

number of musical compositions, a large number of grand operas and light operas, are too long, too carelessly put together, and fail for this reason. They are not above the heads of the public. They are just not worthy of the public because the creative artist involved has been too self-indulgent actually to finish off his job."

Don not only has shown the ability of finishing off a piece of research very well indeed, but he has shown the growth and desire necessary to continue to attack new problems with new approaches. This Award is intended for a man whose accomplishments represent points on a rising curve, and I am sure that Don is a long way from an inflection.

Mr. President, I have the privilege of presenting to you, Dr. Donald L. Graf, as the 10th recipient of the Mineralogical Society of America Award.

PRESENTATION OF THE AWARD BY PRESIDENT MURDOCH

Donald Lee Graf, able and industrious worker through whose researches the complexities of the carbonate rocks are being untangled: it is my pleasure as President of the Mineralogical Society of America, to present to you the Society's Award for 1960, with the firm expectation that you will continue successfully to investigate this and other mineralogical problems.

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ACCEPTANCE OF THE MINERALOGICAL SOCIETY OF
AMERICA AWARD

DONALD L. GRAF, *Illinois State Geological Survey, Urbana, Illinois.*

I suppose we all wonder at times whether our activity in a particular corner of science is of any interest or use to anyone else. When no one comments on an error in a published paper, this can be more discouraging than losing the argument that should have developed. Recognition from one's society, such as you have just bestowed upon me, is therefore particularly heartwarming as evidence of one's relationship to the larger scientific community. I appreciate very much the encouragement that you have given, and can only hope that in the years ahead it will prove to have been warranted.

It has been my good fortune to be employed by an organization, the Illinois State Geological Survey, that has generously supported a pro-

gram in my case divorced from routine tasks. I owe a great deal to having had the chance to work closely with Julian Goldsmith and W. F. Bradley. And, above all, I am indebted to John Haff who sought to explain to us at the Colorado School of Mines the nature of proof and the difference between quality and quantity, and who was responsible for sending me to work under Professor Kerr at Columbia University. Professor Haff once spent an hour explaining to us in vivid detail that we really knew nothing about anything. We were by then past masters at physical chemistry and integral calculus, and it was generally agreed that the professor was badly in error.

Dr. Goldsmith has suggested to you that I am interested in carbonates. This is true. More broadly, I am interested in applying physical and chemical techniques to understanding the mechanisms of equilibrium and nonequilibrium processes in sedimentary environments. A number of us have recently made a modest start toward a basin-wide study of the solids and liquids contained in the Pleistocene evaporite sequence of the Great Salt Lake Desert. The definitive constants in such studies, of course, must frequently be obtained at experimental temperatures and pressures well removed from those which exist in sediments and sedimentary rocks.

Rather than go on at length about research plans, however, I should like to comment on the professional atmosphere within mineralogy and geochemistry since World War II. In my experience it has been a time of remarkable generosity and openness, and of cooperative relationships springing up between widely separated people of diverse interests. The situation is surely the exact opposite of that which in the 1870's led Professor Leidy to conclude that, because of the activities of Marsh and Cope, vertebrate paleontology was no longer a fit occupation for gentlemen. I think, the absence of animosities of any consequence results not from the greater perfection of human beings in 1950 and 1960, but simply from the fact that earth scientists are seated at a mammoth banquet table and know and accept that fact. There are more worthwhile things to be done than any of us can hope to handle, even with the aid of 50 graduate students. The recent bursts of activity in the fields of solid state physics, isotopic chemistry, and marine sedimentation, for example, have opened whole new areas of activity for mineralogists and geochemists, and we are on the verge of extraterrestrial sampling.

Most of us come to the banquet table with a discouragingly small number of concepts and research techniques at our command, in comparison with the spectrum revealed, for example, by a single issue of *Chemical Abstracts*. This frustrating situation is for the most part inevitable, but earth scientists, nevertheless, have been making a determined

effort to achieve greater versatility. There has been a general tendency to plunge into new and enticing fields without exhaustive preparation but with a determination to subject the results of these excursions to severe scrutiny. After all, if Professor Haff was right about the general state of knowledge, there is less reason to be afraid of another man's field. This bursting of previously sacred frontiers allows a geoscientist these days to contemplate adventures in astronomy, chemistry, physics, mathematics, and zoology, in addition to geology. Professor Urey has pretty well covered the list. One is soon brought face to face with the realization that in addition to the old limitations of time, money, equipment, and personal intelligence, there is a highly variable personal limit to the rate at which one can learn new techniques and concepts and still remain happy and productive.

It is not only because of the fine personal relationships and the stimulating variety of problems at hand that I have enjoyed the past ten years spent in science. At the risk of seeming trite, I must emphasize that the long range viewpoint, the dedication to excellence, and the relatively objective standards of evaluation in science are qualities that I find missing in much of the world around me. These qualities were present to a very considerable degree in the Iowa farming villages where I grew up, and they still are.—If the members of the society are surprised at the comparison, I can only suggest that the astonishment in Iowa would probably be comparable.

Thank you very much.