C_3 NEWS

Newsletter of College Chemistry Canada/La Chemie Collegiale au Canada

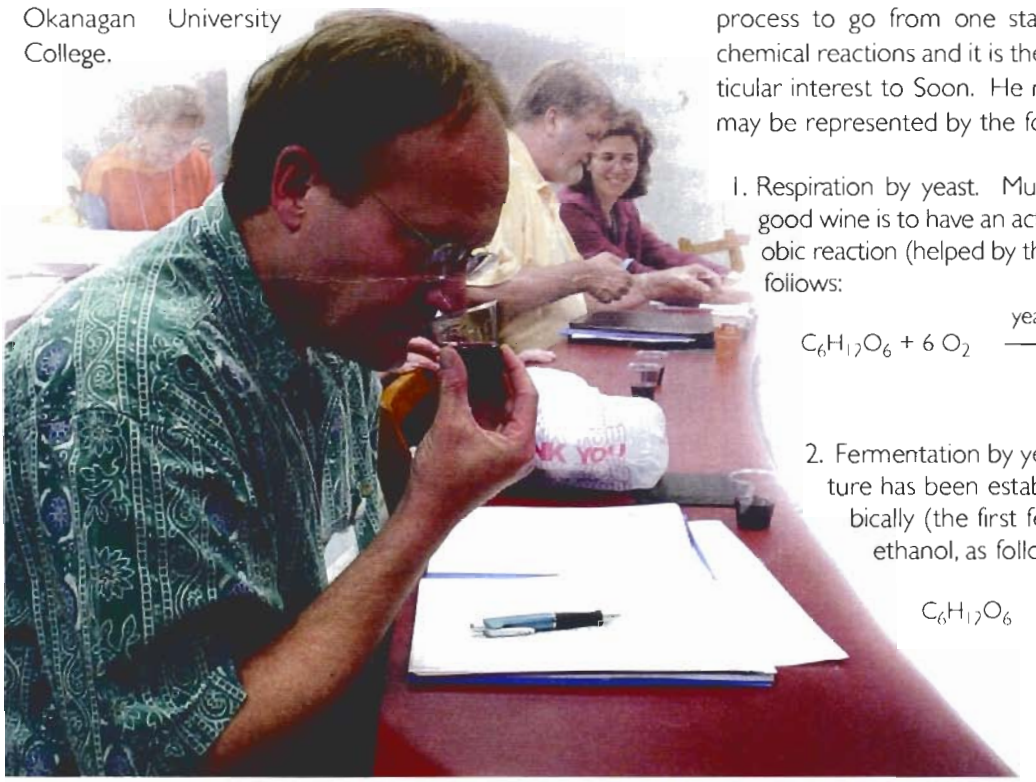
OCTOBER 2004 C_3 NEWS

The Soon Lecture: A Master Winemaker at C3 in Kelowna

By Don Todd, Loyalist College

The participants of this year s C3 conference were treated to an interesting array of speakers and presentations, ranging from teaching techniques, chemical equipment and, of course,the "taste of chemistry" which was the theme of the conference. This theme meant featuring how wines are produced in the Kelowna area with respect to the art and the chemistry involved.

"What does a wine-maker think about when developing taste in a wine?" was the question posed by Howard Soon of CalonaWines. Howard is a 24 year veteran of the Okanagan wine industry who has taught wine appreciation for the last 19 years for Okanagan University College.



Outgoing C3 President (isn t he!) Dietmar Kennepohl samples the aroma of Howard Soon s second wine sample. Photo L. Shaw

Soon says, "real life wine-making is both a science and an art". If one understands both the science (e.g. pH control) and the art (e.g. taste), then all of the steps involved in winemaking can be controlled ....

In other words, "do it right the first time" instead of trying to fix any problems later.

In general, the wine making process overall process starts with the grapes, followed by two fermentation stages and if not controlled, finishes with the production of vinegar. The chemicals present at each stage are different and are responsible for the tastes at those stages. Much of the process to go from one stage to the next involves biochemical reactions and it is these reactions which are of particular interest to Soon. He noted that the overall process may be represented by the following:

1. Respiration by yeast. Much of the success in obtaining good wine is to have an active yeast culture. This is an aerobic reaction (helped by the injection of oxygen) and is as follows:

$$C_6H_{12}O_6 + 6\,O_2 \xrightarrow{\text{yeast}} 6\,CO_2 + 6\,H_2O$$

2. Fermentation by yeast. Once an active yeast culture has been established it is then used, anaerobically (the first fermentation step) to produce ethanol, as follows:

$$C_6H_{12}O_6 \xrightarrow{\text{yeast}} 2\,C_2H_5OH + 2\,CO_2$$

Continued on Page 3

President's Message

My still-vivid memories of our wonderful OUC conference are already months old! (Many thanks to Pat, Steve, and co-workers.) How time flies!

