor's Management Information System
RANN	-	Research Applied to National Needs
SSIE	-	Smithsonian Science Information Exchange
UNCCH	-	University of North Carolina at Chapel Hill
USPS	-	United States Postal Service

Appendix B. INDIVIDUALS ACTIVE IN ARSON CONTROL WORK

Listed in this appendix is a representative group of individuals who are currently engaged in activities aimed at more effective arson control. It is assumed that many fire marshals, fire suppression officers, police detectives, etc. are actively seeking to control arson within the normal course of their duties. No-one is listed here for such activity alone. The persons named conduct research, have sparked innovation, conduct training, or push public education. They include individuals who have provided information for this report, have been mentioned by others, or have published during the last few years. The list is assuredly not complete. Neither does the work of every individual focus primarily on arson. Individuals omitted may be just as active in significant work as those listed. No attempt has been made to incorporate the lists of individuals published previously.(L10,L29,L49,L70) A list compiled several years ago and kindly supplied by Clifford Karchmer(P43) is appended.

Titles as used here are based on best available information, without any specific effort at verification. "Assistant Chief", "Deputy Marshal", et sim. have been collapsed into "Chief", "Marshal", etc.

Dr. Reed Adams
Criminal Justice Program
University of North Carolina
Charlotte, North Carolina

Mr. James F. Ahern
Insurance Crime Prevention Institute
Westport, Connecticut
(203) 226-6347

Prof. Andrew W. Baird
Department of Sociology and Rural Life
Mississippi State University
Mississippi State, Mississippi

Chief John Barracato
Fire Marshal's Office
Fire Department
New York, New York
(212) 566-7340

Prof. Alvin L. Bertrand
Department of Rural Sociology
Louisiana State University
Baton Rouge, Louisiana

Marshal Donald M. Bisset
State Fire Marshal's Office
Augusta, Maine

Marshal Clyde A. Bowden
Office of Comptroller General
State Capitol
Atlanta, Georgia
(404) 656-2064

Mr. Kenneth Bowman
State and Private Forestry
U.S. Forest Service
Arlington, Virginia
(703) 235-8040

Mr. Howard Boyd
Fire Marshal's Office
Nashville Metro Fire Department
Nashville, Tennessee
(615) 259-5341

Mr. Richard G. Bright
Center for Fire Research
National Bureau of Standards
Gaithersburg, Maryland
(301) 921-3387

Capt. Ward W. Caddington, Jr.
Investigations Division
Prince George's County Fire Department
Brentwood, Maryland
(301) 779-9022

Atty. Stephen T. Carmick
Chicago, Illinois

Chief Dan J. Carpenter
Mecklenburg County Fire Department
Charlotte, North Carolina

Mr. Robert E. Carter
Fire Service Training
State of Virginia
Richmond, Virginia

Marshal Clyde W. Centers
Fire Marshal Division
State of Oregon
Salem, Oregon
(503) 378-4917

Mr. Patrick J. Collins
Insurance Crime Prevention Bureaux
Toronto, Ontario

Mr. Henry R. Cordes
INS Investigations Bureau
Morristown, New Jersey
(201) 766-0175

Warden James A. Cumming
Bureau of Forestry
State of New Jersey
Trenton, New Jersey

Chief H. T. DeArmond
National Auto Theft Bureau
Atlanta, Georgia

Prof. Angelo DeCaprio
Fire Science Department
John Jay College of Criminal Justice
New York, New York

Prof. Paul DeCicco
Engineering Department
Polytechnic Institute of New York
Brooklyn, New York
(212) 643-2124

Mr. Robert L. Dee
INS Investigations Bureau
Clinton, Connecticut
(203) 669-8321

Mr. Robert Dexter
Explosives Technology Branch
Bureau of Alcohol, Tobacco, and Firearms
Washington, D.C.
(202) 566-7087

Mr. Jacob J. Diamond
Law Enforcement Standards Laboratory
National Bureau of Standards
Gaithersburg, Maryland
(301) 921-3167

Mr. Lawrence Dolby
Department of Education
Southern Maine Vocational Technical Institute
South Portland, Maine
(207) 799-7303

Dr. Max L. Doolittle
Forest Service Southern Station
Starkville, Mississippi
(601) 323-8162

Mr. Dan Econ
Property Loss Research Bureau
Chicago, Illinois
(312) 346-3660

Chief Marion H. Estepp
Prince George's County Fire Department
Upper Marlboro, Maryland
(301) 952-4940

Mr. Patrick Foley
Wayne County Organized Crime
Task Unit
Detroit, Michigan
(313) 224-2878

Dr. William Folkman
Pacific Southwest Forest and
Range Experimental Station
U.S. Forest Service
Berkeley, California
(415) 486-3445

