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Epilogue

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Editor's note

In this last issue before summer break, each APE Interest Group summarizes its activities during the past academic year, and there is a brief report on the speaker's presentation at the last Lunch With..., in late March. After such a small box in the March issue, sadly there are over a dozen names in the In Memoriam box in this issue. The issue closes with another story about the amazing mathematician Charles Babbage in the 77th article for Mousing Around, by Keith Smillie.

Ruth Gruhn

Notices

Lunch With... schedule for Fall term:

20 September: speaker and topic TBA

25 October: AGM and Photographic Exhibit

22 November: speaker and topic TBA

The annual **Christmas Brunch** will be held on Saturday 16 December.

Instructions for APE Photographic Exhibition

The 2017 Photographic Exhibition will be held in conjunction with the APE Annual General Meeting in October 2017.

There will be two categories:

Category A: This year's theme is "Portraits of People and/or Animals"

Members may enter up to three prints of any size. They may be matted but not framed.

Category B: “Favorites”. Favorite photographs of any subject. Members may enter up to three prints of any size. They may be matted but not framed.

This is an exhibition not a competition, and entries are welcome from any APE member regardless as to whether they are members of the APE Photographic Club.

All attendees at the AGM will be able to vote for the “peoples’ choice” in each of the two categories.

Entries should be given to Ken Barron (780-435-7541 or ken.barron@ualberta.ca) by mid-October 2017.

Reports

Lunch With ... presentation on 22 March 2017

Dr. Andrea Gruneir of the Department of Family Medicine spoke of her 2005 Ontario project considering circumstances of patient transitions from long-term care facilities to hospital. These events are often traumatic for the patient, who can be quite elderly and frail; and are no fun for the emergency room staff either, who do not know the medical history of the patient. The most common reason for a transfer to a hospital emergency room was an injury due to a fall, which should be a preventable accident in a long-term care facility. Dr. Gruneir concluded that there is a need to focus on improving conditions in long-term care facilities, especially the formal training of the health care personnel, whose training now varies considerably from place to place.

Ruth Gruhn

Arts Interest Group

A dedicated group of arts lovers continued to attend the meetings. Talks were on topics as varied as local mystery novels, public art in Edmonton, theatre design, Japanese-inspired illustration of poetry; and the genesis and history of the recorder, the sarangi, and the saxophone. Allison Balcetis, our saxophone player, recently received the mayor’s award for excellence in the arts.

Vivien Bosley

Book Club

As usual, the Book Club met eight times during the academic year, each time to discuss a pre-selected book. Attendance is around a dozen or so people. The selection of books takes place in April or May by e-mail; and the procedure involves a call for

nominations, the development of a list of suggested readings, the circulation of this list, and a vote. A schedule is then developed, and members volunteer to lead our discussions. This procedure usually produces a somewhat eclectic collection of books, and almost always includes a classic (this year it was *Vanity Fair*) and often a biography (for example, *Stalin's Daughter*). We operate in a rather informal way, and welcome all who enjoy a good book. Our list of nominations for the 2017-2018 academic year is available upon request.

Judith Hibberd

Current Affairs Interest Group

This year the Current Affairs Interest Group met on five occasions: October, November, December, February, and March. Over the past year the attendees at our events has been as low as seven and up to a “roomful” at Emeritus House, depending upon the topic being addressed, the speakers, and as well on the influence of vacation times; and as is usual in winter, the weather. As has been the case in recent years, some discussions are led by “imported” experts while for other selected topics, the discussion is developed by the attendees.

The February meeting was an open meeting that centred upon Canada’s relationship with the new U.S. Administration. The March meeting was addressed by Frank Bessai and an Associate from Catholic Social Services Edmonton, who discussed the adaptation of refugees to Alberta, with special attention to recent arrivals from Syria.

Janet Robertson

Dining Out Group

The Dining Out Group had another good year, culminating in a visit last month to the Cajun House in St. Albert which 17 people attended; the food was very good. Thanks to Liz Samson for making the arrangement. Doug and Lynn Dale have invited us to their lakeside cottage later this summer, and we all are looking forward to that.

Eunice Barron

History and Historiography Group

This group had a very exciting season, with some excellent speakers from a wide variety of disciplines. For example, Prof. Joanne Freed gave a presentation on the rivalry between the Catholic Church and the secular bureaucracy within France at the turn of the 20th century over the custody of Carthaginian antiquities in Tunisia. Prof. Albert Braz presented a fascinating lecture and Q & A on the geopolitical, geo-sociological, and geo-cultural position of Canada – Arctic and hemispheric. Patricia Paradis, CEO of the Centre for Constitutional Studies, gave a brilliant talk on the patriation of the Canadian constitution that focused on the period from 1867 to the present but ranged back to the 16th and 17th centuries. Other presentations were also outstanding.

Martin Katz

Photography Group

After many years of organizing the Photography Group, David Baine decided to step down in the fall of 2016. We are all grateful for his many years of excellent arrangements and expert advice. Thank you, David. Although I am by no means an expert in photography, I agreed to try to organize the group, starting in January, since I was away for much of the fall.

The group had an organizational meeting in January at which we challenged each participant to bring a few favorite photographs and to describe why it was a favorite. It became quite clear that we are a diverse group with many perspectives, which makes it even more enjoyable. We also decided that the theme for the year's photography challenge at the AGM would be "portraits of people and pets," and Ken Barron agreed to arrange this competition again this year.

The February meeting focused on a discussion on the topic of post-photography modifications of pictures, pro and con. In April, the meeting focused on portraiture. A meeting on 16 June will involve an excursion to the Wagner Conservation Area to take pictures of the ladyslippers.