I m nervous and apprehensive as I start my term as C3 s president; I prefer to work (if I work at all) behind the scenes. I m both humbled and awed by the confidence you have shown in me. What do I know about leading an organization like this? I m trusting that the presidential mentors I ve had (most recently, Dietmar) and the Executive (an advisory team with whom I ll work closely) will help to keep me on track - and I want to thank them in advance for doing so. Augustana s motto - to lead and to serve - is very much on my mind.

There is also a feeling of excitement and eager anticipation that comes with new beginnings - sort of like the start of a new school year! I don t anticipate that C3 will head off in any radically new direction, but as we continue to seek to fulfill our mandate - in a nutshell, promoting the teaching of chemistry - new developments and opportunities may arise.

Three things I would ask you to do for C3 to the extent that you are able.

First: Start planning now to attend our conference in St. John s next year (2005 June 16 - 19). Invite your friends, colleagues, and acquaintances - don t think just locally; think nationally! Practise emphasizing the last syllable of Newfoundland.

Second, and similarly: Spread the word about College Chemistry Canada. Benefits of membership include not only an annual conference (additional costs apply, of course) and a more-or-less quarterly newsletter (Lawton has been doing a great job!), but access to several scholarships (visit the website: http://www.c3.douglas.bc.ca - thanks Bob B), plus the comfort and inspiration that accompany the knowledge that one is part of a national organization of like-minded people (like-minded, at least, in appreciating the value of chemistry, and the teaching thereof).

Third: Let C3 benefit from ideas you have for the organization. Feel free to communicate with any member of the Executive (Tony, Lawton, Bob B, Bob P, Ian, Dietmar, or me - contact info is elsewhere in this newsletter) if you have suggestions or complaints (or kudos!).

Before I relinquish the podium I ve been given, I want to add my thanks to the well-deserved recognition that has been given to our long-serving, out-going Treasurer, Jacky McGuire.

Enjoy your Fall semester!

(375)

C_3 NEWS

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3. A second fermentation, called the Malo-Lactic Fermentation, is the next stage of the process, in which a lactic acid bacteria is introduced. This converts the malic acid (one of the chemicals from the first fermentation), to lactic acid. This may be represented as follows:

$$HOOC\text{-}CH_2\text{-}CHOH\text{-}COOH \xrightarrow[\text{bacteria}]{\text{lactic acid}} CH_3\text{-}CHOH\text{-}COOH + CO_2$$

This process results in a 0.3 pH increase as well as a 0.1 to 0.3 total acid (TA) content decrease.

4. If the wine is left exposed to the air (the demise of many an amateur winemaker) the alcohol would be converted to vinegar, according the following :

$$C_2H_5OH \xrightarrow[\text{bacteria } (+ O_2)]{\text{acetic acid}} CH_3COOH + H_2O$$

As pointed out by Howard Soon, there are many factors which effect the final subtle taste of any wine. The key ones are; the chemicals present and the pH. These in turn are dictated by what was done at various points in the overall process, such as length of time of the initial "cold soak" of the grapes, the control of the fermentations, the type of containers (e.g. oak, stainless steel) the aging is done in, and what type of biochemical reactions are employed at each step.

Soon illustrated how the biochemical reaction at the Malo-Lacto fermentation stage effected the final taste of a wine. He did this by giving to each participant, at his presentation, two samples of wine. The two were the same wine but the ratio of the malic and lactic acids was different.

These were placed in front of each participant; the first on the left, and the second on the right.

higher malic acid concentration ◯ lower malic acid concentration ◯

Each participant was to then taste the one on the left and make a note of the "taste". This testing procedure was then done for the one on the right and the two compared.

There was a definite difference in the two. The first had a short distinctive taste. The second, on the other hand, had the same first taste (a bit milder) but there was a different distinctive longer taste as well (see figure).

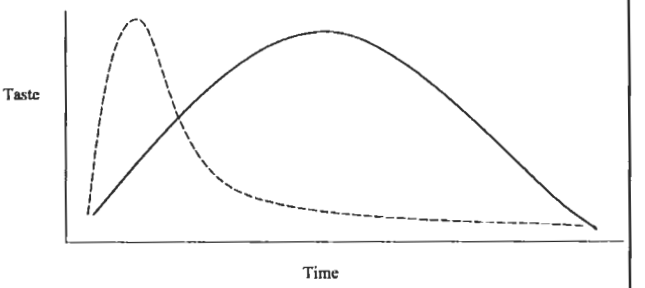


Figure of Taste vs. Time for two wine samples. Dashed line: Wine containing high malic acid concentration, from incomplete malo-lactic fermentation, gives "short taste". Solid line: Wine containing lower malic acid concentration gives a "longer taste".

This taste testing done by the participants demonstrated to them how the control of the second fermentation (that which effects the malic-lactic acid relative concentrations) is important in obtaining a specific desired taste in a wine.

