C_3 News

Summer 1989
Vol. 14, No. 2

Newsletter of College Chemistry Canada / La Chimie Collégiale au Canada

In the *News*

I've just returned from the Calgary Conference. Phyllis Lake and her committee did a wonderful job of organization: buses ran on time, the hotel accommodation was good, and the sessions were interesting. I guess we can forgive Calgarians for the change in our C_3 logo on some of the signs which appeared around the college; the Cs had a strong resemblance to a certain hockey team's emblem. The facilities in the newly renovated Lincoln Park Campus made many of us more than a little envious.

There is a short summary of the conference in this issue of *C_3 News* along with a few pictures which I managed to take. You'll notice that there are no pictures of the barbecue included in the conference photo page; mysteriously, my camera suffered a major power failure that night. Since clearly it was in some people's interest not to have a photographic record of the evening, (see "President's Notebook") I have to suspect sabotage. And for the second year in a row, the prize for finding the most "happening" nightclub at the conference goes to Martha Ann Woodworth from Newfoundland. It's enough to make you swear off telling Newfie jokes.

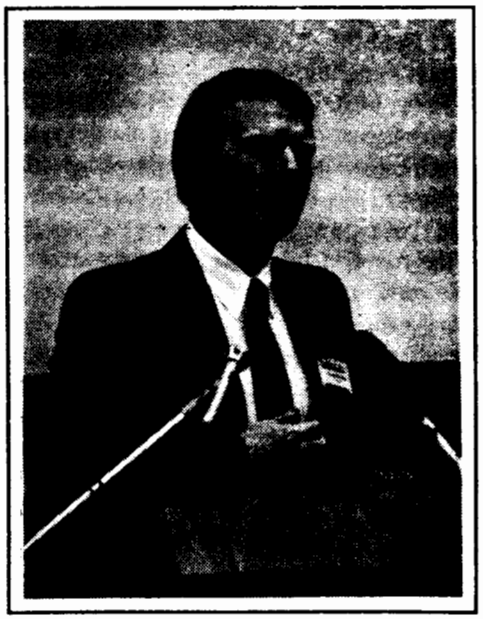
Two short items: I want to start a news (gossip?) column about C_3 members and their activities. It will cover retirements, new posts, awards, leaves, as well as news about colleges or institutions. If you have anything to contribute please send it...it only needs to be a line or two. The second item is that Douglas College is going through a period of labour difficulty. The staff union settled after conducting job action, but the faculty is working without a contract. Don't be surprised if the next few issues of *C_3 News* are a little late in being mailed out.

Bob Browne, Editor

1989 Conference Highlights

Speakers Stress Teaching Environmental Issues

"There is no manual for the operation of the earth. We are in the process of creating one", according to Grant Trump, keynote speaker at the first session of the 16th annual conference of College Chemistry Canada held in Calgary June 1-3. In his talk entitled "Chemical Education and Hazardous Waste Management for the next Decade" Trump discussed a number of issues of waste management, including cleanup of designated sites, legislation, and the implications for chemical education in Canada. He stressed the need for environmental components in courses designed for chemical technologists and technicians. Topics such as compliance with the legal system and worker health and safety will be essential parts of any such course in the next decade. Acknowledging the continuing problem of obtaining funding to develop such a curriculum, Trump suggested giving these courses to industry and recovering some of the development costs.



Keynote speaker Grant Trump

The session continued the theme of the conference which was "Chemicals and the Environment" with talks by the director of the Calgary Fire Department's Hazardous

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In this issue...

Conference (continued from page 1)

Materials Response Team, Dan Wurster of Nova Corporation, and Caroline Simons of the Alberta Special Waste Management Corporation.

The theme broadened for Saturday's sessions; speakers presented a variety of topics from teaching stereochemistry to organic students, to Bob Perkins' talk on putting some fizz into your chemistry classes, featuring different ways to use Alka Seltzer tablets to illustrate topics in first year chemistry. The highlight of the second day was the Safety Workshop given by Jim Kaufman of Curry College. This was a three hour session which was interesting as much for the presentation as the content. A seasoned veteran of the lecture tour, Kaufman used a number of interesting techniques to keep the audience involved. For example, he had participants submit their names for a draw for a free trip to Bimini. He later admitted that it was a hoax, but it gave him the names of everyone in the room to be used when he needed a volunteer, or a question answered. Virtually every type of hazard encountered in the chemistry lab was discussed, but the one which generated the most interest seemed to be electrical hazards. Did you know that if you have a symmetrical two-pronged plug on your toaster or hair dryer that every time you plug these appliances in you are playing Russian roulette? The chances are 50-50 that you have made the chassis the live side of the circuit. Kaufman concluded his presentation by urging all participants to start a safety program in their laboratories, and outlined the essential elements of such a programme.

