

FISHBYTES

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Freeman Dyson: the future and fisheries

by Jennifer Jacquet

Freeman Dyson gave a lecture on biotechnology that I attended at Seattle's Town Hall on December 4th, 2006. Dyson, a physicist from the Institute for Advanced Study in Princeton, New Jersey, has made advances in quantum mechanics and theorized on the use of nuclear propulsion to explore outer space—his first love. But Dyson has also passed his 83 years musing over life on planet Earth.

Citing Carl Woese [1], Dyson described the era of unrestricted gene transfer that existed before the Darwinian interlude—when life coalesced into species and evolution began to be driven by natural selection based on competition between temporary coalitions of selfish genes. He likened this period of genetic sharing, prior to the breakdown into bacterial, archaeal, and eucaryotic lineages, to 'open source' evolution and continued with analogies that

appealed to the Microsoft-savvy crowd. Then, three billion years before Bill Gates, the period of firewalling began. This process was species-based, proprietary, cutthroat—and slow.

Then, ten thousand years ago, humans began to dominate the planet. Dyson believes the epoch of species competition, like the Microsoft heyday, is

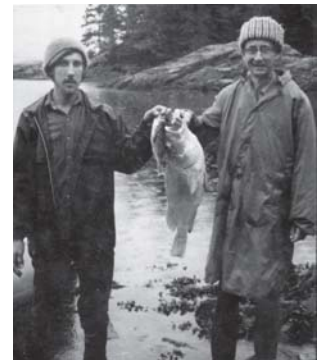
nearing its end.

He believes our present epoch—one dominated by cultural evolution, cultural interdependence, and human impact—warrants a new way of thinking about evolutionary change. The horizontal gene transfer occurring due to human technology should be considered in terms of chaos and system processes, rather than the "reductionism" of Charles Darwin. And the type of transfer that occurred in pre-bacterial times will re-emerge, albeit in a strongly modified form.

In short, Dyson seemed to be saying that natural selection is losing to the speed and innovation of *Homo sapiens*. Technology is now the dominant vehicle for change. He seemed excited as he spoke about future advances in biotechnology. According to Dyson, "designing genomes will be a new art form, as creative as painting or sculpture" [2].

As I sat in Town Hall's pews, I wondered if fisheries scientists would express the same enthusiasm for the future Dyson described. After all, the "Darwinian era" defines the field of biology. Speaking with biologists after the talk, they were indeed distressed that the Darwinian era would be considered only an interlude. Perhaps because marine scientists are only just realizing the oceans' potential in the quest for life's origin [3, 4], it seems premature to consider life's (as we understand it) end.

Cultural, technologically-based evolution cannot entirely replace natural selection, but it can become the dominant driver of change. Biologists are predictably uneasy with this message. Dyson, a physicist with his sights on outer space, is less compromising. He envisions a new era for



Freeman Dyson (right) and his son, George, catch a kelp greenling and a red snapper off Hanson Island, B.C., 1975. Photo by Emily Dyson.

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biology where technology compensates for what it destroys. In terms of fisheries, this may be an uncomfortable concept, but not a wholly unreasonable one. Aquaculture already produces roughly 40% of all seafood (even if it uses fishmeal in the process...). This month, the U.S. Food and Drug Administration declared meat from cloned animals safe for human consumption [5]. What would stop transgenic tuna from becoming the focus of fisheries biology in the future? Well, we would.

Dyson concluded his talk with a discussion of the ethical dimensions of biotechnology. He had useful advice for his home planet, but he also puts most of his hope in the colonization of space and a future beyond our atmosphere. In outer space, he believes, there will again be speciation in the Darwinian sense. (Incidentally, Dyson thinks a promising place to look for life beyond Earth is Jupiter's orbit, where fish from Europa's deep ocean might have splashed out and quickly freeze-dried [6]. The existence of fish on Europa is plausible; in fact, the food web upon which they would rely has even been modeled using ECOPATH [7]). Until then, as fisheries scientists, rather than astrophysicists, our job is to continue to understand and preserve life here on Earth.

References

1. Woese, C.R. 2004. *Microbiology and Molecular Biology Reviews* 68(2): 173-86.
2. Dyson, F. 2005. *Technology Review* March, p. 27.
3. Branes, J. A. et al. 1998. *Nature* 395: 365-67.
4. Venter, J.C. et al. 2004. *Science* 304: 66-74.
5. 'US body backs sale of cloned food', BBC news online December 28, 2006. <http://news.bbc.co.uk/2/hi/americas/6215541.stm>.
6. Dyson, F. 1997. *Atlantic Monthly* November: 71-80.
7. Irwin, L.N. and D. Schulze-Makuch. 2003. *Astrobiology* 3(4): 813-821.