Dr. Martin Forest
Center for the Study of Law and
Society
University of California
Berkeley, California

Mr. Bruce Givens
Naval Investigative Service
Alexandria, Virginia
(703) 325-9449

Det. Steven R. Gleason
Arson Squad
Police Department
Hartford, Connecticut

Dr. Mohammed M. Gohar
State of Ohio Arson Laboratory
Reynoldsburg, Ohio
(614) 864-5510

Chief Alcus Greer
Fire Marshal's Office
Houston, Texas
(713) 222-3011

Mr. Charles Hardin
National Forest System
U.S. Forest Service
Arlington, Virginia
(703) 235-8666

Capt. Richard Hargett
Arson Task Force
Fire Department
Seattle, Washington
(206) 625-4091

Mr. Steven Hasson
Fire School
Southern Maine Vocational
Technical Institute
South Portland, Maine
(207) 799-7303

Prof. J. M. Heineke
Department of Economics
University of Santa Clara
Santa Clara, California

Mr. Jack Hickam
Fire Department
Seattle, Washington

Sgt. Philip Hogan
State Police
East Lansing, Michigan

Dr. Larry Howard
State Crime Laboratory
Atlanta, Georgia

Mr. David A. Hurst
State Farm Fire and Casualty
Insurance Company
Bloomington, Illinois

Mr. William K. Hurteau
Property Loss Research Bureau
Chicago, Illinois

Mr. David Icove
State Fire Marshal's Office
Knoxville, Tennessee
(615) 523-9861

Atty. Sol Morton Isaac
Columbus, Ohio

Mrs. Nora Jason
Center for Fire Research
National Bureau of Standards
Gaithersburg, Maryland
(301) 921-3246

Dr. Q. A. Jenkins
Department of Rural Sociology
Louisiana State University
Baton Rouge, Louisiana
(504) 388-4181

Mr. Clifford L. Karchmer
Human Affairs Research Center
Battelle Institute
Seattle, Washington
(206) 525-3130

Professor James G. Keelan
Fire Science Department
John Jay College of Criminal Justice
New York, New York

Dr. Bernard M. Levin
Center for Fire Research
National Bureau of Standards
Gaithersburg, Maryland
(301) 921-3845

Mr. Richard Lieberman
Tecolote Research, Inc.
Santa Barbara, California
(805) 964-6963

Sgt. Littner
Arson Team
Washington, D.C.
(202) 626-2981

Mr. William Longacre
U.S. Forest Service
Missoula, Montana
(406) 329-3590

Inspector Hugh M. Macguire
Fire Department
Seattle, Washington
(206) 625-4091

Lieut. Robert Maher
Arson Squad
Fire Department
Lynn, Massachusetts

Atty. Arnold Markle
State Attorney's Office
New Haven, Connecticut
(203) 772-1780

Marshal Ralph J. Marone
Fire Department
Hartford, Connecticut

Mr. Robert C. McClary
Wayne County Fire Fraud Unit
Detroit, Michigan

Supt. David M. McCormack
National Academy for Fire Prevention and Control
National Fire Prevention and Control Administration
Washington, D.C.
(202) 634-7541

Mr. Frank McGarry
Fire Prevention and Control Bureau
State of New York
Albany, New York
(518) 474-6746

Mr. William G. McMahon
Bureau of Municipal Police
Division of Criminal Justice Services
Albany, New York
(518) 457-1244

Professor Sheldon Messenger
Center for the Study of Law and Society
University of California
Berkeley, California
(415) 642-4038

Dr. Charles Midkiff
Forensic Branch
Bureau of Alcohol, Tobacco, and Firearms
Washington, D.C.
(202) 566-6277

Chief Leonard Mikeska
Arson Division
Fire Marshal's Office
Houston, Texas
(713) 222-3011

Lieut. Frederick Moffett
Bureau of State Fire Marshal's Office
State Police Department
Hartford, Connecticut

Professor James Nichols
Department of Fire Technology
Tarrant County Junior College
Fort Worth, Texas

Chief Raphael Nieves
Bureau of Fire Marshals
Prince George's County Fire Department
Brentwood, Maryland
(301) 779-9022

Chief Michael O'Connor
Fire Marshal's Office
Fire Department
New York, New York
(212) 566-7340

Marshal Joseph O'Dowd
Fire Marshal's Office
Fire Department
New York, New York
(212) 860-9257

Marshal Joseph A. O'Keefe
Office of the State Fire Marshal
Boston, Massachusetts

Mr. Victor U. Palumbo
National Academy of Fire Prevention and Control Administration
Washington, D.C.
(202) 254-8140

Dr. Gerald Patterson
Oregon Social Learning Center
Eugene, Oregon
(503) 485-2711

Chief William A. Penttila
Fire Marshal Bureau
State of Montana
Helena, Montana
(406) 449-2050

