# PRESENTATION OF THE PENROSE MEDAL OF THE GEOLOGICAL SOCIETY OF AMERICA TO DR. N. H. DARTON[1]

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To me has fallen the pleasant duty of presenting, on behalf of the committee on the Penrose Medal and the council of the society, a statement of those considerations which led the committee to recommend and the council to approve award of the society's highest gift to our distinguished colleague, Nelson Horatio Darton. No office could afford me deeper satisfaction. As a college student some forty years ago I beheld his star, already risen above the horizon of ordinary men. Through four decades I watched its steady progress toward that zenith from which it sheds lustre on our fraternity to-night. To stand sponsor here for one who has long commanded my admiration and affection is indeed a valued privilege.

Yet however pleasant be the task, it is by no means an easy one. To span within the compass of these few moments a life so varied in its interests and so rich in its achievements is a difficult undertaking. Our guest of honor was born seventy-five years ago this current month, published his first geologic papers fifty-eight years ago, and entered upon his remarkable career as geologist for the federal government fifty-four years ago. In the course of his long and fruitful life he has published some 220 contributions to geologic science. More than two dozen geologic folios bear the imprint of his mind, half of them the imprint of his name as sole author. From his pen have come six Professional Papers, eight Water Supply Papers and thirty-six Bulletins. Five states owe their best geologic maps to his field and office labors. Here we have a sum of scientific accomplishment which might be divided among three men and do honor to them all.

But the Geological Society of America does not bestow its gifts for productivity alone. It scrutinizes the quality of the product. I speak not only for myself but for others who have followed the many paths blazed by Darton's pioneering genius when I testify to our astonishment that one man could do so much and do it so uniformly well. To-night we pay tribute to the fact that in the wealth of Darton's productive work there is so much that has withstood the acid test of time, so little of major importance that has required correction or revision.

Such a tribute has peculiar worth. The geologist whose writings are primarily theoretical or philosophical in character may invent an unsound hypothesis or draw an illogical deduction without provoking severe criticism. Errors in theoretical treatment are apt to escape detection by the larger geologic public, while the few critical enough to detect them may be more impressed by the author's powers of abstract thought than by the defects of his reasoning. But the geologist who maps a fault where none exists or fails to note a significant unconformity may be reasonably sure his sins will find him out. His mistakes are writ boldly, in language all can read. And in the very nature of things it is these mistakes, rather than the greater mass of his correct observations, which become the subject of future dissertations. Under such circumstances we are in danger of over-valuing the inventor of abstract hypotheses and under-valuing the discoverer of new facts or new interpretations of facts.

Our guest of honor has given to geologic science a truly stupendous volume of concrete geologic data, and interpretations of them which still command widespread confidence. His creative studies in the stratigraphy and structure of the Great Plains stand to-day as the firm foundation of all later work. His early interpretation of the regional subsurface features of this area remains substantially unchanged. As a pioneer in some regions and as an early worker in others it fell to him to differentiate, classify and name many geological formations in many parts of our country. From pre-Cambrian to Tertiary, the geologic column as we know it to-day reflects in many of its parts the impact of his studies. The geologist in the Coastal Plain, in the Triassic Lowland of New Jersey, in the Central Appalachians, in the northern Anthracite Basin, in the Adirondacks, in the Great Plains, in the Black Hills, in the Bighorn and other outlying mountain groups, in the Rocky Mountain Front Range in the Colorado Plateau, in the plains and mountains of Texas, New Mexico and Arizona, in Old Mexico, Venezuela and Cuba, is not merely walking in the footsteps of Darton: he is studying at his feet. Competent critics have acclaimed him our greatest authority on the structure and stratigraphy of the West.

But Darton's interests have not been confined to structural and stratigraphic problems. To him geologic science is indebted for comprehensive and authoritative studies of artesian waters, as well as for significant contributions to our knowledge of saline deposits in Red Beds of the Southwest, explosive gases in coal, underground temperatures, and explosion craters. For his scientific colleagues he prepared the

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first full bibliographies of North American geology. To the general public he told "The Story of the Grand Canyon" so effectively that his little book bearing this title is now in its 18th edition, the successive issues totalling 138,000 copies.

