

4S Society for Social Studies of Science

Winter 1981

Volume 6 Number 1

IN THIS ISSUE

4S: Progress and Prospects

Editorial: Henry Small	3
Editorial: Jerry Gaston	4

THE SIXTH ANNUAL MEETING	
Hotel Reservation Form	6
A Progress Report	7

Final 1980 4S Budget Report	8
Final 4S Membership Data for 1980	9
Proposed 1981 4S Budget	9
Excerpts from NSF Revised Budget for FY 1982	10

Thought and Opinion

Book Review

Kenneth E. Studer and Daryl E. Chubin's <u>The Cancer Mission: Social Context of Biomedical Research</u>	
Robert Thaler	12

Review Essay

The Sociology of Technology Revisited	
Ron Westrum	16

1982 4S MEETING	19
-----------------	----

In the Literature

Journal Contents	20
------------------	----

Announcements

Reports of Meetings--Trevor Pinch and David Travis; Daryl Chubin	25
Excerpts from the Minutes of the AAAS Council Meeting	27
Center for the Study of Ethics in the Professions--Luncheon Seminar	28
Reports Available from the University of Bielefeld	29
Center for History of Physics Data	31
Humanities Endowment Names Gerald Holton 1981 Jefferson Lecturer	31
Social Psychology of Science Newsletter	32
Appointment Announced	32
Social Studies of Science--Special Order Information	33

4S Society for Social Studies of Science

President: Bernard Barber

Secretary-Treasurer: Lowell Hargens

Council: Daryl Chubin, Loren Graham, Michael Mulkey, Brigitte Schroeder-Gudenus, Henry Small, Albert Teich, Arnold Thackray, Dorothy Nelkin, *ex officio*

Editor: Henry Small

Associate Editors: Jerry Gaston, Steve Woolgar

European Correspondent: Trevor Pinch

Editorial Advisors: Bernard Barber, Joseph Ben-David, Ruth Schwartz Cowan, Diana Crane, Michael Gibbons, Gerald Holton, Camille Limoges, Peter Mathias, Ian Mitroff, Harold Orlans, Nelson Polsby, Nathan Rosenberg, Harvey Sapolsky, Steven Shapin, Merritt Roe Smith, John Ziman, Dorothy Zinberg, Harriet Zuckerman

PROGRESS AND PROSPECTS

EDITORIAL

It is now almost a tradition for outgoing editors of the Newsletter to blither a bit about the past and future of 4S before retiring to obscurity. Since 1977 when I "temporarily" assumed editorial responsibilities from Arnold Thackray and Daryl Chubin, I believe there have been some fundamental changes in the field and in 4S. I would like to think that these changes represent a maturing of the field and a sorting out of various perspectives and interests.

On the publications scene the last few years have witnessed the birth of several new journals relevant to the broad area of social studies of science. These include: Scientometrics (covering quantitative science studies), Knowledge (focusing on creation and utilization of research findings, especially in the social sciences), Science, Technology and Human Values (concerned with the value dimension of science) which recently underwent a metamorphosis from a newsletter to a journal, Technology in Sociology (technology policy questions), Research Communication Studies, and the Sociology of the Sciences Yearbook. Surely this proliferation of formal publication channels indicates a maturing of the cognate fields which encompass 4S. Whether or not 4S decides to attempt the transition from newsletter to journal, it appears that our field will be served by a growing number and variety of specialized publications.

Moving from form to substance, 4S appears to have evolved from a disorganized assembly of disparate individuals to a more ordered but fractured federation of sects and subgroups. At times we appear on the verge of fissioning into a set of micro-societies: A strong program society, a citation society, a lab studies society, a psychology of science society, etc. The polarities of quantitative versus qualitative, structural-functional versus ethnomethodological have emerged. Only the debate over internal versus external sociology of science seems to have lessened, probably due to fatigue on both sides. If the emergence of subgroups and polarities are any indication of maturity, then 4S seems to have reaped the harvest with a vengeance.

Certainly diversity is a good thing for 4S, and several commentators on the first 4S meeting in Ithaca called for more. And while it is perhaps nonsense to talk about a convergence of diverse perspectives, perhaps now more than ever we need to keep the communication channels open, even if this means generating more heat than light. There is something to be said for retreating to positions of perceived strength and working out the details of a particular approach with one's most intimate colleagues. But if we stop at this point, something important will be lost.

For many of us the main attraction of 4S is its interdisciplinary nature. For most, I would guess that 4S is not their main disciplinary identification. We have joined because 4S provides relief from disciplinary definitions and expectations, an atmosphere of informal plurality, simultaneously focused and unfocused. It is this balance which is difficult to maintain but I see as most worth preserving.

The role of 4S and its Newsletter is clearly to provide a forum for diverse groups to work out their research programs but more importantly to share their ideas with the membership as a whole. If there was a problem with the Toronto meeting, it was the lack of community and communication within the 4S contingent

that we had grown accustomed to at previous annual meetings. I am pleased to hear that Daryl Chubin plans to reinstitute the plenary sessions at our upcoming meeting in Atlanta.

In closing I would like to acknowledge the efforts of a number of people who have made my job much easier over the last few years. The full burden of Newsletter production has fallen upon Jerry Gaston at Southern Illinois University and his dedicated and talented assistant, Beverly Morber. Without their efforts the Newsletter would not have seen the light of day. Jerry now assumes full editorial responsibilities at his new institution, Texas A & M, where we wish him all the best and look forward to working with him in his new role. A number of associate editors and correspondents have assured a steady flow of meeting reports, book reviews, and short articles: Henrika Kuklick, Steve Woolgar, Trevor Pinch, and Larry Stern. Thanks and good luck to all.

Henry Small
Institute for Scientific Information

EDITORIAL: JERRY GASTON

An equivalent tradition exists for new editors of newsletters to pontificate about their plans and ideas. I shall not indulge myself in noting observations about the society's progress to date. I will indulge myself in order to say a few words about the editorship of Henry Small. When he assumed the editorial responsibilities, he faced many problems of keeping an existing newsletter going, and with trying to develop the newsletter to serve various interests. He has accomplished an enormous task in keeping the journal going; and he has developed ideas that will continue to improve the Newsletter as our society's official communication vehicle. The Society for Social Studies of Science thanks you Henry; and I personally appreciate your efforts and thank you for bringing the Newsletter to this point.

I will reserve for a subsequent issue the kinds of policies about submissions and deadlines I will try to follow. I want only to say now that some previous policies will be continued intact. For example, we will publish both solicited and unsolicited book reviews. We will publish any announcement that is reasonable in length. We will publish letters and comments without peer review. I will reserve the prerogatives of an editor to edit and to negotiate with correspondents if necessary about the final wording of a communication.

Now, to serve the membership and subscribers, we must receive items for publication. Send them in. If all items published are solicited, we are missing one of the important functions of the Newsletter.

Until 15 July 1981, send materials to this address:

Jerry Gaston
Department of Sociology
Southern Illinois University
at Carbondale
Carbondale, Illinois 62901

After 15 July 1981, send materials to my new address:

Jerry Gaston
Department of Sociology
Texas A & M University
College Station, Texas 77843

HOTEL RESERVATION FORM

The hotel reservation form below should be completed, cut out, and sent immediately to this address:

RESERVATION MANAGER
THE LADHA DOWNTOWN HOTEL
70 HOUSTON STREET, N.E.
ATLANTA, GEORGIA 30303

PLEASE NOTE THAT THESE CONVENTION RATES APPLY TO THE NIGHTS OF
5, 6 AND 7 (THURSDAY, FRIDAY AND SATURDAY) OF NOVEMBER 1981.

CLIP AND MAIL TO THE HOTEL ADDRESS LISTED ABOVE.

NAME _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

Firm or Organization SOCIETY FOR SOCIAL STUDIES OF SCIENCE

Please reserve accommodations as follows:

Arrival _____ at _____ am/pm

Departure _____

Sharing with _____

- ☐ One Person \$34
☐ Two Persons/ 40
One Bed
☐ Two Persons/ 44
Two Beds
☐ Each Extra Adult # \$5.00
☐ Free Crib Needed

- Reservations are held until 6 P.M. unless guaranteed by one night's advance deposit, major credit card, or approved company account. Check out time is 11 A.M.
- Credit ID will be requested at check in, we accept American Express, Master Charge, BankAmericard, Visa, Carte Blanche and Diners Club.
- All reservations must be received 21 days prior to your arrival.
- If a room is not available at rate requested, a reservation will be made at the nearest available rate.
- Children under 17 sharing a room with their parents are FREE.

THE SIXTH ANNUAL MEETING: A PROGRESS REPORT

Daryl E. Chubin

The response of the membership to the special mailing in April soliciting program advice has been gratifying. In order to accommodate the requests for participation, the Program Committee will be suggesting a consolidation of interests. So be prepared to compromise. Proposals for a whole session devoted to a topic may translate into a single paper or into one theme addressed as part of a workshop.

Such decisions will be based on several considerations:

- (1) We would like to bring together all in attendance at the Atlanta meeting for at least one, and possibly as many as three, sessions. After Toronto, we need to rediscover our identity as a society and take stock of the wide range of research, and perspectives on that research, that qualify as "social studies of science." The spirit of the First Annual Meeting in Ithaca where we spoke, indeed confronted, one another should be rekindled. Any society that meets only once per year must invigorate its members on that occasion.
- (2) Recognizing that 4S is not the same society that met in Ithaca, the intellectual invigoration of its members should, and will, take more than one form. The formality of a paper session with one or two discussants has its place; so, too, does the roundtable where work in progress can be discussed. A cross between these two modes, however, has yet to be tried at 4S: the workshop session. In it, researchers who have spent years in a problem area, or with a methodology, can constitute a panel and develop an agenda for debating fine points and future directions. Published papers can be circulated along with the workshop agenda to those who express an interest in attending.
- (3) Finally, 4S has aged sufficiently that it can begin to institutionalize certain features of its annual meeting. I refer here not to the banquet and business meeting, but to special plenary sessions which honor, through review of signal works, members of the social studies of science community. Our self-consciousness as a society includes our capacity to analyze intellectual history and project future pathways that research is bound to take. In Atlanta this year I'd like us to institutionalize a tradition or two.