As with all successful conferences, social events played an important role in providing an informal atmosphere in which to meet delegates, discuss current topics, and find out what is really going on in various parts of the country in the area of college teaching. The Welcoming Wine and Cheese reception, sponsored by the president of Mount Royal College started the social programme. Friday's barbecue catered by Symon's Valley Ranch gave delegates a taste of western hospitality with a beef barbecue, entertainment by Miss Molly and her band, and a square dance. Some hardy souls managed to get up early enough the next morning to run in the annual 5k fun run, and were rewarded with some very nice prizes for their efforts. The fact that the conference hotel was located in the downtown area, within walking distance of a number of restaurants and clubs, made it easy to organize informal social events and shopping tours.

According to Conference Coordinator Phyllis Lake, 100 delegates were present at the conference on Saturday, about 25 of these coming from schools around Calgary for the Safety Workshop. There was a good variety of book publishers and lab equipment manufacturers present (14 in all) which made for some interesting browsing between sessions.

Phyllis Lake and her organizing committee should be congratulated for a conference which was both a financial and an artistic success.

C3 News

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Articles of any length will be gladly accepted. Please send typewritten copy to the Editor at the above address or send by fax. Copy can also be sent on a 5 1/4" floppy disk, IBM format, using WordPerfect, WordStar, Microsoft Word or any wordprocessor producing ASCII output. Deadline for the next issue is September 15, 1989

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Teaching Tips

By Bob Perkins

Solvent extraction is an important technique in chemistry; the successful isolation of natural products rests upon the differing solubilities of the compounds in various solvents. I have used the following system to illustrate solvent extraction, and at the same time, review redox reactions.

One begins with a dilute solution of $K_2Cr_2O_7$, into which a small amount of 3 M H_2SO_4 is added. The addition of a few millilitres of aqueous KI produces no appreciable change in the colour of the solution. I now ask the students to consider a way of telling whether or not any reaction has taken place. The aqueous solution is placed in a separatory funnel, and 10 mL of hexane is added. After shaking for a few seconds, the upper hexane layer turns a dark pink, indicative of the presence of I_2. The iodine has been extracted from the aqueous phase into the hexane.

I now have the class write out the balanced equation for the redox reaction:

$$Cr_2O_7^{2-} + 14H^+ + 6I^- \Rightarrow 2Cr^{3+} + 3I_2 + 7H_2O$$

Once the equation has been completed, I ask the students whether or not we have all the iodine in the hexane layer. Removal of the hexane layer and performing a second extraction with fresh hexane results in another pink layer, however, the intensity of the colour is less than the first time. I can now move into a discussion of distribution coefficients, and show that an equilibrium exists between the two solvent systems:

$$I_{2(aq)} \Leftrightarrow I_{2(hexane)}$$

where $K_D = [I_{2(hexane)}]/[I_{2(aq)}]$

Please see "Teaching Tips" page 7

Girls In Science: *A Workshop for 9 to 12 year olds*

By Penny Le Couteur
Capilano College

For the past five years I have been involved in a project aimed at increasing the participation of girls in science. SCWIST, the Society for Canadian Women in Science and Technology, has sponsored a Girls in Science program for 9 - 12 year old girls, in different localities in British Columbia. Amongst the objectives of SCWIST, is the promotion of equal opportunities for women in scientific, technological and engineering careers. One of the ways of achieving this, is to encourage young women to consider these fields when choosing a career. Research shows that even as we approach the nineties, girls are still opting for the more traditional careers rather than those technological fields that require a background in science and mathematics. This is of particular concern as all indications are that more and more in the future, knowledge and ability in science, mathematics and technology will be necessary for all but the lowest level jobs. Couple these factors with reports that say most young women graduating from high school today can expect to spend thirty or more years in the workforce and you have a situation that should be of concern to all of us, whether we are women, scientists, teachers, parents or all of the above.

