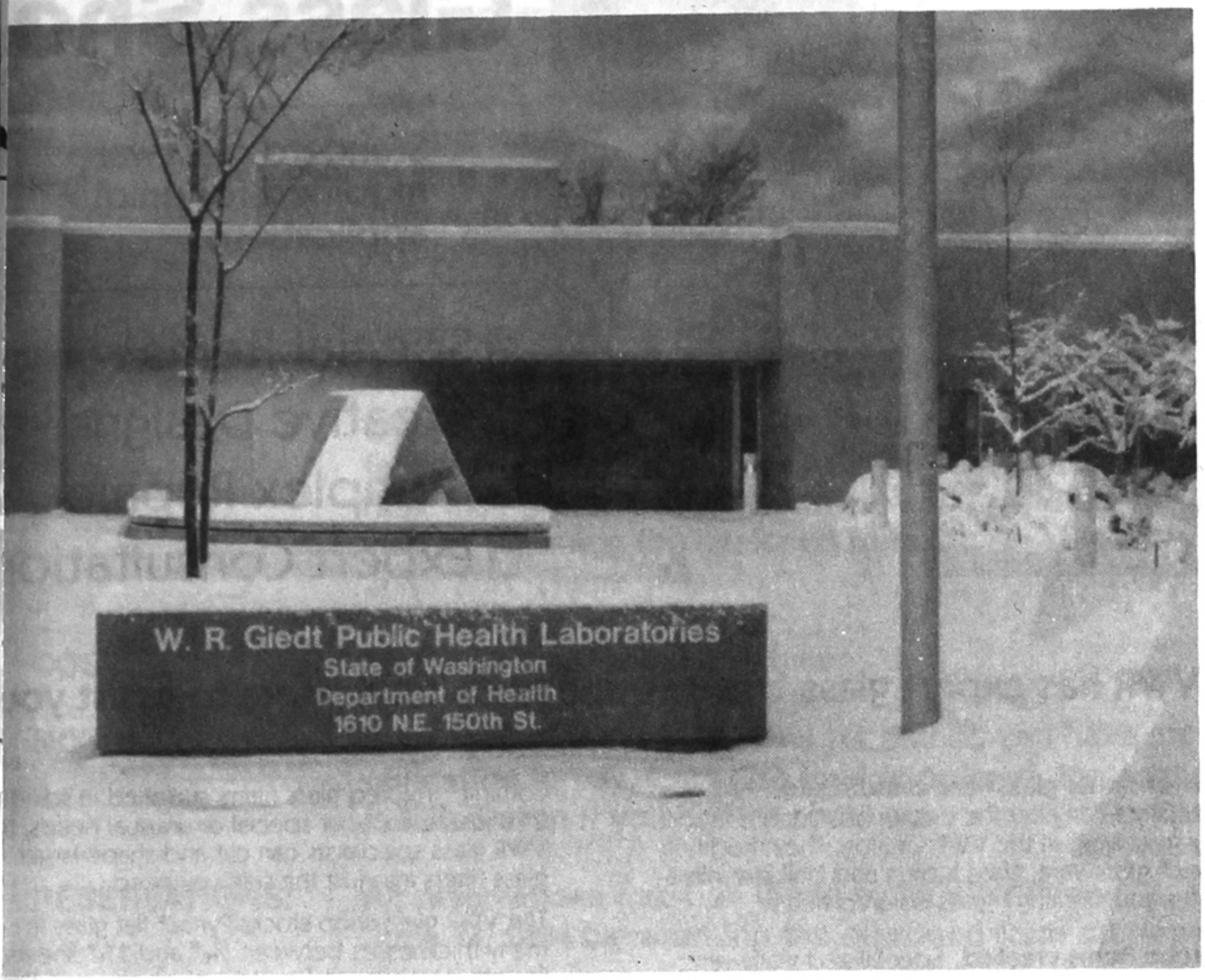


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JUNE MEETING

dyr Chen



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State of Washington
Department of Health
1610 NE. 150th St.

