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ACCEPTANCE OF THE ROEBLING MEDAL OF THE MINERALOGICAL SOCIETY OF AMERICA

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Mr. President, Professor Campbell, Fellows, Members and Guests of the Mineralogical Society of America:

I have two feelings on this third of November, a day so important to me that I would like to call it the day of highest feeling in my life as far as my scientific devotion goes.

First, I feel very proud of the honor to be conferred upon me, the Roebling Medal, which is so highly esteemed all over the world. The second feeling is a more personal one: do I really deserve this unique distinction? Looking around I see so many distinguished mineralogists who would have merited this honor at least as much as I, to say nothing of the many others who are not with us today.

You may be interested in hearing why I started in mineralogy and how I became interested in silicate and other structures. Originally I had not planned to become a mineralogist at all. After the first world war, I began my studies in biology, physics, and mathematics in order to obtain the teacher's degree for high schools. In doing this I also had to study mineralogy, geology, and chemistry, but only at an elementary level. After finishing my examinations I became a teacher of natural history. But it was Rudolf Scharizer, Professor of Mineralogy and Petrology at the University of Graz, well known because of his work on granite pegmatite minerals and on natural and artificial iron sulfates, who soon afterwards insisted that I join his department to become his assistant in teaching classical mineralogy, petrology, and crystallography. He also urged me to do research work in crystallography and mineral and rock analysis. Although Scharizer was an excellent teacher, able to make all phases of classical mineralogy a living subject, I at first did not like this kind of work because I still was more interested in biological problems. I did not yet realize how significant mineralogy and crystallography were becoming, with their growing importance as a means for understanding the rules governing the structure of non-living materials, and as a means for relating geology, physics, and chemistry.

But with time I became especially interested in mineral chemistry. In the course of my own analytical work and by using the publications of S. L. Penfield, W. T. Schaller, R. Mauzelius and many others, and the data collections in Dana's System and Doelter's Handbuch, I soon became disappointed with the various concepts of the molecular constitution of minerals, especially of the silicate minerals. These concepts could not explain in a uniform satisfying manner the variability in composition of many mineral groups with apparently analogous crystallographic and crystal-physical behavior. I became acquainted with the work of V. M. Goldschmidt and his co-workers on the crystal structure of simple compounds. By means of a Rockefeller fellowship I was able to go to the laboratory of Goldschmidt in Oslo. Here I studied the early publications of Sir William L. Bragg and his co-workers on the crystal structure of some silicates. Now it was merely a synthesis of all these results which made it inevitable to abandon the assumption of discrete molecules in the silicates and other groups of inorganic compounds. Instead, the replacement of tetravalent Si by trivalent Al was assumed, as well as other non-isovalent substitutions.

I never intended to give a complete structural classification of the silicates; I only wished to emphasize some principles, e.g., the concept of infinite complex ions in the form of chains and frameworks. Linus Pauling soon after enlarged my proposals by the detecting of infinite tetrahedron sheets in the micas and clay minerals, and B. E. Warren worked out the band structure of the amphiboles. Many other crystallographers in all countries have contributed to this field, working out other types of chains, bands and sheets in the silicate minerals. It soon became clear that the concept of definite and infinite complex ions is not limited to the silicates. Despite the different character in the chemical bonding and despite other coordination numbers, it also holds for other groups of natural and artificial inorganic compounds, e.g., the borates, titanates, niobates, aluminium fluorates, and even hydrates.

Much work has been done in this field, but there is still more to be done, especially in the direction of a refinement which takes into account the thermodynamical conditions of formation, as has been shown in the case of the feldspars by W. H. Taylor, J. R. Goldsmith, Fr. Laves and others.

Referring again to the great honor which you are bestowing upon me, I find it appropriate to recall to our memories how much we owe to Colonel Roebling for his far-sighted and generous attitude, which led him to assist the Mineralogical Society of America and other institutions. This Society has probably become the largest and certainly a worldwide and most highly esteemed Mineralogical Society, with far more than 2000 fellows and members in all countries of the world. Roebling has in this way contributed a great deal to the development of our beloved science in all its branches.

I wish to thank you most sincerely for awarding me the Roebling Medal. You are expressing your appreciation of my very small contribution to our science. Nothing can be more gratifying to a scientist than the knowledge that something he has done is being honored in this fine manner.