Spring 1992
Vol. 17, No. 2

C_3 News

Newsletter of College Chemistry Canada / La Chimie Collégiale au Canada

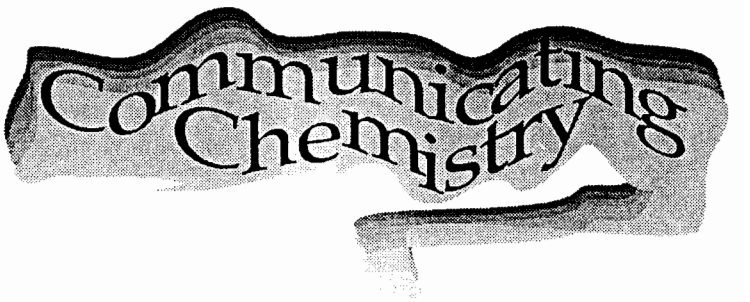
In the *News*

This edition of the C_3 News contains all the information you need to register and plan for the 19th Annual Conference, to be held this year at Vanier College in Montreal. Once you have sent in your registration, responded to the Call for Papers, booked your travel and accommodation, you can reflect on the commentary of Gary Wilson, enjoy "Hot from the Presses" and react to Bob Perkins' paper on "number phobia". This is likely the last edition of the *C_3 News* until the summer, when we'll report on the Montreal conference, and publish new articles on chemical education in all its manifestations.

As for myself, I'm off to San Francisco in April to attend the $2YC_3$ regional meeting at the College of Marin. As well as presenting a paper on "Chemistry by Open Learning", I'll be liaising with our $2YC_3$ colleagues in anticipation of our joint meeting in Rhode Island in 1993. Notices of the C_3 Executive, Board and 1992 Annual General Meetings are given in this issue, as well as a call for nominations for Executive and Board Members. If you're interested in participating more actively in C_3 affairs, now is an opportunity to get involved.

Speaking of Open Learning and Meetings, you may not know that Gary Wilson has arranged a series of audio teleconference meetings of the Executive throughout the year. This use of technology has allowed us to keep much better track of C_3 business. We hope the results are apparent at our meeting in June!

Alan Davis
Editor



College Chemistry Canada

19th Annual Conference

June 3, 4 and 5, 1992

Vanier College

Montreal, Quebec

(See pages 3 - 10 for details)

In this issue...

Hot from the presses

By Bob Perkins
Kwantlen College

Resonance structures pose problems for many students. K. Abel presents a colourful approach which has been useful: J. Chem. Ed. 68, 834 (1991).

Stereoisomerism is one of the more confusing topics encountered by many introductory students. Several recent articles may be of interest.

R. Segelken reports on the use of transpulegol as a potential insect repellant: Chem Matters, 15 (Dec. 1991).

Left-handed yogurt is a big seller in Germany where labels proudly proclaim the absence of the other enantiomeric form: New Scientist, #1785, 62 (Sept. 7, 1991).

Changes in the surface temperature of the ocean are being studied with the aid of of phytoplankton; a 37 carbon alkenone is produced by the organism and depending on the temperature of the water, the molecule contains either 2 or 3 carbon-carbon double bonds: New Scientist, #1790, 22 (Oct. 12, 1991).

S. Griffen uses "chiral crackers" to illustrate the process of resolution: J. Chem. Ed. 68, 1029 (1991).

D. Matteson describes the use of chiral templates for organic synthesis: New Scientist, #1798, 35-39 (Dec. 7, 1991).

Genetic engineering has lead to the development of a strain of tobacco which can convert the weed killer cyanamide (NH_2CN) into urea (NH_2CONH_2). The cyanamide kills the weeds which infest the plants, and then the urea can be converted to useful N compounds which help to increase the growth of the tobacco plants: New Scientist, #1802, 11 (Jan. 4, 1992).

A unique iron catalyst has been found to facilitate the conversion of coal into hydrocarbon mixtures. The catalyst is prepared by exposing solutions of $Fe(CO)_5$ to ultasound: Nature, 414 (Oct. 3, 1991).

