THE SENIOR COLLEGE MESSENGER

Issue 41: March, 2025

This is an organ for members of Senior College to submit short articles that share news, letters to the editor, reactions to the program and anything that they feel will be of general interest. Its regular appearance will allow for an exchange of opinion of topics of interest to the members. In particular, it would be interesting to record reactions to the talks, colloquium topics, books discussed and items appearing in the Messenger*.*

We also welcome brief notices of important books of general interest that are worth reading and views on what should be included in a modern school curriculum from the perspective of your discipline.

Please submit contributions to the co-editors, Ed Barbeau at barbeau@math.utoronto.ca or Mary Finlay at booksaplenty1949@gmail.com.

20th ANNUAL SC SYMPOSIUM: April 9, 2025, 9am-4pm

Adapting to Climate Change: Ways Forward

The effects of climate change are now evident in Canada and worldwide. Our speakers will describe and discuss ways of adapting to new realities in local and global economies and living conditions. They will bring perspectives from research, professional activity, and public policy. Be part of the discussion on Wednesday, April 9!

To join speakers and colleagues at the Faculty Club, early registration is $75 until April 2, and $90 thereafter. This includes refreshments, lunch and the post-event reception.

To participate by Zoom, registration is $25. You can upgrade to the in-person event if you wish.

Visit https://www.seniorcollege.utoronto.ca and click on *Events* for further information.

CURAC ANNUAL CONFERENCE

Are you thinking about a trip to Monreal this May? You might be interested in this event.

The McGill University Retiree Association (MURA) and the College and University Retiree Associations of Canada[1] are pleased to announce that registration for the CURAC annual conference in Montreal from May 21 to May 23 is now open.

There will be simultaneous translation and the opportunity to join virtually. Keynote speakers will address topics that closely parallel themes of recent and upcoming events at our own Senior College. The conference venue has limited seating so early registration is encouraged. Voting delegates should register by March 7; if attending virtually, indicate that as soon as possible.

Here is the link with all the information and registration form: https://www.mcgill.ca/mura-arum/conference.

[1]Senior College is a member of CURAC.

COMMENTS ON EDUCATION IN SCIENCE

Harold Atwood

Harold Atwood accepted the invitation to Senior Collegians to share their views on the impact of public education on society. While his comments speak to a particular area of knowledge, many of his points will resonate with those in other fields. We look forward to further contributions.

Concerning education in science as a factor leading to preparation for the challenges of modern society, I have a few comments on what may be lacking. My early explosure to science was entirely through direct experience, as I tagged along with my father, a forest entomologist.

I cannot recall much formal science education when I eventually reached grade school. Much depended on the interests of individual teachers. For instance, the chart our Grade 4 teacher set up for us to enter observation of birds germinated class enthusiasm for the biological world. In general, the quality of early science exposure in school probably depends greatly on the quality of teachers attracted into the profession. In his recent book, *Upheaval* (2019), Jared Diamond discussed the declining preformance of American students by world standards. He attributes this in part to low salaries and related lack of interest by good students in the teaching profession: "**All** school teachers in South Korea, Singapore and Finland come from the top third of their school classes, but at least half of American teachers come from the bottom third of their classes."

High school courses covered the descriptive aspects of several branches of science but did not necessarily prepare even students with the Grade 13 credits necessary to enter the four year Honour Science program at U of T for the demands of university level courses. Not all made it to second year.

On the whole, our undergraduate science education emphasized comprehension of the basic principles and features intrinsic to the several fields covered in our courses, and there were some outstanding professors who cultivated our interest and motivation. But I think there was a key feature missing in our education, or at least not explicitly brought forward or emphasized, which relates to some of our present-day societal and political problems: the primacy of science as a way to establish knowledge of the real world. The relation of science to such knowledge was worked out by scientists and philosophers during the Englightenment; I think we took it for granted and thus did not consider it worth discussing or teaching until recently. Now we are feeling the impact of several anti-science developments: on the economic level, attempts to discredit the scientific approach to climate change by heavily financed fossil fuel industries (as resoundingly related in our recent book club selection *Dark Money* (by Jane Mayer, 2016, 2017) in the chapter entitled "Fossils"); on the political side, by fact-ignoring and conspiracy-chasing powerful politicians (the most prominent being, of course, Donald Trump and his cabinet choices); on the philosophical level, by relativists who equate opinion with objective knowledge. Several writers have explored these issues in depth (for example, *The Death of Truth* by Michiko Kakutani, 2018; *The War on Science* by Shawn Otto, 2016).

