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A Note from the Editor



At the Royal Society of Canada's (RSC) Annual General Meeting (AGM), the weekend of November 25 to 27, 2011, Professor Graham Bell concluded his term as President of the Academy of Science and Professor Marie D'lorio became our new President.

Professor Bell made significant contributions to both the Academy and the Society. Under his leadership, there has been both the consolidation of endeavours, and the development of new initiatives. On behalf of the Academy, a very big thank you Graham.

Professor D'lorio, our new President, comes with great enthusiasm to continue to enhance and promote the growth and development of the Academy and the Society. A very warm welcome to Marie.

It occurred to me that Fellows might be interested to know what our Specially Elected Fellows are doing now. This thought was triggered by the induction of Dr. Roberta Bondar into *Canada's Walk of Fame* on Sunday, October 23, 2011.

As the first in a series, an article on Professor Bondar is featured in this issue of the Bulletin.

Dr. Bondar was elected as a Fellow of the RSC in 1999. Her citation was:

"Roberta Lynn Bondar, Faculty of Health Sciences, The University of Western Ontario, is an accomplished scientist whose pioneering research into the regulation of blood flow to the brain provides insight into the inability to stand upright in various conditions such as stroke. Bondar has a unique ability to capture the minds and imaginations of people of all ages. She works tirelessly to promote the appreciation of sciences and to encourage learning and research at all levels from primary school to government. She was responsible for expanding opportunities for Canadian scientists to participate in research in space, and for developing international collaboration in life sciences for Canada."

Dr. Bondar is the first scientist, the first medical doctor, the first astronaut and the first photographer/artist to be inducted into *Canada's Walk of Fame*. Part of her citation reads:

"Dr. Roberta Bondar is a very modern version of the complete Renaissance woman. Her stunning list of accomplishments in everything from space travel and medicine to professional photography and public speaking boggles the brain."

I think you will agree that she is a very Special Fellow indeed. In this issue, Dr. Bondar tells us what she is doing now.

In conclusion, I thank the Fellows who have given us feedback on the Bulletin and emphasize that comments and suggestions are always welcome. You may send them to the Secretariat, or directly to me at betty.roots@utoronto.ca.

- Professor Betty Roots, Honorary Editor

Farewell Message from the Outgoing President



The last two years have seen a great deal of activity - and considerable changes - in the Society at large and in the Academy of Science in particular. The Academy III Bulletin, for example, was founded last year so that we can communicate directly with the fellowship. We have been through a systematic review of our procedures, and have reformed our relationship with the Council of Canadian Academies (CCA) and with the Partnership Group for Science and Engineering (PAGSE). We organized the Governor General Lecture Series, given in 2010 by Dr. Clyde Hertzman, and contributed to the Federal Research and Development Review. For the first year, in particular, I was heavily involved in international affairs. I shall certainly long remember the summer of 2010, when the Society hosted both the G8+ National Academies of Science in the spring and the Inter-American Network of Academies of Sciences (IANAS) in the summer. The Academy played a crucial role in developing the statements on the themes of the Ottawa meeting and those of the 2011 meeting of the G8+ Academies in Paris. As I bow out, there are two major initiatives in progress. The first is planning the 2012 RSC symposium on *Early Childhood Development*, organized in concert with the Expert Panel report on the field. The second is the establishment of an Academy of New Scholars and Scientists, which is enthusiastically supported by the Academy of Science and which was endorsed at the recent annual meeting of the RSC. I am glad to leave these in the capable hands of my successor as President, Professor Marie D'Iorio, and hope that the next two years will be as fruitful for her as the last two have been for me.

- Professor Graham Bell, Past-President, Academy of Science



Message from the Incoming President



It is a privilege and an honor to serve you as President of the Academy of Science. As is obvious from Graham's message, he has led and contributed to an exciting revitalization of the Royal Society of Canada and has worked tirelessly at increasing the Academy's international profile. I am committed to furthering this work, as well as supporting a greater national profile for the Academy of Science through active promotion of the RSC at regional events organized by our fellowship across Canada. I plan to invest part of my efforts in supporting the launch of an Academy of New Scholars in the Arts and Sciences; the influx of enthusiastic and creative men and women at the beginning of their research careers is an opportunity for our Academy to be even more dynamic, engaged and influential. I look forward to the next two years!

- Professor Marie D'Iorio, President, Academy of Science

Specially Elected Fellow Dr. Roberta Bondar Writes:



The end of the Space Shuttle program brings new beginnings. Flights on Russian rockets will continue to the International Space Station (ISS) with fewer crewmembers and thus fewer opportunities to study the effects of short duration spaceflight. The flip side is that there should be studies on more crewmembers that will stay in orbit around Earth for longer periods, a prelude to moving out into space beyond low Earth orbit—to the moon, Mars or even to an asteroid.

My colleagues and I have recently published a peer-reviewed paper on one aspect of human physiology related to return from short-term space missions, from data that were acquired over a decade ago. The data are not out of date, as the problems facing space travelers have not been solved or even diminished greatly. Other nations such as China and India are developing their own capabilities for space travel, around Earth and beyond.

China is quietly deploying and attaching modules in orbit that have a space station-esque appearance and they have expressed an interest in lunar mining.