Why do scientists dress so badly? This question is examined in an amusing article by S. Perkowitz: New Scientist, #1800, 22-24 (Dec. 21/28, 1991).

Microbe mining is becoming big business: New Scientist, #1802, 17-19, (Jan. 4, 1992).

Cabbage juice makes an excellent indicator for acid/base solutions on the overhead projector: J. Chem. Ed. 69, 66 (1992).

Solid C_{60} is the subject of an excellent review article by D. Huffman: Physics Today, 22-29 (Nov. 1991). ❐

C_3 Call for Nominations

Nominations are invited for the following positions on the College Chemistry Canada Board of Directors:

Editor
2YC3 Liaison
C.I.C. Liaison
Conference Coordinator
Program Coordinator
Regional Directors: 2 each from the following five regions:
B.C., Yukon
Saskatchewan, Manitoba, Alberta, N.W.T.
Ontario
Quebec
Prince Edward Island, Nova Scotia
New Brunswick, Newfoundland

Nominations can be sent to the C_3 Secretary, Dr. Robert Perkins at Kwantlen College, P.O. Box 9030, Surrey, B.C., V3T 5H8, or can be made at the C_3 Annual General Meeting on June 4th at 4:30 p.m. at Vanier College.

C3 News
Volume 17, No.2, Spring 1992
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College Chemistry Canada Inc.
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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 floppy disk, using WordPerfect, Word, or any word processor producing ASCII output.

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Layout and design by Bob Browne
Printing by the Douglas College Print Shop.

C_3 Student Awards at NAIT

From the interest accrued on a trust account established after the C_3 Conference at NAIT some years ago, two annual awards are given to NAIT students. This year the winners are Maurice A. Ouellet and Maryanne B. Look. They each receive $300.00 for being the most improved students in the first year of their program.

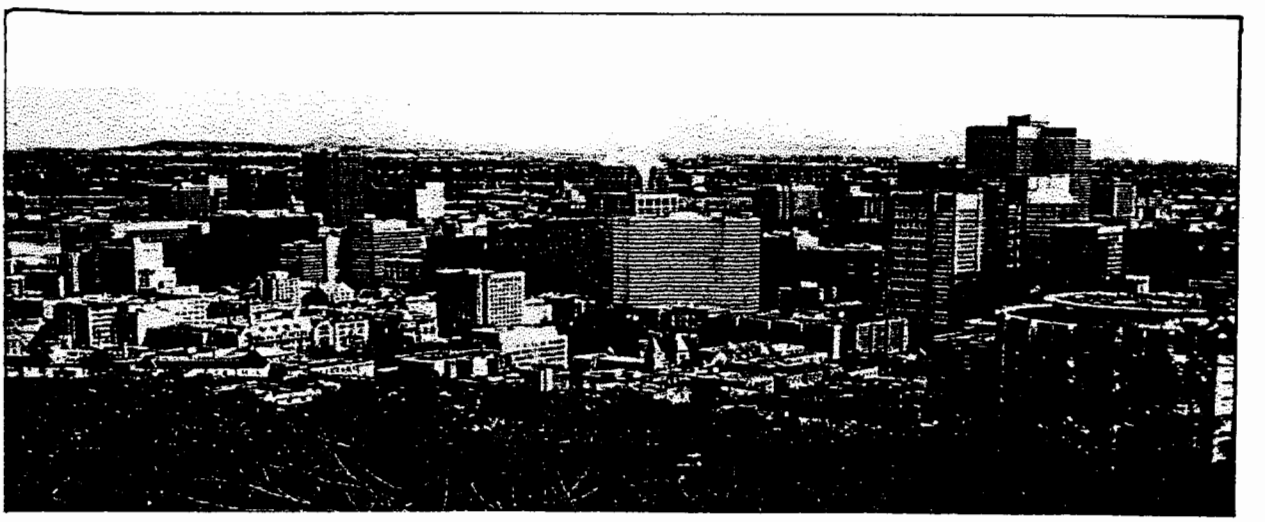
Communicating Chemistry

COLLEGE CHEMISTRY CANADA

19TH ANNUAL CONFERENCE

VANIER COLLEGE
MONTREAL, QUEBEC

JUNE 3, 4, AND 5, 1992



Montreal

CALL FOR PAPERS

COLLEGE CHEMISTRY CANADA
19TH ANNUAL CONFERENCE

June 4 and 5, 1992
Vanier College, Montreal

The theme of the conference is "COMMUNICATING CHEMISTRY" and since C3 members "communicate chemistry" on a daily basis they have a variety of experiences to share. Therefore we hope that many will be able to draw on these experiences to present a paper or a communication for the benefit of all.