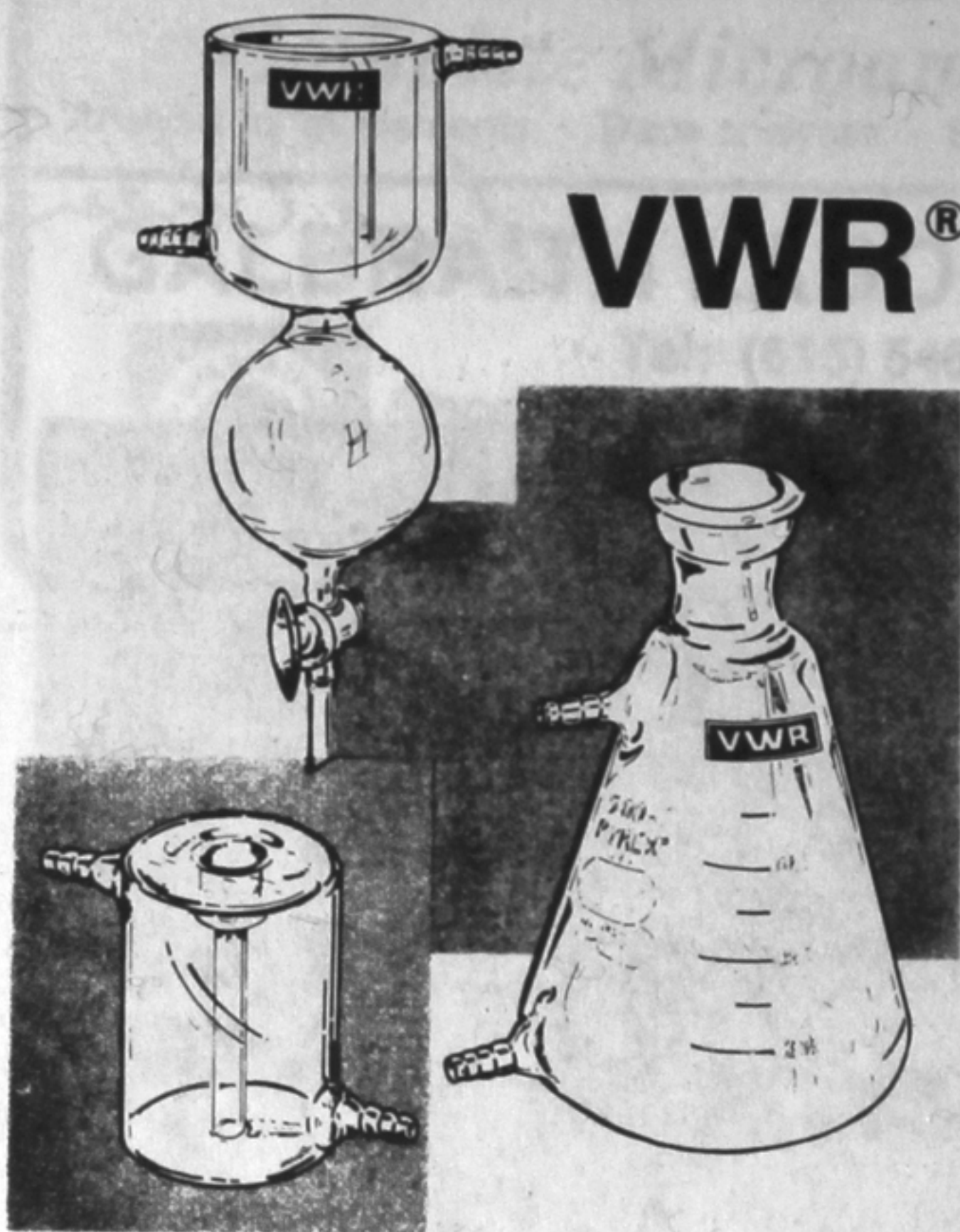
PUGET SOUND CHEMIST

BULLETIN OF THE PUGET SOUND SECTION OF THE AMERICAN CHEMICAL SOCIETY

Volume 55, Number 3



June 1994



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On the cover: the Washington State Public Health Laboratory, site of the June 1994 meeting of the Puget Sound Section of the American Chemical Society (see related articles in this issue).

JUNE MEETING

- DATE:** Wednesday, June 22, 1994
- PROGRAM:** Tour Washington State Public Health Laboratories
- LOCATION:** 1610 N.E. 150th Street, Seattle, WA
- DIRECTIONS:** Take 145th Street Exit (Exit #175) from I-5 and proceed Eastbound on 145th keeping in the left lane. Turn left on 15th Avenue N.E. and travel four blocks northbound. Turn right on 150th and proceed one block. The State Public Health Lab is on your left.
- SCHEDULE:** Please arrive at the front entrance by 1:15-1:30 p.m. A light dinner will follow at approximately 4:00 p.m. We will be visiting various sections of the State Lab. To facilitate an orderly tour we are requesting visitors to rank their preference as to which lab they would like to visit by returning the enclosed form on page 7 before June 17th. Thank you.
- COST:** \$5 per person for a light dinner
- NOTE:** When you make reservations for dinner, you have an obligation to pay. Once the food is ordered, the section is billed even if you do not show up.
- RESERVATIONS:** All reservations must be made by NOON, Friday, June 17, 1994 by returning the enclosed form on page 7.
- OFFER TO STUDENTS:** The section will pay half the cost of dinner for the first ten students (high school, undergraduate, or graduate).

