'magic numbers'. The numbers 50 and 82 were already listed in this very early paper. His classical paper of 1948, "Geochemische Verteilungsgesetze der Elemente IX", contained a complete table of the abundances of the elements and, there again, attention was drawn to the peculiar numbers 50 and 82 that apparently played a conspicuous, but at that time unknown role in nuclear structure.

During the last year of the war and in the years immediately following, it was impossible to do any experimental work in Germany. I spent the time in Hamburg, often in unheated rooms and by candlelight, contemplating Goldschmidt's abundance values and their interpretation. In 1947 Hans Jensen and I wrote a joint paper entitled "Zur Deutung der Goldschmidt'schen Häufigkeitsverteilung der Elemente" (*Naturwiss.* Vol. **34,** 131). We had planned to dedicate this paper to Goldschmidt in honor of his 60th birthday, but, unfortunately, Goldschmidt died shortly before the paper had appeared in print.

Goldschmidt did not live to learn about the explanation for his peculiar nuclear numbers that had emerged from our meditations in Hamburg; however, an advance copy of my paper on nuclear abundance rules did reach him in England. Apparently, from the way he answered, Goldschmidt had read this paper with interest, but in his reply he complained that he had had to undergo a series of operations without being completely cured. A few months later the sad news reached us that Goldschmidt had died of cancer.

Introduction of Lawrence Grossman for the F. W. Clarke Medal

K. K. Turekian *

Mr. President, Ladies and Gentlemen:

On December 14, 1807, a meteorite was observed to fall and was subsequently recovered in Weston, Connecticut—the first such event recognized in North America by its European settlers. Eight days later Thomas Jefferson's Embargo Act became operational. The New England states and in particular, Connecticut, were most affected by the Embargo. For example, New Haven as a seaport never recovered from this insult. It is not surprising that relations between Jefferson and Connecticut could not be described as convivial. It could be that this relationship colored Jefferson's judgment about the true extra-terrestrial origin of the Weston meteorite. So he is on record as doubting the existence of meteorites.

Despite Jefferson's beliefs about international trade and meteorites, both the scientific discipline of meteoritics was inaugurated around that time and surreptitious trade between the United States and the world was effected by enterprising people by way of Canada and the Spanish colonies in North America.

About one hundred and sixty years later another meteorite of world shaking importance landed in a former Spanish colony, Mexico, and made its way into the United States in the hands of enterprising people. Some of it reached as far north as New Haven, the seaport earlier cheated of its potentially great maritime future. At just about that time a purposeful Canadian arrived at Yale to continue that exchange of mind and matter between our two countries that had flourished at such an early date in response to a President's international outlook.

* Department of Geology and Geophysics, Yale University, New Haven, Conn. 06520, U.S.A.

LAWRENCE GROSSMAN

The consequences of this convergence, had it occurred 160 years earlier, undoubtedly would have demoralized Jefferson and his border guards and blown apart the Embargo. The meteorite of course is called Allende and the Canadian is called Lawrence Grossman.

Larry Grossman came sharpened for this encounter by his early intensive interest in mineralogy and a good fundamental undergraduate training at McMaster University.

Allende, a C–3 carbonaceous chondrite, soon after its recovery began to be investigated intensively by a large number of laboratories because of its large supply and availability. Such a world-wide assault has yielded remarkable results, some of which have caused the restructuring of our concepts of planetary history. Grossman's doctoral thesis at Yale entitled "Condensation, chondrites, and planets", much of it subsequently published in *Geochimica et Cosmochimica Acta*, was in the spirit of this enterprise. The essence of Grossman's game plan as first shown in his thesis is to pursue as far as possible the detailed thermodynamic predictions of the behavior of the elements during condensation of solid phases from a gaseous nebula and then to test and refine the calculations by just as detailed an analysis of the real world of meteorites and planets where theoretical dreams sometimes come true. In the meteorite Allende, many of the predictions of the expected condensation sequence of phases and the associated trace elements were tested. His method of approach has led to other fruitful investigations on cosmochemistry such as cosmic abundances and lunar history.

