Contents of this issue

Frontpage illustration: A scene from *Metropolis* by Fritz Lang

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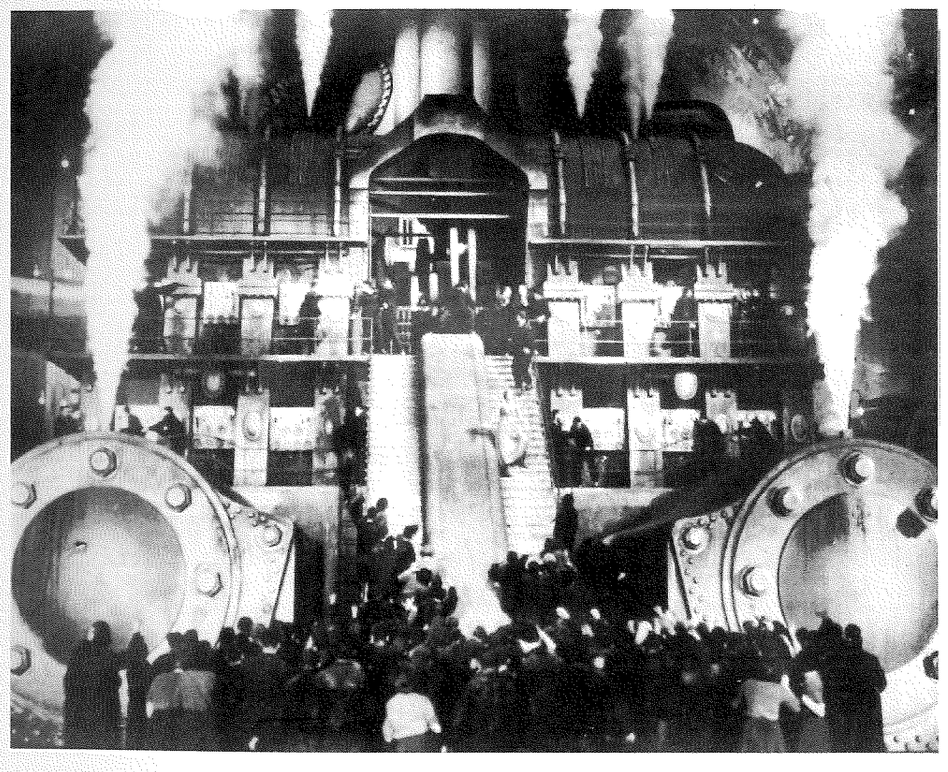

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Technological Culture and Literary Representation

by Lies Wesseling
University of Maastricht, the Netherlands

Review of: Joseph Tabbi, *Postmodern Sublime: Technology and American Writing from Mailer to Cyberpunk.* Ithaca and London: Cornell University Press, 1995. 243 pp.

Postmodern Sublime discusses the efforts of three postmodern American novelists to engage themselves to the world outside the self-contained linguistic fictions that literary postmodernism is usually identified with. According to Joseph Tabbi, the authors in question – Thomas Pynchon, Joseph McElroy and Don DeLillo – attempt to move beyond self-reflexivity and linguistic determinism through their sustained reflections on the implications of contemporary technological culture for the art of literary representation. The book also contains a chapter on Norman Mailer, who is presented as a transitional figure between American romanticism and postmodernism, and a coda on cyberpunk.

Tabbi's critical stance is fully in keeping with a critique of postmodernism that has reached the stage of maturity. Nowadays, critics do not concern themselves with the delineation of postmodernism anymore. Rather, they criticize the cliches which the primary reactions to postmodernism have spawned forth. To give a few examples of stereotypical accusation that have been fired at postmodern fiction:

* as writing about writing, postmodern fiction is a wholly self-contained, solipsistic affair, which negates the representational function of language
* postmodern writing approaches each and every subject ironically, espousing a nihilistic anything-goes-attitude; therefore it is entirely devoid of pathos and high seriousness
* postmodern writing has abandoned the oppositional, critical stance of earlier generations; it is not afraid of being coopted into capitalist commodity culture
* postmodern writing is devoid of ethical or political commitments, its only commitment is to the radical indeterminacy of linguistic free play

These accusations were voiced in the late seventies and early eighties by critics such as Charles Newman and Fredric Jameson. They are hardly representative of the present state of the art.

Tabbi forms part of a rather long line of critics who have attempted to rehabilitate postmodern writing by demonstrating that scepticism concerning the representational function of language does not necessarily forestall political or ethical seriousness. His respectful references to Slavoj Zizek indicate quite clearly where his intellectual allegiances lie. In many respects, Tabbi firmly adheres to the current dictates of political and intellectual correctness: language cannot represent The Other, in fact, any attempt to recuperate otherness is to be firmly resisted. At the same time, he speaks in favor of an unironic postmodern realism, asserting that the writers he is concerned with "share an exemplary willingness to push beyond the limits of the literary, to bring their writing into contact with a nonverbal technological reality" (pxi). As I shall argue, however, Tabbi does not succeed in having his postmodern cake and eat it too.

Tabbi explains the fascination of Mailer, Pynchon, McElroy and DeLillo with technology as an attraction to phenomena that "draw us outside of ourselves", as McElroy put it. In our present-day high-tech world, technology rather than nature is the force which impresses and overwhelms the individual subject, utterly evading its powers of comprehension and representation. Tabbi claims that Pynchon, McElroy and DeLillo have moved way beyond earlier, stalemate

literary attitudes towards science and technology. They are entirely free from the romantic opposition to science and technology. They do not try to compete with science either. Rather than trying to claim for literature the professional prestige of the sciences, the novelists in question accept their marginality in contemporary technological culture. They also differ from naturalist authors such as Theodore Dreiser or Emile Zola, who appropriated certains scientific theories (Dreiser's Darwinism, Zola's thermodynamics) as a means of interpreting and ordering the complexities of contemporary social reality.

According to Tabbi, the attitude of Pynchon, McElroy and DeLillo towards technological culture is in some respects comparable to the way in which the romantics approached nature. The novelists under study have wedded the romantic sublime to technology, BUT with a postmodern difference. This marriage has produced a new mode of writing, Tabbi claims: the technological or postmodern sublime.

What exactly is this postmodern difference? The question is not so easy to answer because Tabbi never stops to define the romantic sublime, but contents himself with an occasional reference to Thomas Weiskel's *The Romantic Sublime* (1976). This is an extremely narrow basis for any book on the sublime, considering the wealth publications which have appeared on the topic during the last fifteen years, about which more later on. Let me first try to paraphrase Tabbi's argument. The sublime, Tabbi posits in his one and only attempt at defining the sublime, always "locates itself between discrete orders of meaning. It is not a category in itself so much as a term that describes what cannot be categorized" (xi). In this case, we are dealing with the discrete orders of literature and science/technology. Around the turn of the century, Henry Adams already introduced a problematic which has remained a dominant theme in American writing ever since, namely the paradoxical notion that the human mind and the world created by twentieth-entury science are technology are somehow at odds with each other, notwithstanding the fact that science and technology are ultimately products of the human mind. Adams's autobiography *The Education of Henry Adams* (1918) teems with expressions of Adams's bewilderment in the face of the new 'multiverse' that was being revealed by the latest discoveries in physics. This new world was being presided over by a nonhuman force, 'the Dynamo', as opposed to more human and spirtual force of 'the Virgin' who had dominated earlier ages. Now more than ever, the rapidly changing technological forces and increasingly complex corporate systems have become too vast for any single imagination to comprehend and represent. Pynchon, McElroy and DeLillo all share Adams's bewilderment, according to Tabbi. Contrary to the romantic sublime, however, the postmodern or technological sublime does not culminate in a moment of transcendence. The romantic sublime as described by Thomas Weiskel is really a twofold process. First, the human mind is confronted with an object too vast and overpowering to take in. The sublime object disrupts habitual modes of comprehension, causing feelings of astonishment and anxiety. This first phase confronts the subject with a striking discrepancy between inner and outer, between mind and world. "Either mind or object or object is suddenly in excess", as Weiskel puts it (Weiskel 1976: p. 24). During the second phase of the sublime experience, however, the mind overcomes its own impotence by "constituting a fresh relation between itself and the object such that the very indeterminacy which erupted in phase two is taken as symbolizing the mind's relation to a transcendent order" (Weiskel 1976: 24). This is Weiskel paraphrasing Kant, but Kant himself is easier to follow. According to the Kantian sublime, the mind is able to transcend itself because different mental faculties come into play at different moments in the sublime experience. When we behold the vastness of the starry skies, for instance, we first experience a shattering sense of inadequacy because the imagination cannot form a mental picture of an infinite object. But then the mind nevertheless triumphs through reason, which is able to think the abstract category 'infinity'. In this moment of transcendence, the mind suddenly partakes of the sublimity of the object, absorbing its vastness, as it were. The sublime experience instills an awareness in the human subject of

its ultimate independence of nature, thereby reminding us of our moral vocation to develop into autonomous creatures who rise above the deterministic laws of nature, freely determining their own fate. Thus, the sublime experience moves from a shattering of our mental facullties to their reunification through the mastery of reason, from loss of self to self-aggrandizement, from ego-deflation to ego-inflation, or however one wants to put it.

Not so in the postmodern or technological sublime, however. According to Tabbi, the excess of contemporary technology, as figured by the insurveyable panorama of computer networks, transportation systems and communications media, utterly defeats the individual consciousness and as such cannot be exploited for the purposes of self-aggrandizement, or so Tabbi has it: "reality is irreducibly decentered and externalized; it is located not in any one human mind or body but in the social relations conducted among human beings through various simulations and abstractions, through bureaucratic institutions, and through the machines that enact 'the automated thoughtfulness of the community'" (p. 10). Tabbi interprets Norman Mailer's preoccupations with space technology as a last-ditch attempt to approach contemporary technology in the mode of the 'egotistical sublime'. The problem with this mode, as Tabbi sees it, is the following: "But the difficulty with all such dialectical resolutions is that they tend to aggrandize self-consciousness at the expense of otherness, be it social, natural, or the objective otherness of the technological, collectively constructed life-world. For this external, incommensurable vastness the mind substitutes its own linguistic infinity and so identifies two categorically separate realms in a willful act of the imagination, a resolution that is at best metaphorical." (p. 19) As we may gather from Tabbi's subsequent arguments, 'at best metaphorical' is not very good, for the discrepancy between the discrete orders of literature and nonverbal technological reality cannot really be recuperated metaphorically. Some critics have interpreted the linguistic excess of the extremely hermetic, multilayered and encyclopedic novels by the authors under study as a verbal equivalent of the excess of technological culture. Thus, semiotic excess would mimetically match technological mass, and in this way, contemporary writers would still have mastered technological culture. But this will not do, according to Tabbi, because literary excess and technological excess are hardly of the same type: "the individual writer, often a loner with pen and paper, could never compete with the high-budget productions of the various corporate media. Excess in this fiction is not simply more than but other than the technological mechanisms, media, and categories it deforms" (p13).