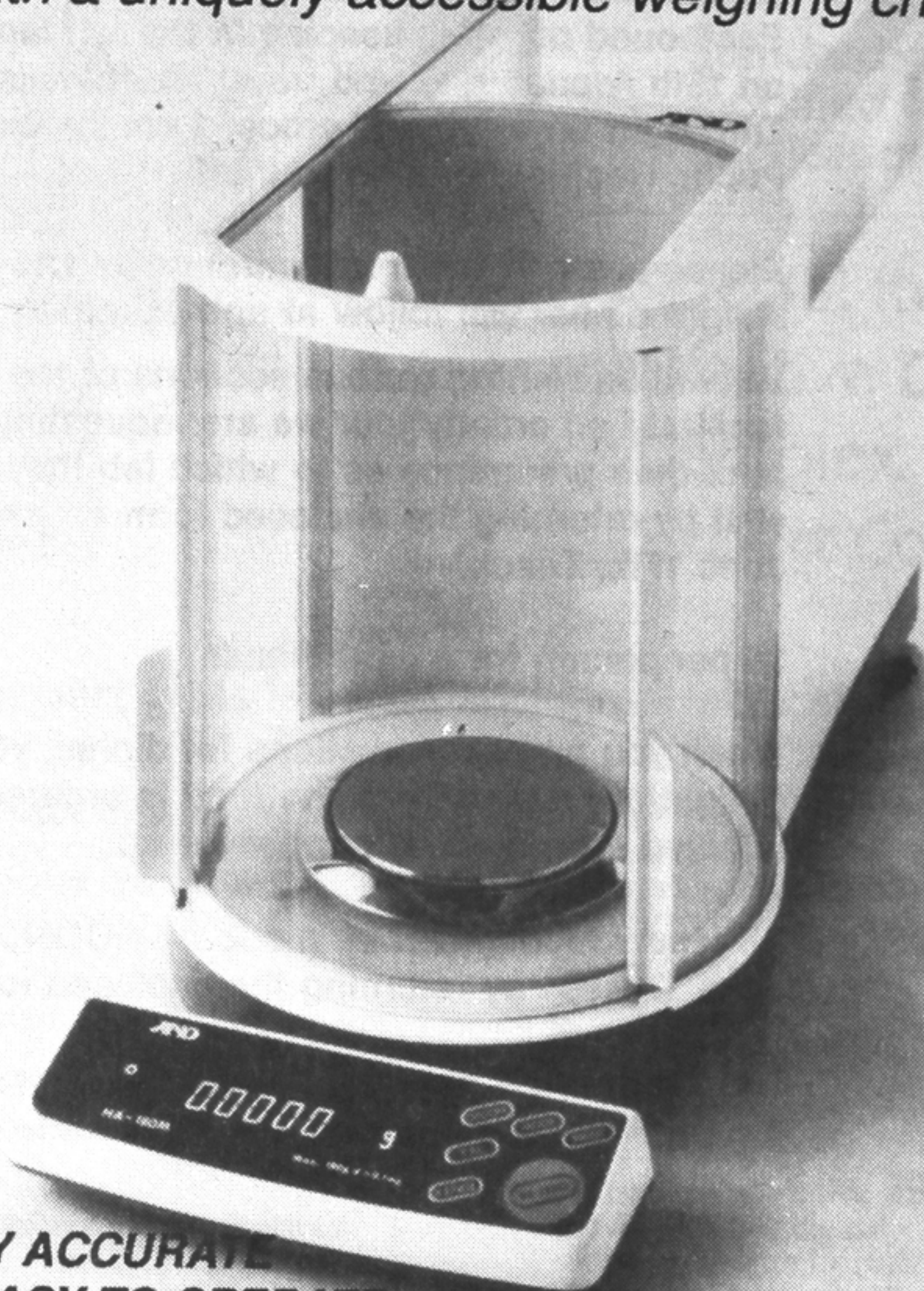
FUTURE MEETINGS 1994

- Thursday, October 13 Mr. Patrick J. Hannan on "*Serendipity as the Ultimate Research Tool*"
- October Pauling Award
- Thursday, November 10 Dr. Walter C. McCrone on "*Judgement Day for the Shroud of Turin*"

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PROGRAM FOR THE PUGET SOUND SECTION MEETING IN JUNE

Our June meeting will be a tour of the Washington State Public Health Laboratory in North Seattle on June 22nd. Please make reservations by returning the form on page 7 and indicating your preference as to which lab you would like to visit.

THE WASHINGTON STATE PUBLIC HEALTH LABORATORY

The Washington State Public Health Laboratory was established by the legislature in the early 1900s. The laboratory was first located in Seattle in the Alaska Building and later moved to the Smith Tower Building. Since 1985 the laboratory has been housed in a 10,000-square-foot facility located on the Department of Social and Health Services Firecrest campus in North Seattle.

The original charge given by the legislature to the laboratory was to *"perform all scientific analyses and tests, chemical, microscopic or other investigations which might be required by the State Board of Health and make prompt reports of results hereof."* Fulfilling this charge has required dramatic expansion in the number of programs offered and services provided.

The Washington Department of Health Public Health Laboratory (PHL) is the most comprehensive and integrated disease and environmental laboratory in the state. The PHL provides reference microbiology and chemistry laboratory analyses, including diagnostic and analytical testing for infectious disease and environmental contaminants, metabolic and other congenital disorders as well as analyses for clinical and environmental parameters that provide scientific information on the health status of individual communities.

The Institute of Medicine in 1988 identified three primary roles or core functions for public health: assessment, policy development and assurance. The PHL is a critical component of each of these activities for Washington. For many communicable diseases, laboratory assessment is the key to diagnosis. The Centers for Disease Control and Prevention (CDC) have stated: "Developing appropriate responses and control strategies for new and emerging infectious disease threats depends on linking laboratory science and epidemiology with prevention-oriented public health practice."

Recognizing the importance of public health laboratory services, the proposed national Health Reform legislation specifies the need for "...a system of state laboratories that screen for metabolic disorders in newborns, provide toxicology assessments of blood lead levels and other environmental toxins, diagnose sexually transmitted disease and tuberculosis requiring partner notification, test for cholera and other infectious disease, and monitor the safety of water and food supplies."

As partners in public health, the PHL staff work with the state Board of Health, state and local epidemiologists, environmental health and community health personnel to develop realistic public health policies based on sound scientific principles as well as current social, economic and political realities. Through its training and certification programs the PHL assures that adequate laboratory capacity and expertise is available in the state to support the routine diagnostic health evaluation of individuals.

The Public Health Laboratory consists of five offices:

1. Assistant Secretary
2. Operations and Technical Support
3. Environmental and Radiation Chemistry
4. Clinical and Environmental Microbiology
5. Newborn Screening

Client Groups Served

Services provided by the Public Health Laboratories are utilized by many diverse client groups and constituents. Health objectives and clients served can be grouped

(continued on page 6)

WASHINGTON STATE PUBLIC HEALTH LABORATORY, continued from page 5

into the following broad categories: The objectives of the various services provided can be broadly stated as:

1. Ensuring the development of healthy children
2. Protecting people from environmental hazards
3. Protecting people from disease

Office of the Assistant Secretary

The Office of Assistant Secretary provides operational and strategic direction and leadership for the Public Health Laboratories. The following functions are administered within the office: Strategic and Operational Planning; New Initiatives; Staff Publications; and Administrative Support Services.