The next progress report will appear in the Fall (September) Newsletter. It will list the tentative program. In the meantime, I urge you to complete and return (to the hotel) the reservation form which is on the opposite page. If for some reason you did not receive the April letter, and you have an idea for the program, please call or write:

Daryl Chubin
TASP/Social Science/4S
Georgia Tech
Atlanta, Georgia 30332

404/894-3195

Final 1980 4S Budget Report

<u>EXPENSES</u>	<u>AMOUNT BUDGETED</u>	<u>EXPENSES</u>	<u>BALANCE</u>
Newsletter	4000	3558.66	441.34
Annual meeting	2500 ^a	-----	-----
Duplicating and postage	500	269.18	230.82
Secretarial	500	500.00	0.00
Telephone	100	4.95	95.05
Miscellaneous	<u>200</u>	<u>345.44</u>	<u>-145.44</u>
TOTAL	5300	4678.23	621.77

<u>INCOME</u>	<u>EXPECTED INCOME</u>	<u>ACTUAL INCOME</u>
Membership renewals	4650	5650.00
New memberships	500	340.00
Sale of mailing labels	----	75.00
Annual meeting	2500 ^a	-----
Balance from 1979	<u>5800</u>	<u>6390.50</u>
TOTAL	10950	12455.50

INCOME 12455.50

EXPENSES 4678.23

BALANCE 7777.27

^a A final determination of gain or loss from the 1980 annual meeting has not been made yet due to the complexities of currency conversion and of determining appropriate shares for the participating societies. Thus, the expenses and income amounts budgeted for the annual meeting are not included in any of the totals in this report. We expect to realize a small gain from the 1980 meeting.

Final 4S Membership Data for 1980

<u>Domestic</u>	<u>Number as of 12/31/79</u>	<u>Number as of 12/31/80</u>	<u>% 1979 Members Not Renewing</u>	<u>% New Members</u>
Professional	323	241	31%	6%
Student	44	31	46%	16%
Institutional	19	13	32%	0%
<u>Foreign (including Canadian)</u>				
Professional	86	84	4%	2%
Student	9	9	11%	11%
Institutional	<u>14</u>	<u>10</u>	28%	0%
TOTAL	495	388		

In addition, there were 12 gratis memberships in both 1979 and 1980

Proposed 1981 4S Budget

<u>Anticipated Expenses</u>		<u>Budgeted in 1980</u>
Newsletter	\$4400	\$4000
Annual Meeting	2000	2500
Duplicating & Post.	700	500
Secretarial	700	500
Telephone	100	100
Miscellaneous	<u>200</u>	<u>200</u>
	\$8100	\$7800

Anticipated Income

Membership Renewals	\$ 4650
New Members	1000
Annual Meeting	2000
Balance from 1980	<u>5800</u>
	\$13500

Excerpts from National Science Foundation Revised Budget for Fiscal Year 1982 (March 11, 1981)

[Editor's note: Pages C-IV-8 and C-IV-9 are reproduced here showing proposed two-thirds cuts in sociology, measurement methods and data resources, and history and philosophy of sciences programs at NSF.]

Social Measurement and Analysis

Program Element, January 1981\$13,700,000

Revised Budget, March, 1981\$3,500,000

Obligations by Program Subelement

Program Subelement	Actual FY 1980	Budget Request FY 1981	Current Plan FY 1981	Estimate FY 1982	Difference FY 1982/81
Sociology	\$3,937,277	\$4,000,000	\$4,100,000	\$4,800,000	\$700,000
Measurement Methods and Data Resources ..	5,000,225	5,000,000	5,100,000	7,000,000	1,900,000
History and Philosophy of Sciences	1,502,329	1,500,000	1,500,000	1,900,000	400,000
Total	\$10,439,831	\$10,500,000	\$10,700,000	\$13,700,000	\$3,000,000

Revised Budget, March 1981

Program Subelement	FY 1981 Rescissions	FY 1981 Revised Current Plan	FY 1982 Budget Amendment	FY 1982 Revised Budget	Difference Revised FY 1982/81
Sociology	\$-1,230,000	\$2,870,000	\$-3,600,000	\$1,200,000	\$-1,670,000
Measurement Methods and Data Resources ..	-1,500,000	3,600,000	-5,200,000	1,800,000	-1,800,000
History and Philosophy of Sciences	-450,000	1,050,000	-1,400,000	500,000	-550,000
Total	\$-3,180,000	\$7,520,000	\$-10,200,000	\$3,500,000	\$-4,020,000

Objectives and Description

The objectives of this element in the January budget were (1) to develop knowledge about social interaction in small groups, complex organizations, and whole societies; (2) to understand fundamental processes of social change; (3) to understand the effects of change in scientific institutions; and (4) to improve the data resources employed in social research, and the quantitative methods used in data analysis.

- The Sociology program subelement supports research in these areas. It also supports studies of decisionmaking in units of varying sizes and types of structure including studies in nonmarket settings such as households where financial transaction data and econometric methods of analysis are inadequate.
- The History and Philosophy of Science program subelement focuses on science and technology as specialized forms of social organization, their modes of development and interaction, and their impact on society.
- The Measurement Methods and Data Resources program subelement supports the development and refinement of measurement methods, including techniques to improve the accuracy and reliability of social surveys, and activities to heighten the quality of data bases widely used in social scientific research.

In the revised program, this element seeks to advance knowledge by strengthening the methodology of and maintaining and improving the data bases required for modern social science research on demographic trends, on the functioning of organizations, and on the growth of science. Contemporary social science is heavily quantitative and empirical; it relies on the regular collection of data for the analysis

of trends, and for the modeling of organizational and demographic processes that underlie those trends and that help explain social order and social change. Major resource projects furnish, for present and future analysis, data relating to such fundamental problems and policy concerns as the changing composition of the population, migration, the societal effects of energy shortages, shifts in the makeup of the workforce; and the role of organizations in job creation. Research support also focuses on studies of science and technology as specialized forms of social organization, their modes of development, and their impact on society.

FY 1981 Rescissions and Revised Current Plan

A \$3.18 million rescission is proposed for the Social Measurement and Analysis program element in FY 1981 bringing the Revised Current Plan to \$7.52 million.

FY 1982 Budget Highlights and Explanation of Increases and Decreases

The requested increase of \$3.0 million in January would have brought total funding in FY 1982 to \$13.7 million. Enhanced activity would have focused on organizational processes and human behavior in organizations, social impacts of population change and family change, and evaluation of research and measurement methods.

FY 1982 Budget Amendment

The Foundation's proposed budget amendment for this program element totals -\$10.2 million. This includes decreases of \$3.6 million in Sociology, \$5.2 million in Measurement Methods & Data Resources, and \$1.4 million in the History and Philosophy of Science. Studies in such areas as patterns of residential segregation, effects of dual career families, and the development of knowledge system will be reduced. Subelements will be combined and restructured to permit more efficient administration and resource use.

Revised FY 1982 Budget Request

The Foundation's Revised Budget Request for the Social Measurements and Analysis program element is \$3.5 million. It will concentrate on sustaining projects that produce data for multiple users.

At a level of \$3.5 million in FY 1982, this program element will focus on projects that:

- Enhance the usefulness of Federal statistics and facilitate access to them;
- Improve the validity and reliability of survey methods;
- Study the assimilation process of recent immigrant groups to the United States; and
- Provide data resources for the study of change in scientific theories and the interaction of science and social forces.

THOUGHT AND OPINION

Kenneth E. Studer and Daryl E. Chubin, The Cancer Mission: Social Context of Biomedical Research. Sage Library of Social Research, v. 103. Beverly Hills: Sage Publications, 1980, 320 pages. \$18.00 cloth, \$8.95 paper.

The Cancer Mission presents an interesting theory on the progression of scientific knowledge. Called the "confluence" theory, it is similar to Edge and Mulkay's concept of branching except that here the idea being advanced is that knowledge progresses through the temporary convergence of specialties around a research problem rather than by continuous specialization or branching. That is, disciplines, such as biology, are organized cognitively so that lines of thought necessarily converge around a problem. As such, confluence is a cognitive process which in turn is followed by the social formation of a "problem domain." In advancing this internalist approach to the study of science, Studer and Chubin (S&C) propose that the social structure of a problem domain reflects the knowledge process formed through confluence rather than some generalizable and comparable sociological process. Put another way, S&C are advancing the idea that researchers in a biological problem domain are socially organized according to the idiosyncratic constitution of biological thought (p. 232). That they are the "visible measurable" social form of the knowledge process (p. 226).

The bulk of The Cancer Mission is ostensibly a test of confluence theory through the case study method. A data set was generated through search techniques of the Index Medicus, Biological Abstracts and the Source Index of the SCI (just how the Source, rather than Permutated, Index would be used is unclear). A set of 656 articles was generated in this manner, representing 1,088 researchers. S&C claim that this data set represents a biomedical problem domain which they label "reverse Transcriptase" (RT). A qualitative analysis of the problem domain was made through a review of the literature and by conducting fifteen interviews (no basis for the selection of interview subjects is given). The knowledge so gained was then used to interpret a quantitative analysis of the data set. Essentially S&C argue that the social structure of RT research failed to reflect the knowledge process of RT because of the intrusion by NCI of mission-oriented research. This intrusion resulted in RT research reflecting the contract process of the Special Virus-Leukemia Program [later renamed the Virus Cancer Program (VCP)] rather than the knowledge process. Because S&C have addressed this book to both sociologists of science and science managers, I assume RT was specifically chosen because of this intrusion. If The Cancer Mission had been designed solely as a test of confluence theory, mission-oriented research could have been controlled for. If, conversely, the study was to be an examination of science management, then the VCP and its effects on biomedical research might have been the focus. Unfortunately, in addressing The Cancer Mission to two different audiences neither has been served.

If we accept the book as presented, that is as a test of confluence theory, then it would seem appropriate for the authors to make an in depth study of the problematics of each specialty or line of thought in the confluent. After all, according to the theory, these are the essential substance of the confluence. However, in reading The Cancer Mission I was continuously troubled by S&C's failure to develop the specialties involved and their problematics in any coherent manner. In chapter one, S&C discuss three approaches to the subject of "celltransformation": viral, bacterial, and molecular biology. This breakdown, however, fails to accurately represent modern research in biology.

Virology can be undertaken as systemic virology, utilizing the principles of Koch in searching for infectious agents, or as molecular virology in which virus, or virus-like, particles are sought within cells. S&C totally miss this split between the systemic and molecular which is endemic throughout biology today (Lewis, 1980). It is also unclear what the authors mean by "cell transformation." Although S&C use the term as a synonym for "cancer," it should be noted that cancer is both an evolving concept (Sontag, 1978; Rather, 1978) and a lay term. It has never been used as a classification category in the Index Medicus or, since 1966, in the Index of Medical Terminology. Viral cell transformation, which is the type of transformation S&C opt for, is also unspecific. A wart is a case of viral cell transformation, but it doesn't result in cancer (or more specifically, neoplastic growth). It would be more accurate to say that RT research is part of a line of research dealing with the problem of latent viral infection, and that the RNA viruses involved are jointly called "retroviruses" (Andrewes, 1939; Gross, 1961; Bishop, 1978). As a result of their failure to draw out fully or make explicit the lines of thought involved and their problematics, the cognitive analysis of RT often becomes confused and unilluminating.