SFU names research vessel after Carl Walters

Fisheries scientists at Simon Fraser University have named their newest research vessel after UBC FC faculty member Prof. Carl Walters. A 10-metre, welded-aluminum vessel built in Port Alberni, the *CJ Walters* carries a remotely-operated mini-sub, equipped with global positioning system instruments and advanced acoustic systems for seabed mapping and fish tracking. Dr Sean Cox, Assistant Professor in the SFU School of Resource and Environmental Management, says he decided to name the boat the *CJ Walters* for two reasons:

"1. To acknowledge Carl's contributions to fisheries science; and 2. Because the boat is ideally suited to the types of innovative, small-scale fisheries field work that Carl really enjoys." For more information and pictures of the vessel and submersible, visit www.rem.sfu.ca/fishgrp/.



The CJ Walters in action.
Photo by Paul Blake

Amanda Vincent presents UBC's 12th President: Stephen J. Toope

When Professor Stephen Toope was ceremoniously installed as the new President and Vice-Chancellor of the University of British Columbia in September 2006, the honour of presenting him officially to the Chancellor, the University and the wider community fell to Dr Amanda Vincent, Canada Research Chair in Marine Conservation at the Fisheries Centre. Dr Vincent spoke about Prof. Toope's illustrious career as the youngest Dean of Law at McGill University, Chairperson of the United Nations' Working Group on Enforced or Involuntary Disappearances, and founding President of the Trudeau Foundation. She pointed out that Professor Toope's scholarly and personal interests in human rights and international

development are matched by his emphasis on creativity and positive, collaborative change in our society. The Fisheries Centre is delighted by Professor Toope's strong support for interdisciplinarity and commitment to a vision of a civil and sustainable society, and wishes him very well in his new role.



Amanda Vincent presents Professor Toope.
Photo by Martin Dee, UBC Telestudios

Adams River sockeye salmon run

by Megan Bailey

I live in BC. I study at the Fisheries Centre. But before October 14th I knew pretty much nothing about salmon, except that I liked to eat it. Upon the suggestions of other FC folk, we decided to end our ignorance (for incredibly, I was not the only one who knew nothing about salmon!) and experience the Adam's River sockeye salmon run. With the help of Eric Parkinson, about 30 students, staff, friends and family journeyed to the Adams River, to join the 10,000 other tourists!

For the rest of you out there that are also not totally in the know, I will provide a brief background. Sockeye salmon return to the Adams River to spawn, after three years at sea. Although there will be sockeye returning every year, every fourth year is a spectacularly large return. 2006 happened to be such a year, with an expected 8,000,000 fish making the 290 km swim inland. Each female that successfully makes the journey will lay a total of 40,000 eggs, and the male

will attempt to fertilize these eggs, although many eggs will never hatch. Following spawning, the sockeye die.

Successfully fertilized eggs will hatch in the spring, and after spending their first year gaining size, the hatchlings will make the swim downstream to the mouth of the Fraser and into the Pacific Ocean. After three years in the Pacific, the sockeye battle their way back up the Fraser, returning to the Adams River. For every 4,000 eggs deposited four years ago, there will be only two adult survivors that reach the Adams River to spawn.

We arrived in different groups at different times on Saturday, with some folks wandering the trails and snapping photos of the fish from the shore, and others wanting a more realistic experience heading for the water in wet suits and dry suits to dive and snorkel amongst the red and green fish. Saturday night was spent eating, socializing and talking "fish" at



Sockeye salmon carcasses provide important nutrients to the river and surrounding forest.

Photo by G. Ong

Indian Point Resort. Sunday morning we headed back to the river for more photo-ops, and then made the drive home Sunday afternoon.

I now feel less ignorant, and more

in love with British Columbia. I would highly recommend that anyone who has the chance learn a bit more about the fish in our area, and enjoy the miracle of the Adam's River sockeye run. Where else can you actually be mesmerized by the smell of 8,000,000 rotting fish?

For more information, check out www.thinksalmon.com

Forum: Are we killing the world's oceans?

A University of Victoria–RSC: The Academies Forum

On **February 21 and 22, 2007**, leading international ocean and climate researchers and government decision-makers will gather at the University of Victoria to address scientific and policy issues of critical importance to the future of Earth's oceans.

This event is part of the series RSC–Universities Forums on Taboo Topics, created to provide citizens and policymakers with a locus where controversial issues can be examined critically and policy approaches explored.

