

FORUM EDITORIAL BOARD

Edward Vrscay
Applied Mathematics
Editor

Paul Fieguth
Systems Design Engineering

Paul Malone
Germanic & Slavic Studies

Jeffrey Shallit
Computer Science

David Williams
Optometry

Catherine Schryer
English Language & Literature
ex officio

Pat Moore
Faculty Association Office
Production

AN INTERVIEW WITH THE ASSOCIATE VICE-PRESIDENT, ACADEMIC

Vera Golini (Dept. of Italian, and Director of Women's Studies) interviews Gail Cuthbert Brandt in the first year of her administrative position. We learn a little about Prof. Cuthbert Brandt's student years (most of her undergraduate years were spent at Waterloo) and her career as an academic. Regarding her new role in the administration, Prof. Cuthbert Brandt discusses plans to strengthen UW's connections with the rest of the world, ongoing departmental reviews and the roles of service and mentorship in the university. She concludes with an invitation to meet more people and to receive suggestions and comments, particularly in the areas of interdisciplinary and international programs. (Page 3)

YOU DO THE MATH

But practical math – reckoning and reasoning. This is what UBC Emeritus Professor Klaus Hoechsmann recommends for early years of primary school. Prof. Hoechsmann argues that young children should be engaged in exercises involving “mindful rote” as opposed to trying to make them “think like mathematicians.”

Take the 1932 Grade 3 arithmetic test on Page 8.

Inside this issue:

Letter to the Editor	2
Are you a <i>real</i> doctor?	3
Interview with Gail Cuthbert Brandt	4
Reckoning and Reasoning	8
Women Underrepresented in Sciences at Top Research Universities	10
President's Message	12

FAUW EVENTS

COUNCIL OF REPRESENTATIVES MEETING

Friday, April 2, 12:00 p.m.

ANNUAL GENERAL MEETING

Friday, April 2, 1:00 p.m.

*A light lunch will be provided
(Location to be announced)*

LETTER TO THE EDITOR

Microsoft, MathWorks, and PeopleSoft

Dear Editor:

Last fall, a student wrote to me asking about the status of curriculum changes associated with the Microsoft Canada Academic Innovation Alliance partnership announced in August 2002. My reply to this student is copied below for your information.

Since writing that reply, I have been thinking more about software issues with Microsoft, MathWorks, and PeopleSoft. In response to your invitation to share my thoughts with readers of the *Forum*, I offer the following opinions, qualifying that I have not had the time to carefully research all details.

I believe that the biggest mistake we, as a low-budget operation, can make is to encode our operations into a framework that is controlled elsewhere. None of these companies has our educational goals as their mandate. Microsoft seems to recognize this at least and has formed a relationship with UW that respects the differences.

The drug-dealer model of business seems to me to be very popular these days – hook your customers on low-entry-cost proprietary technology and then milk them carefully for all they are worth. Prime example – the music CD industry. Eventually people notice and revolt. In medium-scale software engineering efforts such as SISP, it is very easy to hide behind a thin layer of complexity because the fair cost of doing the project is too difficult to establish. The artificial complexity then protects a layer of necessary support staff who do not have the educational goals of the institution as their mandate. When the time comes to change the framework, two sets of support people are needed. See the problem?

Business-at-large seems to have slowly come to realize that this costly layer sits between its needs and the data that it needs to conduct its work. Hence, the sudden revulsion for IT spending and the big interest in open standards such as XML and SOAP. Look at why the web became so popular so quickly. Virtually all of its components are open standards – not controlled by any commercial interests and so simple that the barriers for alternate implementations are all but gone. People interested in economic growth should be arguing this kind of case (especially with respect to legal protections of intellectual property).

At UW, the situation is even sadder. The fragility and artificial complexity of SISP are such that only highly trained specialists can tinker with it safely. We thus find ourselves in a rather ironic – no, dysfunctional is more appropriate – situation: *It is enormously expensive for us to repair this software technology in spite of the fact that we offer some of the best programs in North America for training students in these very technologies that require repair!* In addition, our students don't get Co-op jobs from the exercise and, at the same time, the resources which could help them – and help us – are instead directed into this IT layer.

MATLAB, a great framework for rapid software simulation prototyping, is a distributed version of the same

problem. If each research person pays \$100 per year for the license, then all of a sudden a significant chunk of research change is diverted from research into research framework. I believe that our activities are significantly different from corporate research-and-development activities in the sense that the research prototype is, itself, the final product if the research project has any ongoing scope to it. Tying this to a proprietary framework with a yearly license fee is akin to the company single-sourcing a key component in its final product. Most companies will not do this.

George Freeman

Department of Electrical and Computer Engineering

E-mail to student

Re: Questions about curriculum and C#

As far as I know, no curriculum changes have been proposed in association with the Microsoft agreement. Some of us would like to use .NET technology (or MS Visual Studio, or C#) as the lab technology in certain courses. I believe the current agreement is largely focussed on our experiments with .NET for improving our online training and delivery of some labs and for a proposed outreach course to introduce high-school students to programming concepts. No course changes have come before our department program committee in this regard. You might get more info from Prof. Bill Bishop (manages the .NET projects) or Prof. Tony Vannelli (our department chair) on the exact status of the agreements and progress on these experiments. I'll copy them on this reply.

