

Why Engineers Are Interested in Projects Like Virtual Harlem

William Plummer

Virtual Harlem, as it exists, owes much to the writings of William Arrowsmith in the mid-1960's. At the University of Texas, where I was pursuing graduate studies at that time, Arrowsmith was one of a group of energetic critics and scholars in the humanities which had assembled around the provocative and colorful Dean of Arts and Sciences, John Silber. This group seemed to be some kind of cowboy vigilante philosophers riding roughshod over humanist academics, not trampling ideas under their hooves but riding the ideas themselves out into the world. If we ever do Virtual Athens, Socrates will be seen on horseback, garbed in tunic, Stetson, and boots.

Arrowsmith gained celebrity in 1966 with his controversial article in *Harper's*, "The Shame of the Graduate Schools: A Plea for a New American Scholar." He was mainly concerned to lambaste the humanities—the very heart of the university, in his view—especially about a foolish pursuit of "scientism" that had replaced the drive to teach on a personal basis. All this tended to be regarded with a rather smug amusement by us callow souls striving to become scientists. It seemed that one of their own had let the cat out of the bag: the humanists were trying to adopt the *forms* of science without its substance. Science was real, science was valued, and science was constrained to follow rules that were set up by Nature herself. All else was undisciplined raving, mere opinion, discredited sophistry, more reprehensible than advertising because of its pretentiousness. The only tiny cloud in this view was Arrowsmith's challenge to the scientific method: could it in fact teach mankind how to live well and how to die well.

Where Arrowsmith struck a chord that reverberated perhaps more widely than he knew was his 1967 address to the American Council on Education, "The Future of Teaching." Delivered, according to witnesses, in measured tones, it was a passionate plea to higher education to take up teaching in its grandest sense, and a challenge to the professor to be the living justification—indeed, the living embodiment—of the human value of his or her discipline. Although he swung his cudgel mostly at the humanities faculty, his message seemed even more transparent when applied to the scientist. It is perhaps a little hard to know if a classicist is living an appropriately classical life. But what of a physicist who, when out-

WORKS AND DAYS 37/38, Vol.19, Nos. 1&2, 2001

side the lab, interacts with his fellows on the basis of dogma or prejudice rather than evidence? And what of a mathematician whose private life is governed by bigotry, unaware of her underlying assumptions and throwing logical deduction to the wind? Or a statistician who acts as though some observed behavior of a group characterizes each individual member, leaving the simplest principles of sampling and of standard deviation at the door when he leaves the classroom? Can we say these things never happen? When it does occur the science professor has unequivocally been false to that which he professes.

One must simply come to understand the human values inhering in the academic discipline, and practice them in life. Although Arrowsmith did not consider the nature of science as a human endeavor, it appeared possible to readily apply the general program to science and, indeed, to all of academe. Even a minimal amount of soul-searching thus motivated must surely help the professor and the student in their joint struggle with education, and its pursuit was a faculty obligation that extended far beyond the humanities, or so it seemed to a newly appointed assistant professor whose dean had sent around a copy of the remarks.

Having “back-slid” in my academic career from mathematics to mathematical physics to computer science, I feel qualified to make the claim that computer science becomes very slippery when one attempts to extract core values. This elusiveness derives from the universality of the computer. The things a computer can do are so varied and interesting that essentially every single human endeavor can involve the computer. Those who use the computer as a foundation of quantum chemistry have a view of computing that is totally incomprehensible to those who use computers for data retrieval, and *vice versa*. The important verb here is *use*. Using the computer mainly involves understanding the discipline in which it is used. Its authors do not use most software; the programmers or development teams bridge the gap between the machine and the actual users. The computer engineer and the computer scientist certainly know things about the situation that nobody else does. But ultimately we are toolmakers—Gutenberg rather than Shakespeare, sword smiths rather than warriors. We do not know if our presses will print lies or truths, shopping lists or literature; we do not know if our blades will protect the innocent, kill them, or be turned into plowshares to feed them.

It is a help to realize that, among other things, the computer may be regarded as a medium, in the sense of Marshall McLuhan, and we can therefore be guided by his epistemological insights. McLuhan is a gold mine of novel ideas – “the medium is the message,” the “global village”—but most pertinent to our theme is the title of one of his later books: *The Medium is the Massage*. The computer revolution is certainly giving us a massage. It is rubbing our lives all up and down, and at times its fingers seem to linger too long in the region of our throats. McLuhan’s image is perhaps a little too comforting and benign for describing the real world (at least outside of Canada). But we must concede his point that the medi-

um itself, apart from its content, is changing society.