Possible contributions could include accounts of successful classroom activities that have enhanced learning, or of approaches that have been shown to be effective in conveying to students the excitement of chemistry. Reports of involvement with the community which have led to a better understanding of the role played by chemistry would also be of great interest.

Presentations can be made under two formats:

a) papers of about 25 minutes duration
b) communications, no longer than 10 minutes, in the "How I do it" style

Please send an outline or abstract of the proposed presentation to:

Ariel Fenster
Department of Chemistry
Vanier College
821 Ste. Croix Ave.
St. Laurent, Quebec
H4L 3X9

For further information: (514) 744-7772 or Fax (514) 744-7545.

February 24, 1992

Dear Colleague:

It's the middle of winter. Skies are gray. Days are short. We're chilled to the bone. Our students are fidgety. The grading is piling up. In short, it's the bleakest time of the year. What we need are some thoughts of spring and all the great things it brings. Like the College Chemistry Canada Conference!

This year, Vanier College in Montreal will be your host for this annual spring rite. The emphasis of the program will be on "communicating chemistry" with a view towards making the subject more exciting in the classroom by focusing on the role it plays in diverse walks of life. Our speakers will therefore include not only chemists, but also medical doctors, engineers, industrial scientists and orchardists. We hope that everyone will leave the Conference with a collage of stories, anecdotes and up to date chemical developments which will delight and inspire students back home.

I would like to invite you and all members of your department to join in our activities from the 3rd to the 5th of June. We'll have some great sessions and some fun along the way. The evening of June 3rd will feature a wine and cheese mixer to renew old acquaintances and make new friends to the background of live classical music. There will be an international lunch with food from all corners of the world. The Conference banquet will be held at the McGill Faculty Club where we will be treated to songs, music, stand up comedy and, of course, a gourmet dinner. Other activities will include shopping tours, restaurant visits and sporting events.

A conference preview, accommodation information and a registration form are enclosed. In keeping with a "green policy" of cutting down mailings instead of trees I would ask you to make copies of the form and distribute these to members of your department. The return of the registrations as soon as possible also helps reduce future correspondence. Montreal is great fun in the spring and we, here at Vanier College, are looking forward to hosting the College Chemistry Canada community.

Sincerely,

Joe Schwarcz
Conference Coordinator
Tel.: (514) 744-7137

CONFERENCE HIGHLIGHTS

Thomas Edison and the Chemistry of Sound Recording
Professor Paul Morris, Department of Chemistry, Exeter College, England

Is there a better symbol for "Communicating Chemistry" than the work of Thomas Edison? Without a knowledge of the chemistry of waxes and plastics there would have been no sound recording. Paul Morris is an expert on Thomas Edison and a collector of Edison memorabilia. His lecture will transport us back in time to the excitement of a bygone era and will feature a live recording session as it would have occurred almost 100 years ago!

The Plastic Waste Problem
Professor Leonard Fine, Department of Chemistry, Columbia University, New York

Professor Fine is the author of a number of textbooks and is one of the "finest" chemical communicators in North America. His lectures are laced with demonstrations, anecdotes and humour. He will separate the sense from the nonsense in the controversial plastic waste issue.

Crime in the Classroom
Professor David Harpp, Department of Chemistry, McGill University

Professor Harpp is widely recognized as an outstanding lecturer on topics ranging from chemical education and organo-sulfur chemistry to symmetry in nature. The winner of numerous teaching awards, he has recently received world wide acclaim for the development of a computer program to detect student "collaboration" on multiple choice exams. He will regale us with stories of crime and punishment.

