

# VOICEPIPE

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The Newsletter of the BIO-Oceans Association



## VOD launched: “Van Steenburgh would be pleased”



Contributors to the VOD launch, 20 November 2014 (from left): Tom Shephton (Master of Ceremonies), Don Gordon (VOD Co-editor), Alain Vézina, (DFO Science Director), Faith Scattalon (DFO Regional Director General), David Nettleship (VOD Editor-in-Chief), Stephen Locke (Director, GSC Atlantic), Robert Fournier (Keynote Speaker); Michael Hughes (President, BIO-OA) missing from photo.

### The VOD Book Launch

The launch of *Voyage of Discovery* (VOD) by the publisher BIO-Oceans Association was intended to announce the official release of this milestone book on the history and marine research accomplishments of Bedford Institute of Oceanography (BIO) over five decades (1962-2012) and showcase the result before a diverse audience of government officials and managers, universities, non-governmental organizations, marine industries, elected officials, the media and general public. And what a launch it was, beyond all expectations. Part of the celebration was a series of oral presentations comprising overviews of VOD by current BIO science directors Dr. Alain Vézina (Fisheries & Oceans Canada, DFO) and Mr. Stephen Locke (Natural Resources Canada, NRCan), followed by a keynote address by renowned marine scientist Dr. Robert Fournier (Professor Emeritus of

Oceanography and Interim Director of Marine Affairs, Dalhousie University) to provide a glimpse of the direction that marine studies should take in the future spanning local, regional, and global needs. Summaries of their comments (provided by the speakers) follow:

### Special Speakers

#### Dr. Alain Vézina:

It is my great pleasure to say a few words at this event on behalf of DFO Science at the Bedford Institute of Oceanography. When the book was proposed by the BIO-OA as a community-driven project to mark the 50<sup>th</sup> Anniversary of BIO, Stephen Locke and I brought our full support behind it for several reasons. Mainly, we saw this as a durable reminder of the milestone that BIO passed on 25 October 2012, the official anniversary date. Beyond the speeches, the music, and especially the many happy reunions

Beluga Award  
Nomination Deadline  
1 March 2015

BUY  
*‘VOYAGE OF DISCOVERY’*  
TODAY!!!

### Contents

<b>VOD Book Launch Celebration</b>	<b>1</b>
<b>Special Speakers:</b>	
Alain Vézina	1
Stephen Locke	2
Robert Fournier	3
‘Keynote Address’	
<b>BUY VOD TODAY!</b>	<b>5</b>
<b>From the President</b>	<b>6</b>
<b>WHO IS YOUR BELUGA?</b>	<b>6</b>
<b>A Good Use of the VOD</b>	<b>6</b>
<b>Wildlife Loss in the Global Ocean</b>	<b>7</b>
<b>Noteworthy Reads</b>	<b>8</b>
<b>Remembering Mike Eaton</b>	<b>9</b>
<b>In Memoriam</b>	<b>10</b>
<b>The Carbon Year: The Building Pressure</b>	<b>10</b>
<b>Editor’s Keyboard</b>	<b>12</b>
<b>About the Association</b>	<b>12</b>



that took place at the 50<sup>th</sup> anniversary, this book *'Voyage of Discovery'* would last and continue to tell the story of the first 50 years of BIO to present and future generations of marine scientists, and to all who are interested in the marine sciences. [In fact, books remain the pre-eminent technology to transmit culture and knowledge across human generations.] We also felt that the VOD book project epitomizes a good part of what the BIO-Oceans Association is meant to do, which is maintain contact between present and past employees of BIO and preserve the Institute's history. Finally, our hope is that *'Voyage of Discovery'* will instill in current and future BIO staff a sense of pride for the work that has been done and continues here at BIO.

VOD is not a slight book and it was a major undertaking. We are talking about 48 papers that span all ocean science disciplines, and also policy and management with direct contributions from close to 100 authors. These contributors span retired, emeritus and active scientists at BIO, a remarkable cross-generational effort. They represent virtually all the organizations that call, or used to call, BIO home. When you go through this book, you really get the full sweep of the history of BIO and the breadth of ocean science, engineering and management activities at BIO. It is a book that I am happy and proud to present to visitors and also to hosts when I visit other countries such as a China visit earlier this month.

What is remarkable for me is the immense effort that went into the production of *'Voyage of Discovery'*, all on a volunteer basis. I cannot imagine the countless hours that went into the book's production, from development of its structure, finding the correct people to write the review papers, all the hours these authors spent writing their part, the painstaking editorial work, the graphics design and layout, on to finding a printer/binder and formulating a marketing plan. This is definitely not a simple enterprise! People, not only in the BIO-Oceans Association, but staff in Science and other parts of the Institute gave of their time and effort to attain the publication goal. I am very grateful to all of them and remain amazed by their dedication to seeing this through.

My words of appreciation are not from me only, but represent the view of the entire science sector at DFO. Although the Assistant Deputy Minister of Science, Trevor Swerdfager, could not be here, he did send a congratulatory letter to the book's editor-in-chief Dr. David Nettleship (for complete details, see *VoicePipe* 64: 2, 2014). The successes of BIO bring pride to DFO science as a whole, and this also reminds us that BIO is part of a na-

tional network of science institutions that serve Canadians from coast to coast to coast.

In addition, for me, the *'Voyage of Discovery'* book brings to life the research that has not only made BIO's national and international reputation, but has served Canadians so well over the years. It shows also that BIO has gone through many changes in its history and will continue to do so. It has continued to be relevant and vibrant because management and staff together have adapted to change and continued to be successful when the world changes around them. And that is the lesson that needs to be drawn from this book: although the future is not going to be like the past, BIO will continue to thrive if we do not forget that the recipe for success remains in promoting and sustaining a culture of excellence in all that we do.