Office of Operations and Technical Support

Quality Assurance

The Quality Assurance functions of the laboratory continue to grow as the client groups served become more demanding and government regulations require more scrutiny. With the adoptions and enforcement of the Clinical Laboratory Improvement Act (CLIA), the Laboratory must strictly comply with its applicable requirements. Enrollment in clinical proficiency testing programs is now mandatory with documented satisfactory performance. Additionally, the Laboratory enrolls in the relevant proficiency testing programs offered by the FDA, EPA and CDC. Because the Laboratory's mission of protecting public health is regulatory, and investigative in nature, the analytical results must be legally defensible. This has mandated the implementation of strict controls over the whole process of sampling, analysis and reporting.

Laboratory Certification

The Drinking Water Certification Program is responsible for assessing the technical competency of laboratories to analyze drinking water. During 1991-93 a dramatic increase occurred in the number of labs applying for certification. During the year, 19 new labs were audited and eventually approved, an increase of over 30% from the previous year. With the enforcement of the phase II and Phase V regulations as required by the Safe Drinking Water Act, 62 additional analytes must now be monitored by the major drinking water systems. Additional regulations planned for implementation during the coming year will require monitoring of parasites, particulates and possibly viruses. The Certification Program has received commendations from the EPA and professional colleagues because of the writing and adoption of the Washington Administrative Codes.

Laboratory Safety


The safety program has the responsibility of implementing current safety rules and regulations to ensure a safe working environment for all Public Health Laboratory employees. The safety program is also working to inventory, reduce and dispose of hazardous and/or dangerous chemicals used in the laboratory. MSDS (Material Safety Data Sheets) training is an integral part of the safety program.

Technology Transfer

The technology transfer program provides education and training for laboratory professionals in and adjacent to Washington state. The program is designed to provide training which will increase and/or maintain competence by improving laboratory skills and ultimately the quality of patient care. The training methods used include: Lecture presentations, wet workshops, the audio-visual lending library and teleconferences. Facilities available at the Laboratory include conference rooms as well as training

(continued on page 9)

RESERVATION REQUEST for June 22 Meeting

The first tour of the '94 season is taking shape. The Washington State Public Health Lab has graciously offered to show-case their facilities. To assist with the logistics of the tour, we are requiring interested ACS members and guests to complete the form below and return it **before June 17th** . Each lab visit is scheduled for approximately 90 minutes. We are asking you to arrive at the front entrance between 1:15 - 1:30 p.m. A light dinner will follow at approximately 4 p.m..

Below, the instructions. Rank the lab tour you wish to participate in on a scale of 1 - 3. Where 1 is the lab tour of greatest interest and 3 is the lab tour of least interest. We will attempt to accommodate your selections. However, group size is limited.

Ranking	Group	Description
<input type="checkbox"/> Lab A limit 24	Clinical & Environmental Lab	Testing of clinical and environmental samples for disease causing agents. Presentation will emphasize the recent E. coli outbreak.
<input type="checkbox"/> Lab B limit 10	Newborn Screening and Genetics Lab 400 meter walk (one way) and 2 buildings	Diagnostic testing to detect treatable disorders in newborns and to detect abnormal hemoglobin levels. Presentation will describe the mission & function of the Group.
<input type="checkbox"/> Lab C limit 10	Radiation Lab 400 meter walk (one way)	Monitoring and analytical assessment of air, water, soil & vegetation. Presentation will describe the mission & function of the Group.

Number in your party _____ Work phone _____

Name(s) - print  Home phone _____

For closure, we are planning an early dinner (outdoors if weather permitting) and a question & answer session with a member of the Administration and Operational Services Group. The cost of the dinner will be \$ 5.00.

This tour promises to not only to be informative, but also provocative in terms of how science, public policy and the public's perception are intertwined. **Hope to see you June 22nd!**

Please return the tour selection form by June 17th.

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laboratory which allows hands-on learning. The program utilizes high quality teleconferencing equipment in providing continuing education, taking advantage of the expertise from laboratory specialists around the country. Some of the subjects offered in the past year include: *Intestinal parasites; Microbiology for the Community Hospital; Identification of Blood Parasites; QA and QC in Flow Cytometry*. The training program also supports and assists a variety of health and training organizations such as the National Laboratory Training Network and the Pacific Area Resource Office.

Office of Environmental and Radiation Chemistry

This office provides monitoring of the environment to assure that the public is protected from exposure to chemicals that could affect their health. These chemicals may be either naturally occurring in the geology of the state such as Arsenic and Uranium, or the chemicals may come from mankind's activities such as the pesticide compounds and waste products from the past activities on the Hanford reservation.

A significant activity for the laboratory is the monitoring of the public drinking water. The laboratory serves as the primacy laboratory for the state. In this role the laboratory supports the certification of private testing laboratories through the authority granted by the Federal EPA to the Department of Health's Drinking Water Program.

Another significant activity for the laboratory is in providing quality assurance test results in support of the oversight of private testing laboratories. This role is most clearly defined in the activities of the radiation laboratory. Samples are split with private contracting laboratories and the laboratory does an independent analysis for the radiochemical content of the sample. This laboratory also provides support to the state Department of Ecology in its role for cleaning up the Hanford Reservation. The Department of Ecology along with the Federal EPA and Federal Department of Energy are the responsible agencies that have entered into an accord known as the Tri-Party Agreement.

The laboratory also provides support for the chemical monitoring of shellfish and foods that are either grown within the state or are exported through the State's ports.