Dr Daniel Pauly, Director of the Fisheries Centre, University of British Columbia, will deliver the keynote address on mining fish from the sea. Experts from countries including Canada, Chile, Germany, Scotland and the United States will address such issues as climate change, global aquaculture, ocean acidification and dead zones, coastal communities and fisheries policies, and offshore petroleum resource development.

Further information about this event is at: www.uvic.ca/research/oceansforum.

Food for thought: Letter to the editor

Thanks for keeping "Fishbytes" coming Victoria way. To me, one of the few advantages of declining fish stocks is a probable increase in numbers of their amphipod prey! However, even this can be a mixed blessing. Thus, heavy pressure on ground fisheries on the east coast has apparently resulted in large increases in their normal prey of scavenging benthic lysianassoid amphipods (e.g., *Anonyx*, *Orchomenella* spp.). These have been blamed for stripping the bait from newly set lobster pots and even swarming and devouring the few lobsters and crabs that may be confined in the pots and in holding trays! The species concerned are medium-sized amphipods, mostly about an inch or less at maturity. What they lack in size, they make up in large numbers that can soon reduce a bait fish to a "bag of bones", or a live (but confined) lobster to a hollow exoskeleton.

Dr E. L. Bousfield,
Managing Editor, *Amphipacifica*
Victoria, B.C.

News and Notes

Congratulations

Dr Ahmed Gelchu successfully defended his PhD thesis, "Growth and distribution of port-based global fishing effort within countries EEZs" on December 10, 2006. His work focused on spatio-temporal trends in global port-based fishing effort during the period 1970-2000. He is currently working for the Sea Around Us project, updating the fishing effort database and extending it to the 1950s.

Dr Rashid Sumaila has been elected to the Board of Directors of the North American Association of Fisheries Economists (NAAFE), for a four year term.

Dr Mimi E. Lam, Adjunct Professor, Aboriginal Fisheries, has been elected to a two-year term as Secretary of the Traditional Ecological Knowledge Section of the Ecological Society of America.

The **Pacific Fishery Biologists Scholarship** for the September 2006 competition, in the amount of \$625, has been awarded to MSc student **Megan Bailey**, who will attend the North American Association of Fisheries Economists Forum in March 2007, in Mexico. The theme of the Forum is "The Role of Economics in Mitigating Unsustainability of Fisheries: Dealing with Ecosystems, Environmental Fluctuations, and Governance".

Welcome

Iain Caldwell is starting a PhD with Dr Amanda Vincent. His research will focus on the movement patterns and spatial use of seahorses. He has a BSc from Mount Allison University and a MSc from Dalhousie University, where he studied the movement of painted turtles. He has also worked with the University of Alberta and Environment Canada on movement and spatial use of Barred and Burrowing Owls.

Rajeev Kumar has a Master's degree in Fisheries Resource Management from the Central Institute of Fisheries Education, Mumbai, India. He is now starting a PhD with Dr Tony Pitcher and is interested in studying

simulation modelling of lake ecosystems in Minnesota.

Katja Parkkila is a visiting PhD student from the University of Helsinki, where she is currently working as part of a Fisheries Research Group in the Department of Economics and Management. Her research is in valuation of environmental benefits, with special focus on valuing non-marketed benefits from fishery resources and their habitats.

Tom Porteus has come from the UK with a BSc from the University of Durham and an MSc from the University of Reading. For the past four years he has worked on various predation management problems for The Game Conservancy Trust, which is funding his PhD. Supervised by Dr Murdoch McAllister, he is now investigating the adaptive management of vertebrate pest species using Bayesian modelling.

Andrea Rambeau has a BSc in Marine Biology from UBC. For the last two years she has been working at DFO's Pacific Biological Station in Nanaimo, under the supervision of Dr John Ford, collecting and analyzing photo-ID data for the British Columbia population of humpback whales, which, until now have been primarily used to contribute to the international SPLASH project (Structure of Populations, Levels of Abundance, and Status of Humpback whales in the North Pacific). She will now use these data as a subject for her MSc.

Jennifer Selgrath is a PhD student with Dr Amanda Vincent. She will be studying the relationship between habitat quality and fisheries yield. Jennifer has studied the influence of habitat configuration on American lobster distribution and survival; MPAs at the Friday Harbor Labs; and worked on fishing policy at The Ocean Conservancy. She holds an MSc from San Diego State University and a BA from Wesleyan University.

Sarika Cullis-Suzuki is an MSc student with Dr Daniel Pauly. She recently completed her BA in Integrative Biology at the University of California, Berkeley. She has worked in the Turks and Caicos Islands and in French Polynesia studying MPAs and sustainable fishing practices. For her thesis, she will examine the effects of climate change on MPAs.

More new students in the next issue.

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