#### **Mr. Stephen Locke:**

Good morning everyone. My name is Stephen Locke and I am very honoured to be asked to say a few words at this book launch ceremony. I certainly echo the sentiments of my colleague Dr. Vézina on the importance of this book, the countless hours of effort by BIO staff, past and present, the great work by Dr. David Nettleship, the Editor-in-Chief, and the invaluable contribution the BIO-Oceans Association has made by undertaking the development and publication of the *'Voyage of Discovery'* book, and to 'life' here at BIO.

I have been fortunate to be able to call the BIO my home since 2008 when I took on the position of Director of the Geological Survey of Canada (GSC), Atlantic Division, an organization within the federal department of Natural Resources Canada (NRCAN). Often people fail to realize that there are other federal departments comprising the BIO family – not just Fisheries and Oceans Canada – but also NRCAN, Environment Canada, and National Defense.

The way I tend to describe it is that oceanography, as a science of studying the ocean, has four main disciplines: physical oceanography, biology, chemistry, and geology. The GSC, through NRCAN, focuses on the geology while DFO leads the other disciplines. The BIO is truly a unique, multi-disciplinary, multi-departmental, federal research facility. This contributes greatly to the strength of this Institute and the collaborative, inter-disciplinary work we do here.

NRCAN's contributions to the VOD book are significant: represented by one of four editors, one fifth of the editorial board, with 14 of the 48 papers (29%) comprising

the volume exclusively NRCan contributions, four more as collaborative articles, with a total of direct contributions by over 30 NRCan staff.

Here we are today, in the BIO Ford Auditorium, which was dedicated at the BIO GALA on 25 October 2012 to Dr. William L. Ford, the second director of the Bedford Institute of Oceanography from 1965 to 1978. It was Dr. Ford who worked hard to develop the concept of BIO as a collaborative research campus and made this concept the foundation of the Institute. His vision was of a community of experts seeking to understand Canada's vast and complex marine environment, and his talent ensured that the programs developed at BIO were balanced among the required disciplines. He fostered multi-disciplinary research and instilled a spirit of goodwill and cooperation among the Institute's research teams. Dr. Ford was also instrumental in building the BIO into the world-renowned facility that it is today, and in developing it as a national Canadian scientific resource of marine data and expertise. This book 'Voyage of Discovery' clearly reflects Dr. Ford's vision of collaborative research and cooperation that has been BIO's 'call sign' for over 50 years.

I am very proud to have played a small part in the production of this book. I can remember early discussions on the effort required and the timeline, and this was back in 2010, or maybe 2009. Both Alain Vézina and I were very supportive of this project from day one, working with and supporting the BIO-Oceans Association's initiative on this monumental task.

Personally, I think it is an incredible book, from a historical perspective, a science content perspective, and in being an attractive, quality piece of work. It is filled with rich text, beautiful photographs, and interesting diagrams and charts. Not only did I purchase a copy for myself at home, which is currently at my bedside table as I work my way through the fascinating articles, but I purchased a number of volumes to be able to give out as gifts to the many special visitors and guest speakers we have here at BIO.

In conclusion, we can look back to the vision of Dr. William van Steenburgh who said in 1962 that our research will "enhance the scientific stature and contribute to the many complex and difficult problems that will face oceanographers in the future". The book 'Voyage of Discovery' is a summary and proof of Dr. van Steenburgh's prediction made over 52 years ago, and its content represents a major contribution to Canada's ocean research objectives.



At the book sales table at the VOD launch, from the left, BIO-OA Board members, Lori Collins, Nelly Koziel, and Susan Merchant.

All of us who took part in the production of this book should feel great pride on this day, great pride in this book, and at playing a part in capturing the first 50 years of science here at the BIO. There are far too many people to thank by name but certainly at the top of the list would be Don Gordon for his idea and determination, David Nettleship and the rest of the editorial board, the BIO-Oceans Association, Francis Kelly and the editors for the book layout and design, and the VOD book launch organizing committee for this stimulating and exciting event. Thank you for your attention.

### Professor Robert Fournier: 'Keynote Address'

#### The Next 50 Years – The Future!

Good Morning. I would like to begin by congratulating my colleagues here at the Bedford Institute of Oceanography for seizing the opportunity to celebrate BIO's first 50 years. The volume 'Voyage of Discovery' provides an important perspective on ocean research, but it also reflects the growth of oceanography in Canada. At the risk of appearing presumptuous I assume that another individual, not here today, would also be pleased - Dr. William Van Steenburgh, a major driver in the creation of BIO.

Attempting to understand Dr. Van Steenburgh's motivation, after all these years, could be a fool's errand. However, sufficient information exists to allow a rudimentary placement of that individual in his proper temporal context – the mid to late 1950s. That was a time not so long after World War II when Canadians were flushed