Soon also pointed out that in addition to the above acid ratio, that the presence of other chemicals (an important one is tannins) have an effect on the final taste of a wine as well. The combined taste due to all of the chemicals results in a certain "Suppleness" of that wine, where:

$$\text{Suppleness} = [\ \text{alcohol} - (\text{total acid} + \text{tannin})\ ]$$

In other words, the lower the total acid + tannin concentrations the gentler and smoother the wine.

The moral of the story to the participants: Control all of the steps and obtain the desired taste.

Howard Soon takes questions from the rapt audience. *Photo L. Shaw*

Riding on the KVR

Stream of consciousness? James Joyce wouldn t call it that.

By Bill Blann, Keyano College

PART 1: THE BEGINNER

Let s see: cycle ride down the Kettle Valley Railway -- that sounds like the game for a sunny Sunday afternoon. See some new country. Just the ticket.

I was on a bike once. 1969 it must have been: Banff. Three speeds; backpedal to brake — everything went ducky til we turned down the road to the river, and HILL!

No damage was done. And Kettle Valley is a railway grade: flat as a pancake. Fine. Piece of cake!

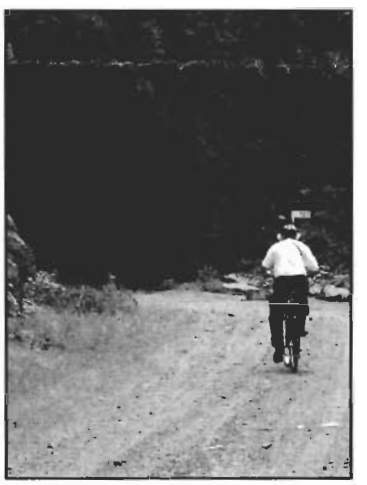
So we all drove way up into the hills that Sunday morning, and there were all these bikes. In spite of the expert opinion I still feel mine s a bit high, but they re the pros. How do you get up on this thing? Wobble around a bit — sort of like Passepartout on his penny farthing. Sit on the seat only after you re up and going - still seems a bit high — but a few false starts and here we go -- keep clear all ahead and hope the roadbed stays wide enough! Hey, this seems to work. We re off!

Lesson one: straight ahead — well, plus or minus about two feet. Gently does it, walking speed. Remember not to jam on the left brake - simple enough, just don t touch the left brake. Keep going — gentle touches on the brake to see how it responds - try to avoid the big rocks and dumps, but how-come you end up going straight over most of them? And, puddle - LAKE! — don t stop, slowwwww — got it, not so bad — he s almost a pro now — lets see, where are all those others? No problem: can t get lost when there are no side turnings.

Lesson two: Try a few stops and starts methinks (ever the systematic learner — who, me?) -- Wobble wobble — don t forget to get off the seat you silly bugger — that s it — off down the trail, with just a touch of the Rowen Atkinson. Gentle turns, dodge the rocks, well, most of them, try to keep straight plus or minus one foot: that should do for now. Good thing it s a railway grade. Nice and flat and no abrupt turns.

Lesson three: how do you turn this thing? — whoa -- well, that was a bit too quick, but, missed the cattle-gate posts -- got through — still aboard — wobbles stabilized — back to straight ahead. So we cruise along, and somewhere along the line Stephen checks back and leaves me with the tail-end-charlie radio. Nothing like cruising along through the woods, smell of the forest, and nobody to see the little foibles of the beginner s instability.

Peter Slade re-adjusting the handle-bars on Bill's bike, for the nth time. Photo B. Blann



Bill Blann rolling along into the tunnel at mile(?) 122 Photo P. Slade

In no time there is the pack, stopped and waiting for me, the darlings — gentle slow-down on the back brake, How do you stop this thing? whoa, get off the seat first, clot! "Nice of you to wait for me folks!"

A fork in the trail: ah, I heard of the detour around the unsafe tunnel — this must be it — down here — ah, DOWN? This isn t a railway grade! Whoooooaaa — and there is the pack, cameras at the ready for the fun — and a voice: "Just manage your brake s " front brake, what front brake? — dead slow still afloat don t dodge too much whoooaa hey paparazzi get out of the way I can t stop here you mad fools am I down? I can t be down I m still up! How s that then? I can ride! Well, sort of. And the usual glide to a halting stop as he forgets once again to get off the saddle to land. (This saddle must be too high — it still feels unstable.)

Oh, yes, for those of you that are wondering, our hero did take a nosedive, only once: starting off down the hill, heading for the edge and flopping a turn as he forgets to get off that saddle again — straight forward and into the soft stuff — not even nasty gravel!

PART 2: OF TOURISM AND TECHNOLOGY

Off with the pack Now we are on more exposed sections of the hillside photo stops have of course become de riguer — after all, this is a tour, and the view is exquisite.

The truck: the others are how far ahead of us? What are they doing — racing? The weather is too nice to race, and we have the beginner s excuse.