The third chapter is a discussion of "The Politics of Cancer." This primarily concerns mission-oriented research, and specifically the special Virus-Leukemia Program established in 1964 (not 1965) and designed by Carl Baker (then Associate Director for Planning, not Director of NCI) Louis Carrese and Carl Rauscher. Although this chapter may be of some interest to science managers, S&C fail to undertake their own empirical analysis of the program, relying instead on Rettig (1977), several journal articles and an interview with Rauscher. None of the secondary sources, however, discuss the VCP in any substantive manner. Yet, S&C conclude, without establishing the phenomenon (quotes from Rauscher deal only with establishing the program), that the VCP funded RT research overwhelmingly by contract; and this primarily to an in-house group. This conclusion is in conflict with Baker (1977) who states (p. 660 and p. 662) that the VCP, though designed as a contract program, functioned primarily as a traditional grant-funding program. S&C have taken the position expressed by one group of biologists in the early '70s which led to formation of the Zinder Committee in 1974; the year S&C began their research. Its report, which is claimed to have been critical of the method by which VCP funding was awarded, has never been published. That S&C accept as fact second-party reports of the VCP seriously weakens their analysis.

This problem and that concerning the cognitive structure of RT, comes about in part as a result of the authors indiscriminate use of retrospective accounts. Elsewhere (Chubin and Studer, 1978) and here, S&C propose that sociologists be attuned to criticisms of scientists concerning violations of the cognitive norms within their discipline. This seems to mean (1) complaints about funding policies, and (2) polemics between scientists holding differing views. It doesn't seem to mean that sociologists must substantiate such complaints or even understand them. The uncritical use of statements made by informants, orally or in print, without substantiation, represents an abandonment of one's role as researcher.

Chapters five and six are concerned with a quantitative analysis of the data set. There are a number of interesting findings here, including that the social structure of laboratories (i.e., whether a lab is democratic or centralized) may be indicated through the coauthorship structure of articles. Or, that individual researchers can be identified with a particular lab due to the similarity in

citation patterns among researchers in each lab. Most of the findings in these chapters, however, have appeared elsewhere (Chubin and Studer, 1979).

Unfortunately, S&C have seen fit to include in their article-set all articles retrieved through their search. As a result, their article-set includes not only articles of "journal science" (i.e., experts writing to other experts) but also of "popular science" (i.e., experts writing to nonexperts). In their analysis of social structure through coauthorship, Spiegelman's lab at Columbia University and Gallo's lab at NCI are united solely on the basis of a letter coauthored by Spiegelman and Gallo, in response to an editorial, in Lancet. Coauthorship, as a measure of social structure, has certain shortcomings (see Broad, 1981) some of which may only be compounded by failing to distinguish between coauthors in "journal science" and in "popular science" (see Fleck for a discussion of journal and popular science).

Chapter six is devoted to "Citation and Cocitation Structures." A separate analysis of 66 articles from the article-set which have been cited 25 times or more reveals that large laboratories, having jumped into RT research following discovery of the enzyme in 1970, with large research projects, produced a string of articles in which their own prior research was cited, but in which research produced by other labs essentially goes uncited. As a result of this and their research design, S&C's analysis here is basically limited to research undertaken at a few labs by a very small percentage of their total RT research population.

S&C distinguish their "cocitation" analysis from "co-citation" analysis as developed by Griffith and Small only in so far as their citing articles are limited to their article-set (p. 269). Actually, S&C's analysis doesn't resemble "co-citation" analysis as utilized by most sociologists of science. S&C fail to indicate (1) which articles are being "co-cited" together; (2) which are doing the "co-citing"; and (3) what is the strength of such "co-citation." In Appendix D, S&C list each of the 66 articles used in this analysis, giving the total number of citations and "cocitations" received by each article. For example, the Temin and Mizutani article in Nature, announcing discovery of RT, is listed as having received 194 citations, 1,414 "cocitations" and .3897 as a "cocitation" eigenvector weight generated through a matrix scaling routine. Because S&C use the individual researcher as the unit of "cocitation" analysis, the high "cocitation" figure is derived from multiplying the number of coauthors of a citing article times the number of coauthors in the cited article. The resulting figure is then a spurious artifact of laboratory size and, as mentioned above, laboratory research program.

The Cancer Mission suffers from extremely poor editing. Many dates and other facts are wrong. Several tables are incomplete. Discussion of data presented in some tables fails to correspond to what is presented in the text. The mentioning of such problems in a review is usually considered poor form, however, they occur with embarrassing frequency. The book also suffers from a failure to define terms used or to use them consistently. There also is no index.

While the idea that specialty branches in science converge to pool their knowledge and expertise to solve a problem at which each has arrived from different directions is interesting and original, it would have been preferable to publish it as a journal article for discussion among sociologists rather than to encumber it with this poorly conceived and executed case study.

REFERENCES

- Andrewes, C.H., "Latent virus infections and their possible relevance to the cancer problem: President's Address," Proc. Royal Soc. Med., 33:75-86, 1939.
- Baker, C. G., "Cancer research program strategy and planning--the use of contracts for program implementation," J. Nat'l. Cancer Inst. Vol. 59, No. 2 (suppl.) August: 651-669, 1977.
- Bishop, J.M., "Retroviruses," Ann. Rev. Biochem., 47:35-88, 1978.
- Broad, W.J., "The publishing game: Getting more for less," Science, 211: 1137-1139 (13 March) 1981.
- Chubin, D.E. "The politics of cancer," Theory and Society, 6:55-74, 1978.
& K.E. Studer "Knowledge and structures of scientific growth: Measurement of a cancer problem domain," Scientometrics, 1:171-193, 1979.
- Fleck, L., Genesis and Development of a Scientific Fact, The University of Chicago Press, Chicago, 1979 [1935].
- Gross, L., Oncogenic Viruses, Oxford, England: Pergamon, 1961.
- Lewis, G., "The relationship of conceptual development to consensus: An exploratory analysis of three subfields," Social Studies of Science, 10:285-308, 1980.
- Rather, L.J., The Genesis of Cancer: A Study in the History of Ideas, Baltimore: Johns Hopkins University Press, 1978.
- Sontag, S., Illness as Metaphor, New York: Farrar, Straus and Giroux, 1978.

Robert Thaler
Teachers College
Columbia University

The Sociology of Technology Revisited

Ron Westrum
Eastern Michigan University

Reading the brief section on the sociology of technology by Jerry Gaston in the Durbin "Guide" (1980), the kindest conclusion one can draw is that the author must have been in a great hurry; for as a survey of literature on the sociology of technology, it is grossly inadequate. One may be able to excuse some of the survey's omissions by noting that the author believes that virtually all valuable sociological work is done by clusters of scholars following a paradigm, but this observation is insufficient to cover all his lacunae. We have a right to expect a high standard of work from the writers of survey articles in handbooks, since these articles might seem to have an authoritative character to the outsider. Hence I feel it would be unfortunate if the unsuspecting reader were to take the survey at face value. There is a good deal of literature in the sociology of technology that it does not mention, and I will try here to fill in some of the gaps left in this treatment.

I should say in Gaston's defense that some years ago I was faced with a somewhat similar task, namely surveying the sociology of technology for an introductory textbook. In looking over the references for the chapter I wrote (Westrum, 1977), I find that there are more references to historical works than to sociological ones. This perhaps indicates that work on the sociology of technology has more often been carried out by historians than by sociologists. Nonetheless, this is hardly a reason to slight works by historians that have important things to say to sociologists in regard to technology. For instance, how one is able to overlook the work of John Nef (e.g., 1950), or what I feel is the most stimulating and readable book on books as Josephson's (1959) biography of Edison and Copley's biography of F.W. Taylor (1923).

Another important topic is the sociology of innovation. The classic systematic treatment of innovation is the book by Barnett (1953), which anyone starting work in this area would find it worthwhile to consult. A considerable literature exists on technological innovation in industry, of which Burns and Stalker (1961) is representative (see also Shanks, 1967). A short useful review of some of the literature is contained in Mansfield (1973). Stern's classic work on the suppression of innovations by large corporations (1959--see also Sutherland, 1949, Chapter 4) also seems to have eluded the survey's coverage.

One interesting case study in this area would be the organization of scientists and engineers by the Allies in World War II, in their efforts to develop and use devices to defeat the Axis. One should certainly mention Clark's account of the rise of the British "boffins" (1962) or the similar account by Baxter (1968) of the American war "wizards." The introductory material in Jones's (1978) autobiography will offer more references on this period. It should be remembered that World War II saw the birth of operations research, which led to the more comprehensive "systems analyses" of the 1960's (Boguslaw, 1965) and their organizational expression, the "think tank" (Dickson, 1971).

In regard to the social effects of technology (if one can use this bald and somewhat misleading expression), there is quite a bit of research on the effects of automation (Bechhofer, 1973) and computers (Whisler, 1970) on complex organizations. On a more societal level--in addition to the books by Ogburn

cited above--there are recent collections on the railroad (Mazlish, 1965) and the telephone (Pool, 1977) which bear consideration. One will also find a good deal on this in anthropology; the two collections by Mead (1955) and Spicer (1965) are examples.

For reasons best known to the author, the survey did not mention the journal that has done the most to forward studies of the sociology of science and technology: Social Studies of Science, now in its eleventh year. The scholar interested in the sociology of technology would also do well to consult Technology and Culture, whose book reviews as well as articles often deal with issues in the sociology of technology.

Finally, I should like to mention some works which have given me some important insights into the sociology of technology. The first is Fitzgerald's (1972) narration of his experiences in the military-industrial complex, indispensable for the student of bureaucracy as well. The second is Barlay's journalistic but penetrating account of industrial espionage (1974). The third is Mead's account of the Trans-Alaskan pipeline (1980).

It is to be hoped that if a second edition of the Durbin volume appears, the next such survey will be able to treat the sociology of technology in a more comprehensive manner.

References

- Stephen Barlay, The Secrets Business (New York: Thomas Crowell, 1974).
- H. G. Barnett, Innovation: The Basis of Cultural Change (New York: McGraw Hill, 1953).
- Phineas T. Baxter, Scientists Against Time (Cambridge: MIT Press, 1968).
- Frank Bechhofer, "Technology and Shop Floor Behavior," in D. O. Edge and J. N. Wolfe, Editors, Meaning and Control: Social Aspects of Science and Technology (London: Tavistock, 1973).
- Robert Boguslaw, The New Utopians (Englewood Cliffs, New Jersey: Prentice-Hall, 1965).
- A. A. Bright, The Electric Lamp Industry: Technological Change and Economic Development 1880-1947 (New York: Macmillan, 1949).
- Tom Burns and G. M. Stalker, The Management of Innovation (London: Social Science Paperbacks, 1966).
- Ronald Clark, The Rise of the Boffins (London: Phoenix House, 1962).
- Sir John Cockcroft, The Organization of Research Establishments (Cambridge: Cambridge University Press, 1966).
- Frank B. Copley, Frederick W. Taylor, Father of Scientific Management (New York: Harper Brothers, 1923).
- Paul Dickson, Think Tanks (New York: Atheneum, 1971).
- Otis Dudley Duncan, Editor, William F. Ogburn on Culture and Social Change (Chicago: University of Chicago Press, 1964).
- A. Ernest Fitzgerald, The High Priests of Waste (New York: Norton, 1972).
- Jerry Gaston, "Sociology of Science and Technology," in Paul T. Durbin, Editor, A Guide to the Culture of Science, Technology and Medicine (New York: Free Press, 1980).

