

Obituary: Melvin L. Moss (1923-2006)

Melvin L. Moss passed away June 25, 2006, at the age of 83. Mel was an anatomist (and former dean) at the dental school at Columbia University, New York (Fig. 1). Indeed, he was very much a home-town success: Born in New York (January 23, 1923), he received his A.B. from New York University (1942), and then his D.D.S. (1946) and his Ph.D. (Anatomy, 1954) from Columbia University. Mel taught at Columbia for the whole of his professional career (Fig. 2), even after receiving his emeritus status in 1993, giving his last formal anatomy lecture in 1993 (Fig. 3).

Labeling Mel as an anatomist is strictly true, but his interests—and his intellectual influence—are more far-ranging. His over-200 publications spanning some 60 years (including many invited book chapters) is itself a testament to his scientific contributions, but those who were fortunate enough to hear him speak at meetings recognize that his sphere of influence was much broader than can be extracted from his writings alone.

Moss' spectrum of research interests ranged from dental histology, tooth formation, odontometrics, bone biology, growth and development, mathematical modeling, branchial arch syndromes, the etiology of malocclusion, anatomical consequences of orthocephalization, and a host of other topics. Mel's command of German provided a valuable prelude into the scientific European literature, so his papers are well-peppered with insights and citations that are less accessible to the rest of us who wrestle with a single language. However, it is Mel's development and vociferous promotion of the functional matrix theory that is his foremost contribution (*e.g.*, Moss-Salentijn, 1997). This involved a true paradigm shift (Kuhn, 1962). Previously (and persistently in some circles), the size and shape of bones were perceived to be the consequence of their genetic endowment. Instead, Moss argued—along with insightful animal experimentation—that bone is “dumb” (an often-repeated metaphor of his), meaning that bone merely responds to the environment (the soft tissues, mechanical demands, *etc.*) that it finds itself in.

I'm fond of dwelling on this “Moss-ism” in my own lectures, partly because of its interesting structure but also because it is so pithy:

The size, shape, position and maintenance in being of all skeletal units are compensatory, secondary and mechanically obligatory responses to the primary morphogenetic demands of their specifically related functional matrices.



Fig. 1. Mel Moss, mid-1980s.

This meshes with the bone biologists' refrain that “function is dominant over form.”

Moss' functional matrix theory rankled more than a few colleagues, commonly generating heated, dynamic discussions at meetings. With his imposing stature, powerful voice, and considerable erudition, arguments with Moss often became lively theater for the audience. Since Moss was such an excellent speaker, he frequently was called on as the scientific expert to open sessions at clinical meetings of dentists (and, especially, orthodontists, who were broadly influenced by the functional matrix theory), so expectations of verbal fireworks between Mel and the antagonist-of-the-day often were fulfilled. Most researchers of his era have “Mel stories.” Indeed, he clearly had a Socratic streak in him that enjoyed teaching by raising his opponent's blood pressure.

Development and elaboration of the functional matrix theory held much of Moss' attention during the latter part of the century, so younger scholars can be excused if they



Fig. 1. Mel Moss, 1993, following his final anatomy lecture, and preceding his emeritate.

perceive Moss as a craniofacial biologist. He published widely (with 16 papers in the *American Journal of Physical Anthropology*), and he did considerable early work on the histology of dental tissues. His work on the phylogeny of mineralized tissues (1964) and the evolution of mammalian dental enamel (1969) are representative of the breadth and scope of his considerable knowledge. Moss participated in several of the International Symposia on Dental Morphology (Moss, 1978, 1982), but he may be best known in dental anthropology circles for his study of tooth sizes of Liberian Negroes (1966, 1967), which is an area of the world that still merits anthropological investigation (Edgar, 2002). Of note, some of Moss' final studies were of teeth (Moss-Salentijn et al., 1997; Moss et al., 2005).

At the risk of being an absurd reductionist, Moss' professional career spanning a half-century offers a special opportunity to reflect on the productivity of an enthusiastic scientist, especially one working before the now-popular multi-author laboratories, where authorship comes more easily, but sole authorship only occurs rarely. Moss' publication record involved several close collaborators over the years, but the work

generally reflects the vision of one person. My collation of his references from 1948 through 2005—which is almost guaranteed to be incomplete—comes up with 247 citations (mean = 4.3/year; sd = 3.2). Moss' productivity picked up in 1954 coincident with award of his Ph.D. (Fig. 4), and it seldom dropped below 4 peer-reviewed papers per year for the next 35 years. This sustained output likewise is shown in Fig. 5, where the cumulative curve has a characteristic sigmoid shape due to a hesitant start at the beginning and a decelerating denouement at the end, but I doubt if there are many of Moss' era who match the long, linear, high rate of publication in between. It devalues a scientist's career to merely count the lines on a CV, but these numbers provide an interesting benchmark of one person's research productivity. Unfortunately, they also cloud the powerful and lasting influence Mel had on his students and colleagues.

Edward F. Harris
Editor

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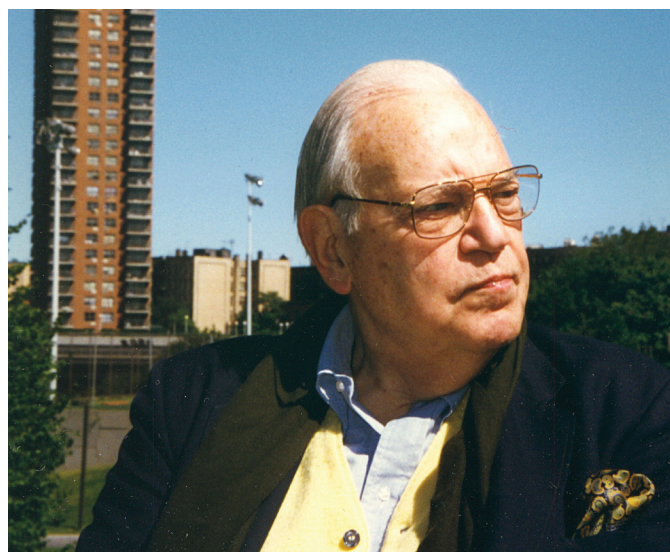


Fig. 3. Mel Moss, mid-1990s.

