A NOTE FROM THE EDITOR: THE NEW SCIENCE

There are more scientists alive today than have ever lived before, and this formidable, intellectual force is reaching wherever human imagination directs it. Any scientist can easily feel overwhelmed by the rapid progress in his/her own specialty, let alone in the broader field to which s/he belongs. There are currently thousands of scientific journals published monthly, and a simple Internet search of a term as specific as "microarray" can generate as many as 116,000 "hits."

Along with this avalanche of information, publications that bring to bear various scientific disciplines in an attempt to reveal a comprehensive, multidimensional understanding of nature are increasingly common. Investigations that cut across disciplines are revealed in the titles and language of recent publications. If language, as poets tell us, reveals the nature of a culture, what should we make of terms like biogeochemistry, DNA semiconductors, and unifying theory? It suggests that our scientific disciplines are converging and that the reductionalist and fragmentary approaches, which typify a science in its childhood, are giving way to an era of synthesis. This is apparent in the physical sciences where the "Standard Model" provides a substantially integrated picture of the subatomic world. Scientists of this world of inner space are often contributing to the work of cosmologists in the understanding of the Earth, its evolution and the destiny of the greater universe. Certainly, the central questions regarding dark energy and the CP violation indicate our science is still adolescent, but the advancements we have made in the last century are amazing. We can look to the collaboration of scientists of inner and outer space for another century of expanding scientific frontiers, leading to a heightened, collective understanding.

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New research into DNA-based semiconductors, organic high-temperature superconductors and molecular organic machinery is an indication of the scientific culture of merging disciplines and technologies which, like nanotechnology, defy categorization. Underpinning all these sciences is the modern computer. Before 1950, a dictionary was unlikely to include the definition of a computer. The ability of computers to input, store and intelligently mine massive amounts of data is central to modern science and has spurred a radical change in how science is done. Scientific advances like the Human Genome Project would have been impracticable without them. All organisms on Earth are DNA based, and there is considerable similarity among the genomes of all life forms. High-throughput gene machines are rapidly deciphering the genomes of numerous organisms, and with massive computer data-banks comparative genomics should soon be able to make an accurate model of all the genes on the planet...a sort of planetary genome.

Microorganisms are well recognized to have changed the atmospheric composition of this planet through photosynthetic oxygenation, nitrogen fixation and carbon sequestration. It is only recently that geologists, chemists, meteorologists, and biologists have come together to begin creating an integrated picture of our living planet's mantle to tens of kilometers in depth where microorganisms have been found to be a substantial geological force. It should be clear to our nation's academic institutions, National Laboratories, and populace that the future of our economy and the science that drives our economy is in an environment where the term "interdisciplinary science" is a redundancy.

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