

4S Society for Social Studies of Science

Spring 1981

Volume 6 Number 2

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4S Society for Social Studies of Science

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4S: PROGRESS AND PROSPECTS

EDITORIAL

Since the last issue of this Newsletter, the editorial office has moved from Southern Illinois University at Carbondale to Texas A&M University. The long-term goal of this Newsletter is to become a significant communication vehicle. And that will be possible only if the membership responds with news items, comments, book reviews, and curricula and research ideas. Therefore, effective immediately, the Newsletter will entertain the submission of a variety of communications--including brief papers--for publication. In contrast to other forms of communication, if a paper is submitted, it will be read by at least one other colleague (and hopefully two) in addition to the Editor. Thus, publication of a paper in the Newsletter will constitute a form of refereed paper.

On the short term, the format and printing arrangements will remain as close to those in the past as possible. We look toward the future, however, when the Newsletter may become transformed into a "real" quarterly journal. This is your Newsletter. Please contribute to it.

In 6:1, I indicated my address to send all editorial materials after 15 July 1981. I repeat that because such repetition may be helpful:

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

4S NOMINATING COMMITTEE PROGRESS REPORT

The Nominating Committee, chaired by President Bernard Barber, is preparing a slate of candidates for the officers and council members of the Society. The ballot will be sent by first class and air mail (abroad) in due course. A serious problem at this point is the Canadian mail strike. The details of participation by our colleagues in Canada have not been completely resolved at this time. But be looking for your ballots and biographies in the mail within a few weeks.

THE SIXTH ANNUAL MEETING: SECOND PROGRESS REPORT

Daryl E. Chubin

The preliminary program for the annual meeting in Atlanta is presented below. Several aspects of it, however, require explanation.

First, the schedule of activities is firm. For example, there will be a luncheon on Friday, 6 November. The two plenary sessions will be held at 4-6 p.m. on Thursday and 8-10 p.m. on Friday. Other sessions are tentatively slotted for the times shown, but are subject to change.

Second, we are experimenting with early morning sessions on Friday and Saturday. To attend these sessions and enjoy a continental breakfast at 8 a.m., you must register for them in advance. The cost for the breakfast (taxes and gratuities included) is \$3.50. A detachable form listing the session numbers you wish to attend and eat at appears at the end of the program. (Of course, you need not eat as a condition for attendance.) You must indicate your preferences and include these costs in your pre-registration check (see Pay Form).

Third, the program for paper presenters is especially tentative. If a complete version of a paper scheduled for presentation is not received by me or the designated session organizer one month prior to the meeting (5 October 1981), it will be dropped from the program. Anyone who submitted a title/abstract to be considered for inclusion in the program will receive a letter from me to this effect.

Fourth, although airfare to Atlanta is beyond our control, the hotel room rates and food costs, I think you'll agree, are moderate. We hope this spurs attendance. (Detailed travel information will be given in the next progress report.) Participation in the program of the Annual Meeting is an opportunity to attract and meet new colleagues. The Society requires, however, that all participants in the program are members of 4S. If you currently are not a member, a membership form is provided elsewhere in this Newsletter. Complete and return it to ensure your place on the program.

Finally, on behalf of my fellow committee members--Joe Agassi, Tom Gieryn, Mike Mulkay--President Bernard Barber, and the Council of 4S, I wish to extend an invitation to come to Atlanta in November. Whether this is your first or sixth Annual Meeting, I think you'll find the multidisciplinary character of the Society refreshing. We are determined to make the most memorable and provocative things occur inside our conference rooms this year, not in the lobby or the coffee shop. The lack of a theme for the meeting has also freed us to offer a wide range of topics and formats that promises to promote exchange on everyone's favorite research interest. In the meantime, if you need more personal persuading, please call me at 404/894-3195. I hope to see you in November.