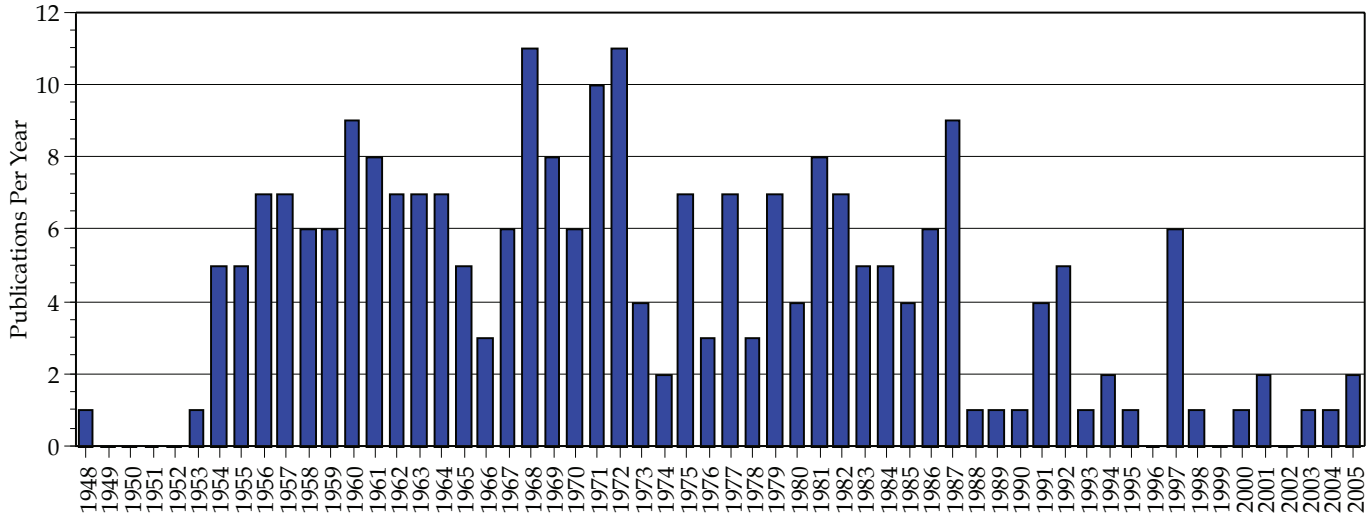


Fig. 5. Publications per year.

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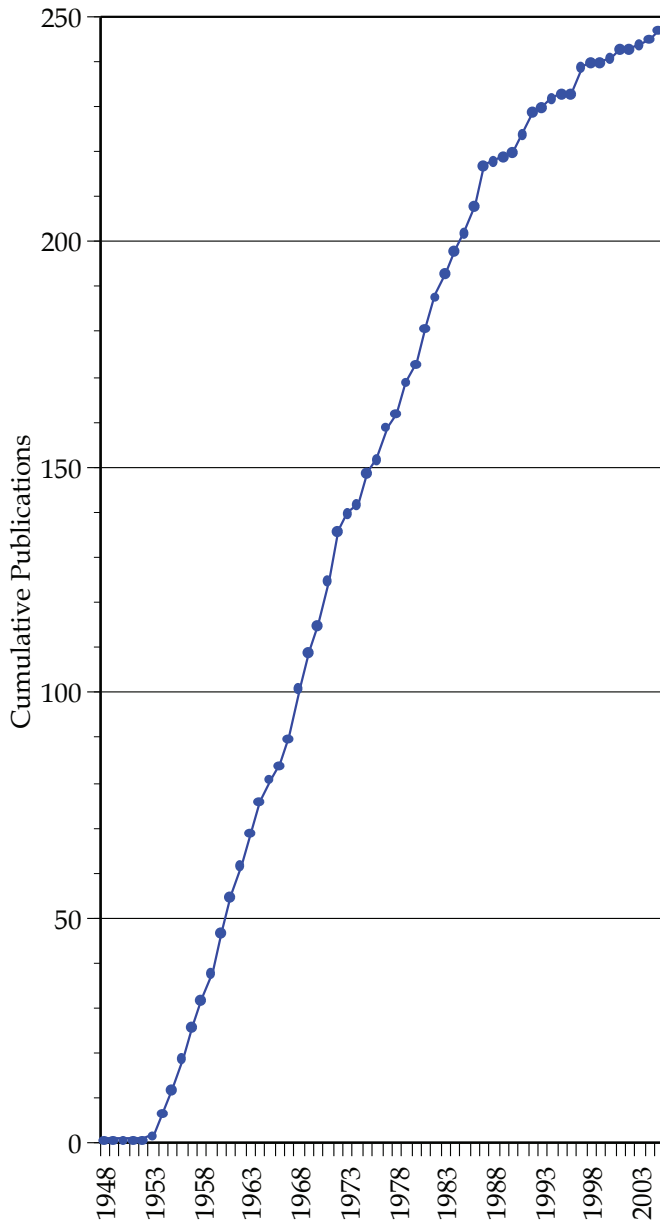


Fig. 5. Cumulative graph of publications.

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