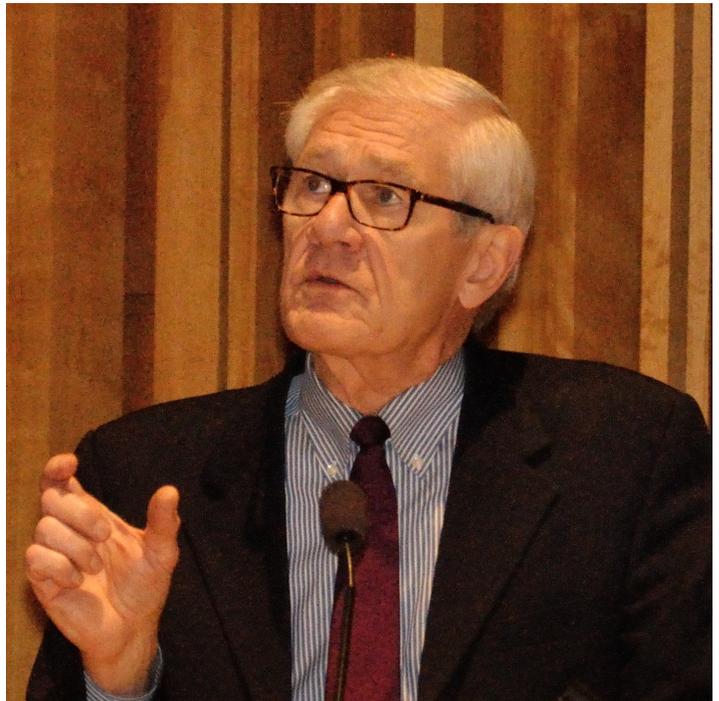
with pride and a can-do attitude following unqualified success in that conflict. Keep in mind that World War II was the first amphibious war, with landings in the Atlantic, Pacific, and Mediterranean. The use of the oceans as a launching platform led to increased awareness as to our shortcomings regarding knowledge of the oceans, as well as the realization that Canada was surrounded by three oceans and possessed the longest coastline in the world.

All of these considerations eventually led to a national imperative, widely accepted in many circles, that Canada should become a major player in a comprehensive approach to the study of oceans. This would be an approach securely grounded on the excellent studies carried out by marine scientists in the then Fisheries Research Board of Canada. The plan was to extend those studies beyond fisheries - to cover the full range of oceanographic pursuits.

A further presumption is to suggest that Van Steenburgh's vision emerged from those times and was viewed as moving Canada into its rightful place among nations. From that vision emerged the BIO, 50 years of research, this celebratory event and, of course, the *'Voyage of Discovery'*. My personal view is that BIO contributed to Canada's maturation as a Science and Technology nation - despite the fact that the 1880s saw Nova Scotia as the Clipper Ship Capital of the world. The implication of that fact is that such a title presumes a high degree of innovation and understanding of a vast array of technologies. One can only presume that Nova Scotian skills were present but quiescent for the early part of the 20<sup>th</sup> century.

As mentioned earlier, the *'Voyage of Discovery'* vindicated the original vision promulgated in the late 1950s and early 1960s. However, we might ask if Van Steenburgh would be pleased with a similar volume - a mirror image of the current book - 50 years in the future? I believe that the answer to that question would be a resounding "No!" The times are quite different! Canada's needs are different! And most of all, the oceans are different!

I think that he would agree that the present volume would be the correct starting point, but the next volume should reflect a different national imperative. This is no longer about Canada's self-realization, and without being overly dramatic, this is about survival. Since the early 1960s the global population has more than doubled. In fact, during my lifetime it has tripled. Phrases



Dr. Robert Fournier gestures during his keynote address at the *'Voyage of Discovery'* launch.

such as 'Climate Change', 'Greenhouse Effect' and 'Global Warming' had not yet entered into common usage.

Over the past 50 years - since the Bedford Institute came into existence - the oceans have become warmer, storms are more threatening, there is greater acidification, lower biodiversity, higher sea level and more pollution. In addition, the ocean's ability to provide services has greatly diminished. For example, 50% of the oxygen we breathe is provided by small plants at the ocean surface, the oceans regulate temperature and moisture in the atmosphere, as well as sequester carbon dioxide and provide genetic resources. The Intergovernmental Panel on Climate Change (IPCC) - a United Nations organization that utilizes between 1,000 and 2,000 scientists - has been in existence for nearly 30 years. During that time the IPCC has produced a series of reports, and most recently the fifth offering in the form of three volumes on the subject of Climate Change. Just a couple of weeks ago it produced the fifth synthesis report - a summation of the previous three - in which it offered a dire warning of impending change. One commentator went so far as to declare that "this was a slow train wreck about to happen".

In the Marine Affairs Program at Dalhousie University where I am currently the Interim Director, when addressing the changing role of the Oceans we often refer

to a quote by world renown evolutionary biologist Edward O. Wilson, who wrote in his 1998 book *'Consilience: The Unity of Knowledge'* that:

“We are drowning in information while starving for wisdom. The world henceforth will be run by synthesizers, people able to put together the right information at the right time, think critically about it and make important choices wisely.”

That comment suggests to me that the balance between basic and applied research has shifted, even though the need for basic research continues. Consider for the moment the Curiosity Rover currently on Mars. The long-term goal of the program within which the Rover operates is to place a human on Mars. However, a great deal of energy has been expended to gain a basic understanding of the atmosphere, soil, and potential for water. I view this as a perfect example of an altered balance between basic and applied research. According to Dr. Wilson, sufficient knowledge exists for us to begin the process of implementing our current knowledge. In other words, we need to apply what we already know.

I would suggest that the role of all marine scientists over the next 50 years will be to embrace the challenge that faces us all, which is that “The oceans – they are us”! In

other words, we are inextricably linked to the oceans through all the myriad systems that control the habitability of this planet, and are mediated through the oceans.

When I was a graduate student 50 years ago I was told that the research cycle was not complete until publication had taken place. This is no longer true. The new end point comes in the form of a much larger responsibility – to influence human behaviour – through public policy, governance and management. That is not to say that marine scientists should become lawyers, political scientists or policy wonks. But it does suggest that we should find new ways to achieve this new end point – perhaps through collaboration or cooperation.

In closing, I believe that Dr. Van Steenburgh would be very proud of BIO and what it has become. It almost certainly reflects his expectations and the *'Voyage of Discovery'* underlines the accomplishments of the past 50 years. Today the times are different. They are no longer about Canada's self-realization or its proper place among nations – since both of those goals have long since been realized. We have a global responsibility to protect the oceans and should soon begin the gradual process of moving toward the second volume of the *'Voyage of Discovery'*.