- R. V. Jones, Most Secret War: British Scientific Intelligence 1938-1945 (London: Hamilton Hamish, 1978).
- Matthew Josephson, Edison: A Biography (New York: McGraw-Hill, 1959).
- Edwin Mansfield, "The Production and Application of New Technology by American Business Firms: A Summary of Findings," in D. O. Edge and J. N. Wolfe, Editors, Meaning and Control: Social Aspects of Science and Technology (London: Tavistock, 1973).
- Bruce Mazlish, Editor, The Railroad and the Space Program: An Exploration in Historical Analogy (Cambridge: MIT Press, 1965).
- W. Rupert McLaurin, Invention and Innovation in the Radio Industry (New York: Macmillan, 1949).
- Margaret Mead, Editor, Cultural Patterns and Technical Change (New York: New American Library, 1955).
- Robert Douglas Mead, Journeys Down the Line: Building the Trans-Alaska Pipeline (Garden City, NY: Doubleday, 1978).
- Elting Morison, Men, Machines, and Modern Times (Cambridge: MIT Press, 1966).
- John U. Nef, War and Human Progress (Cambridge: Harvard University Press, 1950).
- William F. Ogburn, The Social Effects of Aviation (Boston: Houghton Mifflin Company, 1945).
- William F. Ogburn and F. Meyers Nimkoff, Technology and the Changing Family (Boston: Houghton Mifflin Company, 1955).
- Ithiel De Sola Pool, Editor, The Social Impact of the Telephone (Cambridge: MIT Press, 1977).
- Carroll W. Pursell, Jr., "History of Technology," In Paul T. Durbin, Editor, A Guide to the Culture of Science, Technology, and Medicine (New York: Free Press, 1980).
- Joseph Rossman, Industrial Creativity: The Psychology of the Inventor (New Hyde Park, New York: University Books, 1964).
- Jacob Schmookler, Invention and Economic Growth (Cambridge: Harvard University Press, 1966).
- Michael Shanks, The Innovators: The Economics of Technology (Baltimore, Maryland: Penguin, 1967).
- Edward H. Spicer, Editor, Human Problems in Technological Change (New York: John Wiley, 1965).
- Bernard J. Stern, "Restraints upon the Utilization of Inventions," in his Historical Sociology (New York: Citadel, 1959).
- Edwin Sutherland, White Collar Crime (New York: Holt, Rinehart, and Winston, 1949).
- Eric Trist, "A Socio-Technical Critique of Scientific Management," in D. O. Edge and J. N. Wolfe, Editors, Meaning and Control: Social Aspects of Science and Technology (London: Tavistock, 1973).
- Ron Westrum, "Technology and Social Change," chapter 19 in R. Perrucci, D. Knudsen, and R. Hamby, Sociology: Basic Structures and Processes (Dubuque, Iowa: Frederic C. Brown, 1977).

Thomas L. Whisler, The Impact of Computers on Organizations (New York: Praeger, 1970).

James W. Woodard, "Critical Notes on the Culture Lag Concept," Social Forces, Vol. 12 (1934), pp. 388-398.

1982 MEETING OF THE 4S SOCIETY

The 4S/History of Science Society/Philosophy of Science Association
joint meeting will be held in Philadelphia in late October 1982.
PLAN NOW TO PARTICIPATE.

JOURNAL CONTENTS

These contents pages have been reprinted from Current Contents: Social and Behavioral Sciences.

KX995

KNOWLEDGE

Creation • Diffusion • Utilization

VOL. 2 NO. 2 DECEMBER 1980

Sage Publ., Calif.

Watzfeld, Paul F. - a Sociointellectual Biography, M. Pollak	157
Technological Diffusion Research and National Policy Issues, J.D. Roessner	179
Examination by Development, M.M. McCarthy, G.D. Kuh	203
Utilization Research - the Design-To-Use Process, P.P. Rieker	215
Facilitating Evaluation Use by Integrating Academia and Practice, K.W. Johnson	237
Ethological Prerequisites for Psychotherapy Outcome Research: a Survey of Clinical Psychologists, L.H. Cohen	263
Mental Health Accountability Package - Design and Assembly, J.B. Alexander	273
BOOK REVIEWS	
valuation - a Systematic Approach - P.H. Rossi, H.E. Freeman, S.R. Wright, C.C. Abt	300
merica by Design - Science, Technology, and the Rise of Corporate Capitalism - D.F. Noble, J.E. Brittain	305
Nuclear Energy - Necessity or Danger - H. Nowobny, K.D. Knorr	309

LJ293

KNOWLEDGE

Creation • Diffusion • Utilization

VOL. 2 NO. 3 MARCH 1981

Sage Publ., Calif.

Action and Enlightenment Functions of Research - Comparing Private-Sector and Public-Sector Perspectives, R. Deshpande	317
Selected Knowledge Diffusion-Utilization Know-How - Generalizability within Educational Practice, W.C. Wolf	331
Managing the Implementation of Curriculum Innovations, K.A. Leithwood	341
Effective Problem-Solving for Evaluation Utilization, B. Dickey, E. Hampton	361
Work Activities, Settings, Methodologies, and Perceptions - Correlates of Evaluative Research Utilization, F.B. Dickman	375
Decision Analysis for Complex Systems - Integrating Descriptive and Prescriptive Components, H.C. Kunreuther, P.J.H. Schoemaker	389
Information Exchange Among Public Agencies in 3 California Counties, R.J. Rossi, K.J. Glimartin	413
BOOK REVIEWS	
Consultants can Help - the Use of Outside Experts in the United-States Office of Child Development - J.D. Marver, G. Benveniste	444
Using the Social Sciences - A. Cherna, J.A. Barnes	448
Politics and the Professors - the Great Society in Perspective - H.J. Aaron, R. Harris	452

KP515

Minerva

International Council on the Future of the Univ.

This is the latest issue of this journal.

The cover date does not correspond to the actual date of publication.

VOL. 17 NO. 4 WINTER 1979

The Brain Drain Re-Emerges - Foreign Medical Graduates in American Medical Schools, B.L.R. Smith	483
The Implantation of Science in Nigeria and Kenya, T.O. Elsemu	504
Hierarchy and Peripherality - the Organization of a Mexican-Research-Institute, L. Lomnitz	527
REPORTS AND DOCUMENTS	
The Calling and Condition of the Humanistic Disciplines - the Future of the Humanities - Report of a Conference, B. Fabian, R. Vierhaus	549
BOOK REVIEWS	
History of Technology, Vol 3, A.R. Hall, N. Smith	555
Higher Education Developments - the Technological Universities 1956-1976 - P. Venables, P. Papon	557
Industrial Innovation - Technology, Policy, Diffusion - M. Baker, K. Pavitt	562
Scientific Productivity - the Effectiveness of Research Groups in 6 Countries - P.M. Andrews, J. Ziman	563
Genesis and Development of a Scientific Fact - L. Flück, J. Ziman	563
Science and Technology for Development - the Role of United-States - R.P. Morgan, E.E. Iranzi, M.J. Moravcsik	569

KQ450

RESEARCH COMMUNICATION STUDIES

JOURNAL OF

Elsevier Scientific Publ. Co., Amsterdam

Articles and Abstracts in English

VOL. 2 NO. 3 NOVEMBER 1980

What is the Future for New Research Journals in the 1980s - a Discussion, J. Meadows, G. Page, R. Campbell, M. Balaban, A.A. Mantion, H.E. Barnford	137
CARS - Computer Assisted Referee Selection, H.R. Bernard	149
Multiple Authorship and Author Collaboration in Agricultural Research Publications, C. Balog	159
Limits to Collaborative Authorship in Science Publishing, P. Hodder	169
Learned Societies and On-Demand Book Publishing, A. Singleton	179
Book Reviews as Aids to Book Selection, A.I. Dallas	189
BOOK REVIEWS	
Scientific Information Transfer - the Editors Role - Proceedings of the 1st International Conference of Scientific Editors, April 24-29, 1977, Jerusalem - M. Balaban, R. Campbell	193
Writing a Scientific Paper - V. Booth, M. O'Connor	196
Nordic Biomedical Manuscripts - Instructions and Guidelines - G. Svartzmalmberg, R. Goldmann, P. Bengtson	197

KX256

Technology In Society

VOL. 2 NO. 3 1980

D. Allan Bromley
H. N. Sethna
Russell W. Peterson
Sir Peter Parker

Patrick E. Haggerty

Garry D. Brewster

- 257 Energies of the Future
287 The Safety Aspects of Nuclear Energy
295 Lessons of Three Mile Island
303 The Innocent Eye — A Vision of Design Management
319 Improving the Productivity of People and Institutions
337 On the Theory and Practice of Innovation

Pergamon,
England

LD505

Technology In Society

VOL. 2 NO. 4 1980

Don Fuqua
Gösta Lagermalm

Richard E. Walton

Robert U. Ayres
Marc Pelegrin
Philomena G. Grodzka

Pergamon, N.Y.

- 365 Science Policy: The Evolution of Anticipation
375 "Social Technologies": A Need for Industrialized Countries
391 Planned Changes to Improve Organizational Effectiveness
413 Growth, Risk and Technological Choice
433 An Argument Against Automation
449 The New Enterprise

KS964

ISIS

AN INTERNATIONAL REVIEW DEVOTED TO THE
HISTORY OF SCIENCE AND ITS CULTURAL INFLUENCES

VOL. 71 NO. 259 DECEMBER 1980

ARTICLES

JOHN W. SERVOIS: *The Industrial Relations of Science: Chemistry at MIT, 1900-1939*

R. H. NAYLOR: *Galileo's Theory of Projectile Motion*

DENNIS R. DEAN: *Graham Island, Charles Lyell, and the Craters of Elevation Controversy*

CRITIQUES & CONTENTIONS

FRANK M. TURNER: *Public Science in Britain, 1880-1919*

NOTES & CORRESPONDENCE

JEFFREY BARNOUN: *Vico and the Continuity of Science: The Relation of His Epistemology to Bacon and Hobbes*

D. S. TARBELL; ANN T. TARBELL; R. M. JONES: *The Students of Ira Remsen and Roger Adams*

REVIEW SYMPOSIUM

Dictionary of Scientific Biography, edited by CHARLES CULSTON GILLISPY; essays by DONALD FLEMING, JOSEPH NEEDHAM, EDWARD GRANT, and JACQUES RIXIER.

Univ. Penn. Dept. Hist
Soc. Sci.

