

EDITORIAL

Geoscience Canada: Some Reflections on our Golden Anniversary

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PREAMBLE: WHERE DID FIFTY YEARS GO?

My generation asks this question almost on a daily basis as the passage of time not only seems unfairly rapid, but increasingly so. I have now been the Scientific Editor for *Geoscience Canada* for over 8 years, and I am apparently now the longest serving on a long list. My own journey into geology actually began at about the same time as the history of this journal. I previously recounted my exposure to articles from its very first issue, as one of my professors (who had studied in Canada) used material for course discussions. Little did I think then that I might close my career working as its editor. I do not expect that Issue 51 will be the last that I help to assemble, but soon it will be time to pass responsibility to someone who is younger than this Journal. Anyone who has ‘served time’ as an editor knows that it poses some challenges and at times brings acute frustration, but I believe all would agree that it also brings much reward. The articles in each issue slowly become old friends as we read and re-read them, and when we see them in final form it somehow erases memory of repeated copy editing and tiresome reference checks. We may not always understand details of a paper when it lands on our desks, but when it makes it to a proof we have learned much. No editor that I have met claims to enjoy every moment of the work, but all know that it provides a first-class learning experience. If those words persuade you, do not hesitate to get in touch!

In five decades, *Geoscience Canada* was guided by twelve editors, and names will be familiar to many. I could list them one by one in the text, but instead I will follow advice and move them into a table. Sadly, two of them are no longer with us. Gerry Middleton laid down founding principles for what we do and played an important role in developing our *Facies Models* thematic paper series. We lost Roger Macqueen recently, and his six years at the helm were equally valuable. For more about Roger's influence, see the lovely tribute in this issue, and maybe raise a glass to the connections between wine and geology,

A listing of Geoscience Canada editors since its foundation.

GEOSCIENCE CANADA EDITOR	START	END	VOLUME NUMBER
Andrew Kerr	2016		V.43 –
Brendan Murphy	2012	2015	V.39 – V.42
Reginal A. Wilson	2008	2011	V.35 – V.38
Sonya A. Dehler and Steve McCutcheon	2005	2007	V.32 – V.34
Godfrey Nowlan	2002	2004	V.29 – V.31
Roger Macqueen	1996	2001	V.23 – V.28
Phil C. Thurston	1993	1995	V.20 – V.22
Michael E. Cherry	1989	1992	V.16#4 – V.19
Andrew Miall	1983	1989	V.10 – V.16#3
Robert H. McNutt	1979	1982	V.6 – V.9
Gerard V. Middleton	1974	1978	V.1 – V.5

which he helped us to appreciate, and to the wider love of natural science that he personified. My first task here is to express appreciation to all these previous editors for their contributions to the Journal. I know that my work is made easier by standing upon their shoulders. I also thank the managing editor of Geoscience Canada, Cindy Murphy, for her amazing ability to keep things running smoothly despite my unreliable memory and frequently unwise assumptions. Without her efforts and sage advice, I am not sure that we would have made it to half a century. I also sincerely thank Bev Strickland for her skilful work with our article layouts, Evelise Bourlon for her French Translations and Peter Russell for the wonderful graphic icons used in our papers. Last, but not least, Karen Dawe at GAC is our connection for many matters, and is thanked for all her efforts on our behalf. It truly takes a team to run even a small journal.

In the introduction to the first issue, then GAC President W.W. Hutchison (1935–1987) commented that “*The first issue of Geoscience Canada is an historic event for our Association; it marks both the start of a bold new venture and the end of an old one*”. Our first editor, Gerry Middleton, emphasized that articles “*will be written at a technical level that can be understood not only by specialist research workers but also by non-specialists in other branches of the Earth Sciences*”. These are crucial principles for what we now try to do in a world where scientific publications are increasingly specialized and increasingly unreadable. In this Golden Anniversary year, we are surely entitled to recognize and celebrate past

achievements but we must inevitably also look ahead to new challenges that will confront us. The world of science publishing has changed enormously since I adopted this role, and it continues to evolve at a bewildering pace. We have adapted to many of these shifts, in some cases without really thinking about details, and emerged intact, but we will have new challenges to consider in the years ahead.

