NEWSLETTER OF THE AMERICAN SOCIOLOGICAL ASSOCIATION SECTION ON

SCIENCE, KNOWLEDGE and TECHNOLOGY

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AT THE ASA MEETING in Cincinnati, note the following events. Monday August 26, 4:30 PM, SKAT Council meeting (members meet at ASA registration area). Monday 6:30 PM, a catered reception jointly sponsored by SKAT and the Section on the Community. Tuesday August 27, 8:30 AM, section roundtables; 9:30 AM, SKAT business meeting. (Note: these Tuesday events were originally scheduled for another time and have been re-scheduled.)

ALSO AT ASA: A TEACHING WORKSHOP focusing on two series currently in production at WNET in New York City. These series, Medicine At the Crossroads and The Healing Mind include episodes entitled, "The Code of Silence," "The Temple of Science," "The Healer Within," "Healing in Other Cultures," and "Policy Implications of Alternative Medicine." These shows provide current, exciting and challenging material for a wide range of sociology courses. Since these shows are scheduled to be shown over the next few years, this workshop allows sufficient lead time and information on content for teachers of sociology to incorporate them into syllabi or courses. With the help of the staff from PBS, a panel of individuals will present a detailed discussion of the themes and individual shows in each series, of the ways they can be worked into sociology courses, and of teaching materials (articles, book chapters and assignments) that can be used to accompany these materials. In addition, PBS will provide copies of the finished shows for previewing and clips of those still in production. (The organizer/presider is Bernice A. Pescosolido, Indiana University. For more information contact her at the Department of Sociology or through BITNET PESCOSOL@IUBACS)

4-S PLANS: The 1992 meeting of the Society for Social Studies of Science is scheduled for Gothenburg, Sweden August 12-15, 1992. Plans for the meeting are still in process. This year's meeting will be held Friday November 15 to Sunday November 17, 1991, in Cambridge, Massachusetts. For details consult Ms. Judith Stein, Administrative Officer, Program in Science, Technology and Society, M.I.T., Cambridge MA 02139, phone 617-253-4085.

GRANTS AVAILABLE: The National Endowment for the Humanities is pleased to announce the availability of grants under the category of Humanities, Science and Technology for the support of research that brings to bear the knowledge, methods, and perspectives of the humanities on the subjects of science, technology, or medicine. Historical studies and studies of current topics are eligible. However, studies of current science, technology, or medicine must deal with fundamental issues in the humanities. Individuals and institutions are eligible to apply. Applicants may request support for full or part-time salaries, travel, and other costs of conducting research for periods of from one to three years. This category of support is for projects that, because of their intellectual scope and consequent size, duration, or complexity, cannot be accomplished through individual one-year fellowships. Application materials are available from Daniel Jones, Program Officer for Humanities, Science and Technology, Room 318, National Endowment for the Humanities, Washington, DC 20506, or call (202) 786-0210. The next deadline for receipt of applications is October 15, 1991.

KNOWLEDGE, POWER AND BLACK BOXES: AN APOLOGIA FOR THE SOCIOLOGY OF TECHNOLOGY

Rudi Volti
Pitzer College

When I was twelve years old, I was sure that I would grow up to be an aeronautical engineer (in those far-off days the term "aerospace" hadn't been coined). After a number of academic twists and turns I ended up a sociologist. Yet my interest in technological hardware hadn't left me, and with my first academic appointment I began to teach a course on the sociology of technology. (I am somewhat embarrassed to report that the course was entitled "Men and Machines"-- we have made some progress since then in reducing sexist language!) Then, as now, the field was peripheral to mainstream sociology, and there was no standard set of themes, topics, facts, and methodologies. This left me free to define the course as I saw fit, a process that continues to this day.

Although a sociological inquiry into technology is not part of the established sociology curriculum, it is still grounded in the central concerns of the discipline, for there are many natural connections between the sociology of technology and the kinds of issues that engage sociologists of all descriptions and specialties. The sociological relevance of the study of technology follows from the axiomatic principle that technology is a social creation. Tools, techniques, materials, and the organizational systems that tie them together do not appear through spontaneous generation, nor are they simply the product of individual human genius. The technologies found in a particular society have been shaped by the distribution of wealth and income, cultural patterns, and power relationships. A course on the sociology of technology therefore will naturally gravitate towards such themes as the rise of the factory system, the role of the military, corporate and governmental influence over technological development, and the "modernization" of "traditional" societies.