How, then, do the writers in question succeed in refraining from smoothing over the difference between a consciousness that uses words and a nonverbal universe of force? Where Pynchon is concerned, Tabbi seeks an answer to this question in the psychologies of individual engineers in *Gravity's Rainbow* (1973). This historical novel presents an elaborate a cast of German engineers working on the construction of the *Vergeltungswaffe*, the V1 and V2. As we all know, the technological expertise which was developed for this occasion was transported to the United States after the war, in the person of Wernher von Braun, among others, where it was put to further use in the development of the American space program. Pynchon depicts all these engineers as being caught up in forces larger than themselves, thereby supporting the rather familiar point that those who create technology are in turn ruled by their own creations: "In *Gravity's Rainbow* the situation of people being absorbed into their own technologies is everywhere in evidence, and the more technical the passage, the more clearly Pynchon reveals how those who would control the means of technological production are in turn controlled by them." (p. 99) In the case of McElroy, Tabbi focuses on McElroy's invention of a mythical, nonhuman being in *Plus* (1976), called Imp Plus, as a speculative search for a creature whose consciousness would be able to encompass the abstract and decentered world of contemporary technology. According to Tabbi, Imp Plus, a creature who grows in space, is as close as you can get to a fictional emobidment of Donna Haraway's cyborg, where American literature is concerned. These two chapters are really the only corroborations of Tabbi's theoretical claims, because Mailer is discussed as a

belated romantic, while Don DeLillo's writing is categorized as 'beautiful' rather than 'sublime'. DeLillo's work exemplifies a mode of writing which Tabbi calls 'postmodern naturalism'. Postmodern naturalists, according to Tabbi's characterization, are novelists of waste: "Rather, like Benjamin's angel of history, the contemporary naturalist writer disappears into the wreckage of everyday culture, wherein the culture might find its own direction against the continuing storm of a progressivist history." (p. 27) Don DeLillo's novels recycle the numerous waste products of our hyperreal mediated realiy: newspaper clippings, historical documents, films, photographs, medical reconrds, "the data-spew of hundreds of lives" (DeLillo quoted by Tabbi, p. 175). Strange, that the honour of exemplifying postmodern naturalism should go to DeLillo rather than Pynchon, the American novelist of waste par excellence.

After having absorbed the theoretical claims of the introduction, one cannot help feeling increasingly disappointed while studying the chapters on individual authors. Not that these exercises in literary criticism are uninteresting. On the contrary, they offer thoughtful, thought-provoking and detailed interpretations of a number of extremely intricate and hermetic novels. However, they hardly add anything to one's understanding of the postmodern sublime. The theoretical observations of the introduction are shamanistically repeated all throughout the book, but they merely hover above Tabbi's interpretations on individual novels.

Postmodern Sublime suffers from painful and embarrassing omissions. Certainly, Tabbi is not the first to investigate configurations of the postmodern and the sublime. Indeed, in the wake of Lyotard's rereading of Kant, a whole debate has sprung up around this issue, which is accompanied by the usual flood of publications which has become characteristic for present-day academic communication. Strangely enough, Tabbi hardly displays any awareness of this fact. He has not made a sustained effort to situate himself in this debate, nor does he engage in a confrontation with leading theoreticians of the sublime. Tabbi clearly has not studied classical treatises on the sublime independently, such as the expositions by Edmund Burke and Immanuel Kant. Furthermore, he does not show any symptom of having studied influential contemporary commentaries on these classics, such as Paul Crowther's study of the Kantian sublime. It is a pity that David Nye's highly lucid and convincing *American Technological Sublime* (1994) has escaped him, because this would have prevented Tabbi from making unwarrented claims, but Tabbi cannot be blamed for this, considering its date of publication. Most surprisingly of all, he does not really know the work of Jean-Francois Lyotard. His bibliography only lists two rather shallow articles by Lyotard, namely "Answering the Question: What is Postmodern?" and "The Sublime and the Avant-Garde". Lyotard's major work of philosophy which truly broaches the subject of postmodernism and the Kantian sublime, namely *Le différend* (1983), does not enter into the picture at all. Tabbi's discussion of Lyotard comes down to a few scattered remarks, which is rather strange in the light of the fact that Tabbi's theoretical problematic is identical to Lyotard's. Lyotard has it that the philosopher and the artist are to continually revitalize our awareness of the unspeakable and the unpresentable, of that which cannot be said because it cannot be accommodated within the confines of extant language games. Philosophers and artists are to direct our attention to the discontinuities and gaps between different language games, to the limits of the sayable. Tabbi's concept of the postmodern sublime is an unwitting replica of Lyotard's philosophy. Tabbi does not seems to fully realize the strking similarity between his own ideas and Lyotard's, subtly (and mistakenly) pretending to move beyond Lyotard instead:

"The readings that follow accept Lyotard's elevation of the notion of the unpresentable; they even accept Baudrillard's description of the technological culture as mediated through and through. But neither description is a reason for rejecting truth claims in the political and metaphysical realms or, in the aesthetic realm, for denying the power of narrative to transport us out of ourselves. A respect for the facticity of postmodern reality – a reality outside the mind of the artist or historian to which people can respond – saves the four main writers in this study from

linguistic solipsism on the one hand and, on the other, from the total relativism that more cynical pragmatists than Lyotard are prone to fall into."(29). In other words, Tabbi wants to overcome Lyotard's linguistic determinism in order to attain an unironic postmodern realism.

Can it be a coincidence that the only source from which Tabbi takes his cue has been produced by an American literary critic, while nearly all the others I have mentioned are European intellectuals? I am afraid not. Tabbi's intellectual parochialism has produced a number of serious blemishes:

I. *Postmodern sublime* is a taxing book to read for any European student of the sublime whose reading on the subject is not confined to Weiskel only, and who is therefore bound to have some awareness of the diversity among different theories of the sublime. As Tabbi never stops to define his own concept of the sublime, it is very difficult for anyone who is truly knowledgeable about this subject to assess the exact import of his statements.

II. If he would have concerned himself with the European intellectual tradition on the subject in question, he would have realized that there is nothing specifically 'new', 'postmodern' or 'specifically American' about the technological sublime. Burke and Kant already realized that not only natural phenomena, but also man-made artefacts, may be conducive to the sublime experience. As a matter of fact, David Nye's exposition on the technological sublime begins in the 19th century.

III. If Tabbi would have entered into the theoretical debate on the sublime, he would have realized that he has adopted a self-defeating intellectual strategy. Tabbi wants to rehabilitate postmodern writing by demonstrating that there is more to it than radical indeterminacy, irony and self-contained linguistic reflexivity. Postmodern writers do really engage the outside world, Tabbi claims. In order to substantiate this claim, he draws upon the category of the sublime. But because Tabbi has picked up the notion from Weiskel that the sublime is an essentially romantic affair, he needs to modify it somewhat in order to make it comply with the postmodernism wariness of usurping The Other. Therefore, Tabbi censors the moment of transcendence in which the sublime experience culminates, thereby reproducing the outcome of Lyotard's reading of Kant (ideas which are, of course, in the air everywhere both in Europe and the United States). This move, however, sends him right back to the point from which he started: to radical indeterminacy and an unbridgeable gap between word and world. Lyotard's concept of the sublime is hardly the right vehicle for moving beyond Lyotard's linguistic determinism.

Does *Postmodern Sublime* not have anything to recommend itself? Yes, it does, but this should not have been published in book format. The chapters on Mailer, McElroy and DeLillo are interesting in themselves and can reach their audience quite effectively as articles in literary jounals. Everything that Tabbi says about these authors could have been said without any reference to the sublime whatsoever. However, the book has nothing to offer to those who are interested in theories of postmodernism and/or the sublime. In other words, it is not really a book.

Publications such as Tabbi's make one worry over the editorial policies of American academic publishers. How come a prestigious publisher like Cornell University Press has put out a book which is marred by ignorance and faulty arguments? And what is the point of distributing a book on the European book market which only seems to address itself to a small circle of American literary critics? In this time of global communication networks, I find the blatant ignorance of influential and well-known foreign publications on the self-same topic that one is writing about, indefensible, to say the least.

Diverging Perceptions of Hazards and Risks

by Andrew Watterson

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Review of *Misunderstanding science? The public reconstruction of science and technology* edited by Alan Irwin and Brian Wynne. Cambridge University Press. 1996. Cambridge. ISBN 0 521 43268 5

The debate about whether and to what extent the public misunderstands science has a long history. Part of that debate relates to what Harry Otway termed 'the social construction of ignorance' and part, for policy makers, relates to increasingly beleaguered industries and companies who, fearing threats to sales, production and production processes, present public worries about the science and its application as ill-informed and inaccurate.

This book draws primarily on qualitative data and the ethnographic studies are used explicitly to offer an important conceptualisation of the public understanding of science for the reader. The text brings together the findings of a UK research council programme on the public understanding of science and runs the gamut of such subjects as biotechnology, reproductive medicine, the role of museums in 'authorising science', scientific activity on a small Island (the Isle of Man), environmental and occupational hazards on sheep farms and in industrial cities. The relevant or current theoretical underpinning to the wider debate is effectively set in the context of the case studies.

In a country which has produced a large share of so called 'scares' about the application and use of science and technology, the topics have particular relevance. The book also focuses on 'the operation of science in everyday situations' and therefore covers a diverse range of occasionally well worn topics providing new insights and coherent themes for their exploration. Indeed a central and very valuable observation is, as Irwin and Wynne, note that "the 'local' machinations around science as analysed in this collection are of much wider significance than the particular local context in which they are manifested".

There has been fierce debate in the UK between some scientists and several of the social scientists who contribute to this book about the role of science and the social influences which work upon it. In that sense perhaps the book is 'quaintly' British not only because most topics are based on UK experiences but also because elsewhere in Western Europe, social influences on science appear to be more readily acknowledged. The book draws primarily on European social theory and, with a few exceptions - Nelkin and Jasanoff - tends to neglect the important seam of work on public involvement in science, risk perception and communication and scientific controversy generated by researchers on risk at Carnegie-Mellon and on lay perceptions and public actions on pollution by researchers at Brown University, Harvard and Boston University. This is a pity and on occasions detracts from the analysis despite the avowed aim of the authors to explore "the 'local' and 'the cosmopolitan' in the 'micro-social' research presented here".

There may also be some value in texts like this briefly exploring the impact of education outside the museums setting and the lack of a Freedom of Information Act on the type of public reconstructions of science which occur in the UK as distinct from other countries: two topics highly pertinent to the way the public may reconstruct and assess science and technology. The authors, however, cover a lot of very useful ground in a slim volume. Future volumes may follow to plug some of the gaps?

The 'social framing of science' as well as the "role of science in 'framing' public debate" are central themes of the book. The need for scientists to reach the public and for the public to comprehend scientific information and its limits are basic requirements for informed decision-making in any society. To what extent the scientific community needs to detail and explain its work is problematic as indeed is the extent that the public need to understand the details. For instance, the screening and selecting process of what data and mechanisms explain hazards and risk from hazards in the field of public health? Does the 'public' need to understand basic physics and meteorology to make sense of global warming: probably not.