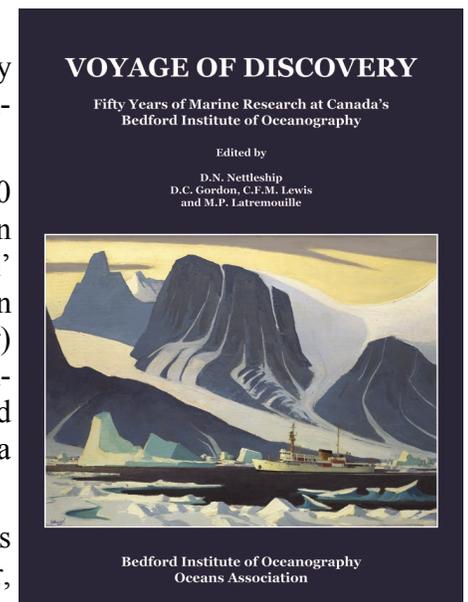
### BUY VOD TODAY!

**BIO-Oceans Association** has published a major treatise reviewing the history and marine research accomplishments at Canada's Bedford Institute of Oceanography (BIO) over five decades primarily in the Atlantic and Arctic oceans.

*'Voyage of Discovery'* (VOD), a massive hardcover volume comprising 460 pages printed on premium 8.5 x 11 inch Sterling 100-lb glossy paper with sewn binding, was released on 6 October 2014 with an official 'VOD Book Launch' at BIO in the Ford Auditorium on 20 November 2014. The book's well-written text (almost half-million words) and illustrations (total of 566, mostly in colour) will appeal to a broad readership from professional oceanographers, environmental/resource managers and decision-makers to marine science students and lay persons interested in the Atlantic and Arctic oceans. This publication is a 'must-have' book for any student of Canadian ocean science.

*'Voyage of Discovery'* is available at BIO or by mail at \$35.00 per copy plus shipping (for mail orders). For prepaid mail-orders (by cheque, money order, credit card), contact BIO-OA for cost of shipping and/or credit card usage (902-826-2360 or 902-469-2798), and then send payment to: BIO-Oceans Association (VOD), c/o Bedford Institute of Oceanography, P.O. Box 1006, Dartmouth, NS, Canada B2Y 4A2. Also available at Binnacle, Bookmark, Chapters Dartmouth, JWD Doull Books, NS Museum of Natural History, Schooner Books, and other retail outlets.

Once obtained, it's cast-off time into the *'Voyage of Discovery'* volume for exciting and stimulating reading of some extraordinary research findings derived from 50 years of study by BIO scientists and associates. Enjoy and discover a sample of the many special characteristics of the marine waters that surround us!





## FROM THE PRESIDENT

Happy New Year everyone! I hope New Year's resolutions are being met. The BIO Christmas party was a success again this past year with a large attendance. The food was great and Santa and his elves made an appearance. November saw the 'Voyage of Discovery' book launch. This was a great success. Bob Fournier, the keynote speaker, emphasized the changes that have taken place over the past fifty years of research and the direction that research might take during the next fifty years in anticipation of printing a 'companion' volume of the 'Voyage of Discovery'.

Printing expenses for the VOD have now been paid. The marketing group has been very active with more than a dozen businesses having either bought copies or taken copies on consignment. There are still copies available for those who haven't already purchased one. The BIO Gift Shop, which is opened on Thursdays each week from noon to 1 pm, has copies available for purchase. In a few months the AGM will be held. A number of executive positions will become available at that time. Anyone who would like to serve on the OA Executive can contact me. This is our association and it is up to members to keep it active.

Mike Hughes



The Ford Auditorium was decorated with balloons and flowers for the launch of the 'Voyage of Discovery'.

## WHO IS YOUR BELUGA?

It is time to nominate that special person for the 2015 Beluga Award. The deadline for sending in your nominations is 1 March 2015.

Our winner from last year, Claudia Currie, is a wonderful example of what this award represents. Candidates can be from any professional and technical field, craft or skill, who has made exceptional contributions to the success of BIO projects, initiatives or programs. The 2015 winner should be someone that encourages cooperation and fosters the team-work approach of BIO. All present and past employees who work or have worked at BIO in any field or specialization are eligible.

Everyone knows someone that deserves this award and I encourage you to make them known to us. It's time to celebrate the best that BIO has to offer and it is up to you to make this happen. Nominations will close 1 March 2015, so please start thinking about deserving nominees and begin filling out your nomination forms (forms are available at <http://www.bedfordbasin.ca/beluga.php>). Send completed nomination forms and supporting documentation directly to the Chair, Beluga Award Committee at: [andrew.cogswell@dfo-mpo.gc.ca](mailto:andrew.cogswell@dfo-mpo.gc.ca).

## A Good Use of the VOD



A copy of the 'Voyage of Discovery' was presented to Jenna Boon, Executive Director, Joggins Fossil Institute by Marianne Janowicz, Chair of the Bay of Fundy Ecosystem Partnership (BOFEP), in recognition of Ms. Boon's skilled facilitation of the BOFEP Steering Committee's Retreat in Sackville, NB on 16-17 January 2015.

## Wildlife Loss in the Global Ocean<sup>1</sup>

by Julie Cohen

UCSB Public Affairs and Communications

Over the past 500 years, approximately 500 land-based animal species have gone the way of the dodo, becoming extinct as a result of human activity. In the ocean, where scientists count only 15 or so such losses, the numbers currently aren't nearly as dire. But that doesn't mean they aren't yet heading in that direction.

A consortium of scientists, including University of California Santa Barbara's Douglas McCauley, has found that the same patterns that led to the collapse of wildlife populations on land are now occurring in the sea. According to the researchers, wildlife populations in the oceans are as healthy as those on land were hundreds or thousands of years ago. However, they warn, that may be about to change as the next 100 years promise to present major challenges to marine life. Their findings were published 16 January 2015 in *Science* Vol. 347, No. 6219.