Genetic Disease: Unravelling the Chemistry
Dr. David Rosenblatt, Director of the Division of Medical Genetics, Royal Victoria Hospital, Montreal

Dr. Rosenblatt is one of the world's leading authorities on the chemistry of genetic diseases. He publishes widely and is called upon to testify in court on genetic matters. We'll hear about real clinical episodes as well as about the celebrated U.S. case in which some poor chemistry put an innocent woman in jail for murdering her baby!

Some Hot and Cold Chemistry In The Real World
Dr. Steve Bodzay, Vice President of Industrial Expertise, Technitrol-Eco Research Inc., Montreal

When industry, the government or private individuals are confounded by chemical problems they turn to Technitrol-Eco Research and Dr. Steve Bodzay. We'll hear about fire and explosion investigations, the chemical problems in decommissioning the DEW line and the reasons for the collapse of the Ocean Ranger oil platform.

Natural Gas: To Pass or Not To Pass, That Is the Question
Dr. Seymour Mishkin, Division of Gastroenterology, Royal Victoria Hospital, Montreal

Dr. Mishkin is a practising gastroenterologist and is an expert on food intolerance and intestinal gas. His present research deals with the relationship between passing gas and reducing the risk of colon cancer. He will put a new meaning to the Gas Laws!

Water, water everywhere...is it safe to drink?
Professor Ronald Gehr, Department of Civil Engineering, McGill University

Professor Gehr's research focuses on drinking water and waste water treatment. He will bring us up to date on the most recent technologies and will examine the real as well as the imagined dangers emanating from our tap.

Analytical Chemistry Calculations using LOTUS 1-2-3
David Adley, Ph.D., Department of Chemistry and Chemical Technology, Dawson College, Montreal

LOTUS 1-2-3 is a user-friendly spreadsheet which can be used to minimize many repetitive and time-consuming tasks associated with analytical chemistry calculations. David Adley will be offering a workshop based on the manual he has developed to custom design the LOTUS 1-2-3 spreadsheet to fit various calculating, graphing and modelling needs.

Chemical Education in The Golden Age of Biotechnology
Professor Youla Tsantrizos, Department of Chemistry and Biotechnology, Concordia University, Montreal

Professor Tsantrizos, a former Vanier College teacher and now a faculty member of Concordia University, is well known for her talent as a lecturer. Her research on the use of microbial metabolites in agriculture and medicine places her at the interface of chemistry and biology. She will provide us with an insight on the major role played by chemistry in the fast developing field of biotechnology.

The Orchardist's Dilemma
Elwood Quinn, Quinn Farm, Ile Perrot, Quebec

We are all concerned with the pesticide controversy. However, no one is more involved than Elwood Quinn, a Quebec orchardist with a degree in agricultural technology who has to deal on a daily basis with the competing demands of legislation, the environment, the consumer and the market place. We will hear about the Alar and other scares from someone who was there and survived to tell it all.

"How I Do It"
C_3 Members, Any college, Anytown, Anywhere
Members of College Chemistry Canada have a wealth of information to share. These short presentations (about 10 minutes) will cover useful demonstrations, effective lab experiments, real life analogies, computer applications and many other great ideas to bring back to our class rooms.

ACCOMMODATIONS

This summer Montreal celebrates the 350 anniversary of its founding and it is expected that accommodations will be difficult to find. Therefore, it is essential that reservations be made early and, in any case, no later than one month prior to arrival.

Hotel Ruby Foo's, 7655 Decarie Blvd., Montreal, Quebec H4P 2H2
Tel.: (514) 731-7701; Fax: (514) 731-7158; Toll free: 1 (800) 361-5419
We have been able to secure exceptionally good rates for this first class hotel where we will also be holding the Wednesday night mixer. It is located conveniently off Decarie Blvd. on the north south metro line (Namur station) and is only two stops from the Vanier College station (du College). The hotel has a full range of amenities such as swimming pool, exercise room, sauna and jacuzzi.
Rate: 65$ single or double occupancy (+ 7% G.S.T.). Parking is included in the rate.
For your convenience, we have included a registration form which you should forward directly to the hotel no later than May 3rd.