Mr. Robert G. Provencher
INS Investigations Bureau
New York, New York

Mr. Joseph Redden
National Fire Protection Association
Boston, Massachusetts
(617) 482-8755

Marshal James C. Robertson
Office of the Fire Marshal
Baltimore, Maryland
(301) 383-2520

Prof. Charles T. Ryan
Fire Service Department
John Jay College of Criminal Justice
New York, New York
(212) 489-3927

Chief Joseph E. Scanlon, Jr.
Fire Department
Lynn, Massachusetts

Mr. Philip Schaenman
National Fire Data Center
National Fire Prevention and Control Administration
Washington, D.C.
(202) 634-7561

Mr. Joseph Schwartz
National Fire Protection Association
Boston, Massachusetts
(617) 482-8755

Mr. David Scondras
Symphony Tenants Organization Project
Boston, Massachusetts
(617) 267-2597

Mr. Robert Sherman
Explosives Enforcement Branch
Bureau of Alcohol, Tobacco, and Firearms
Washington, D.C.
(202) 566-7395

Mr. Robert B. Smith
National Fire Protection Association and Fire Marshals Association of North America
Washington, D.C.
(202) 466-3650

Mr. Walter D. Swift
Property Claim Services
American Insurance Association
Rahway, New Jersey
(201) 388-5700

Lieut. John J. Toth
Arson Unit
Division of State Police
West Trenton, New Jersey
(609) 882-2000

Dr. Pamela Utz
Center for the Study of Law and Society
University of California
Berkeley, California
(415) 654-6292

Dr. Robert G. Vreeland
Department of Psychology
University of North Carolina
Chapel Hill, North Carolina
(919) 966-1269

Dr. Marcus B. Waller
Department of Psychology
University of North Carolina
Chapel Hill, North Carolina
(919) 933-2130

Marshal Wes Werner
State Fire Marshal's Office
St. Paul, Minnesota

Mr. W. R. Wetherington
State Fire Marshal's Office
Richmond, Virginia
(804) 786-4751

Mr. Phillip Wineman
Forensic Branch
Bureau of Alcohol, Tobacco, and Firearms
Washington, D.C.
(202) 566-6277

Mr. John Wrend
Property Loss Research Bureau
Chicago, Illinois

Agencies and Personnel Active in Arson Investigation and Prosecution

Arizona

David L. Dale
Chief Deputy State Fire Marshall
Industrial Commission of Arizona
P.O. Box 19070
Phoenix, AZ 85005

California

Michael A. DeFeo
Attorney-in-Charge
Organized Crime and Racketeering Section
U.S. Department of Justice
2307 Federal Building
300 N. Los Angeles Street
Los Angeles, CA 90012

Sgt. Bruce K. Kamman
Arson/Explosives Detail
Los Angeles County Sheriff's Department
211 West Temple Street, Rm. 734
Los Angeles, CA 90012

Colorado

Robert K. Swanson
Deputy District Attorney
Second Judicial District
West Side Court Bldg.
Denver, CO 80204

Connecticut

Capt. William F. Ellert
Deputy State Fire Marshall
Department of State Police
100 Washington Street
Hartford, CT 01601

Illinois

A.F. Mazzone
Chief Arson Investigator
Division of Fire Protection
Department of Law Enforcement
1722 N. LaSalle Street
Chicago, IL 60601

New York

Bronx

Nathan Dembin
Investigations Bureau
Bronx County District Attorney
851 Grand Concourse
Bronx, NY 10451

Raymond J. Dearie
Asst. U.S. Attorney
Chief, Criminal Division
Eastern District of New York
Federal Building
Brooklyn, NY 11201

Thomas D. Selzer
Asst. District Attorney
Kings County
Municipal Building
Brooklyn, N.Y. 11201

Nassau County

Henry P. DeVine
Chief Asst. District Attorney
Nassau County
262 Old Country Road
Mineola, N.Y. 11501

Buffalo

Robert C. Stewart
Attorney-in-Charge
Organized Crime and Racketeering
Section
U.S. Department of Justice
921 Genessee Building
Buffalo, N.Y. 14202

Massachusetts

John R. Tarrant
Special Attorney
Federal Organized Crime Strike Force
U.S. Department of Justice
1905 U.S. Post Office and Courthouse
Boston, MA 02109

Michigan

Capt. George Cotton
Arson Section
State Fire Marshall's Office
Michigan State Police
714 S. Harrison Road
E. Lansing, MI 48823

Inspector Robert M. Hyatt
Commanding Officer
Wayne County Organized Crime Task Force
1180 Frank Murphy Hall of Justice
1441 St. Antoine St.
Detroit, MI 48226

Mississippi

Steve Ingram
Intelligence Analyst
Organized Crime Section
Office of the Attorney General
P.O. Box 2
Jackson, MS 39205

Missouri

George M. Hughes, Bttln. Chief
Columbia Fire Department
201 E. Cherry
Columbia, MO 65201

Rochester, N.Y.

