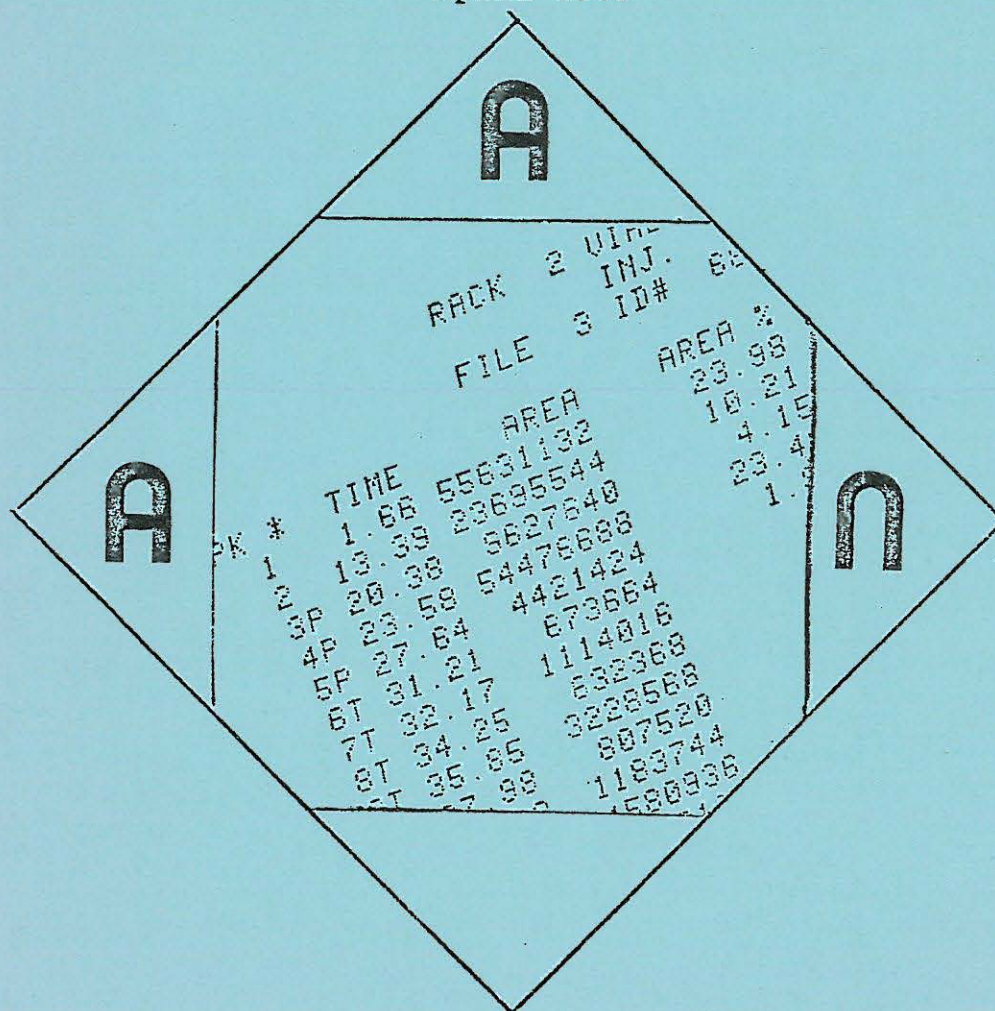


# ARSON ANALYSIS NEWSLETTER

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Attention: R. N. THAMAN

The AAN solicits contributions from forensic scientists,  
arson investigators, and interested parties which have  
some unique or routine analysis which helps in the  
identification of flammable liquid or explosive residues.

EDITORS: Jew-ming Chao, Ph.D., John D. DeHaan, Ronald N. Thaman

JOHN D. DEHAAN

State of California  
Division of Law Enforcement  
Investigative Services Branch  
P.O. Box 13337-3301 C Street  
Sacramento, California 95813

LABORATORY ASPECTS OF ARSON: Accelerants, Devices, and Targets.  
J. D. DeHaan

During the period July 1, 1974 - July 1, 1977, over three hundred cases involving possible arson evidence were submitted to the author's laboratory. A survey of these cases revealed the types of various accelerants and their frequencies of use. Volatile fuels or accelerants were detected in almost 50% of the cases. Gasoline accounted for 60% of the accelerants detected. Investigative reports were available for almost one-half of all cases submitted. From these reports it was possible to determine the types of devices encountered and the targets selected. Accelerants were poured directly onto combustibles in 61% of the cases examined, while Molotov cocktails accounted for only 5%. Grass, hay, and paper were ignited directly in 7%. Ignition or timing devices of any kind were found in only 14% of the cases. Dwellings, commercial establishments and vehicles are the most frequent targets, with dwellings alone accounting for 37% of the cases. This study reveals current trends in arson with implications for laboratory analysts and field investigators alike.

