2003 Career Contribution Award – Structural Geology & Tectonics Division
Gregory Davis

Citation by Clark Burchfiel:

Greg and I first met as undergraduates at Stanford where he graduated with a BSc in 1956 and MSc in 1957 then deserted the “Farm” to migrate across the bay to U. C. Berkeley where he received his PhD in 1961. His early work followed from his dissertation studies in the Klamath Mountains on a detailed study of the Caribou Mountain pluton, westward thrusting within the Klamaths, and the metamorphic and granitic history of the Klamaths. From this early work came several very important syntheses, perhaps the most important of which was the tectonic correlation of units between the Klamaths and the Sierra Nevada in 1969 which influenced all our thinking about Paleozoic and Mesozoic accretion tectonics of the Cordilleran orogen. In the early 1960s Greg and I began work in the Cordilleran thrust belt along the east side of the orogen and began to think about how his work in the Klamaths related to the thrust belt in Nevada, Utah and California. From this joint effort came a synthesis paper with a troubled history, “The two sided nature of the Cordilleran orogen and its tectonic implications.”

The early 1960s and 1970s were a great time for our cooperation, and in my opinion were some of the happiest and most productive times for both of us. Two papers on the interpretation of the evolution of the Cordilleran orogen in 1972 and 1975, the paper on the Garlock fault as an intracontinental transform structure in 1972, the comparison of the Mesozoic Cordillera with the modern analog in the Andes in 1976, and the Mesozoic construction of the Cordilleran collage in 1978, where Greg put forth an interpretation of doubling of the orogen by strike slip faulting the NW Cascades and adjacent Canada, were published. Our work together continued for about ten years when he began his now classic studies of extensional tectonism in the southern Colorado River area.

His first papers on the extensional system came out in 1979. This work followed on the heels of earlier work of Dick Armstrong, Ernie Anderson, and John Profit who had begun to recognize the presence of Cenozoic extension on low-angle normal faults. The late 1970s were a time of great debate about the existence of low-angle normal faults and related core complex formation, but in my opinion, it was the very careful mapping and attention to detail of Greg and his students working in the Colorado River terrain that documented and clarified the existence, magnitude and importance of these structures in a series of papers from 1979 to the early 1990s. His two papers with Gordon Lister on the nature of detachment faults and core complex formation in 1988 and 1989 are classics that still are required reading.

In 1987 Greg began work to document large magnitude extensional tectonism in China north of Beijing with his colleague Zheng Yadong. Subsequently Greg and Yadong moved west into Inner Mongolia where published maps suggested important Early Cretaceous extensional structures were present but unrecognized; now documented and shown to have developed within a few million years of major crustal shortening. This work has fully opened the floodgates for widespread extensional tectonics in China, but the extent and relation of this extension to plate boundaries has been very challenging in explaining its tectonic origin. What makes this work so important is not just the major contribution to Chinese tectonics, but the fact that it is very difficult to explain the tectonic setting of Early Cretaceous extension and core complex
formation more than 1000 km removed from any major plate boundary. These studies break new
ground and are producing results that are challenging all our concepts for the dynamics of large
magnitude extensional faulting.

Greg’s work of more than 40 years has had enormous global impact on structure and
tectonics from well-documented field studies to geodynamic analysis. It is only fitting that he is
the 2003 recipient of the SG&T Career Contribution Award.

Reply by Greg Davis:

This award is a dream come unexpectedly true. I am extremely grateful to the Division,
to GSA, and to those who nominated me for making it happen. My review of the 15 Career
awardees who have preceded me leaves me feeling appropriately humbled to be included
amongst them, and happily aware that one of them was my teacher — Ben Page at Stanford,
another my grad office roommate at Berkeley — Win Means, and still another, my oldest friend
and longest interacting colleague — Clark Burchfiel. My need to respond to Clark's overly kind
citation has prompted my analysis of how this honor may have come about. Hopefully, in part,
because of moderate intelligence and, in earlier years, strong legs. However, of no lesser
importance in my being here today has been the influence of, and interactions with, others. My
father, Rodney Davis, a Portland fireman, started the process by encouraging in many ways a 10
year-old boy to develop his budding interests in geology-rich Oregon. I cherish those memories.
Later came my association with superb geologists, some of whom profoundly influenced my
education, and others who worked with me as research colleagues over the years. Ben Page, my
undergrad structure professor, and Lionel Weiss, with his pioneering work in structural analysis
at Berkeley and before, were the most influential contributors to my education. Subsequently,
much of my tectonics research has been co-authored with stellar individuals who either deserve a
Career award in their own right — Jim Monger, Gordon Lister, and Darrel Cowan lead that list
— or, in the case of my citationist, have already won it.

Another factor contributing to my presence here today is simply repeated good luck! I
had wanted to conduct Ph.D. research in northeastern Oregon, but was informed by a professor
at another university that the area in question was his. I therefore turned to my second choice,
the Klamath Mountains of northern California. It was pure serendipity! Doctoral and
subsequent field studies there led to my rediscovery (long after the forgotten work of Oscar
Hershey in ca. 1905) of major Mesozoic west-directed thrust faulting.

In 1964, Clark and I began Mohave Desert mapping in the east-directed foreland thrust
belt and pondered over the divergent thrust geometry of the Cordilleran orogen. We submitted a
"two-sided orogen" paper in the mid-1960's to Science, but it was twice rejected as
unsubstantiated. Although later published in the obscure proceedings of the 1968 IGC meeting
in Prague (ended abruptly by the Russian invasion), its core ideas led us to AJS papers in 1972
and 1975 on possible plate origins of the US Cordillera.

The Klamaths and their fault-bounded counterparts in the northern Sierra Nevada also
provided fodder for early tectonic correlations between Canada and the US within what we now
call the accreted terranes. A 1978 gray literature paper co-authored with Jim Monger and Clark
on this Cordilleran "collage" remains one of my favorites.
It was more good fortune that I was introduced in 1975 to the Whipple Mountains of southeastern California by a San Diego State master's student, Ann Terry. Her discovery of enigmatic subhorizontal faulting in that range led to a decade-long USC field and petrologic effort there with my colleague Lawford Anderson, a dozen of our students and, later, Gordon Lister. In 1981, Brian Wernicke, a USC undergrad then at MIT, published in Nature a conceptual breakthrough on the nature of low-angle normal faults and the "metamorphic core complexes" of George Davis and Peter Coney that contained them. Our understanding of continental crustal extension would never again be viewed in conservative ways, and evolves still.

My recognition on a one-day fieldtrip north of Beijing in 1985, of a Whipple-like core complex underlying the Great Wall was continuing good luck and led to research in China that continues to this day. Again, collaboration with others, among them Peking University's Zheng Yadong and Qian Xianglin, and Arizona's George Gehrels, has provided new insights into the complex Mesozoic mountain systems of northern China. My appointment, since 2000, as a Guest Professor at Beijing's China University of Geosciences is a most welcome one and greatly aids this research.

I must close this response with mention of the many students, some 45 or so, who trusted me to be their graduate adviser at USC. They sometimes found me over-demanding, but, I hope, always fair to them and interested in their projects. They, too, have contributed in many different ways to who and where I am this day, and I collectively thank them for that. It's very clear that my appreciation for this award is owed to many.