The new paper compares the march of the Industrial Revolution on land to current patterns of human use of the world's oceans. During the 1800s vast tracts of farmland and factories beat back forests and sucked up resources that were mined and drilled out of the ground. As a result, many terrestrial species were driven to extinction. In the ocean, however, fishing continued to rely on sailing ships clustered in small slivers of near-shore water.

"A lot has changed in the last 200 years," said lead author McCauley, a professor in UCSB's Department of Ecology, Evolution and Marine Biology (EEMB). "Our tackle box has industrialized."

Co-author Steve Palumbi of Stanford University lists several emerging threats to the oceans. "There are factory farms in the sea and cattle-ranch-style feed lots for tuna", he noted. "Shrimp farms are eating up mangroves with an appetite akin to that of terrestrial farming, which consumed native prairies and forest. Stakes for seafloor mining claims are being pursued with gold-rush-like fervor, and 300-ton ocean mining machines and 750-foot fishing boats are now rolling off the assembly line to do this work."

According to the authors, increasing industrial use of the oceans and the globalization of ocean exploitation threaten to damage the health of marine wildlife populations, making the situation in the oceans as grim as that on land. As McCauley pointed out, we now fish with

helicopters, satellite-guided super trawlers and long lines that can stretch from New York to Philadelphia.

"All signs indicate that we may be initiating a marine industrial revolution", he said. "We are setting ourselves up in the oceans to replay the process of wildlife 'Armageddon' that we engineered on land."

One solution the paper highlighted involves setting aside more and larger areas of the ocean that are safe from industrial development and fishing. However, co-author Robert Warner, an EEMB research professor at UCSB, cautioned that reserves alone are not enough. "We need creative and effective policy to manage damage inflicted upon ocean wildlife in the vast spaces between marine protected areas", he said.

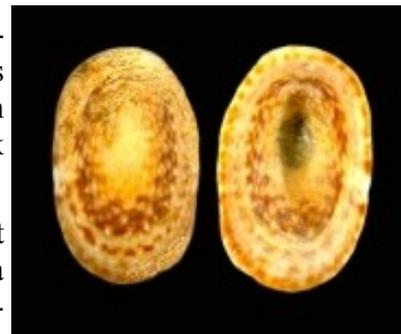
Among the most serious threats to ocean wildlife is climate change, which according to the scientists is degrading marine wildlife habitats and has a greater impact on these animals than it does on terrestrial fauna. "Anyone that has ever kept a fish tank knows that if you crank up your aquarium heater and dump acid into the water, your fish are in trouble", said co-author Malin Pinsky, an ecologist at Rutgers University. "This is what climate change is doing now to the oceans."

Still, as the researchers emphasized, the relative health of the oceans presents an opportunity for saving them. "Because there have been so many fewer extinctions in the oceans, we still have the raw ingredients needed for recovery", said McCauley. "There is hope for marine species that simply does not exist for the hundreds of terrestrial wildlife species that have already crossed the extinction threshold."

The ocean's future is yet to be determined, the researchers said. "We can blunder forward and make the same mistakes in the sea that we made on land, or we can collectively chart a different and better future for our oceans", Warner concluded.

<sup>1</sup> Reprinted with permission by the Department of Public Affairs and Communications, University of California Santa Barbara, CA.

See more at: <http://www.news.ucsb.edu/2015/014732/wildlife-loss-global-ocean#sthash.2vNFNdHA.dpuf>.



One of 15 marine species declared extinct, the eelgrass limpet (*Lottia alveus*) lived in the Atlantic Ocean until 1929.



## NOTEWORTHY READS: BOOK REVIEWS IN BRIEF

David N. Nettleship  
Book Review Editor

The *Noteworthy Reads* section is an effort by BIO-OA to produce a representative list of recent noteworthy book publications related to the marine sciences and other subjects of general interest. The listing is not intended to be comprehensive or complete, but merely an attempt to highlight a number of 'good reads' that may be of interest to OA members and associates. Most books listed are available at local bookstores and public libraries. Book prices are regular retail in Canadian funds, but discounts of 20-30% are normally available on line at: e.g., amazon.ca or chapters.indigo.ca. Contributions of book reviews to 'Noteworthy Reads' are welcome – send via e-mail to David Nettleship: dnnlundy@navnet.net (phone: 902-826-2360).

Following a short break (*VoicePipe* 61-64), '*Noteworthy Reads*' is back and ready to provide tips on some terrific winter reads spanning late 2013 to December 2014. Owing to the premium on space within each of our quarterly annual issues, we've decided to reduce the column from three to two pages starting in *VoicePipe* 66 in April 2015. As a 'catch-up' strategy, the present issue is limited to one and a third pages that highlight our own special BIO-Oceans Association publication followed by a short list of eight other titles worth reading over winter, all delightful and several destined to become classics. The start of a regular two-page column in Issue 66 means that only about eight detailed reviews will appear in each issue of *VoicePipe*, a number that demands great care in the selection of books to highlight. PLEASE send your suggestions of books to review and, even better, write and submit your own short reviews (200-250 words) of discovered favourites for consideration of publication. There is a wealth of new publications that continue to inspire, and we have much to be thankful for the abundant supply. Read on, and keep writing me about new titles that especially stimulate and excite!