Most recent examples in the UK, which the book touches upon but does not look at in detail - partly because the controversy and the 'facts' surrounding it are evolving all the time - is the BSE (Bovine Spongiform Encephalopathy) problem/'scare'. The book nicely catches, with several of its case studies, what the authors describe as the 'diverse, shifting and often diverging categories' of both " 'science' and the 'general public' ". This example has revealed the inability of some scientists - and the book rightly notes the lack of homogeneity of scientists' views as much as 'the public's' - in government service, in research institutes, in industry and in academia - to reach the public. Part of the scientists' problem has been that they do not understand themselves the science or acknowledge the hypotheses which explain BSE. Part of the problem has been that the response to incomplete knowledge and challenges to established theories and knowledge has led to 'knee jerk' reactions by scientists which assert absolute safety without explanation. Such assertions tend to confirm public scepticism about scientists.

The book poses a number of central and 'common analytical questions' about public understanding of science. These include what people understand by science and scientific expertise, to whom do the public turn for technical information and advice and then how do the public select, evaluate and use the information so gleaned. Quite critical to these questions for the authors is how the public relate the scientific advice to their own experiences. This may be seen as participatory research or lay or community epidemiology developed in the USA and Africa and described in the 1980s but somewhat neglected in Europe outside Scandinavia, terms the authors surprisingly do not use although several of their case studies relate to this approach.

Several of the studies - especially those on sheep farmers in the English Lake District affected by pollution from Chernobyl, communities living near industrial hazards in northern cities, islander views of science - provide rich data and combine such data with apt theoretical underpinning. The chapters which look at organisations per se and some of the wider issues in overviews rather than the more detailed 'fieldwork', a term which is a misnomer for the accounts offered in one or two chapters prove more problematic and perhaps reveal some of the snags and pitfalls which the public themselves experience in dealing with scientists. These chapters may also suffer because the volume totals only 225 pages and hence contributions always run the risk of being too brief and compressed in places.

For instance, the chapter on environmental organisations and their use of science reviews a wealth of literature which has of course been funneled, filtered and, in some instances distorted before it reaches the analyst: caveat emptor! The reference to the Alar story states that the 'media publicity overrode the processes of technical debate, ensuring that only [the environmental group] assessments of risk counted'. A more detailed study of this episode would show that the technical debate and one set of processes had been going on for many years before the media story broke and that the biggest difference at the end of the day were those between the industry producing the chemical and the US Government agencies.

The Alar story is an example of a constricted scientific debate and more an example of what earlier commentators in the book identify as misperceptions of knowledge but in this case the misperceptions are by the analysts themselves. The concept of 'a technical debate' harks back to the idea of 'pure science' with the testing of hypotheses and unequivocal data production whereas the Alar story really illustrates the availability of 'a greater plurality of sources' in which a relatively well informed 'public' succeeded in

forcing through a public health precautionary policy. The myth now presented by industry and EPA critics is that the public misunderstood the science because of media distortion. In this particular instance, the author compresses the story, fails to identify distorting influences from industry and its own scientific lobby and hence misinterprets the role of 'the public'. This is a minor criticism in a book which is generally well researched but probably under-referenced.

Irwin and Wynne conclude that "useful scientific knowledge needs to be reflexive and self-aware rather than dismissive of (such) social and epistemological concerns as irrelevant and 'soft'. If science is to work with rather than against public groups (or simply be ignored by them), then usefulness' and 'self-reflexivity' must form part of the same social and institutional process". In Scandinavia and the Netherlands such a statement would probably be a truism for some science, technology and health professionals: in the UK it most certainly is not.

This book finishes with a brief consideration of the practical and policy implications of their work. The role of 'learning systems' based on science shops, trade unions and other non-governmental community and environmental organisations in making the link between science and 'practice' in the public arena is viewed as central to this process.

The book is well worth obtaining and will provide both an insight into the nature and direction of the UK debate on the public understanding of science and rich case study material.

Moving Science: Science, Gender and Science Fiction

by Sybille Lammes
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In the last two decades both science and technology studies and film and television studies have had much to say about the relationship between science and fiction. As science and technology studies contests the assumption of fact as truth, so film and television Studies the supposition that fiction is mere fancy. Feminist critique has provided an an important impetus to the debate. Feminist film theory has shown how gender is embedded in fiction films and television series, stressing that these representations should be taken seriously. They tell us a cultural truth. In STS the gendered-ness of science and technology has been stressed. The neutrality of fact and objectivity are doubted. In both these areas gender studies has paid a lot of attention to the scientific spectatorship as a gendered activity, discussing the scrutiny of passive female bodies. It seems at least strange that so little attention has been paid to the coherence of ideas already developed in both fields. A comparison may broaden scopes and weaken unnecessary borders, a prerequisite if further thoughts on visual culture are to be developed. Such a journey into both worlds proves anyway obligatory when studying gender and science in Science Fiction audiovisuals.

Film is Technology

Cinema could be described as quintessentially a technology of illusion. If one wants to look at the ghost in the machine, go to the movies and the roaring projector casting light on the white screen will transport you to wild places. Cinema, as an apparatus totally dependent on technology, uses that technology to make you believe what you see. Thus something which is made should look, if only briefly, like it has not been made. This reliance on both technology and illusion might be called the paradox of cinema, which in a different way is also at work in fictions on television and maybe even in the so called new media.

Despite their inclination towards illusion, audiovisual apparati should ultimately be situated within the realm of technology.[1] These optical machines rely on a whole technological process of which only a tiny bit is revealed to the viewer. Behind the screen lies a history of shooting the scenes, developing the material, and selecting and compiling that leads to the 'final' cut. The technology we as the viewer are allowed to see is limited to the moving images and sound, glued together into a seamless pattern. If it's not a b-movie or an avant-garde or eclectic film, booms should not pop up in the frame, no actor should look directly into the camera and the technicians should keep off screen.

The film-theorist Comolli, said the following about this in his article "Machines of the Visible":

> Thus what is in question is a certain image of the camera: metonymically, it represents the whole of cinema technology, it is the part for the whole. It is brought forward as the visible part for the whole of the technics.[2]

Comolli, who describes cinema as a dream machine, states here that the visible part of cinema obscures a much greater apparatus. This symptomatic replacement of the whole technology by the seen image, can be viewed as part of a Western tendency towards ocularcentrism, whereby 'I see' equals 'I believe', a notion which also lies at the heart

of scientific thought. Thus a split is generated between the seen (and heard) and not seen (not heard) which lies behind the screen.

This fictitious split is reflected in the general tendency in film and television studies to situate technology behind the screen and exclusively explore the technology of film on this level. Ironically, academics who should be the first to be aware of the whole of the apparatus, all too often leave this pattern unchallenged. A few exceptions aside, studies of technological developments of cinema or television rarely pay attention to the representations themselves, presuming that what is shown to an audience is not primarily technological. The majority of academics are either interested in the illusion or in the technological, but do not bring the two together.

Science fiction, I would argue, foregrounds the need for an approach in which technology and fiction are no longer kept separately. By depicting technologies within its mise en scene, science fiction representations point in a subtle way to the underlying technologies of the audio-visual apparatus. Without breaking the rule of the illusion, the machine is brought back into the ghost. Laser-beams, monitors, x-rays, flashes of light, optical eyes, and many special effects can be described as such meta-medial aspects of science fiction, always full of meaning.

Although notions of the audio-visual media as essentially male (being voyeuristic techniques of observation) have already proven to be dated and too general, the way audio-visual technologies are employed can be very gendered. Hence what is made visible or visually scrutinised in scenes which depict technologies, often refers to the gender dimensions of the audio-visual apparatus. Later in this paper I will give some examples of this.

So both the way characters relate to technology and the way technologies are embedded in the story, might incorporate gender dimensions. However, it can be difficult to distinguish whether such representations are to be located on a meta-medial level, or should be read as part of the wider landscape of science and gender. The very core of this problem is that the two levels are intertwined. Science fiction film, science and gender engage in a sometimes uncomfortable menage a trois.

Scientific Metaphors

From the field of science and technology studies it has been claimed that science can appear very science fictional. Throughout her work Donna Haraway has stated that science shares its utopian character with science fiction, looking for the ultimate frontier and colouring this quest with ideals. In her *Primate Visions: Gender, Race, and Nature in the World of Modern Science* she says for example:

> Scientific practice and scientific theories produce and are embedded in particular kinds of stories. Any scientific statement about the world depends intimately upon language: upon metaphor.[3]

Hence, according to Haraway, science and fiction should not be conceived as two separate spheres but as part of a continuum of cultural expressions of science. Some metaphors of scientific practice and theories are enclosed in science fiction audiovisuals. With this, the overt maleness of most science might also be taken aboard, being translated into a new narrative. The question which remains unanswered however, is how this translation changes these scientific metaphors. What should be taken into account is that, even when we speak about metaphors, fiction gives much more space to play with those metaphors than 'serious' science does? I would argue that metaphors of science cannot only be slightly altered in science fiction, but can even be totally twisted around or mutilated into new collages. Hence a rigorous line between science and fiction cannot be drawn, but that does not mean that it is all the same. Accordingly, whereas one can speak of a continuum between science and science fiction, one should be careful not to loose sight of differences between them as well. Science gets translated into fiction, and the viewer does not understand science fiction as scientific truth (in which he or she might believe in other settings). Fiction envelops science, while at the other end of the scope science encompasses fiction.

Piercing the Female Body

Although misogynous metaphors in science, as described by Harding and others such as Keller and Schiebinger,[4] can be challenged as being too all embracing (not too good) to be true, they do offer insights which may enhance the analysis of scenes in science fiction audiovisuals. According to Sandra Harding metaphors of gender have been applied to science throughout history to "make morally and politically attractive (...) new conceptions of nature and inquiry required by experimental method and the emerging new technologies (...)."[5] In these metaphors the female body is the passive locus of scrutiny. Harding traces this practice back to the Copernican theory, which from the fifteenth century onwards gradually transposed the earth-centred universe into a sun-centred universe. Since then the earth has had a passive female connotation, a passive body being penetrated by the heavens, so to speak. The earth and the female body were, according to Harding, firmly placed together, as the passive material examined and used by an opposite active male pole. Wild nature/the woman had to be tamed in man's struggle to control his fate.

The visual technological culture in which both science and audiovisuals are firmly rooted can account for the striking resemblance of theories such as Harding's to certain feminist film theories. Of particular importance in those theories is the question who holds the looks and who has the looks. Film is conceived as a passive female body, which gets fragmented by a voyeuristic masculine gaze, being animated by this gaze into a fetish. Giuliano Bruno, a film historian and theorist, offers fruitful insights into the closeness of this cinematic gaze to that of the scientific gaze. In her provocative article "Spectorial Embodiments: Anatomies of the Visible and the Female Bodyscape" she points to the proximity of cinema and science, or more specifically physiology:

> Like cinema, physiology (...) is a dynamic language that affirms the temporality of the body, its process and motion.[6]

What makes part of her argument so compelling is that she looks at representations of science in early Italian film (the medical genre) and explains these scenes as referring to film and its similarity with a female body, a comatose body moved by the operator. Thus the body in the film and the way it is scrutinised refers to the technological body of the film, itself closely related to the observation and inscription of bodies in medical science.