University of Montreal Residences, 2350 Blvd. Edouard Montpetit, Montreal
Reservation address: P.O. Box 6128, Station A, Montreal, Quebec H3C 3J7
Tel: (514) 343-6531; Fax: (514) 343-2353
The residences of the University of Montreal (Vincent d'Indy metro station) are approximately 15 minutes away by metro from the "du College" station.
Rate: $31 for an individual room (+ 7% G.S.T.). Breakfast is not included. Reservation must be made no later than May 3rd and must include a first night deposit.

McGill University Residences, 3935 University St. Montreal, Quebec H3A 2B4
Tel: (514) 398-6367; Fax: (514) 398-6770
The residences are for those who want to be downtown, close to stores, restaurants, theatres and museums but who are on a budget. It will take you about 30 minutes to reach Vanier by metro.
Rate: $32.50 for an individual room (+ 7% G.S.T.). Breakfast is not included. Reservation must be made no later than May 3rd and must include a first night deposit.

The Four Seasons, 1050 Sherbrooke W. Montreal, Quebec H3A 2R6
Tel: (514) 284-1110; Fax: (514) 845-3025; Toll free: 1 (800) 268-6282
We have been able to bring down the price of downtown decadent luxury to an "affordable" level. Count about 25 minutes to reach Vanier by metro.
Rate: $140 single or double occupancy (+ 7% G.S.T.). Reservation must be made as soon as possible and you must ask for the McGill University rate.