One of the reasons often given for girls deciding against careers in science and engineering, is that they lack familiarity and experience with tools, and that their toys do not encourage the development of spatial relationships and an interest in mechanics, motors, and electricity. Parents are usually very concerned about non-sexist toys when their children are pre-schoolers but somehow this concern does not continue as the children get older. If you don't believe me, make the following comparison. Take a few of the standard department store or chain store catalogues and look at the toy section. First note the preschool toys; wonderfully colored and creative toys for both little boys and girls. Now turn to the pages for older children. There will be no doubt when you are at the boys' pages - power wheels, walkie-talkies, 44-piece tool set, binoculars, skate boards, transformers and remote controlled vehicles of all types (with battery rechargers). It will not say "girls' Toys" at the top of the other pages but you won't have any difficulty in realizing that is where you are, even if the predominant color was not pink and the only models were not girls. Some of the items in the catalogue that I have in front of me are; dolls with complete beauty salons, dolls with their own pool party accessories, dolls with a complete beach party, 17 fashion accessories for dolls, "My Very Own Shopping Cart", "Little Miss Make-Up", a toy ironing board and an iron that really works. (Ever wonder why no-one has come up with a "My Very Own Shaving Kit" for seven year old boys?). In some catalogues, the science toys are right in the middle of the boys' toys. In other catalogues, these are in a supposedly neutral section but generally it is boys who are shown involved with the chemistry sets, electronic kits and microscopes.

So it is not surprising that girls are usually less familiar than boys with tools and with mechanical and electrical objects. The aim of the Girls in Science program has been to provide a hands-on series of workshop involving practical science, use of tools and building small projects. Each workshop consisted of four or five half-day sessions. The workshop instructors were all young women science or engineering students who had helped develop some of the workshop units. We found the ratio of three or four instructors to about 16 girls worked well. Because of the hands-on design of the workshop and the problem-solving format, we found that this ratio was essential if each girl was to carry out the experiment herself, build her own motor and feel comfortable enough to ask her own questions. Over the time that the project has been running, a number of different units have been developed. These include bicycle repairs, building a wooden bird feeder or a

Please See "Girls In Science", page 8

President's Notebook

Musings on the 16th Conference...For those of you who missed it, it was great. The hospitality shown by the chemists and others at Mount Royal together with a focused, and interesting program, culminating in an outstanding safety workshop by Jim Kaufman, guaranteed success. The hospitality extended beyond the College as well. There is something to be said for visiting a city a week after their team has won a major trophy. The locals have the confident relaxed and friendly air of victors, and even treated our colleagues from Montreal with remarkable tact.

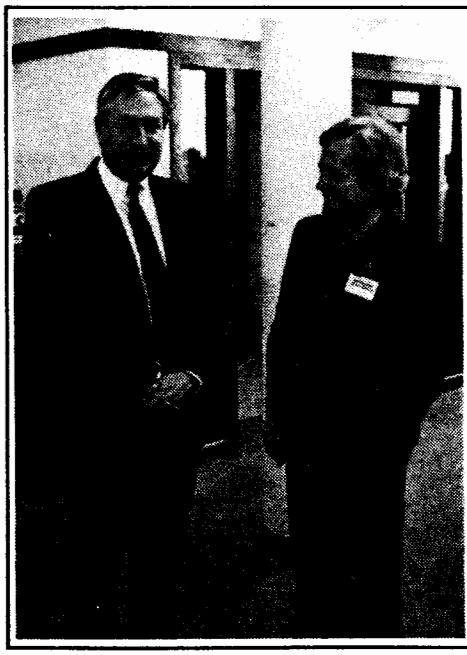
It was especially nice to meet some new faces, particularly from Alberta. Local school teachers and new community college faculty seemed impressed with the conference, and with our organization. Speaking of which, we have a brand new executive, a healthy bank balance, and the prospect of an exciting joint conference with 2YC3 in 1990 at Capilano College. We are also being increasingly recognised by other groups as *the* national organization of college chemists. So the prospects for C_3 look good, unless someone releases a photograph of Gord Erskine (John Abbott College) and I dangling our cowbells (Gord's was bigger) either side of a woman in green (called Brenda?) who played her honker just before the exuberant square dancing at the barbecue. Of course we can always claim we were demonstrating a simple model of vibrational modes in a triatomic molecule.

Just a word of thanks to Shahid Jalil who is stepping down as Treasurer of C_3. Shahid has been the most consistent member of our organization, and in many ways is the institution itself. Under his management, the finances have stabalized, and he has seen us through incorporation with the changes in procedure that this has involved. Thanks Shahid.