### SPECIAL PUBLICATION:

#### OCEANOGRAPHY IN ARCTIC AND EASTERN CANADA

Nettleship, D.N., D.C. Gordon, C.F.M. Lewis, and M.P. Latremouille (Eds.). 2014. *Voyage of Discovery: Fifty Years of Marine Research at Canada's Bedford Institute of Oceanography*. BIO-Oceans Association, Dartmouth, NS. 460 pp. Hardcover, \$35.00 (ISBN 978-0993644306).- A fascinating review of the history and marine research accomplishments at Canada's premier oceanographic laboratory – the Bedford Institute of Oceanography (BIO) – over five decades, primarily in the Atlantic and Arctic oceans. In a series of 48 papers by past and present research staff from all oceanographic disciplines at BIO, the history of Canadian oceanography before BIO and a broad cross section of the Institute's work from 1962 to 2012 are featured with particular emphasis on contributions to Canadian and global understanding / man-

agement of the marine environment. Divided into 12 sections with a Preface and Epilogue, *Voyage of Discovery* is the most extensive overview of the history and scientific accomplishments of the Bedford Institute of Oceanography under one cover: Historical Roots, Arctic Studies, Ocean Life, Ocean Circulation and Chemistry, Hydrography and Seabed Mapping, Geological Oceanography, Fisheries-Ecosystems-Aquaculture, Marine Contamination, Technology and Instrument Development, Energy Developments, BIO and the Law of the Sea, and The BIO Experience. This book's well-written accounts (close to half a million words) and illustrations (566, mostly in colour) will appeal to a broad readership from professional oceanographers and environmental/resource managers and decision-makers to marine science students and lay persons interested in the Arctic and Atlantic oceans, and their present status and future welfare. A milestone volume that will stand as a reference source for years to come and a starting point for development of future plans to protect the oceans worldwide, a global responsibility we all share for the betterment of humankind and the planet.

### Short Reviews

**Birkhead, Tim, Jo Wimpenny, and Bob Montgomerie.** 2014. *Ten Thousand Birds: Ornithology Since Darwin*. Princeton University Press, Princeton, NJ. 544 pp. Hardcover, \$45.00US (ISBN 978-0691151977).- Written by a master avian researcher with two accomplished colleagues, 'Ten Thousand Birds' is an impressive book that not only provides a rich history of modern ornithology, but also tracks the development of the biological sciences in a unique and engaging manner from Darwin to the present time.

**Black, Conrad.** 2014. *Rise to Greatness: The History of Canada from the Vikings to the Present*. McClelland & Stewart, Toronto, On. 1,106 pp. Hardcover, \$50.00 (ISBN 978-0771013546).- A riveting history of Canada by one of our most respected biographers and historians. Spanning the period from 874 to 2014, the account reveals details of the people and events that shaped the nation, taking it from colony to dominion to country. An outstanding synthesis that should be read by all Canadians despite its humungous size – a perfect winter read!

**Cabot, David and Ian Nisbet.** 2013. *Terns*. New Naturalist Series 123, HarperCollins, London, England. 461 pp. Hardcover, \$70.00 (ISBN 978-0007412471).- An outstanding review of one of the most fascinating groups of oceanic birds – the terns! Synthesizes a wealth of new information derived from recent research, focussed largely on distribution and status, migrations, reproductive biology and behaviour, food and feeding ecology, and conservation needs and prospects. Overall, a comprehensive natural history of these elegant and stunning seabirds.

**Gershwin, Lisa-ann. 2013. Stung! On Jellyfish Blooms and the Future of the Ocean.** University of Chicago Press, Chicago, IL. 456 pp. Hardcover, \$30.00 (ISBN 978-0226020105).- A fascinating and informative review of the enormous adverse impact humankind has had, and continues to have, on marine environments and ecosystems causing a marked decline in biodiversity. The central message is a reality check and demand for immediate action to safeguard surviving communities and their habitats from further alteration and destruction.

**Lovegrove, Roger. 2012. Islands Beyond the Horizon: The Life of Twenty of the World's Most Remote Places.** Oxford University Press, Oxford, England. 228 pp. Hardcover, \$36.00 (ISBN 978-0199606498).- A pleasure to read and dream about the geography and history of these well-chosen remote and often inaccessible islands around the world's oceans. Take your pick - from poorly known sites such as Inaccessible Island (Tristan de Cunha archipelago) and St. Paul Rocks (off Brazilian coast) to relatively well-known isolated islands like St. Kilda and South Georgia - and plan away for your next voyage of discovery!

**Ruse, Michael. 2013. The Gaia Hypothesis: Science on a Pagan Planet.** University of Chicago Press, Chicago, IL. 272 pp. Hardcover, \$27.00 (ISBN 978-0226731704).- Philosopher and evolutionary biologist Ruse uses James Lovelock's 'Gaia Hypothesis' and its history to reveal the nature of science and the present need for scientific discussion about the world as a whole and its future. A timely and thought-provoking book.

**Shubin, Neil. 2013. The Universe Within: Discovering the Common History of Rocks, Planets, and People.** Pantheon Books, New York, NY. 240 pp. Hardcover, \$28.95 (ISBN 978-0307378439).- An informative and entertaining account of how biology, chemistry, geology, physics and other sciences have created and shaped the most intricate details of human life – a profound follow-up to the author's earlier bestseller, 'Your Inner Fish'!

**Wilson, Edward O. 2014. The Meaning of Human Existence.** Liveright (W.W. Norton), New York, NY. 208 pp. Hardcover, \$24.00 (ISBN 978-0871401002).- From one of the world's pre-eminent biologists and two-time winner of the Pulitzer Prize, comes a lively and learned examination of the nature of human existence, and what makes humans different from all other animals. A short and invaluable interpretation.

## Remembering Mike Eaton

by Ron Macnab

BIO and the Canadian Hydrographic Service lost a respected alumnus when Mike Eaton died at age 86 on 9 October 2014. For a memorial service that was held at the Cole Harbour Meeting House on 6 November, I was invited to deliver a few remarks that reflected feedback from former staff of the local branch of the Geological Survey of Canada who knew Mike, and who benefited tremendously from his expert advice and assistance concerning navigation for mapping and research in coastal zones and the high seas. My remarks also mentioned selected incidents and situations that illustrated aspects of his character.