Personally, I am very much in favour of trying C# in our programming language course (ECE 150). The idea has been floated and gotten bogged down in committee discussion and, at least from my perspective, is dead for the moment. We are very much more involved in considering larger-scale curriculum revisions to the Electrical Engineering and Computer Engineering programs, which we want to remain vital and current; to monitoring the new Software Engineering program, where the first class of students is in third year; and to consideration of a potential new program in Nanotechnology Engineering. The Microsoft .NET framework, C#, ASP.NET, etc. are one vendor's technologies. We already teach the concepts which would allow students to understand those, or competing, technologies for clearer programming interfaces, web service support, etc.

Personally, I have high regard for Microsoft, and for its products, and would welcome arrangements where we benefit from access to their technologies and they benefit from our implicit advertising through use of their technologies. There are other companies, such as The MathWorks (vendors of MATLAB), whom I hold in very low regard and whose technologies I would not consider for courses or infrastructure. Universities, especially in selfish times such as these, don't have the resources necessary to just buy what they need and mount their programs. Thus, we seek the healthiest possible symbiotic relationships with corporations. If they try

(Continued on page 3)

“ARE YOU A REAL DOCTOR?”

by David Williams
School of Optometry

I can remember from my early days as a practising optometrist being asked this question. On occasion, I must confess, I have actually lost my self-control and responded, “Are you a *real* patient?”

I did have the good fortune to be instructed by an excellent linguist and thinker who told me that we must distinguish between a person’s *vocational designation* and their *professional designation*. I must point out that there are actually NO doctors. The word ‘doctor’ is not a vocational designation nowadays. There are dentists, physicians, optometrists (*inter alia*). These are vocational designations. People holding degrees called Doctor of Dental Surgery, Doctor of Medicine, Doctor of Optometry may be addressed as Dr. X, Dr. Y, Dr. Z, but the term ‘doctor’ does not accurately describe what they do. They practise dentistry, medicine, optometry.

On the other hand, I recall walking out of my Ph.D. defence, and being greeted by one of my committee members with the quip, “Now you’re a *real* doctor”.

And that is historically true. A quick look through the *Oxford English Dictionary* serves to remind us that the word ‘doctor’ arises from the Latin ‘docere’, meaning ‘to teach’, and that the ‘doctor’ is, by reason of his/her skill in any branch of knowledge, competent to teach it, or is one whose attainments entitle him/her to express an authoritative opinion. People holding doctorates in academic disciplines, e.g., Doctor of Philosophy in Physics or French, certainly have these skills, and are properly addressed as Dr. A and Dr. B at university, but again, their vocational designation would more properly be ‘professor’ or ‘lecturer’ or some suitable variant referring to teaching.

The *OED* shows use of the word in 1303 to refer to early religious teachers. Alas, shortly afterward, in 1377, the *OED* shows the use of the word to denote medical practitioners. I realize that the intervening 627 years of misuse might justify some people in the present in their own misuse of the term. But those of us who cling to the Latin root of the word will say, “No, if you mean

‘physician’ then you should say ‘physician’, not ‘doctor’.”

Looking in more detail at the *OED* entry, one finds a tremendous range of uses of the word. A sampling follows:

1303: Seynt Gregory . . . telleþ mo hymself a lone Pan alle þe doctours do echone.

1548: This kyng . . . in marcial affaires a very doctor.

1660: After those two, Doctor Diet and Doctor Quiet, Doctor Merriman is requisit to preserve health.

1700: *Doctor*, a false Die, that will run but two or three Chances. *They put the Doctor upon him*, they cheated him with false Dice.

1785: *Doctor*, a composition used by distillers to make spirits appear stronger than they really are.

1821: The cook, at sea, is generally called doctor.

1833: A heated doctor, or soldering bit.

1886: The pad, or ‘doctor’, as it is sometimes called, is dipped in the gold solution and applied to the part to be gilt.

1902: It is necessary . . . to have your male cat doctored when he arrives at years of discretion.

1938: Du Maurier was a skilful ‘play doctor’, and the final script . . . bore only a family resemblance to the drama which Edgar had written at top speed.

Considering such varied uses of the term over the centuries, I would suggest that using the appropriate vocational designation brings a much-needed clarity to one’s language. An extra syllable won’t kill us.

E-MAIL TO STUDENT (Continued from page 2)

to control our activities or change the symbiosis into profiteering, we drop the relationship. To preserve academic freedom and integrity, we have no choice but to be prepared to drop damaging relationships.

Notwithstanding the poor announcement made in August 2002, the whole C#/curriculum issue is, in my opinion, a big red herring. UW’s deals and infrastructure investment with PeopleSoft are much more restrictive and damaging, very much more costly, and have already had a huge negative impact on our reputation, quality, and integrity. Yet,

somehow, this has never been newsworthy (except the good-news BS from official UW sources). There has never been a ‘fessing up’ to the capital and ongoing costs. Nobody is accountable or responsible. To walk away is a millions-of-dollars problem.