The above is an abstract of a paper which John DeHaan will be presenting at the 8th IAFS meeting in Wichita. (editor)





PRESIDENT  
WALTER HOLZ  
CRIME DETECTION LABORATORY  
DEPT. OF HEALTH  
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FIRE MARSHAL DIVISION  
DEPT. OF STATE POLICE  
7150 HARRIS DRIVE  
LANSING, MICHIGAN 48913

## MICHIGAN CHAPTER

# *International Association of Arson Investigators*

April 7, 1978

WALTER O. JACOBS  
Walter O. Jacobs Assoc., Inc.  
St. Clair Shores, Michigan  
Term expires 1978

TO: President H. Ray Vliet and Board of Directors

WALTER HOLZ  
Crime Detection Lab.  
Mich. Dept. of Health  
Lansing, Michigan  
Term expires 1978

FROM: Forensic Laboratory Services Committee - I.A.A.I.

CHARLES R. CRAFT  
Detroit Fire Dept.  
Detroit, Michigan  
Term expires 1978

SUBJECT: FORENSIC LABORATORY SERVICES COMMITTEE - ANNUAL REPORT

The Forensic Laboratory Services Committee presently is comprised of the following representatives:

GARTH MEYER  
Roscommon County Sheriff  
Roscommon, Michigan  
Term expires 1978

Chairman, Walter L. Holz, Chemist, Michigan Department of State Police, Forensic Science Division, 714 S. Harrison Road, East Lansing, Michigan 48823.

JACK PELL  
Fremont Mutual Ins. Co.  
Fremont, Michigan  
Term expires 1978

Co-Chairman, Robert L. Kuntz, Senior Arson Investigations Chemist, Detroit Fire Department, 250 W. Larned Street, Detroit, Michigan 48226.

EDWIN G. BARRETT  
State Farm Fire & Casualty Co.  
Flint, Michigan  
Term expires 1979

Dr. David A. Burke, Crime Laboratory Scientist, Michigan Department of State Police, Northville Regional Crime Laboratory, 42145 W. 7 Mile Road, Northville, Michigan 48167.

JAMES M. THOMAS  
J. Thomas and Assoc.  
Northville, Michigan  
Term expires 1979

Mr. Barker W. Davie, Jr., Police Chemist, Fort Wayne Police Department, #1 Main Street, Fort Wayne, Indiana 46801.

KENNETH SHELLEY  
Department of Fire Marshal  
Kalamazoo Fire Department  
Kalamazoo, Michigan  
Term expires 1979

Mr. Robert I. Hilliard, Crime Laboratory Scientist, Michigan Department of State Police, Negaunee Regional Crime Laboratory, Box 180, US-41 East, Negaunee, Michigan 49866.

WILLIAM R. RUCINSKI  
Fire Marshal Division  
Dept. of State Police  
Lansing, Michigan  
Term expires 1979

Dr. John A. Juhala, Crime Laboratory Scientist, Michigan Department of State Police, Bridgeport Regional Crime Laboratory, 6296 Dixie Highway, Bridgeport, Michigan 48722.

MYRON A. FRANKS  
Fire Marshal Division  
Dept. of State Police  
Lansing, Michigan  
Term expires 1979

Dr. Quon Y. Kwan, Research Associate in Criminalistics, The Aerospace Corporation, 955 L'Enfant Plaza S.W., Suite 4040, Washington, D.C. 20024.

EARLE W. CHILES, SR.  
Fuel Gas Co., Inc.  
Flint, Michigan  
Term expires 1980

Mr. Glenn M. Moore, Crime Laboratory Scientist, Michigan Department of State Police, Holland Regional Crime Laboratory, 304 Garden Avenue, Holland, Michigan 49423.