Again, as with the metaphors described by Keller and Harding, one should both be aware of the altering force of fiction and of the historical changeability of those metaphors. One could argue that the exploitation of the female body became less of a straightforward metaphor in this post-modern era and that the female body can perform a more active and powerful role in contemporary audiovisuals, without turning immediately wild. Male bodies can, on the other hand, be more easily reduced to a fetish (as Brad Pitt felt when he took part in Thelma and Louise).

Metropolis and the X-Files

I would like to illustrate the latter with examples from two science fiction audiovisuals which both involve bodies which are scientifically scrutinised. My first example I draw from Metropolis (Fritz Lang, 1926-27) and my second one from the X-Files (Chris Carter, 1993-) a highly successful contemporary television series.

Metropolis was released in 1927, on the eve of the emergence of a Hollywood science fiction genre. Its raving success, then, and in different forms now, justifies calling Metropolis a science fiction myth. Especially the scene of the transformation of a female robot into flesh has been recycled and used in other films, most notoriously in Frankenstein films, although here the animated body has been mostly male. It might be seen as exceptional that the mad scientist Rotwang creates the techno-feminine, although she is presented as 'wet' ware and not hardware as many of her male colleagues are. Metropolis's animated female body is the centre point of an implosion of body and mind. Made by her creator to replace monotonous and mechanical human labour, she turns out to be a sentient body.

On her iron body the fear that technology

might cause an implosion of distinctions between human and machine, made and born, is inscribed. These confusions accentuate the gender dimensions of this polarisation. The female passive body becomes active. At first glance this seems to fit neatly into a male idea about science and gender. It could be explained as a fear of loss of male dominance. However, the scientist Rotwang who animates her is to blame for her appearance. He creates a monster in the likeness of the heroine (Mary). Hence *Metropolis* condemns this misogynous role of science.

The robot, Mary II, can be seen and understood as a product of the male gaze. Her appearance incites questions about gender and looking. More specifically, cinematic technologies and the cinematic gaze are questioned by her appearance. She is a male fantasy or fetish turning sour. This is stressed by the dréam sequence shortly after her transformation. Eric, the son of the boss of Metropolis who fell in love with the virtuous and authentic Mary, has a nightmare in which the bad Mary performs a striptease. Numerous male eyes circle kaleidoscopically around in this sequence. Also during her performance much attention is paid to the male audience watching her with pronounced eyes. The caption reads: "Now we shall see whether people believe the robot is a creature of flesh and blood". The robot made human is like a cinematic body, making distinctions between technology and illusion, form and content, untenable.

In the dazzling scene of transformation Rotwang seems to need the genuine Mary to mechanically duplicate her appearance. As filming often has been described as well, he makes a copy of an authentic moving image. Rotwang pulls a heavy handle to make his iron creation come alive. A swift editing sequence follows. Lightning, boiling liquids and light circle which surround the body of the robot. Then her heart lights up and in a close-up her metal face turns into the likeness of her alter-ego, the Madonna. The immobilised bodies in Rotwang's lab are caught in the light, as the viewer is captured by the light of the projector.

Metropolis seems to prove that misogynous metaphors of science can be twisted around and criticised more openly in fictions. It actually denounces the scientific metaphors which have been firmly rooted in scientific discourses, especially at that time. Nevertheless when it concerns gender, the film still thinks very much in oppositions and clear distinctions. The locus of hope is Mary I, the Madonna. Fear is embedded in Mary II, the whore. The creator of all this trouble is male.

The X-Files, made 70 years later, displays a less rigid approach. The X-Files is a television show about two FBI agents who work with the "X-Files" - unexplained cases. The fading lines between science and fiction in the X-Files can be partly explained by the medium it uses. Television broadcasts (especially when using a remote control) compilations of images from the news, advertisements, documentary films, talk shows, videoclips, television series, and so forth. The subjects taken up by the series are often taken from the news and translated into fictional drama. Often it concerns popular scientific accounts of UFOs, as for example the Roswell affair.

From ex-Vietnam patriots on whose brains experiments have been conducted, to a monster created by the Chernobyl disaster, and alien abduction: every subject in which science and the abnormal or paranormal blur, offers fruitful material for the series. Interestingly, the 'pure' scientist of the two is female. Agent Dana Catherine Scully (what a striking surname) is a young pathologist, who scrutinises the bodies of the diseased and who knows how to work with a computer. Generally speaking, she is the cool-headed one who was assigned to keep an eye on her male colleague Agent Fox William Mulder, who believes in extra-terrestrial life. Both of them are very intelligent: Scully is an outstanding medic, while Mulder is a psychologist with a photographic memory. Gender proves to be less tangible and fixed in this series, but that does not mean it is absent. Although both protagonists are educated and independent, Mulder is the explorer and Scully sits back and looks at bodies of science. Is it too simple to conclude that the role of voyeurism is changed to female in the X-Files. They both have the looks (one episode shows Mulder in a swimming pool) and hold the looks, but Mulder as a true male pioneer sees beyond the obvious. Furthermore, Scully seems to be obsessed by dead unanimated bodies, while Mulder is intrigued by new and communicating bodies.

Extra-terrestrial life combines very well with the audio-visual, and especially with television, which functions on signs 'from outer space'. Also, this aural apparatus,[7] makes one wonder where our communication will go next (will E.T. go home?). In the episode "Little Green Men" Mulder again proves to be unstoppable in his quest for truth. He travels to Costa Rica to the abandoned SETI program site, a site which really exists. The machinery there consists of all audio-visual means to receive images and sounds from outer space. What he encounters are shadows of aliens. Televisional technologies are in their own way new technologies of the imagination. Maybe Mulder could be described a man of the new media, looking for the latest frontiers in communication and the aliens as the monsters which this pursuit can produce. Mulder is trapped in this machine of images.

Both examples illustrate how science fiction holds complex relations with its own audio-visual technological grounding and with the larger field of science. In unexpected and surprising ways, metaphors of science can be traced in science fiction audiovisuals. The occularcentric craving of science gets a new dimension. Metaphorical scenes in science fiction can be read as translations of fears and hopes surrounding science and gender, but also as referring more specifically to audio-visual technologies and gender. Science is transformed into science fiction, and is important to understand that these moving images of fiction produce their own tales of gender, science and the magic.

This discussion paper is based on a paper originally presented at: Science and Popularization: Higher Seminars for the Study of Science in Society, an Interdisciplinary Initiative Involving the Centre for Science Studies, the Department of Theory of Science and Research and the Department of History and Ideas, Goteborg University.

NOTES

1. Michael Punt has stated that the rigorous cleft between entertainment, science and technology is actually not that old. See Michael Punt, "'Well, who you gonna believe, me or your own eyes?': A Problem of Digital Photography", in: *The Velvet Light Trap*, No. 36 (Fall 1995), pp. 3-20.

2. Jean-Louis Comolli, "Machines of the Visible", in: Teresa de Lauretis and Stephen Heath (eds), *The Cinematic Apparatus*, Macmillan Press. Houndsmill, Basingstoke, Hampshire and London (1980), pp. 121-142, p. 124.

3. Donna Haraway, *Primate Visions: Gender, Race, and Nature in the World of Modern Science*, Verso, London and New York (1992), p. 4.

4. Londa Schiebinger, *The Mind has no Sex? Women in the Origins of Modern Science*, Harvard University Press, Cambridge, Massachusetts and London (1989); Evelyn Fox Keller, Reflections on Gender and Science, Yale University Press, New Haven (1985); Sandra Harding, The Science Question in Feminism, Cornell University Press, Ithaca and London (1986).

5. Sandra Harding, *The Science Question in Feminism*, Cornell University Press, Ithaca and London (1986), p. 113.

6. Giuliana Bruno, "Spectorial Embodiments: Anatomies of the Visible and the Female Bodyscape", in: *Camera Obscura*, vol. 28 (1992), pp. 239-262.

7. David Morley has suggested that it might be better to think of television as an aural medium instead of a visual medium. See: David Morley, "Television: Not so Much a Visual Medium, More a Visual Object", In: Chris Jenks (ed.), *Visual Culture*, Routledge, London and New York (1995), pp. 170-189.

Dissertation Abstracts

Jane E. Millar, *Interactive Learning in Situated Software Practice: Factors Mediating the New Production of Knowledge During iCASE Technology Interchange*, PhD Science and Technology Policy Studies, University of Sussex.

This is a study of the learning process. In particular, it focuses on factors mediating learning during the organisational integration of iCASE technology (integrated Computer-Aided Software Engineering tools and associated methods). The aim is to make a contribution to understanding learning both generally and specifically in relation to iCASE technology interchange.

Learning is critical for competitiveness and economic growth. Traditionally research in the innovation studies literature has considered learning as a passive, automatic process. More recent research has focused attention on the situated, active and interactive features of learning. The significance of interaction and activity are notable in theoretical accounts of situated learning in psychology. These two disciplinary strands are brought together in a integrated theoretical framework for research into technology related learning. This is used to examine the learning process through empirical research into the organisational integration of iCASE tools and methods.

Learning during iCASE technology interchange is shown as a dynamical process, mutually constituted by interactions between joint social activity, technology and context. These factors are revealed to affect the knowledge produced during collaborative software development activity, the software developed and the software development process.

A number of general conclusions can be drawn from this study. First, that traditional passive and automatic conceptions of learning have limited relevance to understanding the dynamical features of learning involved during technology interchange. Instead, learning amongst communities of practitioners with technology is more appropriately understood as a situated, interaction intensive and social process. Second, this approach is in itself insufficient unless it pays close attention to the membership of that community of practitioners and their relative involvement in technology interchange. Third, understanding the effect of interactive situated learning on the production of knowledge requires detailed examination of the mediation function through which cognition is achieved. Recommendations for industry and government policy are provided.

Isabel Boira-Segarra, *Industrial Organisation and Environmental, Performance of the Electricity Industry in England-Wales and Spain*, PhD, University of Sussex

This study analyses how electricity generating firms achieve certain environmental performance under different industrial organisational structures through a comparative study of the main electricity utilities in England-Wales and Spain.

This work studies industrial organisation by referring to firms' operating environment arguing that structural transformations and changing environmental constraints introduce complexity and risk that make technical and organisational shifts necessary for electricity firms to adapt and survive. Environmental performance is measured employing the concept of environmental capabilities as an analytical tool to study the way firms develop and accumulate the required technical, human and organisational assets to manage, co-ordinate and govern environmental performance in the face of uncertainty and technical and organisational -change.

