THE AMERICAN MINERALOGIST, VOL. 48, MARCH-APRIL, 1963

PRESENTATION OF THE ROEBLING MEDAL TO JOHN W. GRUNER

PAUL F. KERR, *Columbia University, New York, N. Y.*

President Campbell, Members of the Mineralogical Society of America and Friends:

The Roebling Medal was established by the Mineralogical Society of America in 1936 to be awarded annually for distinguished service in the science of mineralogy. It was named in honor of Col. Washington A. Roebling, a generous benefactor of the Society, builder of the Brooklyn Bridge, and remembered among mineralogists as the donor of a great collection of minerals to the United States National Museum. Since the medal was created, 20 awards have been made. These have gone to scientists from among the several fields recognized by the Society both in North America and abroad. These men, selected by their fellow scientists for this award, have received the greatest recognition that mineralogical science on this continent may offer.

Today, it is with great pleasure that we join on this occasion of the 43rd annual meeting of the Society to honor Professor John Walter Gruner who is to receive this year's award. Dr. Gruner, now Emeritus Professor of Mineralogy of the University of Minnesota, with the many students who have received his training, with his record of public service in mineralogical science, and his scientific contributions set forth in 110 published papers, is eminently worthy to receive a medal for distinguished service in the science of mineralogy.

John Gruner was born in the small town of Neurode in the Sudetenland, July 12, 1890, in an area that is now part of Poland. His father was able to send him through the nine years of the gymnasium, but was unable to send him to a university. However, from earliest times, John wanted to go to America, the land of unlimited possibilities. By working two years in a wholesale house, he saved enough money to carry out his plan. He landed in New York early in 1912, and within 12 months had learned enough English to accept a position as a civil engineer with the Big Four Railway at Indianapolis, Indiana. On vacation trips while thus employed, he visited Colorado and New Mexico, and became interested in geology.

In the fall of 1915 John enrolled at the University of New Mexico, which then had only 200 students, charged no tuition, and was situated where board and room were available for 20 dollars a month. He took courses in geology under Professor Charles Kirk, supplemented with work in chemistry and modern languages. He graduated in 1917 and then studied at the University of Iowa under Professor George F. Kay in geology, and at the same time took courses in physical and analytical chemistry.

In the fall of 1918, he became Professor W. H. Emmons' research assistant at the University of Minnesota and studied petrology under Professor Frank Grout. He took the one and only course in paleontology he claims to have taken during that year from Professor Carl Dunbar, who was then on leave from Yale. He received his M.S. degree in the spring of 1919, became an instructor in mineralogy in 1920, and received the Ph.D. in 1922. He was appointed assistant professor in 1923, associate professor in 1928 and on the retirement of Professor Emmons became full professor in 1944. He became a professor emeritus in 1959.

Early in his career as a professor, Dr. Gruner became interested in crystal structure, and took advantage of a sabbatical year in 1926 to study at the University of Leipzig with Friedrich Rinne and Ernst Schiebold. He also came in contact with others active in the European universities at that time, including in particular R. Brauns, Paul Niggli and Wilhelm Eitel. This interest in crystal structure led to studies in the kaolin group where he was able to establish fundamental structures which have been widely accepted and frequently quoted.

As a professor at the University of Minnesota and an active scientist, Dr. Gruner at an early stage in his career became interested in the fundamental problems of the iron ranges. His work led to exciting discoveries, as for example the martitization of the ores of the Mesabi, and the discovery of microscopic algae in the Precambrian.

As a result of his knowledge of iron ores, he was called to Germany in 1937–38 as a consultant. This was a hectic but interesting experience, although it provided a foretaste of the totalitarianism to come.

The war brought about some reorientation in Professor Gruner's work. During 1943 and 1944, he was asked to teach physics laboratory to enlisted men and to others, and enough geography of Europe so the soldiers would not get lost during the invasion. At the same time, he carried on his research in mineralogy. Later, from 1945 to 1953, he worked on the growth and twinning of quartz for the U. S. Signal Corps.