WILBERT TEISE  
Shelby Twp. Fire Dept.  
Utica, Michigan  
Term expires 1980

Dr. Donald M. Plautz, Crime Laboratory Scientist, Michigan Department of State Police, Northville Regional Crime Laboratory, 42145 W. 7 Mile Road, Northville, Michigan 48167.

WM. D. ANDERSON  
Fire Marshal Division  
Dept. of State Police  
Lansing, Michigan  
Term expires 1980

Mr. Tom F. Plotinski, Crime Laboratory Technician, Oakland County Sheriff's Department, 1201 N. Telegraph Road, Pontiac, Michigan 48053.

Mr. Larry A. Presley, Crime Laboratory Scientist, Oakland County Sheriff's Department, 1201 N. Telegraph Road, Pontiac, Michigan 48053.

JAMES KITSON  
Detroit Fire Dept.  
Detroit, Michigan  
Term expires 1980

Mr. Charles L. Thomas, Crime Laboratory Scientist, Michigan Department of State Police, 714 S. Harrison Road, East Lansing, Michigan 48823.

FRED MULLER  
Livingston Co. Sheriff Dept.  
Howell, Michigan  
Term expires 1980

### GOALS AND OBJECTIVES

Goals and Objectives of the Forensic Laboratory Service Committee are:

1. To unite for the mutual benefit of those public officials and private persons engaged in the control of arson and kindred crimes.
2. To provide for exchange of technical information and developments.
3. To encourage cooperation between public service agencies and associations to further fire prevention and the suppression of crime.
4. To encourage high professional standards of conduct among arson investigators and to continually strive to eliminate all factors which interfere with administration of crime suppression.
5. To foster greater professional competence in the investigative technique and recognition of the crime of arson.
6. To unite Forensic Scientists with fire investigators and to promote further activity in forensic laboratories.
7. To serve as a group for the exchange of ideas, methods, and improved technology.

### COMMITTEE ACCOMPLISHMENTS

Committee members presented a full day on Forensic Laboratory Services at the 28th Annual Meeting of the International Association of Arson Investigators, in Lansing, Michigan on May 4, 1977. Topics were: "Scene Equipment", "Gas Chromatograph", "Other Evidence", "Rural Fires, Spontaneous Ignition, Lightning, and Electrical Causes", "Latent Prints", and "Polygraph".

The Committee hosted 17 forensic scientists and chemists during the Seminar. These persons represented 10 different States and the District of Columbia. All have work responsibility of providing services to fire and arson investigators.

In a special meeting held on Tuesday evening, May 3, 1977, the group heard from Joe Gorski, East Washington State Crime Laboratory concerning progress of a two year study funded by LEAA to determine the best techniques for examining fire debris. The project is about two-thirds completed and thus far tends to show that gas chromatographic analysis of fire debris for flammable liquids is of greatest value to the fire investigator.

COMMITTEE ACCOMPLISHMENTS (continued)

Other topics presented at the special meeting were techniques of flammable liquid identification and comparison, flash point, steam distillation, solvent extraction, fireworks analyses, carbon monoxide in blood, and micro-crystalline structure in metals.

A summary of answers to a four page questionnaire prepared by the Forensic Laboratory Services Committee was presented. Of 196 questionnaires distributed internationally, more than 100 responses were received. These represented 35 States, the District of Columbia, Canada, and Europe. 94% of the responding laboratories indicated flammable liquid identification as a regular activity; 53% take part in arson scene investigations and collect samples from the fire scene; and 49% offer arson investigator training. Gas chromatography is the method of choice for examining fire debris. Flame ionization detectors are most commonly used on headspace or liquid samples for identification and comparison of flammable liquid residues. Temperature programming is favored over isothermal operation. 95 reporting laboratories listed 275 personnel who perform fire and arson related analyses. Other services offered by these laboratories include flash point, ignition temperature, and fabric burn rate. IR, UV, TLC, refractometry, AA, and fluorometry are also used in making determinations in connection with fire investigations. Agencies served by the laboratories include fire, police, prosecuting attorneys, defense attorneys, and medical examiners.

The final special events for the laboratory personnel at the Seminar were the Wednesday evening tours of the Scientific Laboratories of the Michigan State Police and the Division of Crime Detection at the Michigan Department of Public Health.

