On Sports, Science, and Cars

A visit to historical sites (*e.g.*, the Acropolis in Athens, the Coliseum in Rome) would quickly remind us that athletic pursuits and spectator sports held an exalted place in ancient culture. The gladiators in Roman times, from all accounts, led a good life and were revered for their physical prowess. It is not very different today. Modern athletes are worshipped by the young and old alike and are amply rewarded for their skills. Do scientists like Einstein or old-fashioned inventors in the mold of Edison and Franklin leave an imprint on the common psyche like Babe Ruth? Unfortunately, scientific pursuits and the significance of key discoveries are not easily grasped by the lay public and so a Nobel Prize does not hold the same mass appeal as winning the Tour de France. However, there is hope. Rumor has it that a reality TV show is in the works where the contestants are high school science "geeks" vying for a grand scholarship prize for higher studies. Hopefully such shows will promulgate the notion that science is "cool." Interestingly enough, anthropologists are looking for parallels between the behavior, habits, and rituals of ancient tribes and those of fans of ball clubs like the Chicago Cubs. This gives new meaning to the term "field research" when, for example, Margaret Mead's early work on the tribes around Samoa gives way to the current study of Holly Swyers (a University of Chicago anthropologist) on the "tribes" around Sammy Sosa in the Wrigley Field bleachers.

Scientific advancements and sporting achievements have important synergies. Advances in composite materials and nanotechnology have handsomely contributed to the tremendous improvements in the performance of ski, athletic, and golf equipment, as well as tennis rackets over the past three decades. Science and engineering have gone hand in hand with the evolution of the automobile as we know it today, ranging from the catalytic converter and the self-tinting rear view mirror to the plethora of sensors in a modern car. Improved materials and aerodynamics, and breakthroughs in combustion science and technology, translate to big bucks in the auto racing arena. Closer to the theme of this issue of *Interface*, we are now talking about replacing the internal combustion engine for routine transportation needs: first, partially as in the gasoline-electric hybrids, and then completely, as in the all-electric (fuel cell-powered) versions. Major auto manufacturers have already built prototypes of the latter and leased them to a state or city government. The U.S. Environmental Protection Agency has come out with a rating of hydrogen-powered vehicles on a mile-per-kilogram (mpkg) basis, roughly the energy equivalent of a mile per gallon using conventional gasoline fuel.

This special issue of the magazine examines some key aspects, primarily associated with the membrane and the electrocatalyst, in the development of the proton exchange or polymer electrolyte membrane fuel cells (PEMFCs) for powering automobiles. However, there are still other monstrous problems to overcome that are not addressed in these pages. A fuel cell vehicle is about 100 times as expensive to produce as a conventional vehicle. The power train is three times as large and heavy as a gasoline IC engine, and the prototypes still cannot manage the 300-plus-mile fuel range of most production cars. Then there is the small matter of developing a viable hydrogen generation/distribution infrastructure. Hopefully, we can report on some of these developments in the future. Stay tuned.

Krishnan Rajeshwar
Editor

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