The chemistry laboratory provides testing for lead contamination of blood, dust, pottery and paints. The information acquired from these analyses are used by Department of Health personnel to develop a preliminary assessment of the extent of possible lead contamination in Washington and to target regions or populations that may require additional investigations.

Clinical and Environmental Microbiology

The Office of Clinical and Environmental Microbiology comprises several laboratories which isolate and identify a variety of communicable and sexually transmitted disease agents so appropriate measures can be implemented to prevent the spread of these agents. Preventing the spread of these agents protects the lives and health of the people of Washington state. The Office of Clinical and Environmental Microbiology laboratories:

- Serves as the reference laboratories for the state for the definitive identification of human and animal pathogens.
- Serves the state as the resource of information on laboratory practices.
- Provides consultation and training to improve and assure quality services in other laboratories.

The Office protects the health of the people of the State of Washington by ensuring that all laboratories in the state have access to the information and knowledge required to provide quality services to their clients in an accurate manner.

Disease Surveillance / Emergency Response

In January, *Escherichia coli* 0157:H7 caused the largest documented food borne

(continued on page 11)

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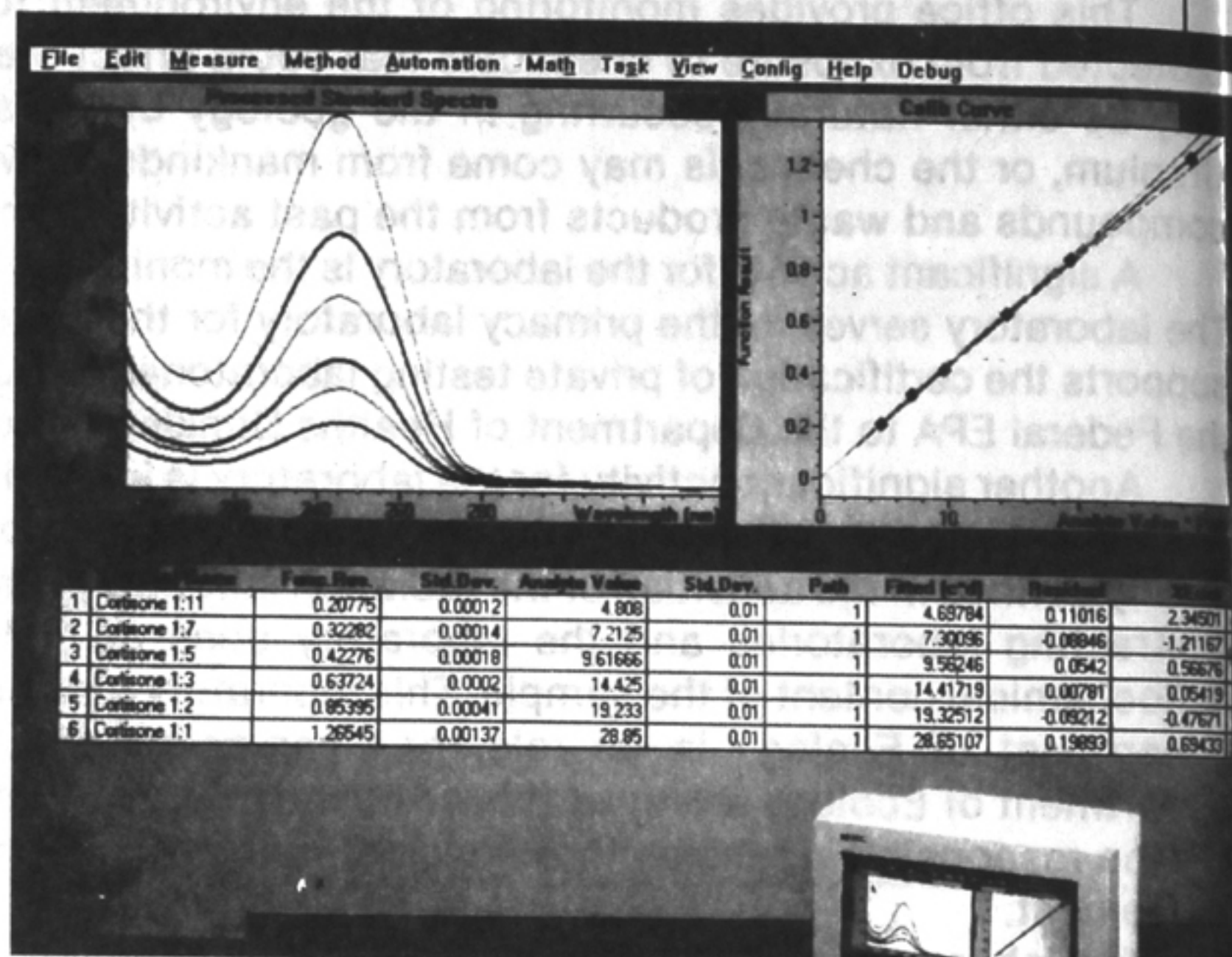
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outbreak in the history of Washington state. The outbreak led to 144 hospitalizations, 30 cases of Hemolytic Uremic Syndrome (HUS) and 3 deaths.

E. coli 0157:H7 is found in intestinal tracts of healthy cattle and potentially contaminate meat during slaughter. Studies have consistently shown that when compared to other common enteric pathogens, *E. coli* 0157:H7 is the second or third most commonly isolated known pathogen. Through investigations by state and federal epidemiologists, this outbreak was traced directly to hamburger served at outlets of one burger chain.