Happy investigating.

Regards,
George Freeman

INTERVIEW

WITH DR. GAIL CUTHBERT BRANDT ASSOCIATE VICE-PRESIDENT, ACADEMIC

On 8 December 2003 Vera Golini, past editor of the FAUW Forum, met with Dr. Gail Cuthbert Brandt, Associate Vice-President, Academic. Dr. Brandt has looked over this article, derived from a taped discussion, to make sure it accurately reflects her views.



- VG: Gail, thank you for agreeing to meet for this interview. Now that the very first term of your appointment to this Office is winding down, how are you feeling in your new post with your new responsibilities?
- GCB: I'm feeling very happy with my decision to take the position. I'm finding it to be very exciting and very demanding at the same time. But, while it's challenging, I see lots of opportunity for growth, particularly personal growth, as I engage with new issues and people.
- VG: When did you first join the University of Waterloo, and where were you before coming here?
- GCB: I could say officially, I suppose, in terms of administration and having a faculty position here, I joined in 1992 when I assumed the principalship at Renison College. However, my connection to the University of Waterloo goes back much farther than that. I was a student here in an undergraduate Honours History program from 1963 until 1966 and then, because the University at that time was so small, I ended up transferring for my final year to the University of Toronto. So, I did three-quarters of my degree here but my degree is from the University of Toronto.
- VG: Where did you do your graduate work, and in what field?
- GCB: My Master's degree was from Carleton. Then I spent one year in Paris between my MA and PhD, which I did at York University in Toronto. My PhD was in French-Canadian history and my thesis was an historical analysis of the Franco-Ontarian community of Sudbury.
- VG: Has the University changed a lot from the 1960s when you were here as an undergraduate?
- GCB: A great deal. Of course, at that time there were so few buildings on this huge wide-open campus and, as undergraduates, I think we felt a little bit like pioneers because we were relatively small in numbers. But it was a wonderful experience, especially because most of us were the first generation of students in our families going to university. Many came from small towns or from rural areas all over the province of Ontario and I think this cadre of young people really developed together, and we felt a kinship. It was also a good time because there was so much building going on; it was very exciting to be part of that. Sometimes it wasn't all that convenient as we went through mud and slush. I remember that Laurel Creek flooded one spring, and we had to devise some other way to get across it to attend classes when we were in the Faculty of Arts.
- VG: As a student, as a young woman, were you already involved with committees and doing volunteer work at UW?
- GCB: I guess I was because, if I go back and look at the yearbooks from the University of Waterloo, I was a member of the Politics Club. I was also very actively involved at Renison College, both in the student council and as a don in my third year. I liked to get involved in those kinds of activities. But, of course, studying took top priority and in those days there didn't seem to be as many opportunities for volunteer work for university students as there are currently.

- VG: I'd like to follow-up on your career a little. It's interesting and fascinating how it has developed through time. After your PhD did you remain at York or did you go elsewhere?
- GCB: I was already contacted by the Principal of Glendon College, at York University, when I was in Paris. He asked me, if I did decide to register in the PhD program at York, if I would be interested in being a teaching assistant at Glendon College, since I obviously spoke French. I said that I would be. That was the beginning of my very long connection with Glendon College. After I finished my PhD, with the exception of a year when I taught at the Erindale campus of the University of Toronto, the rest of my time was spent at Glendon in the History Department there, as well as in Multidisciplinary Studies. The latter was a separate department at Glendon, and I assumed the Chair of it shortly before I left to come to Renison.
- VG: When would that have been? About the 1980s?
- GCB: In the 1980s I started to get very active in administration at Glendon.
- VG: So you have been familiar for some time now, with inter- and multidisciplinary studies?
- GCB: Yes, because that department at Glendon housed the Women's Studies program. It housed the Canadian Studies program and some technology and science interdisciplinary programs as well. So, it was a very interesting department and I had some wonderful colleagues that came from both the natural sciences and environmental studies, as well as the social sciences and humanities side.
- VG: Those years of administrative experience are useful in your present work, then.
- GCB: Yes, that's very true, and that was one of the things that attracted me to this position. Probably the three things that attracted me most to this position were the opportunities to cultivate international connections, strengthen our interdisciplinary studies programs, and to continue to work with the Colleges. I am very committed to broadening our international experiences here at the University of Waterloo, and I am very much a champion, if you like, of interdisciplinary studies. The third component, which for the first time is associated with this particular office, is being liaison person with our federated university, St. Jerome's, and the affiliated Colleges – Conrad Grebel, Renison and St. Paul's.
- VG: You have followed Dr. Bruce Mitchell in this Office. Are you also in charge of departmental reviews across the University?
- GCB: Yes, I am. That work continues. As you know, all undergraduate programs at Ontario universities have to be reviewed every seven years and we are well into the first cycle of reviews at the University. That's quite interesting as well. I particularly enjoy the opportunity to meet the external reviewers and to talk to them about their initial findings. Afterwards I get their report and see how they assess things at the University of Waterloo.
- VG: It's very interesting to realize that, after achieving your degrees, not only have you returned to Renison in the capacity of Principal, but to your *alma mater*, the University of Waterloo, in a leadership role. All this while, have you been following a planned path, a dream. . . ?
- GCB: I would like to suggest that I am such a methodical person and so well organized that I could plan all this. But I have to admit that none of it was planned. I was very happy at Glendon College because I was teaching in my area of specialization, which was French Canada, and was teaching in a bilingual context. So I very much enjoyed that. It was just serendipity that I happened to see the advertisement for the principalship of Renison College. I had enjoyed my undergraduate experience so much at Waterloo and at Renison, that I decided it might be time for a change. It just seemed like a good opportunity to come back to a city and an area that I had enjoyed so much.
- VG: I was wondering, before we go on to other considerations, in relation to your areas of responsibility that you have now as Associate Vice-President, what might be some of the plans for the near future that you and the Administration have in mind.
- GCB: I think we are committed to strengthening Waterloo's connections with the rest of the globe. We want to increase the opportunity for our students to have international experiences and also to have a curriculum that incorporates a good deal of material that's relevant to being a global citizen. So there are two components to it. There's the mobility aspect of how we increase the opportunity for individuals, whether they are students or faculty, to go out to other institutions and have other experiences. Similarly, for those people who do not wish to, or are unable to take advantage of those opportunities, but who still want to have a better understanding of global issues, how can we