On March 8, 1978, several members of the Committee presented three workshops at the 20th Annual Seminar and Training Course in Arson Detection and Investigation at the University of Michigan. Topics presented included "Chemistry of Fire", "Evidence Container Selection", "Fire Investigation Books", "The Combustible Gas Detector (Sniffer)", and a "Sniff Test (using the nose to identify flammable liquids and other liquids)". A separate report has been prepared for the April issue of the Michigan Chapter "Arson News". A copy will be forwarded for inclusion in the next issue of "The Fire and Arson Investigator". Participants of the Seminar rated these workshops very favorably on their evaluation sheets.

On March 17-18, Mr. Charles Quick and I attended a "Fire Related Forensic Chemistry" course at the Ohio Fire Academy in Reynoldsburg, Ohio outside Columbus. Mr. Quick is one of the Crime Laboratory Scientists who conducts analyses on evidence submitted to the East Lansing Laboratory of the Michigan State Police in connection with fire cases.

COMMITTEE ACCOMPLISHMENTS (continued)

Mohamed Gohar, Chief Chemist in the Ohio Arson Laboratory, conducted a very interesting and informative lecture-laboratory course for seven participants.

There are three laboratories in the Fire Marshal Division. These are located in the recently completed Academy. The largest of the three laboratories is where the analyses are being conducted on fire debris submitted by sixteen investigators from the Bureau along with fire investigators from local, city, and county departments. The second largest laboratory, not yet completed, is designated for use as a testing laboratory. Methods will be developed or adapted from standard methods to test various materials for smoke density, flame spread, flammability, etc. The third, and smallest laboratory, is used for instructing Fire Marshal investigators in the use of portable gas chromatographs as an investigative tool in the field. The investigators are also taught proper procedures for collecting, preserving, labeling, and submitting samples to the laboratory in this facility.

As a result of a persistent educational program, led by Mohamed Gohar, eighty-five percent of the samples received for analysis at the Ohio Arson Laboratory are submitted in tight, closed containers (either metal, glass, or suitable plastic). Mohamed has also designed a multi-sheet form to accompany evidence submitted to the laboratory. The sheet, when properly completed by the investigator, relays essential information to assist the analyst in conducting the proper types(s) of analysis.

An open discussion during the first day of the course revealed that there was good agreement between the several laboratories represented in regard to sample handling and analysis.

Mohamed discussed the use of capillary columns and instructed the group in their use. Another technique used by the Ohio Arson Laboratory involves extraction of fire debris with carbon disulfide. An excess is placed with debris in a container and mixed intimately for several minutes to extract unburned or partially burned flammable liquid or any other extractables that may be present. The liquid is then removed to a Kontes Concentrator Tube (Kontes Catalog No. K-569300) and placed into a Kontes Tube Heater (Catalog No. K-720000) to reduce the volume of carbon disulfide and thus concentrate the material extracted. One tenth of a microliter or more of the concentrated extract is then introduced onto a G.C. column such as a 50 foot, 0.02 inch stainless steel column containing D.C. 550. Mohamed conducts temperature programming using a stream of carbon dioxide introduced over the oven bath circulating fan to maintain a stable program from 0°C. to 160°C. A flame ionization detector is used. Electron capture is used to compare gasolines for lead in cases of gasoline theft or underground leaks. A 10 foot, 1/16" MicroPak column with OV 101 is used.



COMMITTEE ACCOMPLISHMENTS (continued)

Dr. Juhala, Dr. Kwan, and I met with the President, three Vice Presidents, and the Advertising Manager of Central Solvents and Chemicals Company of Chicago, Illinois on March 28, 1978 to discuss numerous concerns. Dr. Juhala and I received financial assistance for this meeting from the Michigan Arson Committee which is funded in large part by Michigan Basic Property Insurance Association. An agenda, consisting of numerous questions was prepared by the Committee at its first meeting of 1978 on January 25. Some of the more pertinent questions and answers are:

1. Sources of material. Major sources are Dow Chemical Company, Hercules, Monsanto, Eastman Chemical, Exxon, Celanese, and others.

2. How are solvents formulated for particular applications? They are blended in a mixing tank or directly into drums, depending on size and complexity of the formulation.

3. How is the quality of products controlled? Quality must conform to pre-established specifications. Typical quality control would involve specific gravity and gas chromatograph. In other instances distillation, refractive index, flash point, etc., is employed.

4. How are lot numbers assigned? Drums factory packed by our suppliers generally have lot numbers on them. However, a considerable amount of our business is done by our own filling of drums and the assignment of lot numbers may or may not be employed.

