

ABSTRACTS NWAFS SPRING MEETING --SPOKANE

Spring 2002

A New Forensic Science Program at Eastern Washington University

Dr. Suzanne Bell, Eastern Washington University

In conjunction with the Washington State Patrol (WSP) and in consultations with the Idaho State Patrol (ISP), EWU has developed a new program in forensic science. The degree is an option under the chemistry department and includes a strong biology component to prepare students for further training in DNA analysis. The degree will be available starting in fall 2002. An overview of the program will be presented and opportunities for participation by regional laboratory personnel, in either teaching or research activities, will be discussed. Input and ideas for regional collaborations, including acquisition of shared instrumentation will be sought.

A New Approach to Predicting Year of Birth Based on Skeletal Remains, Neural Networks, and Commercial Data Mining Software

Dr. Suzanne Bell, Eastern Washington University

Neural networks are data analysis tools well suited to a variety of forensic applications. With the advent of widely available commercial software designed for business use, networks have become easier to use, versatile, flexible, and an ideal complement to existing statistical techniques. With the integration of genetic algorithms, the once daunting tasks of network optimization and variable selection have become manageable. In the present study, networks were used to classify skeletal remains and to predict race, sex, and age-at-death and secular change patterns based on common osteological measurements of the skull. A brief overview of networks and genetic algorithms will also be presented.

GASTRIC CONTENTS AND VOMITUS

Enzymatic and Microscopical Tests

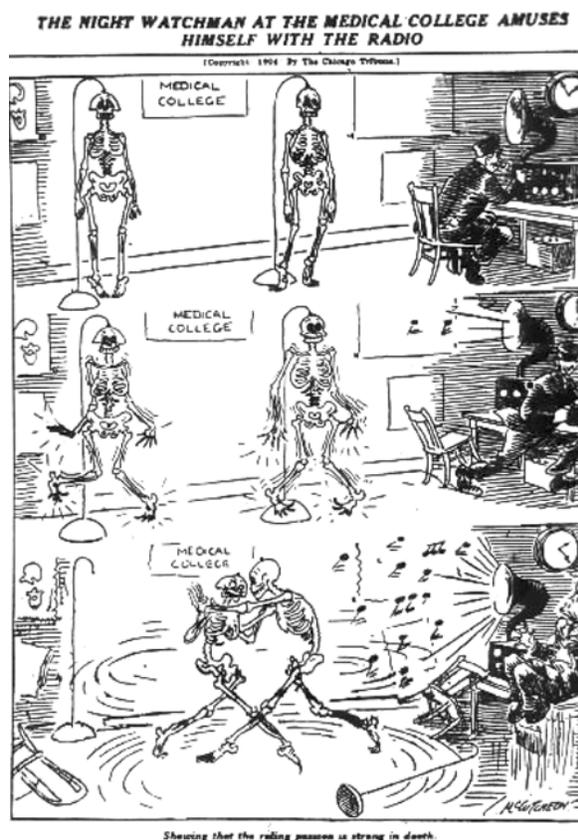
William M. Schneck, WSP Crime Lab-Spokane

A simple reliable micro-enzymatic test will be presented to identify vomit stains at the microscopic level. The test consists of placing a small quantity of a suspected vomit stain in a cavity microscope slide. One to three drops of whole cows milk is added to the stain, the slide is then placed in a humidity chamber for 30 minutes after which a microscopic examination for the presence of curdling is conducted. As far back as 1897 (Simon, C.E., *A Manual of Clinical Diagnosis by Means of Microscopic and Chemical Methods*) workers have tested for the presence of gastric enzymes using the coagulation effects of milk. Further works by Lee, H. C., Gaensslen, R. E., Galvin, C., and Pagliaro, E. M., (JFS, January, 1985) have verified the curdling activity of milk in the presence of gastric contents. This test can be used in conjunction with food product identification to identify a stain as vomit. Food ingredients such as starch can be readily identified using the polarizing light microscope. With the aid of case studies, a variety of foods will be discussed with staining methods used in their microscopic characterization.

Fiber Analysis of Questioned Documents

Walter Rantanen, Integrated Paper Services

Usually only superficial paper characteristics are used in separating or validating specific documents. The most common features examined are the general appearance, color, caliper, and if any watermarks are present. Within the actual



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paper can be found a significant number of variables even with documents that appear relatively the same. Each manufacturer can have their own recipe for producing the paper. The types of fibers, their ratios, pulping process, variables, additives, fillers, and other pigments can be used to show papers are consistent or decidedly different.

Fiber Reference Collection Database Ken Keiper, WSP Information Technology Division

The Fiber Reference Collection Database, developed by the Washington State Patrol's Information Technology Division for the Washington State Patrol's Crime Laboratory Division will be demonstrated. This demonstration will give a brief explanation of the design of the Database. This demonstration will also provide information on Adding Analysis Data and Browsing Analysis Data concerning Microscopic data, Refractive Index Data, Dispersion Staining Data, and Solubility Testing Data. The demonstration will wrap up with a Questions and Answers session.

Technical Challenges Encountered During the DNA Process of World Trade Center Disaster Victims Christopher Cave, Bode Technologies Group, Inc.

The events of September 11th set off, amongst other things, the world's largest DNA identification project ever. In order to generate and report results in a timely fashion a blending of techniques and staff from high throughput data banking and forensic casework was required. Since October 12th over 17,000 samples have been processed ranging from skeletal remains, soft tissue remains, DNA extracts and family reference samples. One of the greatest challenges has been sample quality, as many of the remains had spent several weeks in burning rubble of >2000°F. From tissue extracts we are only recovering profiles from ~30% of the samples and

obtaining ~70% no results. At present we are obtaining results from ~71% of the skeletal remains while getting no results from ~29% of the bones. This can be directly compared to the analysis of skeletal remains of the AA587 crash where remains recovery occurred more quickly. Using the same methods, profiles were obtained from 93% of the bones tested with only 7% no results.