ensure that they can learn more about the current realities of international life as nations are increasingly interconnected? At this point we are doing a very thorough review of our international activity. I am in conversation with the Deans of the various Faculties and the Heads of our federated University and affiliated Colleges. What we're trying to do is to optimize all of the connections that we have, both at the institutional level and also at the Faculty/College level. This way we hope to get more synergy, if you like, among our various levels of activity such as student exchanges, memoranda of understanding, research connections, and faculty exchanges. We are strengthening our existing relationships and establishing some new ones with other institutions that we think share Waterloo's vision.

- VG: As you mentioned, the departmental reviews are ongoing for a while. Is anything new on the horizon for interdisciplinary / multidisciplinary programs?
- GCB: Their reviews are also ongoing. Bruce Mitchell, my predecessor, was very proactive in helping to strengthen the interdisciplinary studies programs through some marketing initiatives. We are continuing those in order to help students become more aware of and knowledgeable about multidisciplinary and interdisciplinary programs.
- VG: Turning to another interesting point, are there sufficient opportunities for women to take up administrative posts at the University of Waterloo? In this regard I was wondering what actions you think may be taken to ensure that more women accede to positions of responsibility at department and faculty levels. . . .
- GCB: The implied answer is perhaps in your question; there are plenty of opportunities for women to take up positions, particularly at this University. I think that the problem of why there are not more women in administrative positions is a complex one and it will require actions on many fronts. The initial place to start, I believe, is in departments and therefore I think we come back to mentorship. Mentorship is so important in this area, in helping women to sort out where their strengths lie and encouraging them to build on those strengths. Mentorship is also important in helping them to develop coping mechanisms, particularly for younger women, who still have family responsibilities. It's very challenging for them to try to find the time to do their teaching, their research and look after their families, and still take on administrative duties, which often entail work that goes well beyond a "normal" nine-to-five life. Mentoring may start with a chair, who has a sense that there is a woman in the department who has capability and talent for administrative tasks, asking that woman to take on a specific task. Recruiting her for increasingly responsible committee work within that department is an important next step, and, hopefully, this person will go on to fulfill the role of associate chair or chair. As a result, she will have received valuable exposure to a wide variety of administrative tasks and roles.
- VG: Are you saying that it is important for people in positions of responsibility to take notice of good performance, good work, and not let it just slide unnoticed?
- GCB: Exactly; noticing and rewarding that talent, and also stressing how important that work is, often to other colleagues in the department. I think there is a tendency when we're looking at dossiers to always put the emphasis on research and teaching. Service does get rewarded less than teaching or research. So, I think it's very important that at the very least we recognize that work by thanking people for doing it, and by telling them that they've done a good job.
- VG: You seem to be stressing that good service gets noticed and rewarded less, but does not necessarily contribute less to the Academy.
- GCB: Service facilitates the research and teaching activities of other people, and makes them more productive. It's also of importance to the students because if we don't have well-run academic programs then it's obviously the students who suffer. They have to have access to good faculty advisors, and all of that work is important to the successful operation of the University.
- VG: It's also part of mentorship for students to have women in administrative positions as role models.
- GCB: We know how important role models are from many studies that have been done in the social sciences. I think that, as well, the kind of resources and infrastructure that are available to women is also important. I know that, in my own case, I probably would not have ended up being able to do administrative work at Glendon College had it not been for the cooperative day care that we established for faculty and staff members right on campus. That made it so much easier for me as the mother of three to take on these kinds of chal-

lenges. I'm not sure that I would have been able to do so had I not had good, reliable day care. Of course, having your children right on campus, where you could just pop down and see them whenever you wanted, was a wonderful luxury.

VG: I remember that you chaired the Task Force which prepared the report, "Welcoming Women Faculty: The Report of the Provost's Task Force on Female Faculty Recruitment," in June 2002. Dr. Amit Chakma wishes to attract more women faculty to UW. I was wondering what are some of the ideas in that Report.