In Washington State an average of 200 cases of *E. coli* 0157:H7 are reported per year to the Office of Epidemiology. The incidence of *E. coli* 0157:H7 infections is seasonal with most cases being seen in summer months (June through September). During January and February of this year the Enteric Laboratory analyzed 1070 samples with more than 50% testing positive for *E. coli* 0157:H7. The rapid analysis of these results led to prompt treatment for those affected and brought attention to how hamburger was being prepared in restaurants.

A separate food outbreak resulted in the isolation of four *Salmonella* serotype in a citrus juice drink mix containing powdered eggs. In addition to three known serotype, the Enteric Laboratory identified a fourth as not previously described. Following confirmation of the new serotype the microbiologist responsible for isolating the organism was asked to name the serotype. The isolate was named *Salmonella* Serotype *Wenatchee* in honor of his home town.

Environmental Microbiology

The Asian Gypsy moth is a forest denuding pest inadvertently brought to Western Washington on ships coming from Asia. The USDS Forest Service selected the South Puget Sound area for the Asian Gypsy moth eradication project. The area selected is 130,000 acres and includes densely populated portions of Pierce and King counties. Three applications of *Bacillus thuringiensis* (B.t.), a naturally occurring bacterial pesticide, were used to eradicate the pests before they could gain stronghold in Western Washington.

The MIDI automated microbial identification system was one tool used to obtain rapid and economic results. The MIDI system is a valuable public health tool that combines computer power with the proven techniques of cellular fatty acid analysis. Fatty acid methyl ester (FAME) analysis is based on the isolation and quantification of fatty acids unique to each species of organism. Prior to the purchase of the automated system, identification of unknown isolates was based on comparing the fatty acid profiles of the unknown isolates to the existing profiles. MIDI automatically determines the fatty acid compositions of unknown isolates, then searches against extensive libraries of known compositions for accurate identification.

The MIDI system is routinely used to identify unknown isolates submitted to the Laboratory. In addition to routine submissions, the system has proven to be invaluable in substantiating the epidemiological link between infective agent and infectious disease of food-born outbreaks.

Community Assessment

Four years ago, the Laboratory required 12 weeks to confirm a case of TB. Advances in molecular level testing using DNA probes, automated culture procedures, polymerase chain reactions (PCR) and the MIDI system have made it possible to produce a diagnosis of TB in 2 weeks.

DNA probes have aided the rapid identification of mycobacteria species from cultures of clinical specimens. The incorporation of DNA probes by the Laboratory in 1989 allowed the identification of both *M. avium*, *M. intracellulare* and a combined *M. avium* complex.

(continued on page 12)

The Laboratory continues to search for methods to speed the isolation and identification of *Mycobacterium tuberculosis*. Polymerase Chain Reaction shows great potential. In 1992, the Center for Disease Control awarded the Laboratory a grant for PCR applied research. This was the only grant awarded in the United States. The Laboratory is performing research to investigate the feasibility of using PCR as routine diagnostic tool.

Newborn Screening

Most babies are born healthy and will develop and grow normally. A few, however, have special problems. Universal screening of Washington infants to detect and treat certain preventable disorders was implemented in 1977. In 1992, the Laboratory screened almost 77,000 infants, conducting a half million tests on more than 100,000 specimens. In July of 1993 the Laboratory expects to screen their one millionth infant.

Washington state requires hospitals to submit a blood specimen from every newborn to the Office of Newborn Screening. The specimen is tested for certain treatable disorders which can cause severe developmental impairment, severe illness, and would not otherwise be detected. Infants with detected disorders can then be medically managed to develop normally. The disorders to be screened for are determined by the Board of Health. The disorders currently being screened for are:

- **Phenylketonuria (PKU)** - inability to metabolize the common amino acid phenylalanine due to lack of the enzyme phenylalanine hydroxylase. If untreated, PKU results in severe neurological and developmental damage. Treatment consists of a special diet low in phenylalanine. Affected infants develop normally with the proper dietary control. During 1992, seven infants with PKU were born in Washington, Newborn screening detected these infants and their treatment began before any damage occurred.
- **Congenital hypothyroidism (CH)** - insufficient production of the thyroid hormone thyroxine due to malformation or malfunction of the thyroid gland. If untreated, CH results in severe neurological and developmental damage. Treatment consists of replacement of hormone with synthetic thyroxine. Affected infants develop normally with proper treatment. Twenty-two infants with this disorder were detected through newborn screening in 1992. All were placed on treatment shortly after birth and are doing very well.
- **Congenital adrenal hyperplasia (CAH)** - excessive production of androgenic hormones due to lack of the enzyme 21-hydroxylase. If untreated, CAH can lead to imbalance in the body's concentration of salts which in turn can rapidly lead to shock and death. CAH also causes excessive masculinization and extremely premature sexual maturation. Treatment consists of providing cortisol which normalizes hormone production. Proper treatment prevents death and stops the masculinization process. Newborn screening detected the six infants born with this enzyme deficiency during 1992. All are doing well.
- **Hemoglobinopathies including sickle cell disease:**
Hemoglobinopathies are genetic alterations of the hemoglobin molecule that cause characteristic clinical and laboratory abnormalities. Universal screening for hemoglobinopathies was fully implemented in Washington on November 1, 1991. The most important for newborn screening is Sickle Cell Disease (SCD), a condition marked by a tendency for red blood cells to take on a sickle shape due to an abnormal structure of the hemoglobin molecule. The altered shape shortens the life span of the cells resulting in anemia, and impeded circulation, especially in capillaries. Children with SCD are highly susceptible to bacterial infections that can rapidly lead to overwhelming sepsis and death. Affected children experience chronic and repetitive pain episodes, degeneration of various organ systems, and are also vulnerable to rapid pooling of blood in their spleens which can lead to death. Treatment varies with regular doses of

(continued on page 13)

penicillin to prevent infection and parents are trained to recognize the symptoms that require immediate medical intervention. Proper treatment dramatically reduces infections and death. Eight infants with sickle cell disease are detected through newborn screening in 1992 and entered into treatment programs.