None of this is likely to be a revelation to the readers of this newsletter. Although each sociologist will have his or her distinctive approach to the study of technology, it will not be totally idiosyncratic; much of it will be consonant with the prevailing paradigms, theories, themes, and topics of mainstream sociology. But what about the non-sociological content? Specifically, to what extent does an adequate sociology of technology require an understanding of technology itself? Should a sociologist be content with treating particular technologies as so many "black boxes"? Can we be satisfied with a description and analysis of the social inputs and outputs of these boxes, with scant concern for their contents?

This general issue is not confined to the sociological study of technology. Similar concerns have engaged scholars working in the related fields of the history and sociology of science. Here, an "internalist" science-oriented study of science has been challenged by an "externalist" approach concerned with the social, economic, political, and cultural dimensions of science and its development. As sociologists, we have rallied behind (and helped to create) the fundamental idea that science is a social creation that cannot be reduced to an abstract intellectual process. Yet at the same time, it seems evident that a sociological inquiry has to be complemented by an adequate comprehension of the science itself. Social arrangements are important, but so too are ideas; the task of the sociologist of science is to chart the interaction of the two. Without an understanding of the ideas themselves, a sociological inquiry into the development of science is likely to be a one-dimensional exercise.

The same can be said of the sociology of technology. But if at some point it becomes necessary to pry open the black box, how widely should it be opened? This is something that many of my students have wondered about. On occasion, after an overly detailed lecture on the Newcomen engine or the principles of a transistor's operation, a student will voice the question that others are surely thinking: "Are we going to be tested on this?" It is a reasonable question. An adequate response must include some justification for the inclusion of technical material into a class in sociology.

In the first place, it can be argued that a knowledge of the actual technological products and processes are necessary if one is to comprehend the modern world and effectively function in it. Civics courses are taught on the premise that an educated public is necessary if informed choices are to be made in the political arena. A similar argument can be made about the need to support intelligent choices of the technologies we pay for, either directly or through our taxes.

This is an argument that probably shouldn't be pushed too far; exposure to a civics class doesn't seem to make much difference in a student's level of political knowledge. In promoting the comprehension of technology or the workings of government, one course can only do so much. If a comprehensive understanding of today's technologies is the goal, the effort is doomed to failure. But a higher degree of technological sophistication might at least induce a healthy skepticism regarding the claims of advertisers, corporate managers, government officials, military brass, and other self-interested purveyors of new technologies.

On a somewhat more general level, a greater familiarity with actual technologies can help to demystify technology, thereby alleviating the sense of impotence we often experience when confronted with massive and massively complex technological systems. Although it doesn't resolve any of the key issues, there is still something fortifying about having the knowledge that the sole purpose of a commercial nuclear reactor is to boil water (in order to run steam-powered turbine that drives an electrical generator). The details of many technologies are wondrously complex, but the basic principles of their operation are not difficult to grasp. As long as its limitations are not ignored, a higher level of technical knowledge will enhance our capabilities as scholars and citizens. Knowledge does not always translate into power, but ignorance generally insures weakness.

A better understanding of actual technologies also can help us to avoid a trap easy to fall into: an unwarranted enthusiasm for technological fixes to social problems. The study of a particular technology will demonstrate that it is designed to do a particular task, and that the less ambiguous the task, the better the technology performs. Many problems, especially social ones, are anything but unambiguous. Technology can solve some problems, but not all of them. An understanding of specific technologies can go a long way toward clarifying the difference.

Next, the study of specific technologies leads one easily to the idea of a system. The notion that the social order can also be conceptualized as a system is a very old one in the history of sociology, and in its naive form it has been misleading or worse as a representation of how societies actually work. Even so, there is considerable value in thinking through the inter-connections found in the social order, especially when these are seen as points of conflict as well as accord. The study of technology can help to revitalize the old and honorable tradition of studying society in its fullness. This would be a salutary outcome for a discipline that has too often been absorbed with narrow studies of seemingly isolated social phenomena.