531

550

571

589

609

620

633

B 290M

SOCIAL PROCESS OF SCIENTIFIC INVESTIGATION. Yearbook 1980

SOCIOLOGY OF THE SCIENCES: A YEARBOOK. VOL. 4

EDITED BY K.D. KNORR, R. KROHN, R. WHITLEY
D Reidel (Dordrecht), 1981, 328 Pages, \$30.00 Softbound,
LCW 80-22279, ISBN: 90-277-1175-5

Introduction - toward the Empirical Study of Scientific Practice. R. Krohn vii

DISCOVERY ACCOUNTS

The Interaction between Theory and Data in Science. M. Demey 8
The Scientist as an Analogical Reasoner - a Critique of the Metaphor Theory of Innovation.
K.D. Knorr 25

Is it Possible to Reconstruct the Research Process - Sociology of a Brain Peptide. B. Latour 53

DISCOVERY ACCEPTANCE

Theoreticians and the Production of Experimental Anomaly - the Case of Solar Neutrinos.
T.J. Pinck 77

The Role of Interests in High-Energy Physics - the Choice between Charm and Colour.
A. Pickering 107

The Effects of Social Context on the Process of Scientific Investigation - Experimental Tests of
Quantum Mechanics. B. Horvay 139

On the Construction of Creativity: the Memory Transfer Phenomenon and the Importance of Being
Earnest. L. D. Travis 165

THE RESEARCH PROCESS

Struggles and Negotiations to Define What is Problematic and What is not - the Sociologic of Trans-
lation. M. Callon 197

The Development of an Interdisciplinary Project. J. Barmark, G. Wallen 221

WRITING PUBLIC ACCOUNTS

Discovery - Logic and Sequences in a Scientific Text. L. S. Woolgar 239
Contexts of Scientific Discourse - Social Accounting in Experimental Papers. N. Gilbert,
M. Mulkey 269

THE CONTEXT OF SCIENTIFIC INVESTIGATION
The Context of Scientific Investigation. R. Whitley 297

Social Studies of Science

Sage Publ., London

Articles in English

VOL. 10 NO. 4 NOVEMBER 1980

393 The Chimerical Cat - Philosophy of Quantum Mechanics in His-
terical Perspective. S.G. Brush

449 Multivariate Cluster Analysis and the Changing Cognitive Or-
ganization in a Specialty of Physics. E. Neel

DISCUSSION PAPER

475 Through Paradigm-Land to a Normal History of Science. N. Reingold

497 Exemplars and Analogies - a Comment on Crane Study of Kuh-
nian Paradigms in High Energy Physics. A. Pickering

502 Exemplars and Analogies - a Comment on Crane Study of Kuh-
nian Paradigms in High Energy Physics - Reply. D. Crane

507 Exemplars and Analogies - a Comment on Crane Study of Kuh-
nian Paradigms in High Energy Physics - Reply. A. Pickering

509 Rationality and Deconstruction.

515 Rationality and Authority - on the Confusion of Justification and
Permission. C.L. Hardin
M.J. Mahoney

ESSAY REVIEW

519 Politics and Rhetoric in the Sociobiology Debate. W.R. Albury

VOL. 10 NO. 1 JANUARY 1981
Alternative conceptions of technology

D. Sahal

2

Evolutionary behavior of complex sociotechnical systems

Z. Bonen

26

University research grants management: Accountability

viewed as an exchange — the U.S. case

K.S. Arnow

46

The impact of R&D spending on the foreign sales of new
Canadian industrial products

N.W. McGuinness and B. Little

78

B 286A

SCIENCE, TECHNOLOGY, AND NATIONAL POLICY

EDITED BY T.J. KUEHN, A.L. PORTER

Cornell University Press (Ithaca), 1981. 530 Pages, Bibliography,

\$35.00 Hardbound/\$9.95 Softbound, LC# 80-66900, ISBN: 0-0014-1343-5

AS THE PUBLISHER REQUIRES PRE-PAYMENT, PLEASE ENCLOSE

WITH YOUR ORDER A CHECK PAYABLE TO Cornell University Press.

Introduction - the Agenda for Science and Technology Policy.	11	The Scientific Advisory System - some Observations.	263
THE SOCIAL CONTEXT OF SCIENCE AND TECHNOLOGY		Office of Management and Budget - Skeptical View of Scientific Advice.	274
The Society		B. Cullison	
Technology, Evolution, and Purpose.		The Congress	
H. Brooks	35	Congress and the Science Budget.	
How Technology Will Shape the Future.		H. Roback	297
E.G. Mehlhorn	57	Scientists on the Hill.	315
The Artificial Environment - Disneyland is Better.		The Rhetoric and Reality of Congressional Technology Assessment.	327
T. Rozak	80	B.M. Casper	
The Policy		The Courts	
The Spectrum from Truth to Power.		Towards a New Technological Ethic - the Role of Legal Liability.	347
D.K. Price	95	L.H. Tribe	347
The Scientist and the Politician.	132	Risk and Responsibility.	356
The Economy		D.L. Bazelon	
The National Climate for Technological Innovations.	148	State and Local Government	
D. Schon	148	Science Policy in American State Government.	
Trends in United-States Technology - a Political Economist View.	161	H.M. Sapoly	367
M. Borczyk	161	Federal Technology Policy - Innovation and Problem Solving in State and Local Governments.	
The Politics		J.D. Roesner	397
World Affairs		Citizen Participation	
Military Research and Development - a Postwar History.	190	Participatory Technology.	416
H.F. York, G.A. Grib	190	Information and the New Movements for Citizen Participation.	434
The Transfer of Technology to Underdeveloped Countries.	215	H. Henderson	
G. Myrdal	215	Public Choices	
The International Functional Implications of Future Technology.	226	Technology Assessment and Social Control.	
E.B. Stolinikoff	226	M.S. Baran	451
SCIENCE, TECHNOLOGY, AND AMERICAN GOVERNMENT		The Politics of Technology Assessment.	
The Federal Executive		M.R. Berg	474
Organization for Science and Technology in the Executive Branch.	251	Science and the Formation of Policy in a Democracy.	496
		D. Moraw	

VOL. 2 NO. 5-6 OCTOBER 1980

SCIENCE INDICATORS: IMPLICATIONS FOR RESEARCH AND POLICY --
SOCIAL SCIENCE RESEARCH COUNCIL CONFERENCE, MAY 1978.

GUEST EDITORS: HARRIET ZUCKERMAN AND ROBERTA BALSTAD MILLER

Science Indicators - Implications for Research and Policy - Social-Science-Research-Council Conference, May 1978. H. Zuckerman, R.B. Miller 327

CONTEXTS

Science Indicators and Science Policy.
Science Indicators and Policy Analysis.

Indicators of Science - Notes and Queries.

H. Brooks 331
H. Averch 339
H. Zuckerman, R.B. Miller 347

SCIENCE, TECHNOLOGY, AND THE ECONOMY

International Indicators of Science and Technology - How does the United-States Compare.

R. McCulloch 355
E. Mansfield 369
R.B. Freeman 375
N. Rosenberg 387
C.V. Kuh 395
S. Cole 405

International Indicators of Science and Technology - Comments.

Indicators of the Impact of R and D on the Economy - Comments.

Indicators of the Impact of R and D on the Economy - Comments.

Indicators of Scientific Manpower - Comments.

Indicators of Scientific Manpower - Comments.

BASIC RESEARCH

United-States Science in International Perspective.

United-States Science in an International Perspective - Comments.

Indicators of Basic Research in the Physical Sciences.

Vital Signs for Basic Research in the Behavioral and Social Sciences.

PUBLIC OPINION

Indicators of Public Attitudes toward Science and Technology.

T.R. Laporte, D. Chisholm 439

BOOK REVIEW

Science and Science Policy in the Arab World - A.B. Zahlan.

M.J. Moravcsik 449

Articles and Abstracts in English

VOL. 3 NO. 1 JANUARY 1981

Funded Research, Multiple Authorship, and Subauthorship Collaboration in 4 Disciplines.

A.G. Heffner 5

Citation Networks in Information Science.

Some Social-Psychological Aspects of Becoming a Physicist.

The Analysis of Scientometric Matrices for Policy Implications.

The Analysis of Square Matrices of Scientometric Transactions.

BOOK REVIEW

A Guidebook for Technology Assessment and Impact Analysis - A.L. Porter, F.A. Resnik, S.R. Carpenter, A.T. Roper, R.W. Larson, J.S. Tiller.

P.R. McCallister 65

COMMENTARIES

- Why Cant History Dance Contemporary Ballet
or Whig History and the Evils of Contempo-
rary Dance. *L. Graham* 8
- Applied Philosophy and Philosophers Practice.
M. Mulkey 7
- Wisdom, Expertise, and the Application of
Ethics. *D. Nelkin* 16
- A Significant Limit on Applied History, Philoso-
phy, and Sociology of Science and Tech-
nology. *P.T. Durbin* 18
- A Role for the Contract Mechanism in Australi-
an Science and Technology - R. Johnston. 53
- Remember the Future - the Apollo Legacy, Vol
50, of Science and Technology Series - S.
Kent. 53
- The Elf Odyssey - National Security Versus En-
vironmental Protection - L.L. Klessig, V.L.
Sirite. 53
- Environmental Mediation - the Search for Con-
sensus - L.M. Lake. 53
- Visual Art, Mathematics and Computers - Selec-
tions from the Journal Leonardo - F.J. Mali-
na. 54
- Politics, Science, and Cancer - the Laetrile Phenomenon - G.E. Markle, J.C. Petersen. 54
- North-American Social Report - a Comparative
Study of the Quality of Life in Canada and
the USA from 1964 to 1974, Vol 1, (Founda-
tions, Population, and Health), Vol 2, (Cri-
me, Justice, and Politics) - A.C. Michalos. 54
- Science and Technology for Development - the
Role of United-States-Universities - R.P.
Morgan. 55
- The New Economic and Political Order of the
1980s - J. Naibitt. 55
- National Patterns of Science and Technology
Resources, 1980. 55
- Systems for Stimulating the Development of
Fundamental Research - Natl-Sci-Fdn-
Directorate-Sci-Tech-Int-Affairs-Div-Int-
Programs. 56
- Technology and Steel Industry Competitiveness
- Off-Tech-Assessment. 56
- Environment Policies for the 1980s - Org-Econ-
Cooperat-Dev. 56
- The Impact of Tourism on the Environment -
General Report - Org-Econ-Cooperat-Dev. 56
- Pollution Charges in Practice - Org-Econ-
Cooperat-Dev. 57
- Proceedings of the 29th Pugwash Conference on
Science and World Affairs, Development and
Security. 57
- A Selected Annotated Bibliography of Profes-
sional Ethics and Social Responsibility in
Engineering. 57

MEETING REPORT

- Science and Technology Studies-Toronto 80, the
Joint Annual Meetings of the History-Of-
Science-Society, Philosophy-Of-Science-
Association, Society-For-The-History-Of-
Technology, and Society-For-The-Social-
Studies-Of-Science, Held in Toronto, Canada,
16-19 October 1980. *S. Razisno* 20
- RESEARCH REPORT
- Controversies in Science and Technology - a
Protocol for Comparative Research.
G.E. Markle, J.C. Petersen 25