SOCIETY FOR SOCIAL STUDIES OF SCIENCE
SIXTH ANNUAL MEETING
Atlanta, 5-7 November 1981
Best Western Ladha Downtown Hotel

Preliminary Program

Thursday, 5 November

- 10:30 a.m. Council Meeting
- 1:00 p.m. Welcome: Bernard Barber, President 4S
Joseph Pettit, President, Georgia Tech
- 1:30-3:30 SESSION 1. Organizational Settings
Participants include Marcson-chair, Bozeman and
Ruscio, Coates, Fridjondottir, and Friedkin.
- SESSION 2. Public Knowledge and Participation in
Technical Decision-Making
Participants include J. Petersen-chair, B.
Campbell, Dutton, Thevenin, Travis, Wilkes
and Reed.
- 4:00-6:00 PLENARY. Micro- vs. Macrosociology of Knowledge
Participants include Knorr-organizer, Mulkay-
chair, Gieryn, and Woolgar.
- 9:00 Cocktail Party

Friday, 6 November

- 8:30-10 a.m.
(continental
breakfast
available at
8 a.m.) BREAKFAST SESSION 3. Instrumentation for Research (panel)
Gobstein-organizer and chair.
- BREAKFAST SESSION 4. Historical Studies of Science
Participants include Thackray-chair, Jahiel,
McDonough, Restivo, Yoxen, and Ziman.
- 10:00-10:30 Coffee Break
- 10:30-12:30 SESSION 5. Social Contexts of Scientific Discourse
Participants include Small-Chair, Bazerman,
Cozzens, Gilbert, McKegney, and Mullins.
- SESSION 6. Science & Technology in International
Perspective
Participants include Michalos-chair, G. Cole,
Fitzgerald, Frame, Richter, Sharma, and Vessuri.
- 12:30-2 p.m. Luncheon (to be followed by presentation of the John Desmond
Bernal Award for Distinguished Contributions
to the Social Studies of Science).

- 2:00-3:00 p.m. 4S Business Meeting
- 3:00-5:00 SESSION 7. Bibliometric Studies of Science
Participants include Griffith-chair, Bayer, Callon et al., Cohn and B. Cole, MacAulay, Smart and Elton.
- SESSION 8. Speculation and the Process of Discovery
Co-sponsored by the Social Psychology of Science Subgroup and organized by Westrum and Wilkes.
- 5:00-6:00 Social Psychology of Science Subgroup Business Meeting
- 8:00 PLENARY. Epistemologically Relevant Internalist Sociology of Science: A Report and Discussion on the Cazenovia Conference
Participants include D. Campbell-organizer and chair, Rosenberg, Gamble, Restivo, Rosenthal, and Nichols.

Saturday, 7 November

- 8:30-10 a.m.
(continental
breakfast
available at
8 a.m.) BREAKFAST SESSION 9. Toward Social Studies of Technology
Participants include Gaston-chair, Agassi, Carpenter, G. Cole, Johnston, Montgomery, and Westrum.
- BREAKFAST SESSION 10. Politics and the Social Sciences (panel)
Participants include Teich-organizer and chair, Miller-organizer, and Aaron.
- 10:00-10:30 Coffee Break
- 10:30-12:30 SESSION 11. Explaining Science: Practical Reasoning and Rhetoric
Participants include Stehr-chair, Koefed and van Themaat, Mulkay, Pinch, S. Turner, and Woolgar.
- SESSION 12. The Diffusion of Knowledge in Nineteenth Century Britain
Participants include Sevier-organizer and chair, Fritschner, Hutchinson, S. Pyenson, and Thackray.

PRE-REGISTRATION FOR BREAKFAST SESSIONS*

I plan to attend (please ✓):

Friday Breakfast Session 3_____

4_____

Saturday Breakfast Session 9_____

10_____

Breakfast Total (@ \$3.50 per ✓)

\$_____

(insert this total
on Pay Form)

*Breakfast is not compulsory for attendance; register only
if you desire breakfast.