Studying electricity producing firms in England-Wales and Spain allows assessment of the influence on the creation and accumulation of environmental capabilities of markets characterised by different levels of competition whilst being subjected to similar environmental pressures. The evidence shows that English-Welsh enterprises respond to competitive demands by implementing cost cutting strategies with environmental requirements being seen as a cost drain that needs to be minimised. This results in a tendency to satisfy environmental compliance by obtaining their environmental capabilities externally which together with a lack of internal competence rebuilding reduces short-term costs but compromises learning, their ability to generate change and thus, the sustainability of their environmental performance. In turn, Spanish firms operate in highly controlled markets that allow them to recover some environmental costs, thus reducing the commercial risk embodied in compliance. They satisfy environmental requirements in a less cost effective way than English-Welsh firms but their commercial strategies include continuous investment in a stock of internal competencies that will allow them to learn from their outsourcing relationships and sustain their environmental performance.

Patrick van Zwanenberg, *Science, Pesticide Policy and Public Health: Ethylene Bisdithiocarbamate Regdation in the UK and USA*, D. Phil., University of Sussex

This thesis examines the regulation of pesticide safety in the UK and USA with reference to the Ethylene Bisdithiocarbamate fungicides. Two groups of questions are posed. The first is concerned with different ways in which science is produced, deployed and incorporated into regulatory decision-making, and the consequences of those differences for both the production of reliable knowledge and the protection afforded to public health. The second group is concerned with identifying some of the structural factors that might contribute to an explanation of those differences, and consequently with suggesting how science and regulation could be improved. By drawing on developments in several disciplines, particularly in the social studies of science and science policy studies, the first group of questions is addressed by partially disentangling scientific and social considerations within the two 'regulatory regimes' technical deliberations on pesticide safety. Those social considerations are linked to broader structural factors via a more general account of the development and deployment of scientific resources in each country and an historical analysis of the evolution of pesticide control arrangements.

It is argued that most of the social considerations which are exemplified in the American regime's deliberations coincide with consumers' interests in a safe food supply, and have, for the most part, facilitated a robust, relatively reliable, and prudent evaluation of safety. By contrast the social considerations exemplified in British deliberations coincide with commercial interests in the continued registration of the fungicides, and have resulted in a distinctly unreliable and incautious evaluation. Several intervening variables ensured, however, that neither regulatory regime adequately protects public health. The different social considerations are related to a range of procedural and institutional factors in each regime, and these, in turn, are linked to the particular features of each nations administrative and political culture. A number of alternative political, institutional and procedural mechanisms for improving the use of science in pesticide regulation are set out.

Bruce Stephan Tether, *Virtual Panacea & Actual Reality: Small Firms, Innovation & Employment Creation, Evidence From Britain during the 1980s*, D. Phil., University of Sussex

The last twenty years have seen a dramatic reassessment of the role of small firms, both in the creation of new employment and in the development of new technologies. This reappraisal has heightened expectations of small firms as a vehicle for economic regeneration, with some countries, notably the UK, relying on small firms as a 'virtual panacea' for long-standing economic problems.

This empirical study examines the actual role of small firms in terms of the introduction of new technologies and the performance of innovative small firms in employment

creation.

A new data-set of significant British innovations (and innovating firms) was constructed for the study, comprised of those technologies which won the Queen's Award for Technological Achievement or the British Design Award between 1980 and 1990.

This study examines the size distribution of innovating firms and the different approaches to innovation of small and large firms. This analysis confirms previous studies' findings that small firms are less dependent on R&D activities for innovation, but were nevertheless responsible for more innovative outputs per employee than large firms. However, the study also includes a novel assessment of the value of the innovations. This finds that the value increased with firm size, suggesting innovation counts overestimate the contribution (by value) of small firms to innovation. This analysis suggests large firms were the primary source of innovation.

Finally, the study examines dynamic data on employment change amongst the innovative firms. This shows the small award winners grew more rapidly than 'conventional' small firms. Nevertheless, the increased employment they generated was wholly inadequate as a counter to the employment lost through the contraction of the data-set's large firms.

Overall, the study shows innovative small firms have made an important contribution to the British economy but they are no panacea for the country's longstanding economic difficulties.

Richard Albert David Isnor, *Sectoral Governance and Sustainability in Non-ferrous Metals Production a Study of Policy Convergence*, D. Phil., University of Sussex

Policy-making in modern governments is increasingly being recognised as the product of complex interactions between participants in policy subsystems. Comparative policy theory suggests that policy subsystems confronted with similar challenges will demonstrate policy convergence regardless of national setting. In this thesis, it is hypothesised that the similar nature of environmental and economic policy pressures facing the non-ferrous metals industry in Australia, Canada, and the United States has caused policy convergence in this sector.

A comparison of explicit and implicit technology policy instrument choices and governing styles in the non-ferrous metals policy sector of these countries is undertaken. Broad policy convergence in the membership of non-ferrous metal policy communities and in policy instrument choice is identified. However, while governing styles and relationships between participants in policy communities and policy networks exhibit remarkable convergence in the Canadian and Australian non-ferrous metals sector, distinct characteristics are retained in the United States. It is argued that in Australia and Canada convergence has been caused by similar political institutions, similar levels of sectoral political commitment, and similar political cultures explicitly embracing the concept of environmental and economic sustainability. Unique political institutions and culture, a general lack of political commitment to this sector, and less interest in the concept of sustainability is largely responsible for the differences exhibited by the United States.

Lotte Stig Nørgaard *The Development of Patient Medication Records in Denmark A Social Constructivist Perspective* The Royal Danish School of Pharmacy, Department of Social Pharmacy, Universitetsparken 2, 2100 Copenhagen, Denmark 1996

This Ph.D. dissertation represents a meeting between two fields: pharmacy practice research and social constructivist theory. Pharmacy practice research is defined as the field of investigation studying the pharmacy sector as an organization, its tasks, resources, activities and results. The aims of the dissertation, are to, from a social constructivist perspective, to describe and analyze the development of patient medication records (PMRS) and adjacent screening programs (especially the drug interaction screening program (DISP) in Danish pharmacies until 1995. Further aims are to make suggestions for further development in Danish pharmacy practice, based on experiences gained from PMR development in Denmark, and to discuss the advantages and disadvantages of using a social constructivist approach to describe and analyze the development of PMRs and PMR screenings in Danish pharmacies.

Researchers in social pharmacy as well as other researchers with an interest in the development of information technology in the health care field comprise the primary target group.

Chapter 2 outlines the basis for the SCOT theory, provides a description of the theory and addresses its advantages and disadvantages.

Part II (Chapters 4-12) contains a description and analysis of the actual construction and implementation of PMRs and screening programs in Danish pharmacies. Disagreement as to how to define PMRS, in terms of content, storage and patient access existed, even though several actors in the Danish pharmacy practice field agree that a PMR contained at least some sort of information about drugs sold to a single patient. Thus, it was of interest to try and discover the underlying reasons for interpreting the PMR in so many different ways. Part II describe how PMR development can be located according to two different configuration models, depending on the time span. Until 1993 the PMR field can be described most adequately according to a configuration model lacking a clearly dominant technological frame, and from 1993 according to a configuration model with more than one dominant technological frame.

Up until 1993 PMR development in Denmark was marked by the creation of the information technological frame (IT frame) originating in the Danish Pharmaceutical Association (DPA). The frame was held together by a vision of a computer based working place for the pharmacist. In 1 990 the DPA began developing a database for the first PMR screening program in Denmark, a drug interaction screening database. The development of the database would turn out to be rather complex and influenced by various interest RSGS. By the end of 1992 several RSGs were included in the IT frame such as pharmacy proprietors, pharmacists, employees at the DPA, researchers, computer vendors, a computer consultant and hospital physicians. Part of these RSGs were enrolled in the IT frame as a result of different sorts of problem redefinition.

From 1993 the IT frame was not alone in structuring the identification of problems and problem-solving strategies used in relation to PER development. The DISP so to say met the Danish pharmacy practitioners, the GPs (and partly the patients). From then on, PER development in Denmark was characterized by four (more or less) dominant technological frames. Of these, the pharmacy practice frame, the physician's frame, and the patients frame were bound together into a sort of "practice triangle".

Though a vast majority of pharmacists from different RSGs supported the use of IT in the pharmacies, many of them switched off the DISP. Hence, in the summer of 1993 only 10% of the pharmacies used the DISP. Problems experienced by the pharmacists in working with the DISP were of a technical, knowledge-related and organizational nature, just as problems related to cooperating with the GPs, legislation and professional characteristics were experienced.

The GPs fell into two different RSGs, both included in the physician's frame, in terms of their opinion of the DISP (and other computer based PER screenings to come): a cooperation group and a confrontation group. Whereas the cooperation group supported the use of PMR screenings in the pharmacies, the confrontation group considered the pharmacies to be using the DISP to extend the boundaries of pharmacy practice into areas bordering the territory of the medical profession, namely prescribing.

Only few RSGs included in the IT frame, the pharmacy practice frame or the physician's frame took specific initiatives to enroll the third corner of the practice triangle, the group of patients. The patients were deliberately kept uninformed as to the existence of the DISP, as they were not to get apprehensive and lose faith in the authority of the GP.

In October 1993 a "rescue plan" for the DISP was agreed upon between some of the RSGs included in the IT frame (the DPA, a DCPP group, hospital physicians). Thus, during 1993 and the beginning of 1994 the drug interaction database and programs were improved several times. After a difficult start, the DISP had finally reached a higher degree of stabilization within several RSGs.

The Ghost of Cheiron

by Geoff Bunn

A Report on the First Meeting of the European Society for the History of the Human Sciences, 30 August - 3 September, 1996

On arrival at the train station, anyone looking suspiciously like a bewildered academic was rounded up by Sacha Bem's welcoming committee, packed into a minibus, and transported to the conference centre - a spooky seventeenth-century castle. Some delegates headed straight for the bar, unperturbed by its dungeon-like atmosphere. Once incarcerated in the isolated Oud-Poelgeest estate - at one time owned by the renowned grave-robber Herman Boerhaave - friends old and new were greeted, the drawbridge was raised, and Cheiron settled down to a sumptuous feast.

Hans van Rappard, an original founding member of the society, welcomed us with some humourous, if ambivalent, reflections on "Cheiron at Fifteen." While it was true, he said, that "CHEI-RON" was composed of two of those notorious memoro-experimental nonsense syllables, the word's very lack of meaning served to encourage "dialogues between perspectives." A more functional name, he feared, might prevent inter-disciplinary discussion by suggesting to potential invaders that the history of psychology preferred to remain besieged in its own fortress rather than liberated from intellectual confinement.

There was no evidence of any entrenched thinking the following day however, when papers were heard on topics ranging from the development of humanistic psychology in Spain, to the story of "mandatory scientific discussions" in the former East Germany. A coach-ride to the seaside town of Noordwijk, a tranquil river-boat trip through the polders (accompanied by an eloquent social-historical commentary by Jeroen Jansz), and an excellent dinner *en bateau* provided the perfect end to an energetic first day.

Appropriately slotted between two of the following days three sessions devoted to historiography, Ted Porter's invited lecture reevaluated the relationship between "positivist social science and the Enlightenment tradition". Drawing attention to the "romanticist aspect of positivism", Porter argued that Karl Pearson had more than the lofty ideals of Enlightenment rationalism in mind when he established the "Men and Women's Club." Contrary to the received view of Pearson as an inhibited pedant, in fact "the longing to merge his individuality into something larger was with him all his life."

