

University of New York's Graduate School and University Center, find that a home computer does help—but it doesn't aid all children equally.

More than 5,000 of the eighth graders had computers at home, and, on average, their test scores were 10 to 12 percent higher in reading and math than those of their computerless peers. However, the kids with home computers, not surprisingly, tended to come from wealthier, better-educated families. Taking such factors into account, the average computer "edge" shrinks to about three to five percent—roughly the same advantage conferred by, say, making extracurricular visits to museums.

To the disappointment of the authors and others hoping that this peculiar home appliance would promote social equality, computers also seem to confer unequal advantages on those who use them. Children whose parents ranked high in socioeconomic status got a bigger academic boost from having a PC at home than did other computer-equipped kids whose parents lived in more humble circumstances. Boys derived more benefit than girls, and white children gained more than black and Hispanic ones. "Technology does not educate by itself," Attewell and Battle conclude. "Only if there is a conducive social environment does learning occur."

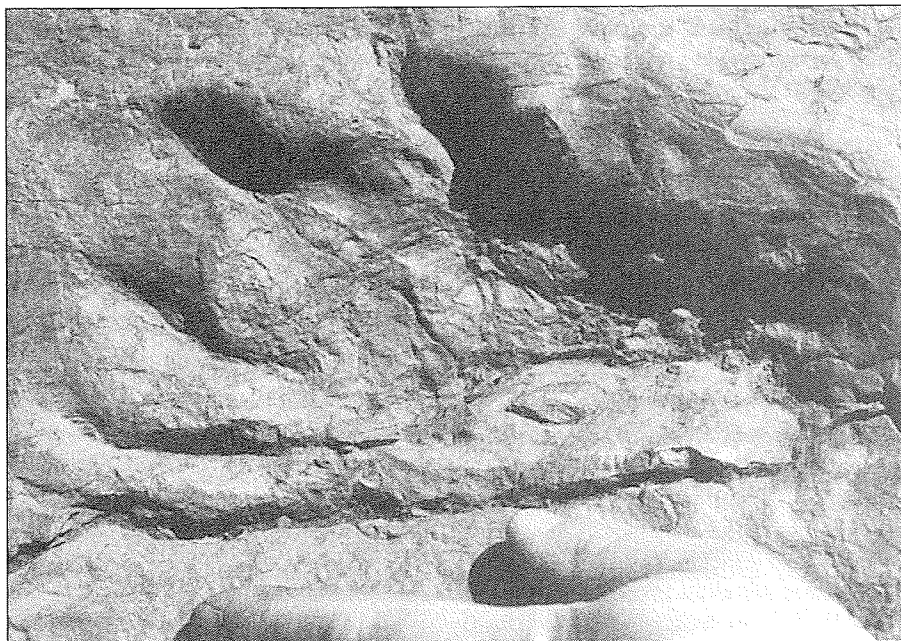
Small Science

"Amateur Science—Strong Tradition, Bright Future" by Forrest M. Mims III, in *Science* (Apr. 2, 1999), American Assn. for the Advancement of Science, 1200 New York Ave., N.W., Washington, D.C. 20005.

"Modern science," an editorial in *Science* proclaimed a few years ago, "can no longer be done by gifted amateurs with a magnifying glass, copper wires, and jars filled with alcohol." On the contrary, it *can* be and *is* being done, retorts Mims, a writer, teacher, and amateur scientist.

"Without remuneration or reward," he

points out, "enthusiastic amateurs survey birds, tag butterflies, measure sunlight, and study transient solar eclipse phenomena. Others count sunspots, discover comets, monitor variable stars, and invent instruments." Most amateurs pursue their passion for science in their spare time, without getting much recognition. "Although some are



Paleontologists in New Mexico quickly (and unwisely) dismissed amateur Jerry MacDonald's claim to have discovered hundreds of well-preserved tracks of prehistoric animals like the one above.

retired, others are taxi drivers, photographers, civil servants, pilots, or missionaries.” Pierre Morvan, a French taxi driver, is also a self-taught entomologist who for more than two decades has spent his vacations collecting, drawing, and studying Asian ground beetles, especially those of the Himalayas.

Some amateurs are accepted as colleagues by professional scientists, Mims says, presenting their findings at conferences and publishing papers in peer-reviewed journals. A paper on massive storms on Saturn that appeared in *Science* in 1996, for instance, was coauthored by the storms’ discoverer, Donald Parker, who earns a living as an anesthesiologist for Mercy Hospital in Miami.

Though modern scientists do use sophisticated methods and instruments, so do amateurs these days, Mims points out. “Amateurs built some of the first home computers, and

today some of our own systems that far outclass what was available to our professional colleagues only a few years ago.”

Nevertheless, he acknowledges, “a few” professional scientists refuse to take the work of amateurs seriously—and they sometimes come to regret it. In 1990 Jerry MacDonald, a doctoral student in sociology, found hundreds of well-preserved tracks of reptiles, amphibians, and insects in Permian sandstone in southern New Mexico. Professional paleontologists in New Mexico scoffed at his claims, because Permian trackways had never been found in that region before. MacDonald got a much warmer reception, however, at the Smithsonian Institution’s National Museum of Natural History and the Carnegie Museum of Natural History, where impressed paleontologists put samples of his finds on display.

The Limits of Science

The postmodernists have a point about scientific knowledge, writes Margaret Wertheim in *The Sciences* (Mar.–Apr. 1999). She is the author of *Pythagoras’ Trousers* (1995), a history of the relation between physics and religion.

The current bitterness engendered by the so-called science wars has obscured the fact that postmodernism expresses an essentially reasonable insight: all knowledge is derived within a particular cultural framework and will therefore reflect aspects of that culture. Medieval Europeans, for instance, lived within a Christian-Aristotelian framework, and their cosmology, with its central earth surrounded by ten celestial spheres of increasing metaphysical purity, reflected both Christian and Aristotelian perspectives. . . .

One of the claims of postmodernists is that modern Western scientific knowledge is also culturally influenced, that it is not purely objective. That does not mean that postmodernists believe scientific knowledge is simply made up; no postmodernist scholar of science of my acquaintance holds such a view. The claim is not that the laws of physics are mere cultural constructs—that, for instance, the inverse square law of gravity [which states that the force between two objects decreases in proportion to the square of the distance between them] could change from one culture to the next. The thesis is rather that the entire world picture described by contemporary physics—such as the view that time is linear or the belief that reality is purely physical—is a culturally specific way of seeing.

Unfortunately, many scientists, as well as many science-and-religion students, have viewed postmodern interpretations of science as inherently threatening. . . . In a pluralistic world, [theologian J. Wentzel van Huyssteen] argues, everyone must take a more open stance toward all forms of knowledge, including science. Although that path is necessarily a difficult one—and far more intellectually demanding than foundationalist approaches—it seems to me the only way forward that can avoid a new form of dogmatism. Without such an open-minded perspective, science is in danger of replacing Christianity as the new engine of Western cultural imperialism.