

## Acceptance of the Distinguished Public Service Medal for 1991

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As the second recipient of the MSA Public Service Medal, I am delighted not only to be so honored by my Society but to have the opportunity, following in the footsteps of the first awardee and our President, Malcolm Ross, to make a statement that members might cogitate on.

“Public service” is a catchy phrase today that implies personal activism: an individual (identified with the group) making an impact by pursuing a particular direction in an overt manner. Our Public Service Medal is, in a way, defining possible MSA vectors: directions that members may adopt within the world at large. “The public” could be defined as very broad, i.e., the citizens of the U.S.A., or, reflecting on the melting pot that is the Geological Society of America, we mineralogists, petrologists, and crystallographers might consider those involved in other geological and geophysical pursuits as “the public” when it comes to understanding minerals and rocks.

The public that I have focused on, physicians, lawyers, and journalists, pushes a vector that might be called interdisciplinary discourse, but it goes beyond the scientific arena toward health-related extremes. This was indeed a challenge, one I fell into rather than searched for. And, as with most of us who migrate into new areas, I learned at every turn, with and from each new person I encountered.

One of the first and foremost discoveries I made in moving out of my mineralogic niche was that there was a terminology problem. These nonmineralogists needed a glossary. I give you two rather basic examples.

1. The term “mineral” to the three groups, and to most people, refers to the ingredients in the little red tablets that one buys in the drugstore marked “one-a-day.” Parenthetically, if you think you know the precise definition of “mineral” consider the blurring now underway as we try to decide which organic and synthetic species should be included in the latest revision of *Dana’s Textbook Of Mineralogy*.

2. The term “mineralization” does not mean the formation of one or more of the 3500 or so mineral species for most people, many of whom have had background courses in biology and specifically, microbiology. “Mineralization” is the technical term applied when microbiota digest organic molecules, the remains of past living tissues—the solubilization and recycling of nutrients that sustains the base of the food chain. Those of you attending the opening sessions of this annual Geological Society of America meeting have heard about proliferating bacteria in anoxic environments, with the cannibalism typical of the bacterial system assumed. This is a very dif-



ferent use of “mineralization” than we understand when writing about paragenetic sequences or ore deposits, but we can appreciate the availability of “mineral” materials as essential for the production of new life forms.

Of the many people who know we have left the Bronze Age, passed through the Iron Age and probably through a Copper Age (for industrialization and electrification), to arrive now in the Silica Age (microchips, optical fiber, Fiberglas, etc.), few understand that each of the above, and indeed most of the raw materials essential to our everyday lives, comes from rocks and minerals.

If you haven’t personally encountered the lack of understanding of the solids we depend and dwell on, perform an experiment at your next nontechnical social engagement. Ask what a chip is. The most usual answer is “something you can put more and more information on in a smaller and smaller space.” But what of the material

that is the “space,” essential to storing and maintaining the information? It is unknown, dismissed as silicon, and certainly its attributes are not discussed, least of all in the advertisements to the public by IBM, Apple, or DEC.

This brief recounting of the lack of background on minerals and rocks not only illustrates the misunderstanding of the materials, but of the several fields that MSA represents with their contributions, past and potential. The introduction and education of our areas of expertise in the now-popular arena of natural surroundings (including manmade products in our technologically oriented society) is totally omitted in most grade schools and avoided by most students thereafter—shameful. Let’s face it: John and Mary Q. Public have avoided physical or chemical, laboratory or hard (*sensu stricto*) science throughout their formal education—and with impunity.

As Mac said last year in his acceptance speech, what we don’t know *will* hurt us. This lack of understanding has caught up with us. It is physicians, lawyers, and journalists who have provided whatever information was required to gain huge fiscal awards for occupational exposure to minerals and who testify to the hazards of minerals. It is the public at large who vote on environmental issues such as waste disposal sites, water quality, or asbestos removal. It was parents wanting to protect their children (a noble cause) who insisted that any and all fibrous materials be removed from schools and launched the latest mineral mining boom in our cities. Shouldn’t we (members of MSA) be involved and active in these endeavors, imparting accurate information? We are the ones who should communicate and educate the public sharing our knowledge of the diverse, indeed essential, ingredients in our lives, minerals and rocks. The gauntlet has been thrown down by the public.

Lawyers, physicians, and journalists have sharpened my communication skills. They are intelligent, well-educated, earnest people for the most part. They just haven’t been exposed to mineralogical and petrological concepts in everyday life as they should have been. As was my experience when I was exposed to them, I had to refine my definitions. They often asked penetrating questions. We should seize the opportunity to advance the understanding of our expertise.

This past March I was lucky enough to go to Indonesia, a group of 13000 islands that are one country. Their motto, “Unity in Diversity,” I proffer to you for the future of mineralogy, petrology, and crystallography and the

promulgation of knowledge. Here is an analogy that illustrates why and how I think it can and will work.

Over my career (and I do not think I am unique) I have encountered and exchanged ideas with many friends and colleagues from a diversity of backgrounds. To start with the traditional, there are crystallographers who are members of MSA: Joan Clark and Charlie Burnham. However, I worked with David Davies and Paul Sigler, who would now be labeled molecular biophysicists because they work on DNA and enzyme structures, but they employ the X-ray diffraction techniques familiar to all of us. There was Arthur Alderman, and Arthur Gascoyne, Australian mineralogists and petrologists who were interested in the Coorong carbonates, and in this country most recently are Ann Wylie and Mac Ross, related to asbestos investigations. There were physical chemists: Ralph Beebe and Steve Kittelberger; and geochemists: Bob Berner and Tony Lasaga; paleobiologists: Heinz Lowenstam and Ken Towle; and microbiologists: Bill Ghiorse and Grant Ferris. These colleagues in diverse basic science fields were matched by clinicians in orthopedic medicine: Jim and John Albright and Peter Jokl, and in occupational health: Bernard Gee and Wistar Miegs; pathologists: Darryl Carter and Brooke Mossman; and lawyers: Nancy Siegal, Mike Hinkel, Tom Geraghty. Such a diversity of people and, with them, a myriad of experiences not only have served to confirm my enthusiasm for minerals and mineralogy but have also prodded me to seek out the mineral materials that are ubiquitous in living creatures. I am today most accurately labeled a biomineralogist.

I wish to thank the interdisciplinary fields represented by the Mineralogical Society of America for making it possible to explore this diverse corner of the universe inhabited by minerals. I thank my associates, colleagues, and friends who have shared their ideas and questions and are truly part of the process that has brought this singular honor bestowed upon me today. Exhilarated and inspired by their confidence, I will push ahead with the important messages of minerals and mineralization to the world at large for as long as I can.

Finally, some of you know that I accepted the challenge of diversity very early on. When I married Brian J. Skinner 37 years ago, I was only dimly aware that communication with Australians was a special kind of public service requiring the refining of many definitions. For us, and for the MSA, it has, and continues to be, dynamic unity from diversity. Onward and upward!