Perhaps the effort to comprehend society in these terms smacks too much of intellectual hubris. Paradoxically, however, a study of individual technologies operating within a system can provide a healthy dose of humility. Intellectual arrogance may not be as evident in sociologists as it is in, say, economists. Still, we want to be taken seriously, and would like to think that sociological theory and research can make a contribution to the emergence of a racially integrated society, more productive workplaces, safer streets, more livable communities, and so on.

It is entirely proper that we have such aspirations; from its inception, sociology has never been simply an intellectual exercise disconnected from basic human needs and concerns. There is a place for social engineering, but at the same time, some experience with the products and processes of actual engineering is likely to leave us with a better appreciation of the magnitude of the task. It is vastly easier to design a new microprocessor or steam turbine than it is to design effective policies and programs for countering drug addiction or adolescent pregnancy. By their nature, technological tasks tend to be more limited in both their objectives and the variables that need to be taken into account. Under these circumstances, success is more likely; anyone who has written a useful computer program or modified an engine to

attain higher performance has experienced what Sherry Turkle has described as "closed system ecstasy." Yet even here, success only comes after overcoming uncertainty, false starts, and unexpected interactions between separate components. As sociologists, we still have the obligation to mobilize our intellects, expertise, and imaginations in the effort to make a better society. But we should not harbor any illusions about the magnitude of the task. Some time spent troubleshooting a malfunctioning electrical circuit or reading about Rudolf Diesel's decade-long effort to produce a more thermally efficient internal combusion engine could yield considerable insight into the difficulties of creating something that is both new and effective.

Every sociologist has a unique set of interests, concerns, and avenues of inspiration. Not all will share my interest in technology as both a subject for sociological inquiry and a source of insight. Nor are they likely to set aside their books, questionnaires, and tabulations of survey data in order to pursue a course in mechanical engineering. Yet our technologies are as much social creations as our prisons, bureaucratic organizations, and patterns of personal interaction. A sociology that excluded these major components of the social system would be hopelessly incomplete. Perhaps the day will come when sociologists say the same thing of technology.

POLAND'S SCIENCE AND HIGHER EDUCATION IN TRANSITION

Ann T. Lanier and Manfred J. Cziesla

The following report is based on a visit (March 9-28, 1990) on behalf of the University of Illinois at Chicago to establish international cooperation with Polish universities, and on a May 1990 follow-up visit, and on interviews with Polish officials in the United States.

The Polish system of higher education and research was reorganized after World War II to bring it into conformity with the Soviet model. This involved (among other changes) the breakup of comprehensive universities into specialized institutions (colleges of liberal arts and sciences, medical academies, technical universities, economic academies, etc.). It also involved the transformation of the Academy of Sciences into a research establishment with its own research institutes. In the "election" of new members of the Academy of Sciences, political clearance by the Communist Party was a mandatory step, although active participation in the activities of the party was not a sufficient condition for election, and not all elected members were supporters of the Communist regime. Representation of Polish science in international scientific organizations, and opportunities for foreign travel and international scientific cooperation under official agreements, were largely reserved for members of the Academy and its institutes.

Now the system is being reorganized again, under new political and economic conditions. The dominant role of the Academy will be weakened. Universities will seek to obtain some of the funding for big research programs that had previously been reserved for the Academy. The transfer of the Academy's research institutes to the universities has been seriously discussed although it appears that at this time at least some of these institutes will stay with the Academy. Universities are now authorized to conclude

international agreements for scientific cooperation; they do not need prior permission from the Ministry of National Education (MNE) but need merely inform the MNE after arrangements have been made. However, there has also been a flow of personnel to the universities from the Academy and from the former communist central administration, so that, as functions are transferred to the universities from the Academy and the government, some of the same personnel may continue to be involved.

The higher education law adopted in September 1989 has given the universities much more autonomy than they previously enjoyed. However, the fragmentation of the old-style comprehensive universities through introduction of the Soviet system after World War II has not been reversed. This fragmentation has led to isolation of scientific disciplines and has impeded the interchange of ideas and interdisciplinary research. Institutional autonomy, however desirable it may be in other respects, may make it more difficult to bring the fragments of the old comprehensive universities together again, since each of these fragments has now become a comparatively autonomous unit.