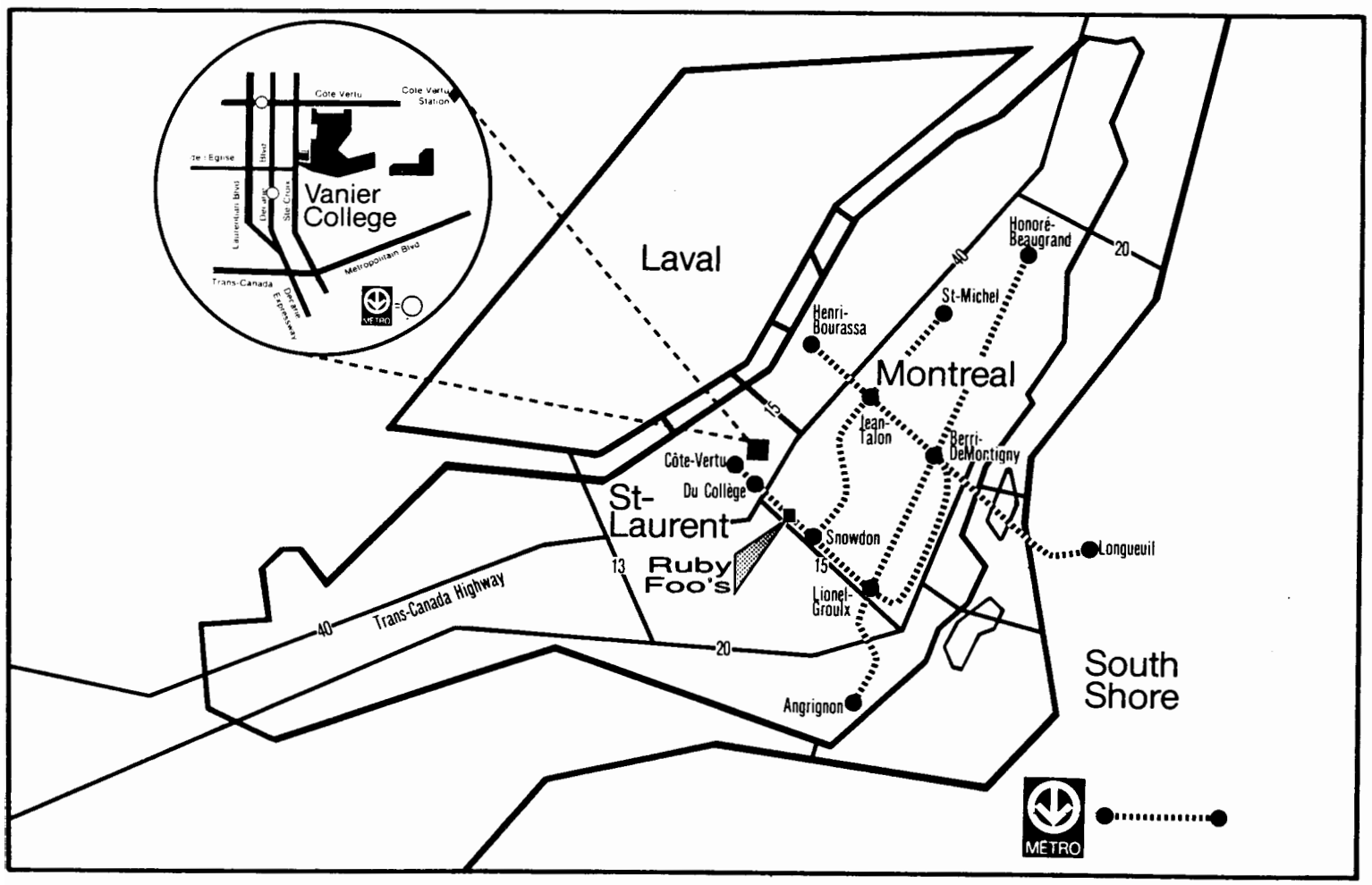
TRAVEL INFORMATION

Canadian Airlines International is the official airline for the conference. This will allow participants to obtain a minimum of 15% discount off regular fares or a 5% discount off the year round excursion fare or the lowest fare at the time of booking by using the conference toll free number 1 (800) 665-5554 and quoting the conference number **0372** when you, or your travel agent, book your flight.

There are some very interesting fares available for travel to the conference. However it is essential to book rapidly as the cheaper fares have limited availability.

For your information, here are examples of the lowest possible Vancouver-Montreal return fares available at the time of printing.

Seat sale: $339 + tax, must be booked before March 7th.
Seat sale: $379 + tax, must be booked no later than 21 days before departure.
Excursion: $458 (less 5%) → $435 + tax, must be booked no later than 21 days before departure.
Excursion: $606 (less 5%) → $575 + tax, must be booked no later than 14 days before departure.
Excursion: $1064 (less 5%) → $1010 + tax, must be booked no later than 7 days before departure.
Regular economy: $1478 (less 15%) → $1256 + tax.



COLLEGE CHEMISTRY CANADA
19th Annual Conference
Vanier College
June 3 - June 5

"Communicating Chemistry"

Name: _____
(Last) (First)

Institution: _____

Address: _____ City: _____

Province/State: _____ Postal/Zip Code: _____

Telephone: (_____) _____

1992 MEMBERSHIP

C_3 _____ 2YC3 _____ H.S. Teacher _____

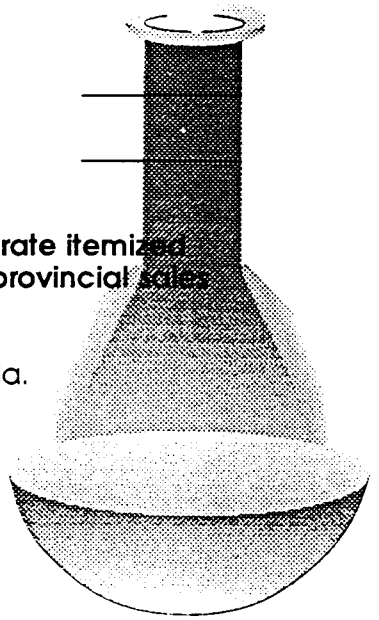
ACS _____ C.I.C. _____ Other _____

FEES	**AMOUNT**
Registration fees (complete conference): $50 for members and $60 for non-members. Non-members automatically become members upon payment of complete conference registration fees.	_____
Registration for one day ($30 for non-members; $10 for students).	_____
Annual Banquet: $45 — Thursday evening at the McGill University Faculty Club.	_____
Total Fees	_____

NOTE: The receipt will indicate the Total Fees received. Also, a separate itemized statement will accompany the receipt. All fees include the GST and provincial sales taxes.

Make cheque payable to Vanier College—College Chemistry Canada.