Back of Darton's interpretations of geologic phenomena there is a wealth of philosophic thought. But his philosophy is expressed in terms of concrete facts rather than in terms of abstract reasoning. There are advantages in such procedure. The essential dignity of science lies in this: that it is the study of truth, immutable and eternal. Philosophy is but man's conception of the truth. Hence philosophies rise and fall, victims of the discoveries of new facts. That philosophy is best which is most firmly founded on, and most strongly buttressed by, established facts.

When facts loom so large that they obscure the philosophic structure they support, one should not hastily conclude that no philosophy is there. If the facts are firmly established, and if they are correctly interpreted, that in itself is proof that the author of these accomplishments was guided by a sound philosophy. "There are more things in heaven and earth, Horatio, than are dreamt of in your philosophy." But your philosophy is founded on the solid rock, and shall not be shaken by the winds of time.

We honor to-night a master builder, one who has wrought into the edifice of American geology some of its most beautiful and most enduring parts. We honor a master artist, one of peculiar genius. Like Powell, Dutton and other figures of the heroic age of American geology, Darton has splashed at a ten-league canvas with brushes of comet's hair, painting boldly the salient features of vast areas of our continent. Like the best of our modern masters he has etched with infinite pains the details which complete the picture. Standing between the explorers of our early years and the systematic students of to-day, linking the past with the present, Darton has had the wisdom to combine the best in both methods of research. As a result, he stands to-day, alone and pre-eminent, the acknowledged master of field technique, the greatest reconnaissance geologist of our time.

He stands alone, but not apart from his fellow workers. A host of younger men have found in his kindly interest and generous aid inspiration to new endeavor. His own interests have transcended the bounds of his geologic labors. We find him serving in his home environment as vice-president of the Alliance Française, president of the Spanish-American Atheneum, member of the Italy-America Society, the Archeological Society and of the Instituto de las Españas. To breadth of interest and understanding he has added a genial human sympathy which has bound men to him in bonds of affection: "the elements so mix'd in him that Nature might stand up and say to all the world, 'This is a man.'"

All men delight to honor such a man. At the hall of the American Geographical Society in New York City, in letters of bronze on walls of marble, Darton's name is inscribed along with the great explorers of the world. He has held positions of honor and trust in many scientific and other organizations while the rolls of honorary membership in a number of foreign societies are adorned by his name. Such recognition can not add one cubit to the stature of our honored guest. Nor is it in our power to-night to add to or detract from the high distinction he has attained through long years of unremitting labor performed with a high standard of scientific integrity. But we can stand up and say to all the world: "This is a man to whom high honor is due."

# OBITUARY

## SIR FREDERICK BANTING

MAJOR SIR FREDERICK BANTING died, in his fiftieth year, while engaged in carrying information on the results of medical research on war problems from Canada to England.

Frederick Grant Banting began his career in medical research with a mental equipment which enabled him to surmount all obstacles, to become Canada's foremost scientist and one of the world's great benefactors. His scientific curiosity was insatiable and his energy in the pursuit of knowledge boundless. His thorough training as a practical surgeon served him well, but his interest in the fundamental aspects of all medical problems was never dimmed.

Banting was a good student, but he stood apart from his fellows by virtue of his critical interest in the physical and chemical bases for the current medical teaching rather than for his ability to secure high marks in examinations. He was interested in the practical aspects of medical work and preserved throughout his career a compelling desire to relieve the suffering of individual patients. His experiences as a battalion medical officer made a lasting impression on his mind. Again and again, even in the busiest phases of the insulin investigations, he found time to set a fracture or perform a surgical operation on one of his army comrades or on some patient who was in need. His predominant thought, even in his last hour, would be to do his utmost to relieve the suffering of others.

In the insulin investigations, which made his repu-