5. How many components are in certain compounds and how are these components identified? Industrial chemicals and solvents as sold by us are seldom 100% pure. A classic example would be xylene which actually contains not only the three isomers but also ethylbenzene. Aliphatic hydrocarbon solvents are generally a broad mixture of products and the composition can be expected to vary depending on crude runs through the refinery. No attempt is made to identify the many ingredients but, rather, the product must conform to various specifications such as gravity, boiling range, gas chromatograph fingerprint.

6. Distribution--Quantities of certain products and how the distribution is made: Our companies engage in various means of distribution. Most typical would be to receive the product from our supplier in either tank truck or tank car, empty into our own tank storage, and then fill into 55-gallon drums. We also receive pre-packaged products in drums or bags and resell them in their original containers. Another means of distribution is by employing our tank trucks to pick up material from our supplier and deliver direct to the customer.



COMMITTEE ACCOMPLISHMENTS (continued)

7. Is this strictly a distribution Company or does it formulate? We consider ourselves to be a distribution company but, at the same time, we also blend formulate a number of products for our customers.

8. Are markers used in the products, and if so what markers are used? Markers (colors or other trace components) are not intentionally employed.

9. Quantities of materials handled? Our companies typically handle quantities from 7,000-gallon tank trucks to 55-gallon drums as well as 5-gallon containers and, in some cases, less.

10. What are the uses (normal, generally accepted, and special) of the products handled by the Company? For the most part, our solvents are used to thin paints, printing inks and adhesives and for metal cleaning. We also sell quantities of resins in the formulation of paints, printing inks and adhesives; plasticizers for such compounds as well as unsupported film.

11. Please describe chemical compound nomenclature (common names, trade names, generic names). Many of our products are sold by the chemical name but when it comes to compounds, trade names are more typically employed. Unless a compound has been formulated by us whereby we use our own code name, compounds made by our suppliers are sold under their trade names.

The trip was extremely beneficial to us in that it gave us first-hand information on many organic liquids encountered in the conduct of analyses of fire debris. Furthermore, we established an excellent contact with an industry which promised and demonstrated sincere and complete cooperation in coping with some of our problems. Mr. Karl Giloth, President, is making arrangements for us to receive samples of numerous chemicals distributed by Central Solvents and Chemicals Company. He also promised to make similar samples available to other fire investigation chemists who have access to any of their numerous plants in the United States if they contact him, using their organizational letterhead, stating their needs. Mr. Giloth is located at Central Solvents and Chemicals Company, General Offices, 7050 West 71st Street, Chicago, Illinois 60638; (312) 594-7000.

We were conducted on a tour of the corporate office, laboratory, storage field, drum cleaning and painting operation, liquid filling room, and warehouse.

The entire conference and tour was beneficial as a valuable learning experience in the business of proper handling, storage, and distribution of chemicals and the problems related thereto.

COMMITTEE ACCOMPLISHMENTS (continued)

Finally, the Committee met at the Northville Laboratory of the Michigan State Police on Thursday, March 30. Present were Drs. Kwan, Juhala, Burke, Plautz, and Messrs. Sund, Kuntz, Presley, Plotinski, Thomas, and Holz. We were joined by a specially invited guest Ron Thaman, Chemist, of Systems Engineering Associates (SEA) of Columbus, Ohio. Ron described his work and analytical methods. He uses techniques similar to those described as used in the Ohio Arson Laboratory but prefers diethyl ether to carbon disulfide to extract fire debris. An automatic sampler allows Ron to introduce samples into the G.C. on a round-the-clock operation when necessary. Both Mohamed and Ron agree that the extraction procedure is valuable in increasing the number of positive cases by extracting identifiable residues missed in customary head sampling techniques. This is true, particularly when the heavier hydrocarbons, such as paint thinner and the fuel oils are used as fire accelerants.

Goals and objectives of the Committee were discussed. It was decided that it would be in the best interest of the field of forensic laboratory personnel if more communication can be achieved. We propose that the I.A.A.I. Membership Committee seek to sign up more persons in this group. The Committee would assist by supplying names of prospective members and/or sending copies of the Fire and Arson Investigator to prospects along with application forms.

The Committee planned two field days; one on "Electrical Causes of Fire" and the other on "Explosive Devices". Reports of these events will be presented in future issues of The Fire and Arson Investigator.