The Past: Our History of Adaptation and Improvisation

“*Publish or Perish*” and “*Adapt or Perish*” are well-known maxims, but they are in many senses inseparable concepts. We have adapted constantly over 50 years, and sometimes it seems that every issue involves some kind of improvisation in order for it to emerge as planned. The very nature of our Journal shifted progressively as we adapted so as to thrive. We started out as a “Society Journal”, available principally to members of the Geological Association of Canada (GAC). We did not offer external subscriptions as such but were available at Canadian Universities and in libraries. In addition to technical articles, we published commentaries, conference reports and society news. This was a valuable role, but in those early days our influence and accessibility beyond Canada was limited. However, that was a very different world, dominated by print media, and international scientific collaboration was limited compared to what we now take for granted. The concept of *Open Access* seemed inconceivable in those times, but now it dominates discussion of our future, and science publishing in general. Despite those 20th century limitations, *Geoscience Canada* achieved international impact, especially through our *Facies Models* and *Ore Deposit Models* thematic series papers, which became teaching and reference materials. As the new millennium dawned, digital publication and distribution opened new opportunities for smaller journals to have larger impacts, and there was a change in our strategy. Under the leadership of my friend and predecessor Brendan Murphy, *Geoscience Canada* became partially independent from GAC, and was no longer tied to GAC membership dues. Subscriptions akin to those offered by other journals were offered, although at much-reduced rates compared to our competitors. This brought us growth in subscriptions, increased revenue to GAC and - most importantly - the promise of wider readership, especially beyond Canada.

Changes always initiate other shifts, and this devolution created challenges in producing and distributing what was then an exclusively print-based journal. As the new century unfolded, it seemed that hardcopy publishing might give way entirely to PDF documents and other e-publications. This was welcomed by some readers and users, but not always by publishers, because it carried implications for copyright and financial sustainability. Despite such predictions, books did not become obsolete (for which I am truly thankful) but the trend to digital media is inexorable. It became clear that this would define the difference between publishing and perishing, and *Geoscience Canada* became a fully electronic journal. This second transition further increased our readership, but its impact is harder to measure because the linkage to subscriptions was weakened. Once a document is in PDF format, it will take unrestricted

flight, no matter what legal strictures might dictate. We probably reached many more people around the world, but this did not automatically provide us with more resources to do what we do, or to do more. The evolution of *Geoscience Canada* in the first decades of the 21st century is best viewed as a halting journey towards *Open Access publishing* (OA), which will be discussed subsequently. Suffice it to say that this is one of the major issues, if not *the* major issue, that now confront us. It will be the next step in our journey of adaptation and improvisation, but we are unsure of how to proceed. Undoubtedly, we will need to improvise yet again.

OUR DISTINCTIVE MANDATE: THEMES AND THEMATIC SERIES

I am often asked “*what kind of papers do you publish?*”, or “*is our paper suitable for Geoscience Canada?*”. These questions can be tricky to answer. We have published technical papers in all areas of geoscience, and we seek diversity in our content, in all senses of that now-powerful word. We are of course a Canadian journal, and much of our content is directly or indirectly connected to the remarkable geology of our country, but this should not restrict us. Since 2015, we have published articles connected to all continents, with the possible exception of Antarctica, but it would not surprise me to find something from the frozen South in our archives. We are an international journal, with authors around the globe, and we aspire to be even more so. In addition to papers dealing with rocks, minerals and related matters we have explored history, with particular emphasis on Canadian pioneers of our science. These are also important contributions and we feel that such material is just as valuable as isotope science or tectonic models. Some papers we have published, like those in Paul Hoffman’s *Tooth of Time* series, resist rigid classification, but remain insightful and thought-provoking. The characters who defined geological thinking are often just as interesting as the scope of their research, and we delight in bringing them to life. Other published material, such as conference reports, reviews of books and GAC presidential addresses fill other important functions on a national scale. It may seem hard at times to discern a common thread within our pages, but above all we seek to produce material that can cross the sometimes artificial boundaries between the disciplines within Earth Science. We want petrological insights to inform stratigraphers and paleontologists, and treatments of climate science to resonate with economic geologists; in essence, to publish material that allows concepts and information to flow in all directions. It may be a rather tired metaphor, but we would like to be a bridge between increasingly divergent disciplines concerned with our Earth, but not only the Earth. That is an ambitious aspiration, and I would never claim that we attain it all the time, but if we approach it even some of the time it surely benefits both authors and readers alike.

Science journals are not all about research and should not be. In our view, we also must assess material in terms of long-term educational value and try to develop this role. Many of our papers provide conceptual and factual overviews of topics or areas, discussing opposing viewpoints and highlighting gaps

in our knowledge. These articles provide up-to-date resources for educators, and it is our hope that they may inspire educators to develop their own reviews of salient topics. And, of course, take the time to submit them for future issues of the journal! This is another aspiration that we can probably never fully attain, but some of these efforts have proved successful, and we believe that they will have enduring value.

These diverse objectives come together in the numerous *Thematic Paper Series* that *Geoscience Canada* initiated over 50 years, some of which were published as self-contained compilations of linked papers. The best known are *Facies Models*, aimed at concepts in sedimentology and stratigraphy, and *Ore Deposit Models*, which outlined conceptual genetic frameworks for mineral resources. These are just two examples of this approach to scientific publishing, and we hope that there will be others, such as *Igneous Rock Associations*, managed by Jarda Dostal, at St. Mary's University. Hardcopy compilations of such papers may not remain viable in years to come, but they should appear at least in digital format. We acknowledge the difficulty in doing this with limited resources, and know that not all these will bear fruit, but even partial success represents a lasting contribution of educational value. *Geoscience Canada* is also very proud to include papers written by students based on thesis-related research, and we also see this as an important educational role. There are times when such ventures require additional assistance at an editorial level, but it is surely an investment in our collective future to provide such encouragement and support.

