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THOUGHT AND OPINION

Editor's Note

This issue of the 4S REVIEW will arrive considerably later than it would have--had all things gone as originally planned. Does that sound familiar?

Although this can be interpreted as an excuse, only some of the delay was the fault of the Editor. For my part, I apologize to our members and hope it will be possible for you to be generous in your forgiveness. For those whose announcements were dated so that tardy publication of them would be ridiculous, I am especially apologetic.

Because this issue (2:#3) is late, the final issue (2:#4) will also be late, but not nearly so much as this one! If plans for the first issue of 1985 are only half on target, that issue (3:#1) will be out almost on schedule in late March, 1985.

Your patience is appreciated.

Jerry Gaston

CALL FOR PAPERS

As Editor for Bibliography and Literature of the 4S REVIEW, I have been asked to develop a new section of the journal that would provide useful, coherent surveys of the voluminous literature in the social studies of science. For several years, the 4S Newsletter has reproduced selected "tables of contents" from journals indexed by the weekly publication Current Contents. This is a redundant waste of scarce and expensive pages: Current Contents is available by subscription through the Institute for Scientific Information, and it is also available at many university libraries. Moreover, tables of contents do not indicate the quality or substantive relevance of papers, an acute problem in our specialty where titles are often poor descriptions of the research within.

Some have proposed that 4S REVIEW establish a comprehensive, subject indexed "cumulative bibliography" similar to that provided by Isis for the history of science. This bibliography would include abstracts of papers along with referencing information. This may be a desirable goal for the future, but resources available to me now (both personal resources such as time, and institutional resources such as graduate assistantships for library runners) are too scarce to make such an effort feasible. Moreover, the interdisciplinary and international nature of social studies of science, surely a key to our intellectual vitality, raises nightmares for a thorough bibliographer. Imagine the frightening length of a cumulative bibliography that would soon dwarf the Isis list by including not only the history of science, but also sociology of science, philosophy of science, science policy, technology and culture, etc. The scholarly interests of 4S members are so diverse that a professional reference librarian (to say nothing about a mere library-user) would find it challenging to devise a subject categorization that is logically coherent yet intellectually useful to all. Of course, we could settle for less-than-comprehensive coverage of the social studies of science, but then I would hear the protesting howls from sectors of the specialty whose precious literature had been forgotten.

Given these considerations, I propose a new, regular feature of the 4S REVIEW to be called "CRITICAL SYNTHESIS." These papers would--in the scope of the literature they review--steer between the too-narrow book review and the too-wide "review article." Larry Stern continues to do a superb job in organizing and editing conventional book reviews for the journal. To avoid duplication of effort, a "Critical Synthesis" will not take the form of short reviews of recent titles. Neither will it achieve the comprehensiveness of "review articles" of the specialty taken nearly as a whole. Such encompassing review articles are becoming more common in other journals, and recent examples would include: Michael Mulkay, "Sociology of Science in the West" Current Sociology, 28 (Winter 1980), 1-184; Steven Shapin, "History of Science and its Sociological Reconstruction" History of Science, 20 (1982), 157-211; Henrika Kuklick, "The Sociology of Knowledge: Retrospect and Prospect" Annual Review of Sociology, 9 (1983), 287-310; H. M. Collins, "The Sociology of Scientific Knowledge: Studies of Contemporary Science" Annual Review of Sociology, 9 (1983), 265-85.

My goal is to publish topical surveys of coalescing literatures in the hottest pockets of research in the specialty. We all spend time "reviewing the literature" as a necessary part of research. Sometimes the literature search turns up long-forgotten precursors that anticipate our newest ideas. Usually, we

create idiosyncratic combinations of books and articles whose mutual relevance seems low except in terms of our unique research agendas. At the very least, literature reviews force us to impose an order on the mass of potentially relevant works, old and new: what are the enduring themes and persisting debates?

However, by the time we "write up" the final version of a paper, our literature searches are often collapsed to brief mentions of the few essential references. The review tries only to establish a context for the reported empirical research that follows. In my opinion, this familiar gloss on a literature review forces omission of much useful information. Perhaps a number of you would be willing to share the largely private world of your literature searches, by writing them up in the kind of detail not ordinarily allowed by space-constrained articles in journals reporting primary research.

Some ground rules: the surveys should be 10-15 pages in length, double-spaced. The scope of the reviewed literature should be roughly equivalent to session topics at recent 4S Annual Meetings, for example: Rhetoric of Science, Social Stratification and Scientific Careers, Science and Technology Indicators, Political Economy of Science, Science Policy, Style of Scientific Papers, Scientific Innovation, Science and Public Controversies, Public Attitudes Toward Science, Scientific Instrumentation, Funding of Science, Bibliometric Studies of Scientific Literatures, Scientific Practice in Laboratories, Theories of Scientific Change, Science and War, Science in Developing Countries, Scientists in Industry, and Professional and Political Interests of Scientists. (This list is intended to be suggestive, not restrictive.) The surveys should be critically selective: authors should assess the relevance of books and articles, as well as their quality and utility for future inquiry. Scholarly controversy would be a welcomed result. The surveys should not be restricted to recently published works. The "novelty" will come from resuscitations of old writings long-assumed to be uninteresting, or from the establishment of unappreciated connections among bodies of research. References should be listed alphabetically at the end of the text (no footnotes); in the text, a reference should list only the cited author's name, date of publication and page number, e.g. Price (1963:45). The surveys will be selected and edited by me, perhaps in consultation with other members of the 4S REVIEW Editorial Board.

Success depends on the willingness of some of you to take on this task. If you have an idea for a CRITICAL SYNTHESIS, or better still, if you have already started to write the inaugural edition, please contact:

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A "New Physiognomy of Servitude":
Some Comments on a New Philosophy
of Science*

In his monumental, and quite obviously prophetic, study of Democracy of America (published in 1835/1840), Alexis de Tocqueville discussed the question of what principle of intellectual authority would operate among the Americans.¹ For these people, imbued with the spirit and sentiments of equality, recognize among themselves no superior persons, or elite. Yet, since no one can "demonstrate for himself all the truths of which he makes daily use," and since there is no social life without common beliefs and actions, an intellectual authority must exist--the only question is where it resides and by what standard it is to be measured.

That very passion for equality that disposes democrats to think for themselves and to trust no other man--to prefer, as Tocqueville speculated, to be equally enslaved than to tolerate aristocracy--also disposes them to place great faith in the opinions of the multitude, in comparison to which each is insignificant and weak. Since there is equal judgement, the greater truth is possessed by the greater number. "Faith in public opinion," Tocqueville said, "will become for them a species of religion and the majority its ministering prophet."

There is in this, he continued, "matter for profound reflection to those who hate not only the despot but despotism...For myself, when I feel the hand of power lies heavy on my brow, I care but little to know who oppresses me; and I am not the more disposed to pass beneath the yoke because it is

held out to me by the arms of a million men."

If public opinion achieves such authority, Tocqueville concluded, contrary to their expectations, beliefs, and public announcements, "men would not have found the means of independent life; they would simply have discovered--no easy task--a new physiognomy of servitude" (my emphasis).

All this, he might have added, under the banner of rationality and progress.

Tocqueville penned these pessimistic warnings as a true friend of democracy. "Because I was not an opponent of democracy I wished to be frank. Men will not receive the truth from their enemies, and it is very seldom offered to them by their friends." He also believed democracy to be the wave of the future. He thought it "an irresistible fact" and travelled to America in order to see it in its pure form.

As John Dunn has penetratingly observed, Tocqueville was in some respects correct. Democracy has conquered the world. The language of democracy--democratic theory--has become the moral esperanto of the modern state, even if, in practical reality, it is everywhere pretty thin on the ground: something all of us cannot help but want yet cannot hope to achieve.²

Much the same, I think, can now be said about what we call "modern science." The observations Tocqueville made about the place, necessity, and consequences of intellectual or cognitive authority in social life I find both penetrating and important. The sciences--or, perhaps, scientists--in the modern world

possess an astonishing degree of intellectual authority, and the question of how that authority was achieved and is maintained is one I believe historians must address and address explicitly.

This is especially so now because there has developed, largely in the wake of Thomas Kuhn's work, a strong historically minded movement amongst philosophers of science which believes the proper task of the philosopher of science is, to summarize Dudley Shapere's extended argument, to explain the history of the sciences.³

How can theories about knowledge, Kuhn had generously remarked in his famous book, fail to apply to the history of science?⁴ In all this, they--the "friends of discovery": Shapere, Thomas Nicholls, Kuhn, Richard Burian, and others--seem to have little trouble in identifying what it is about the history of science that needs explaining. The historically-minded philosophy of science will explain to us the grounds and causes of science's achievements--its unity, its coherence, its explanatory power involving well-grounded beliefs, and its methods, all of which exhibit rationality and progress. These are the givens--the facts to be explained.⁵

But such is only the beginning.

Having uncovered the actual methods, practices, and conduct of past scientists, through analytical and historical research, we will not simply have obtained post facto general descriptions of science at work: we will have discovered the methods, the actual "logic" which underwrites, certifies, warrants, and justifies science's achieved rationality, authority, and

progress. Just look at what is delivered if we will but get with it and abandon the illusory distinction between "discovery" and "justification."

To enter these writings, typified by the Boston Studies Reno Conference volumes, edited by Nicholls,⁶ is to enter a Semantic Wonderland in which historical generalizations--perhaps quite true ones--about research work, strategies,⁷ and practices, become somehow simultaneously certifications, logics, and justifications of the associated and resultant knowledge claims.