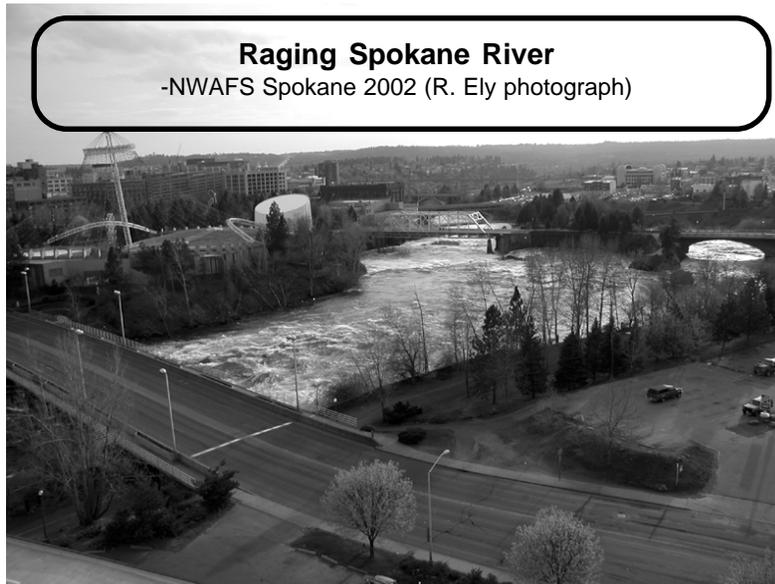
VOLCANIC, BIOGENIC AND EXTRA-TERRESTRIAL GLASS

William Schneck-WSP Crime Lab-Spokane

Glass may be defined as an inorganic product of fusion which has cooled to a rigid randomly disoriented state

without crystallizing. Glass particles are a common trace evidence material examined in crime laboratories. Most examiners involved in the characterization and comparison of glass are familiar with manufactured glass products such as float glass, tempered glass, bottle glass, and glass fibers. Non-manufactured glass is relatively common in nature and will be described. Examiners will find non-manufactured glass in

soil, building materials, abrasives, polishes, filters, cleaning agents, and fillers in paint and polymers. Biogenic glass as the name implies, originates from a living organism. Microscopic diatoms, radiolarian, sponge spicules, and phytoliths will be described. Volcanic glass originating from extrusive volcanic source rocks range from obsidian, pumice, perlite and have a variety of more exotic forms such as Pele's Hair. A very unusual glass in which you will probably never see in casework is of extra-terrestrial origin. Tektites are chunks of lunar rock which were ejected from the moon during several meteorite impact events. During reentry into earth orbit they were re-melted by aerodynamic ablation. They can be found in the United States, Czechoslovakia and Australia to Asia.



Raging Spokane River
-NWAFS Spokane 2002 (R. Ely photograph)

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Detection of Gunshot Residues on Secondary Surfaces **Matt Noedel, WSP Crime Lab-Tacoma**

Deposition of gunshot residue (SSR as gunpowder particles, nitrites, and vaporous lead) has been well documented on relatively close intermediate targets in-line with the shooting trajectory. Recently, a number of requests have been made about the potential presence of GSR on surfaces not directly in-line between the muzzle of the gun and the ultimate target impacted. Of particular interest are situations when the shooting environment is in a confined space (like the inside of a car). A series of experiments were conducted to evaluate the potential for deposition on such adjacent surfaces, the potential for locating and recognizing the deposition, and the persistence of these residues.

Proposed Method for Analysis of Personal Lubricants/ Creams/Lotions found on Clothing

Dr. JoAnne Marzowski and Ken Prentice, WSP Crime Lab-Seattle

A proposed scheme for analysis of lubricants, creams and lotions in clothing stains will be presented. KY Jelly, Vaseline Intensive Care hand cream, and Coppertone Sunscreen lotion were analyzed using stereomicroscopy, Fourier Transform Infrared Spectroscopy (FT-IR), and Capillary Zone Electrophoresis (CZE). Lubricant stained material was screened using stereomicroscopy and FT-IR. Discreet differences were found in CZE of these three lubricants. CZE analysis of control and lubricant stained clothing will be presented.

An Interesting Shooting Scene Reconstruction **Gaylan Warren, Columbia International Forensics Lab**

This talk examines a shooting scene reconstruction by four different methods. The shooting scene involved four vehicles, two shooters, and two targets. The questions asked were: Where were the shooters and the targets? And were they moving or not? The scene was reconstructed by string, trigonometry, and total station. The talk will examine the methods and results.

A Comparison of Retention Times and Elution Order Between Two Low Bleed GC/MS Columns

Arnold Melnikoff, Spokane W.S.P. Crime Laboratory

OV-1 and OV-5 are the most common capillary columns used for GC/ MS drug analysis. The 100% dimethyl polysiloxane and 95% dimethyl-5% diphenyl

polysiloxane columns are used because of their relatively low bleed and high temperature limits and their boiling point elution order. Unfortunately there is only a modest difference in retention time. The DB-200 columns stationary phase of trifluoropropyl polysiloxane stationary phase offers the same low bleed and high temperature limits but has the additional advantage of changing the elution order of compounds that contain lone-pair electrons or with electron rich molecules such as aldehydes, ketones and unsaturated compounds. This paper compares the retention time and elution order of OV-5 to DB-200 capillary columns in the analysis of controlled substances.