PLANS TO MEET THE GOALS AND OBJECTIVES IDENTIFIED ABOVE

The Committee feels that the goals and objectives can best be met with little or no cost to the Association if increased efforts are made to communicate through the "Fire and Arson Investigator". Thus, in the year ahead, we intend to introduce more information related to the use of the laboratory in fire investigations.

We propose that if the Association Membership Committee would send copies of the latest "Fire and Arson Investigator" to persons whose addresses are listed on pages 86-88 of the "Proceedings of the 28th Annual Meeting" along with an invitation to join the Association, that a number of members would be gained. Our questionnaire from last year indicated that 72 persons from 66 laboratories would be interested in forming a laboratory Section within the I.A.A.I. The Committee will address topics of special interest to this group of people in the hope of attracting them into active participation.

PLANS TO MEET THE GOALS AND OBJECTIVES IDENTIFIED ABOVE (continued)

The Committee is aware that the Association has no provision for providing money to Committees for the purpose of meeting or conducting activities which may result in benefits to the membership.

We are sure you are aware that employers cannot always totally support Committee functions.

We would like the Board of Directors to consider initiating whatever action is necessary to support Committees which find it essential to conduct such meetings or engage in special projects or activities which concern and benefit the membership. The recent trips to the Ohio Fire Academy and Central Solvents and Chemicals Company by members of this Committee are examples of the types of activities this Committee would like to continue to engage in and report to the membership on a more frequent basis.

The Committee has made tentative plans for two field exercises; one in Grand Rapids, Michigan in May to discuss "Electrical Causes of Fire" with Chief Electrical Inspector Arthur Towner, and another on "Explosive Devices" sometime in July. Since the Committee is primarily from Michigan, we do not consider that outside funding will be necessary for these particular meetings but absence of funding could prevent members outside Michigan from participating.

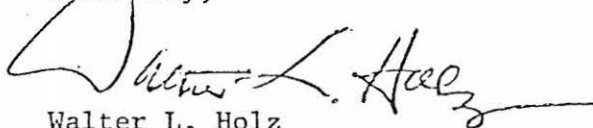
The Committee merely proposes these ideas but feels that some consideration should be given particularly to Committees which "function in the field" so to speak and cannot properly function by correspondence alone.

As in the past, the Committee seeks the advice of the President, Board of Directors, and other interested parties.

My personal thanks go to all the members who have so willingly and faithfully served this Committee.

All of us thank you for the opportunity to serve the I.A.A.I.

Sincerely,



Walter L. Holz

Chairman

Forensic Laboratory Services Committee

WLH/jmb

- \* Bob Graves of ATF in Cincinnati, Ohio tells the readers of the AAN that he is working on a new article much like the one which appeared in Vol. 1, No. 5. The article will concentrate on accelerant analysis of kerosene and like liquids.
- \* The AAN is looking for editors to help accumulate information and articles of interest to the reader of the AAN. Please welcome our eastern editor, Dr. Jimmy Chau, and our western editor, Mr. John DeHaan. The AAN still needs an editor in the northern and southern parts of the United States. If anyone is interested, please write to the AAN mailing address.
- \* Several areas of interest exist to the readers of the AAN. The AAN is looking for articles describing the following types of analysis:
  - 1) Explosive residue analysis
  - 2) Pro and con of headspace analysis
  - 3) Use of GC/IR and GC/MS in fire debris analysis
  - 4) Concentration of headspace vapors prior to GC analysis
- \* A new publication, Fire Technology Abstracts (FTA), has taken over the previous duties of Fire Research Abstracts and Reviews. The Chief Editor of the new publication, L. J. Holtschlag, informs the AAN that articles of interest will be included in FTA. The publication is available from:

FIRE REFERENCE SERVICE  
P.O. Box 19518  
Washington, D.C. 20036

The cost of the publication is \$11.50/year.

- \* The International Association of Arson Investigators (IAAI) can be a very important organization for the forensic scientist to become acquainted. The IAAI has worldwide membership and has a committee geared toward the forensic scientist. The committee is called the Forensic Laboratory Services Committee and is chaired by Walter L. Holz, Chemist, Michigan Department of State Police, Forensic Science Division, 714 S. Harrison Road, East Lansing, Michigan 48823. The enclosed report details some of the activities underway.



- \* PLEASE help Dr. Chao complete his survey. Submit to him directly your column parameters and chromatogram of GASOLINE! Let's not be apathetic about it ---- do it now!