I began by asking that all present who had sailed or worked in the field with Mike to raise their hands, and was gratified to note that a number of Mike's former associates were in attendance. For the benefit of those in the room who'd never had the experience, I explained that former shipmates are special, in that 'life at sea' offers unique opportunities to know colleagues in a framework that is both professional and social, and to cultivate friendships that endure long afterwards because they're born of shared experience. I personally consider myself privileged to have sailed with Mike, and to have observed his innate courtesy and his level-headed approach to solving problems.



Mike Eaton (left) with his team (from left): Steve Grant, Nick Stuijbergen, and David Wells.

Mike Hughes alluded to this when he stated: "I remember meeting Mike for the first time in the officer's dining room on *Baffin*. We introduced ourselves and the impression I immediately got was 'here is a true gentleman'. I was quite correct and over the years was never proven wrong".

As a visionary motivator and team-builder, Mike had the smarts to recognize when he lacked certain specific skills to transform his visions into realities, and he was adept at recruiting complementary personalities who in turn had the smarts to do the job. In its formation and composition, the BIO Navigation Group was a perfect

example of Mike's influence: under his direction, the Group became a powerhouse of innovation, engaging luminaries such as Dave Wells, Steve Grant, and Nick Stuijbergen.

Now living in New Zealand, Dave Ross testified to this by writing: "My major memories of Mike are his willingness to share his knowledge with others, and to participate in research where his expertise could be of value. He taught me a lot".

Mike was not only a good judge of character: he wasn't intimidated by numbers, and could readily undertake complicated calculations. In the days before digital computers completely took over number-crunching tasks, Mike made regular use of the Odhner Arithmometer, a mechanical calculator that was tedious to operate, but which was capable of precision operations. He was only the second person that I ever met who used such a device (the first was my father).

While Mike was a veritable storehouse of information concerning navigation in coastal zones and the high seas, he sometimes had difficulty finding his way around a computer keyboard. Whenever Dave and Steve developed or revised a piece of software that featured a user interface, they would ask Mike to subject that interface to a crash test, confident in his ability to find flaws and weaknesses that needed correcting before public release.

Mike's interests ranged far beyond navigation and hydrography. With field work giving him ample opportunity to observe seabirds in the wild, he taught himself to recognize the various species; he could also discuss knowledgeable their habitats and their behaviours. Having mapped regions and visited sites in the Canadian Arctic that are associated with early British mariners, he was fascinated with the history of polar exploration. A true 'Renaissance Man', he grasped every opportunity to expand his knowledge of topics that lay outside of his profession.

Mike was also an erstwhile pilot, having been assigned to the Royal Navy's Fleet Air Arm upon joining the Navy at the end of World War II. In those days, the RN trained budding pilots in Gipsy Moth biplanes, and something about flying in those antiquated machines must not have appealed to Mike. As he once described to me, his entreaties for a transfer to sea-level duties

were turned down by his superiors, prompting him to take matters into his own hands. By then he was qualified to undertake solo flights, so piloting his Gipsy Moth until he was over the Royal Yacht of the time, he executed a vertical loop above the regal vessel, thereby gaining his expulsion from flight training.

I tell this story to illustrate how Mike's personality traits were evident when he was a young man, foretelling the temperament that he displayed later in life whenever he embarked on undertakings that he considered worthy while overcoming obstacles in his path. For those of us who knew Mike, he serves as an inspiration: when faced with life's challenges, we need only picture Mike in the cockpit of his biplane, confident in his abilities and prepared to take whatever effective action that was needed to achieve his objectives. That is a fitting legacy from a remarkable man and a respected shipmate.

## The Carbon Year: The Building Pressure

by Ray Grigg<sup>1</sup>

The pressure is building to reduce global carbon emissions. At each meeting of the United Nations' Conference of the Parties (COP), the urgency becomes more palpable. The Lima meeting of COP 20 in December 2014 failed to reach the preliminary commitments necessary for the binding international agreements expected at the COP 21 meeting in Paris in December 2015. France is getting nervous because its reputation will be sullied if the Paris COP is a failure — French President Francois Holland made this very clear to Prime Minister Stephen Harper during an autumn 2014 visit to Ottawa.

With the Kyoto Protocol expired and without a binding replacement agreement from subsequent COP meetings in Cancun, Copenhagen and Durban, the default position has been for individual countries, provinces and communities to do the best they can to reduce emissions. This approach has been helpful but not sufficient. Almost all of Canada's reduced emissions have come from provincial initiatives, not federal. Most other countries have been unable to meet their voluntary reduction targets.

Meanwhile, international agencies have been carefully charting carbon emissions for hopeful signs. But these signs are rare. In 2012, for example, the increase in carbon emissions of 1.4% was less than the increase in GDP of 3.4%, indicating that the world economy is beginning to decouple from fossil fuels by becoming more efficient. In 2013, carbon emissions crept up by 2.3% while GDP rose by 3.3%. In 2014, emissions rose by 2.5% while GDP increased by 3.3%. If climate change is

## In Memoriam

**Kearney, Carlton Earle**, died 15 January 2015, wireless operator, CSS *Dawson*.

going to be slowed and reversed, however, total global emissions must not just trail GDP but must be reduced by a yearly average of at least 2.5% until all emissions reach zero on or before 2100. Any delays now will mean steeper future reductions.

Two lessons are to be learned from these statistics. First, efficiency alone in a world of expanding GDP is unlikely to bring about sufficient carbon emission reductions. And second, although the accomplishments of efficiency is mostly symbolic, it is nonetheless important. Every factory that uses less energy reduces emissions. The same is true for every new car that burns less fuel, and for every LED bulb that replaces an incandescent one. Statistics confirm that every individual choice, no matter how small, contributes to measurable environmental benefits.

