AGI IAN CAMPBELL MEDAL

Presented to Gordon E. Brown, Jr.



Gordon E. Brown, Jr. Stanford University

Citation by Georges Calas

I am pleased to nominate Prof. Gordon Brown, Dorrell William Kirby Professor of Earth Sciences and Chair of the Department of Geological and Environmental Sciences at Stanford University, for the Campbell Medal. Gordon Brown deserves this honor by the importance of his service as a geologist, educator, administrator, and public servant. For more than 45 years, he made major contributions at the interface between Earth and Environmental Sciences, Physics and Chemistry, concerning a broad range of fundamental questions and societal issues. Gordon Brown was always devoted to the public service: at Stanford and SSRL, at NSF and DOE and in scientific organizations, as MSA. Such a broad activity illustrates the way Gordon Brown does science: having excellent and original ideas, teaching students, sharing and communicating, and working hard, including nights on synchrotrons...

The first recipient of the Campbell Medal, in 1981, was Dick Jahns, a former student of Ian Campbell at Caltech and Dean at Stanford. Gordon was close to Dick. He and Rod Ewing edited the Jahns Memorial Volume of the American Mineralogist.

I am deeply honored to give this citation and it is very fitting that Gordon Brown is receiving the AGI Medal in Memory of Ian Campbell.

Response by Gordon E. Brown, Jr.

I wish to thank the Executive Committee of the American Geosciences Institute for selecting me for this high honor. I also wish to thank my friend and scientific collaborator Prof. Georges Calas of the University of Paris VI and others for nominating me for the Ian Campbell Medal, and for Georges' kind words as my citationist. As will become evident, my career has been influenced by several early recipients of the Ian Campbell Medal as well as by others, including Georges.

In 1964, while an undergraduate at Millsaps College in Jackson, MS, I had the pleasure of meeting Richard Jahns, the first Ian Campbell Medalist. It's worth noting here that Dick had a connection with Ian Campbell, who taught him mineralogy as an undergraduate at Caltech. This experience helped convince Dick to switch from chemistry to geology as a major. Many years later, Dick's Sigma Xi lecture at Millsaps College on granitic pegmatites sparked my interest in combining my chemistry and geology background in graduate school, and I entered the Ph.D. program in Geochemistry and Mineralogy at Penn State in 1965. That proved to be an excellent choice for me even though Dick had moved to Stanford as Dean of the School of Earth Sciences just prior to my arrival at Penn State.

I worked with Jerry Gibbs at Penn State and embarked on a M.S. thesis project in x-ray crystallography, which was one of the specialities of Ian Campbell. I also benefitted from classes from and discussions with the late Rustum Roy, one of the pioneers in materials research, as well as Will White, who sparked my interest in mineral spectroscopy. I accompanied Jerry Gibbs to Virginia Tech in 1966 and obtained M.S. and Ph.D. degrees there under his guidance in 1968 and 1970, respectively. Following post-doctoral work at SUNY Stony Brook on the Apollo 12/14 lunar samples and on development of hightemperature x-ray diffraction methods with Charlie Prewitt and Jim Papike, I took my first academic position in 1971 at Princeton University, where I had the pleasure of getting to know Hollis Hedberg, the second Ian Campbell Medalist. Hollis and other emeritus professors and I often had morning tea together in the ore deposits collection room of Guyot Hall and discussed the development of the theory of plate tectonics, particularly the role played by Harry Hess in developing the concept of sea-floor spreading.

Dick Jahns entered my life again in 1971 when he invited me to Stanford to give a seminar. I was offered a faculty position at and settled into teaching and research at Princeton. During a second visit to Stanford a year later, I met Konrad Krauskopf – the third Ian Campbell Medalist - who took me on a short field trip in the California Coast Range and, together with Dick Jahns, and Bill Luth, convinced me to leave the tectonically inactive east coast and come to the earthquake-prone Bay Area. I made this move mainly because of the excitement I felt about the interdisciplinary research that has become a characteristic of Stanford University. My 40 years at Stanford have been filled with many intellectually stimulating collaborations with Stanford colleagues in the geosciences, particularly George Parks, as well as materials scientists, chemists, microbiologists, physicists, and electrical engineers. These collaborations tackled complex mineralogical and geochemical problems that required an interdisciplinary approach.

Stanford after having been at Princeton for only three months, but I declined this offer

Early in my Stanford career, I became involved in the first major synchrotron user facility - the Stanford Synchrotron Radiation Lightsource (SSRL) - which produces extremely intense x-rays that can be used to study matter of all types under conditions ranging from the high temperatures of silicate melts in Earth's crust to the extremely high pressures of Earth's core. These powerful x-ray sources, now numbering about 80 worldwide, can also be used to study biogeochemical processes under conditions typical of the Critical Zone where the seven billion human inhabitants of Earth live. I was fortunate to have helped in founding the GeoSoilEnviro-Consortium for Advanced Radiation Sources (GSE-CARS) at the Advanced Photon Source at Argonne National Laboratory, which was led by the late Joe Smith of the University of Chicago, and in developing a new interdisciplinary research area referred to as Molecular Environmental Science that resulted in new synchrotron beam line facilities at SSRL at SLAC National Accelerator Laboratory and the Advanced Light Source at Lawrence Berkeley National Laboratory. These national scientific facilities have been used by thousands of geoscientists and scientists and engineers from other disciplines to study problems ranging from the structure-property relationships of silicate minerals and melts, the aging of pits of US nuclear weapons, the structure of proteins, and the structure of oxide catalysts, to the speciation of high-level nuclear waste, minerals under conditions characteristic of Earth's core-mantle boundary, the structures

and environmental transformations of engineered nanomaterials, and the interaction of environmental contaminants and bacteria with mineral surfaces. It is in this last area that I have focused much of my research over the past twenty years, working with many very bright graduate students and postdocs and with Georges Calas and his group at the University of Paris VI and VII.

I have indeed been lucky to have worked in a stimulating environment at Stanford

University on a variety of Geoscience problems at the boundary with other disciplines with many collaborators. I have also served on many advisory committees and organized a number of workshops at the National Science Foundation, the Department of Energy's Office of Science, and many national laboratories over the years, which have given me the opportunity to represent the Geosciences community in a variety of multidisciplinary research contexts.

Again, I am honored to receive this prestigious award from AGI in recognition of my service to the Geosciences and feel very fortunate to have had many opportunities to represent the Geosciences community in broader arenas of science and engineering at the national level.