At one point during the conference, delegates were alarmed to discover that a U.S. biotechnology company shared their name. Perhaps the billion-dollar interests of Chiron Inc. were threatened by the modest ambitions of Cheiron-Europe? Perhaps Chiron Inc. wanted to secure the genetic patent on a ghoulish "half-human, half-horse" creature, and they needed Cheiron-Europe out of the way? Whatever his motivations, Adrian Brock's suggestion that the conference vote on the issue of a name change was timely.

After dinner, Guest of Honour Kurt Danziger presented an intricate paper on "the history of psychological categories." If Danziger is right that what is interesting about a category like *attitude* are not the thousands of psychological studies it has generated but rather the events leading to its ontologization, then psychology has indeed an "attitude problem." Inspired by the talk, those attending the subsequent business meeting wondered which category our newly-formed organization should privilege; the social, the behavioural, the psychological, or the human? As the day had started, so it finished - by proving Roger Smith's thesis that the formation of disciplinary boundaries involves both intellectual and professional commitments. With the blessings of all but a few traditionalists (and the odd abstaining amodern Latourian), the resolution was adopted. From now on we were to be known as the European Society for the History of the Human Sciences (ESHHS for short).

Following another busy day spent discussing, among other things, culture theory, psychological instruments, and the psychology of religion, delegates were treated to a tour of the Boerhaave Museum for the history of science. It was here that one beer-loving British Euro-skeptic learned that a "Leyden Jar" was not, as he had thought, a tiny but standardized quantity of ale that Maastricht bureaucrats were about to impose upon the European community, but was rather an historically important piece of electrical apparatus. Immediately after the tour we enjoyed a demonstration of 's Gravesand's eighteenth-century magic lantern. Its poetic operator, enthusiast, collector, and restorer was Willem Albert Wagenaar, rector of the University of Leiden.

The omniscient Jeroen Janz then led a merry procession of scholars through the picturesque streets back to the waiting coach. The afternoon's activities turned out to be emblematic of the whole meeting; friendly, fascinating and fun. On behalf of all the delegates, let me thank Sacha, Jeroen and Marijke for their efficiency, good-humour and patience, and for working so hard to produce such a triumphantly successful conference.

At the final dinner, ESHHS president Ingemar Nilsson recounted a dream that had woken him the previous night. A dark but rowdy creature he called "Cheiron" had got drunk and drowned in a canal. "It may well have happened near here," he speculated, to the great alarm of his tipsy audience. "Perhaps Cheiron still haunts the area," he added, ominously. We can only hope that this eerie "poldergeist" restricts its fiendish activities to the Oud Poelgeest castle, and refrains from returning to haunt any future meetings of the European Society for the History of the Human Sciences.

A message from 4S

Join the Society! As many of you know, membership in the Society for Social Studies of Science is excellent value. For $30 (full member) or $15 (students, Eastern Europe, developing countries) you receive four issues of Science, Technology, and Human Values (which is normally $57), three issues of the newsletter Technoscience (including the preliminary program for the annual meeting of 4S), and reduced registration fees at the annual meeting. No matter where you are in the world, these publications are sent to you via First Class postage, without additional charge. If you want to join or renew your membership, you can send a check from a U.S. bank or an international money order for the appropriate amount to: 4S, P.O. Box 487, Canton, MA 02021 (USA). If you are outside the U.S. you can join by Visa or MasterCard--just send your name, account number, expiration date, and signature. Or send the information (minus the signature) by email to: acadsvc@aol.com. Contact: Wesley Shrum, Department of Sociology, Louisiana State University, Baton Rouge, Louisiana 70803, USA, email: sowesl@unix1.sncc.lsu.edu, office phone 1-504-388-5311, fax 1-504-388-5102.

Conference Announcements and Calls for Papers

To mark the centenary of the discovery of the electron, the **British Society for the History of Science** is holding a *conference to explore the history of modern physics* on Friday and Saturday, 11-12 April 1997 at the Royal Society (on the 11th) and the Science Museum (on the 12th). Fees for conference participation only are £20 for BSHS members, £30 for non-members and £10 for students. Accommodation is available at Imperial College. For information, contact BSHS Executive Secretary, 31 High St, Stanford in the Vale, Faringdon, Oxon, SN7 8LH, UK. Email registration can be arranged via Jon Agar <AGAR@FS4.MA.MAN.AC.UK>

"Knowledge and Its Discontents: Science, Expertise, Modernity" will be held at **Cornell University** in Ithaca, New York on May 2-4, 1997. Leading American and European scholars in the field of science and technology studies will examine the changing social and political meanings of expertise and its role in the making of modern culture. In conjunction with the conference, there will be a day-long workshop organized by the Science and Technology Studies graduate students on Friday May 2nd. Further information and a registration form for the conference are available from the Cornell Science and Technology Studies website at http://www.sts.cornell.edu/Workshop.html. Registration forms and information also can be obtained from Lillian Isacks, Department of Science and Technology Studies, 726 University Avenue, Cornell University, Ithaca, NY 14850, USA. tel 1-607-255-6234; fax 1-607-255-0616; email li10@cornell.edu.

The **International Society for the History of the Neurosciences** will hold its *third meeting* on June 4-6, 1998 in Annapolis, Maryland. The structure of the meeting will be platform and poster papers as well as thematic symposia, all to be refereed by the program committee. Proposals for papers and ideas for possible symposia can be submitted now to Harry Whitaker of the University of Quebec at Montreal, <whitakeh@ere.umontreal.ca>. For additional information contact a member of the local arrangements committee, Dr. Ola Selnes, Johns Hopkins University School of Medicine, Ola_Selnes@cogneuro.med.jhu.edu.

For information on membership in the society, contact: Dr. Duane E. Haines, Department of Anatomy, University of Mississippi Med. Ctr., 2500 North State Street, Jackson, MS 39216-4505, tel 1-601-984-1640, fax 1-601-984-1655, email dehaines@fiona.umsmed.edu

The *Twenty-second Annual Humanities and Technology Conference, Interface '97*, will be held in Marietta, Georgia on October 15-17, 1997. Sponsored by the Social and International Studies Department of **Southern Polytechnic State University** in Georgia, USA, and The Humanities and Technology Association, the conference provides a forum for discussing the interaction of humanistic concerns with scientific and technological developments. Past participants have represented such diverse fields as engineering, technology, computer science, physics, history, literature, music, and medicine. Without excluding other topics, this year's conference especially invites proposals that focus on Ethical Issues in Science and Technology. Wednesday-night lecture and Keynote Address by Ruth Schwartz Cowan, SUNY-Stony Brook.

Individual paper and session proposals must be received by May 1, 1997. Email submissions welcome. Mail to: Julie R. Newell, Director, INTERFACE, Department of Social and International Studies, Southern Polytechnic State University, 1100 South Marietta Parkway, Marietta, GA 30060-2896, tel 1-770-528-7481 or 1-770-528-7442, fax 1-770-528-4949, email jnewell@spsu.edu, web www.spsu.edu/interface.

The *Future Location of Research in a Triple Helix of University-Industry-Government Relations* will be held in **New York City** and **Purchase, New York**, on 7-10 January 1998. The boundaries between public and private, science and technology, university and industry are in flux. Universities and firms are assuming tasks that were formerly largely the province of the other. As the university crosses traditional boundaries in developing new linkages to industry, it devises formats to make research, teaching, and economic development compatible. How is the role of the university as a source of independent expertise affected by these changes?

The distribution of research locations is a key factor of economic growth in a knowledge-based economy. Within industry, questions are raised about what should be located within the firm, between firms, or among firms, universities, and government laboratories. Is there a role for the corporation in supporting basic research or is that task best left to academia and government? What is the role of government given the need for technological innovation in national and regional development? Evaluation criteria, mapping methods, foresight and assessment techniques can be reconceptualized and further developed with reference to the Triple Helix.

University-industry-government relations shape networks of communication: new research agendas are constructed on the Internet, at cooperative research centers, in virtual research institutes. A co-evolution between new technological developments and their cognitive and institutional environments changes the knowledge infrastructure. What is the feedback on the intellectual substance of disciplines? How do interdisciplinary science-technologies develop at the interfaces? A spiral model of innovation is required to capture the evolution of multiple linkages at different stages of the capitalization of knowledge.

We call for papers on these issues. Paper abstracts (two or three pages) to be submitted before June 1, 1997. Final program date: October 1, 1997. Manuscripts received before October 1 will be refereed before the conference. See for the theme paper: EASST Review, Vol. 15 (1996, Nr.4), pp. 20-25 or at www.chem.uva.nl/sts/loet/theme.htm

For further information contact convenors: Henry Etzkowitz, Science Policy Institute, Social Science Division, State University of New York at Purchase, 735 Anderson Hill Road, Purchase, NY 10577-1400, USA. Tel. 1 914 251 6600; fax: 914-251-6603. E-mail: spi@interport.net
Loet Leydesdorff, Department of Science & Technology Dynamics, Nieuwe Achtergracht 166, 1018 WV Amsterdam, The Netherlands. Tel. (+31) 20- 525 6598; fax: 525 6579. E-mail: l.leydesdorff@mail.uva.nl

The *Meanings of Practice: historical and sociological perspectives on the practices of science, technology and medicine* is an upcoming conference co-sponsored by the **Society for the Social History of Medicine** and the **British Society for the History of Science**, to be held in Manchester on Friday, November 14, 1997.

In recent years, the term 'practice' has been widely adopted by historians and sociologists of science, technology, and medicine to address a number of historiographical and sociological problems. These problems range from the importance of intellectual developments in the history of science, technology and medicine, to the relationship between social structures and human agency in social theory. The notions of 'practice' deployed to solve them seem to vary widely from one context to another, from the marxist, materialist notion of 'praxis' implicit in much work of social historians to the notion of 'world in the making' articulated by ethnomethodologists.

Although both historians and sociologists often borrow and combine these notions to solve their particular problems, it is not always clear that they can combined so freely. In fact, some of these historians and sociologists are quite critical about some notions rather than others. The aim of the meeting is to highlight this diversity, without necessarily seeking, probably impossibly, to establish a single meaning of 'practice'.

It might be more fruitful, instead, to consider the relationships between the diverse meanings by bringing together historians of sociologists and asking them to reflect and comment upon

this diversity and the reasons for divergence. Pluralism is a good thing, but it does not invalidate criticism.

For further information, contact: Paolo Palladino, Department of History, Lancaster University, Lancaster LA1 4YG, UK, tel: 44 1524 592793, email <P.Palladino@Lancaster.ac.uk>.

The Centre for Technology and Society and the Centre for Women's Research at the **Norwegian University of Science and Technology (NTNU)** are organising a combined workshop and doctoral course on *Gender, Science, and Technology*, May 27-31 1997. The course is organised as part of the activities of Network of European Centres in Science and Technology Studies (NECSTS) and is supported by the Norwegian Research Council, European Association for Studies in Science and Technology (EASST) and NTNU. It is open for participants from both Norway and abroad.