Poland's universities face severe economic problems. They have serious needs for English-language instruction, for scientific journals and books, for laboratory equipment, and for more widely-distributed opportunities for their scientists to travel to the West. Some assistance is provided through the Trans-European Mobility Program for University Studies, through programs of Aid to International Development, and through private efforts by Western universities and individual scientists. In our opinion, consideration should also be given to a proposal to establish an American University in Poland. Such a university could be a catalyst for the modernization of the whole Polish system of higher education.

A READING LIST

Randall Collins has permitted us to publish the reading list for his course on "Social Organization: Sociology of Science." Items marked with (*) are required readings.

1. INTRODUCTION

* Marx and Engels, The German Ideology. 1846. (International Publishers, paperback: pages 1-43: "Preface"; "Feuerback: 1. Ideology in General" especially part b. "Concerning the Production of Consciousness."
* Emile Durkheim, The Elementary Forms of the Religious Life. 1912. (Free Press, 1965: pages 13-33, "Introduction: Subject of our Study; Religious Sociology and the Theory of Knowledge"; pages 462-96, "Conclusion."

OTHER CLASSIC SOCIOLOGY OF KNOWLEDGE:
Emile Durkheim, and Marcel Mauss, Primitive Classification. 1903.
Karl Mannheim, Ideology and Utopia. 1929.
Ludwig Fleck, Genesis and Development of a Scientific Fact. 1935.
(reprint, Univ. of Chicago Press, 1979.)

Robert K. Merton, Science, Technology and Society in Seventeenth Century England. 1938.
Robert K. Merton, The Sociology of Science. University of Chicago Press. 1979. (collected papers)

THE STRONG PROGRAM OF SOCIOLOGICAL EXPLANATION

*David Bloor. 1976. Knowledge and Social Imagery. London: Routledge and Kegan Paul.
Barry Barnes. 1977. Interests and the Growth of Knowledge. London: Routledge.
David Bloor. 1983. Wittgenstein: A Social Theory of Knowledge. New York: Columbia University Press.
David Bloor. 1984. "Durkheim and Mauss Revisited: Classification and the Sociology of Knowledge." In Nico Stehr and Volker Meja (eds.), Society and Knowledge: Contemporary Perspectives in the Sociology of Knowledge. New Brunswick, N.J.: Transaction books.

2. INTERNAL STRUCTURE OF SCIENTIFIC COMMUNITIES

*Warren O. Hagstrom, The Scientific Community. Basic Books, 1965. Paperback reprint Southern Illinois University Press. Introduction, Chapters 1-3, 6.
*Nicholas C. Mullins, Theories and Theory Groups in Contemporary American Sociology. Harper and Row, 1973.
Belver C. Griffiths and Nicholas C. Mullins. 1972. "Coherent Groups in Scientific Change." Science 177: 959-64.
Diana Crane. 1972. Invisible Colleges. Univ. of Chicago Press.
Jerry C. Gaston. 1973. Originality and Competition in Science. Univ. of Chicago Press.
Randall Collins and Sal Restivo. 1983. "Conflicts and Developments in the Sociology of Science." The Sociological Quarterly 24: 185-200.
Susan E. Cozzens. 1989. Social Control and Multiple Discovery in Science. Albany: SUNY Press.
Daryl E. Chubin and Edward J. Hackett. 1990. Peerless Science: Peer Review and U.S. Science Policy. Albany: SUNY Press.

3. NETWORKS OF PUBLICATIONS, NETWORKS OF PEOPLE

*Derek de Solla Price, Little Science, Big Science, and Beyond. 1963. Enlarged edition, 1985. Chapters 2, 3, 5, 6, 8, 10, 11.
*Bruno Latour, Science in Action. Harvard Univ. Press, 1987. Introduction and Chapter 1.
Steven Cole and Jonathan Cole. 1973. Social Stratification in Science. Univ. of Chicago Press.
Pierre Bourdieu. 1975. "The Specificity of the Scientific Field and the Social Conditions of the Progress of Reason." Social Science Information 14: 19-47.
Joseph Ben-David and Randall Collins. 1966. "Social factors in the origins of a new science: the case of psychology." American Sociological Review 31: 451-65.
Henry Small and Belver Griffith. 1974. "The Structure of Scientific Literatures," Science Studies [now Social Studies of Science] 4: Part I: 17-40; Part II: 299-365.
Eugene Garfield, Citation Indexing. N.Y.: Wiley, 1979.