Newborn Screening is currently investigating the use of Polymerase Chain Reaction (PCR) and DNA analysis for hemoglobinopathy screening. Until recently PCR and DNA analysis were confined to research laboratories. A few labs around the country have pioneered the use of these techniques for the screening of newborns for genetic disorders.

The Laboratory is testing these new procedures for the detection of genes that produce abnormal hemoglobins including the sickle cell gene. We hope to use PCR and DNA analysis as confirmatory test after initial screening reveals the presence of a hemoglobinopathy. The technique offers the benefit of rapid reportable result of a definitive genotype without the masking effect of fetal hemoglobin and without requiring a new sample to be drawn from the infant. The technique can significantly reduce the time to diagnosis for affected infants.

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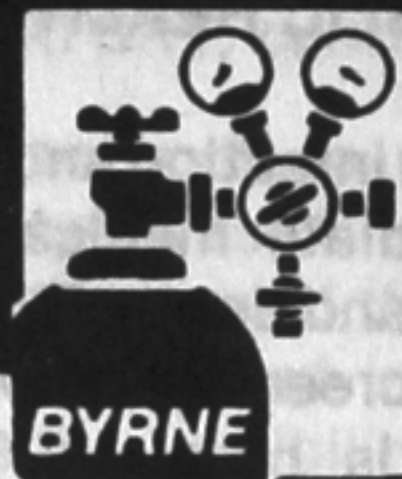
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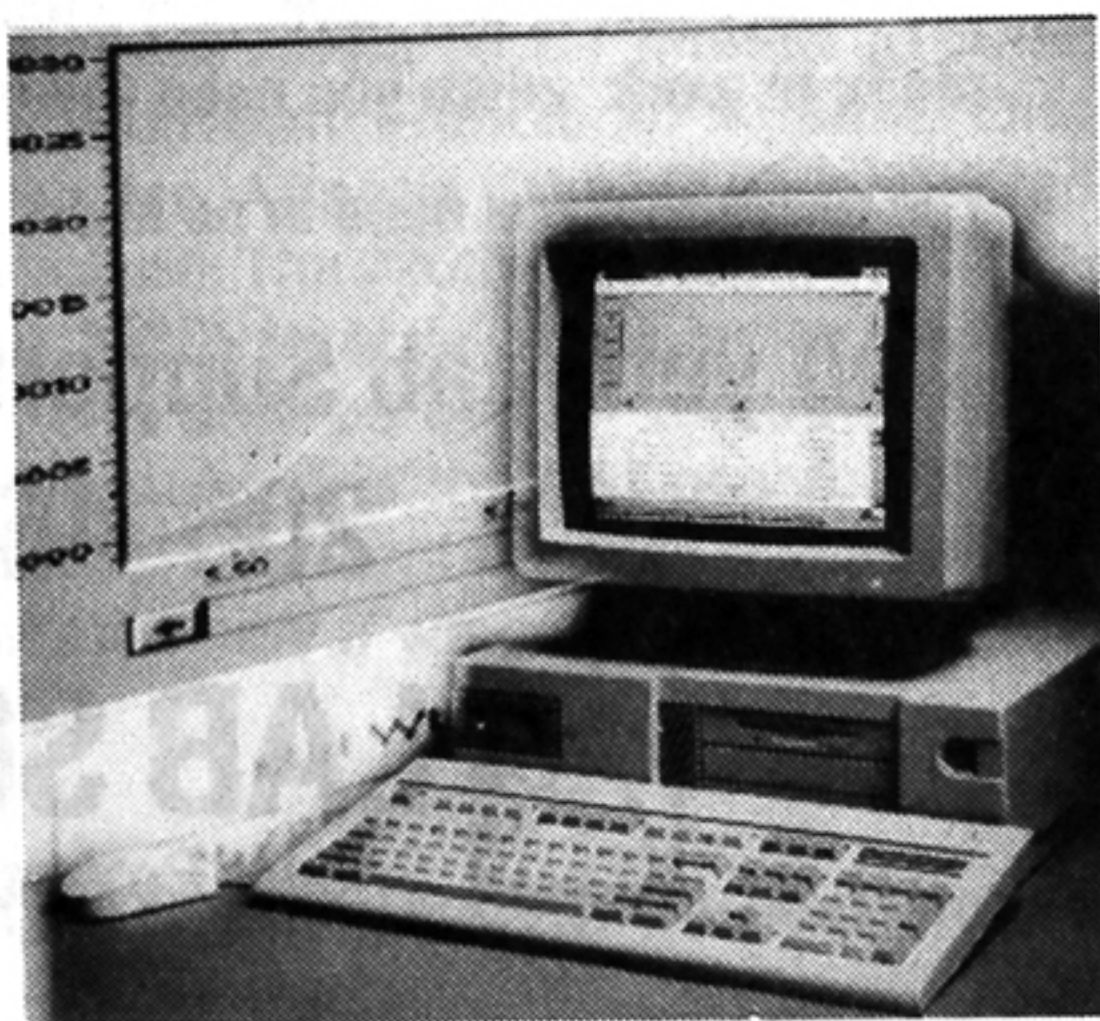
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Report by

BILL WASSERMAN, COUNCILOR, PUGET SOUND SECTION

My activities for this meeting included a number of functions in addition to the Council meeting itself. During the interim between the Chicago and San Diego meetings, I was appointed a full member of the Society's Committee on Meetings and Expositions, and a member of that Committee's subcommittees on Expositions and also on Site Selection Committee. In addition to the Society appointed me as the liaison from the Committee on Meetings and Expositions to the Committee on International Activities. My other official function at San Diego involved my continuing activity as Assistant Director of the Society's Task Force for the Curricular Reform in (General) Chemistry Project.