From 1949 to 1958, he held contracts with the Division of Raw Materials of the Atomic Energy Commission. This work took him to the Colorado Plateau and it was here that I had the pleasure of seeing him on a number of occasions. As new deposits were discovered, and it was important to know the mineralogical features involved, Professor Gruner's services were in demand. When annual conferences were held in Grand Junction to appraise the many studies in progress, Professor Gruner was on hand to add stimulating and constructive scientific observations. The results of his work are covered in many reports on file in the archives of the Atomic Energy Commission.

One day during the summer of 1950, I was studying alteration features in the Prospector mine at Marysvale, Utah. At that time, all traffic in and out of the mine was by means of a zigzag series of steep inclines. Exit from the mine involved a climb of 1000 ft. or more up a 22 degree slope. Up the shaft came John, loaded with a heavy bag of specimens. Far behind was his assistant, equally loaded. A few friendly remarks, and he was on his way upward, loaded with enough uraninite to arouse the enthusiasm of any prospector. Thus John went from mine to mine throughout the Plateau, and then to his university laboratory where, with students and assistants, he developed scientific conclusions from the specimens collected.

Those of us who have been fortunate enough to encounter John Gruner as he has gone about his field work with sturdy persistence, or have benefited from the clarity of his discussion of scientific problems, or have sat and listened to his presentation of mineralogical problems in scientific meetings, or have had the stimulation of knowing him as a friend, take real pleasure in the knowledge that he is to receive this award. Those of us who live in America, join with our friends from overseas with pride to witness the presentation of the highest award offered by the science of mineralogy in North America, to one who made his way by his own efforts from a humble beginning in a small Sudetenland town, to a lifetime of eminent scientific work.

Mr. President, it is both a pleasure and an honor to present to you Professor John Walter Gruner, who is to receive the Roebling Medal of the Mineralogical Society of America.

