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Notes from the 1987 AAAS General Meeting

John Gardenier, the SCS representative at the annual meeting of the American Association for the Advancement of Science, in Chicago, 14-18 February, reports as follows:

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Computer simulation was not as prominent at this year's AAAS meeting as it was last year, though certainly there were some papers — and sessions — where simulation was featured.

For example, at a session on "Some Mathematical Questions in Biology: Population Models," one could learn that there is a lively symbiotic process in which new empirical data are stimulating new theoretical work in population ecology and population genetics. In turn, new mathematical models stimulate new insights into biological processes, including fundamental advances in understanding genetic variation at the level of DNA and quantitative genetics. Neural net models are alive and well in brain research.

One of the most important topics discussed at the conference hinges on computer simulation: "Is Nuclear Winter Real and Relevant?" As the symposium organizer, J. Fred Singer, noted: The scientific debate is important in its own right, apart from the overwhelming ecological, political, and strategic implications.

Most exciting to me were the hints of what science may be offering the simulation community, rather than the reverse. Last year we noted intense interest of scientists in graphical simulation. That has stimulated the mathematicians to address topics like: "Chaotic Dynamics and Computer Graphics"; "The Henon Mapping: How to Use the Computer to Explore Four-Dimensional Images"; "Morphology of Complex Boundaries"; and in general, "The Mathematics of Images."

Some scientists are still exploring the edges of basically well-understood processes in Artificial Intelligence (AI) such as "Imprecision and Expert Systems." But also, more esoteric forms of AI are reaching the stage of practical applications. A session on "Computer Programs that Reason and Learn" presented software programs which have successfully solved open problems in mathematics and physics, or have replicated theoretical developments in physics through heuristic inference.

Other programs are exploring "Genetic Algorithms: A Biological Metaphor for Learning" and "Learning on Computational Neural Networks." A new Association for Automated Reasoning is attracting some applied scientists — including me!

There are at least two huge science programs building: a supercollider for the study of high-energy physics; and a foregone conclusion that man will decipher (map in detail) the human genome, the latter being a 30-year effort for the U.S., Japan, and Germany. Among the papers on that effort was one addressing the "Computational Aspects."

A symposium organized by Rachelle Hollander of the National Science Foundation (and the AAAS Professional Society Ethics Group), along with Jules Lapidus, President of the Council of Graduate Schools, addressed "Ethical Norms in Science: Challenges and Opportunities." As the scope and diversity of science grow, the replication of experimentation suffers. As more and more students are drawn into science and taught under the "publish or perish" banner, the temptations to rush incomplete science to press — or even to fake the data — grow. The problems are real, but uncertain in size. The best news is that interest in the problem is growing.

Finally, I was personally delighted to see growing interest in "Converging Cultures: Science and the Arts." At a Simulators Conference luncheon in Norfolk in 1985, I encouraged simulator engineers to bring graphic artists into their design teams. The simulator is fundamentally a graphical communication device; the best graphical communicators are artists. Papers in Chicago included: "The New Visual Age: Building the Artificial Reality" and "Computer Graphics for Scientific Imaging."

Science is alive and well, as is one of its indispensable tools – computer simulation. Their mutual contributions will assure continuing changes in concepts as well as in professional practice.

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Beyond Simulation?

This writer has often proclaimed that if a problem can be described in sufficient detail, it can be simulated. Of course the catch is in that phrase "sufficient detail." Certainly that is the case with the problem, or problems, arising from trying to simulate the threat of nuclear war.

Consider the following excerpts from a paper entitled "The Challenge of Political Self-Responsibility in the Nuclear Age" by John E. Mack, M.D. (Professor of Psychiatry, Harvard Medical School, Cambridge Hospital, Cambridge, Massachusetts) presented at the Annual Meeting of the American Association for the Advancement of Science (held in Chicago in February of this year).

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Throughout human history conflicts between ethnic groups or nation states have been settled as often by force as by diplomacy or negotiation. Nations have rarely proved able to resist the allure of superior military technology when it seemed to offer the possibility of gaining political power over other countries or of securing their own survival. All that can be said in defense of this system of violence and dominance — if its lawless destructiveness can be thought to contain the degree of order which the word "system" implies — is that the human race is, at least for the moment, still present on the globe.

No one, surely none of the many millions of victims of human violence, would claim that the war system has "worked" in the sense of offering protection and the right to a secure existence for the world's populations. Even the coldest of political analysts, critical of the impatience of psychologists in the nuclear age who urge the overthrow of the war system, would agree that there is room for improvement.