THE DARK SIDE: SOME PERENNIAL CHALLENGES

If something has not yet become obvious to readers, let me use plain words. Surviving and prospering as a small journal largely dependent on volunteer power is very difficult, and we are a small fish in a very large pond. Ideas and aspirations are wonderful but turning them into reality is vastly more difficult. Realistically, if every paper that we seek from our community was actually submitted and processed, we would struggle to accommodate the workload and meet publication deadlines.

If the papers that we publish become like old friends, there are challenges that become old enemies. The crucial step is of course the first one - getting submissions in the first place. Any editor of a small journal will inevitably spend significant time soliciting papers. We do receive unexpected papers and welcome them with joy, but many successful papers require much persuasion and overcoming resistance. It makes our day when potential authors decide that resistance is futile and finally put pen to paper, as we used to say. I will wisely avoid elaboration, but I have come to realize that editors are not always popular. Soliciting papers resembles my limited experience with angling; it takes many casts and good bait to actually get a bite, and even then the fish will probably try to squirm off the hook. The challenges do not end with submission, but only begin with that critical step. Finding reviewers is increasingly difficult and can cause some long delays. Invitations to review are often declined on the basis of other commitments and deadlines but these are experienced by most of us. Reviewing is time-consuming and can involve difficult judgements, even when

papers are well written and constructed. Nevertheless, it is a very important part of the process because without peer review we have no means to measure accuracy and clarity, or to suggest ways in which both might be enhanced in the final text. I wish that I could say that submissions are always well written, well illustrated and fully complete, but most of you will know the reality. I suspect that some reluctance on the part of potential reviewers centres on the quality of submissions. I also know from discussions with other editors that this is a common problem, even for journals that have much higher submission rates than we do. At this point I could easily diverge into a long and rambling diatribe about poor writing and organization, but even I recognize that giving way to such temptation would be unwise. I will say only that a deficit in modern secondary education with respect to grammar and writing skills is exacerbated by the lack of university-level courses aimed at teaching good scientific writing. We are now considering a new *Thematic Paper Series* to guide potential authors in preparing and submitting papers, which we hope can be organized in conjunction with other journals in Canada. It is not seen as something specifically for our benefit, but rather as something that can benefit all. The need is abundantly clear to all editors.

THE ELEPHANT IN THE ROOM: OPEN ACCESS AND ITS IMPLICATIONS

Open Access (OA) is often labelled using this cliché, suggesting that we are all aware of it but reluctant to recognize or discuss it. This is far from accurate; awareness, anticipation and sometimes apprehension around OA are everywhere these days. At least two previous editorials were devoted to the topic, and it is probably mentioned somewhere in every single editorial that I have written. The bulky elephant certainly cannot be ignored any longer by any scientific journal interested in its future. I would be surprised if readers are unaware of the concept but let us define it simply. It means that all published articles should be available online immediately and can be accessed and circulated without cost or legal impediments. This has obvious benefits, such as extending visibility of research, facilitating the sharing of new ideas, and reducing inequalities that disadvantage scientists from lower-income countries. Few (if any) scientists would hesitate to embrace this idealistic concept as desirable progress, but the world of scientific publishing is not ideal, and includes several large profit-driven corporate publishers. A second reality is that smaller not-for-profit journals such as *Geoscience Canada* cannot function without some financial support for operations and growth, which for us presently comes largely from modest subscription revenue. Open Access literature has grown dramatically in the last two decades, but in its purest form, as defined above, it has yet to dominate scientific publishing. Many well-known journals in Earth Science continue to operate on traditional models, where content remains behind subscription walls and copyright protections stay in place decades after initial publication. Access to such research for scientists beyond academic institutions may only be possible via ingenious solutions involving their more fortunate professional col-

leagues. I had to employ these strategies many times in my career with a Provincial geological survey. New OA journals that can be accessed freely by readers have emerged, but these are not necessarily free to authors, who must pay article processing charges (APC). Although exceptions are there for some content (e.g. invited papers) authors or institutions now bear the costs of publishing. The propagation of OA based on this payment model prompted a new direction for many established subscription-based journals, which now offer unrestricted access for papers, but only following fee payments. These are not *specifically* labelled as APCs, but in many cases they are more expensive. Another important factor is the requirement that research funded by public agencies must be freely available to those who ultimately funded such work through taxation. The costs of OA publication then become another line item in the cost of research. There are some journals that provide complete OA without transferring financial support from readers to authors or institutions, but these are presently a minority, especially in science. Publication in these is facilitated from other revenue available to supporting societies with such resources or is gathered from wider community funding on a voluntary basis. The journals that levy APCs on essentially all authors understandably encounter questions about the quality of published material and the rigour of peer review, because their revenue is directly linked to the number of papers that they publish. Some of these initiatives have successfully established a reputation for high-quality papers, but this has not dispelled views that some journals based on the pay-to-publish model are of diminished quality.