THE AMERICAN MINERALOGIST, VOL. 48, MARCH–APRIL, 1963

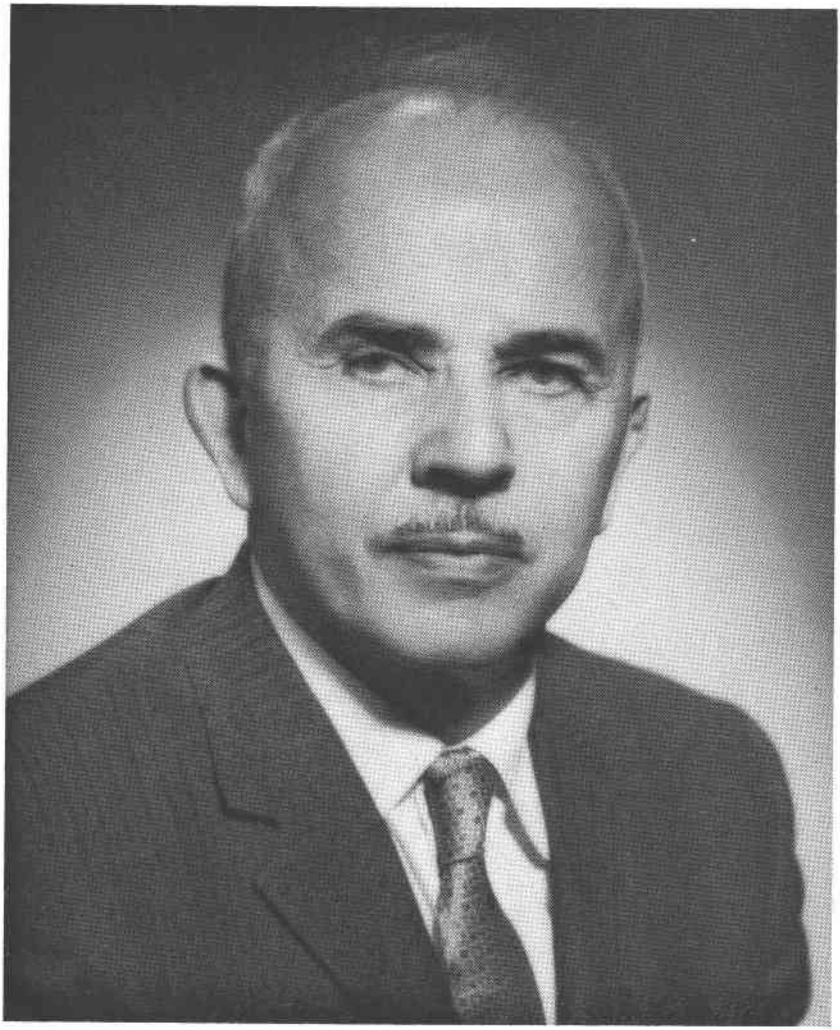
ACCEPTANCE OF THE ROEBLING MEDAL

JOHN W. GRUNER

President Campbell, Paul Kerr, Fellow Mineralogists and Guests:

It is with deep gratitude and happiness that I accept this great honor you have bestowed on me. It is not yet clear to me how I, who never had a formal elementary course in mineralogy, could have been chosen. It was the lack of such a course which caused an Ivy League institution to refuse me when I applied for admission to its graduate school in 1918. This setback became a stimulus to greater effort on my part.

When I started to teach mineralogy at the University of Minnesota



John W. Gruner

in 1920, 90 students, most of them veterans of World War I, crowded into my class. After the last war, classes were still larger. In spite of heavy teaching loads, I was able to study some of Niggli's and Wyckoff's early works on space groups, which fascinated me. In 1926, when I had earned a sabbatical leave, I went to Leipzig where Friedrich Rinne had an *x*-ray laboratory very well equipped for that time. You young men have no idea how simple and how meager was the apparatus for exploring crystal structures until about 1927. Reflection intensities were largely estimated by eye. *X*-ray tubes were fickle and shock hazards, and calculations were made with mechanical calculators or log tables. Nobody in mineralogy had heard of automatic electronic counters or *x*-ray fluorescent analysis, for they had not yet been invented. The era of 10 to 50 thousand dollar machines did not dawn until twenty years later.

When Bragg's and Pauling's laboratories began to solve one silicate structure after another, they made enormous progress. We, of course, had little idea that our contributions to the layer structures of the clay minerals in the thirties would be only an introduction to the problems. In fact, the work on these sheet structures was to continue for another 25 years, with still no indication of completely satisfactory solutions in the foreseeable future. I remember a remark by Harry Berman in 1935: "John, can't you find out the structure of glauconite?" We did find out that it is very similar to biotite. But look at what has happened to glauconite in the score or more of investigations since that time. And who wants to count the papers on the montmorillonite group since the first one appeared in 1933?

A number of the older mineralogists, of course, applied themselves to a study of these perplexing materials, but made only slow progress, largely because of lack of manpower and the modern diffractometers and electronic computers. With the impetus of the AEC, Space Research and the goading by Communists, this has changed. The number of workers in our and allied fields has multiplied perhaps tenfold in the past two decades. Team work and co-authorship are now the familiar pattern in almost any kind of research. Recognizing the many merits of this system, perhaps we should ask ourselves whether it has the *disadvantage* of not pinpointing responsibility and of not clearly defining the creative accomplishment of the individual thinker.

One might comment also on the greater emphasis now placed on results gained by application of thermodynamics as compared with field and microscopic work in reaching conclusions with respect to the origin and paragenesis of minerals and their deposits. It is logical that this development should come now; the older generation lacked the requisite theoretical background.