In collaboration with his colleagues, Dr. Grossman continues to pursue the full story of Allende as well as other diagnostic material from the Solar System in order to contribute to our understanding of this corner of the Galaxy. Indeed it is not unthinkable that ever more wonderful models of planetary origin may emerge from such studies. At this point I am compelled to quote from a world-renowned geochemist's prophetic statement on matters of this sort: "We should not be alarmed at such possibilities" (CRAIG, 1974, p. 158).

Thus, Mr. President, I present to you Dr. Lawrence Grossman for the award of the F. W. Clarke Medal of the Geochemical Society for 1974.

REFERENCE

CRAIG H. (1974) A scavenging model for trace elements in the deep sea. *Earth Planet. Sci. Lett.* **23**, 149–159.

F. W. Clarke Medal Acceptance Speech

LAWRENCE GROSSMAN *

It is a great honor and a great pleasure for me to receive the Clarke Medal. It would be inconsiderate of me, however, to take *all* the credit for this achievement as there are numerous people to whom I feel indebted for helping me to win this award.

Firstly, I would like to thank my parents who were able to instil in me at an early age a very deep appreciation for libraries, books, reading and natural science

* Department of the Geophysical Sciences, The University of Chicago, 5734 South Ellis Ave., Chicago, Illinois 60637, U.S.A.

in spite of the fact that they themselves never finished high school. They wanted me to become a doctor but watched helplessly as my boyhood obsession with mineral collecting grew instead into my taking a course in chemistry and geology at university.

I chose to attend McMaster University because of what I perceived to be its Department of Geology's emphasis on pure science as opposed to the preoccupation with practical courses oriented toward mineral exploration which I saw in many other Canadian geology schools. I owe thanks to the faculty and graduate students in that department who initiated me into the beauty and intricacy of geochemistry in the period 1964 to 1968.

I received offers from several graduate schools but had difficulty selecting one because I wasn't sure of what aspect of geochemistry I was most interested in. I chose Yale because its program seemed to offer the broadest spectrum of possible research areas in that field. During my stay at Yale from 1968 to 1972, its Department of Geology and Geophysics was a stimulating and exciting place. There were a large number of graduate students with exceptional academic records and scientific training. There was keen competition among us in our course work and, at the same time, a healthy respect for each other's abilities. The Dana Club lounge was a meeting place for students with diverse backgrounds and thesis projects and the informality of the room sparked the communication of new ideas. There was ample opportunity for the development of close personal friendships among students, research associates and faculty at weekly seminars and periodic departmental parties and picnics.

A surprising number of people have asked me what it was like to study with Karl Turekian. Karl is a dynamic person with a lively sense of humor. He has the ability to infect his associates with his enthusiasm and several doctoral theses, including my own, were inspired by his carefully prepared course lectures. The critical ingredient in his research group was communication. Morning coffee breaks beside the blackboard and the informal lunchtime geochemistry seminar series entitled "From Plankton to Planets" were eagerly attended by all of us as well as many non-geochemists anxious to hear the latest. Perhaps it is not surprising that the paper which won me the Clarke Medal was part of a thesis which sprang from this kind of atmosphere and I am very grateful to Karl for having created this environment. I think most of you in this room will agree that this is a very stimulating and exciting way to carry out research, but how many of us can claim that our departments or our research groups have captured this elusive atmosphere?

I owe many thanks to Syd Clark for serving as one of my thesis advisers and for teaching me to suspect anyone who claims to know the composition of the Earth's interior from geophysical measurements alone.

I wish to thank my wife Karen for her sacrifice, patience, moral support and many helpful hours of hard work while I was in graduate school.

Finally, I am very grateful to the Geochemical Society and the Clarke Medal Committee for the honor which they have conferred on me and I hope I will continue to be worthy of it.