Then of course there was this rain stuff: just long enough and hard enough to make one stop and don the raingear, and a few yards down the way it stops. Just long enough to be inspired to put the raingear away and didn t it go and start up again? Still, in a place like this it s not enough to dampen the day.

The tunnel at mile 122: photo-op view again. It is here, when one picks up the conveyance one notices that the wheel is not at right angles to the handlebars. Peter, shouldn t this wheel be straight relative to the handlebars? And should the handle not be rigid to afford proper control of the conveyance? The expert examines the device — we try jamming the bar in a bit — One mounts up and proceeds toward the tunnel, but the machine is much more wobbly than before. We try the radio, to call in for advice or rescue but the radio is unresponsive — in fact, the icons previously seen on the screen have disappeared. Try fiddling: is the volume on OK? What if we push the other buttons? No way to give it mouth-to-mouth. The device is dead as a doornail.

The upshot of this was a swap of vehicles by the generous Peter, who is more stable on bikes than I — so he now has a bike that is too big, has a loose handlebar that needs jamming back every few meters, and has to baby it all the way to the next point of contention while the novice takes his noticeably smaller, distinctly easier to operate machine. Yes, the other bike was too high.

Eventually there is a crossing: Naramata that way and a cute little sign showing the KVR straight across. But does it? The next part of the line runs down a big gully - - not a railway grade. Which way are we supposed to go? Are we done, or do we carry on? Time to call in — of course the radio is not ready for the Lazarus trick. Peter has his cell phone, but who to call? It happens that Peter gave Art a wake-up call that very morning, and so has Art s phone number in the memory: very useful wake-up call that!

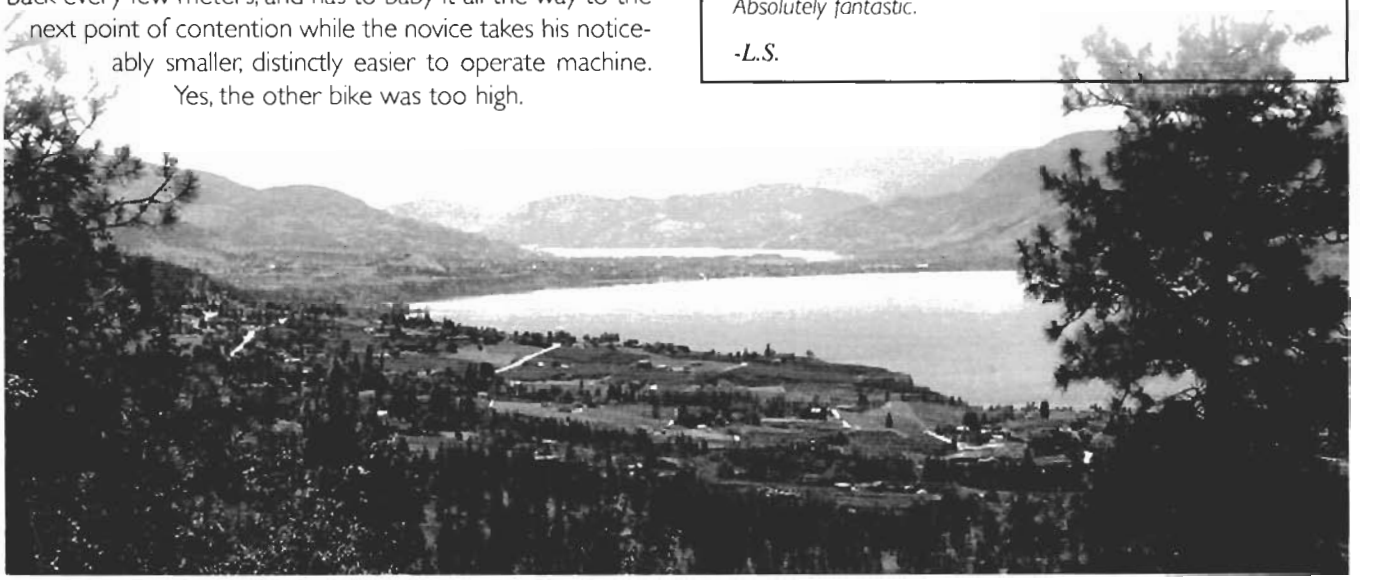
And that is how you found us — tail end charlies with the wonky bike and dead radio (so much for well serviced equipment!) — we d rather hoped you hadn t eaten all the lunch. And maybe someday we will get to see the last ten k we missed out on.

Editor s Note:

As someone who rides a bike more frequently than Bill, I just had to offer a very brief alternate record of the KVR bike ride. Here goes

Equipped with nice mountain bikes, we rode a gentle downhill slope for 36 km, with great sweeping views of Okanagan Lake. The scariest moment I witnessed was the daredevil quail running out of the bush directly under Arthur Last s front wheel (miraculously, a collision was avoided and both Arthur and the quail survived). In the case of Bill Blann riding down the slippery mud covered slope, in the rain, I decided to get myself out of any possible trajectory he may have taken, and therefore missed the sight. Other than these foibles, it had to be the most civilized bike ride I ve ever done and I d do it again in a minute. And at the end, we had lunch at the Hillside Estate Winery, located, remarkably, on a hillside, right below the KVR. Absolutely fantastic.

