ber of the Academy in 1953, and was offered an honorary membership in the Mineralogical Society of London. His name first appears on the list of Fellows of the Mineralogical Society of America in 1960.

Professor Ito, your colleagues here are happy to acknowledge you as one of the leaders of our science. Mr. President it is my privilege, and personal pleasure, to present to you Professor Tei-ichi Ito.

THE AMERICAN MINERALOGIST, VOL. 54, MARCH–APRIL, 1969

ACCEPTANCE OF THE ROEBLING MEDAL OF THE MINERALOGICAL SOCIETY OF AMERICA FOR 1968

TEI-ICHI ITO, *Mineralogical Institute, Department of Science, University of Tokyo, Tokyo, Japan.*

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

I feel indeed very much honored by the award of this coveted medal, and by the inclusion of my unworthy name in the illustrious list of the Roebling medalists that adorn the history of our science. When the fund for the medal was established about thirty years ago and as the first recipient, the late Professor Palache was announced, I could, of course, hardly imagine that I should one day be conferred with the same honor. However, I wouldn't be honest with myself if I denied that a faint aspiration arose in the bottom of my heart for contributing to our science something, however insignificant it might be, as compared with the brilliant works of Palache. For me the dream has turned to reality. It was to my utmost pleasure to be informed by the President that the Mineralogical Society of America was bestowing upon me this unique distinction for a mineralogist. In particular, to be introduced by Professor Buerger, whose works I have admired throughout my life, is the highest honor conceivable for me, although I think I do not at all deserve his utterances concerning me and my works. Actually I used to hand over to him many of my pupils, who had outgrown me, to be trained further by him in his laboratory.

Mr. President, I should like to express my sincere gratitude to the Mineralogical Society of America for the great honor it has done me as well as to my many collaborators without whose painstaking efforts I couldn't arrive anywhere.

Perhaps as usual I may be permitted to say some personal words on this occasion. I was, as Professor Buerger remarked, at first interested

Tei-ichi Ito

in petrology. My first paper published was on a zonal growth of potash and soda feldspars in an alkaline rock. At that time the science of rocks in the really modern sense was in its infancy, and was being intensively developed in the United States at the Geophysical Laboratory of the Carnegie Institution, for the most part by Norman L. Bowen and his able associates. Today I can still recall vividly how I was reading, totally absorbed, one paper after another that Bowen was producing in rapid succession. He was fascinating all of us, who were interested in rocks all over the world. It was no wonder that I, who as a young student had just initiated myself into the academic year, leaned towards petrology and made up my mind to follow Dr. Tsuboi, then an assistant of Professor Bunjiro Koto, the venerable father of Japanese petrographers and volcanologists. Tsuboi was an ardent disciple and advocate of Bowenism. It was, therefore, rather with reluctance that I accepted in the middle twenties a position which was to be eventually identified with one made vacant by the untimely death of Kotora Jimbo, Professor of Mineralogy in the University of Tokyo. I was, so to say, obliged to turn to mineralogy. However, it was a consolation for me to hear at that time that some of the well-known contemporary mineralogists in their student years had taken up petrography for their doctor's theses. Thus I had to start my study in mineralogy from ABC. At that time my laboratory was rather poorly equipped. A Goldschmidt two-circle goniometer was the only instrument. Soon I was devoting my time to adjusting this valuable and delicate tool for the study of minerals.

My stay in Europe, which took place soon afterward, was not only beneficial to me, but also decisive for my later scientific career. In those days two celebrated schools of mineralogy, among others, flourished in Europe, those of V. M. Goldschmidt in Oslo and Paul Niggli in Zurich. It was fortunate for me that I was privileged to stay with the latter. He led me to be aware of the cardinal problems in mineralogy. Isomorphism and polymorphism were the most important that had been awaiting elucidation since the early days of Haüy, Mallard, Tschermak, Friedel and Groth. Whereas isomorphism was clarified to a certain degree due to the advent of X-ray crystallography, V. M. Goldschmidt coming foremost, polymorphism remained to be solved. With these problems, isomorphism and polymorphism, broadly in mind I applied to Professor Bragg's laboratory at Manchester, England, and worked with a number of his collaborators. Drs. J. West and W. H. Taylor took pains to introduce me into the then promising realm of structure analysis. In Manchester, I came to know Dr. B. E. Warren of the Massachusetts Institute of Technology, who, together with Bragg, had just worked out the crystal structure of diopside, the first common rock-forming mineral to be

analysed with X rays. His paper on the structure of the rhombic pyroxenes followed. I wondered if his results would not be applicable to interpret the relationships among the pyroxenes in general. The conception of twinned lattices happened to occur to me in a very natural way. Further development need not be gone over again here. I would like to mention how deeply I was indebted to Warren at this stage of my study.

The problem of science varies from day to day, as data upon data accumulate. What yesterday was very important looks like a trifle today. The problem of polymorphism (of minerals) is no exception. What we have achieved (as we dare say) will soon become obsolete. However, limiting our consideration within the small domain of polymorphism, too much is still to be done. The problem of science is, so to say, everlasting. My regret is that I have done so little in the vast field of minerals and always at so slow a pace. However, Schopenhauer once asserted, as if he were pleading for me: *Das Echtes geht stets langsam seinen Gang.*

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PRESENTATION OF THE MINERALOGICAL SOCIETY OF AMERICA AWARD FOR 1968 TO BARCLAY KAMB

DONALD L. GRAF, *Department of Geology and Geophysics, University of Minnesota, Minneapolis, Minnesota 55455.*

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

The present is a time of trial for a venerable institution. The distant frontiers of the Mineralogical Empire are being raided by vigorous young tribes of barbarians—the Goths, the Visigoths, and the Ostrogoths; the Physicists, the Geophysicists, and the Chemical Physicists. The alarmed inhabitants of the realm are building castles. At the center, converts to a new religion called geochemistry have gained the confidence of the Emperor himself. I am here today to tell you about one who escaped from the Physicists at an early age to join the forces of the Empire, one who went to the frontiers and outperformed the invaders.

Barclay Kamb has carried out extensive studies of the crystallography and physical properties of a petrologist's mineral, a rock-forming mineral that has received surprisingly little attention from others—ice. He has determined the crystal structure of a crystallographer's mineral, zunyite. He is one of the few in recent years to contribute to theoretical crystal optics. He has published a major paper on the thermodynamics