What can be said of all this?

We might begin by noticing that such certainly is a kind of procedural rather than substantive theory of knowledge--and further, a procedural theory in which the procedures--that-guarantee-knowledge are always the ones which those who have been selected as having cognitive authority de facto happens to have followed. It ends up being a kind of Panglossian "Whatever is, is what ought to be."

Now it seems to me that this is all utter nonsense, or, at best, unfounded fantasy.

Unfounded fantasy, because:

(a) if Martin Hollis is right, and I think he is, all human beings at all times are "rational" beings--the Greek Cardinal Bessarion is not being irrational (or a-rational) about the Eucharist; he is, rather, probably just wrong;⁸ and (b) the question of "progress" depends, after all, in some measure, on how the story turns out. If we annihilate ourselves and much of the rest of terrestrial life in the next few generations--by self-inflicted

catastrophe or by uniform and steady degradation of the human habitat--what will we then say? An optimist, I guess, would say it was an accident. Some methodists might claim it was the result of the failure of science to penetrate more fully into the corridors of power. One who has thought about and been impressed by the Faust stories (a pessimist?) might suspect that the spider was in the cup from the outset.

Utter nonsense, because:

(c) to certify a method you must have a theory of knowledge. To find that certain procedures are followed by a certain select some of those who claim to know something, and that therefore those procedures underwrite their claim, is just what Amory Lovins has called "spherically senseless": it makes no sense no matter which way 'round you look at it; and (d) if Michael Oakeshott is right, and I think he is, no set of procedures or methods can constitute rationality or rational conduct because human conduct is simply not comprehensible cast as a rule-governed, rule-following activity. "Rules" and such are always post-facto accounts of what we did--the rules did not and could never fully constitute our doings. Therefore, one can neither give explanation or instruction in rational conduct by discovering or announcing rules and methods.⁹

Given these rather elementary and cursory considerations, it is odd that it has never occurred to these philosophical/historical "methodists" to consider the hypothesis, the possibility, that the "methods" and strategies they discover at work in scientific practice might often be connected

not to a unique kind of rationality or progress, but rather they serve to produce, however unwittingly, status and authority, that is, power: social, intellectual or cognitive, political, literary, and economic.

I will cite but two of many examples where such might be the case. Christiaan Huygens, himself a rather strict Cartesian "deductivist" in practice, drew up a plan for the organization of the "physical sciences" section of the Academie Royale des Sciences along Baconian, utopian, utilitarian, "scientistic" lines, a rather transparent bit of disingenuousness. More deeply and perhaps unconsciously disingenuous is Isaac Newton's fairy-tale piece of autobiography sent to Henry Oldenburg for publication in the Phil. Trans. in the form of a "compelling tale of discovery" of the heterogeneity of white light by means of contrived experiences with prisms.¹⁰ Newton appears here as the Arthur Conan Doyle of the Scientific Revolution. More insight might be had into these events if it were considered how such presentations furthered the cause of creating greater authority and power for the "man of science."

Indeed, such a suggestion was powerfully and generally made almost 15 years ago in a paper which I think is still the best critical discussion of Kuhn ever to appear: M. D. King's "Reason, Tradition, and the Progressiveness of Science" which appeared in History and Theory (1970). King writes:¹¹

The way ahead does not lie in the elaboration of theories of 'scientific man' whether 'rational methodist' or 'progressive puzzle-solver' but in the study of the creation and

maintenance of 'cognitive authority'...To assume in the interests of epistemology, that whatever else, scientific method is what scientists really do, and it is, whatever else, rational and progressive is simply to postpone the historical question.

Just as we have learned in political theory to distinguish the question "what is legitimate political authority?" from the question "How, historically, has political authority been created, granted, and maintained in different circumstances and places?," and just as we have learned to do the same in history of religion--few would now wish to argue that the "success" of Christianity is due to the fact that Jesus really is the son of God--so, too, we must insist on the reality of a distinction between the philosophical question of the legitimacy of cognitive authority and the perfectly historical question of how cognitive authority was created, granted, and has been, with ups and downs, maintained by science. Historical work, King suggests, should adopt "epistemological agnosticism."

Seen in this light, the new historical philosophy of science is illicit--at least as illicit as the Christian theory of Christianity, to which it bears a striking resemblance--and it must be criticized on the grounds I have suggested.

Lest you imagine I am engaging in some academic display of territoriality, let me say that I think the instincts, if not the good judgement, of these methodists is sound and points in the right direction. For I would propose that King's distinction between the historical and the

philosophical (between the explanatory/descriptive and the normative) is to be taken pro tempore. It should be kept as long as is necessary to encourage historical work on the question of de facto "cognitive authority" and to criticize un-historical, un-philosophical programmes such as those envisioned by the new historical philosophy of science. But at the end of the day, I do foresee the necessity, indeed, the inevitability, of some form of closure between history and philosophy of science.

As I now imagine it, this closure will be constituted by the discovery of the primacy of "narrative" together with the recognition that "we" are authors in a double sense--narrators of what has happened and creators, in some measure, of our own futures. The normative/descriptive distinction reappears in the form of the question: Is there such a thing as "a true narrative account" (which would necessarily be, I take it, a set of embedded true narratives) and if there is, what is it like to know when we have it? Or, to put it in the form of a more familiar query, "On what grounds shall we choose between rival narrative structures (genres) which seem equally competent to tell the story?" The normative/descriptive distinction breaks down, as I see it, in the recognition that we have some choice in the matter. As I said, much depends on how the story turns out. Just what "the true narrative" is depends, at least in part, on what we choose to do.¹²

Our choices and our understandings cannot be rooted, in the first instance, in a cosmology (understood as a "true" account of nature and human nature). For such, it appears, is simply not

available to us. If there is an absolute frame of reference, I would want to argue that it lies in self-knowledge. If R. G. Collingwood is right, as I think he was, the primary "science of self-knowledge" is called "history."¹³

Whether such a line of argument will be successful, I cannot say. One thing, however, is evident: that we should not yoke ourselves to an unexamined doctrine of the rationality and progressiveness of science whereby "scientific method" or "methodist philosophers of science become the ministering prophets. For if this programme gains the day, we shall have discovered--all to easy a task--a new physiognomy of servitude.

Notes:

*Versions of this paper were read at the West Coast History of Science Society in Pasadena, Calif. (March 1983) and the Canadian Society for History and Philosophy of Science, Vancouver (June 1983).

1. All citations are from the Reeve translation as revised by Bowen and Bradley (New York: Random House/Vintage, 1945), Vol. II, "Author's Preface" and Chapters I-II of the "First Book. "Influence of Democracy on the Action of Intellect in the United States," pp. vi, 3-13.
2. See his Western Political Theory in Face of the Future (Cambridge University Press: 1978).
3. In the first paragraph of his "The Character of Scientific Change," which appeared in Thomas Nickles, ed., Scientific Discovery, Logic, and Rationality (Boston Studies in the Philosophy of Science, vol. 56,

Dordrecht/Boston/London: D. Reidel, 1980). It is probably not fair to single out Shapere, but his seemed to me the most elaborate and elaborated claim of those in this and the companion volume (vol. 60 of Boston Studies, Scientific Discovery: Case Studies, 1980) that shared this remarkable feature. His paper is on pp. 61-101 and the ensuing discussion is transcribed on pp. 102-116. The concern to defend the certainty of "progress" against "anarchy" revealed in the discussion, by both Shapere and some commentators, was for me more reminiscent than anything else, of Boyle and Newton worrying about atheism, which, you'll recall R. S. Westfall concluded, was actually subversively lurking in their own minds. (See Science and Religion in Seventeenth-Century England, New Haven: Yale University Press, 1958; reprinted 1970, p. 219).

4. The Structure of Scientific Revolutions (The University of Chicago Press, 1962/1970), p. 9.
5. Again, a summary of remarks by Shapere and others in Boston Studies, vol. 56 (see Note 3), especially pp. 47, 82-3, 106, on the last of which it is claimed that science (always?) expresses "our best-grounded beliefs about the way things are." Thomas Nickles emphasizes that it is a "fact" (his emphasis) "that science does arrive at the truth or brings us closer at some points," noting that many agree with this claim (p. 47). Since I don't wish to be misunderstood, perhaps I should say that the claim may well be true. I just have two