-L.S.

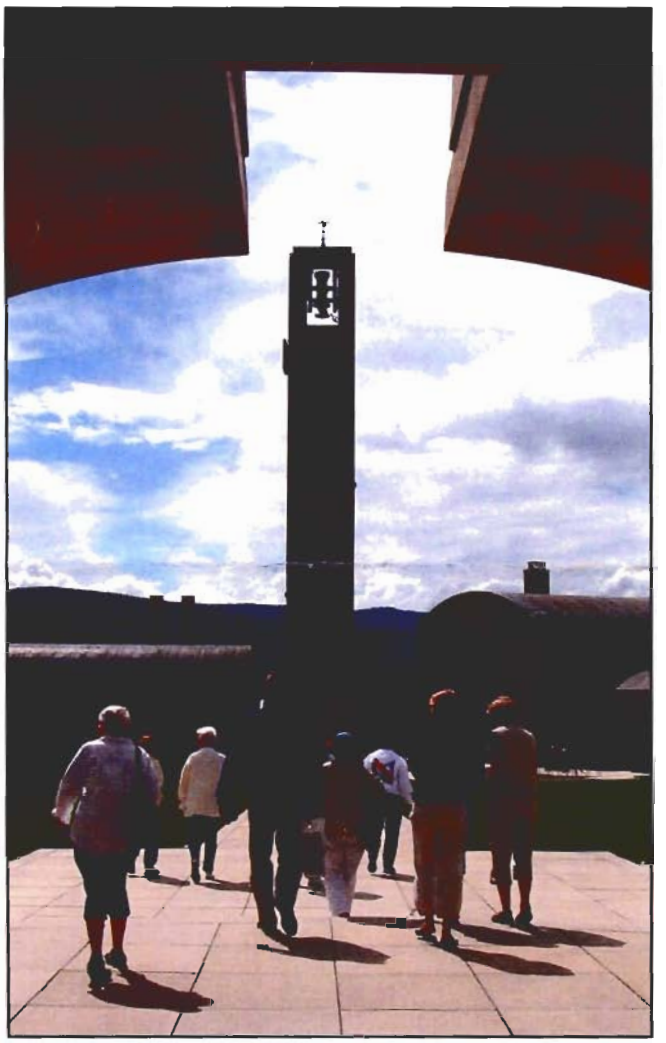


One of the spectacular views along the KVR. *Photo: B Blann*

The Boat Trip/Winery Tour

By Bob Browne

Our Sunday outing started at the Summerhill Winery south of Kelowna, and the tour showcased the Methode Champenoise for making sparkling wine. Since most of us have never made sparking wine on purpose, this was an interesting lesson on how it should be done. After initial fermentation, extra yeast and sugar is added, and the bottles are racked neck down. Each day the bottles are rotated a quarter of a turn, until a yeast plug forms in the neck. Traditionally, this plug is frozen and then removed in a process called disgorgement.



The Gate at Mission Hill *Photo B. Browne*

Scale Model of The Great Pyramid at Summerhill Winery *Photo B. Browne*

Unquestionably, Summerhill is most famous for aging its wine in an 8% scale replica of the Great Pyramid, a practice which the owner claims "clarifies" liquids. The pyramid was precisely built so that one wall points toward true north, and no ferrous metals were used in its construction, apparently so that the thing doesn t re-orient itself to magnetic north. Did I detect a few skeptics in the group? The tour concluded with a lesson on the finer points of wine tasting, including an opportunity to try a late harvest ice wine (for a small fee).

The boat trip was originally scheduled to be aboard the Fintry Queen, but mechanical troubles had left her at the dock, so the organizers chartered a two-deck house boat called the Funseeker. This turned out to have some advantages, because we had the vessel all to ourselves, and the trip around Okanagan Lake was three hours instead of two. The boat was well equipped, with barbeque, hot tub, and a bar, complete with bartender. Pat Baird, and husband Gary, put together a delicious lunch of barbequed chicken, salads and breads.

Cave at Mission Hill *Photo B. Browne*

Those of us who didn t need to hurry to the airport persuaded our van driver, Jessica, to drive to the Mission Hill winery, for one more tour. You enter the winery through a massive gate, past meticulously kept gardens, and under an archway displaying a hand-carved keystone with the proprietor s family crest on it. In the distance, a 12-story bell tower, containing specially cast bronze bells, each one dedicated a member of the von Mandl family. (In my opinion, some people just have too much money). The wine tour consisted of a five-minute "educational" video, and a walk through the caves, blasted out of volcanic rock, where they age their red wine. Not much chemistry in evidence, but Mission Hill is certainly set up for the tourist trade.