BOOK REVIEWS

- 1979 Annual Report - Amer-Asoc-
Advancement-Sci-Comm-Sci-Freedom-
Responsibil. 48
- Informed Consent in Medical Therapy and Re-
search - B. Barber. 48
- Technology, Environment, and Human Values -
I.G. Barbour. 48
- A Guide to Humanities Centers in the United-
States - D.L. Bronte. 49
- American Science and Modern China, 1876-1986
- P. Buck. 49
- Computers and Banking - Electronic Funds
Transfer Systems and Public Policy - K.W.
Colton, K.L. Kraemer. 49
- Directory of Audio Visual Sources - History of
Science, Medicine, and Technology - B. East-
wood. 50
- Science, Technology and Public Policy - an In-
ternational Perspective - S. Encel, J. Ro-
nayne. 50
- Knowing and Valuing - the Search for Common
Roots, Vol 4, the Foundation of Ethics and
its Relationship to Science - H.T. Engel-
hardt, D. Callahan. 50
- A Voice Crying in the Wilderness - Essays on
the Problems of Science and World Affairs -
B. Feld. 50
- Essays in Medical Sociology - Journeys into the
Field - R.C. Fox. 51
- Communication - the Essence of Science - W.D.
Garvey. 51
- A Retrospective Technology Assessment - Sub-
marine Telegraphy - the Transatlantic Cable
of 1866 - George-Washington-Univ-Program-
Policy-Studies-Sci-Tech-Int. 51

CONTINUED

CONTINUED

- Becoming a Physician - Development of Values
and Attitudes in Medicine - E.C. Shapiro,
L.M. Lowenstein. 57
- The Social Dimensions of Energy Options. 58
- The Cancer Mission - Social Contexts of Bi-
omedical Research - K.E. Studer, D.E. Chu-
bin. 58
- The Psychoanalytic Debate - Scientific, Legal
and Ethical Perspectives - E.S. Valenstein. 58
- The Therapeutic Revolution - Essays in the So-
cial History of American Medicine - M.J. Vo-
gel, C.E. Rosenberg. 59
- Bibliography of Bioethics, Vol 6 - L. Walters. 59
- Margins for Survival - Overcoming Political Li-
mits in Steering Technology - E. Went. 59

VOLUME 72

ISIS JUNE 1981

NUMBER 262



ARTICLES

- JAMES A. SECORD: *Nature's Fancy: Charles Darwin and the Breeding of Pigeons* 163
- STEVEN SHAPIN: *Of Gods and Kings: Natural Philosophy and Politics in the Leibniz-Clarke Disputes* 187
- ANDREW PICKERING: *The Hunting of the Quark* 216

DOCUMENTS & TRANSLATIONS

- BERNARD R. GOLDSTEIN: *The Hebrew Astronomical Tradition: New Sources* 237

NOTES & CORRESPONDENCE

- PAUL ERICKSON: *The Anthropology of Charles Caldwell, M.D.* 252

NEWS OF THE PROFESSION

- Annual Meeting of the History of Science Society* 257
- The Charles Babbage Institute* 263
- Éloge*: ANNE TIHON: *Joseph Mogenet, 1913-1980* 266

RETROSPECTIVE REVIEW

- Critical Problems in the History of Science*, edited by MARSHALL CLAGETT:
essays by MARTIN RUDWICK, WILLIAM COLEMAN, EDITH SYLLA, and LORRAINE
DASTON. 268

BOOK REVIEWS

60 Reviews

NOTES ON CONTRIBUTORS

332



REPORTS OF MEETINGS

Trevor Pinch and David Travis

SCIENTIFIC ESTABLISHMENTS AND HIERARCHIES (Sociology of the Sciences, Yearbook Conference), St. Antony's College, Oxford, 5th-7th July 1980.

This was a working conference which brought together a number of sociologists of science concerned with scientific establishments. Papers were read by (in order of presentation):

N. Elias, University of Bielefeld; R. Whitley, University of Manchester; C. Hay, Brunel University; D. Bennett, University of Oxford; P. Weingart, University of Bielefeld; Dr. Gruhn, University of Erlangen-Nuremberg; T. Shinn, Maison des Sciences de l'Homme; D. Chubin and T. Connelly, Georgia Institute of Technology; J. Ziman, University of Bristol; E. Yoxen, University of Manchester; R. Hohlfeld, Max-Planck Institute, Starnberg; A. Rig, University of Leiden; J. Fleck, University of Manchester; D. Travis, Polytechnic of North London; A. Dolby, University of Kent; D. Hatch and B. Rawlings, University of Manchester; H. Nowotny, European Centre for Social Welfare Training and Research, Vienna; P. Hoch and H. Martins, St. Antony's College.

What would a North American make of this European Jamboree? We invited Daryl Chubin to comment.

A North American at Oxford: A Report on the Conference on
"Scientific Establishments"

After a month-long visit to the U.K., the Oxford Conference on "Scientific Establishments and Hierarchies" was a fitting culmination to this North American's first glimpse at the European sociology of science community "in session." If anything, this two-day exercise of not only attaching names to faces, but also observing those names make faces, confirmed my earlier impression that indeed schisms (and jealousies) abound "over there." I won't dwell on these below, though I invite you to conjecture, fantasize, and reconstruct reality as you please.

Remarkably, while many of the conferees confessed that they knew not what an "establishment" was, all related admirably to N. Elias's theme paper. Near-unanimity prevailed on the propositions that (i) there is more than one scientific establishment, and (ii) they tend to do more harm than good. The kinds of harm (see 4 below) and what we could (or should) do about them, however, were more contentious issues. Liking such contentiousness, I was miffed that some blanket prescriptions--methodological and theoretical--were advanced in the names of "coherence" and "practical application." Such qualities are presumably favored by establishment figures within the academy, and more important, by those in policy-making roles outside.

Thus spurred by P. Weingart's provocative commentary on Sunday afternoon, the conferees engaged in one of the few vigorous exchanges of the weekend. The other came when our views on the volume, its function and audience, were solicited by convenor R. Whitley. A mixture of discomfort and apprehension surfaced here: Which papers would be retained for the volume (a doubly significant question because cross-referencing of others' contributions to the volume was suggested and widely supported, yet most of the papers presented had not progressed beyond abstract/rough-draft-minus-footnotes stage)? Advising editors and authors what should be done after, as T. Shinn put it, "initial investments" in them have been made, is futile. This being the fifth or sixth Yearbook, the editors know

what must be done; the question is whether they, or recruited others do it. In any case, look for an editor's introduction which tries to connect the selected papers. Look, too, for a volume that seeks a much wider audience (i.e., non-sociologists) than Yearbooks have heretofore attracted. Although this may be a thoroughly idiosyncratic perception, I think the editors would like to recapture some of the momentum generated by Volume 1, for subsequent volumes have become increasingly uneven in execution and tone despite their timely themes.

As for themes that recurred at Oxford, several are noteworthy. Some emerged spontaneously, while others were the crafted centerpieces of various presentations. For brevity, I will note them together with the relevant authors and antagonists at the conference. You can guess the status of each.

1. Reductionism is the "original sin" of sociologists since it confirms the implicit hierarchy of the sciences with physics at the top and sociology near the bottom (N. Elias, H. Martins).

2. The hegemony of physicists endows them with authority to make pronouncements on any scientific issue. A corollary of such hegemony is the explanatory imperialism that militates against the knowledge claims of non-physicists (H. Rose, A. Rip).

3. The sources of social scientists' data for making claims are of central importance. Case studies, e.g., of controversies and of laboratories, are either a boon or a bane in the sociology of science. The methodological problem of generalizability is compounded by varying definitions of controversy and of what constitutes laboratory life (J. Fleck, R. Hochfeld, D. Travis).

4. Methodological problems have ideological and political correlates. That is, establishments are significant because they define, and therefore legitimate, problems, orientations to them, and claims about them. Establishments do harm by demarcating science from pseudo-science (A. Dolby), preserving institutional forms (E. Yoxen), and in general, imposing insider-outsider perspectives on the production and negotiation of knowledge claims (P. Hoch, H. Nowotny, H. Rose). How we study establishments will affect our ability to understand the ways they distort-obstruct-subvert knowledge.

5. Understanding how establishments operate is requisite for producing policy-relevant knowledge. Thus the form of our knowledge will determine its eventual use, e.g., by policy-makers. Yet this belief over-subscribes to a rationalistic model of both scientists' behavior and science policy-making (P. Weingart).

If the role of social studies of science in the analysis of establishments appears multifaceted (schizophrenic?) from my summary--interpretive, debunking, activist, irrelevant--that is the nagging feeling which the conference instilled. To my mind, the Rorschach-like quality of the Elias theme paper was affirmed by the author himself when, in a closing commentary, he remarked, "We here are in danger of becoming an establishment." Such a "revelation" was in full display to this observer throughout the conference. And while only J. Ziman seemed resigned to his designation as an establishment member, he employed it as a reminder that such a designation need not make one smug.

Self-reflection on one's status and participation in establishments is a must. On that most would agree. The struggles both within science and in more public domains must be exposed as a first step toward reordering the dominance relations

that characterize social, and not just scientific, life. Perhaps on this, agreement is a more remote possibility. If so, then the Yearbook volume on "Scientific Establishments" could provide a needed heuristic to a fractionated community which one conferee confided to me was trapped by "dead-end, old-business sociology of science." Such a premature death rattle may yet have an uncommon predictive accuracy. If this does come to pass, at least we could claim that some other scientific establishment willed it.

Daryl E. Chubin
Georgia Institute of Technology

EXCERPTS FROM THE MINUTES OF THE AAAS COUNCIL MEETING (Toronto, January 7, 1981)

1. Reestablishment of the President's Science Advisory Committee (PSAC), proposed by the Board of Directors as a joint resolution of the Board and Council.

Whereas science and technology are strategic elements of U.S. policy-making on domestic and foreign issues that bear on improving our living standards, promoting domestic tranquility, defending our borders, and seeking arms limitation agreements; and

Whereas policy choices transcend the missions of individual federal agencies and programs and require improved measures and criteria to support national decision-making; and

Whereas sufficiently broad and independent scientific expertise cannot be provided solely in the White House staff or the National Security Council or the Office of Management and Budget; and

Whereas the President's Science Advisory Committee during its 22 years of existence effectively provided such scientific and engineering advice at the highest level of government,

Therefore be it resolved that the AAAS urges President-Elect Reagan to reestablish the PSAC, to assist him and the full-time Science Adviser to the President, confident that this action would benefit the nation, strengthen the Presidency, have the support of the Congress, and encourage the scientific and engineering communities.

Council voted to adopt the resolution without change.