- problems with it: (a) Increasing the number of different ways we can announce that it is true; (b) There are some grounds for suspecting it is false; to take one example, it is routinely claimed that "science progressed" in moving from Aristotelian philosophy to Newtonian natural philosophy, but since Newton wrote no books entitled "Ethics," "Poetics," "Politics," or "Rhetoric," it is at least not obvious. (For a provocative argument that we now know less about moral theory and politics, see Alasdair MacIntyre, After Virtue, Notre Dame University Press, 1981 and Shirley Robin Letwin, "Nature, History, and Morality" in R. S. Peters, ed., Nature and Conduct, London: MacMillan, 1975, pp. 228-250).
6. See Note 2.
 7. This is Clark Glymour's term in Theory and Evidence (Princeton University Press, 1980). It is somewhat disconcerting, at least to a humble historian, to find the following words apparently being used synonymously: "logic," "strategy," "warrant," "certification." This is the first place I have seen anyone talk about "the Hypothetico-Deductive strategy," but perhaps I just haven't been around. Glymour does finally deny any clear connection between his analysis of the "bootstrap strategy" and questions of rationality, truth, and progress (p. 377), but it comes after a great deal of discussion I read as suggesting (or taking for granted) quite the opposite.
 8. "Reason and Ritual" in Bryan R. Wilson (ed.), Rationality (Oxford: Blackwell, 1970), pp. 221-239. See also his "The Social Destruction of Reality" in Hollis and Lukes (eds.), Rationality and Relativism (Oxford: Blackwell, 1982), pp. 67-86.
 9. Especially in two papers in Rationalism in Politics and Other Essays (London: Methuen, 1962): "Rationalism in Politics" [1947], pp. 1-36, and "Rational Conduct" [1950], pp. 80-110. The latter essay contains a remarkable anticipation of Kuhn's famous thesis (which Kuhn may even have heard about by way of Michael Polanyi). In any event, Oakeshott's argument helps to explain the immense popularity of Kuhn's book, for if Oakeshott is right, then Kuhn's critique is not a critique of science so much as a critique of "our" operative (and deeply mistaken) notion of "rationality" (which we know in our more lucid moments to be "crackpot"); hence Kuhn's best-seller. Notice also the interesting ways in which Oakeshott's argument (or the failure of it) bears on the question of "artificial intelligence"; could there be such a thing as a "mannerist" machine, breaking the rules creatively while appearing to perfect them?
 10. See A. I. Sabra, Theories of Light from Descartes to Newton (London: Oldbourne, 1967) and my review in Science, 170 (Dec. 1970), pp. 1074-76.
 11. Page 31 (the paper is on pp. 3-32). A session has been organized around King's paper at the George Sarton Centennial Conference (November 1984 in Ghent, Belgium) entitled "Perspectives on Cognitive Authority in the Sciences" at

- which King will respond to a number of papers.
12. For a forceful presentation of some arguments for the "primacy of narrative," see: Alasdair MacIntyre, "Epistemological Crises, Dramatic Narrative, and the Philosophy of Science," The Monist, 60 (1977), pp. 453-471, reprinted in Gary Gutting (ed.), Paradigms and Revolutions (University of Notre Dame Press, 1980), pp. 54-74; his "Objectivity in Morality and Objectivity in Science" in Engelhardt and Callahan (eds.), Morals, Science and Society (Vol. III of The Foundations of Ethics and Its Relationship to Science) (Hastings-on-Hudson, N.Y.: 1978), pp. 21-39; and a forthcoming book on the nature of progress in the sciences.
 13. The Idea of History (Oxford:1946/1961), "Part V. Epilegomena," pp. 204-231 especially. But see also his provocative and wrongly neglected An Essay on Metaphysics (Oxford: Clarendon Press, 1940), as well as The Idea of Nature (Oxford University Press, 1945/1960).

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Henrik B. G. Casimir. *Haphazard Reality: Half a Century of Science*. New York: Harper & Row, 1983.

In order to promote the public understanding of science, the Sloan Foundation a few years ago invited "a representative selection of accomplished and articulate scientists to set down their own account of their lives in science" (p.1X). To date several of these important memoirs have been published--those of F. Dyson, H. Casimir, P. Medawar, J. Bruner--the most recent being S. E. Luria's autobiography, A Slot Machine, A Broken Test Tube. The form of the account is left to be decided by the author, and ranges from a series of essays, as in the case of Bruner, to the more intimate and revealing statement by Freeman Dyson. Hendrik B. G. Casimir's Haphazard Reality is more a tale of the communities of which he was a member than a full story of his life. In his introduction Casimir states that his book "...is a personal narrative, but I have tried to write about people I met and knowledge I gained rather than about myself" (p.1). He pleads that his own career is hardly an exciting subject for a biography. He wants to tell the story of the great physicists of the century, and to describe their intellectual achievements which led "to a deeper understanding of nature as well as to surprising technological innovations" (p. 3). He assesses his own role in these developments as "a modest one", but notes that "a minor actor...often has a better opportunity to watch great actors than the great actors themselves." His book is to be "a guided tour" through the history of physics and technology, from the beginning of the century to the early sixties,

and his role as guide is to give coherence to the story but "not to impose himself."

In this he has succeeded admirably. A good part of the book, and several appendices, consist of Casimir's enlightening account of the history of physics in the first half of the twentieth century, with enough background materials to make the story self-contained and understandable to a "general reader." The book also contains a valuable, entertaining and insightful collection of vignettes of many of the physicists Casimir has associated with. Here are some of them: Lorentz, Ehrenfest, Bohr, Pauli, with whom he studied; Goudsmit, Uhlenbeck, Landau, Gamov, members of his own generation; Kramers, Gorter, de Haas, colleagues in Dutch academic circles; Holst and Loupart, colleagues at the Philips Laboratories. Haphazard Reality also offers valuable insights into Dutch middle class culture and a rewarding overview of Dutch educational and scientific establishments. The last part of the book deals with the Philips Corporation whose Research Laboratory Casimir joined in 1942. The Philips Research Laboratory is one of the great industrial laboratories in the world, and one of the most successful. In 1946, Casimir became its co-director, and later he also served on the executive committee overseeing the operation of the entire corporation. During his long and distinguished career Casimir acquired a thorough knowledge and a deep understanding of science, technology and the market place. His somewhat pessimistic assessment of the price of scientific and technological progress, and his words of warning as to where the science-based

technologies are leading western society, thus carry special weight.

Casimir was born in 1909 into a fairly well off Calvinist middle class family. His father--a man of considerable intellectual abilities, whose prodigious memory impressed Casimir deeply--became an outstanding schoolmaster by hard work and perseverance. He was the first principal and, until his retirement in 1931, the guiding spirit of the Lyceum in the Hague, a private school established in 1905. The Lyceum combined under one roof and largely with the same teachers, two curricula usually found in separate institutions: one designed to equip students for careers in industry or business, and the other the standard Gymnasium curriculum with its accent on Greek and Latin, designed to prepare students for entrance to the Dutch Universities. Casimir's mother--a warm, sensitive, insightful woman--was deeply religious, yet undogmatic and "remarkably free of worldly ambitions." Casimir asserts "If my father taught me, my mother educated me" (p. 16). Both mother and father took learning extremely seriously. Casimir makes the point that there are great similarities between Dutch Calvinists and Jews in their reverential attitude towards learning. Although Casimir's father forsook the Calvinist faith early in life, books and reading remained a lifelong passion.

Casimir attended his father's Lyceum, essentially taking both curricula. He passed the final examinations of the Gymnasium in the science track with flying colors in 1926. His father's friendship with Ehrenfest, and the influence of a devoted and

conscientious physics teacher at the Lyceum, helped Casimir decide to enroll at Leiden University as a student in theoretical physics. In his first year there Casimir showed considerable talents in both physics and mathematics. He was particularly adept at "combining physical phenomena with mathematical formulation," the hallmark of a theoretical physicist, and Ehrenfest took him under his wing. Casimir's recollections of his years at Leiden are fascinating. He makes palpable the pervasive and overwhelming influence of Ehrenfest--as mentor and as teacher--and the subtler influence of Lorentz, who, although he had died in 1928, remained the model every young Dutch theoretical physicist tried to emulate. The atmospherics of physics at Leiden in this exciting period are beautifully captured: Ehrenfest's colloquium; the visits of Dirac, Wigner, Einstein, Planck, Elsassner; the spirit of camaraderie that pervaded Ehrenfest's seminar. Ehrenfest had rigorous and exacting standards but he also invested a great deal of effort in the nurture and maturation of his student. Casimir accompanied Ehrenfest to Bohr's theoretical physics conference in Copenhagen in 1929 and to the University of Michigan Summer School in 1930.

The successful completion of a thesis under Ehrenfest was clear proof of unusual abilities and promise. Casimir defended his doctoral dissertation in the fall of 1931 and stayed on as Ehrenfest's assistant for one more year. The assistantship allowed him to travel and Casimir made several trips including an extended stay in Berlin. Casimir feelingly describes physics in Berlin in 1932--Schrodinger,

Becker, Nernst, their intellectual entourage, the Kaiser Wilhelm Institutes--and incisively sketches the social scene.

In the fall of 1932 Casimir became Pauli's assistant. He returned to Leiden in the fall of 1933, having accepted a teaching position there in the spring of that year at Ehrenfest's insistence. Ehrenfest, early in 1933, had evidently decided to commit suicide and wanted to make sure that an able and responsible person would carry on at Leiden after his death until a successor was chosen to fill his chair. Casimir gives a moving account of Ehrenfest's life and death and a deeply felt assessment of Ehrenfest's personality and contributions to physics. Casimir stayed at Leiden until 1942. While there he did important work in theoretical physics and also carried out elegant experimental researches in low temperature physics having become de Haas' senior assistant in 1936.

Casimir is a master at deftly and sensitively conveying the psychological ambiance of his surroundings. His description of the brilliant young theoretical physicists around Bohr in the early thirties conveys not only the style of doing physics but also delineates the issues addressed by outlining the content of their researches. His depiction brings to mind the English nursery rhyme:

Little Jack Horner sat in a corner, eating a Christmas Pie
He put in his thumb and pulled out a plum and said "What a good boy am I."

Similarly any one interested in the stylistics of experimental physics in the 1930's should consult Casimir's book. Whether

he describes experimental activities in nuclear physics, atomic physics or low temperature physics, the "feel" of the practice is succinctly captured.