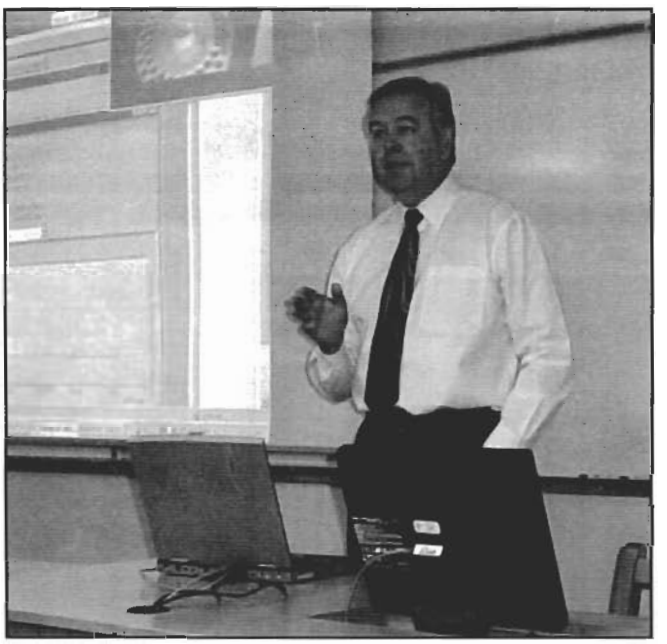
The C3 group samples wine at Summerhill Winery. *Photo B. Browne*

Let s Hope they remembered the sunscreen. Enjoying the sunshine on the Funseeker. *Photo B. Browne*

Do you know what you are drinking?

By Nicole Sandblom & Vivian Mozol, University of Calgary

"What s in your wine?" Dietmar Kennepohl asked. He looked out at the crowd of chemists gathered in a lovely modern lecture room at the Okanagan University College. Later in the day, the clouds would lift over Kelowna, B.C., and wine would be served. But for now, the question still needed answering.



Ron Currie at the controls of the remote SPME-GC system. The auto-sampler can be seen on the screen.

Photo L. Shaw

"What s in your wine?" Ethanol, of course. The enzyme, alcohol dehydrogenase, turns this into nasty acetaldehyde (since it gives you a hangover). Eventually, this turns into acetic acid and then carbon dioxide. There s a little methanol in wine too, which is not so nice since it turns into formaldehyde inside your body. However, as Dietmar pointed out, it s all about quantity! If you have enough ethanol and the concentration of methanol is low enough, ethanol wins in the competition by the enzyme and your cells are happier.

To answer the question quantitatively, Dietmar handed off the presentation to Ron Currie. Using an ordinary web browser, Ron led us on a visit to the Canadian Remote Sciences Laboratories. Using the computer, he took a headspace sample from concentrated wine. A solid phase microextraction fibre adsorbed the sample. Into the gas chromatograph via the automated procedure . and BAM! like Emeril s kitchen, out popped the results!

Preserving and maintaining all of the data from these spectra, this innovative technology transfers results to the home computer. Perhaps most importantly, a student need not apply for an extra loan. He or she can manipulate and store spectra without using the proprietary software from the instrument vendor. Dietmar and Ron showcased this fabulous opportunity for students to get a taste for using actual analytical instruments using remote techniques

"What s in your wine?" well, in this case, a wee small bit of methanol (0.015%), lots of ethanol, and tiny amounts of propanol and butanol.

Cheers! to the organising committee for a taste of CHEMISTRY, the 31st College Chemistry Canada, June 10-13, 2004.

