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Editor's Note

This issue of the end of the calendar year begins with the Lunch With ... event schedule for the upcoming Winter term. Following the **In Memoriam** box is the reprint of one of Keith Smillie's old columns, *Mousing Around*, this one reminding us of the early years of the personal computer, and how it changed the world. Now we carry one in our hand.

Despite my plea in the September issue I did not receive an adventure story from an ARAS member for this issue. Remember, an *adventure* can entail dramatic events in exotic places, but also frustration in dealing with a bureaucracy, or struggling with a computer. Gordon Rostoker's submission of a thoughtful essay has prompted me to request similar words of wisdom from us experienced elders. Think about it.

Ruth Gruhn

Notices

Speakers at the three Winter term sessions of "Lunch with..." in early 2026 will all focus on Canadian topics. For **January 28**, Rod MacLeod (History), author of a history of the RCMP and of the University of Alberta, will speak on a topic related to Western Canada. On **February 25**, Alison Criscitiello (Earth and Atmospheric Sciences; Director, Canadian Ice Core Lab; mountaineer) will talk about her work as an ice core scientist, including fieldwork on a high arctic ice cap. Lastly, on **March 25**, Geoff Holroyd (Canadian Wildlife Service; Co-founder and current Chair, Beaverhill Bird Observatory) will bring it all home to roost, so to speak, by drawing on his wealth of experience and knowledge about birds in Alberta and abroad. Look for more details about these talks, as well as their time and place, in ARAS's weekly newsletter as the date for each of them approaches.

Lunch (sandwich, soup, dessert squares, and coffee), catered by The Upper Crust Café, is available by 11:30 and costs \$25 per person (payable in person or, preferably, by Interac to ARAS at emirhse@ualberta.ca). Note that the price has increased this year, in response to the increased cost of catering.

Reports

Lunch With ... event 12 November 2025

Our guest Josephine Van Lier, Director, Early Music Alberta, brought to our gathering her collection of base string instruments, featuring viola da gamba in a range of sizes, and a 1724 cello. In contrast to a cello, a viola da gamba has six strings of sheep gut, and frets are marked on the neck. Like a cello, it is played with a bow but with a different movement. Unlike a cello, it is rarely played solo. In the 17th century the cello began to displace the viola da gamba as the most popular base instrument. In her presentation, Ms. Van Lier played samples of period music on the various instruments, to the great delight of the audience.

A thoughtful essay by Gordon Rostoker

WHY THE CORONAVIRUS HAS COME TO VISIT HUMANITY

While we are battling to stay alive in this time of COVID-19 spreading worldwide, it would do well to ask why this virus has been busy killing somewhere over 7 million people around the world in a global pandemic. We tend to think of this virus as isolated from the rest of the world, and not part of an interactive system involving all living beings on the planet.

I would wager that very few people around the world are aware of the Gaia hypothesis, developed by James Lovelock in the UK and Lynn Margulis in the United States in the 1960s, and presented formally in the 1970s. It proposed that all living things on earth, as well as inorganic matter, collectively form an entity that is known by scientists as a **complex adaptive system**. Everything in our physical world is made up of layers of complex adaptive systems, from combinations of different quarks that make up nucleons, to flora and fauna (including ourselves) that make up life on this planet. So, we should view a human being as a complex adaptive system made up of about 37 trillion cells of different **types**; and about 40 trillion bacteria, not to mention a bunch of viruses. Gaia is simply a complex adaptive system in the level above where the flora and fauna sit. Gaia should be viewed as having its primary purpose to survive and possibly to reproduce – not so far different from human beings. If Gaia wishes to survive, we must ask ourselves what Gaia views as a threat to its existence.

To start exploring this matter, we should think about how Gaia has succeeded in producing our environment, which is favorable for the existence of life as we know it. As an example, most every life form we know requires oxygen to survive. Over millions of years, the amount of oxygen in the atmosphere has been relatively steady at around 21% of the air around us. There is a reason for that. Lower oxygen levels would not allow flora and fauna to harness the energy of the sun to produce large structures like trees and ourselves. If the concentration of oxygen in the atmosphere reached 25% or so, any fire started in a forest would burn so fiercely that huge tracts of vegetation and everything in its path would be

destroyed. An oxygen level of 21% is a sweet spot! Proponents of the Gaia Hypothesis have identified all the sources of oxygen and the means by which it is removed from the atmosphere. To maintain such a constant level of oxygen over millions of years in the face of ice ages and countless volcanic eruptions speaks to intent – and for that reason the entity known as Gaia should be understood as a system that works to maintain its own existence by creating conditions in which life can thrive.