What is remarkable about Casimir's recollections of the period before 1945 is their accuracy. He indicates that it was his habit to dispose of most of the letters he received during that period, and that he did not do any archival searches to write his book. I happen to have come across some letters Casimir had written during this period and their content corroborates the presentation in his book. One chapter of Haphazard Reality relates Casimir's experiences during World War II. After the fall of Holland in 1940, Casimir recalls "that the first months of the occupation were less horrible than we had feared. Daily life soon returned to normal...many [people] were inclined to accept the unavoidable with equanimity" (p. 202). This is precisely the gist of a letter that Casimir wrote from Leiden to Van Vleck at Harvard on May 31, 1941 informing him that he is "safe and sound and the same holds for other [D]utch physicists and for our laboratory."¹ In fact, most of this letter consists of the experimental results he and his associates had obtained on the relaxation times of the paramagnetic salts they had been working on. In a later [undated] letter to Van Vleck written some time during 1942 after he had joined the Philips Laboratory, Casimir still could write "Life here is still somewhat primitive and though the situation has much improved I think that judged by American standards our standard of living is definitely low."²

His account of the war years--as everything else in the book--is

candid and unpretentious. His self-doubts--whether he did enough for others--are forthrightly stated, and the way he managed to survive is presented without embellishment. Casimir readily admits his bias for pre-Hitler German culture and his admiration of Heisenberg. His portrayal of the visits to Holland during the war of some of the German scientists--Becker, Kopferman, Heisenberg--is revealing and contains an assessment of Heisenberg's role in the German war effort which I believe is much too charitable.

In April 1942, Casimir joined the Philips Laboratory and soon thereafter, he became its co-director. The Philips Research Laboratory was established in 1914, not very long after the brothers Gerard and Anton Philips started the Philips company to manufacture incandescent lamps. Anton, in one of his trips to the United States, had been deeply impressed by what he had seen at the G. E. laboratories and became convinced that scientific research was essential to the future of the enterprise. In October of 1913 Dr. Gilles Holst was hired to head up the research division of the company. He proved to be an ideal choice. A versatile, well trained physicist, he set the objective of the Philips Research Laboratory to be the understanding of the phenomena and the materials that play a role in the products Philips manufactured. The Research Laboratory was set up as a separate arm of the company with the director reporting directly to the top management of the company. The shaping of the research programmes that would best serve the future interests of the company was left to the Research Laboratory itself. A policy of open communication with the

scientific world, bolstered by an effective patent policy, was instituted from the start. The laboratory was able to attract talented and imaginative researchers and it flourished under Holst's guidance (see page 237 for Holst's principles for running the Laboratory). The strong emphasis that Holst gave to research in solid state physics proved to be the firm foundation on which the later successes were based. The Laboratory under his, and later Casimir's direction, designed important new magnetic materials, better vacuum tubes, and developed the lead oxide target for the plumbicon TV tubes--the most widely used tubes in color TV sets. More recently, the laboratory has been at the forefront of research in integrated circuits, semiconductors lasers and image intensifiers and transformers.

Casimir tells the story of how the Philips enterprise came into being, but he has decided not to write about his Philips years. This is unfortunate because he indicates that over the years he has developed "reservations about the capitalistic system, about the rat race of competition, about the consumer society to which a company like Philips caters, and about the commercial and industrial practices that are unavoidable if one wants to stay in the game" (p. 240). Casimir avers that the fact that many of the persons involved are still alive is responsible for his reticence and silence. I hope that he will make a private record, for the story he has to tell is too important not to be set down.

Although Haphazard Reality is not an autobiography, it nonetheless sensitively conveys Casimir's

growth as a scientist, as an administrator and as a statesman of science. He allows us to see that at times he is disappointed with himself--given his talents and intuition he ought to have been a more creative and productive scientist; given his insights and understanding he ought perhaps to have taken more courageous stands at certain critical times--particularly during World War II. I suspect that it is partly the legacy of his Calvinist upbringing that accounts for both his genuine modesty and for what he describes as being a little bit lazy, but could perhaps be better characterized as being a little bit fatalistic. He could indeed have done more as a scientist, but the book of nature is there to be read--and if he didn't someone else will. Similarly his unwillingness or inability to upset the status quo--to be daring--perhaps prevented him from realizing his creative gifts to the utmost. But one should not allow the honesty, unpretentiousness and straightforwardness of the presentation to diminish Casimir's stature and to pay less heed to what he has to say. What he says--and what he doesn't say--are very much worth noting, precisely because of his erudition, his deep knowledge of the physical sciences, and his accomplishments as a scientist and as a top level industrial administrator.

I want to devote the remainder of this review to a consideration of the last two chapters of Casimir's book, entitled "Industry and Science after the Second World War" and "The Science-Technology Spiral," which outline his views on the nature of the interaction between science and technology. In the first of these two

chapters, Casimir states his view that the "spectacular" advance of our technological abilities since World War II was "mainly based on pre war fundamental knowledge, but that post war advance in knowledge [in physics] would not have been possible without post war technology" (p. 255). Casimir gives several examples from his own experiences at the Philips Laboratories to substantiate these assertions.

Casimir makes the important point that "only the physics of atoms, molecules, gases and condensed matter, and nuclear physics are of direct technological importance" (p. 260) and that the relevant phenomena in these areas are all explained by what he calls "traditional" quantum mechanics (i.e., the quantum mechanics developed in the late 1920s including some elementary version of quantum electrodynamics) and macroscopic theory (i.e., hydrodynamics, Newtonian gravitational theory, etc.). All later developments (such as the explanation of superconductivity) "are a further elaboration of principles that were known before, or the mathematical solution of problems formulated on the basis of existing theory." Modern technology is interested in precise details--e.g., "not only in the basic explanation of ferromagnetism, but in the properties of specific materials"--and the point that Casimir wants to stress is that "traditional" quantum mechanics can account for both the basic theory and the detailed technological application.

In the closing chapter of this book Casimir outlines his model of the relation of present day science and technology, a model he has called the science-technology

spiral. Casimir believes that to a first approximation, science can be looked at as an "independent stream," whose dynamics follows more or less the Kuhnian scheme: "most research workers at the very front,...creating entirely new concepts or discovering entirely new phenomena" (p. 297). To Casimir, "the development of technology presents a similar pattern," but the structure is even more complicated. "There are more simultaneous developments in parallel, more methods and products that are discarded as obsolete." However, "technology today always draws upon earlier scientific results" (p. 297) though it never uses the most recent and "hardly ever the most profound results and notions of academic research." There is always a time lag of ten to twenty years, with the time lag tending to increase. The progress of science on the other hand depends on technology without any time lag; science in fact uses the latest and most advanced technology. This is true in the experimental realm as well as in theoretical work where computers have introduced a new kind of theoretical practice. What Casimir means by his science-technology spiral is that "technology uses scientific results but with a time lag; science uses technology without a time lag" (p. 299). Although he does not explicitly say so I believe Casimir only claims to be talking about the physical sciences-technology linkage--for the model doesn't seem to apply to the more recent interactions between the biological sciences and biotechnology. To a large extent, science in Casimir's discussion means science carried out at universities and refers primarily to those disciplines upon which technology depends (the

physics of atoms, molecules, solids and gases, etc.) whose understanding relies on "conventional" quantum mechanics. The work carried out at industrial research laboratories complements the results of academic researches "that are applicable in principle so that they become applicable in practice." In fact the difference between university research in science (as defined by Casimir) and the work carried out at industrial laboratories is not different in kind but lies "in the choice of subject and, possibly, in the motivation." Essentially, Casimir's model regards technology as the application of knowledge that has its origin in science: technologists apply the new knowledge which scientists discover. Although this image of technology as applied science may not have wide currency,³ it may well be the model which best describes the activities at the Philips Laboratories under Holst and Casimir. The interdisciplinary teams of scientists and "technologists" that Holst set up to solve problems may have set a pattern which prevented scientists and "technologists" from considering themselves as separate cadres belonging to autonomous disciplines and distinctive subcultures. The emphasis on publication which applied to every member of the technical staff of the laboratory stressed by both Holst and Casimir, blurred the distinction between the scientist who has the urge to publish and the "technologist" who is the anonymous individual who deals with knowledge that is far more intractable to communicate.⁴ Keeping abreast of new developments in the sciences was a responsibility shared by scientist and "technologist" alike.

Casimir readily admits that at best his model only gives "a fairly correct picture of the way knowledge and technological skill are acquired; it does not deal with socioeconomic aspects nor with deeper reasons" (p. 302). He agrees that one could speak of "a technology-economy spiral, or feed-back loop, that is working in parallel with the science-technology spiral" (p. 302), but the fact that he could outline his science-technology spiral without taking the technology-economy spiral into account suggests to him "that the science-technology spiral is an almost autonomous mechanism." Casimir pointedly notes that not only is the physics developed under different ideologies remarkably the same, so is the technology developed under different socioeconomic systems and, moreover, the interaction between science and technology seems to have important parallels everywhere. Relations between universities and industry, the transfer of academic research into industry are strikingly similar in the U.S., Russia and China. This "forces" Casimir to conclude that the answer to the question of who is controlling the science-technology spiral can only be: "nobody."

I would have suspected that the idea that technology following its own course independently of human action would not have proven acceptable to Casimir. Also, I would have thought that he would be more sensitive to how deeply and significantly "the structures, processes and alterations [of technology] enter into and become part of the structures, processes and alterations of human consciousness, society and politics"⁵ and that these in turn entrain further changes--which

often reinforce the initial trends. It is disappointing that Casimir is so ready to accept the separation of facts and values, i.e., the autonomy of the science-technology spiral. For in the final analysis, science and technology are the knowledge and the skills that allow us to create the radios, power plants, and nuclear weapons. Whether and to what extent we want to manufacture and use them is surely part of that human knowledge.