McLuhan gives a description of the processes that occur when a new medium arrives, but he can not tell us in detail what the outcomes of these processes will be. He shows that recent developments are bringing people closer, but he cannot predict whether the approach is with open hand or clenched fist. He proves that the medium itself will change us and provides much guidance about the kinds of things that will change; but this level of analysis does not say much about the details.

It is widely held that society is experiencing a “computer revolution,” although the phrase has no fixed meaning, implies no ends, nor speaks to human consequences. It would seem that only the means denotes anything specific: presumably you can not have a computer revolution without a computer or a revolution without revolutionaries. But who are the revolutionaries in the trenches of this revolution? The computer technologist? The end-user?

The word processor was developed to help programmers document programs. It was soon generalized to the use of professionals for writing letters and novels. In education it has changed the way students approach the daunting task of learning to express themselves in the written language. The programmers never saw this coming. But what English professor anticipated that a fast adding machine had anything to do with text?

The NSFnet—forerunner of today’s ubiquitous internet—was initially conceived to connect researchers to the national Supercomputer Centers. Yet, almost immediately, non-supercomputer traffic began to predominate. A librarian once told me in a kind but unequivocal way that, now that “my gang” had worked out the bits and bytes of the Internet, it was time for the librarians to take over the lead. But what librarian of the time comprehended that the amazingly elegant IP routing protocol could lead to a universal communication medium that could grow almost without bound and with nobody really in charge. We saw it used on my campus for co-authors in Missouri and Scotland to exchange works on Elizabethan literature. Email notes added to the bandwidth requirement for the internet, but we also found a Sloan Fellow at Missouri running his research group remotely from Australia by means of the internet; the transmissions exchanged included control signals for computer-based instruments, data analysis programs, and graphical representations of results. Not an LOC code in sight.

In all quarters, the first experience of the World Wide Web was often an epiphany of stunning impact. One bounced along following links from computer to computer around the world, but you never logged on to anything—or logged off! Yet the first reaction of many computer scientists was the sinking feeling that another means had been found for diverting computer resources away from serious use. A successful maker of terminal emulation software could not be persuaded to work on TCP/IP versions of their product, let alone evolve it with browser features. The techies did not see what was coming.

Now this has all been an orgy of discovery, with much fun had by all. And it has confirmed one of my own most fervently held principles: planning is essential, but no substitute for luck. There has been serendipity on all sides, as users never saw the technology coming and technologists never saw the uses coming. This is not encouraging. We rely on success by serendipity despite the fact that we are each individually clueless. Even worse, just when it is becoming clear that computers constitute an amazing new communications medium, we have a major disconnect between those who know what it *is* and those who know what it *does*. In simpler times knowing either of these things was pretty much equivalent to knowing the other, but not anymore. The CPU in my laptop has more components than any man-made object more than 25 years old, and it provides a myriad of means to do things. The ends supported can be combined in arbitrary ways, so the uses possible are “myriad factorial.” This is beyond the knowing of the computer engineer and a profound barrier to his quest for meaning.

I believe the foregoing discussion casts doubt on the possibility that the humanist will meaningfully come to grips with the problem either. Skilled in the study of man through his works and his literature, the humanists might be neither technologist nor user, and might not know enough to provide the desired insight. One will miss most of the point of a chess match if one has no knowledge of the rules—it will be virtually indistinguishable from two preschoolers playing with pretty blocks, except for the mysterious presence of two clocks that the participants seem to strike alternately.

It is cliché to believe that “science is too important to be left to the scientists,” with the atomic bomb as the cliché justification. Science *is* too important to be left to scientists, but only for the reason that science is a human endeavor that should belong to mankind. This is the same reason that novels are too important to be left to novelists or painting left to painters, or philosophy left to philosophers.

Given that we must mind each other’s business, the first task is to enable communication at a most appropriate depth. Plato observed that the creator is usually the worst person to ask what his work means: he is driven by his Muse—inspiration—a process outside of human comprehension. We must therefore be alert to each rare opportunity to create regions of overlap in which we can share actual ideas in common, rather than only tell each other *about* our disparate ideas. To address the issue of meaning for computer scientists, the humanist and scientist must work jointly toward a shared goal, and both must have a hand in shaping the underlying medium as well as the eventual content.

The Virtual Harlem project was irresistible to the Advanced Technology Center in large measure because of its promise to create such a setting. From my perspective this promise has been richly fulfilled, and the resulting environment has produced its intended result. I am convinced that we have first hand evidence that the

understandings which will grow from efforts such as Virtual Harlem will in fact be powerful enough to permit the technology revolution to be guided and anticipated rather than mindlessly fulfilled.

**The Technologies Used
in the
Virtual Harlem Project**