GCB: We stressed very much the fact that this has to be a family-friendly institution, not only for new women faculty members, but also for young male faculty members. Increasingly, couples are making decisions about universities and you have to not only recruit that couple but you have to retain them too. If you are going to spend all that time and effort you don't want to have them wooed away by another institution within a year or two. So, we put forward a number of recommendations and I am pleased to say that the administration has already acted on some of the recommendations and continues to implement others.

VG: What are some of those?

GCB: For example, we suggested that we do something to help young faculty members make settling into our University and community much easier and there's now a person on campus – her name is Fran Hannigan – who has been hired to do this. Part of her responsibility is to help departments, when they are recruiting, to answer the questions of prospective faculty, to help them with their housing issues, find schools for their children, find family doctors – those things that often make the difference between a faculty member deciding whether or not to join a given university. We all know that we're in strong competition, not only with other universities in North America for faculty members, but also with government and industry. We are very conscious of the fact that women, as a group, are under-represented on our campuses, as they also are in government and in many sectors of industry.

VG: As director of Women's Studies here at UW, I am curious about your research projects. Do you have any under way, or are you planning some?

GCB: I have two major research projects underway right now. One is the completion of a study of women who worked in the textile industry in Quebec. In large measure it is an oral history for which I interviewed over 80 women who worked in the two textile centres of Magog and Valleyfield in Quebec. I am looking at the impact of industrialization on their lives and how women's labour evolved over time from the late nineteenth century until the middle of the twentieth century. My other project, which I have started researching, is a history of the eight Anglican liberal arts universities and colleges in Canada. Many, like Renison College, are associated with a major university. I am looking at issues around governance, around the division between Church and State and how denominationally-based colleges exist within the framework of a secular university. I'm also looking at issues such as co-education and the tradition of the liberal arts, and how they have evolved over time as well. So, in both cases, I'm looking, as historians always do, for patterns of continuity and change.

VG: Continuity and change seems to be a metaphor for the trajectory of your academic career. . . . Is there anything on which you would like to elaborate before we part?

GCB: Because this is a new position for me, I am very keen to meet more people on campus and to hear about their visions, particularly in areas such as interdisciplinary and international programs. I would welcome any ideas, suggestions or comments that they have as we try to forge new collective strategies in both of those areas.

VG: Gail, thank you very much.

GCB: You're very welcome.

*Dr. Gail Cuthbert Brandt can be reached at:
gcbbrandt@admmail.uwaterloo.ca
519-888-4567, extension 5466*

Dr. Vera Golini is Director of the University of Waterloo Women's Studies Program and an Associate Professor in the Department of Italian at St. Jerome's University.

Reprinted with permission from *Pi in the Sky*, the publication of the Pacific Institute for the Mathematical Sciences, <http://www.pims.math.ca/pi>

RECKONING AND REASONING

or

The Joy of Rote

by Klaus Hoechsman
 Department of Mathematics
 University of British Columbia

You might have heard of this story, but it bears being repeated. In 1992, Lou D'Amore, a science teacher in the Toronto area, sprung a Grade 3 arithmetic test from 1932 on his Grade 9 class, and found that only 25% of his students could do all of the following questions.

1. Subtract these numbers: $9,864 - 5,947$
2. Multiply: 92 times 34
3. Add the following: $\$126.30 + \$265.12 + \$196.40$
4. An airplane travels 360 kilometres in three hours. How far does it go in one hour?
5. If a pie is cut into sixths, how many pieces would there be?
6. William bought six oranges at 5 cents each and had 15 cents left over. How much had he at first?
7. Jane had \$2.75. Mary had 95 cents more than Jane. How much did Jane and Mary have together?
8. A boy bought a bicycle for \$21.50. He sold it for \$23.75. Did he gain or lose and by how much?
9. Mary's mother bought a hat for \$2.85. What was her change from \$5?
10. There are 36 children in one room and 33 in the other room in Tom's school. How much will it cost to buy a crayon at 7 cents each for each child?

This modest quiz quickly rose to fame as "The D'Amore Test". Other teachers tried it on their classes, with similar results. There was some improvement in Grades 10 to 12, where 27% of students could get through it, but they tend to be keener anyway, since their less ambitious classmates usually give up on quantitative science after Grade 9. All in all, the chance of acing the D'Amore Test appears to be independent of anything learnt in high school.

At first glance this seems as it should be, because the

test certainly contains no "high school material". On second thought, however, a strange asymmetry appears: while all students expect to use the first two R's (Readin' and Ritin') throughout their schooling and beyond, they drop the third R (Rithmetic) as soon as they can – if indeed they acquired it at all. Has it always been like this? I doubt it: my grandmother went to school only twice a week (being needed in yard and kitchen) but was later able to handle all the arithmetic in her little grocery-store without prior attendance of remedial classes. She did not even have a cash register.