Perhaps the majority of the mineralogists of the future will be "synthesizers" able to make from a few simple raw materials "pure" minerals for applied science and industry. Conspicuous recent examples are quartz and diamond. Does this call for a redefinition of the scope of mineralogy? If one applied 150,000 bars of pressure to make stishovite, has he become a physicist, or is he still a mineralogist? If he used physical or chemical theory to interpret some natural occurrences or their absence should he be called a geophysicist or a geochemist rather than a mineralogist?

Personally, I have been as much fascinated by the origin of minerals, especially in deposits of unusual size, as by their chemistry and structures. That my views have occasionally clashed with those of other workers some of you probably remember.

In the summers of the twenties and thirties we reexamined portions of the Lake Superior region, in particular the Precambrian iron formations and ores. When we started it was claimed by our predecessors that the origin of these formations and ores was all solved and settled in their minds. Our investigations showed that there are many unknown factors in this picture, and in spite of great efforts since by many investigators, they still exist and probably will continue to exist for generations to come, unless geochronologists can come to our rescue.

We were luckier, when almost by accident, we were caught up in the uranium boom in 1948 and were asked by the Atomic Energy Commission to attack the problem of the origin of the uranium deposits of the Colorado Plateau and of the western states in general. Here was a paradise for a mineralogist, provided he was satisfied with small specimens and remembered to attach the prefix "meta" to some species after he brought them from the field to the laboratory. Dehydration during transport might even produce a new species known *already* under a different name. By 1955, with the cooperation of scores of geologists and chemists, we were in a position to advance a "multiple migration-accretion" hypothesis, if not a theory, to account for the accumulation of uranium in sizable deposits, which we hope will stand up under the test of time.

Let me conclude this rambling account of some of my activities in the rewarding and adventurous field of mineralogy by once more expressing my sincere gratitude for the very great honor you have today conferred upon me.

THE AMERICAN MINERALOGIST, VOL. 48, MARCH-APRIL, 1963

PRESENTATION OF THE 1962 MINERALOGICAL SOCIETY OF AMERICA AWARD TO DOUGLAS S. COOMBS

FRANCIS J. TURNER, *University of California, Berkeley, California.*

It is my privilege to introduce—unfortunately in absentia—Douglas Saxon Coombs, recipient of the Mineralogical Society of America Award for 1962.

Dr. Coombs was born and educated in Dunedin, New Zealand, where he graduated from the University of Otago with the degrees of BSc and MSc. After a short period as lecturer in geology in the same university he proceeded to Cambridge and took his PhD degree under the direction of C. E. Tilley. He returned to New Zealand as lecturer in geology at Otago and was subsequently appointed Professor of Geology and permanent head of the department at the same university—a position that he currently holds. During the past three years he has twice visited the United States, once as a visiting professor at Pennsylvania State University, and has spent a further period at Cambridge. In 1961 he was president of the section on Geology of the Australian and New Zealand Association for the Advancement of Science.

Dr. Coombs' professional training was exceptionally broad and thorough. He elected to extend his undergraduate training to include the full majors in each of geology, physics and chemistry. In geology he was fortunate enough to come under the influence of a most distinguished teacher, W. N. Benson, himself the heir to a small department with a fine tradition for research established early in the century by Patrick Marshall (familiar to many of you for his pioneer classic work on ignimbrites and on the wearing of beach gravels). Subsequently he came under the unique influence of the Cambridge School of Mineralogical Petrology, and still later learned something of the experimental approach to petrological problems from his collaboration with W. S. Fyfe in New Zealand and his association with O. F. Tuttle at Pennsylvania State.

Dr. Coombs' principal contributions to mineralogy and petrology fall in three categories:

(1) As befits a student of the Cambridge school he has published on the optics, structure and chemistry of mineral series, notably the pumpellyites and some zeolites.

(2) He has worked extensively in the field of basaltic rocks. His petrological study of the alkaline basalts of Ascension Island is still unpublished; but a general survey of the nature of primary basaltic magmas,

their chemical variation and their differentiation was presented before the 1962 International Congress in Washington and will appear this year.