Mail to: David Hall
College Chemistry Canada - 92
Vanier College
821 Ste. Croix Ave.
St. Laurent, Quebec, Canada H4L 3X9



Can You Hold It In Your Hand?

By Bob Perkins
Kwantlen College

I really enjoy chemistry but I just can't do math." If this sounds familiar to you, then you are probably facing the same number-phobic students as I am in my high school chemistry upgrading courses here at the college. Many students experience difficulties because they really don't understand the difference between a measurement and a unit-factor. Too many students try and string together long lines of unit-factors with the hope that the correct answer will "fall out" at the end of the process. While it can be a valuable shortcut and time-saving technique for the experienced student, the unit-factor method can act as a barrier to the student who is trying very hard not to understand what is going on and is merely using a "recipe" to solve problems.

For several semesters I have been trying to come up with another way to get more students thinking about a problem before heading to the calculator. I stress that they must be able to determine whether a number corresponds to a measurement (i.e. one they can hold in their hand) or to a unit-factor (i.e. one they cannot hold in their hand). Also important is the ability to realize the desired unit of the unknown quantity which they must determine. The following questions will illustrate what has seemed to work for some of the students.

Question 1. John stops off at the supermarket on his way home from school and notices that tomatoes are on sale for $1.39 a kilo. It is also apparent that these are special tomatoes as they all have the same mass (125 g), and the same number of seeds (124). If John has $5.00 available, determine the number of tomato seeds he could obtain.

The majority of the students have no difficulty indicating that the # of seeds is the desired outcome of the problem. Many of them will initially have trouble with the fact that $5.00 is the only measurement in the question. It is the only number which they can "hold in their hand"; the others are all ratios: dollars/kg, g/tomato, and seeds/tomato. I suggest to the class that any solution should start with the known measurement followed by the use of the appropriate unit-factors until one obtains the desired unit for the final answer.

For example:

$5.00 x 1 kg/$1.39 = 3.6 kg of tomatoes

3.6 kg x 1 tomato/0.125 kg = 28.8 tomatoes

8 tomatoes x 124 seeds/tomato = 3472 seeds

After the first part of the calculation is performed I have the class describe how the measurement has not changed, we are merely changing the unit by which it is being reported from dollars to the number of kilograms of totatoes. The students can then see how the use of another unit-factor will lead us closer to the "desired unit" for the final answer.

Question 2. How many cubic metres of the mineral magnetite (density = 5.2 g/cm^3, iron content = 74.2%) would be necessary to provide 750 kg of pure iron?

In this situation, the "I can hold it (barely) in my hand" quantity is the 750 kg of iron. The students must realize that the % Fe is a ratio (as well as the density). The solution should start with the mass of pure Fe.

750 kg Fe x 100 kg magnetite/74.2 kg Fe = 1010.8 kg magnetite

There is no factor containing kg in the question, but the density is reported in g/cm^3. If one changes the mass from kg to g, then the value for the density of the magnetite can be utilyzed.

1010.8 kg x 1000 g/1 kg x 1 cm^3/5.2 g = 1.944 x 10^5 cm^3

Finally, the deired unit for the answer can be obtained by the conversion from cm^3 to m^3.

1.944 x 10^5 cm^3 x 1 m^3/10^6 cm^3 = 0.19 m^3

Question 3. What mass of oxygen gas would be required for the complete combustion of 50.0 mL of ethanol (C_2H_5OH: density = 0.789 g/mL) if a 45% excess of oxygen is used?

The volume of the ethanol is the only "I can ..." quantity.

50.0 mL x 0.789 g/mL = 39.45 g ethanol

Since the balanced equation for the process has a 3:1 mole ratio for the two reactants ($C_2H_5OH + 3\ O_2 \rightarrow 2\ CO_2 + 3\ H_2O$), one needs to determine the number of moles of ethanol present, and then the number of moles of oxygen necessary.

39.45 g ethanol x 1 mol/46 g = 0.858 mol ethanol

0.858 mol x 3 mol oxygen/1 mol ethanol = 2.57 mol oxygen

Using the ratio for the excess reagent (1.45/1), followed by the molar mass ratio, we can arrive at the final result.