2. Human Rights and Scientific Freedom, proposed by the AAAS Committee on Scientific Freedom and Responsibility.

Whereas human rights and scientific freedom are closely linked, and both of them remain under attack and continue to deteriorate in many countries throughout the world, and

Whereas the AAAS Workshop on Scientific Cooperation and Human Rights in the Americas, meeting at the same time as the AAAS 1981 Annual Meeting in Toronto, with the participation of numerous scientists from Latin America and North America, has expressed deep concern about the deterioration of human rights and scientific freedom in a number of countries in Latin America, and in particular the continued detention of scientists, engineers, and medical professionals as well as many other political prisoners, in many cases without charge or trial and in conditions of great physical hardship and torture; the deterioration of the quality and availability

of scientific education at all levels; and the dismissal of a large number of scientists from teaching and research posts, accompanied by a general decline of academic and scientific freedom, and

Whereas the lack of scientific freedom and the attack on human rights has become a chronic as well as a currently urgent problem, requiring the exploration of new initiatives as well as continued response to attacks on individuals as they occur,

Therefore be it resolved that AAAS, as a matter of high priority, extend and intensify its efforts to defend and advance both scientific freedom and basic human rights and to condemn attacks on them, and that it urge its affiliated societies and other organizations and individual scientists to become more actively involved in these matters.

Council voted to adopt the resolution without change.

CENTER FOR THE STUDY OF ETHICS IN THE PROFESSIONS
ILLINOIS INSTITUTE OF TECHNOLOGY
FRAUD IN SCIENCE IS TOPIC OF ETHICS LUNCHEON SEMINAR

Declaring that science is "the only sector in society where truth is the ultimate value," Deena Weinstein, Professor of Sociology at DePaul University, catalogued a series of examples of fraud in science which raise serious ethical and control problems for the scientific community. Speaking at the May 5 Professional Ethics Luncheon Seminar hosted by the Center, Professor Weinstein argued that "fraud has increased with the decline of science as a vocation and as a community governed by professional norms." The consequences of such fraud, she stated, threaten the integrity of science and portend dramatic changes in the science-society relationship.

Professor Weinstein cited several factors contributing to the incidence of fraud among scientists: (1) the increasing bureaucratization of science, accompanied by greater economic constraints, has, contrary to an earlier time, placed the selection of research problems in the hands of non-scientists. As a consequence, a growing number of scientists are under pressure to produce results which justify the economic investment made by others for a problem that they would not have chosen to pursue but for the fiscal and bureaucratic exigencies of big science; (2) career pressures related to promotion and tenure; (3) a decline in the effectiveness of self-regulation (peer review) by scientists and the failure to punish offenders when they are identified; (4) a greater emphasis on original work rather than on replication; and (5) the decreasing willingness of scientists or their employers to share their data with others.

Fraud, according to Weinstein, will have several adverse effects. It will diminish the prestige of scientists in the eyes of the general public and their policymakers and lead to greater restrictions on the autonomy of science. It will also hinder the conduct of science and the interpretation of findings as scientists experience increased uncertainty about the validity of data and the reliability of methods employed by their brethren. For a society dependent in so many ways on the application of knowledge produced by science, the specter of fraud can have a debilitating effect. Beyond the more short-term practical impacts on governmental and industrial decisionmaking, Weinstein noted the symbolic importance of science in contemporary societies and voiced concern that, as people's confidence in science is seriously shaken by the incidence of fraud, they are likely to turn to alternative sources of "knowledge," such as astrology or occultism.

Professor Weinstein's remarks will be published by the Center as part of its Occasional Papers Series. To request a copy of the paper or additional information about the luncheon seminars, contact the Center's director, Mark S. Frankel.

REPORTS AVAILABLE FROM THE UNIVERSITY OF BIELEFELD

Nearly six years ago the first number of the "Report Wissenschaftsforschung" was published by the University of Bielefeld. In the meantime the series has increased to 18 volumes. The series is so successful that the few copies which we are only able to produce of each volume are out of stock quickly.

Therefore we have decided to have the "Report Wissenschaftsforschung" edited in form of a book by the B.-K. publishers. Depending on the size the price will vary between DM 10,- and DM 18,- if you send your order to the Science Studies Unit.

At the same time we are able to reproduce volumes which are already out of stock if the demand is accordingly high. Therefore I ask you to tell me if you are further interested in receiving the series against payment. Furthermore I would like you to inform me which of the already available volumes you would like to receive.

Please contact: Dr. Günter Küppers
Universität Bielefeld
Postfach 8640
4800 Bielefeld 1
WEST GERMANY

The "Report Wissenschaftsforschung" which have appeared to date are:

- | | | |
|-------|---|--|
| Nr. 1 | W. Rammert | Die Bedeutung der Technik für Genese und Struktur der neuzeitlichen Wissenschaft |
| Nr. 2 | W.v.d. Daele
P. Weingart | The Utilization of the Social Sciences in the Federal Republic
An Analysis of Factors of Resistance and Receptivity of Science to External Direction |
| Nr. 3 | W. Rammert | Technik, Technologie and technische Intelligenz in Geschichte und Gesellschaft--Eine Dokumentation und Evaluation historischer, soziologischer und ökonomischer Forschung zur Begründung einer sozialwissenschaftlichen Technikforschung |
| Nr. 4 | G. Küppers
P. Stichel
P. Weingart | Wissenschaft zwischen autonomer Entwicklung und Planung--Wissenschaftliche und politische Alternativen am Beispiel der Physik |
| Nr. 5 | E. Schmitz
P. Weingart | Knowledge, Qualifications and Credentials: Changing Patterns of Occupations--An Analysis of Six Cases of Credentialling in Germany |
| Nr. 6 | H. -J. Trümpener | Die Existenzbedingungen einer Zwergwissenschaft--Eine Darstellung des Zusammenhangs von wissenschaftlichem Wandel und der Institutionalisierungsform einer Disziplin am Beispiel der Ägyptologie |

- | | | |
|-------|--|--|
| Nr. 7 | P. Lundgreen
(Hrsg.) | Zum Verhältnis von Wissenschaft und Technik--
Erkenntnisziele und Erzeugungsregeln akademischen
und technischen Wissens
Vortragstexte einer Tagung |
| Nr. 8 | R. Stichweh | Ausdifferenzierung der Wissenschaft--Eine Analyse
am deutschen Beispiel |
| Nr. 9 | G. Küppers
(Hrsg.) | Kernenergie und ihre Alternativen--Risiken und Kosten
verschiedener Energieversorgungssysteme |
| Nr.10 | G. Tolksdorf | Ansätze zur Operationalisierung des Konzepts "Ver-
gesellschaftung der Wissenschaft"--Problemanalyse
und Diskussion von Wissenschaftsindikatoren |
| Nr.11 | D. Urban | Wissenschaftlermobilität und Wissenstransfer--Eine
empirische Studie zum Verhältnis von Stellenmarkt,
Arbeitssituation und Forschungsprozess im deutschen
Hochschulsystem |
| Nr.12 | H. -J. Trümpener
P. Weingart | Empirische Forschungsprozessanalyse--Bibliographie,
Literatur- und Problemanalyse zur empirischen Forschung
über den Prozess wissenschaftlicher Forschung |
| Nr.13 | E. Mendelsohn
D. Nelkin
P. Weingart
(Hrsg.) | The Social Assessment of Science--Proceedings |
| Nr.14 | G. Kamphausen
Th. Schnelle | Die Romantik als naturwissenschaftliche Bewegung--
Zur Entwicklung eines neuen Wissenschaftsverständ-
nisses |
| Nr.15 | G. Küppers
H. Nowotny
(Hrsg.) | The Impact of Nuclear Controversy on Decision-
Making Structures |
| Nr.16 | N. Ulitzka | Interaktion von Wissenschaftssystem und Politik-
system unter Legitimationsaspekten |
| Nr.17 | A. Stracke | Zur Entwicklung probabilistischer Theoriebildungen
1850-1910--Eine kommentierte Bibliographie |
| Nr.18 | A. Leupold
P. Weingart
M. Winterhager | Wissenschaftsindikatoren und quantitative Wissen-
schaftsforschung--Eine annotierte Bibliographie |

CENTER FOR HISTORY OF PHYSICS DATA

New collections of source material, with many uses for historical and sociological studies, are now available at the Center for History of Physics of the American Institute of Physics. In oral history, the Sources for History of Modern Astrophysics project has created over 10,000 pages of single-spaced transcript, all edited and indexed and with detailed tables of contents, of interviews with 100 leading astronomers and astrophysicists. With the possibility of content analysis in mind, many of the same questions were asked most of these people, for example questions on education, career decisions, problem choices, funding, and relations with colleagues and the public. Histories of major observatories suggest that these first big-science institutions had a tendency to surprisingly sharp administrative crisis; this is just one example of issues, described from varied viewpoints in the interviews, that would repay historical and sociological study. A set of autobiographical questionnaires addressed to senior astronomers who were not interviewed, numerous bibliographies on which astronomers checked off those of their own papers they thought best, citation studies of these same people, and various other materials are also available for systematic study. Of course, the interviews cover not only such social questions, but also most aspects of the technical history of modern astronomy.

The AIP Center complemented the interviews by preserving many documentary records of astronomers and observatories. A number of these collections are now available at AIP on microfilm. Finding aids to various sources were compiled--for example, a guide to the archives of Lick Observatory and a listing of the Otto Struve papers at Yerkes Observatory.

These new materials may be used by themselves, or in connection with the other interviews, questionnaires, documents, etc., comparable in nature and of still greater extent, that the AIP Center holds on nuclear physicists, quantum physicists, and others. An international project to preserve sources for the history of solid-state physics is now getting underway. For information write Spencer Weart, AIP, 335 East 45th St., New York, New York 10017.

HUMANITIES ENDOWMENT NAMES GERALD HOLTON 1981 JEFFERSON LECTURER

The National Endowment for the Humanities (NEH) has announced that Harvard physics professor Gerald Holton, an internationally recognized historian of science and one of the world's leading Einstein scholars, will deliver the 1981 Jefferson Lecture. The Lecture is the highest honor the federal government confers for distinguished intellectual achievement in the humanities. Joseph D. Duffey, Chairman of the Endowment, announced the lecture at a meeting of the National Council on the Humanities.

Holton, the tenth recipient of the annual award, was scheduled to deliver the Jefferson Lecture in Washington on May 11 and in Boston on May 13. This year's lecture will be delivered in two parts for presentation separately in each of the host cities.

"Dr. Holton has contributed to our understanding of the fundamental human motivations behind scientific achievement," Duffey said. "He has presented important ethical and value issues related to science and technology, and uncovered the role that persistent themes play in scientific advancement."

The Jefferson Lecture was established by the NEH in 1972 to recognize major intellectual achievements which have practical application to today's world. Its goal is to provide a unique forum from which distinguished thinkers, scholars, and citizens can bring the wisdom of their experience to bear on matters of broad public concern.

