ARSON ANALYSIS NEWSLETTER

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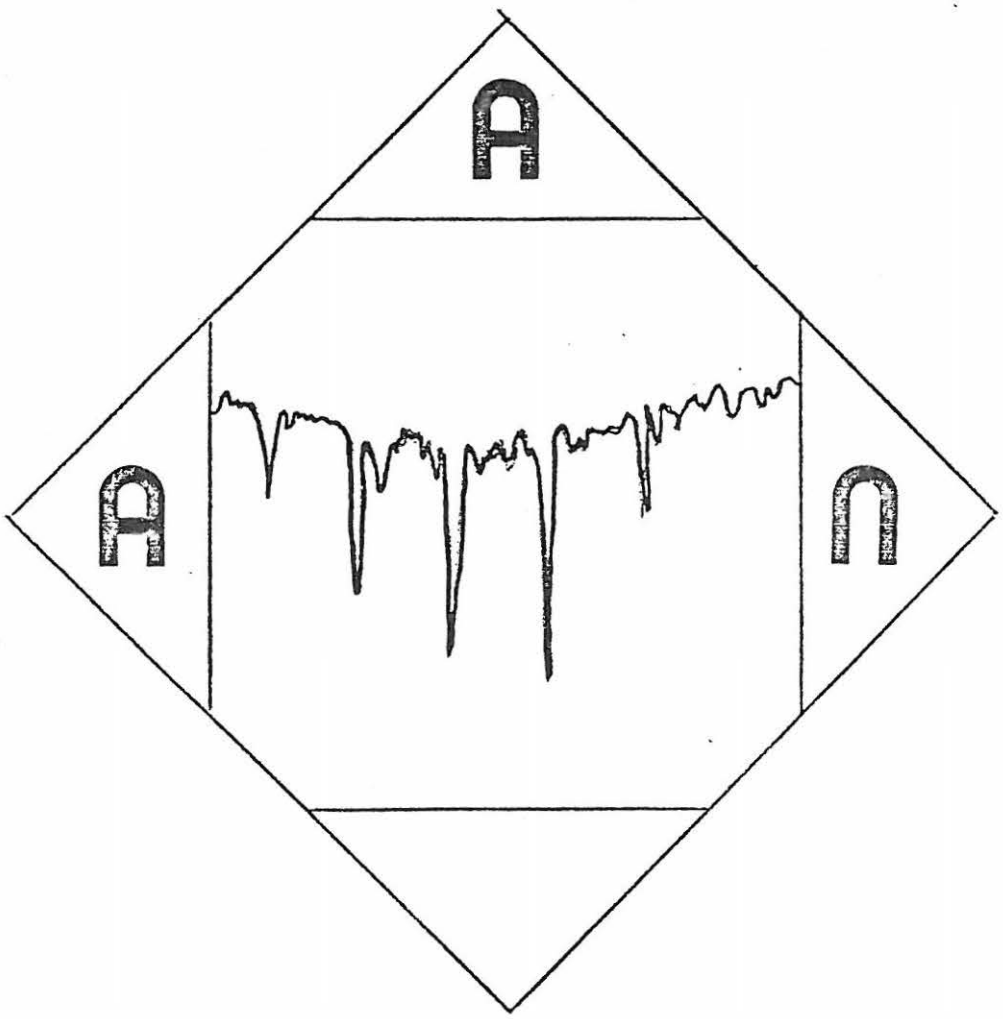

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7349 Worthington-Galena Rd.
Columbus Ohio 43085

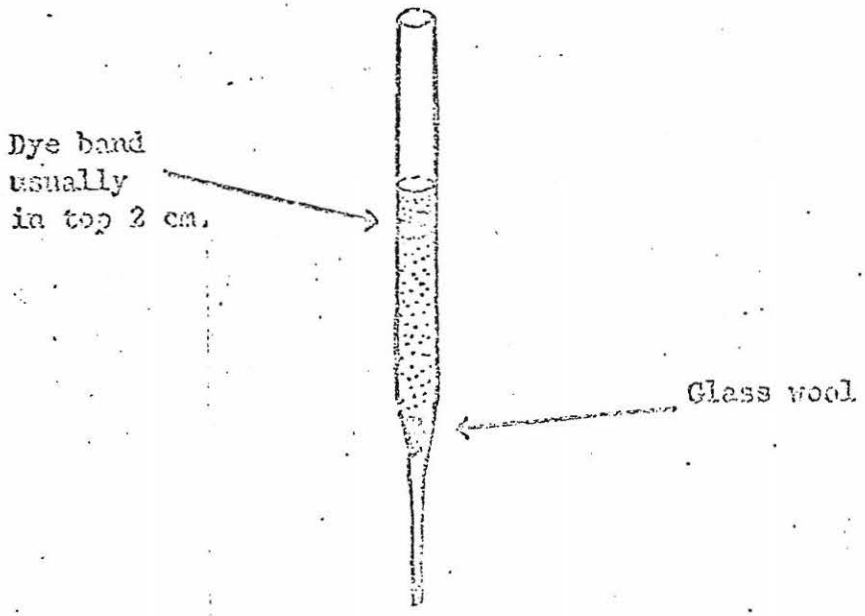
STUDY OF GASOLINE DYES

William E. Pearce - N. C. Bureau of Investigation

A common request in forensic laboratories is the analysis and comparison of gasoline. Gas liquid chromatography (G.L.C.) is used for the identification and comparison of gasoline samples, and is very successful. In addition, requests often concern the brand of gasoline in question. In this regard, studies of G.L.C. data have proved quite complicated and difficult to interpret. A method has been reported by Häusser by which brands of German gasolines were distinguished by the dyes which label them as leaded motor fuel. The purpose of this study is to determine if this procedure is applicable to U. S. gasoline samples.