To many administrators, think-tankers, etc., this is beside the point, because we now live in the brave new computer age. A highly placed person who has likely never repaired a car engine, and probably knows little about computers, said that 20 years ago "an auto mechanic needed to be good at working with his hands" whereas now he needs Algebra 11 and 12 to run his array of robots. For a more insights of this kind, you might wish to visit www.geocities.com/Eureka/Plaza/2631/articles.html, where electricians, machinists, tool-and-die makers, and plumbers are also included "among those who need Grade XI or XII algebra". It doesn't say what for.

Mechanics laugh at this: remember the breaker-point gaps, ignition timing, engine compression, battery charge, alternator voltage, headlight angle, and a multitude of other numerical values we had to juggle in our minds and check with fairly simple tools – today's gadgets make our jobs more routine, they say. But ministerial bureaucrats tend to believe the hype, with a fervour proportional to their distance from "Mathematics 12", which has gobbled up Algebra 12 in most places I know.

Aye, there's the rub: the third R has morphed into the notorious M. "What's in a name?", you ask, "that which we called rithmetic by any other word would sound as meek". How many times must you be told that M is hard and boring, and hear the refrain "I have never been good at M"? It is the perfect cop-out, acceptable even in the most exclusive company – a kind of egalitarian salute by which "normal" members of the species *homo sapiens* recognise one another. How can a teacher of, say, social studies be expected to develop vivid lessons around unemployment, national debt, or global warming – as long as these topics are mired in M? He/she still must mention numbers, to be sure, but can now present them in good conscience as

disconnected facts, knowing that his students' minds will be uplifted in another class, by that lofty but (to him/her) impenetrable M.

Ask any marketing expert: labels are not value-free, they attract, repel, or leave you indifferent. Above all, they raise expectations, which, in the case of M, are as manifold and varied as the subject itself. Is it conceptualisation, exploration, visualisation, constructivism, higher order thinking, problem solving – or all of the above? The guessing and experimenting goes on and on, producing bumper crops of learned papers and theses, conferences, surveys, and committees, as well as confused students and teachers. “This is the first time in history that Jewish children cannot learn arithmetic” said an Israeli colleague, referring to the state of Western style education in his country, where the recent Russian immigrants maintain a parallel school system.

Not every country has followed the R to M conversion. In the Netherlands and (what was) Yugoslavia, children still learn *rekenen* and *račun*, respectively, together with reading and writing. The more weighty M is left for later. Germany clung to *Rechnen* till the 1960's, and then rashly followed the American lead, pushing *Mathematik* all the way down to *Kindergarten* – with the effect of finding itself cheek-to-jowl with the US (near the end of the list) in international comparisons.

I hear the sound of daggers being honed: what is this guy trying to sell (in this culture we are all vendors) is it “Back to Basics”, does he hanker for “Drill and Kill”, for “Top Down” at a time when all good men and women aspire to “Bottom Up”? Readers unaccustomed to Educators' discourse might be puzzled at such extreme positions getting serious attention. They would immediately see middle ground between tyranny and anarchy, boot camp and nature trail, etc. Why do we always argue Black versus White? I really cannot explain it. Maybe it is because we need strident voices and must hold single notes as long as we can, in order to be noticed in this mighty chorus. How did we get here?

Although the benefits of planned obsolescence are obvious, they are not often mentioned to justify the present trend toward innumeracy. It is the relentless advance of technology which must be seen as the main reason for the retreat of archaic skills. Speech-recognising computers already exist, and once they are mass-produced, writing will not need to be taught anymore, at least not at public expense. Whatever we now do with our hands and various other body-parts outside the brain will clearly fall into the domain of sports. Only in this spirit does it make sense to climb a mountain top which can be more safely reached by helicopter.

Before the advent of electric and later electronic calculators, computations had to follow rigid algorithms which allowed the boss or auditor to check them. This was “procedural knowledge” of an almost military kind – justly despised and rejected when it became obsolete. Oddly enough it did, however, have an important by-product: by sheer habit, *simple* calculations were done at lightning speed, and often mentally – of course with a large subcon-

scious component. In many places, this “mental arithmetic” was even practised as a kind of sport, still “procedural”, in some sense, but open to improvisation – more like soccer than like target shooting.

Look at the first question of the D'Amore Test: $9,864 - 5,947$. Abe did it the conventional way and had to “borrow” twice. Beth zeroed in on the last three digits, noting that 947 exceeded 864 by $36 + 47 = 83$, which she subtracted from 4000. Chris topped up the second number by 53 to 6000 and hence had to increase the first one to $9,864 + 53 = 9,917$. Dan and Edith had yet different ways, but all got 3,917. On the second question, Abe again used the standard method, since he was a bit lazy but meticulous. Beth looked at the 92 and thought $100 - 10 + 2$, playing it very safe. Chris spotted one of his favourite short-cuts: $3 \times 17 = 51$, and reasoned that $9 \times 34 = 6 \times 51 = 306$, and so on. Dan was attracted to the fact that 92 was twice 46 which lies as far over 40 as 34 lies below it. Therefore 46×34 was $1600 - 36$, which had to be doubled to $3200 - 72$. Edith blurted out the answer 3128 and said she did not remember how she got it.