Nicole and Vivian undertaking a careful wine tasting experiment with Rod Restivo

Photo L. Shaw

The Two Bobs (not so) Excellent Adventure

How two chemists apply scientific principles on the trip home

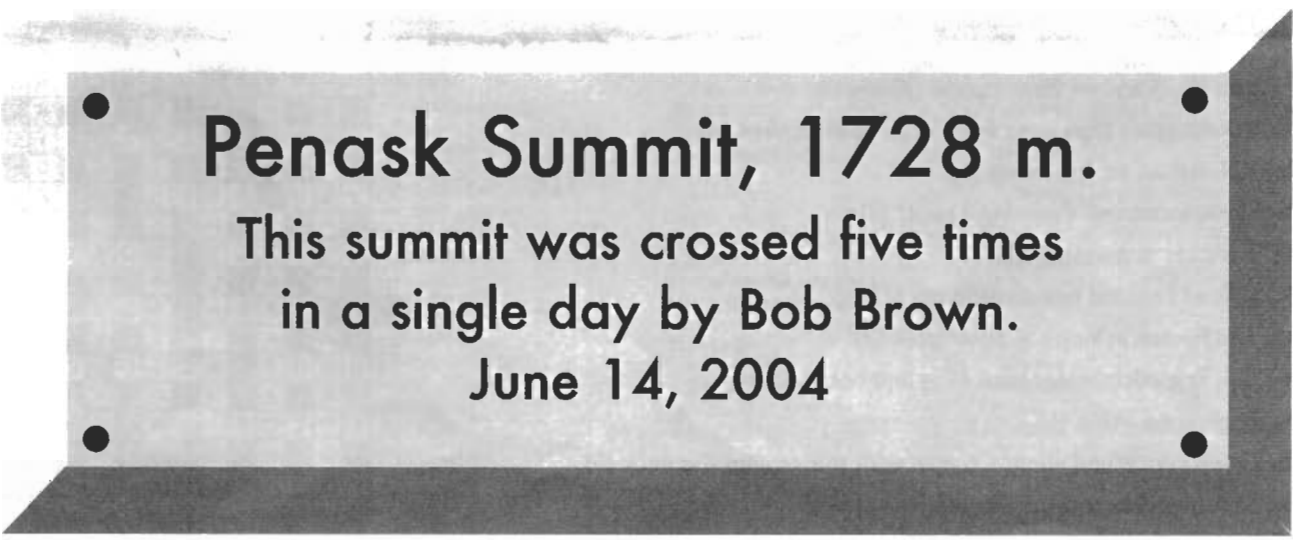
By Bob Browne

As anyone who was in Kelowna will attest, the recent C3 conference was a terrific success; the sessions were interesting, the food was good, and the Sunday outings went as smoothly as a 2002 Chardonnay. So it was with a certain sadness that Bob Perkins and I packed up the hospitality suite on Monday morning and loaded the car for the trip home.

Heading west from Kelowna the highway takes you over the Coquihalla Connector, one of the highest elevation highways in Canada. As we sped along toward the 1728 m Penask summit, the car quite suddenly stopped. Being two competent(?) chemists, we figured we should be able to diagnose the problem by applying the scientific method. So with car manual in hand, we went through a series of hypotheses, testing each one, making careful observations and drawing conclusions. Between experiments, the car would obligingly start, run a few minutes, and stop again. We stumbled toward, and finally over, the summit, coming to rest for the final time in the middle of a bridge. We applied f = ma to get the car off the road, and then I hitchhiked back to town with a lovely couple who tried to sell me a franchise to an on-line shopping mall. The third time over the summit was with my friendly BCAA tow truck driver, who, learning that I was a chemist, joked "Well, I guess chemistry let you down, eh?" I pointed out that the chemistry would work just fine if only the physics would let it. Back to town with the car, we were dropped off at the local OK Tire store. (BCAA: "We have to distribute the work, and it was their turn". Me: "But I don t need tires!"). The mechanic suggested a variation on the scientific method for diagnosing the problem: start replacing parts in order of cheapest to most expensive. While I pondered what would have happened if Robert Boyle had used this variation, Bob, who had to be in Vancouver that night, was applying a more nautical principle: if the ship is sinking, get the heck off. A phone call confirmed that there was one more flight out that day but would require a quick trip to the airport during rush hour. Luckily, one of the store s customers volunteered to drive Bob, and they apparently happily traded pictures of their grandchildren all the way there.

Two hours later, the mechanic declared that the car was fixed, and besides, it was quitting time. I set out for the summit for the fifth time, not exactly confident of the repair, and knowing that if it failed, Id be up there for the night. Fortunately, I went sailing over it this time, because it was snowing heavily at the top.

Final lesson learned: the conservation laws do not extend to money. Trip to Kelowna: $40; return trip to Vancouver: $1000; reconnecting with C3 friends at the conference: priceless.



College Chemistry Canada Cryptic Crossword

Fax the editor your correct solution to the puzzle. Winners will have their names published in C3 News.
Fax this page to (403) 440-6095