RETURN THIS SHEET WITH PAY FORM TO:

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4S ANNUAL MEETING
DEPARTMENT OF SOCIOLOGY
INDIANA UNIVERSITY
BLOOMINGTON, INDIANA 47405

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PAY FORM

(Pre-registration for Sixth Annual Meeting)

Pre-registration Fee (\$15; it will be
\$20 in Atlanta) \$ _____

Breakfast(s) (\$3.50 for session 3 or 4;
\$3.50 for session 9 or 10) _____

Luncheon Reservation (\$9.00 for London
Broil entree) _____

TOTAL PRE-REGISTRATION AMOUNT \$ _____

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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.

MEMBERSHIP RENEWAL FOR CALENDAR 1981

NAME _____
ADDRESS _____
CITY _____ STATE _____ ZIP _____
COUNTRY _____

MEMBERSHIP DUES

Three Categories of Membership:

Please check
which is appropriate

- | | | |
|---|------|-------|
| 1. Professional (e.g., Faculty or Postdoctoral) | \$15 | _____ |
| 2. Student | \$ 5 | _____ |
| 3. Institutional (including libraries) | \$25 | _____ |

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4S
Department of Sociology
Indiana University
Bloomington, Indiana 47405 (USA)

NOTE: PLEASE SEND IMMEDIATELY TO SAVE SCARCE RESOURCES REQUIRED
TO SEND "REMINDER" NOTICES.

Cut & Mail

THOUGHT AND OPINION

Bibliographic Measures as Scientific Indicators

Belver C. Griffith
Drexel University

Currently research utilizing bibliographic measures is in transition. There is greater confidence that the new concepts of linking and clustering documents display something of the intellectual process of science; however, only gradually are we beginning to use them and accept their use in more applied ways. One potentially important application is science policy, but as policy tools, bibliographic indicators are comparatively new and untested. My argument, in a nutshell, is that they will generate a new and unamiable form of policy research; these methods add their own special element of objectivity, that is, one has to cheat egregiously to cook the data; I focus on this special objectivity and the accompanying lack of amiability. However, there is a broader issue. A study of process is not a study of policy or has direct policy inputs. I'll be concerned with this at several points and I see bibliographic measures as not only suggesting new policies but also as raising new questions. At the end I return to this problem of dealing with policy.

Several broad problem areas have been examined by researchers studying scientific literatures and have generated research with potential policy implications. These areas include:

- (1) Circumstances surrounding major achievements and discoveries;
- (2) Structure and membership of scientific specialties (defined here as groupings of scientists about certain scientific problems), their patterns of communication and conceptual consensus;
- (3) The transfer of basic knowledge into application or technology;
- (4) The contributions of individual organizations, states and regions to the open scientific literature and their interrelationships, and;
- (5) The intellectual character of large literature and related scientific systems.

Please note that in each area research is based on the open literature, and whenever possible, on some intellectual dimension of that literature.

I do not want to review findings in each area, but to show, instead, how they could affect policy research, dealing with science. High degrees of communication, and in particular, journal publication, accompany high scientific achievements in basic science. An interest in highly focused citation activity has led researchers to look at hepatitis, reverse transcriptions and weak interactions in particle physics, years in advance of the award of Nobel prizes. However, equally provocative results have been generated by examination of very large literature systems, which I will examine first, frankly because achievements there underlie the claims to validity in other work.

The findings directly relevant to my argument are those that run counter to received knowledge or to other methods of subdividing and measuring science. Price (1979) has recently allowed us entry into his implicit model of the overall