COUNCIL MEETING

The Council met on Wednesday, March 16, with a very limited number of action items on our agenda this time. We selected two candidates for 1995 ACS President Elect: Allan Bard (University of Texas) and Ronald Breslow (Columbia University). These well-qualified contenders will be voted on by the general membership of the Society later this year. We approved the earlier action of my Committee on Meetings and Expositions to move the Spring 1998 Meeting from St. Louis to Dallas, the only city with available facilities at that time. Previously, last August in Chicago, we moved the Spring 1977 Meeting from San Antonio to San Francisco (April 13-18). Also approved were the 2003 meetings to be held in New Orleans and New York. Housekeeping actions such as accepting changes in names of ACS local sections, honoring prize-winning section activities, and hearing reports from numerous Society and Council Committees occupied the rest of the morning. A major undercurrent noticeable at San Diego was stirred by the reports that employment prospects for chemists have grown considerably more dim. Instead of a 3-5% deficiency in the number of chemists available, there is now, apparently, a 2-3% surplus. There was even talk about devising methods to restrict the number of chemists in the national pipeline by reducing the numbers accepted into chemistry majors and graduate schools. However, it was felt that panic was inappropriate, and a wait-and-see attitude for the moment was generally favored.

MEETINGS AND EXPOSITIONS COMMITTEE

The need to move the Spring 1988 meeting from St. Louis was recognized again due to the loss of at least one major hotel. Meeting attendees in St. Louis would have been forced to stay at hotels 30 or more miles from the convention center. Only Dallas had space available for our meeting at an appropriate time. It was recognized that the previous Dallas meeting was poorly attended, but there was no other choice available. We were faced with the need of selecting sites for 2004 and 2005. Very few cities are left that can provide enough close-in hotel space, and enough meeting rooms as well as huge exposition site. The most likely possibilities seem to be limited to Anaheim, Boston, Chicago, Las Vegas, New Orleans, and San Francisco. Atlanta, Orlando, Philadelphia and San Antonio could be future sites. Atlantic City will be inspected, but great reservations about its desirability were voiced. The 225th meeting was awarded to New Orleans for March 23-28, 2003, and the 226th to New York (Javits Conventions Center) for September 7-12, 2003. New York can only be used if the Javits Center is available; Chicago remains on the list only because it is the last possible site in the midwest. (Seattle could crack the list *if* the Convention Center builds the promised new exposition space. Vancouver could be considered *only if* we can work out a joint ACS-CIC Meeting or a Pacific Basin Congress.)

INTERNATIONAL ACTIVITIES COMMITTEE

Numerous international meetings are in the planning stages. The next one of major

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ACS MEETING SAN DIEGO, continued from page 17

interest is the 13th International Conference on Chemical Education in Puerto Rico, August 8-12, 1994. Ram Lambda (Inter-American University of Puerto Rico) has an outstanding program arranged. A major international symposium, meeting involving the ACS and the Royal Chemical Society may be forthcoming as soon perhaps as with the April 2-7, 1995, ACS meeting in Anaheim. My guess is that date is way too optimistic, but some ACS RCS meeting will be held soon, probably in the US. Major concerns for the Committee were the ongoing disastrous events affecting our colleagues in China, the former Soviet Union and Eastern Europe in particular. The committee is interceding with present and future ACS Presidents and our national leaders in Washington to insist on more humane and responsible treatment of some increasingly abused chemists and other scientists. Past President Helen Free wrote a particularly inspired letter to President Boris Yeltsin.

TASK FORCE ON GENERAL CHEMISTRY

Our major focus is on developing several new approaches to teaching general chemistry. Great dissatisfaction with the huge encyclopedic current texts and courses is widespread and is fueling the movement to develop new general chemistry programs including:

- laboratory discovery (funded by NSF, Ram Lambda directing)
- begin with organic chemistry (University of Michigan, Seyhan Ege directing)
- core modular program (private and other funding, Jim Spencer directing)
- material science emphasis (NSF, ICE, U. Of Wisconsin, Art Ellis directing)

A major thrust soon to be visible will be an ACS-NSF monograph on General Chemistry Reform. Watch for it.

49th NORTHWEST REGIONAL MEETING OF THE AMERICAN CHEMICAL SOCIETY

The 49th Northwest Regional Meeting of the ACS will be held in Anchorage, Alaska, at the University of Alaska Anchorage campus from June 16-18. The complete technical program and conference description appeared in the April 25 edition of *Chemical & Engineering News*.

McDonnell Douglas Travel Company (MDTC) has been selected as the official travel agency for the 1994 ACS Meeting Travel Program. Reservations can be made through MDTC at 1-800-825-6382 or by contacting the individual airlines below and referring to the ACS file number:

American Airlines

1-800-433-1790

File number S9324

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File number 38540111

Additional information may be obtained from: University of Alaska Anchorage, College of Community and Continuing Education, Conferences & Institutes, 3211 Providence Drive, Anchorage, AK 99508-8258; Phone: (907) 786-6730, FAX: (907) 786-6739.

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Puget Sound Section, ACS Executive Committee Future Meetings in 1994

Meetings are open to all members and are held on the second Wednesday each month.

June 8 September 14

Place: Seattle University

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Meeting: 6:30 PM in Room 511,
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