2.57 mol oxygen x 1.45 x 32 g/1 mol = 119 g oxygen

This technique can be applied to a wide variety of problem types. I have found that after a couple of classes, my beginning (or returning adult) students are not quite as intimidated by numerical calculations. The key is forcing them to distinguish between measurements and unit-factors before they grab the calculator and start punching buttons. ❐

Our Mistake...

In the article Acid/Base Misconceptions by Bob Perkins which appeared in the last issue of the *C3 News*, we gave the wrong data for question 5. The teachers didn't really score as badly as we led you to believe. Here is the question, and the correct data for the responses:

Question 5:

What is the conjugate base of NH_3?

A) NH_4^+ B) OH^- C) NH_2^- D) other

Response	A	B	C	D
Teachers	17	4	89	0
	15.5%	3.6%	80.9%	0.0%
Students-U	52	10	189	5
	20.3%	3.9%	73.8%	2.0%
Students-C	45	9	39	9
	44.1%	8.8%	38.2%	8.8%

College Commentary

Tapping into the grapevine

By Gary Wilson
John Abbot College

"So what did you learn at school today?" You remember the question. Your dad used it over dinner, or supper if you lived west of Sault St. Marie. It generally evoked the response, "Oh, I dunno". And you usually meant it. Later we used it on our own kids, sometimes just to irritate them. But we don't often use it on ourselves (these days).

I'm just as bad as the next person when it comes to not often asking that question about myself, and I know that my colleagues will remind me of the fact when they read this. We all know the value of feedback. We try to give as much as we can to our students. This is getting to be more difficult these days, as classes become larger. We explore classroom strategies which promote more student - student interaction. They're pretty good at giving feedback to each other. But we don't seek much of it for ourselves, especially from these same students.

Do you know your reputation as a teacher? You have one you know. There is a lot of action out there on the grapevine. Some of it is embarrassing, but nice. Some of it is mean spirited. Some of it is blatantly false. Some of it is there because you have taken special pains to create a certain reputation, and it serves a constructive purpose, or at least your purpose. Some of it is true. Whether or not you know what your reputation is, the other students "know". Most of these students are not even in your class and never have been. Many have decided that they never will be. Others can hardly wait to sign up. The counsellors and advisors "know". Some of your teaching colleagues "know", or they "know enough". It is a truism in the student culture that all teachers stick together, so your teaching colleagues may get a laundered version unless they have the reputation for being a renegade. The administrators "know". The secretaries undoubtedly "know". To be successful as a teacher, you should know too.

If you've been teaching for more than five years I'm sure you used to know. You used to ask. Remember? You were less confident then. You wanted to find out if what you thought you were doing, was what the students thought you were doing. With experience came confidence. You built your reputation. You were pleased with its effects. I keep hearing that the students have changed. Have you?

Check it out. Ask your students again. Feedback at the beginning of the semester will give you an idea of the "information" presently on the grapevine. Feedback about two-thirds through the course will tell you what your own students are feeding the grapevine. You'll get the most honest feedback if you assure student anonymity. Time the exercise to avoid major examinations and stay away from just before final exam week (your students can't take the chance that you don't read minds). Stress that you want their honest opinions. Ask innocuous questions as well as the zingers. Get some feedback, for yourself. Compare it with your own perceptions. Don't over-rationalize the results. Lose some of your confidence. In a few semesters you'll "know" too. You can then decide if you wish to change anything.

I have always felt that the teaching profession was unique in that the real professionals are marked by their lack of security. They are invariably questioning their methods and their motives. They are off balance, and they keep their students that way as well. It's how they earn their summer vacation! ❐

College Chemistry Canada (La Chimie Collegiale Au Canada)

Notice of Meetings

C3 Executive:
Wednesday, June 3rd, 1992,
2:00 p.m., Vanier College

C3 Board of Directors:
Wednesday, June 3rd, 1992,
3:00 p.m., Vanier College

C3 Annual General Meeting:
Thursday, June 4th, 1992,
4:30 p.m., Vanier College

C3 News
Alan Davis, Editor
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