Paul D. Allison, J. Scott Long, and Tad K. Krause. 1982. "Cumulative Advantage and Inequality in Science." American Sociological Review 47: 615-25.
Paul D. Allison and J. Scott Long. 1990. "Departmental Effects on Scientific Productivity." American Sociological Review 55: 469-78.
Lowell Hargens. 1988. "Scholarly Consensus and Journal Rejection Rates." American Sociological Review 53: 139-151; followed by debate with Cole, Simon, and Cole.
Christine L. Borgman (ed.). 1990. Scholarly Communication and Bibliometrics. London: Sage.

4. MICRO-CONSTRUCTIONIST STUDIES OF SCIENTIFIC PRACTICE AND DISCOURSE

*Bruno Latour, Science in Action, Chapters 2, 4 and 6.
Bruno Latour and Steve Woolgar. Laboratory Life. The Social Construction of Scientific Facts. Sage, 1979.
Karin Knorr-Cetina and Michael Mulkay, Science Observed. Perspectives on the Social Study of Science. Sage, 1983.
Harold Garfinkel, Michael Lynch, and Eric Livingston. 1981. "The Work of Discovering Science Construed with materials from the Optically Discovered Pulsar." Philosophy of the Social Sciences 11: 131-58.
Karin D. Knorr-Cetina, The Manufacture of Knowledge. An Essay on the Constructivist and Contextual Nature of Science. Pergamon, 1981.
Augustine Branigan. 1981. The Social Basis of Scientific Discovery. Cambridge University Press.
Barry Barnes and Davis Edge (eds.). 1982. Science in Context. MIT Press.
Nigel Gilbert and Michael Mulkay. 1984. Opening Pandora's Box. A Sociological Analysis of Scientists' Discourse. Cambridge University Press.
Michael Mulkay. 1985. The Word and the World: Explorations in the Form of Sociological Analysis. London: Allen and Unwin.
Andrew Pickering. 1984. Constructing Quarks. A Sociological History of Particle Physics. Univ. of Chicago Press.
Steve Woolgar. 1988. Science, the Very Idea. Tavistock.

5. ORGANIZATIONAL STRUCTURE OF INTELLECTUAL DISCIPLINES

*Randall Collins, Conflict Sociology. 1975. Chapter 6 "A Conflict Theory of Organizations," and Chapter 9, "The Organization of the Intellectual World."
*Richard Whitley. 1984. The Intellectual and Social Organization of the Sciences. Oxford: Clarendon Press. Chapters 1, 3-5.
Lowell L. Hargens, Patterns of Scientific Research. A Comparative Analysis of Research in Three Scientific Fields. A.S.A. Rose Monograph Series, American Sociological Association, 1975.
David Edge and Michael Mulkay, Astronomy Transformed. The Emergence of Radio Astronomy in Britain. 1976.
Stephan Fuchs. 1986. "The Social Organization of Scientific Knowledge." Sociological Theory 4: 126-142.
Stephan Fuchs and Jonathan H. Turner. 1986. "What Makes a Science 'Mature'? Organizational Control in Scientific Production." Sociological Theory 4: 143-150.

6. LONG-TERM CHANGE IN SCIENCE AND IDEAS

*Joseph Ben-David, The Scientist's Role in Society. 1971. Univ. of Chicago Press, new edition, 1984. Chapters 2-8.
*Derek de Solla Price, Little Science, Big Science, and Beyond. Chapters 1 and 12.
*Randall Collins. 1989. "Toward a Theory of Intellectual Change: the Social Causes of Philosophies." Science, Technology and Human Values 14: 107-140.
*Randall Collins. 1987. "A Micro-Macro Theory of Creativity in Intellectual Careers: the Case of German Idealist Philosophy." Sociological Theory 5: 47-69.
Derek de Solla Price, Science since Babylon. 1961. Enlarged edition, 1975.
Thomas S. Kuhn, The Structure of Scientific Revolutions. 1962; second edition 1970.
Thomas Kuhn. 1977. The Essential Tension. Selected Studies in Scientific Tradition and Change. Univ. of Chicago Press.
Olga Amsterdamska. 1985. "Institutions and Schools of Thought: the Neogrammarians." American Journal of Sociology 91: 332-58.
Bruno Latour. 1988. The Pasteurization of France. Harvard University Press.
W. Bijker, T. Pinch, and T. Hughes (eds.), The Social Construction of Technological Systems MIT Press 1987.