Notes

1. This letter is to be found in the Van Vleck archives at the Neils Bohr Library of the American Institute of Physics in New York. I thank Dr. Spencer Weart for permission to quote from it.
2. Ibid.
3. See for example E. N. Hiebert, "The Changing Relation of the Theoretical and Practical Aspects of Science," Acta historiae rerum naturalium necnon technicarum, Special Issue 13, Prague 1982, pp. 507-531.
4. R. P. Multhauf, "Geology, Chemistry and the Production of Common Salt," Technology and Culture, 17 (1976), pp. 634-645.
5. L. Winner, Autonomous Technology Technics-out-of Control as a Theme in Political Thought (Cambridge, MA: MIT Press 1977), p. 6.

S.S. Schweber
Brandeis University
Department of Physics

SOCIETY NEWS**CALL FOR PAPERS****TENTH ANNUAL MEETING, SOCIETY FOR SOCIAL STUDIES OF SCIENCE
24-27 October 1985**

The program committee of 4S announces the annual call for papers for the 1985 meetings, to be held at Rensselaer Polytechnic Institute, Troy, NY, 24-27 October, 1985. The relevant deadlines are:

Preliminary papers/abstracts:	1 March, 1985
Preliminary program:	1 May, 1985
Final papers/abstracts:	1 August, 1985

Preliminary papers or abstracts should be sent to the chair of the program committee: Edward Manier, Program in the History and Philosophy of Science, 314 Decio Hall, University of Notre Dame, Notre Dame IN 46556.

Strong preference will be given to short (5-10 pages) or complete papers submitted by the 1 March deadline. Abstracts must include the following: a clear problem statement, an account of the methods used, a statement of results and their significance for the field. Incomplete abstracts or abstracts too brief to appraise properly will be returned to the author for revision and no extension of deadline will be granted.

Individuals wishing to organize sessions should send the following information: preliminary session title, 150 word statement of the purpose of the session; preliminary list of (not more than 5) participants.

Recent experience has shown that some projects can be very effectively presented in poster sessions. The poster sessions at the Ghent meetings were very successful. Authors may indicate a preference for consideration for such sessions.

MEMBERSHIP DUES REMINDER

If your mailing label says "EXPIRES 12/83," this will be your last issue of 4S REVIEW until your dues are paid. The Membership Renewal Form was published in Volume 2, Number 2 of 4S REVIEW [on page 43]. Please take a minute right now to renew your membership, and thus avoid unnecessary costs to the Society.

J. Scott Long, Secretary

ANNOUNCEMENTS: FEDERAL AGENCIES**NATIONAL ENDOWMENT FOR THE HUMANITIES**

The National Endowment for the Humanities is pleased to announce that 76 seminars for college teachers will be offered during the summer of 1985. Each year, the Summer Seminars for College Teachers program provides teachers at undergraduate and two-year colleges a unique opportunity for advanced study or research in their own fields or in fields related to their interests. In 1985, places will be offered to 912 participants at 43 different institutions across the United States and one institution in Paris, France.

Each of the twelve participants in a seminar will receive a stipend of \$3,000 to cover travel to and from the seminar location, books, and research and living expenses. For eight weeks during the summer, participants will work under the direction of a distinguished scholar and with colleagues in an area of mutual interest. Participants will have access to the collections of a major library, will discuss a body of common readings with their colleagues in the seminar, and, outside the seminar, will pursue individual research or study projects of their own choosing and design. Seminar topics are broad enough to encompass a wide range of interests while being central to the major ideas, texts, critical concerns, and approaches of the humanities.

Copies of the NEH brochure describing the content of each seminar are available from the Public Affairs Office, Room 409, NEH, Washington, D. C. 20506. Detailed information about the subject matter and requirements of individual seminars and about the availability of housing, and application instructions and forms, are available directly from the seminar directors at the addresses indicated. APPLICATION DEADLINE: 1 April 1985.

EXACT SCIENCES IN ANTIQUITY AND THE MIDDLE AGES (June 17-August 9, 1985)

Asger Aaboe
Department of the History of Science
c/o Yale Summer & Special Programs
53 Wall Street
New Haven, Connecticut 06520

AGREEMENT AND DISAGREEMENT IN SCIENCE (June 17-August 9, 1985)

Larry L. Laudan
Center for the Study of Science in Society
Price House
Virginia Polytechnic Institute and State University
Blacksburg, Virginia 24061

THE SOCIAL HISTORY OF MODERN SCIENCE (June 24-August 16, 1985)

Everett Mendelsohn
Department of the History of Science
Science Center 235
Harvard University
Cambridge, Massachusetts 02138

[This seminar is open only to teachers in two-year colleges.]

REAPPRAISALS OF THE SCIENTIFIC REVOLUTION (June 17-August 9, 1985)

Robert S. Westman
 Department of History
 University of California
 Los Angeles, California 90024

U. S. GENERAL ACCOUNTING OFFICE--DISSERTATION SUPPORT

The U. S. General Accounting Office (GAO), one of the support arms of Congress, performs audits and evaluations of the programs, activities, and financial operations of federal departments and agencies. Although the GAO is perceived by many to be solely an "accounting" agency, the GAO staff encompasses many social and behavioral science disciplines.

One of the lesser known activities of the GAO is the Doctoral Research Program. Each year the GAO funds up to five research projects by doctoral students. This program allows participants to carry out a work project and gather data for their dissertation while being actively involved in GAO activities. The program, designed to encourage in-depth analysis of topics relevant to the GAO, provides a vehicle for the exchange of knowledge on the "state of the art" between the academic community and the GAO. Students gain a data base otherwise unobtainable and access to information not normally available, as well as financial support.

Because the GAO conducts studies in a diverse number of academic disciplines, many opportunities exist for social and behavioral scientists. Research topics which have been previously funded include governmental policy responses to technology-induced societal risks; the role of federal and state governments in education; and federal budget decision-making.

To be eligible for the GAO Doctoral Research Program one must be a U. S. citizen, have completed all course work leading to a doctoral degree, and be willing to move to Washington, D. C., for the period of employment (not to exceed one year). Participants receive a temporary appointment at the GS-9 level, which provides a salary of about \$21,000.

Applications are assigned by research topic to the appropriate member of the GAO Educator Consultant Panel for review. Final selection is made on the basis of a match between the student's research plans and the needs of the GAO.

The next deadline for applications will be in February, 1985; however, early inquiries are encouraged. For more information about the program contact:

Dominic DelGuidice, Coordinator
 Doctoral Research Program, GAO
 441 G. Street, NW
 Room 7614
 Washington, D. C. 20548

Telephone: 202/275-5495

ANNOUNCEMENTS: FUTURE CONFERENCES/MEETINGS

**THE IXth INTERNATIONAL CONFERENCE
ON THE SOCIAL SCIENCES AND MEDICINE**

will be held at
Korpilampi Forest Lake Hotel, nr Helsinki, Finland
8-12 July 1985

The themes on this occasion will be:

- Demand and discrimination in health care: assumptions and realities
- The spatial distribution of health resources within countries and communities
- The economics and evaluation of dental care and treatment
- The impact of the pharmaceutical industry on health in the Third World
- The proper contributions of social workers in health practice
- Ambiguities and crises among nurses and in nursing
- The influences of private sector expansion on comprehensive health services provision
- Ethical components in the allocation of scarce resources
- The formulation and legitimisation of professional ethics in the field of health
- The child as a focus for health promotion in the developing world (The problem of child mortality will be specifically mentioned in the preamble to this section)
- Social sciences in health policy and practice
- Models of health and illness
- The cultural integration of illness
- Labour relations in health services planning and practice
- Measuring the health of populations, indicators and interpretations
- Problems of substance abuse: exploitation and control
- The place of primary health care in a comprehensive health system
- The analysis and assessment of health policies and programmes
- Disability and rehabilitation
- The cultural component of behavioural epidemiology
- Rural development and primary health care in less developed countries
- Socio-economic status differences in health

The attention of prospective participants is drawn to the fact that this series of Conferences is unusual in that there are no formal presentations. Instead, each group, with its own background paper published in advance, will be conducted on a seminar-type basis. This is to facilitate the richest possible exchange across cultural and disciplinary boundaries.

Although there will be no formal presentations, anyone wishing to submit papers may do so and it will be for the relevant section to decide which, if any, of these papers will be considered in detail. All material submitted will be automatically considered for subsequent publication.

The language of the Conference will be English.

The registration fee is £90 (\$150). For further details and registration forms write to:

PETER J. M. McEWAN PhD
Glengarden
Ballater
Aberdeenshire AB3 5UB
Scotland
U.K.

