G.K. GILBERT AWARD

Presented to Robert G. Strom

Robert G. Strom
Lunar and Planetary Laboratory, University of Arizona (emeritus)

Citation by H. Jay Melosh

I am delighted to celebrate Bob Strom's receipt of the Gilbert Award. Spanning more than four decades of research, Bob has contributed in myriad important ways to our understanding of the geology of the Moon, the inner planets, and the satellites of the outer solar system.

As a member of the imaging team for Mariner 10, Strom led the initial investigation of volcanic and tectonic processes on Mercury. He marshaled the arguments for a volcanic origin for plains deposits on that planet, and he documented the principal types of tectonic features and their implications for patterns of stress and strain. In particular, Strom deduced that lobate scarps on Mercury record a period of global contraction, and from the distribution, lengths, and throws on such features he determined the timing and magnitude of that contraction. His fundamental finding has provided a key constraint on models for the thermal evolution of Mercury for 30 years. More generally, Strom has integrated what is known about Mercury in a series of review articles and in two books. He helped to make a compelling case to send further spacecraft to Mercury, a phase of exploration of the innermost planet that is only now fully underway. Bob continues to play an active role in the exploration of Mercury as a member of the MESSENGER mission team.

Following the Magellan radar mapping of Venus, Strom teamed with Jerry Schaber to address the implications of the population of impact craters and their states of preservation to constrain the resurfacing history of Venus. Strom carefully and thoroughly assembled the geological and statistical arguments for catastrophism — the view that most of Venus had been resurfaced within a geologically short time interval. This hypothesis was strongly resisted at the time by a planetary geophysics community who favored more gradualistic resurfacing scenarios, but Strom and his colleagues — most persuasively in their 1994 paper — won the community over. We still do not understand the interior mechanism for global resurfacing, but no one now argues that Venus is not the product of such a history.

With Vic Baker and Jeff Kargel, Strom overturned the static, post-Viking view of Mars. Their analysis of the surface of Mars suggested the possibility of extensive sheets of ice or water and active volcanism. Although highly controversial at the time, much of this work has been vindicated by the discovery of widespread and indubitable glacial features on the planet and evidence of a much more important role for flowing water than previously thought.

Strom's most recent work builds on the crater studies that he made throughout his career. Compilation of the impact crater size frequency distributions in the inner solar system, on the most ancient terrains of Mercury, Mars and the Moon, coupled with crater distributions from Voyager's images of the satellites of the outer planets convinced him many years ago that the inner solar system underwent a unique episode of heavy meteoritic bombardment. Most recently he recognized that this population bears the distinctive signature of bombardment from the main asteroid belt, while the more recent lightly cratered plains in the inner solar system bear the traces of the size-filtered present NEO population. This finding dovetails neatly with the dynamically inspired "Nice" model of planetary migration and orbital destabilization in the asteroid belt and has led us at last to a better understanding of the Late Heavy Bombardment.

G. K. Gilbert, in whose honor the award is named, had a deep interest in impact craters, lunar geology, volcanism and even glaciation. Gilbert would have taken immense pleasure in knowing of Bob Strom's many contributions to Planetary Science. It is thus most fitting that Bob should be the 2009 recipient of the Gilbert Award of the Geological Society of America.

Response by Robert G. Strom

I want to thank the award committee for this great honor. I will always cherish the Gilbert Award and try to live up to the ideals it represents.

I began my career as a planetary geologist in 1961 at the Space Sciences Laboratory of the University of California, Berkeley before I moved to the Lunar and Planetary Laboratory at the University of Arizona in 1963. At that time there was hardly any data amenable to geologic studies of the Moon and planets. The best data were Earth-based telescopic images of the Moon with a resolution of about 1 km. There was no geologically pertinent information for the planets or outer planet satellites other than some rather crude measurements of their composition and blurry images of the surfaces of Mars and Mercury. All geologic studies were confined to the Moon. Also at that time there were plans to send spacecraft to the Moon, and eventually its human exploration announced of John Kennedy in 1961. This gave planetary geology an enormous boost.

I have been extremely fortunate to have been involved in space exploration from its inception when there was very little lunar and planetary geological information to the present when there is an abundance of geological information that is pouring in even as I speak. We have now seen details of the surfaces of the Moon and all the terrestrial planets, plus incredible details of all the major outer planet satellites. We have also seen details of the surfaces of asteroids and comets. All of these data have been accompanied by a plethora of other geologically pertinent information such as the composition and quantitative topography of many Solar System objects. Today the planetary geology community has grown tremendously and has specialists in tectonics, impact cratering, geochemistry, and many other areas. We are also beginning to decipher the geology of icy bodies; some with exotic compositions like Titan's methane ices and liquids. As a result we are beginning to understand the origin, evolution and geologic history of our Solar System in ways that would have been impossible only a short time ago. It is now possible for a planetary geologist to spend his/her entire career working on one specialty such as the tectonics or stratigraphy of Mars. This would have been unthinkable only 20 years ago.

I am extremely fortunate to have seen and participated in the beginnings and the maturation of planetary geology. I am also

fortunate to be currently participating in the MESSENGER mission to Mercury. I was on the Mariner 10 mission that flew by Mercury three times in 1974-75. Until the MESSENGER mission was approved in 1998, I was convinced I would never live long enough to see another mission to Mercury much less participate in it. Although I am officially retired, I plan to continue studying and writing papers on various aspects of planetary geology, particularly the impact cratering record. Before I leave this planet, I hope to see the return to the Moon by humans, and other exciting planetary missions. Again, thank you so much for the presenting me with the G.K. Gilbert award.