PHILOSOPHY/SOCIOLOGY OF SCIENCE
Larry Laudan. 1977. Progress and Its Problems: Toward a Theory of Scientific Growth. Univ. of California Press.
Marc de Mey. 1982. The Cognitive Paradigm. Reidel.
Martin Hollis and Steven Lukes (eds.). 1982. Rationality and Relativism. MIT Press.
Ronald Giere. 1988. Explaining Science: A Cognitive Approach. Univ. of Chicago Press.
Steve Fuller. 1988. Social Epistemology. Indiana University Press.

SOCIOLOGY OF PHILOSOPHY
C. Wright Mills. 1942/1969. Sociology and Pragmatism. The Higher Learning in America. New York: Oxford University Press.
Michele Lamont. "How to Become a Dominant French Philosopher: the Case of Jacques Derrida." American Journal of Sociology 93 (1987): 584-622.

PSYCHOLOGY OF CREATIVITY
Dean Keith Simonton. 1988. Scientific Genius: A Psychology of Science. Cambridge University Press.

INSIDERS' ACCOUNTS OF SCIENCE
C.P. Snow, The Search. (1934 novel)
_____, The Affair. (novel)
James Watson, The Double Helix.

SCIENTIFIC SCANDALS
William Broad and Nicholas Wade, Betrayers of the Truth. Simon and Schuster 1982.

SOCIOLOGY OF MATHEMATICS

R. Wilder, The Evolution of Mathematical Concepts. New York: Wiley. 1975.
R. Wilder, Mathematics as a Cultural System. Pergamon Press, 1981.
Randall Collins and Sal Restivo. 1982. "Mathematics and Civilization," The Centennial Review 26: 277-301.
Randall Collins and Sal Restivo. 1983. "Robber-barons and Politicians in Mathematics: A Conflict Model of Science." Canadian Journal of Sociology 8: 199-227.
Sal Restivo, The Social Relations of Physics, Mysticism, and Mathematics. Boston: D. Riedel, 1983.
Philip Kitcher. 1984. The Nature of Mathematical Knowledge. Oxford University Press.
Eric Livingston. 1986. The Ethnomethodological Foundations of Mathematics. London: Routledge.

BACKGROUND MATERIAL: HISTORY OF UNIVERSITIES

Christopher Jencks and David Riesman, The Academic Revolution, 1968.
Burton R. Clark, The Higher Education System. Academic Organization in Cross-National Perspective. UC Press, 1983.
Bruce Kuklick, The Rise of American Philosophy. Cambridge, Massachusetts, 1860-1930. Yale U.P. 1977.
Terry N. Clark, Prophets and Patrons. The French University and the Emergence of the Social Sciences. Harvard Univ. Press, 1973.
Pierre Bourdieu. 1988. Homo Academicus. Polity Press.
Randall Collins. 1981. "Crises and Declines in Credential Systems." In Sociology Since Midcentury: Essays in Theory Cumulation. New York: Academic Press.
Randall Collins, Three Sociological Traditions. Oxford U.P. 1985. "Prologue: The Rise of the Social Sciences." pp. 3-46.

JOURNALS: Social Studies of Science; Science, Technology and Human Values; Isis; Sociology of the Sciences Yearbook; Minerva; Science in Context; Science; Nature; and Social Epistemology.

A MESSAGE FROM THE EDITOR

Please send material for the next issue of the newsletter to Maurice Richter, SKAT Editor, Sociology Department, SUNY-Albany, 1400 Washington Ave., Albany NY 12222. I can also be reached by phone at home at 518-869-6720 and by E-mail at MR274@ALBNYVMS.BITNET.