Experimental:

10 ml of gasoline is poured through a pasteur pipette, which is filled with absorption alumina (80-200 mesh from Fisher A540) to a depth of approximately 5 cm.



The column is then washed with 4 ml of petroleum ether, and dried by passing N_2 through the column. The dye is extracted from the dry column using a small amount of acetone. Th acetone is evaporated and the pure dye thus obtained is spotted on a silica gel plate, which is developed in benzene.

Results and Discussion:

Studies conducted on eleven brands has shown that the dye composition is consistent within brands. There is also good discrimination between dye patterns in different brands. There are several factors which must be considered when trying to predict the brand of gasoline.

The first is the geographical area over which the standard samples are taken. Since gasoline may be delivered by numerous pipe lines and or water terminals, different dye patterns may be exhibited by the same brand. Sufficient known samples must therefore be taken from the same geographical area to establish distribution trends.

The time lapse between samples is also a factor. Studies conducted over several week periods show good consistency within the brand. The lapse of months often reveals differences in the dye patterns.

These factors considered, known samples should be obtained for each determination, from a certain location, and during a certain time.

While brand determination can be rewarding, the author considers comparison and tagging of gasoline by this method equally important. Dyes can be used to tag gasoline which needs to be identified later. This procedure has been used by this laboratory in cases of gasoline leakage and gasoline theft.

We have shown the dye composition to be relatively consistent within brands when proper knowns are taken and especially useful in gasoline tagging.

BIBLIOGRAPHY

Hausser, H.: Arch. Kriminol. 125, 72 (1960).

"Unidentifiable Multicomponent Hydrocarbons" --

Can The Forensic Laboratory Help?

Ronald N. Thaman - Systems Engineering Associates
7349 Worthington-Galena Road
Columbus, Ohio 43085

Introduction: Everyone who has been in the fire analysis area for any length of time usually is confronted with an "unidentifiable multicomponent hydrocarbon". The plain fact is that the hydrocarbon mixture, even though it may be in large concentration, does not match current laboratory chromatograms of known flammable liquids. The unknown mixture can be identified by combined gas chromatography/ mass spectrometry but this only tells the scientist the individual names of the chemicals. A clever defense attorney can easily discredit the isolation of some foreign chemical by various pyrolysis arguments. What is important in the analysis of fire debris is to be able to identify a brand name commercial product. Well over 9,000 commercial solvents, etc., are in the NFPA Index of Trade Name Liquids.

Possible Solution: Since the problem is a major one, a concentrated, dedicated effort is necessary if a solution is to be found. If enough interest is generated, a nationwide effort could generate an interlaboratory reference system which could provide the answer to an "unidentified multicomponent hydrocarbon". If interest is along this area, please write to me and relate your ideas as to how this problem can be solved.

* The 1976 Southwest Regional ACS meeting was held in Forth Worth, Texas on December 1-3. The symposium on forensic chemistry had the following:

    24 - Forensic Chemistry in Arson Investigation, G.C. Denault, Q.Y. Kwan
    25 - Arson Accelerants, Recovery, and Identification, A.T. Armstrong, R. Wittkower
    26 - Arson Residues by Combined Analytical Techniques, J.N. Lomonte, I.C. Stone, L.A. Fletcher
    27 - Comparison of Decomposition Products from Selected Burned Materials

  Abstracts may be obtained from:

    Max Courtney
    Criminalistics Laboratory
    Fort Worth Police Department
    1000 Throckmorton
    Fort Worth, Texas 76102

    (Source: C & EN November 1, 1976)

* Only four responses were received from the questionnaire which appeared in the last AAN. How can the format be improved if apathy rules. Please respond!

* The 1975 (December) issue of Chemistry in Britain was devoted to the role of scientific instrumentation in forensics (Source: Chemtech - September 1976)

* Dr. Bari Lateef, Associate Professor of Forensic Science, Youngstown State University, Youngstown, Ohio 44555, writes a new type of information might be included in the AAN: "(A) Arson Investigations - Physical Evidence, (b) Abstracts of the Legal Cases of Arson Convictions in U.S.". What are your thoughts considering this new section?

William E. Pearche
Forensic Chemist
State Bureau of Investigation
421 North Blount Street
Raleigh, North Carolina 27601

Lt. R.B. White
Laboratory Director
State of New Jersey
Department of Law and Public Safety
Division of State Police
Records and Identification Section
South Regional Laboratory
P.O. Box 126
Hammonton, New Jersey 08037

NOTICE

In an effort to update the mailing list of the "AAN", a letter must be received requesting the "AAN" by no later than February 1, 1977 or your name will be removed from the mailing list.

Ronald N. Thaman
Systems Engineering Associates
7349 Worthington-Galena Road
Columbus, Ohio 43085