Where does *Geoscience Canada* fit within this new environment, and what direction will we ultimately follow? The short answer is that we do not really know, as options need to be assessed in the context of short-term and long-term objectives. As much as I would prefer to write about science, it is more appropriate to close this editorial by exploring some of these issues. During my tenure, *Geoscience Canada* has indeed progressively moved towards OA publishing, but we have yet to fully achieve it. Presently, *all* content becomes completely accessible a mere twelve months after publication, i.e. articles in this issue will be freely available as of March 2025. We did not initiate this policy, as it comes with our membership of the Érudit publishing consortium. During the Covid-19 pandemic, this policy replaced previous guidelines in which content became fully OA two years after publication. We are free to designate selected content OA on an immediate basis, and we do so for book reviews, conference reports and other non-technical material, and material such as GAC presidential addresses. For technical papers, we previously offered immediate OA status in return for very modest charges based on the length of published papers. In many cases these were gladly provided by the institutions of professional authors, but no payments were required for publication under the normal framework. We remain very hesitant about obligatory APCs because many of our authors do not benefit from support, and some papers are written by students. Offering the immediate OA option to those who desire it and enjoy institutional support helped us continue the work involved in running the jour-

nal and increasing its profile, without creating barriers to publication. Most of the financial support for the Journal continues to come from individual subscriptions and institutional subscriptions routed through the Érudit consortium. In the past, we adopted a hybrid approach that suited our circumstances and mandate without moving costs from readers to authors, but also supported the requirement for immediate OA by funding agencies. This approach worked well from our perspective, and we considered it a fair compromise.

To reiterate a point made more than once, the world of science publishing is constantly changing, and there is now another shift in our 50th anniversary year. The hybrid OA approach that served us well is not sustainable because we are at the same time benefiting from subscription fees. Further, there is a wider resistance to the 'hybrid' OA model, because it partly resembles the approach of some profit-based corporate journals, although we do not consider it to be at all equivalent. The only alternative to the subscription-based model is to initiate immediate open access for *all* material without cost to authors or readers. From a philosophical perspective, this would be ideal, but it means that virtually all subscription income would be lost. There is some support within the Érudit consortium for such transitions, but it would not support our operations as currently structured, nor would this support contribute to the wider mandate of GAC in Canadian Earth Science. We have concerns that being unable to offer immediate OA for some articles will have a negative impact on the content of *Geoscience Canada*. It certainly appears that our Golden Anniversary year will be one of difficult decisions. Nevertheless, I wish to stress that authors can still make their research available as soon as articles are published but must now use other routes. Starting in 2024, authors can place the pre-layout text of accepted papers, with related materials, on their institutional or personal websites, and can circulate links to such material. More details on this option will be provided to authors of articles in volume 51 as they work through the publication pipeline.

This is only the beginning of changes for the Journal related to OA initiatives that should be anticipated in the coming years. The policy direction of Érudit, with whom we have an excellent working relationship is towards universal *Diamond Open Access*, i.e. elimination of subscription-based access, even for interim periods. It is clear that this will present challenges for us in maintaining financial support. We will need to consider and adopt alternatives. Possibilities include seeking an alternative publishing relationship that will accommodate compromises that we previously developed, or defining alternative funding strategies that will allow us to embrace Diamond Open Access and grow as we wish to do. In this context, recent announcements by Canadian research agencies, including the Canadian Institutes of Health Research (CIHR) and the National Science and Engineering Research Council (NSERC - the main supporter of Earth Science research) also have longer-term implications. These agencies will require full OA by the end of 2025 for all publications related to funded research, in accordance with requirements by agencies in many other jurisdictions. The exact form of this future is not readily

predicted at this stage, but it may spell the end of research publishing that depends on the subscription model, and we will need to find routes that facilitate Diamond OA in our near future. It may well be the only viable option, but how can we make it viable?

It would not be my first choice to end this anniversary editorial by outlining what seems to be a daunting challenge, but it is one that will require more adaptation and innovation, and one that will benefit from the views and ideas of our readers and our authors. Many scientific journals have lasted for centuries rather than decades, but they have not done this without embracing change. I hope that this journal will be around to celebrate many more anniversaries and ask our diverse followers to get involved in the process. We may be a part of GAC, but we truly belong to a much wider Canadian Geoscience Community.



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