



Neville G. W. Cook

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1938–1998

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A DISTINGUISHED EXPERT ON MINING and the mechanical behavior of rocks, Neville G. W. Cook, professor in the Department of Materials Science and Mineral Engineering of the University of California, Berkeley, died of cancer on March 3, 1998, at his home. Although he had suffered from non-Hodgkins lymphoma for a number of years, he remained professionally active essentially to the end of his life. He was known internationally for his contributions to rock mechanics, the design of deep mines, and study of underground nuclear waste repositories. A skilled teacher and researcher, Cook was also an able administrator, serving on many committees to help shape the College of Engineering, the Berkeley campus, and his field of study.

Born in Pretoria, South Africa, on January 29, 1938, Neville Cook received his B.Sc. degree in engineering in 1959 and his Ph.D. in geophysics in 1962 from the University of Witwatersrand. In his dissertation research, Neville initiated a study of the failure of the rock surrounding underground excavations, with particular reference to the seismic description of rock bursts in the deep mines of the Rand, including an inventive physical model for locating the sources of rock burst events.

Neville Cook's remarkably productive professional career began in 1962, when he served for a year as a research fellow in the Department of Geophysics and Geochemistry of the Australian National University, Canberra. During this time he wrote

the classic book *Fundamentals of Rock Mechanics* with the distinguished Professor J.C. Jaeger, F.R.S. This book is now in its fourth edition. In 1963 and 1964 he served as visiting assistant professor of mining engineering at the University of Minnesota, and since 1968 was adjunct professor at that institution. In 1964 Cook was appointed the first director of the Mining Research Laboratory of the Chamber of Mines of South Africa, an industry collaborative-organization. During the next decade under his lead, the laboratory grew markedly. During 1974 Cook became the principal architect of the technical content for a much expanded research and development program for the Chamber of Mines as well as of the organization to handle it in the capacity of research and development consultant to the Chamber of Mines. In this role he was responsible for the overall technical research and development program and for the coordination of work done by its constituent laboratories. As inventor or coinventor, he was awarded some twenty patents, ceded to the Chamber of Mines. When Cook left the Chamber of Mines to join the Berkeley faculty, the Mining Research Laboratories at the Chamber of Mines had grown from its initial ten persons to 500. It was largely due to Cook's efforts that it had developed into one of the finest centers of excellence of its kind in the world.

In South Africa, Cook's professional activities ranged over many different aspects of mining and related disciplines, including rock mechanics, rock properties and rock breaking, the design of mining machinery and mining systems, rock bursts and earthquake seismology, and tectonophysics. Although most of Cook's original work was concerned with gold mining, during his latter years at the Chamber of Mines, his efforts also turned to coal mining. Neville Cook received international acclaim for his studies on rock bursts in the deep gold mines of South Africa. That program completely changed the thinking worldwide on the study of rock bursts and possibilities for the reduction of their severity. Beginning with that work, he remained a recognized authority on seismic source mechanisms.

Before coming to Berkeley, Neville Cook had already received several prestigious awards: the Central Mining-Rand Mines Award of the South African Institution of Mechanical Engineers, 1966;

Research Medal of the South African Institution of Mechanical Engineers, 1968; American Institute of Mining and Metallurgical Engineers Rock Mechanics Award (with Professor J.C. Jaeger), 1969; Gold Medal of the Associated Scientific and Technical Societies of South Africa, South Africa's premier award for outstanding contributions to science and technology, 1971; Research Medal of the South African Institution of Mechanical Engineers, 1975; and the Rand Mines Award of the Institution of Mechanical Engineers, 1975.

Berkeley had had a long tradition in mining education, and in 1975 the program in mining engineering was reinstated in the Department of Materials Science and Mineral Engineering. A thorough and prolonged search brought Neville Cook to the department as professor of mining engineering. He quickly became involved in the development of new courses in mining and rock mechanics. Examples of courses were mining and mineral resources, rock breaking, fundamentals of mining engineering, fundamentals of rock mechanics, advanced rock mechanics, and energy and nonrenewable resources. Professor Cook's teaching was always characterized by well-organized, lucid, stimulating, and forcefully presented lectures. He was invited widely to present keynote lectures around the world. In 1988 he became the first holder of the Donald H. McLaughlin Chair in Mineral Engineering.

Upon arriving in Berkeley, he rapidly initiated an active research program, much of it through Lawrence Berkeley Laboratory where he was faculty senior scientist in the Earth Sciences Division. His first major research project involved rock mechanics problems associated with the underground storage of nuclear wastes. Examples of his subsequent research included subsidence resulting from underground coal mining, effects of stresses and pore fluids on the velocities and attenuation of seismic pulses, microcrack growth in crystalline rock, deformation and fracture processes around bore holes, the behavior of wetting fluids in porous and fractured rock, and transport in fractured rock. Professor Cook was actively involved in research with graduate students and postdoctoral researchers and exceptionally close to them. During his twenty-two years at Berkeley, nineteen stu

dents completed their Ph.D. degrees under his supervision, and nine students their M.S. degrees.