Now, we should ask ourselves what the primary threat to Gaia is at the present time. What component of the system is out of whack? The answer is simple. It is we human beings who are reproducing out of control, destroying elements of the environment all around us. How many species have we hunted to near extinction? How many habitats of other fauna (don't forget, we are fauna!!) have we destroyed as we expand our footprint on the planet? We should not be so foolish as to believe that those flora and fauna have no reason for existence as part of Gaia. So, when humanity starts to have a negative impact on Gaia, we should not be surprised if Gaia takes action in an attempt to survive. How Gaia might take action we shall leave for a moment, to consider the population explosion of the human species on this planet.

Perhaps Thomas Malthus was a little premature in expressing concern about how rapidly humanity was growing in numbers. In 1798, when Malthus expressed concern about the population growth, he foresaw a time when disease and starvation would be a consequence of too many people and too few resources. He had no idea, at the time, how clever and inventive we humans are. Even as our numbers soared, we found ways to feed ourselves and improve our standard of living to an extent that would have been unimaginable in 1798. However, the idea that population growth might be a threat was brought back to life by the Club of Rome in the early 1970s, whose seminal work *The Limits to Growth* triggered a firestorm of controversy that still simmers. They were the first to treat the development of humans and their economy as a complex system that could be studied quantitatively.

Those who worked on this problem after the initial study reached the conclusion that a sustainable population level for humanity with a good living standard for all would be no more than about 3 billion people. We are now at 8 billion people, and about 1000 people have been added to Earth's population since you started reading this article. Each new person will want a good life, and living a good life calls for harnessing a lot of energy. It would be prudent to assume that Gaia has taken note and has tasked herself with the job of bringing our population level down to a more sustainable 3 billion human beings.

How might Gaia achieve this goal? There probably is no single method that will be employed by Gaia. But, how about evolving an entity that can **selectively** take out human beings – how about a virus? How about COVID-19? So far, at the time of writing, there are well over 7 million fewer human beings alive than would have been the case had the virus not spread around the globe. Of course, Gaia must cope with the ingenuity of human beings who are, even as you read, developing techniques to foil the virus and bring it to its knees. However, Gaia has other ways of bringing down the population. There are the time-honored ways of warfare (both gang and state), and we know full well that famines are an effective way of reducing populations. While such statements are coldly clinical, they represent the way nature works. Gaia will do whatever it takes to bring the human population into

harmony with the ecosystem it shares. After all, after the first couple of years of the pandemic during which the virus has taken out over 7 million human beings, approximately 70 million humans per year had been added to the planet, given the present rate of population growth (which has stabilized to just under 1% in recent times). Obviously, Gaia has work to do! It seems to be starting its work by allowing the COVID-19 virus to mutate – even as we humans are producing vaccines to combat the virus, it is changing in ways that make it more contagious and perhaps eventually capable of overwhelming our ability to produce vaccines to combat it.

Are we looking at the extinction of humanity? Of course not! We humans have a niche in the **complex adaptive system** that is Gaia. We each, in our own way, play a purposeful role in the life of Gaia. However, there doesn't need so many of us to achieve our purpose, whatever that might be in the context of Gaia. The downside of what is to come is that we will have to see our numbers decrease from 8 billion (and rising) down to about 3 billion and hopefully stable. How that will be achieved will not be very pleasant from the human perspective. The upside is that there is a place for us on our planet, doing what human beings are uniquely able to do; use our brains to explore our local environment (Earth) and our more remote observable environment (the Universe). Find out what it is all about! And make it a pleasurable and fulfilling experience!!

Gordon Rostoker

P.S. To get an appreciation of complex adaptive systems and how Gaia might be considered such a system, Google the Wikipedia entry for **complex adaptive systems** and read what it says. If you aren't already familiar with the Gaia hypothesis, a good read is the updated version of the book *Gaia: A New Look at Life on Earth* by James Lovelock, Oxford University Press, 2000. There is "meat" behind the hypothesis.