(3) Most notable is Dr. Coombs' unique contribution to the mineral facies of low-grade metamorphism and diagenesis—the zeolitic and related facies. This work was founded upon a fine field study in the Taringatua Range of Southern New Zealand, where graywackes and volcanic sands have been converted largely to mineral assemblages dominated by zeolites, pumpellyite and chlorites. Later he extended his investigations to deeply buried geosynclinal sediments (mainly graywackes) elsewhere in New Zealand, concentrating especially on the veinlets which criss-cross these rocks on a regional scale and which he regards as products of incipient metamorphic differentiation. Only by use of x-ray techniques and by great persistence in microscopic study of these fine-grained mineral assemblages has Dr. Coombs been able to unravel the intricacies of their paragenesis. In so doing he has opened up a new chapter in petrology and has stimulated a wave of investigation along similar lines by colleagues in New Zealand and Australia. Into the science of metamorphic petrology he has introduced the concept of burial metamorphism.

It is fitting that in Dr. Coombs' absence the award should be presented to him through the hands of another notable New Zealand mineralogist and geochemist, for many years his associate in New Zealand and now my own colleague in California. I have pleasure in introducing to our president for this purpose Professor W. S. Fyfe.

THE AMERICAN MINERALOGIST, VOL. 48, MARCH-APRIL, 1963

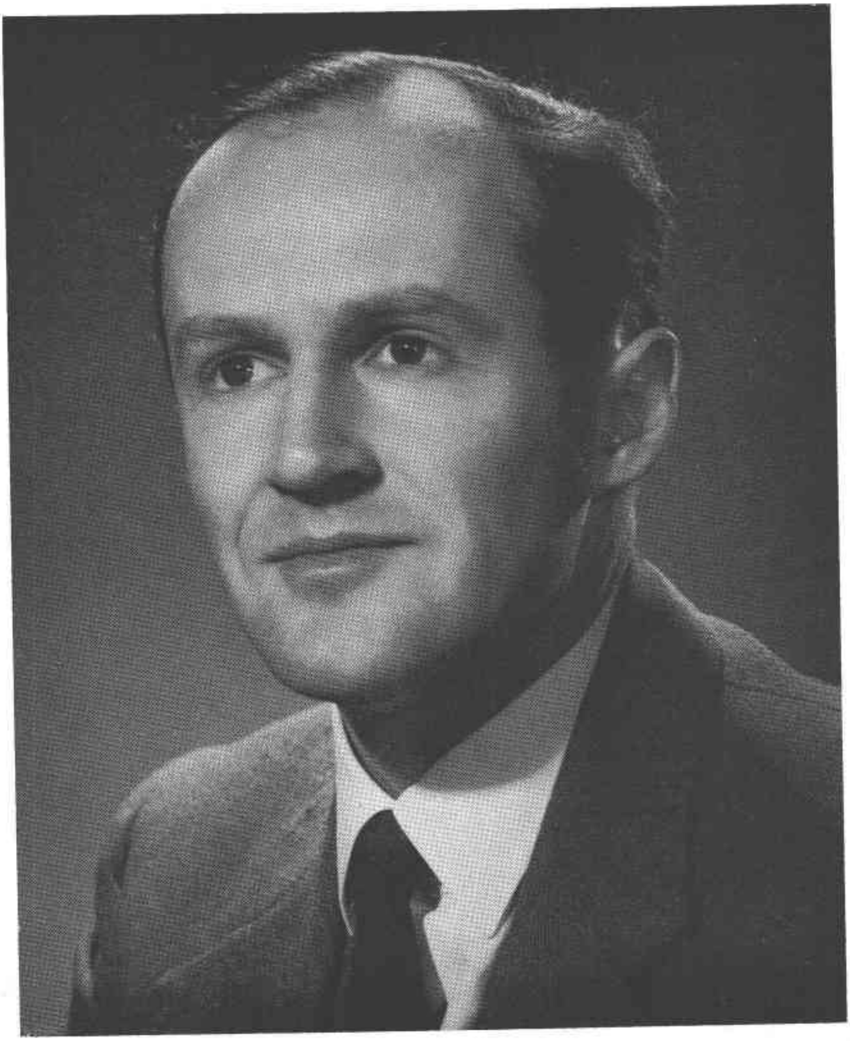
ACCEPTANCE OF THE MINERALOGICAL SOCIETY OF AMERICA AWARD FOR 1962

DOUGLAS S. COOMBS, *University of Otago, Dunedin, New Zealand.*

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

President Campbell's letter informing me of the M.S.A. Award took me completely off balance, and for several days afterwards I found myself walking away from the library with unchecked books and committing other similar vagaries.

Before I go any further I must say how sorry I am that I have been forced to break with a precedent maintained by former recipients, who have all been able to accept the Award in person. But it is a long way from Dunedin to Houston and in spite of encouragement from my Uni-



DOUGLAS S. COOMBS

versity and a sincere appreciation of the great honor which the Award carries, the unfortunate fact remained that the date of this meeting coincides with a round of vital duties in New Zealand. I am however particularly happy that my friend and former Otago colleague, Bill Fyfe, is able to be present on my behalf. For it was Bill who urged me some years ago to turn back to the problems of the mineralogy and phase relations of very low-grade metamorphism. The upshot was for me a particularly instructive and fruitful period of collaboration between two individuals whose primary interests were overlapping but distinct, in one case in experiment and thermodynamics and in the other case in more orthodox mineralogy and general geology. It is only by the accident of the alphabet that my name appears first on our joint paper with A. J. Ellis and A. M. Taylor on the zeolite facies.