The creation of nuclear weapons, especially of thermonuclear instruments of mass destruction attached to intercontinental delivery systems, has created an altogether new international

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reality. Whereas more advanced weapons could at one time be used to provide a military advantage, nuclear devices are, in effect, giant boomerangs which would, having destroyed an adversary, cause the destruction of their users, either through retaliation or by nuclear winter- related phenomena. The "collateral damage" to the rest of the world's population that a nuclear war would cause is a further dimension of our altered reality. Nuclear devices have radically transformed the meaning of such traditional terms as force, advantage and winning...

Those who are committed to these ideas [winning a nuclear war], many of whom are responsible for American nuclear weapons policies, or hold prominent places within the "strategic" community, are thus basing American security and the survival of the rest of humanity on a kind of casual, or at least amateur, psychological analysis.

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We have become hostages, utterly dependent for survival upon individuals and groups outside of our own country. People throughout the world feel vulnerable, knowing that sudden annihilation, or an agony that could be worse than immediate death, might descend upon them at any moment. There is no military or technological device that can protect us, however deep our faith in science and technology may be.

One would think that the apprehension of this new and dangerous situation would have inspired the most intensive search on the part of national leaders, especially in the nuclear powers, for alternatives to the war system and a strenuous effort to replace it with more collaborative approaches to the settling of international differences.

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In the United States the fear of annihilation has spawned an intensification of primitive hatred and new forms of dichotomized or we-they thinking... The bizarre Star Wars plan offers a different sort of escape from the nuclear threat, a kind of desperate resort to appealing myth, science fiction and blind faith in technology. On the Soviet side, cruel imposition of severe controls upon Eastern and Central Europe and sometimes upon its own people, and the denial of any Soviet responsibility for the arms race itself, has contributed to American fear and distrust and has made a positive transformation of the U.S.-Soviet relationship particularly difficult.

In prescribing change, or in suggesting how psychology might contribute to the reduction of international tensions, I am calling here primarily for American initiatives, for I believe that in seeking to modify any human relationship, self-responsibility must be the starting point... In [psychological] clinical work the blaming of others is quickly recognized as counter-productive...

In the international political arena, blaming of other nations for present tensions, and even for many domestic problems, is a traditional aspect of foreign affairs, although some leaders are more prone by temperament to use this device than others. There is little precedence for self-responsibility in international relationships, and American leaders have yet to discover a mandate within our body politic for the owning of at least a share of responsibility for the current state of tension between the United States and the Soviet Union, the terrible hardship in Central America, or for a host of other political, social, economic, health and nutritional problems around the world.

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I am not arguing that Soviet actions have not brought about much of our fear, that Soviet power is not a threat, or that Soviet behavior has not at times warranted distrust and antagonism, as have our attitudes and actions. The actions of others are responsible in part for virtually all troubled individual and group relationships. But in the age of nuclear interdependence there is no human future in perpetual blaming, in the relentless externalization of responsibility. For such behavior can only inspire more fear and resentment, an intensified sense of threat and the responsive creation of additional weaponry, however useless or dangerous this may be from a military point of view.

What is the role of political psychologists in bringing about this movement toward self-responsibility? There are many practical steps that we can encourage such as promoting international contacts by citizens, professional groups and military and political leaders. The incentive, the mandate is there in the desire of people to survive, and in their recognition that the old cycles of blame, hostility, and fear-inspired defensive and aggressive escalation can lead only to the final inferno. Paradigmatic shifts occur by insisting upon the possibility of something new, and by making a clear commitment to that possibility. Political self-responsibility seems to me to be an idea that is beginning to be born. Citizen and professional exchanges, the speeches of some leaders, and the work of many artists, entertainers and humorists seem increasingly to be giving expression to this possibility. The role of psychologists is to make the notion of political self-responsibility explicit at every opportunity until the leaders of the nuclear powers feel supported in acknowledging their own nation's responsibility and are inspired to work to develop non-military, non-technological solutions to the human impasse that we have created.

What I am asking for is not a morbid self-criticism or blaming. Rather, what is needed is a sober self-questioning and self-analysis by involved professionals and, ultimately, by national leaders, comparable to what individuals or groups seeking genuine insight undertake when their aim is self-awareness and change.

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With a fresh look and the courage of new insight we might discover that the arms race is not primarily about the Russians but something we create together [with them] that derives from deep-seated cultural, historical, economic and psychological forces that are as much the responsibility of the United States as of the U.S.S.R. Armed with the power of political self-responsibility we might discover new truths about Soviet vulnerabilities, fear and intentions that create a picture less alarming than the one we now confront. Overtures born of such a national psychological shift are likely to be welcomed in the Soviet Union and could lead to reciprocal responses such as occurred in 1963, when a U.S. initiative led to the banning of atmospheric nuclear weapons testing.

Concrete steps can lead to the reduction of tension and begin the journey toward genuine international partnership.

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How would you simulate that? Or any aspect of it? Do you know anyone who is attempting to? THAT would truly be Simulation in the Service of Society.

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