Summer Conference on Historical, Philosophical, and Social Studies of Biology--1985

This cross-disciplinary conference open to sociologists, historians, and philosophers of science interested in biology, as well as to biologists, will be held on the campus of St. Mary's College, Notre Dame, Indiana (South Bend) from June 24-29, 1985. The conference will consist of plenary sessions, workshops, and works-in-progress sessions, after the model of the Summer Conference on the Philosophy of Biology held at Denison University in 1983, and first planned at the joint meetings of the PSA, HSS, SSSS, and SHOT held in Philadelphia in 1982. Suggestions for topics and personnel for plenary sessions and workshops are welcome. Submissions of abstracts for works-in-progress sessions should be postmarked not later than 4/1/85. Accommodations are available on the St. Mary's campus for \$20 per day for room, board, and all recreational facilities. Registration fees to cover other conference costs will be minimal. Suggestions, inquiries, and letters of intention to participate should be sent to:

SUMMER--1985
314 Decio Hall
Program in History and Philosophy of Science
University of Notre Dame
Notre Dame, Indiana 46556

Planning History Group

The Fourth Annual Luncheon of the Planning History Group will be held on Saturday, April 20, 1985, at Noon in the Loring Conference Room of the Hyatt Regency Hotel in Minneapolis. The luncheon is being held in conjunction with the meeting of the Organization of American Historians. Kathleen Neils Conzen, University of Chicago, will present a paper entitled "Urban Pageantry and the Invention of Ethnicity." Jon C. Teafor, Purdue University, will chair the session. Tickets will be available as part of the pre-registration package for the OAH meeting or at the OAH Registration. As the number of tickets is limited, purchase through pre-registration is encouraged. For additional information, contact:

Blaine A. Brownell
College of Social and Behavioral Sciences
University of Alabama at Birmingham
Birmingham, AL 35294

Telephone: 205/934-5643

-or-

Mark H. Rose
The Program in Science, Technology, and Society
Michigan Technological University
Houghton, MI 49931

Telephone: 906/487-2115

ANNOUNCEMENTS: POSITION/FELLOWSHIPS AVAILABLE

Einstein Project: Assistant Editor

The Einstein Papers Project is preparing a complete edition of Einstein's published and unpublished writings and correspondence to be published by Princeton University Press. The project is seeking a full-time Assistant Editor to begin as soon as possible. The duties will include transcription, annotation and archival research. The candidate must possess an excellent reading knowledge of German and post-doctoral experience in one or more of the following fields: history of twentieth-century physics, philosophy of physics, physics (background in statistical physics, relativity or quantum theory preferred). Experience with word processors desirable. Salary negotiable. Princeton University Press is an equal opportunity employer. Submit letter of application and curriculum vitae to:

John Stachel
Einstein Project
Boston University
Boston, MA 02215

Hagley Museum and Library Fellowships

The Hagley Museum and Library announces research fellowships for 1985-1986 to be funded by the National Endowment for the Humanities (NEH) and the Andrew W. Mellon Foundation. The program is designed to promote integrative and comparative research into the social context and consequences of industrialization of the United States in the century following 1850. Scholars from any humanistic discipline or from related social sciences are encouraged to apply. The minimum residency is six months, and the maximum stipend is \$25,000 for an academic year. Under NEH guidelines, these fellowships may not be awarded to degree candidates or for study leading to advanced degrees. Completed applications must be received by 15 February 1985. Awards will be announced by 1 April 1985. For information, write to:

Glenn Porter
Hagley Museum and Library
Box 3630
Wilmington, DE 19807

ANNOUNCEMENTS: LECTURESHIP PROGRAM

GTE Foundation Lectureship Program

Grants up to \$4,000 may be made to accredited colleges and universities to bring in outside lecturers to discuss the broad topic of "Science, Technology and Human Values."

Application forms may be obtained from Richard Schlatter, Director of the Program. The deadline is March 1, 1985.

Richard Schlatter
Room 105
185 College Avenue
Rutgers University
New Brunswick, NJ 08903

Telephone: 201/932-7270



Ethics and Values in Organization Development

CALL FOR CRITICAL INCIDENTS IN OD

With a grant from the Program on Ethics and Values in Science and Technology of the National Science Foundation, IIT's Center for the Study of Ethics in the Professions and several Organization Development (OD) professional groups are conducting a collaborative research project to assess ethical issues in OD. The project is expected to produce: (1) a Casebook on Ethical Issues in OD; (2) an Annotated Bibliography in OD Ethics and (3) an OD Clearinghouse on Professional Ethics to promote continuing assessment of ethical issues beyond the life of the project. An important goal of the project is to contribute to the development of ethical guidelines for OD researchers and practitioners. The project is committed to widespread participation in its activities by OD professionals and their clients, social and behavioral scientists familiar with OD and philosophers working in applied and professional ethics.

The project is soliciting critical incidents and statements of concern describing ethical issues in OD. The incidents or statements may reflect actual experiences or observations or they may reflect serious ethical concerns as perceived by persons inside or outside the OD field. A sample of ethical issues likely to arise during OD research and practice might include confidentiality, responsibilities of change agents, researcher-practitioner role conflict, informed consent and accountability in terminating professional-client relationships. Contributors are encouraged to describe the ethical issue(s), the conditions which precipitate it and how, if at all, it was or could be resolved. Project staff, with the assistance of an Advisory Board, will use the materials submitted to prepare a series of case scenarios which will be suitably disguised to ensure anonymity, while retaining sufficient information to assess the ethical concerns and alternative strategies for resolving them. The cases and their assessment will be presented at a series of panels at OD professional meetings convened over the next twenty months.

Submissions and inquiries should be addressed to Dr. Mark Frankel, Co-Project Director, CSEP, IIT Center, Chicago, Illinois 60616-3793; (312) 567-3017.

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Boston Colloquium for the Philosophy of Science 1984-1985

EPISTEMOLOGICAL OPPORTUNISM AND THE RISE OF QUANTUM MECHANICS, 1925-1927

MARA BELLA, *History of Physics, Hebrew University, Jerusalem*
 Commentator: DAVID CASSIDY, *History of Physics, The Einstein Papers at Boston University*
 Chair: JOHN STACHEL

Tuesday, September 25
 East Balcony, GSU*

TRUTH IN ART OR SCIENCE? MARXIST AESTHETICS: A HISTORY AND EVALUATION

STEFAN MOLAWSKI, *Philosophy, Polish Academy of Sciences, Warsaw*
 Commentator: LEE BAZANDALL, *Aesthetics, Oshkosh*
 Chair: ROBERT S. COHEN

Tuesday December 4
 Terrace Lounge, GSU*

THE PARADOX OF THE TAXICABS

L. JONATHAN COHEN, *Philosophy, Queen's College, Oxford*
 Commentator: RICHARD JEFFREY, *Philosophy, Princeton University*
 Chair: STEPHEN GROSSBERG

Tuesday, October 2
 School of Nursing
 Auditorium

ON NEGATION: A MISTAKE IN INTUITIONISTIC LOGIC

HORST A. WESSEL, *Philosophical Logic, Humboldt University, Berlin, G.D.R.*
 Commentator: RICHARD MARTIN, *Philosophy, Northwestern and Boston Universities*
 Chair: ROBERT S. COHEN

Tuesday, October 9
 School of Nursing
 Auditorium

SYMPOSIUM: EXPERTISE IN A DEMOCRACY

Chair: MARCEL LAFOLLETTE

Friday, October 12
 Law School Auditorium,
 765 Commonwealth Avenue
 2 p.m.

I. EXPERTS IN HEALTH CARE DECISION-MAKING

THOMAS BEAUCHAMP, *Philosophy and Ethics, Georgetown University*
 Commentator: GEORGE ANNAS, *Health Law, Boston University*

EXPERTS AND THE LEGISLATIVE PROCESS

JEREMY STONE, *Science, Technology and Public Policy, Federation of American Scientists, Washington, D.C.*
 Commentator: SHELDOON KAINSKY, *Philosophy of Science and Public Policy, Tufts University*

II. WHAT TO DO WHEN THE EXPERTS DISAGREE

HARVEY BROOKS, *Science, Technology and Public Policy, Harvard University*
 Commentator: FRANK VON HIPPEL, *Physics and Public Policy, Princeton University*
 [In association with Science, Technology, and Human Values]

8 p.m.

POLITICAL THEOLOGY AND ECONOMIC THEORY

JOHN COBB, *Theology, Claremont Graduate School*
 Commentator: PAUL DEATS, *Social Ethics, Boston University*

Chair: LEROY S. ROONEY

[In association with the Boston University Institute for Philosophy and Religion]

Tuesday, October 16
 Conference Auditorium,
 GSU*

AN ALTERNATIVE IN THE PHILOSOPHY OF MATHEMATICS: JEAN CAVAILLES

SANTIAGO RAMIREZ, *Philosophy of Mathematics, National University of Mexico and Center for the History and Epistemology of Science, Amiens, France*
 Commentator: LORRAINE DASTON, *History and Philosophy of Science, Princeton University*

Chair: MICHAEL MENDILLO

CAN MACHINES THINK?

DANIEL DENNETT, *Philosophy, Tufts University*
 Commentators: JOSEPH WETZENDRAUM, *Electrical Engineering and Computer Science, Massachusetts Institute of Technology*
 PETER BIERI, *Philosophy, University of Bielefeld*
 Chair: BARBARA VON ECKHARDT

Tuesday, November 6
 Terrace Lounge, GSU*

PHYSICS AND PHILOSOPHY: ACTION AT A DISTANCE IN 20TH CENTURY PHYSICS

JOSE M. SANCHEZ-RON, *Physics and Philosophy, University of Madrid*
 Commentator: JON JARRETT, *Philosophy, University of Vermont and Harvard University*
 Chair: THOMAS GLICK

Tuesday, November 13
 School of Nursing
 Auditorium*

SYMPOSIUM: MODERN BIOLOGY AND THE NEW MATERIALISM

Chair: LYNN MARGULIS

Tuesday, December 11
 Conference Auditorium, GSU*
 2 p.m.