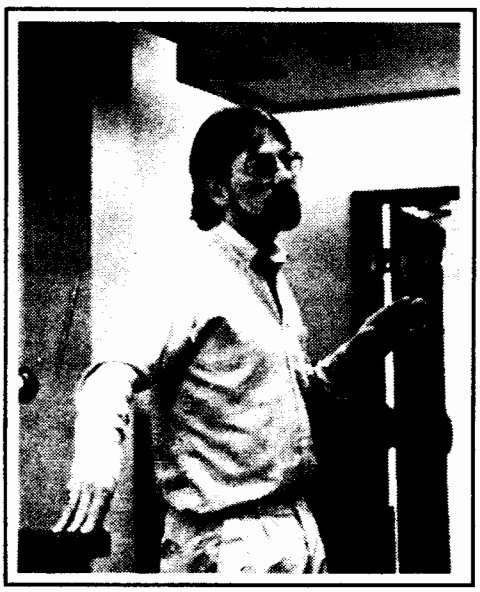
Alan Davis, President

1989 Calgary Conference

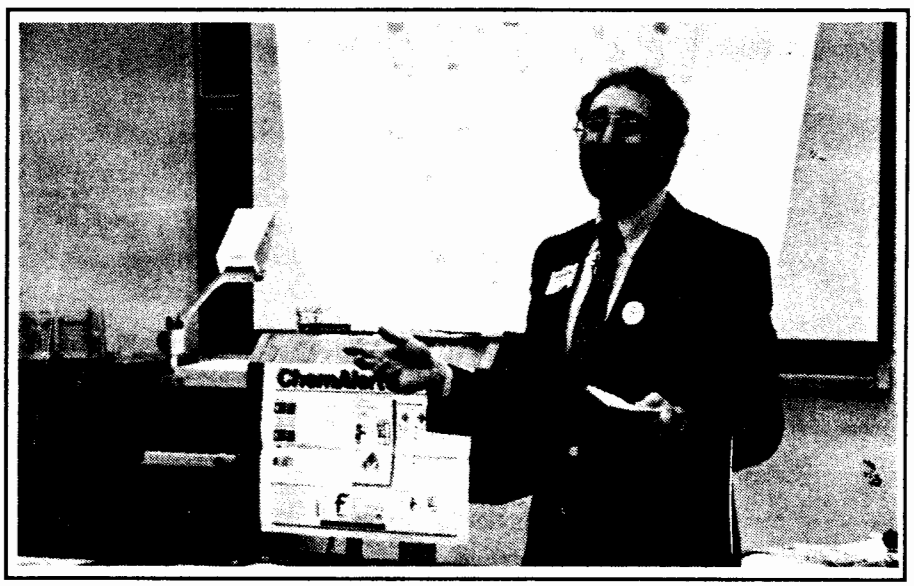
Jim Kaufman talks to a group of members at the wine and cheese party.



The president of Mount Royal College Donald Baker, meets the president of College Chemistry Canada, Alan Davis.



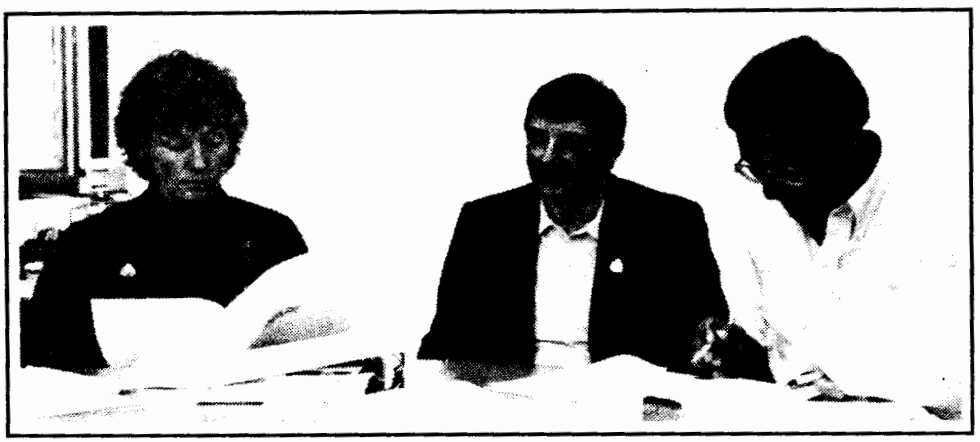
Patrick Moynahan explains the effects of CFCs on the ozone layer.