workings of the world's literature; the extent to which he has gotten his numbers right, finally, seems striking. The scale of inputs, outputs and the personnel involved are reasonably convincingly estimated and interrelated. This large-scale study of the cycling of citations and documents argues for a current document output, a world's stable of active authors, and world supply of well-cited (3 or more times) documents, all equal to 500,000; if taken seriously, these estimates make science policy research manageable. However, both the assumptions underlying Price's model of the world's literature and some of its implications are subtle and important. First, the literature is focused; the 3,000 or so journals from which Science Citation Index generates citation data bases contain the majority of world science. His carefully wrought model shows that scientific activity, at least that which is associated with openly published literature is also focused. Collectivities of 500,000 are easily handled by today's technology and easily studied. If we proceed to build a science policy science about these people and documents, we will effectively isolate the "mind" of the enterprise and be able to study it independent of its bloated body, the hardware and the massive expenditures for systems and instruments. The joining of this intellectual demography with the economics of science and technology will tell us, I believe, that the "essential spirit" of big science is very inexpensive. I argue that bibliographic measures offer an alternative and complementary metric to economic and manpower consideration and one which gives early warnings of the effectiveness of an area of research.

Anderson, Narin and McAllister (1978) successfully attacked a hoary, respected technique, widely used in science decision, namely expert panels; they showed that a strong component in Roose-Anderson judgments of the quality of any single graduate department was the bibliographic output, independent of quality of publishing journal, of the whole university. Succinctly, how does Princeton rate in law? Generally bibliographic measures are more inclusive and more democratic; stratification in science is very real, very powerful, but not always justified on merit.

Small and myself (1979) examined the overall structure of the social and behavioral sciences literatures; we found we could characterize such a large system of literature through the answers to several groups of questions. First, what is cited? Who wrote it? How old is it? Well established benchmarks for the natural science literature are that methods are most generally cited, but that any clustering system identifies highly cited journal articles, containing new findings and theories, and written within the past several years. In this way, researchers have found the Nobelists, mentioned earlier. However, social and behavioral scientists cite books, devoted to theory, that are old; they focus citations on the works of one or two individuals in cluster of documents.

The second group of questions deal with structure, derived by co-citation and clustering: What and who are clustered? What clusters are connected? How are clusters changing? We learn, thus, much about the nature of change, the rate at which new developments appear and the power of theory in integrating diverse subject matters. The social and behavioral sciences were found to be generally a poor system, built about books, personalities, much theory but with little apparent power to integrate many applied areas, and an inability to falsify and purge older work.

The principal point of our work, however, lay in generating a method for comparing broad literature systems and drawing conclusions on their

epistemological "health"; all measures corroborated the picture of the social and behavioral sciences as being relatively ineffectual. That is, the natural sciences set certain clear benchmarks for the handling of knowledge. A highly critical system, based upon individual journal articles, and closely tested theory not only rapidly builds but also rapidly discards, with scant regard for the famous.

The greatest amount of research has focused on scientific specialties, particularly after Small and I (1974) showed that they could be described in terms of groupings of documents and that many significant discoveries were identified with such groupings or clusters. Changes occur more rapidly, and involve more researchers and institutions than expected; it is easy to understand why National Academy of Science membership for Nobel laureates is so frequently post hoc (Zuckerman, 1977, pp. 196-198). Small (1979) has shown, most recently, that specialties are built upon many conceptual threads; the bibliographic complexity, within which, achievement occurs is actually a conceptual complexity. Generally, bibliographic measures present more democratic and always more complicated pictures of scientific change.

My final remarks focus on two points. The first point is the limitations of these methods, and in particular, I respect David Edge's (1979) recent and thoughtful paper on this point. Knowledge areas differ in the degree to which they have responded to the primitive methods we have used, but we do know where we are best and worst, and some reasons why. Fields differ in systematic ways; competitive basic science is well displayed with our technique. Fields which publish in closed circulation technical reports are, of course, not displayed. Some fields' basic bites of knowledge are written very slowly, and arbitrary year-by-year analysis does not do them justice. Also, as Edge makes clear, the full story involves many types of influences, and this is understandable.

The second point is that we, this collective community of social scientists of sciences, have used a variety of ways to subdivide science and study its structure. However, only citation methods, of all these, identifies and focuses upon the research problem. There, I believe, is bibliographic measures' unique contribution to policy research; but further, its ability to work in near real-time insures the capacity to feed an intellectual metric into the policy-management process. That capacity is currently underexploited.