As human beings once again venture outward from Earth, great questions can be posed of science to solve problems in engineering, human physiology and biology. But my next great adventure lies not among the stars *per se* but here on the surface of the planet we call Earth. Privileged to have represented the international science community on my space mission some two decades ago, I have used the platform of my careers and specialties to encourage a better understanding of, and respect for, life on Earth. My quest to continue to explore and to share is grounded in the fundamentals of curiosity and lifelong learning.

New worlds open up for me as I push into the inner space of human endeavour. Opportunities for me have grown through volunteerism such as the two terms that I served as Chancellor of Trent University; in my photographic odysseys in North America and abroad; through my writing and photographic fine art exhibitions of my creative works;



in my love of the natural environment and lessons learned from being curious; continuing my medical education in my specialty of neurology; in business, on courses to be a better Board member and Director.

And always, always, being there for friends and family.

Over the past three years, new beginnings for me include the founding of a new charitable organization, The Roberta Bondar Foundation (www.therobertabondarfoundation.org). Inspiring hope, the Foundation is an environmental awareness and learning opportunity for all generations. The vision is to create an emotional bond with the natural environment and to embrace it as our personal heritage. If we love something we will protect it.

We encourage critical thinking through photography, speaking the universal language of images, to see the world in a different way and to ask questions. Photographing the natural environment artistically means focusing attention on the natural world around us, the world in which we live and quite often impact. But can art alone answer our questions once we are filled with passion and respect for other living things with which we share the planet? Certainly, we can ask of ourselves a technical question such as: how can I improve my shot the next time? As researchers, we know that there is so much more.

Some have forgotten why the sky is blue or how hoodoos become so interesting. Recombining the standard spheres of science and art, is to be in a world akin that of Leonardo da Vinci—a renaissance for the new millennium. Creativity and innovation emerge from diversity of backgrounds and what better way than to see the environment through new eyes, to follow lines and textures and to ask why it is that way.

The signature program of The Roberta Bondar Foundation is the Traveling Exhibition and Learning Experience, which seeks to interest people of all ages in the beauty and diversity of the natural environment in which we live. Currently, the theme of the Traveling Exhibition and Learning Experience is Biodiversity and Extinction with the framed prints categorized into Biomes.

The majority of the framed fine art prints that I have donated to the Foundation for its unlimited use are very large, with images measuring 32 inches by 40 inches and 54 inches by 18 inches, in panoramic format, giving the generous white borders and the shadow box frame a very large presence. There are also cameos of insects, plants and animals that live in the different Biomes. For example, there are cameos of a White Rhinoceros and of a Black Rhinoceros in the Tropical Savannah's Wooded and Open Grasslands.

We have also produced a *Gallery Catalogue* and *Learning Guide*, with all of the images, not only listed and present but also with an intriguing introduction to the concept of Eco zones. Newer ideas that we have developed include “Eco Spots,” “Technical Notes” and “Your Turn,” all of which are cross-generational in their appeal and content. Like our planet in evolution, it is a work in progress as more Biomes and photographs of their inhabitants and constituents are added. This past year we welcomed animals from the Masai Mara in their biomes and by next year, migratory birds in their over-wintering areas will join our exhibition. The Traveling Exhibition and Learning Experience will continue in North America and will also move internationally.

Another of the programs of the Foundation is the Bondar Challenge, a photographic and written competition geared to exploring the environment.



Two “pilot” Challenges were completed in 2011, the first at an elementary school level (Grades 6, 7 and 8) and the second at the secondary school level (Grades 9 to 10 and 11 to 12). The winning entries and the Honourable Mentions were selected by a panel of judges known for their expertise in art, science and education. Any student who submitted a qualifying entry received a Certificate of Participation and Bondar Challenge button, with the winners and Honourable Mentions also taking home a gift bag of prizes that included books on some aspect of science and magazines of nature photography. The schools of the winners also received books for their libraries. In the summer, the Foundation will run a more challenging Bondar Challenge pilot program in selected summer camps.

How do we know if we have been successful in our goals? We have feedback from teachers that gives us hope and moves us forward. For students new to Canada whose first language is not English, the essay allowed them to put their classroom learning to the test. In spite of the accessibility of cameras in their phones, many of the students had never photographed anything but each other and some had never looked up to see a bird long enough to identify it. Others saw garbage for the first time as they were told not to include “clutter” in their images. They had assumed the garbage as part of their environment and had become accustomed to it. They are now more environmentally aware and want to clean up their surroundings. They have been given new vision.

In an age where “nature deficit” has become too prevalent in a country with vast lands and waters, young people who follow in our footsteps need more than ever to have the opportunity to transfer classroom knowledge into the real world. As a life form, ensuring human health and finding an ethical balance with nature while enjoying the fruits of our discoveries and inventions is the responsibility of all ages.

Nothing in my 129 times around the planet, either looking at it or away from it has diminished my sense of place—the fleeting moment, the fragility and yet resilience of life. All of it. A photograph of a sunset could also be that of a sunrise. I choose the latter with the promise of new beginnings and new worlds to discover.

- *Dr. Roberta Bondar, FRSC*