The workshop will explore recent developments in studies of the gendering of science and technology. Particularly, we will discuss the idea that gender, on the one hand, and science and technology on the other, are shaped continuously and in interaction. This will be done through presentations of both theoretical perspectives and empirical work, with an emphasis of the latter.

The workshop has a dual practical purpose. First, it is intended as a course for doctoral students. To get credit for the course, students must present a paper during the workshop or write an essay to be evaluated after the course. Second, it is meant as an arena for exchange about the teaching of and research into the gendering of science and technology.

The workshop will be situated in "Suhm-huset" in downtown Trondheim. Attendance is free, but there is a small fee of NOK 300,- to partially cover expenses for lunches, coffee/tea, copying, and social events. Register before April 4 1997.

More information about the workshop may be obtained from:
Ann Rudinow Saetnan, Centre for Technology and Society, Norwegian University of Science and Technology, 7055 Dragvoll, Norway, tel +47-73-591786, fax +47-73-591327, email: <Ann.R.Saetnan@sts.ntnu.no>

The *Fourth International Conference on Hypermedia and Interactivity in Museums* (ICHIM97) will be held at the **Louvre** in Paris, September 1-5, 1997. The focus of the meeting will be on the ways in which hypermedia and interactive experiences can enhance museum visits and museum publications as well as serve as the foundation for enhanced curatorship and scientific research. Topics of interest include Museum Content (digital capture and representation, multimedia and object database management, licensing), Hypermedia Design (interfaces, searching, navigation, linking methods, metaphors & object typologies), Interactive Publications (product development, delivery formats, marketing and distribution, online delivery systems), Installations (ergonomics, audiences, human-computer interaction), Museum Applications (conservation, education, multimedia documentation, rights management, membership and development, sales and marketing), Evaluation (formative evaluation, product pre-testing, summative evaluation, impact assessment, sales), Collaboration (Museum/Industry partnerships, Museum/University & School partnerships, Standards), and Legal and Societal Impacts (copyright, visual literacy & mediacy, the concept of museums, economic models, training). See www.louvre.fr/ichim97 and www.archimuse.com/ichim97. For more info email David Bearman, Conference Organizer, <dbear@archimuse.com>.

CALL FOR PAPERS: The 1997 Meeting of the **Society for Literature and Science**, Marriott Hotel, Pittsburgh City Center, Pittsburgh, Pennsylvania, October 30-November 2, 1997. Instructions for submitting abstracts and proposals are available at http://mickey.la.psu.edu/~hquamen/SLS_97.htm
Program Chairs: Susan Squier, email: sxs62@psu.edu, and Richard Nash, email: nash@ucs.indiana.edu

Call for papers: The Council on Middle East Studies, at the **Yale Center for International and Area Studies**, invites proposals for papers to be given at an interdisciplinary conference scheduled for October 30 - November 1,1997, entitled "*Transformations of Middle Eastern Environments: Legacies and Lessons*." 1-2 page abstracts, along with curriculum vitae, are due March 31st, 1997. Proposed Topics: Climate Change; Links between Nature and Culture: Water Management and Irrigation; Environmental Movements; Deforestation and Desertification; Pollution; Issues of the Marine Environment; Agrarian Issues and Development; Environmental Law and Policy; and Remote Sensing as a Research Tool. Please forward all abstracts to: Abbas Amanat, Chair, Council on Middle East Studies Conference on Environment, Yale Center for International and Area Studies, P.O. Box 208206, New Haven, CT 06520-8206 U.S.A. Enquiries can be directed to the conference organizers, Roger Kenna and Magnus Thorkell Bernhardsson, at tel 1-203- 432-6252; fax 1-203-432-9381; email: Roger.Kenna@Yale.edu or Magnus.Bernhardsson@Yale.edu.

Science & Society: the technological turn is the subject of an STS conference to be held in **Tokyo, Kyoto & Hiroshima**, Japan on March 16-22, 1998. Planned sessions have the following key words: Network Assessment of Science; Knowledge Production Mode 2; Transnationalization of Corporate Science; Technology and Media; Science and Technology under Cold War; International Relation in the Post-Nuclear Age; Science and Technology in Asia; Japanese Studies on STS; MITI and Innovation Policy; Post-Colonial Studies; Implication of STS on Science Education; Science Education Policy; Human Resource; Cultural Studies; Expertisation and Public Awareness; Gender; Medicine; Social Epistemology of Science; Religion and Science.

Call for papers: 15 March 1997 is the deadline for proposal for sessions and additional key words; 31 August 1997 for papers and poster sessions, 31 October 1997 for early registration ($300). Thereafter it costs $400. Information is available at http://hostcinf.shinshu-u.ac.jp/stsconfjp.html. Contact the CONFERENCE OFFICE, c/o Prof. Shin-ichi Kobayashi, Graduate School of Information Systems, University of Electro-communications, 1-5-1, Chofugaoka, Chofu City, Tokyo 182, Japan, e-mail sts@kob.is.uec.ac.jp, fax. 81-424-85-9843.

A Summer Conference on the *Anthropology of Science and Technology*, sponsored by the STS Department of **Rensselaer Polytechnic Institute** and the Committee of the Anthropology of Science, Technology, and Computing (CASTAC) of the General Anthropology Division (GAD) of the **American Anthropological Association**, will be held on 28-29 June 1997, at the RPI campus in Troy, NY. *Call for papers.*

This relatively small conference will provide anthropologists and kindred spirits with the opportunity for some sustained interaction. Papers will be presented on a wide range of topics, including technology in the workplace, new information technologies, reproductive technologies, public understandings of science, biomedical sciences, and other areas of science, technology, and culture.

Submit a one-paragraph abstract to David Hess by April 15 at the STS Dept., RPI, Troy NY 12180-3590. 1-518-276-8509 (voice); 1518- 276-2659 (fax); hessd@rpi.edu
The registration fee is $20, $10 for students and unemployed. Accommodations are handled by Corey Miller, tel 1-518-276-6694 or millec3@rpi.edu

Net News

A new mail distribution list has been set up to carry information and discussion related to the *history of chemistry*. The list is supported by the **Chemical Heritage Foundation** in Philadelphia, the **Sidney M. Edelstein Center for the History and Philosophy of Science, Technology, and Medicine** in Jerusalem, and by the **German Chemical Society's History Division**. To join send mail to MAISER@LISTSERV.NGATE.UNI-REGENSBURG.DE

with nothing but the following command in the body of your message:
subscribe CHEM-HIST

A new WWW resource on the *history of Chinese medicine* is available at www.soas.ac.uk/Needham/Chimed/. It is managed by an international group of scholars who study the history of medicine in China. They welcome curiosity and input.

The moderated listserv PCST-L@cornell.edu is devoted to discussions of all aspects of public communication of science and technology, with a substantial part of the discussion being about media issues. The listserv has about 500 subscribers, from more than 20 countries, ranging from science journalists and public information officers to museum people to scientists who popularize to academics from journalism, communication, and science-studies who specialize in science and the media. The moderator is Bruce Lewenstein <bvl1@cornell.edu>.

To join, send the following message to LISTPROC@cornell.edu:
subscribe PCST-L yourfirstname yourlastname

H-SCI-MED-TECH is a moderated electronic mail discussion list intended for the growing number of scholars who study science, medicine and technology across a wide variety of periods and regions of the world. Subscribers will be able to share information about teaching and research, to get news of professional activities (e.g., jobs, conferences, fellowships and grants) and, most importantly, to participate in conversations about matters of common interest: new methods, new questions and new scholarship.

More information can also be found at the H-Net Web Site, located at http://h-net.msu.edu and questions may be directed to Harry Marks <smt@h-net.msu.edu>. To join H-SCI-MED-TECH, please send a message to: listserv@h-net.msu.edu (with no subject line) and only this text: sub H-SCI-MED-TECH firstname lastname, institution

Sociological Research Online (www.socresonline.org.uk/socresonline) is a new, high quality, fully-refereed on-line electronic journal publishing on the World Wide Web. It has now published four issues. Contact the editor, Liz Stanley, at <s.peters@soc.surrey.ac.uk>.

The first version of the *Resource Center for Cyberculture Studies* is now up and running. It can be found at: http://otal.umd.edu/~rccs. Comments, suggestions, ideas, and contributions are welcome. The Resource Center for Cyberculture Studies is an online, not-for-profit organization whose purpose is to research, study, teach, support, and create diverse and dynamic elements of cyberculture. RCCS seeks to establish and support ongoing conversations about the emerging field, to foster a community of students, scholars, teachers, explorers, and builders of cyberculture, and to showcase various models, works-in-progress, and on-line projects. Contact: David Silver, Director, Resource Center for Cyberculture Studies, Department of American Studies, University of Maryland, College Park, <DS207@umail.umd.edu>

For some information about common email hoaxes, plus tips on how to spot them and who to check with, try the following URL: http://ciac.llnl.gov/ciac/bulletins/h-05.shtml

Positions Available

Applications are invited for a joint (equally shared) tenure stream appointment at the rank of Assistant Professor in the Departments of Geography and History at the **University of British Columbia**. The search is for an outstanding scholar in American (preferably western American) environmental history and historical geography who is well-grounded in the sciences and the humanities. Research and teaching interests must be compatible with those of both departments and preferred applicants will be those with: developed interests in the social dimensions of environmental change and the social construction of nature; and research that centres upon renewable resources, preferably forestry. Teaching responsibilities include undergraduate courses in both departments and in two or more of the following areas: American environmental history, Forest History, Natural resource or environmental geography, and Humanistic perspectives on the environment.

Applicants are expected to have a Ph.D., teaching experience and significant publications. Inquiries or applications, including a curriculum vitae and the names, addresses and telephone numbers of three referees should be sent to either:
Dr. David Breen , Department of History, University of British Columbia, #1297 - 1873 East Mall, Vancouver, British Columbia V6T 1Z1
FAX: (604) 822-6658
Dr. Trevor Barnes, Department of Geography University of British Columbia, 1984 West Mall Vancouver, British Columbia V6T 1Z2,
FAX: (604) 822-6150
The closing date for applications is 24 March 1997 and the
starting date for this position is 1 July 1997.

The **Max-Planck-Institute for the History of Science in Berlin** announces three Walther Rathenau postdoctoral research fellowships for the academic year 1997-98. The Rathenau fellowships are intended to give outstanding young scholars of all nationalities who have recently received their doctorate in any field the opportunity to pursue a research project that connects the history of science or technology to their own discipline. The deadline is 31 March.

The theme for 1997-98 is "Forms and Genres for the Communication of Scientific Knowledge". Examples might include interdisciplinary projects dealing with the representation of scientific knowledge in various forms of print and writing (lab notebooks, research papers, textbooks), museum displays, films, paintings, and other media, as well as with interactions of popular and expert knowledge traditions.