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BIBLIOMETRICS

A BIBLIOGRAPHY AND INDEX

Volume 1: 1874-1959

by
Alan Pritchard

in collaboration with

Glenn Wittig

BIBLIOMETRICS
Volume 1: 1874-1959

This bibliography and index with its unique features of citation and reference indexes will prove to be an essential reference work for all researchers in the field of **bibliometrics** and its many applications. Areas which will find this bibliography of value include librarianship and information science, scientometrics and all aspects of science studies (including the history and sociology of science generally and of many individual scientific, social scientific and arts and humanities disciplines). Based upon Pritchard's *Statistical bibliography: an interim bibliography* (published in 1969), Volume 1 comprehensively covers the period from 1874 to 1959.

Subjects included: citation studies, abstracts journal studies, analyses of primary documents (particularly journals), analyses of citations and publications of individuals, organisations and countries for the purposes of evaluation, together with theoretical studies on growth, scatter (Bradford-Zipf), obsolescence and rank-frequency. Some related areas of circulation and questionnaire studies and of content analysis have also been included.

A brief bibliometric analysis of the bibliography has also been included, providing statistics of growth, languages and ranked periodicals.

Contents:

Introduction outlining the scope of bibliometrics and providing a brief bibliometric analysis.

Bibliography of some 600 entries, arranged chronologically.

Reference Index. All items which have been examined (about 75%) have their references to the bibliometrics literature listed.

Citation Index. A citation index to the bibliometrics literature is included. Thus it is possible to use these two indexes to carry out the citation search technique of 'cycling'.

Alphabetic Index to authors, subjects and corporate bodies.

Order (Cash with order--£5.00; \$12.00) from ALIM Books, 4 Knutsford Avenue, WATFORD, Herts WD2 4EL, England

SPECIAL ANNOUNCEMENT

4S ESTABLISHES JOHN DESMOND BERNAL AWARD

The Society for Social Studies of Science is pleased to announce the establishment of the JOHN DESMOND BERNAL AWARD for distinguished contributions to the social studies of science.

The award consists of a plaque and a check for \$750, together with a contribution to the cost of the award winner's attendance at the Annual Meeting of 4S.

The award is named in honor of the polymathic scientist J.D. Bernal who was, inter alia, the author of The Social Function of Science (1939) and Science in History (1954). The first presentation of the award will take place at the Atlanta Meetings in November. The Bernal Award is made possible by the generosity of the Institute for Scientific Information, Philadelphia, Pennsylvania.

ANNOUNCEMENTS

ISIS: EDITORIAL ASSISTANTSHIP FOR 1982-83

DUTIES: The Editorial Assistant takes responsibility for the day by day administration of the Book Review section of Isis. The Editorial Assistant also helps the Editor and his associates keep abreast of developments in the history of science and participates in every aspect of the work of the journal.

QUALIFICATIONS: The assistant must be an accepted candidate in the Ph.D. program in the History and Sociology of Science at the University of Pennsylvania. Previous experience in the history of science or in editorial work is preferred though not required.

STIPEND: Currently \$6000 plus tuition. The assistantship is a one year, half-time position that begins on 1 July 1982.

FUTURE ROLE: It is hoped that in the second year the Editorial Assistant will succeed to the position of Editorial Coordinator (also half-time), for which the stipend is currently \$6600. The Editorial Coordinator plays a major role in the production of Isis (proofreading, layout, maintaining timetables) and in promotion, distribution and back issue sales.

APPLICATIONS: Candidates should first submit a letter outlining their academic experience and indicating the relevance of Isis and the assistantship to their graduate work and future plans. Candidates will be sent the usual University of Pennsylvania application forms by which to seek admission to the Department of History and Sociology of Science. The candidate's initial letter (which should be addressed to the Editor) weighs heavily in the selection process. Applicants from all countries are welcome. The closing date is 1 February 1982.