I. BIOLOGY CONFRONTS THE TWENTIETH CENTURY

EVERETT MENDELSON, *History of Science, Harvard University*
 THE HERITAGE OF PHYSICS IN THE TRANSFORMATION OF BIOLOGY
 EVELYN FOX KELLER, *History of Science and Mathematics, Northeastern University*
 VARIETIES OF REDUCTIONISM IN CONTEMPORARY BIOLOGY
 PHILLIP KITCHER, *Philosophy of Science, University of Minnesota*

II. SUBJECT, OBJECT, AND ORGANISM IN MODERN BIOLOGY

RICHARD LEWONTIN, *Zoology and Biology, Harvard University*
 [Followed by a panel discussion]

8 p.m.

SYMPOSIUM: THE GAY SCIENCE: PHILOSOPHICAL AND SCIENTIFIC PERSPECTIVES ON HOMOSEXUAL RESEARCH

I. Chair: RICHARD SENS

Friday, January 18
 Conference Auditorium, GSU*
 10 a.m.

HOMOSEXUALITY: A PHILOSOPHICAL OVERVIEW
 MICHAEL RUSE, *Philosophy and History of Biology, University of Guelph*
 CONTROVERSIES IN HOMOSEXUALITY:
 A VIEW FROM THE LAB, A VIEW FROM THE COUCH
 RICHARD PILLARD, *Psychology, Boston University Medical School*

II. Chair: MURRAY COHEN

2 p.m.

IS HOMOSEXUALITY A CONSTRUCT OR REALITY? THE ANSWER IS "YES"

JAMES WEINRICH, *Psychology, Boston University Medical School*

EXPLAINING HOMOSEXUALITY: PHILOSOPHICAL ISSUES AND WHO CARES?

FREDERICK SUPPE, *Philosophy, University of Maryland*

CAN HOMOSEXUAL RESEARCH BE VALUE FREE?

NORETTA KOERTGE, *History and Philosophy of Science, Indiana University*
 [Followed by a panel discussion]

HOW TO MAKE A SCIENCE: EPISTEMOLOGICAL DEBATES IN EARLY 19TH CENTURY BRITAIN

PIETRO COSI, *History of Science, Harvard University*
 Commentator: S. S. SCHWEBER, *Physics and History of Science, Brandeis University*
 Chair: BERNARD ELEVITCH

Tuesday, January 22
 Terrace Lounge, GSU*

SCIENCE AND THE CIVIL RELIGION OF LIBERAL DEMOCRACY

YARON EZRAHI, *Political Science, Hebrew University of Jerusalem*
 Commentator: EVERETT MENDELSON, *History of Science, Harvard University*
 Chair: KATHERINE PLATT
 [In association with the Boston University Institute for Philosophy and Religion and the Boston University Center for Judaic Studies]

Wednesday, January 23
 Conference Auditorium, GSU*

TIME AND THE OTHER: THE OBJECT OF ANTHROPOLOGY

JOHANNES FABIAN, *Anthropology, University of Amsterdam*
 Commentators: ANTHONY LEEDS, *Anthropology, Boston University*
 KENNETH BRECHER, *Astronomy and Physics, Boston University*
 Chair: ERAZIM KOHAK

Tuesday, February 12
 School of Nursing
 Auditorium*

The Conference Auditorium, Terrace Lounge, and East Balcony are in the George Sherman Union (GSU), 775 Commonwealth Avenue. The School of Nursing is at 635 Commonwealth Avenue. Unless otherwise noted, sessions are at 8 pm. Further information at: 617-353-2604.

SCIENCE, SEXUALITY, AND THE STATE: EUGENIC THOUGHT AND PRACTICE IN GERMANY, 1890-1935
 PETER WEINGARD, *Sociology of Science*, University of Bielefeld
 Commentator: MAUREN GIOVANNI, *Anthropology*, Boston University
 Chair: MORDECAI FEINGOLD

Tuesday, February 19
 Terrace Lounge, GSU

SYMPOSIUM: HISTORY AND PHILOSOPHY OF SCIENCE IN THE U.S.S.R. TODAY

Friday and Saturday, March 15 and 16
 Terrace Lounge, GSU

HISTORY AND PHILOSOPHY OF PHYSICS
 S. R. MIKULINSKI, *Institute of the History of Science and Technology*, Moscow
 M. D. AKHUNDOW, *Institute of Philosophy*, Moscow

Times to be
 announced

HISTORY AND PHILOSOPHY OF BIOLOGY
 I. T. FROLOV, *Institute of Philosophy*, Moscow

THE ORGANIZATION OF SOVIET SCIENCE
 M. S. BASTRAKOVA, *Institute of Philosophy*, Moscow

Discussion: MARK ADAMS, *History and Sociology of Science*, University of Pennsylvania;
 ROBERT S. COHEN, *Physics and Philosophy*, Boston University; LOREN GRAHAM, *Philosophy of Science*, Massachusetts Institute of Technology; JOHN STACHEL, *Physics*, The Einstein Papers at Boston University; WILLIS TRUITT, *Philosophy of Technology*, University of South Florida;
 ALEXANDER VUCINICH, *History and Sociology of Science*, University of Pennsylvania
 [In association with the Subcommittee on the History, Philosophy, and Social Study of Science]

THE SNAKE IN THE GARDEN OF EDEN: REFLECTIONS ON FORERUNNERS OF LANGUAGE IN OTHER SPECIES

Tuesday, March 19
 Terrace Lounge, GSU

NORMAN GESCHWIND, *Neurology*, Harvard University and Beth Israel Hospital
 Commentator: PETER MARLER, *Neurology*, Rockefeller University
 Chair: JEAN BEBBO GLEASON

THE LOGIC OF RAMON LLULL, 13TH CENTURY INFORMATION SCIENTIST

Tuesday, March 26
 Terrace Lounge, GSU

ANTHONY BONNER, *Music, Literature, and Translation*, New York City
 Commentator: MICHAEL SHANE, *History of Science*, Harvard University
 Chair: WILLIAM C. CARROLL

COMMUNICATIVE ACTION AND THE POSTULATE OF PRACTICAL REASON

Wednesday, March 27
 Conference Auditorium, GSU

THOMAS MCCARTHY, *Philosophy*, Boston University
 Commentator: FALDENICE G. LAWRENCE, *Theology*, Boston College
 Chair: HAROLD H. OLIVER

HOW LOGICAL WAS CARNAP'S WORLD?

Tuesday, April 2
 Terrace Lounge, GSU

JOELLE PROUST, *Philosophy*, University of Provence
 Commentator: WILLARD VAN ORMAN QUINE, *Philosophy*, Harvard University
 Chair: RICHARD JEFFREY

PARTS AND WHOLE: A SYMPOSIUM IN MEMORY OF LANCELOT LAW WHYTE

Tuesday, April 9
 Terrace Lounge, GSU

I. Chair: RAMA BANJAL
THE LIFE AND WORK OF LANCELOT LAW WHYTE
 ROBERT S. COHEN, *Philosophy and Physics*, Boston University
PRINCIPLES OF COMPOSITION
 ARNEN SHIMONY, *Philosophy and Physics*, Boston University
 Commentator: SYDNEY REDNER, *Physics*, Boston University
EPISTEMOLOGY OF COMPLEX SYSTEMS
 ROBERT ROSEN, *Theoretical Biology*, Dalhousie University
 Commentator: HANS ZUCKER, *Microscopic Physics*, Systems Theory, *Philosophy of Nature*, KGHW Research and Development Associates, Belmont

II. Chair: DAVID LAYZER

STATISTICAL MECHANICS AND THE BRAIN

MICHAEL ARNIB, *Computer and Information Sciences*, University of Massachusetts, Amherst
 Commentator: HYMAN HARTMAN, *Earth Science*, Massachusetts Institute of Technology
 [Special exhibit of the Lancelot Law Whyte papers in Mugar Memorial Library]

8 p.m.

PROTOPHYSICS: A SYMPOSIUM IN HONOR OF PAUL LORENZEN

Thursday and Friday, April 18 and 19

Chair: ROBERT S. COHEN

FOUNDATION OF GEOMETRY
 PAUL LORENZEN, *University of Erlangen*

CHRONOMETRY AND KINEMATICS
 PETER JANUHL, *University of Marburg*

CLASSICAL RATIONAL MECHANICS
 CHRISTIAN THIEL, *University of Erlangen*

GRAVITATION AND ELECTROMAGNETISM
 KLAUS MAINZER, *University of Konstanz*

SPECIAL THEORY OF RELATIVITY
 HOLM TITENS, *University of Marburg*

GENERAL THEORY OF RELATIVITY
 RUDIGER INHETVEN, *Befreiende Institute*, Erlangen

Commentators: JÜRGEN EHLERS, *University of Munich*; PETER MITTELSTAEDT, *University of Cologne*; JOACHIM PEPPER, *University of Cologne*; FRIEDRICH RAPP, *Technical University of Berlin*; PAUL SACAL, *New Mexico State University*; ARNEN SHIMONY, *Boston University*; JOHN STACHEL, *Boston University*; JUDSON WEBB, *Boston University*; HANS ZUCKER, *Belmont, Massachusetts*
 [In association with the Boston University Department of Physics]

Place and times
 to be announced

SYMPOSIUM: FREUD'S DREAM THEORY

Wednesday, April 24
 Conference Auditorium, GSU

Chair: RICHARD SENS

I. DREAMING: ALTERNATIVE EXPLANATIONS FROM MODERN SLEEP RESEARCH

ALLAN HOBSON, *Neurophysiology*, Harvard Medical School and Laboratory of Neurophysiology, Massachusetts Mental Health Center
 Commentator: PETER WOLFF, *Developmental Psychology*, Harvard Medical School and Children's Hospital

4 p.m.