Across

6 Appropriate student attire (3,4)

7 Aluminum arm strikes fear (5)

9 If no screwups, then data! (4)

10 Bad ICBM simile like oil and water (10)

11 Difficulties appear at the end of the chapter (8)

13 Quickly run to retroactively poll Silver (6)

15 Neo backwards about vanadium heater (4)

17 Hot carbon? (5)

18 Sighted incorrect aldehyde without Dahl (4)

19 Sheath the broken levees (6)

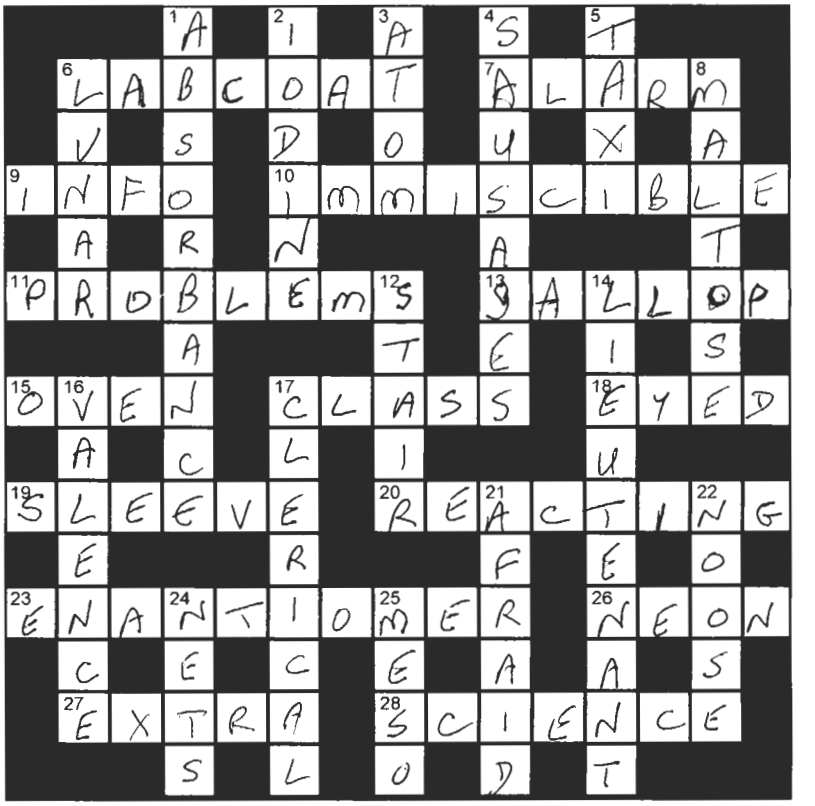
20 Argentic clean up is proceeding to completion (8)

23 Unfairly renominate by show of one hand (10)

26 Glowing noble gas (4)

27 More of Sussex trace element (5)

28 Subject 58 has been broken into since (7)



Down

1 Sadly, bicarbonates don't have it when put in a visible region spectrophotometer. (10)

2 Matinee idol lacks metal element (6)

3 The smallest piece of anatomy? (4)

4 What do they put in these things? Mix three parts sulfur, one part gold, one part silver, and an Electrophile. (8)

5 Vehicle takes Don away from hazardous oxidant (4)

6 #71 ran up on the moon (5)

8 Untasty oatmeal's missing a sugar (7)

12 Toxic tar is one step (5)

14 Officer Neil ate nut unmannerly (10)

16 The French in Vance is outermost (7)

17 Call Eric mistakenly about filing and bookkeeping (8)

21 Frightened numb (6)

22 One's concerned about Oxygen with this around the neck (5)

24 Sent unsatisfactory profits (4)

25 Some twisted compound adjective (4)

S	U	P	P	E	R	■	M	E	R	C	U	R	I	C
T	■	A	■	R	■	■	■	Q	■	H	■	A	■	E
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T	U	N	G	S	T	E	N	■	R	E	V	E	R	T

Winners of previous puzzle: Suzanne Pearce, Stephen L. Hansen, Kwantlen University College

News from CIC

Norman and Marion Bright Memorial Award Call for Nominations

The Award shall be presented to an individual who has made an outstanding contribution in Canada to the furtherance of chemical technology. The person so honoured may be either a chemical sciences technologist, or a person from outside the field who has made a significant and noteworthy contribution to its advancement.

The Award was established in 1980 to commemorate the devotion of the Brights to The Chemical Institute of Canada (CIC), culminating in Norman's service as Treasurer, 1967-70, and Marion's as Manager of Membership Services, 1970-74.

Award: An engraved medallion, together with an honorarium of such amount as shall be made available by the Trustees of the Chemical Education Trust Fund of the CIC.

Deadline: October 31st , 2004 for the following year s award.

For information on submitting a nomination and the nomination form, please visit the Web site at www.chem-tech.ca/eaward.html or contact the awards coordinator at 613-232-6252 or awards@cheminst.ca. Membership in The Institute is not a prerequisite for the bestowal of the Award.

Member News

Bob Perkins is a grandfather. Bob sent this photo of his family. From left, Bob s daughter Amanda holding a 5-week old Isabella, Bob s mother Doris Perkins and Bob himself. Congratulations, Bob!

Photo: C Perkins

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Quails Gate Estate Winery - where some beleaguered cyclists visited after the KVR bike ride and lunch. Can anyone say wine tasting ?

Photo: B Blann

Dietmar Kennepohl and Marten Lettinga on the Fun Run. And, they seem to be having fun!

Photo B. Blann

The Kettle Valley Railroad bike group, with a couple of absentees. This was taken right after the group emerged from the shelter of a train tunnel after some rain.

Photo: A guy from Monashee Tours named Ed

The UCFV contingent gets ready to roll: Peter Slade and Arthur Last get on their bikes. Hey Peter! Those glasses look a lot like what my students wear in chem labs!

Photo L. Shaw

Bob Browne presents retired Treasurer Jack McGuire with an Ogopogo and a lifetime C3 membership for her outstanding service.

Photo B. Blann

Here it is: Bill Blann coming down the slippery slope on his bike, followed by that guy named Ed.

Photo: S McNeil