In view of the current disregard of fact-based knowledge and the advent of Trump with increased licence to overturn established order, I would agree with Bertrand Russell (*Power*, 1938) who argued, "In excited times, a politician needs no power of reasoning, no apprehension of impersonal facts, and no shred of wisdom. What he must have instead is the capacity of persuading the multitude that what they passionately desire is attainable, and that he, through his ruthless determination, is the man to attain it. The

most successful democratic politicians are those who succeed in abolishing democracy and become dictators." Regarding education, "To acquire immunity to eloquence is of the utmost importance to the citizens of a democracy. — Education should be designed to counteract the natural credulity and the natural incredulity of the uneducated: the habit of believing an emphatic statement without reasons, and of disbelieving an unemphatic statement even when accompanied by the best of reasons." An educator "will aim at strengthening individual judgment, and will instill what he can of the scientific attitude towards the pursuit of knowledge."

CALENDAR OF COMING EVENTS

Events marked with **F** are for fellows and external fellows. Advanced registration is necessary for each event. This can be done in response to a weekly email from Senior College or the Faculty Club to its members that describes the events or through the Senior College website.

20th Annual Symposium (Zoom and in person at the Faculty Club

Wednesday, April 9: 9 am – 4 pm

CURAC Annual Conference

May 21-23: McGill University, Montreal

Talks: Wednesdays 2-4 (Zoom and in person at the Faculty Club)

March 5: Ajay Heble *The determination to care: festivals, pedagogy, community*

March 12: Madeleine Zurowski *Dark matter*

March 19: James Campbell *Music inside out*

March 26: Mark McGowan *'Kindred spirits' in the North: indigenous peoples in British North America and their donations to Irish famine relief*

Colloquia: Thursdays 2-4 pm
Senior College Centre, 256 McCaul Street

March 13: *Biological discoveries and their implication for sex and gender issues* (Organizer: Phil Sullivan)

Book Club: Mondays 2-4 pm (Zoom only) (**F**)

March 3: Timothy Garten Ash, *Homelands: a personal history of Europe* (2023) (Leader: David Milne)

April 7: Ursula K. Le Guin, *The dispossessed* (1974) (Leader: Molly Wills)

May 5: Emily Wilson, *The Odyssey, by Homer in the new poetic translation* (2017) (Leaders: Linda Hutcheon & Martin Revermann)

June 2: Andrew Stobo Sniderman & Douglas Sanderson (Amo Binashii), *The Valley of the Birdtail* (2022) (Leader: Janet Paterson)

July 7: Fei-Fei Li, *The worlds I see: curiosity, exploration and discovery at the dawn of AI* (2023) (Leader: Susan Pfeiffer)

Aftermath

Students who take secondary mathematics may learn about the interesting set of equations:

$$1^3 + 2^3 = 9 = (1+2)^2$$
$$1^3 + 2^3 + 3^3 = 36 = (1+2+3)^2$$
$$1^3 + 2^3 + 3^3 + 4^3 = 100 = (1+2+3+4)^2$$

and so on.

It turns out that sets of numbers for which the sum of the cubes is equal to the square of the sum are quite common. Another way to find such a set is to pick any number, say 12. Write down all the numbers that divide evenly into it; here they are 1, 2, 3, 4, 6, 12. For each of these divisors, write down the number of numbers that divide evenly into them.

Divisor of 12	List of its divisors	Number of its divisors
1	1	1
2	1, 2	2
3	1, 3	2
4	1, 2, 4	3
6	1, 2, 3, 6	4
12	1, 2, 3, 4, 6, 12	6

We find that

$$1^3 + 2^3 + 2^3 + 3^3 + 4^3 + 6^3 = 324 = (1+2+2+3+4+6)^2.$$

This method works for any number apart from 12.

There are many other patterns involving powers. Among the more zany is this one:

$$(1^5 + 2^5) + (1^7 + 2^7) = 162 = 2 \times (1+2)^4$$
$$(1^5 + 2^5 + 3^5) + (1^7 + 2^7 + 3^7) = 2592 = 2 \times (1+2+3)^4$$
$$(1^5 + 2^5 + 3^5 + 4^5) + (1^7 + 2^7 + 3^7 + 4^7) = 20000 = 2 \times (1+2+3+4)^4$$

and so on.

One of the more delicious theorems along this line is that *if two consecutive cubes differ by a perfect square, then its square root is the sum of two consecutive squares.* For example

$$8^3 - 7^3 = 512 - 343 = 169 = (2^2 + 3^2)^2$$
$$105^3 - 104^3 = 32761 = (9^2 + 10^2)^2$$
$$1456^3 - 1455^3 = (35^2 + 36^2)^2$$
$$20273^3 - 20272^3 = (132^2 + 133^2)^2$$