I am particularly happy and honored also that the presentation is to be made by Professor Turner, for it was Dr. Turner and the late Professor W. N. Benson who gave me my early teaching and inspired me to follow a life of geological teaching and research. I can well remember overhearing a few words of a conversation between Professor Benson and Dr. Turner about the subject and emphasis of the Master's thesis on which I was about to embark. Like almost all Masters' theses in the Geology Department of Otago, then and now, it had a firm basis in general geology. Benson clearly expected there would be a strong bias towards elucidation of the stratigraphy of the area, as indeed was essential. Turner had presumably been expressing the hope that the petrology of the graywackes and associated sediments would not be overlooked. "Well," I heard him say, "someone has to do the petrology of those graywackes." The petrology of the graywackes of southern New Zealand is still not "done," but at least we know a little more about some aspects of their alteration, and furthermore it transpires that the type of alteration we found is really very common in many parts of the world. A lot more detailed mineralogical, experimental and field data are required before there is hope of a really thorough understanding of the processes involved.

You will see I was particularly fortunate, and my teachers particularly perspicacious, in the choice of a topic for my first piece of independent research.

However it was not till I went to Cambridge and studied under Professor Tilley that I realized fully that an understanding of rocks is dependent on a thorough understanding of their constituent minerals, and it was at Cambridge that I really began to study the mineralogy of burial metamorphism. It was at Cambridge too that I developed a keener interest in volcanic petrology, and under the stimulus of a three-month visit from Dr. O. F. Tuttle, in feldspar mineralogy. These interests remain.

Apart from three years as a graduate student at Cambridge, and eight months more recently at Penn State, all my research work has been done at the University of Otago. Otago, although rich in its own traditions, is not a large institution by present-day standards, and furthermore it is geographically about as remote from the centers of learning in the Old World and in North America as it easily could be. In these days of large team projects in very large research laboratories it will thus be an encouragement to all who work under other conditions that our work at Otago has been singled out by the Society for this most generous recognition.

Gentlemen, I cannot conceive of any award which I could cherish more, or which will serve as a greater incentive to continued effort.