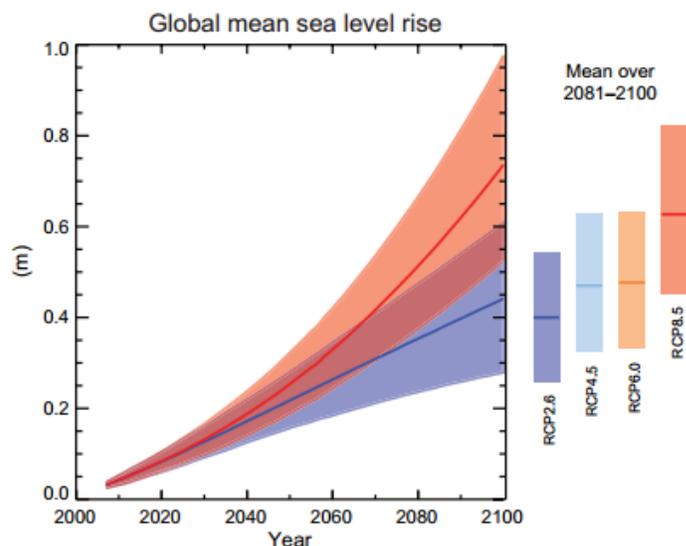
Another development is promising. The prestigious journal *Natural Geoscience* recently reported that more than half of all known fossil fuel reserves on the planet will have to remain unburned if we are to avoid dire climate change. With this realization, hundreds of the world's financial institutions, foundations and universities are beginning to transfer billions of dollars of investments from coal, oil and gas to renewable energies.

But time is crucial and the numbers are daunting. Global yearly carbon dioxide emissions are now, as of the beginning of 2015, about 37 gigatonnes. To translate this number into slightly more approachable terms, this is 37,000 million tonnes. The wisps of smoke drifting up from a hunter-gatherer's cooking fire or from a solitary country cottage makes our planet seem very large. But 37,000,000,000 tonnes of carbon dioxide is a declaration that our fires have grown sufficiently large to influence the planet we occupy. So we should not be surprised if our emissions are changing climate, acidifying oceans, melting ice caps, raising sea levels, driving species to extinction.

These consequences are being confirmed with sobering statistics:

- Six months ago, the US National Oceanic and Atmospheric Administration measured the world's average temperature at a new record of 16.2°C, 1.3°C higher than the 20<sup>th</sup> century average. The 10 hottest years since 1880 occurred in the 15 years between 1998 and 2013; none occurred before 1880.

- The pre-human extinction rate for species was 0.1 per million per annum; the present rate is somewhere between 100 and 1,000, a rate that is 1,000 to 10,000 times normal.



Projections of global mean sea level rise (after Summary for Policymakers, Working Group I, IPCC's Fifth Assessment Report AR5).

- For centuries prior to 1800, sea level rise was essentially zero; from 1900 to 2000 it was 1.7 mm per year; from 1990 to 2013 it increased to 3 mm. The total sea level rise by 2100 is expected to be about 0.5 m. But many variables could increase this number. Earth's average atmospheric carbon dioxide concentrations are expected to reach 400 ppm sometime in 2015. The last time concentrations were this high, about 3 million years ago, sea levels stabilized at about 10 metres above present levels. This suggests sea level rise will be continuous for centuries, presenting colossal challenges for coastal cities, settlements and agriculture.

The importance of reducing carbon dioxide emissions continues to increase exponentially. This means that 2015 will be an even more crucial year for taking corrective action. The longer we procrastinate, the more radical and difficult must be our future reduction measures.

If our inclination to inaction continues, we may reach a time when the problem of climate change is unstoppable and unsolvable. Unfortunately, we don't know when this time will occur. We may have already reached and passed it. But we can be virtually certain that continued delays will only make the challenges and the consequences increasingly difficult — for our climate, for our oceans, for innumerable species, and for civilization as we know it. Whether 2015 becomes a year for optimism remains uncertain.

<sup>1</sup>Ray Grigg is an environmental columnist with the Campbell River newspaper (Vancouver Island, BC) whose weekly column is distributed throughout western Canada under the umbrella "Shades of Green" (e-mail: raygrigg@island.net). Reprinted with permission of the author.

**Editor's Keyboard:** Central to this issue are the reports on the launch of the 'Voyage of Discovery'. By all measures, the VOD has been a resounding success for the BIO-OA. Peter Wells, BIO-OA member and accomplished VOD book seller and I attended the Bay of Fundy Ecosystem Partnership retreat in Sackville, NB where the VOD was presented as a gift to the facilitator. Mike Eaton is remembered in this issue as well. The team Mike assembled in the Navigation Group is an excellent example of a team that made vital contributions to the science and survey work at BIO. Finally

we have two articles with a focus on two issues threatening the planet, wildlife loss and climate change. A recent workshop introduced me to Planetary Boundaries within which humanity can continue to develop and thrive for generations to come. Using this concept genetic diversity was classified as a high risk and climate change as an increasing risk. Professor Fournier's message of the larger responsibility of the scientist "to influence human behaviour through public policy, governance and management" is fitting for both of these and other issues threatening the planet. *Andy Sherin*



## ABOUT THE BIO-OCEANS ASSOCIATION

The Bedford Institute of Oceanography Oceans Association (BIO-OA) was established in 1998 to foster the continued fellowship of its members; to help preserve, in cooperation with the Institute's managers and staff, BIO's history and spirit; and to support

efforts to increase public understanding of the oceans and ocean science. Membership is open to all those who share our objectives. Most current members are present or past employees of BIO or of the federal departments of Environment, Fisheries and Oceans,

and Natural Resources (or their predecessors) located in the Halifax Regional Municipality. Membership is \$10.00 per year, \$40.00 for five years, or \$150.00 for a lifetime membership.

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