In Memoriam

Peter Allen	Bio-Medical Engineering
Gerry Redmond	Physical Education
Peter Smy	Electrical Engineering
Marilynn Wood	Dean of Nursing

Mousing Around

Keith Smillie

Recently I came across a copy of *Time* magazine dated May 3, 1982, with the cover story entitled “COMPUTER GENERATION A New Breed of Whiz Kids”. This issue marked the debut of a new department on computers, that according to the publisher, “constitute yet another quantum leap in the ability to cope with the world”. The whole issue presented an interesting glimpse of the world thirty years ago, so before looking at the state of computers and computing them, we might mention a few events that were making news.

Internationally the British fleet was approaching the Falkland Islands, Helmut Schmidt’s Social Democratic Party agreed to support NATO’s decision to install nuclear missiles in five Western European countries, and in the United States questions were being asked if President Ronald Reagan and Secretary of State Alexander Haig really did have a foreign policy. The obituary of Archibald MacLeish occupied over half of the obituaries page, and even the recent introduction of fancy shoelaces imprinted with “rainbows, hearts and whole menageries” merited a news item of about 30 lines and an illustration. There was no Canadian news.

To me the advertisements were at least as interesting as the news. There were about half a dozen ads for cars, most of them very large by today’s standards, although the Volkswagen Rabbit received a full-page ad emphasizing its “CIS Fuel Injection” system. There were even more liquor ads, all of them touting the advantages of their particular brand. However, for me the most interesting ad was one by TransCanada Telephone System promoting its free booklet, “35 Ways to Become More Effective with Long Distance,” which included opening new accounts, collecting overdue accounts, and even “conversation starters”. How things have changed with the Internet and the World Wide Web! However, before we become too smug, we should ask ourselves how today’s technology will look thirty years hence.

The *Time* cover shows a computer-generated image of a young schoolboy, which is reproduced on a small scale on the index page with the following caption: “With an ease and enthusiasm few adults can fathom, a new breed of youngsters, some no more than toddlers, is mastering a machine that is sparking a revolution in the classroom and the world”. This claim, I believe, sets the tone for the present content of the new Computer department.

The lead article, about seven-and-a-half pages in length (about half a page is taken up with a liquor advertisement) describes in enthusiastic terms the experience of schoolchildren with computers both in school and at home. The many illustrations show children with rapt looks on their faces, either alone or in groups, using computers. There are no teachers present in any of the pictures, although one of them does show a mother seated at a computer receiving a lesson from her 12-year-old son, who has a very patient look; and has the caption “If you were born before 1965, boy, you’re going to be out of it”.

The accompanying text gives interesting examples of what these children are doing with computers, and we can mention only a few of them here: A 14-year-old is finishing a long program which constructs a detailed image of a human heart, another 14-year-old is working on a simulation of a nuclear reactor, and a 15-year-old is working on a verb-testing program for Spanish classes. There are stories of children becoming addicted to computers, including one in which the only way a father could get his son’s attention at home was to “go down to

the cellar and throw the house's main power switch".

Unfortunately there are stories of the improper or illegal use of computer facilities. Pirating of software is an example which one teenager justifies with the words: "This is illegal, but we are basically honest people. I don't know anyone who doesn't pirate software". Another student was able to break into the Department of Defense's Arpanet, the predecessor of the Internet, and use it for a pen pal club, dating service, and electronic magazine.

There is a two-page essay on the nature of thinking and whether computers can think or will ever be able to think. For me the most interest part of the essay was a brief discussion of the ELIZA project of Joseph Weizenbaum at M.I.T., in which an IBM computer was programmed to simulate a psychoanalyst carrying on a conversation with a "patient" in natural language. The following example of such a conversation is given:

Patient: You are like my father in some ways.

ELIZA: What resemblance do you see?

Patient: You are not very aggressive, but I think you don't want me to notice that.

ELIZA: What makes you think I am not very aggressive?

Patient: You don't argue with me.

ELIZA: Why do you think I don't argue with you?

Patient: You are afraid of me.

ELIZA: Does it please you to believe that I am afraid of you?

Today ELIZA may be compared with the IBM computer "Watson" which appeared not too long ago with much fanfare on the television show *Jeopardy*.

Although much has changed in the world of computers, and in the world at large, since this issue of *Time* appeared, many of the computer questions mentioned are still with us. These include attracting more women into what many see as a male preserve, what programming language should students be taught, when should students be introduced to computers, and should computers be introduced at all as a separate subject in the schools.