Raymond E. Cornelius
First Asst. District Attorney
Monroe County
Civic Center Plaza
Rochester, NY 14614

Ohio

Douglas P. Roller
Attorney-in-Charge
Organized Crime Strike Force
U.S. Dept. of Justice
Rm. 526, Standard Bldg.
Cleveland, OH 44113

Rhode Island

Charles A. Reppucci
Chief Investigator
Organized Crime Unit
Department of the Attorney General
Providence County Courthouse
Providence, RI 02903

Texas

George A. Kelt, Jr.
Assistant U.S. Attorney
Acting Chief, Criminal Division
12000 Federal Building
515 Risk Avenue
Houston, TX 77002

James P. Barklow, Jr.
Asst. District Attorney
Dallas County Government Center
Dallas, TX 75202

Washington

Capt. Richard Hargett
Chief, Arson Squad
Seattle Fire Department
301 Second Avenue South
Seattle, WA 98104

Washington, D.C.

C. Neil Benson
Chief Postal Inspector
U.S. Postal Service
Washington, D.C. 20260

West Virginia

Eddie E. Lester, Chief
Arson Division
Office of the State Fire Marshall
1800 Washington Street, E.
Charleston, WV 25305

Wisconsin

Thomas E. Brown
Assistant U.S. Attorney
E. District of Wisconsin
517 E. Wisconsin Avenue
Milwaukee, WI 53202

Private Sources

James F. Ahern, Director
Insurance Crime Prevention Institute
15 Franklin Street
Westport, CT 06880

Robert E. May, Executive Secretary
International Association of Arson
Investigators
97 Paquin Drive
Marlboro, MA 01752

Appendix C. ORGANIZATIONS ACTIVE IN ARSON CONTROL

In this appendix organizations are listed which are engaged, as organizations, in activities for more effective arson control. Routine activity by fire marshal's offices, fire department, etc. do not warrant inclusion here. Neither are academic institutions listed because of activities by individual faculty members. On the other hand this list is undoubtedly incomplete, and there may be many other organizations equally active in tackling arson problems.

The Aerospace Corporation
El Segundo, California

Bureau of Alcohol, Tobacco, and Firearms
Washington, D.C.
a. Explosives Enforcement Branch
b. Explosives Technology Branch
c. Forensic Branch

American Insurance Association
Rahway, New Jersey

Arson Bureau
Division of State Fire Marshal
Columbus, Ohio

Battelle Columbus Laboratories
Columbus, Ohio

Fire Department
Lynn, Massachusetts

Fire Marshals Association of North America
Washington, D.C.

Fire Marshal Bureau
State of Montana
Helena, Montana

Fire Marshal's Office
Houston, Texas

Fire Marshal's Office
New York, New York

Fire Prevention and Control Bureau
State of New York
Albany, New York

Human Affairs Research Center
Battelle Institute
Seattle, Washington

Insurance Crime Prevention Bureaux
Toronto, Ontario

Insurance Crime Prevention Institute
Westport, Connecticut

John Jay College of Criminal Justice
New York, New York
a. Criminal Justice Center
b. Fire Science Department

Maryland State Fire Marshal's Office
Baltimore, Maryland

Bureau of Municipal Police
Division of Criminal Justice Services
Albany, New York

National Bureau of Standards
Gaithersburg, Maryland
a. Center for Fire Research
b. Law Enforcement Standards Laboratory

National Fire Prevention and Control Administration
Washington, D. C.

National Fire Protection Association
Boston, Mass.

National Wildfire Coordinating Group

Naval Investigative Service
Alexandria, Virginia

Prince George's County Fire Department
Upper Marlboro, Maryland

Property Loss Research Bureau
Chicago, Illinois

Seattle Fire Department
Seattle, Washington

Office of the State Fire Marshal
Boston, Massachusetts

State Fire Marshal's Office
Augusta, Maine

State Fire Marshal's Office
Hartford, Connecticut

Division of State Policy
West Trenton, New Jersey

Symphony Tenants Organization Project
Boston, Massachusetts

U.S. Forest Service
a. Cooperative Forest Fire Control
Arlington, Virginia
b. Fire Management,
Arlington, Virginia
c. National Forest System,
Northern Region,
Missoula, Montana
d. Pacific Southwest Forest Experiment Station,
Berkeley, California
e. Southern Forest Experiment Station,
New Orleans, Louisiana

Wayne County Organized Crime Task Unit
Detroit, Michigan

END