Jim Kaufman works his audience at the Laboratory Safety Workshop.

Phyllis Lake, second from left, with some of the hard-working members of the conference organizing committee.

Cynthia Mutch, Peter Slade and Sudhir Abhyankar at the annual C3 Baord of Directors meeting.



Members of the executive and board of directors of College Chemistry Canada. Front row, left to right: Bob Browne, Cynthia Mutch, Alan Davis, Dick Kroeger, Martha Ann Woodworth. Second row: Shahid Jalil, Bill Blann, Peter Slade, Gary Wilson, Natasha Holbach, Dinesh Bhatnagar.

New Executive Elected at AGM

Two long-serving members of the executive of College Chemistry Canada stepped down at this year's Annual General Meeting, held on June 3 at Mount Royal College. Shahid Jalil has been treasurer continuously since the inception of the organization, and Natasha Holbach has been secretary for a number of years. Both will continue to be active members of C_3 and Shahid will continue to look after liaison with $2YC_3$.

Newly elected to the executive are Phyllis Lake, who will assume the position of Treasurer, Dinesh Bhatnagar, who replaces Natasha as Secretary, and Gary Wilson who becomes President Elect. A new slate of Board members was also elected and these are shown in the accompanying table.

In addition to the elections, reports of the President, Treasurer, Secretary, Editor, and Conference Coordinator were tabled at the meeting. The President reported that he had met with the organizers of the 1990 Conference and that plans were on schedule. The conference at Capilano College will be held later in than usual (June 14-16) to accommodate $2YC_3$ members from Washington and Oregon whose exams run into June. He has also been meeting with the President of $2YC_3$, Edith Bartley, to set criteria for future joint conferences between C_3 and $2YC_3$.

A new procedure for auditing the financial records was reported by the out-going Treasurer, Shahid Jalil. The procedure, called a review rather than an audit, was carried out by Ian M. McCrea Chartered Accountant. The financial statement tabled by Jalil showed that for the year ending March 31 1989, receipts and dispersements totalled $2645 and $2293 respectively, leaving a surplus of $352, and an accumulated balance of $9134. There will be no increase in membership or conference fees for the coming year.

The Editor asked for help with the newsletter in the form of an associate editor and more contributing writers. He made a plea to all those in attendance to submit an article or item to the newsletter in the coming year.

Please see "AGM" page 7

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Hot From the Presses!

By Bob Perkins

Should you use more frequent quizzing as a means of improving student performance? M. Freilich reports little evidence of any significant improvement over a four semester study. J. Chem. Educ. **66**, 219-223 (1989).

M. Strauss and J. Clarke suggest ways to reduce the fear and trembling in the examination hour. J. Coll. Science Teaching, 233-235 (1989).

Watch for nitrates in the lab! M. Nagel gives a good account of things which have gone wrong in the past and provides some suggestions for the safe storage of these materials. J. Chem. Educ. **66**, 248-249 (1989).

G. Rayner-Canham and B. Layden report on a science safety road show which has been successfully used to bring safety concerns to the local schools. J. Coll. Science Teaching, 330-333 (1989).

The controlled oxidation of ethene to ethanal by oxygen gas is the basis of a new fuel cell developed by K. Otsuka et al. The new process reduces the risk of explosion present in previous cells. Chemical Communications, 1272 (1988).

R. Bonnett reviews the use of visible light with porphyrins to combat cancer tumors. New Scientist, 55-58 (January 28, 1989.) J. Sessler describes the use of a modified porphyrin-cadmium complex which can be activated with red light, allowing treatment of tumors which lie deep within the body. J. Amer. Chem. Soc. **110**, 5586 (1988).

Production and analysis of atoms of elements 107, 108, and 109 are described by P. Armbruster and G. Munzenberg. Scientific American, 66-72 (May 1989).

L-altrose has recently been found in the rumen (the first of four stomachs) of cattle. The possibility exists that the bacteria may be cultured to produce the sugar in commercial quantities. Science News, 46 (January 21, 1989).

FT-IR and NMR spectroscopy are now playing a major role in modern biochemistry and medicine. Two excellent articles describe recent developments. Chemistry in Britain, **24**, 1015-1018 and 1021-1024 (1988).