II. CRITIQUE OF FREUD'S ARGUMENTS FOR HIS DREAM THEORY

ADOLF GRUNBAUM, *Philosophy of Science*, University of Pittsburgh
 Commentator: MARSHALL EDELSON, *Psychiatry and Psychoanalysis*, Yale University School of Medicine

8 p.m.

25th ANNIVERSARY OF THE BOSTON COLLOQUIUM FOR THE PHILOSOPHY OF SCIENCE

Tuesday, May 7
 Conference Auditorium, GSU

TWENTY-FIVE YEARS LATER: WHAT ARE THE NEW PROBLEMS IN THE PHYSICAL AND SOCIAL SCIENCES?

Speakers: KENNETH BRECHER, ROBERT S. COHEN, YEHUDA ELEKHA, EDWARD MCKINNON, ERNAN MCMULLIN, RUTH BARCAN MARCUS, GYÖRGY MENDLSOHN, EVERETT MENDELSON, PHILIP MORRISON, HILARY PUTNAM, NORMAN RUDICH, ISRAEL SCHEFFLER, S. S. SCHWEBER, ARNEN SHIMONY, JOHN STACHEL, LAZZIO TISZA, KURT WOLFF, HANS ZUCKER

3 p.m.

Virginia Tech
Center for the Study of Science in Society
LECTURE SERIES IN SCIENCE AND TECHNOLOGY STUDIES 1984-85

The Center for the Study of Science in Society announces its 1984-85 lecture series [some have been presented already, but are listed for those interested in possibly obtaining further information from lecturers-Ed.].

5 October 1984

"MARRIAGE, FAMILY AND RESEARCH PERFORMANCE IN SCIENCE."

Harriet Zuckerman, Sociology, Columbia University

5 December 1984

"AT THE CORE OF THE CHEMICAL REVOLUTION: LAVOISIER'S CONCEPTUAL PASSAGE."

Frederic L. Holmes, History of Medicine, Yale University

21 January 1985

"STRUCTURES AND MACHINES: TWO SIDES OF ENGINEERING KNOWLEDGE."

David Billington, Civil Engineering and Architecture, Princeton University

17 April 1985

"WAS CHRISTIANITY RESPONSIBLE FOR THE DISMAL STATE OF MEDIEVAL SCIENCE?"

David Lindberg, History of Science, University of Wisconsin

4:00 p. m.

1 May 1985

"SCIENCE AND POLITY IN EIGHTEENTH-CENTURY FRANCE."

Keith Baker, History, University of Chicago

4:00 p. m.

For further information call or write: Center for the Study of Science in Society, Virginia Tech, Blacksburg, VA 24061. Telephone: 703/961-7687.

ANNOUNCEMENTS: NEW BOOK SERIES

Martinus Nijhoff Publishers Announces a New Book Series

Martinus Nijhoff Publishers wishes to announce a new series of books under the heading: Science and Philosophy. This series will place emphasis on philosophical analyses of science which are based on an examination of actual scientific practice, present or past, in the physical or the biological sciences. We welcome contributions from diverse philosophical traditions, as well as philosophical analyses by historians of science, sociologists of science, and scientists. Inquiries should be addressed to the series editor:

Dr. Nancy J. Nersessian
 c/o Martinus Nijhoff Publishers
 Humanities and Social Sciences Division,
 Spuiboulevard 50
 3311 GR Dordrecht
 The Netherlands

ANNOUNCEMENTS: NRC COMMITTEE**A DECADE OUTLOOK ON RESEARCH OPPORTUNITIES IN THE
BEHAVIORAL AND SOCIAL SCIENCES**

The Committee on Basic Research in the Behavioral and Social Sciences is a National Research Council unit established in 1980 to assess and improve the vitality of research in the behavioral and social sciences. The first Committee report, Behavioral and Social Science Research: A National Resource (1982) was a general statement of the scientific value, significance, and social utility of behavioral and social science research. A second Committee report, currently in preparation, derives from a 1983 symposium on "Knowledge in Social and Behavioral Science: Discoveries and Trends Over Fifty Years."

These two Committee projects concentrated on the past record and present dimensions of behavioral and social science. There is now a national commitment to expand the future scientific and technological base. Promising new research directions must be canvassed, resources needed to foster prospective advances must be defined and evaluated, and priorities for additional scientific research spending must be developed and rigorously scrutinized. These processes are now occurring in nearly every major branch of science.

The Committee has therefore agreed to undertake a Decade Outlook on Research Opportunities in the Behavioral and Social Sciences, with the formal participation of the National Research Council's Commission on Behavioral and Social Sciences and Education, the Center for Advanced Study in the Behavioral Sciences, and the Social Science Research Council. This project, supported by the National Science Foundation, the Russell Sage Foundation, and other sponsors, will be completed in 1986.

The Decade Outlook will study scientific frontiers, leading research questions, and new resources needed over the next decade, roughly 1986-1995, for rapid progress on fundamental problems in the behavioral and social sciences. The final report is to contain recommendations for research resources, facilities, and programs that may provide a high level of returns to fundamental knowledge.

The Committee invites ideas on leading research questions for the next ten years and new resources needed to enable rapid progress in the social and behavioral sciences. Responses and inquiries should be addressed to:

Committee on Basic Research in the Behavioral and
Social Sciences
National Research Council
2101 Constitution Avenue, N.W.
Washington, D.C. 20418

ANNOUNCEMENTS: COSSA**COSSA Seeks Suggestions on Science Policy Study**

On September 26, the Task Force appointed by House Science and Technology Committee Chairman Donald Fugua (D-FL) to establish an agenda for the Committee's two-year study of science policy in the United States approved an outline draft that included the following questions regarding the social and behavioral sciences:

In making decisions about the support of the social and behavioral sciences by the federal government what criteria should apply? To what extent do the social sciences help the nation make informed use of the discoveries and technologies produced by the physical and life sciences? What contributions to national priority setting should the social sciences be making that they are not now making? What is the role of the government in facilitating or inhibiting the contributions of the social sciences to issues of national importance? To what extent should support distinguish between the individual disciplines within the field of social and behavioral sciences? To what extent has past social and behavioral science research in any of the disciplines contributed to the formulation of social or other policies and what are the prospects for the future?

The study will also focus on the goals and objectives of national science policy, the institutional framework for the conduct and support of research, education and manpower questions, the impact of science on "the information age," the regulatory environment for scientific research, funding mechanisms, and the role of Congress in science policy making.

The Committee is also interested in conducting an analysis of the contributions of the social and behavioral sciences to society. They would welcome suggestions on how to go about such a study. Suggestions can be sent to:

COSSA
1200 17th Street, NW
Suite 520
Washington, DC 20036

ANNOUNCEMENT: NEW RESEARCH AREA PROPOSED**Connectology**

Connectology has a history of only a few years. Its basic idea and methodology are still in incipient stages. The intended purpose of the new science is to keep a permanent and systematic watch upon the method of inter-connections of the problems of technics and science. It studies the conditions of adaptation of connectologic techniques already elaborated in another field or division of science. Namely, progress attained in another field or division of science and the scientific methods applied in such work--their regularities--offer chances of development for any other science. Connectology furthers sciences in every discipline of all countries. Thus a new chapter in the discipline of systematization of science, connectology, dealing with the symbioses in sciences, has been brought to the world.

The first Atlas of Interlacements of the Field of Sciences is in preparation under the auspices and collaboration of the Hungarian Academy of Sciences and of 6 Hungarian universities. The Atlas is based upon the International Standard Nomenclature for Fields of Science and Technology, proposed by UNESCO in 1974. UNESCO judges the future role of Connectology very positively. Upon request of interested scholars, the undersigned willingly sends more information about the proposal: Professor Andrew Schranz, Budapest, Columbus 10/b, H-1145, Hungary.

ANNOUNCEMENTS: INVITATION TO JOIN EASST

EUROPEAN ASSOCIATION FOR THE STUDY OF SCIENCE AND TECHNOLOGY

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of Bielefeld)

Newsletter editor

Arie Rip, Chemistry and Society Programme, P.O. Box 9502, 2300 RA
Leiden, NETHERLANDS

with the assistance of Dr. Henk Verhoog (Institute of Theoretical
Biology, University of Leiden)



EASST was founded in 1981 to stimulate communication, exchange and collaboration in the field of studies of science and technology in Europe. One reason to establish an interdisciplinary scholarly society is the merging of history, philosophy, sociology and psychology of science in recent years. Another reason is the importance of connecting these perspectives with economics and political and policy studies of science and technology. Thus, cross-disciplinary interaction, and cross-fertilization between humanistic and policy-oriented studies in the field are important aims. Finally, the variety of scholarly, cultural and political styles in Europe is both a challenge to communication and exchange, and itself an important aspect of studies of science and technology in Europe.

MEMBERSHIP FORM
EUROPEAN ASSOCIATION FOR THE STUDY OF SCIENCE AND TECHNOLOGY

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Chemistry and Society Programme,
University of Leiden, P.O. Box 9502,
2300 RA Leiden, Netherlands

Membership dues for 1984: *Dfl.* 27 or *£* 6 have been paid by one of the following means (indicate the method chosen):

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Arie Rip/EASST, Bergschenhoek, Netherlands

or

(for those in Britain or outside Europe, where payment by check is more convenient)
☐ by check, made out to EASST and sent to Prof. John Ziman,
Imperial College, 53 Prince's Gate, Exhibition Road, London SW 7 2PG, England

or

☐ other means: . . .

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4S REVIEW

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4S REVIEW

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