

# Rethinking the 'Other' Sciences

*This guest editorial by Richard N. Zare, Marguerite Blake Wilbur Professor of Chemistry at Stanford University and chairman of the National Science Board, is one in a series to bring the views of a broad spectrum of chemical community leaders to C&EN readers.*

A major challenge I face in my new position as chairman of the National Science Board is to learn more about research areas that lie outside the physical sciences. Getting to know the social and behavioral sciences is part of this challenge. Frankly, I'm skeptical. I share the biases of many of my colleagues that the physical sciences seek more objective truths, treat cleaner data, follow more rigorous methods, and are freer from investigator bias.

Lately, though, I'm wondering. In particular, I'm wondering whether some problems that are limiting society's benefit from advances in the physical sciences might not be answered by the social and behavioral sciences. NSF-sponsored research in this area (the Human Capital Initiative) focuses on a number of questions: How do children learn? Why do people make "bad" decisions? What factors link the perpetrators of violent crimes, their victims, and the locations of the violence? Why is the earnings gap between rich and poor widening?

Let me concentrate here just on this last issue. The distribution of income in the U.S. has become less equal in recent years. Between 1979 and 1995, the real (inflation-corrected) median weekly earnings of those with less than a high school degree fell by 21.6% (from \$440 to \$346). During the same period, the real median weekly earnings of those with a high school degree fell by 17.4% (from \$523 to \$432). Meanwhile, those with a bachelor's degree or higher experienced a 3.4% increase (from \$722 to \$747). What accounts for the widening gap?

Several hypotheses exist. One is that past public policy has disadvantaged poor people and favored the rich. Another is that economic globalization has sent the good jobs overseas. A third is that the information revolution increasingly favors well-educated workers. It matters a great deal which of these hypotheses, if any, are consistent with the evidence. Otherwise, public policy could take a wrong turn, at great expense and even great harm to society.

Careful scientific investigation goes against the first two hypotheses. Income inequality has increased since the late 1960s through different Administrations and the leadership of both political parties. Furthermore, many other industrialized countries have experienced increasing wage inequality over the same period, albeit less strongly. Finally, the inequality has also been increasing in sectors of the economy that have little to do with international trade. But considerable evidence is consistent with the third, information revolution, hypothesis. For example, industries whose methods are advancing the fastest are experiencing the fastest divergence between earnings of more educated and less educated workers. Something about workers' skills and what they are required to do on the job has changed over the last generation. What is it? Some social and behavioral scientists, under NSF support, are now attacking this scientifically interesting and socially important question.

Many of our citizens are calling for increased training to equip workers whose jobs are at risk with skills needed to face the new challenges. Others argue that workers without fundamental skills and good work habits cannot be effectively retrained. Others point to the importance of making an investment in early education—to promote science and math literacy—that will equip the next generation for an ever-changing workplace. Still others look solely to the marketplace to solve the problem. If the best path is to be revealed, it will be by the light of the social and behavioral sciences. The same can be said for many other critical human problems.

Human problems are complex systems, but perhaps the most fascinating fundamental questions of science that we will face over the next half-century will fall in the domain of complex systems. The human benefits of solving such problems could be immense. The social and behavioral sciences are a small fraction of what NSF does. Although budgets are tight and likely to become tighter, it behooves us to support the best work in this field and pay attention to what it can tell us.

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