

Filme Materiale

As I sit this evening in another strange, yet strangely familiar, hotel room, I am distracted by the news of a movie release featuring the basketball star Shaquille O'Neal. Given the critical acclaim for Mr. O'Neal's acting skills, the title *Steel* will probably be remembered only on the shelves of your local Blockbuster store by the time these words appear in print, little matter how soon that may be.

However, there will be an inevitable cult following; and it may swell especially within the ranks of MRS, for the man who has made brittle fracture into a kind of performance art stars as a metallurgist in this movie. The term "metallurgist" is a little quaint, these days, even though my own undergraduate degree is a Bachelor of Metallurgy; still, here it is—the materials scientist as superhero. Of course, I suppose that like all superheroes, Mr. O'Neal's character has a meek phase from which he is transformed by the press of unwanted circumstances. Is the materials scientist, then, simply a symbol of meekness and normalcy? It's hard to imagine Shaq under any circumstances fitting inconspicu-

ously in the milling crowd at a typical MRS meeting. Those who complain of the athletic demands of the three-hour Fall Meeting would see the infamous mall runs transformed into truly exciting fast-break events. Stand not too close to those glass doors....

Interesting, too, to contemplate Mr. O'Neal travelling to the meeting, coach class in the middle seat of a row of five aboard a crowded DC10.

However unlikely the premise of this new entertainment, it is part of that most exclusive of genres, the materials movie. Perhaps it would sound more significant as an art form if we agreed to call it "filme materiale." The distinguishing feature of this type of movie is its dependence upon materials, materials science, or materials scientists for its plotline and it includes such classics as *The Absent-Minded Professor*, with its thermodynamics-defying flubber (a remake called *Flubber* and starring Robin Williams is now in the theaters, so the genre is enjoying a major revival, relatively speaking); *The Man in the White Suit*, with its early insights into the properties of polymers and their impacts

upon the fabric of society; and *No Highway in the Sky*, in which metal fatigue was the great terror that threatened to consume the hero (a British metallurgist—this one released in 1951) and other airline passengers including Marlene Dietrich. I am ever interested in hearing new nominations for membership in this genre, though I draw the line at most science fiction movies. I would grudgingly admit to some kind of associate membership *Star Trek IV* (or so) for its metal stockholder:

SCOTTY (gesticulating at a quickly constructed diagram on a Macintosh screen): Can ye make this, laddy?

BLUECOLLAR (peering quizzically at the screen): Transparent aluminum?

Surely a great materials moment. On the far edge of acceptability would be *The Graduate* for a single line uttered by its hero's uncle at his graduation party, "Only one word, Ben: plastics!" Let me know if you have any other favorites of your own. Maybe we can organize a festival of filme materiale at a forthcoming MRS meeting.

ALEX KING

Materials Science: An Offspring of Metallurgy

When my children were small, my wife and I used to play a game of "definitions" with them on long car journeys so they should not get too fractious. We asked them to define all sorts of words, concrete ones for a start and abstract ones later, and they had great fun with it, but I carefully avoided asking them to define "materials science," even though just occasionally one of them would ask: "Daddy, what exactly do you do in the office?" Quite generally, the most important abstract concepts are the hardest to define. Just try to formulate a concise definition of "energy" or "entropy"!

Even if one sheers away from attempted definitions, one can still consider what is included in a concept, and what excluded. A question which obsesses me is: Is the study of metals and alloys to be regarded as part of materials science and engineering? Let us consider some facts which have a close bearing on this question:

1. Most (though by no means all) present-day university departments of materials science and engineering have emerged directly from former departments of metallurgy or metallurgical engineering. A child carries some of its parent's genes, so must not a derivative academic department carry some of its forebear's intellectual genes?

My own department in Cambridge is currently named "Department of Materials Science and Metallurgy." If metallurgy is part of materials science, this name is a logical nonsense. In fact, however, the name stems from an attempt, years ago, to keep a diplo-

matic balance between fierce metallurgists and equally determined innovators. Diplomacy has never paid much attention to logic.

2. At the meetings of the MRS, symposia on metallurgical topics are few and far between; the series of intermetallics symposia have been the most notable. Since symposia are originated by enthusiastic members, this suggests either that few people primarily interested in metals belong to MRS, or else that those who do are not enthusiastic about metallurgical research. It could also imply that those who are enthusiastic deliver that enthusiasm through the more traditional metallurgical societies in the United States or abroad. I have not heard any evidence to suggest that metallurgically inclined members are discouraged by the MRS leadership, and it is noteworthy that in recent years, metallurgists have become senior officers of MRS and some have won the top awards.

We are told that MRS originated in the dissatisfaction of a number of American scientists, industrial researchers in the fields of physics and chemistry who, at the time, were ill served by the APS and ACS. Industrial metallurgists in America were certainly not ill served by the TMS and ASM; both had, and have, a distinct industrial bias. So, metallurgists must have been few in number in the early, formative stages of MRS, and I have the impression that only now is their influence beginning, precariously, to be felt.

3. Perhaps the greatest strength of our reju-

venated discipline, materials science, is its proclivity for linking previously disparate interests. A symposium on integrated circuit manufacture will incorporate the metallurgical skills involved in depositing metallic interconnects, combatting the "purple plague," optimizing invar or other alloys for leads, and more generally the understanding of diffusion processes (which from the start was a joint creation of physicists and metallurgists), together with other skills, involving optical expertise, CVD, formulation of photoresists, and the like. I suggest that metallurgy will be most appropriately developed within MRS by formulating symposia in which metallurgical aspects are seamlessly integrated with quite distinct branches of materials science, as distinct from symposia which are 100% metallurgical. Also, metallurgical topics are sometimes hidden within a title which has no overt metallurgical links. For instance, at Boston in 1997, there is a symposium on high-pressure research: The title does not reveal that many of the papers have a geological import, while some others deal with metals. This is exactly as it should be; it is consistent with the ethos of MRS as it has developed over the years.

So long as we metallurgists avoid the risk of hubris, of the intellectual arrogance we were apt to show in the early years of materials science, I really do not think that we need fear a backlash against us by other kinds of materials scientists. The child will not disown the parent.

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