When I was in Grade 7, I knew such kids – and was irked by the fact that many played this mental game as well as they played soccer. Justice was restored when, in Grade 8, they were left in the dust by x and y but continued to outrun me on the playing field. Maybe they never missed the x and y in later life (unlike contemporary plumbers), but I am almost sure their “number sense” often came in handy. Today's kids are to acquire this virtue by doing brain-teasers and learning to “think like mathematicians”, carefully avoiding “mindless rote”.

Whenever I walk by the open door of a mathematician's work place, I see black or white boards covered with calculations and diagrams. How come they get to indulge in this “rote”, while kids must fiddle with manipulations or puzzle till their heads ache? Could it be that we mathematicians sometimes engage in “mindful rote” – the kind known to musicians and athletes? If so, we ought to step out of the closet and tell the world about the *joy of rote*. Anyone who has observed young children will immediately know what we mean.

And while we're at it, we might reclaim ownership of the M-word, at least suggest that it be kept out of the K-4 world. This does not mean that schools should go back to teaching arithmetic – admittedly an awkward label. How about “reckoning and reasoning”, a third and fourth R to balance the first two? They would be associated with good old common sense, and, as Descartes has pointed out, nobody ever complains of not having enough of that.

Klaus Hoehsmann is a professor emeritus at the University of British Columbia in Vancouver, B.C. More information about the author and other interesting articles can be found at: <http://www.math.ubc.ca/~hoek/Teaching/teaching.html>.

The Forum thanks Prof. Hoehsman for permission to reprint his article.

Reprinted with permission from The Chronicle of Higher Education, issue dated January 23, 2004. Copyright 2004 by The Chronicle of Higher Education

WOMEN UNDERREPRESENTED IN SCIENCES AT TOP RESEARCH UNIVERSITIES, STUDY FINDS

By Robin Wilson

Women represent only a very small proportion of the scientists, mathematicians, and engineers working at the nation's top research universities, according to a study reported last week. Male faculty members outnumber female professors even in the few scientific disciplines where women earn more Ph.D.'s than men, it found.

The shortage of women at the nation's top institutions is "a grave national problem," say the study's authors. In fact, it is an issue that has troubled many academics for years.

"People have known that women are underrepresented," says Donna J. Nelson, an associate professor of chemistry at the University of Oklahoma at Norman and the study's chief investigator. "The extent to which they are underrepresented is news."

The study, which was financed by the Ford and Guggenheim Foundations, was endorsed by representatives of three national women's organizations. "This study illustrates that there is a lot of work to do to meet the goals we all thought we had adopted by enactment of antidiscrimination laws three and four decades ago," said Jocelyn Samuels, vice president for education and employment at the National Women's Law Center.

Ms. Nelson and one of her undergraduates, Diana C. Rogers, wanted to study the number of women at the nation's 50 most-elite research universities. They determined which institutions were at the top by looking at those that spent the most money on research in each of 14 disciplines: astronomy, biological sciences, chemistry, chemical engineering, civil engineering, computer science, economics, electrical engineering, mathematics, mechanical engineering, physics, political science, psychology, and sociology.

They found that, in most fields, the proportion of bachelor's and doctoral degrees earned by women was much higher than the proportion of beginning faculty members teaching in the discipline.

In the biological sciences, for example, 44.7 percent of the Ph.D.'s awarded nationwide from 1993 to 2002 went to women. But only 30.2 percent of

assistant professors of biology at the top 50 universities in 2002 were women. In computer science, women earned 20.5 percent of the Ph.D.'s awarded from 1993 to 2002, and yet only 10.8 percent of the assistant professors of computer science at the top universities in 2002 were women.

More Ph.D.'s Than Professors

Even in psychology, where women earned 66.1 percent of the Ph.D.'s awarded from 1993 to 2002, only 45.5 percent of the assistant professors at the top research universities in 2002 were female.

"In most science disciplines, qualified female candidates exist but they are not being hired," says the report, "A National Analysis of Diversity in Science and Engineering Faculties at Research Universities." The report doesn't identify the cause of the imbalance but says administrators must ask themselves whether they are setting up "barriers" to hiring women or whether women who earn Ph.D.'s are turned off by the academic experience and seek jobs elsewhere.

The study found that the proportion of full professors in science, math, and engineering at the top universities who are women was even tinier than the proportion of assistant professors. Over all, only 3 percent to 15 percent of full professors in the 14 disciplines within the top departments were women.

The same goes for women from minority groups. The top 50 research institutions, have had only 19 black women teaching in the science, mathematics, and engineering disciplines included in the study.

At all of those institutions, there are only two black female mathematics professors, one of chemistry, and none in computer science or physics.

The report says female students need role models to be successful. "When female professors are not hired, treated fairly, and retained, female students perceive that they will be treated similarly," says the report. "This dissuades them from persisting in that discipline."

WOMEN IN SCIENCE AND MATHEMATICS

Science and engineering departments have few tenured and tenure-track female faculty members, even though the number of female students in those programs has increased. A new study looks at the number of women by rank in the top 50 departments, as determined by the National Science Foundation according to research funds expended.

