PENROSE MEDAL

Presented to
Raymond A. Price

Raymond A. Price
Queen's University (Professor Emeritus)

Citation by Tekla A. Harms

Just as it was my honor and great good fortune to have been his student, it is my honor to cite Raymond Price for the 2012 Penrose Medal from the Geological Society of America.

Born in Winnipeg, in the flattest part of Canada's prairies, Raymond Price went on to give geology an unparalleled understanding of a terrain so rugged it ultimately cost him three knee and two hip replacements. As an undergraduate at the University of Manitoba, Ray made two choices that have consequently reshaped our knowledge of orogenic belts; he elected to take a geology course to compliment his studies in physics and chemistry and he started his life-long collaboration with another Manitoba geology student, who we know as Mina Price. Graduating with honors in geology, Ray went to Princeton, where he completed a PhD in three years. For the next decade, he mapped the Canadian Rocky Mountain thrust belt as a research scientist with the Geological Survey of Canada and as the director of their Operation Bow-Athabasca. Over the years, he has published maps covering an area of some 20,000 square kilometers, or roughly the area of the Swiss, French, and Italian Alps combined. This, alone, is a staggering accomplishment. Moving from the GSC to the Department of Geological Sciences at Queen's University in Kingston, Ontario, and with his posse of 31 graduate students over 24 years, Ray continued to investigate the structure of the southern Canadian Cordillera. The Geological Survey of Canada called Ray back into service in 1981 first as Director General and next as Assistant Deputy Minister for the Earth Sciences Sector. (That his departure from Queen's immediately followed my arrival as a graduate student I choose not to take personally!) While holding these posts, Ray also served on virtually every commission and council of note associated with the earth and environment in North America, too numerous to report here but ranging from establishing the International Lithosphere Program, to Chairman of the Board of Trustees of the Sudbury Neutrino Institute, to President of our own Geological Society of America. Ray returned to Queen's a decade later and resumed his teaching and research career. His transition to Professor Emeritus over a decade ago has not curtailed his publishing, research, supervision of graduate students, or service to the Earth Science community - work that goes on to this day.

The foundation of Ray's research lies in his detailed understanding of the geometry of the Canadian Cordilleran thrust belt in space and time, developed from his extensive mapping. Ray has drawn balanced cross-sections and palinspastic reconstructions that demonstrate the three-dimensional character of the thrust belt with unparalleled precision. This has made the Canadian Cordilleran thrust belt an archetype among the world's orogens. Ray has gone on to build a comprehensive understanding of the kinematics, mechanics, and dynamics of thrust belts, in general. He is responsible for demonstrating the role of tectonic wedging over a broad range of scales, and addressed the mechanical paradox of thrust fault displacement with a dislocation model of fault propagation. Ray explored the role of gravitational body forces in thrust wedge propagation, and documented the interplay between original continental margin stratigraphy and subsequent thrust geometry.

With a breadth of vision equaled by few, Ray has been able to integrate the geology of the thrust belt with the evolution of the Canadian Cordillera as a whole, in all its complexity. Ray has documented the co-evolution of the thrust belt and its foreland basin, linking isostatic subsidence and pulses of clastic influx to thrust fault advances. He recognized the relationship of the amalgamation of outboard terranes to the collapse, thickening, metamorphism, and cratonward translation of the ancient continental margin along a basal decollement that rooted under the detached hinterland. Ray saw the role of extension in the final stages of Cordilleran development and identified the presence of metamorphic core complexes in western Canada. He demonstrated a link between major dextral strike-slip faults and core complex extension, synthesizing both with relative plate motion vectors in a single, evolving, regional strain ellipse.

The importance of Ray's body of work toward a general model of orogeny cannot be overestimated. It is reflected in the recognition that Ray has gained internationally. He has received distinguished awards from the Geological Societies of England and Germany, and from the French Government. He is a Fellow of the American Association for the Advancement of Science and a Foreign Associate of the US National Academy of Sciences. In his home country, Ray holds the Logan Medal of the Geological Association of Canada, the Douglas Medal of the Canadian Society of Petroleum Geologists, is a Fellow of the Royal Society of Canada, and an Officer of the Order of Canada, the highest civilian honor given.

Ray has a zeal for knowledge and deep sense of responsibility toward the future; he has the highest scientific ethic, a gentle and constructive candor, and unwavering generosity in the promotion of young scientists.

I know you will all join me in congratulating Ray Price on becoming the 2012 Penrose Medalist.

Response by Raymond A. Price

This is a unique, unexpected honor: unique because of my esteem for previous Penrose medalists and because GSA has been my principal professional association for 56 years, unexpected because I know many people worthy of the Medal who have not yet received it.

I am deeply grateful to Tekla Harms and other colleagues for my nomination; and to my wife, Mina, for 56 years of encouragement and support, in the field and the lab, as well as at home. I am also grateful for my good fortune over the past 60 years, including exceptional mentors, scientific colleagues, and graduate students; and the outstanding research opportunities available to me during my association with the Geological Survey of Canada (GSC) and Queen's University.

In 1952, after one geology course, I was hired by the GSC for Geoff Leech's mapping team in the Purcell Mountains of SE British Columbia. Geoff, an extraordinary mentor and role model, so nurtured my fascination

with the mountains and my interest in geology that I switched from physics and chemistry to geology. With his help, I also obtained GSC field experience in the western Rockies, Canadian Shield and the Alberta foothills. After I arrived at Princeton, the GSC gave me a PhD-thesis mapping project along the continental divide in the southern Canadian Rockies. My GSC supervisor and prime mentor was Bob Douglas, a pioneer in elucidating the evolution of the Canadian Rockies. From 1958 to 1968, as a research scientist at the GSC, with Bob's support, I was given two regional mapping projects that spanned the width of the Canadian Rockies. One was along the U.S.A. border. The other, Operation Bow-Athabasca, a large helicopter-supported project to map the region between Banff and Jasper, included my esteemed colleague and close friend Eric Mountjoy and eight other GSC geologists. Besides these exceptional opportunities for a hands-on regional overview of the southern Canadian Rockies, I was also authorized to spend several summers studying thrust-related folding and the tectonic significance of meso-scale faulting and fracturing within this region.

At Queen's University I worked with many gifted graduate students, mainly in the Canadian and northern US Cordillera. I also collaborated with stimulating colleagues like Dugald Carmichael, John Dixon and Herb Helmstaedt. Co-supervision of eight graduate students with Dugald enhanced my appreciation of the beauty of metamorphic petrology and its utility in elucidating tectonic processes. My fruitful collaboration with Jim Monger on the evolution of the Canadian Cordillera began after I first moved from the GSC to Queen's and is still flourishing 35 years later.

Thank you GSA, and thank you all.

View the images along with the full text from Ray Price's Gold Medal Lecture at http://www.geosociety.org/awards/12speeches/GML-Penrose.pdf