In addition to his active role in teaching and research at Berkeley, Neville Cook put a great deal of energy into service, not only to the university but also to government and professional societies. He contributed a broad outlook and informed opinion that often uplifted the level of the discussion and approach being taken. On the Berkeley campus, he was chairman of the faculty of the College of Engineering, 1988 to 1990; vice-chair, Department of Materials Science and Mineral Engineering, 1990 to 1997; chair, Committee on Research, Berkeley Division of the Academic Senate, 1989 to 1991; member, Divisional Council, Berkeley Division of the Academic Senate, 1989 to 1993; director, Berkeley Engineering Fund, 1988 to 1990; and director, Berkeley Engineering Alumni Society, 1988 to 1990. In 1993 he was also named professor in the Department of Civil Engineering (where he assisted in developing a long-range plan), and in 1994, professor in the Department of Nuclear Engineering. From 1994 until shortly before his death, he also served as chair in the Energy and Resources Group at the University of California, Berkeley.

Neville Cook published extensively the results of his research—some 200 total publications. In addition, he served extensively on the editorial boards of professional journals in his field. He was editorial adviser, *International Journal Rock Mechanics Mining Sciences and Geomechanics Abstracts*; associate editor, *Journal of Geophysical Research*; member, editorial board, *International Journal of Geotechnical and Geological Engineering*, and member, advisory editorial board, *International Journal of Mining and Geological Engineering*.

After coming to Berkeley, Cook continued to receive recognition from his peers. In 1988 he was elected to the National Academy of Engineering. Subsequent awards included distinguished member, Society of Mining Engineers of the American Institute of Mining, Metallurgical and Petroleum Engineers; Basic Research Award, U.S. National Committee for Rock Mechanics; Jaeger Memorial Dedication Lecturer, 29th U.S. Symposium on Rock Mechanics; Basic Research Award, National Re

search Council's (NRC) Commission on Geosciences, Environment and Resources' (CGER) U.S. National Committee for Rock Mechanics; and Müller Lecturer, Eighth International Congress of the International Society for Rock Mechanics, Tokyo, 1995 (the Society's Premier Award for outstanding contributions to the theory and practice of rock mechanics and rock engineering).

Neville Cook also found time to serve on national and international committees and panels on mines and rock mechanics and on setting environmental standards for radioactive waste management and respirable dust in mines. He did this until he was advised for health reasons not to travel by air. Neville Cook always ran well-organized, tightly controlled meetings—he was an excellent and dedicated committee chair. To illustrate the range of his role, we cite a few examples: chairman, NRC's National Materials Advisory Board Committee on Measurement and Control of Respirable Dust in Mines; member, CGER's Panel on the Waste Isolation Pilot Plant of the Committee on Radioactive Waste Management; member, CGER's U.S. National Committee for Rock Mechanics Panel for Defining Critical Rock Mechanics Research Requirements, Subpanel on Rock Fragmentation and Drilling (1979 to 1980); chairman, CGER's U.S. National Committee for Rock Mechanics Panel on Domestic and International Activities; chairman, CGER's U.S. National Committee for Rock Mechanics; member, Office of Nuclear Waste Isolation Earth Sciences Review Group, Battelle, Columbus, Ohio; member, Geosciences Advisory Panel, Los Alamos Scientific Laboratory, Los Alamos; member, Office of Nuclear Waste Isolation, Engineering Review Group; chairman, Workshop on the Containment of Underground Nuclear Explosions, Office of Technology Assessment, Congress of the United States; member, CGER's Board on Earth Sciences and Resources; and chair, joint CGER and Commission on Engineering and Technical Systems' Committee on Advanced Drilling Technologies. Cook controlled his time well and was able to do all of this while maintaining his university commitments.

Despite being devoted to his intellectual work, Cook pursued other interests. Early on he spent considerable time building a

racing car that he had designed himself. The home-built car with Neville Cook at the wheel was the fastest in South Africa, helping him to earn the title of “South African Hillclimbing Champion.” Throughout his life, Cook retained his love of cars and steam trains and continued to build them—often from the frame up. That mind of his always reasoned out solutions to problems, according to his wife, Jennifer, who once opened her dish-washer and found a brake drum inside. Neville had reasoned it was the best place to clean the drums on the car he was rebuilding.

Neville married Jennifer Reay in 1959. They had two children, a daughter, Anne-Marie, and a son, Paul. Their daughter, (Anne-Marie Cook-Polak) and their son-in-law (James Polak) all received master's degrees in mineral engineering from the University of California. Neville and Jennifer felt lucky to be living in the United States and spent many vacation weeks traveling throughout the United States in their camping van. They also enjoyed bicycling from their base in Lafayette. Neville often said that the two most important decisions in his life were first and the most important, to marry, Jennifer, and second to join the faculty of the University of California.

In October 1998 an international conference was held in Professor Cook's honor at Lawrence Berkeley Laboratory, the proceedings to be published as the Neville G.W. Cook Memorial in a special issue of *the International Journal of Rock Mechanics and Mining Science*. This is indicative of the high respect and esteem in which his name is held, and will continue to be held, in the world community of engineering scientists.