AAAS CHANGES MEETING DATES

By action of the AAAS Board of Directors at its April meeting, the dates of our Annual Meeting have been changed from January 3-8 to the Memorial Day holiday weekend (Thursday through Tuesday), beginning in 1983. The schedule of future meetings is now as follows:

1982	Washington, D.C.	(January 3-8)
1983	Detroit	(May 26-31)
1984	New York	(May 24-29)
1985	Los Angeles	(May 23-28)

This change will have the effect of extending the appointment of your current representatives on AAAS Section Committees from January 8, 1983, to May 31, 1983. (Our Bylaws specify that terms will end on the last day of the Annual Meeting.)

FORTHCOMING CONFERENCE AND MEETINGS

SECOND NATIONAL CONFERENCE ON ETHICS IN ENGINEERING. With the support of a grant from the National Science Foundation, the Center for the Study of Ethics in the Professions at Illinois Institute of Technology will host the Second National Conference on Ethics in Engineering to be held at the Palmer House in Chicago on October 2-3, 1981. The theme for the Conference will be "Beyond Whistle-Blowing: Defining Engineers' Responsibilities."

In sessions featuring formal papers and case studies, philosophers, academic engineers, and scholars in other fields will join with practicing engineers from industry and government. The Conference will focus on such topics as Responsibility in Organizations, Regulation of Technology, Designing for Safety, Technological Decision Making, Cost/Benefit Analysis, and the Role of Engineers in the Political Process. An important objective is to advance research which bridges the gap between theory and practice. An additional aim is to encourage collaboration of academics with practicing engineers who can help to identify problems and solutions and to implement changes in organizational structures and practices. We hope to make some headway in formulating approaches which can be applied to individual decision making and policy choices.

All abstracts, papers, and inquiries regarding the program or registration should be addressed to the Director of the Conference: Dr. Vivian Weil, Center for the Study of Ethics in the Professions, IIT Center, Chicago, Illinois 60616 (312-567-3472).

HSS MEETINGS. The 20th Annual Meeting of the HISTORY OF SCIENCE SOCIETY will be held at the Hyatt Regency Hotel in Los Angeles, California on December 27-30, 1981, in conjunction with the American Historical Association. Robert G. Frank Jr., Medical History Division, UCLA Medical School, Los Angeles, California 90024 is chairperson for the History of Science Society local arrangements. The program co-chairpersons are David Lindberg and Ronald Numbers, Department of History of Science, South Hall, University of Wisconsin, Madison, Wisconsin 53706.

For more information about the History of Science Society and its publications, contact Sally Gregory Kohlstedt, History Department, 311 Maxwell Hall, Syracuse University, Syracuse, New York 13210.

PLEASE SEND PAPERS OR DRAFTS OF PAPERS TO THE VARIOUS SESSION ORGANIZERS.
WE LOOK FORWARD TO AN EXTENSIVE AND ACTIVE PARTICIPATION IN MEXICO CITY.

RC 23 SOCIOLOGY OF SCIENCE MEETING at the MEXICO CONGRESS
16-21 August 1982

P R O G R A M

(1) Sociology of Science: Theoretical Concepts and Practical Applications

Session Organizer: Helmut Steiner
Deutsche Akademie der Wiss. zu Berlin
Otto-Nuschke-Str. 22-23
108 Berlin
German Democratic Republic

(2) Social Problems of Scientific Development in Third-World Countries

Session Organizer: Janos Farkas
1035 Budapest
Szolo U 86 VI 31
Hungary

(3) Comparison of Current Analytical Programs in the Sociology of Science:
An Assessment on Progress and Perspectives of the Field

Session Organizer: Michael Mulkay (provisional)
Department of Sociology
University of York-Heslington
York YD1 5DD
United Kingdom

(4) The Debate Over the Social Consequences of Scientific-Technical Progress:
Toward a New Concept of Science?

Session Organizer: Peter Weingart
Universitat Bielefeld
Forschungsschwerpunkt Wissenschaftsforschung
Postfach 8640
4800 Bielefeld 1
West Germany

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

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