Nils Peterson

Travel Club

The Travel Club met five times during the 2016/2017 period. We saw interesting presentations on a variety of cities around the world. In October Doug and Joan Hube gave a colourful presentation on Birding in Namibia. That event was followed by Nat and Marie Rutter's account of a tour in Myanmar. In January Don and Jean Bellow described their tour of Egypt with a cruise down the Nile. In February David Jones gave a video presentation of his trip to Myanmar, Nepal, and Tibet. In April Ed and Murial Toop brought us back to Canada with a description of their road trip through Newfoundland from St. Johns to L'Anse Aux Meadows.

We are looking for presenters for the coming 20-17-2018 year. Any one interested in giving a presentation of their travel experiences please contact Don Bellow at dbellow@shaw.ca.

Don Bellow

In Memoriam

John Bilsland	English
Frank Bueckert	Drama

John Colbourne	Mechanical Engineering
Jim Corrigan	Museums and Collections
Frederick De Luna	History
Fernand Ellyin	Mechanical Engineering
Gouri Gourishankar	Electrical Engineering
Geoff Kulak	Civil Engineering
Verna Lefebvre	Clothing and Textiles
Neil Madsen	Biochemistry
Peter Savaryn	Chancellor
Harry Schiff	Physics
Brian Sproule	Medicine
Bill Stewart	Extension
Louise Taylor	APO, Registrar's Office
Joseph Warwaruk	Engineering

Mousing Around

Keith Smillie

77. Charles Babbage and the Analytical Engine

As was mentioned at the end of the previous column, work continued on the Difference Engine until 1842, although Babbage had lost interest in it ten years earlier. At that time he conceived a plan for a much grander machine, which he called an Analytical Engine. In this column we shall give a brief description of the Analytical Engine, and also introduce Lady Lovelace and her contribution to Babbage's work.

The Analytical Engine, which would be a truly automatic computer, was to have the following five components: a *store* for holding the numbers to be operated on; a *mill*,

which was Babbage's term for an arithmetical unit, for performing the arithmetic operations; a *control* unit for ensuring that the operations were performed in the correct sequence; an *input* device for providing the machine with data; and an *output* device for displaying the results of the calculation.

Numbers were to be represented in the Analytical Engine, as they were in the Difference Engine, by columns of wheels, with one column for each number and one wheel for each digit. The store was to accommodate 1000 fifty-digit numbers. Transfer of data between the store and the mill was to be by an elaborate system of gears and rods. Control of a calculation was to be accomplished by means of punched cards similar to those used to control the operation of the Jacquard loom used in weaving. There were to be two types of cards; control cards to specify the type of operation to be performed in the mill, and variable cards to control the transfer of numbers between the store and the mill. Input was to be accomplished by manually setting the wheels of the store, although tables of mathematical functions were to be supplied on punched cards. Output could be printed on paper, punched on cards, or cast in molds from which printers' blocks could be made. One aspect of the operation of the Analytical Engine to which Babbage devoted a considerable attention was the handling of carry digits that could arise in addition. He eventually developed an anticipatory carry in which all of the carry digits could be handled simultaneously.

Unfortunately Babbage wrote no complete account of the Analytical Engine; however, in 1840 he gave a series of public lectures in Turin that were written up by a young engineer, L. F. Menebrea, (who became Prime Minister of Italy in 1867); and published in a Swiss journal in 1842. A year later they were translated into English and extensively annotated by Lady Lovelace, and published in *Taylor's Scientific Memoirs*. The paper is mainly concerned with the programming of the Analytical Engine, and several examples of programs are discussed in considerable detail.

Now we must introduce Lady Lovelace. She was born Ada Augusta Byron, and was the daughter of Lord and Lady Byron. She had considerable mathematical talent, a characteristic that she shared with her mother, who encouraged her mathematical interests. She studied for some years with the noted mathematician Augustus De Morgan. She became interested in Babbage's work in 1834 at the age of nineteen, when she attended a lecture on the Difference Engine by Dionysius Lardner, who was a noted popularizer of mathematical subjects. In 1835 Ada Byron married William, Baron King, who was created the first Earl of Lovelace in 1838. Lord and Lady Lovelace became friends of Babbage, and she was able to follow his work closely. Lady Lovelace died of cancer in 1857 at the young age of 37. Lady Lovelace may be considered the world's first computer programmer.

The name "Ada" was given to a programming language designed for what has been termed "large long-lived applications where reliability and efficiency are essential". It was originally developed in France in the early 1980s; and has been revised several times since then, the last time in 2005, although additional features were introduced as late as 2012.

Dionysius Lardner's paper on the Difference Engine stimulated a Swedish engineer, George Scheutz, to build a similar machine that could accommodate fourth-order differences to fourteen figures. A copy of this machine was made for the British Government, and was used in the Office of the Registrar General for the preparation of life tables. Several types of Difference Engines were built in the early 1900s, some of them being adaptations of existing calculating devices.

Possibly the most interesting continuation of Babbage's work is the construction by the London Science Museum of Difference Engine No. 2 from Babbage's plans for his uncompleted Difference Engine No. 1. This work, which was begun in the second half of the 1980s, was undertaken in part to see if engineering practice in Babbage's time would have been sufficiently precise for the construction of a working machine; and partly as a most fitting tribute to Babbage on the 200th anniversary of his birth on December 26, 1991. A fascinating account of this work, which involved "bankruptcy, funding crises, mishaps and the politics of any major engineering project," has been told by Doron Swade, an Assistant Director and Head of Collections at the Science Museum, who was in charge of the project. (Swade's book was published in Great Britain with the imaginative main title of *The Cogwheel Brain*, and a couple of years later in America more prosaically as *The Difference Engine*.) A better introduction to the life and times and work of Charles Babbage would be difficult to find.



Have a great summer, everyone!

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