Holton has been publishing widely in both the scientific and nonscientific literature. He is a Fellow of the American Academy of Arts and Sciences, and founder of its quarterly, Daedalus. He also established the important review journal, Science, Technology and Human Values. Among Holton's books are Scientific Imagination: Case Studies and Thematic Origins of Scientific Thought: Kepler to Einstein.

Holton is best known for the thematic analysis of scientific work which has identified the central themes connecting major scientific advances. His studies reveal that despite spectacular changes in science from one decade to the next, the important root ideas of outstanding scientists remain fairly constant.

The Jefferson Lecturer is selected annually by the National Council on the Humanities. Previous recipients have been Barbara Tuchman (1980), Edward Shils (1979), C. Vann Woodward (1978), Saul Bellow (1977), John Hope Franklin (1976), Paul Freund (1975), Robert Penn Warren (1974), Erik Erickson (1973), and Lionel Trilling (1972).

SOCIAL PSYCHOLOGY OF SCIENCE NEWSLETTER

Professor Ron Westrum wishes to announce that the sub-group on the "social psychology of science" publishes a newsletter which comes out about twice a year and contains bibliography, announcements of research and, occasionally, small articles. Recently featured was a synoptic bibliography on the psychology of science. Persons wishing information should contact him at the following address:

Dr. Ron Westrum
Department of Sociology
Eastern Michigan University
Ypsilanti, Michigan 48197

APPOINTMENT

DAVID MILLER has been appointed Lecturer in the History and Philosophy of Science at the University of New South Wales, Australia. Mr. Miller is currently completing a PhD dissertation on "Metropolitan Science in the Age of Reform: A Study of the Changing Role of the Royal Society of London, 1815-1835."

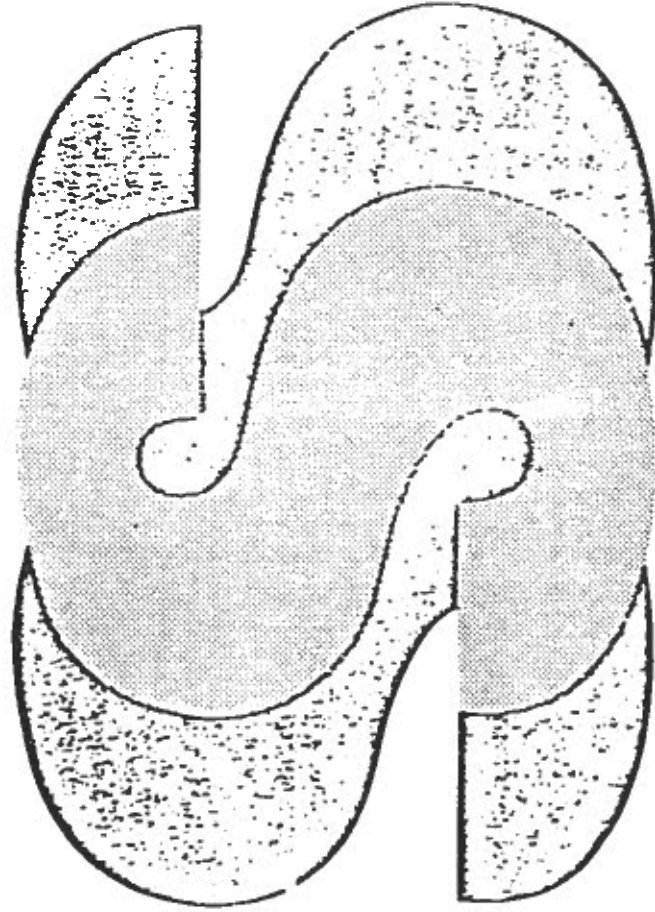
Social Studies of Science

An International Review
of Research in the Social Dimensions
of Science and Technology

**SPECIAL OFFER
TWO YEARS FOR THE
PRICE OF ONE**

Details on back

(S) SAGE Publications



Social Studies of Science

An International Review of Research in the Social
Dimensions of Science and Technology

Joint Editors David Edge *Science Studies Unit, University of Edinburgh* and Roy
MacLeod *Institute of Education, University of London*

A quarterly journal devoted mainly to
the results of original research and
analysis, whether empirical or
theoretical, which brings fresh light
to bear on the concepts, processes
and consequences of modern science
and technology - with interdisciplinary

contributions from a diversity of
fields, including political science,
sociology, economics, history,
philosophy, psychology, social
anthropology and the legal and
educational disciplines

**Contents of Volume 10
Number 4 November 1980**

The Chimerical Cat: Philosophy of
Quantum Mechanics in Historical
Perspective *Stephen G Brush*
Multivariate Citation Analysis and the
Changing Cognitive Organization in a
Specialty of Physics *Edward Nadel*
Discussion Paper
Through Paradigm-Land to a Normal
History of Science *Nathan Reingold*
Responses and Replies
Exemplars and Analogies: A Comment
on Crane's Study of Kuhnian Paradigms
in High Energy Physics *Andy Pickering*
Reply to Pickering *Diana Crane*
Reply to Crane *Andy Pickering*
Rationality and Disconfirmation
C L Hardin
Rationality and Authority: On the Con-
fusion of Justification and Permission
Michael J Mahoney
Essay Review
Politics and Rhetoric in the Sociobiology
Debate *W R Albury*
Decennial Index
A Cumulative Decennial Index of
Science Studies, Volumes 1-4 (1971-74),
and *Social Studies of Science*, Volumes
5-10 (1975-80)

**Contents of Volume 10
Number 3 August 1980**

The Rise and Fall of Public Opposition in
Specific Social Movements *Peter
J Leahy and Allan Mazur*
The Relationship of Conceptual
Development to Consensus: An
Exploratory Analysis of Three Subfields
Gwendolyn L Lewis
Discussion Paper
Can There Be a Consensus on Nuclear
Power? *Julia Bickerstaffe and
David Pearce*
Notes and Letters
Warime Fission Research in Japan
Phillip S Hughes
Country Report
The History and Social Studies of
Science in Italy *Giuliano Pancaldi*
Essay Review
The Naturalization of Science
Michael Neve
An Abstract
precedes each of the main contribution
and Notes on Contributors follow
each paper

Contents of Science

published four times a year in February, May, August and November

Contents of Volume 10 Number 2 May 1980

Papers
The Problem of Junior-Author Papers
Constructing Citation Counts
*Scott Long, Robert McGinnis and
Paul D Allison*
Notes and Letters
Production and Citation Measures in the
Sociology of Science: The Problem of
Multiple Authorship *Duncan Lindsey*
Inequality and Scientific Productivity
Paul D Allison
Country Report
Science Studies' in Sweden
Jan Elzinga
Essay Review
Scientific Development: The Develop-
ment of Science, Science and Develop-
ment, and the Science of Development
Mary B Anderson and Peter Buck
Course Bibliography
A Course in the Social History of
Science *Steven Shapin*

Contents of Volume 9 Number 4 November 1979

Papers
The Origins of the American
Scientific Debate over Fallout
Hazards *Carolyn Kopp*
The Reification of Mendel
Augustine Brannigan
Quantitative Foundations for the
Sociology of Science: On Linking
Blockmodeling with Co-Citation
Analysis *Timothy Lenoir*
Notes and Letters
International Research Collaboration
*J Davidson Frame and Mark P
Carpenter*

Contents of Volume 9 Number 3 August 1979

Papers
Carcinogenic Risk Assessment in the
United States and Great Britain:
The Case of Aldrin/Dieldrin
*Brendan Gillespie, Dave Eva, and Ron
Johnston*
The Interdependence of Therry and
Experiment in Revolutionary Science:
The Case of Parity Violation
*D Hywel White, Daniel Sullivan and
Edward J Barboni*
Normal Explanations of the Paranormal:
The Demarcation Problem and Fraud in
Parapsychology *Trevor J Pinch*

Review Paper
Psychology of the Scientist:
An Evaluative Review *Michael J
Mahoney*
Notes and Letters
Authorship Recognition of Subordinates
in Collaborative Research *Alan G
Heffner*
A Deductive Explanation of the Matthew
Effect in Science *Jack A Goldstone*
Scientific Societies and their Journals:
Biomedical Scientists Assess the
Relationship *Karen B Levitan*

Order Form

to SAGE Publications 28 Banner Street, London EC1Y 8QE

SPECIAL OFFER 2 Years for the price of 1

☐ Please enter my subscription to *Social Studies of Science*
at the Institutional/Individual rate for ____ years

Individual

☐ 1 year £10.00

☐ 2 years £19.00

☐ 3 years £28.00

Institutional

☐ 1 year £22.50

☐ 2 years £44.00

☐ 3 years £65.00

I would like my subscription to start with

☐ Vol 10 No 1 1980 (and receive the 1979 issues free)

☐ Vol 11 No 1 1981 (and receive the 1980 issues free)

PAYMENT MUST ACCOMPANY ORDER

☐ I enclose cheque for _____ Date _____

☐ I am paying by International Giro Amount _____

SAGE's Giro Account Number is 548 0353

☐ Please invoice my Access/Master Charge/Eurocard account

Signature: _____

Name: _____

Address: _____

SAGE Publications 28 Banner Street, London EC1Y 8QE
Tel: 01-583 3831

Contents of Volume 10 Number 1 February 1980

Papers
Fragmentation and Investment in
Sedimentology *John Law*
An Exploratory Study of Kuhnian
Paradigms in Theoretical High Energy
Physics *Diana Crane*
Research Areas and Stratification
Processes in Science *Lowell L Hargens,
Nicholas C Mullins and Pamela K Hecht*
Notes and Letters
Collaboration and the Quality of
Research *Stanley Presser*
Essay Review
The Radical Sociology of Medicine
Peter W G Wright
Conference Report
Workshop on the Social History of
Mathematics (West Berlin, 5-8 June
1979) *Herbert Mehrtens*

Citation Visibility of Africa's Science
Yakov M Rabkin et al
Could the 1978 Nobel Prizewinner in
Chemistry have been Predicted?
Charles Oppenheim
Responses and Replies
The Notion of Independent
Simultaneous Invention or Discovery
*Ron Westrum, Dean Keith Simonton
and Edward Constant*
Essay Review
From Avocation to Job: The Changing
Nature of Scientific Practice
Russell Moseley

4S Society for Social Studies of Science

The 4S Newsletter is published four times each year at the Department of Sociology, Southern Illinois University, Carbondale, Illinois 62901, and sent to all members of the Society for Social Studies of Science. Membership is on a calendar year basis. Membership dues (\$15 for professionals, \$5 for students) and institutional subscriptions (\$25) should be sent to: The Secretary/Treasurer, 4S, Department of Sociology, Indiana University, Bloomington, Indiana 47405.

Editorial Assistant: Beverly Morber

4S

Department of Sociology
Southern Illinois University at Carbondale
Carbondale, Illinois 62901

Non-Profit Org.
U.S. Postage
PAID
Permit No. 15
Carbondale, IL