Furthermore the Institute announces the Lorenz Kruger Postdoctoral Fellowship for 1997-98 for an outstanding junior scholar whose current research combines perspectives from the history of science with those of the philosophy of science and/or the history of philosophy. The fellowships are awarded for a one year stay at the Institute in Berlin, beginning October 1997. They are open to scholars of all nationalities who have completed their Ph.D. no later than 30 September 97 and no earlier than 30 September 92. The stipend for applicants from abroad is 3400 DM per month. Women are encouraged to apply. Qualifications being equal, precedence will be given to candidates with disabilities. Applicants are invited to send a curriculum vitae, a brief research proposal (500 words), a writing sample (e.g. a dissertation chapter or article), and two letters of recommendation to:

Max Planck Institute for the History of Science, Abt. Personal, Wilhelmstrabe 44, 10117 Berlin, Germany.

The **National Science Foundation** has issued a new announcement for proposals, titled, *"Societal Dimensions of Engineering, Science and Technology: Ethics and Values Studies, and Research on Science and Technology."* The announcement number is NSF97-28. Target dates for proposal submission are February 1 and August 1, yearly.

You can get the new program guidelines electronically by sending an e-mail to <stisserve@nsf.gov>. In the text of the message, write *get nsf9728.txt* and you will be sent a copy. For general information about how to get NSF materials, send a separate e-mail and in the text write *get nsf9564.txt*.

The NSF Home Page address is www.nsf.gov. You can also find the new guidelines at the NSF web site, under www.nsf.gov:80/wais/pubs.htm. When you reach that site, you will see a box in which to insert the nsfpubnumber, such as: nsf9728. Once you do that and click on "search," the document will appear.

Postdoctoral Awards at La Villette

The Centre National de la Recherche Scientifique, Cité des Sciences et de l'Industrie ("La Villette") is pleased to announce several research positions (for French speakers) funded by the C.N.R.S. for the year 1998. Candidates must have a doctorate in the history of science or technology (or closely related fields). Applications are encouraged from younger scholars whose projects fall within one of the Centre's main areas of research: 1. the history (19th and 20th century) of the relationship between science, technology and industry; 2. the history (19th and 20th century) of the spread of scientific and technical knowledge and practices, including the history of popularization; 3. the history (19th and 20th century) of the interaction of France with foreign countries in the fields of science and technology; 4. the historiography of science and technology in general.

Work at the Centre is interdisciplinary, with a strong emphasis on comparative studies. Research resources include the specialized libraries and other facilities of the Cité des Sciences et de l'Industrie. The duration of an appointment usually varies from three to six months. All positions require a work permit issued by the French authorities. The gross monthly salary is usually around 13.000 Francs.

Deadline for applications for 1998 is March 28, 1997. Letters of application, accompanied by a complete curriculum vitae, a list of publications, a brief statement of the proposed research (in French) and two letters of recommendation, should be sent to John Krige, directeur, C.R.H.S.T., Cité des Sciences et de l'Industrie, 75930 Paris Cedex 19, France. tel 33. 1. 40 05 75 52; fax 33. 1. 40 05 75 51.

The 1997 awards were as follows:
Jennifer Alexander (University of Washington, Seattle) topic : The international congresses on scientific management held in Europe in the 1920s; Thomas Archibald (Acadia University, Wolfville, Nova Scotia) topic: The evolution of the distribution of labour between mathematician-analysts and theoretical physicists in the 19th Century;
Beatrix Bäumer (Technische Universität, Braunschweig) topic: A FrancoGerman comparison of the origins of cooperation between university research and the chemico-pharmaceutical industry in the 19th Century;
David Cahan (University of Nebraska, Lincoln) topic : From natural philosophy to the sciences: historiographical studies on science in the 19th Century;
Ileana Chinnici (Palermo Observatory, Italy) topic: The diffusion of photographic techniques in astronomy and the international "Carte du Ciel" project (1887-1964);
Marcela Efmertova (Faculty of Electrical Engineering, Technical University of Prague) topic: A comparative study of the scientific and industrial relationships between Czech and French electrical engineers in the interwar period.

News from the Association

EASST Elections Results

Rob Hagendijk, from the Department of Science and Technology Dynamics at the University of Amsterdam, has been elected president of EASST. He succeeds Aant Elzinga on July 1, 1997.

Elected to the EASST Council were Maria Eduarda Gonçalves (Instituto Superior de Ciencias do Trabalho e da Empresa, Lisbon, Portugal), Günther Küppers (IWT, University of Bielefeld, Germany), Mammo Muchie (Environmental Science and Engineering, Middlesex University, Oakwood , U.K.), and Luis Sanz-Menendez (Consejo Superior de Investigaciones Cientificas, Instituto de Estudios Sociales Avanzados, Madrid, Spain).

In total 113 ballots were returned to the EASST secretariat.

News about the Profession

Renate Mayntz retires

Renate Mayntz, sociologist and founding director of the Max Planck Institute for the Study of Societies (MPlfG) in Cologne, Germany, will be retiring on April 28, 1997.

Devoted to basic research on the interplay between government intervention and social self-regulation, the MPlfG is in the midst of a transitional phase. Professor Mayntz is working with the institute's future directors, Professors Fritz W. Scharpf and Wolfgang Streeck, in developing a new research programme aimed at studying the governance of advanced industrial societies in the face of internationalization and economic globalization.

In 1985, Renate Mayntz became the founding director of the Max Planck Institute for the Study of Societies in cologne, while remaining an honorary professor at the University of Cologne. Mayntz research interests include macro-sociological theory, comparative social and political research, organizational and administrative sociology, and the sociology of technology.

A collection of her essays is being published in honor of the occasion of her retirement: *Soziale Dynamik und politische Steuerung*, at Campus Verlag. Mayntz intellectual autobiography can be found in 'Mein Weg zur Soziologie: Rekonstruktion eines kontigentes Karrierepfaden' in C. Fleck (ed.), *Wege zur Soziologie nach 1945: Biographische Notizen* (Leske & Budrich, Opladen, 1996).

The Nicholas Mullins Award

The Nicholas Mullins Award is awarded each year by the Society for Social Studies of Science (4S) for an outstanding piece of scholarship by a graduate student in the general field of Science and Technology Studies. The prize, consisting of a cheque of 500 U$ and a certificate and travel money for the 1997 annual meeting will be awarded for the seventh time.

The competition is for graduate student papers, which must be submitted in English, based on all types of scholarly products in the field of science and technology studies: unpublished papers, published articles, dissertation chapters. It is recommended that dissertation chapters be adapted so as to make them "stand-alone." The work may not be older than two years at the time of submission. The intended readership for the papers is a general STS audience, rather than a specialized disciplinary readership. A graduate student can only make one submission a year.

The length of a paper should not exceed 10,000 words -- including notes and references. According to the rules, longer papers will be "punished" in the evaluation procedure, i.e., they do not have to be read in their totality. They should be typed double-spaced. Six (6) copies should be sent to the chair of the Nicholas Mullins Award Jury (see address below), but for students for whom this would be a financial hardship two (2) copies would be acceptable.

The name and address of the author, the name and address of the author's institution should be on a separate sheet, so that these can be detached from the distributed copies. Deadline for submitting contributions is 1st June 1997. Papers received after that date will be considered for next year's contest. The evaluation is executed blindly by a jury of STS scholars. The winner will be announced at the Banquet at the Annual Meeting of the 4S. Winners are expected to attend the Annual Meeting of the 4S.

For further information, please contact the chair of the jury: Anne Figert, Department of Sociology and Anthropology, Loyola University Chicago, 6525 North Sheridan Road, Chicago, IL 60626-5311 USA, e-mail: afigert@luc.edu, FAX: 1 773 508 7099, Phone: 1 773 508 3431.

Journal news

Articles are being solicited for *Perspectives on Science: Historical, Philosophical, Social.* It publishes studies of science (and medicine and technology) that integrate historical, philosophical, and/or sociological understandings of the topic(s) addressed. Each issue includes case studies, theoretical articles, and historiographic essays. For more information, see www.journals.uchicago.edu/POS/home.html. Or contact Ed Lamb, Managing Editor, Perspectives on Science Department of Philosophy, Virginia Tech, Blacksburg, VA 24061-0126, USA, tel 1-540-231-7879; fax 1-540-231-6367; email lamb@vt.edu or pos@vt.edu.

Event Horizon is a new interdisciplinary journal in the arts and sciences. It is an interdisciplinary forum for researchers and writers in the sciences and humanities. Each issue treats a topic of broad interest. The journal invites contributions from the natural and physical sciences, medicine, computer science, engineering, social science, history, literary and cultural studies, and the arts. Each issue will feature a variety of essays, book and film reviews, and a simple and relevant science experiment. Contact: EVENT HORIZON, c/o Thomas Akbari and Don Fallon, Department of Literatures in English, Murray Hall, CAC, Rutgers University, New Brunswick, NJ 08903, USA, e-mail akbari@eden.rutgers.edu or ubik@eden.rutgers.edu.

Donna Haraway at the 1997 European Graduate Summer School

In cooperation with EASST, the 1997 European Graduate Summer School in Science and Technology Studies will be held on 1-5 September 1997 in Enschede, The Netherlands. This year the key lecturer will be Donna Haraway, and the focus of the program is her work.

Donna Haraway will present various themes running through her scholarship as they relate to science, technology and gender. Other speakers will join in and elaborate on these themes in various directions. There will be ample time for participants to present and discuss their own work. Informal exchange with other participants and with the speakers is a long-standing feature of the Summer School.

The annual Summer School has been organized since 1986 by the Netherlands Graduate School of Science, Technology and Modern Culture (WTMC). Participation in the School is part of the curriculum for WTMC students in the Netherlands. Graduate students from other European and non-European countries are most welcome to join the Summer School and enjoy the lively debates and informal exchange with other young scholars and distinguished senior researchers in the field. EASST supports the Summer School through its Travel Stipend Scheme.

Fee : DFL 1400.-; Reduced rate: DFL 1200.-.

Fees include lodging and breakfast from Sunday or Monday till Friday as well as coffee and tea during breaks, the welcome reception and all materials relating to the lectures. Lunches and dinners can be taken at the (student) restaurants on the campus.

Participants who are members of EASST can participate at a reduced rate. This reduced rate also applies to foreign participants from institutions that participate in European exchange programs in STS (like NECSTS, ESST, TSAST).

Scholarships: WTMC offers five stipends of DFL 400,- for promising young foreign scholars who do not have sufficient means to cover the costs of their participation.

Travel Stipends: See EASST Review vol 15, 1, p. 31. The information also has been posted on the EASST web site: www.uva.chem.nl/easst.

Letters of application should include a short C.V. and a description of one's research. In order to qualify for a reduced rate or a stipend the letter of application should contain the relevant information about one's research, institutional affiliation and/or EASST-membership. If one applies for a WTMC stipend a letter of recommendation from a senior scholar in the STS field is required. Applications for EASST Travel Stipends should contain the information stipulated in the EASST Review.

For applications, stipends and further information please contact Rob Hagendijk, Dept. Science & Techn. Dynamics, University of Amsterdam, Nieuwe Achtergracht 166, 1018 WV Amsterdam, The Netherlands. Tel 31-20-525-6898, fax 31-20-525-6579, email a498rob@horus.sara.nl.

Application deadline: May 20, 1997.