C. Yaws and P. Chiang list thermodynamic data for 700 organic compounds in a recent article; an excellent source of numbers for questions. Chem. Eng. **95**, (13), 81-88 (1989).

Chemical soccer balls, symmetric molecules containing hexagonal arrays of from 28 to 540 carbon atoms, are described by C. Vaughan. Science News, 56-57, (January 28, 1988).

The confusion present concerning the signs of the electrodes in electrochemical versus electrolytic cells is mentioned in Education in Chemistry, 4, (January 1989).

P. Monaghan and M. Coyne present the results of a survey conducted on the proposed change to the labelling of the groups in the periodic table. Some interesting comments here! Education in Chemistry, 139-141, (September 1988).

Teaching Tips (continued from page 2)

The students can calculate that several washings with small volumes of solvent will be more efficient than one washing with a large volume of solvent.

To finish up, I add a small amount of Na_2SO_3 to the mixture with swirling. The orange colour of the excess dichromate is replaced by that of green Cr^{3+}, but the hexane layer is still pink! As the $I_2(aq)$ is reduced by the SO_3^{2-}, the I_2 in the hexane layer will gradually move to the water layer to try and keep the system at equilibrium. Eventually the hexane layer will turn colourless as all the I_2 is reduced by SO_3^{2-}. Balanced redox equations may be written for these reactions as well.

I have used this sequence of reactions for several years now and have found it to be a very effective way of introducing the topic of extraction, with the added bonus of reviewing redox systems.

AGM (continued from page 6)

Past President Dick Kroeger reported that he has been working to establish the College Chemistry Canada Award. He tabled a draft of the guidelines for the award and reported that he may have an industrial sponsor in Canada Packers Ltd. Dick will be continuing with these negotiations in the coming year.

Other reports were tabled by the Regional Directors in which they outlined their activities in recruiting members in their regions. The final report was given by Phyllis Lake, Conference Coordinator. She outlined the history of the planning which went into organizing the conference and gave a summary of the work of each sub committee. She indicated that there were close to one hundred registrants and fourteen exhibitors at the conference and reported that preliminary figures indicated a profit for the whole enterprise. Phyllis warned the meeting, however, that she found her calculations hard to believe.

Copies of the official minutes of the Annual General Meeting and of the complete reports of the executive and board members may be obtained from the Secretary, Dinesh Bhatnagar, Algonquin College, 200 Lees Ave, Ottawa ON, K1S 0C5.

Institutional Members

College Chemistry Canada gratefully acknowledges the financial support given by the following institutional members:

Algonquin College
Cabot Institute
Douglas College
Keyano College
Malaspina College
Memorial University
University of Calgary

Girls in Science (cont from page 3)

hanging basket, designing and setting up circuits, making ice cream, kitchen chemistry, making a concrete flower pot, pinhole cameras and investigating the habits and habitats of wood bugs. The response to these workshops has been very positive. The girls enjoyed the chance to repair and service their own bikes and to eat the product of their study of thermodynamics (ice cream is the result of heat transference!). Special interest was shown in those projects that could be taken away and we understand that lop-sided concrete pots and slightly irregular birdfeeders now have pride of place in a number of B.C. homes.

Our before and after surveys showed a definite change in the girls' attitudes. They felt more comfortable using tools and showed a greater willingness to consider the possibilities of science and technology careers for themselves. With a grant from Employment and Immigration Canada, SCWIST has now published a workbook describing the project, explaining how to set up a similar program and giving full details and directions for organizing and carrying out the workshops. Each unit is thoroughly explained and comes complete with optional games, quizzes and full illustrations. Limited copies of this workbook, "Imagine the Possibilities...Girls in Science Workshop Activities", edited by Louise Hudson, are available for groups or individuals interested in setting up a similar program. Write to SCWIST, P.O.Box 2184, Vancouver, B.C. V6B 3V7. Please enclose $10 to cover handling and mailing.

The 17th C_3 - 109th 2YC_3 Joint Conference

June 14 - 16, 1990

Capilano College

North Vancouver, B.C.

Conference Theme: Chemistry on the Pacific Rim

Highlights:
- ❒ *"Breakthrough" lectures by prominent researchers.*
- ❒ *A session on "Chemistry and Distance Education"*
- ❒ *General sessions on Teaching, Curriculum, and related issues*

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