Proportions of faculty members in each rank who are female

	Assistant professor	Associate professor	Full professor	All ranks
Mathematics	19.6%	13.2%	4.6%	8.3%
Chemistry	21.5%	20.5%	7.6%	12.1%
Physics	11.2%	9.8%	4.6%	6.6%
Biological sciences	30.2%	24.9%	14.8%	20.2%

Note: Figures for chemistry are for the 2003 fiscal year. All others are for 2002.

Source: "A National Analysis of Diversity in Science and Engineering Faculties at Research Universities," by Donna J. Nelson and Diana C. Rogers

GRAD HOUSE SKI TRIP FEBRUARY 28

- Mount St. Louis/Moonstone
- Bus leaves UW Ring Road/Needles Hall 5:30 am
- Bus leaves resort 4:30 pm (back by 7:30 pm)
- **Ski Lift Pass and Coach Transportation: 45.00**
- Ski Rentals are available at the resort (rental extra)
- Buy your ticket at the Grad House by Friday Feb. 27

**Your FAUW membership
includes membership in Grad House**

FAUW Office

Pat Moore, Administrator

Sandy Rung, Assistant

Room 4002, Mathematics & Computer Building

Phone: 888-4567, ext. 3787

Fax: 888-4307

E-mail: facassoc@uwaterloo.ca

Website: <http://www.uwfacass.uwaterloo.ca>

FAUW FORUM

The FAUW Forum is a service for the UW faculty sponsored by the Association. It seeks to promote the exchange of ideas, foster open debate on issues, publish a wide and balanced spectrum of views, and inform members about current Association matters. Opinions expressed in the Forum are those of the authors, and ought not to be perceived as representing the views of the Association, its Board of Directors, or of the Editorial Board of the Forum, unless so specified. Members are invited to submit letters, news items and brief articles.

If you do not wish to receive the Forum, please contact the Faculty Association Office and your name will be removed from the mailing list.

ISSN 0840-7320

PRESIDENT'S MESSAGE

GREETINGS AND SALUTATIONS

It seems as if two long standing institutions are about to change – one of minor significance, the other of major importance.

The FAUW Board has decided to discontinue the yearly preparation of membership cards. Our staff was spending a great deal of time preparing the cards; however, we felt they served little purpose. The only time the cards are really needed is during confidential voting, but we have membership lists that fulfill the same function. We also discovered, on investigation, that most other faculty associations in Ontario do not issue membership cards.

At the same time we are still encouraging faculty who do not belong to the Association to join. We are your representatives in terms of initiating and developing policy that affects faculty, and we are your salary negotiators. If you want to influence our decisions, you need to join the Association so that you can vote and make your views known. Membership applications are available from the Association Office (x3787) or on the Association Web site (www.uwfacass.uwaterloo.ca).

The second change will also affect faculty but in a much more significant way. Many internal and external political signs are indicating that mandatory retirement will cease to exist within the next few years. We have already raised this issue at the Faculty Relations Committee and learned that the Administration considers such a change almost inevitable. For one thing, we in Ontario are out of synch with other jurisdictions in the United States and in Europe that do not follow such policies. Consequently, our programs did not seem as attractive to senior faculty.

This change could have some benefits for some faculty, but might not be welcomed by other faculty. Some faculty, especially women faculty, come into their careers late. Consequently, they do not have well developed pensions on their retirement. Other faculty, both male and female, have projects in place, perhaps well funded projects, that they have not completed by the mandatory retirement age. Some are in good health, actively involved in their scholarship, and supporting a number of graduate students. They are simply not ready to retire and, in fact, losing such people could prove counter

productive. We are only now beginning to recover from the effects of the SERP retirement plan. SERP took a significant number of grant holders out of our system and has affected our ability to get other grants. Retaining senior faculty who can achieve grants and bring newer faculty into the grant networks makes sense.

However, there are definitely some negative implications to the end of mandatory retirement. A number of university administrations are indicating that they believe tenure should cease at age 65 and that faculty after that point would have to, as it were, prove their worth to their institutions. One senior university administrator has observed that universities will have to become colder and more aggressive in their treatment of both faculty and staff. With mandatory retirement in place, administrations could afford to let somewhat less productive employees drift towards retirement. However, if the new legislation is enacted, then administrations will be more inclined to force those perceived as non-productive out of the workplace. The change in retirement legislation could also cause problems for faculty renewal. It might prove more difficult to create positions for new faculty.

In order to fully understand the implications of the possible end of mandatory retirement, we have created

an ad hoc committee under the direction of Frank Reynolds. We have identified the policies that need to be changed and the effects on the pension plan. We will be providing you with an update on this information at our next Annual General Meeting.

Our basic position, however, remains straightforward. We believe that faculty need to be offered informed choices when they reach retirement age. The option of early retirement ought to remain available for some faculty, and the option of extending their careers beyond 65 ought to be available to other faculty.

If the legislation is enacted that will eliminate mandatory retirement and if that legislation is applied to universities (and we expect both eventualities), then we will be working with the administration to develop new policies and procedures to guide interactions over this important time in our careers. Now is a really good time for you to let us know what your thoughts are on this important issue.



Catherine Schryer
*Department of English Language
and Literature*