International Summer Academy on Technology Studies

Technology Studies and Sustainability

Deutschlandsberg, Austria, July 11 – 16, 1999

Organised by the Inter-University Research Center for Technology, Work and Culture (IFZ), Schloegelgasse 2, A-8010 Graz, Austria, the aim of this summer academy is to explore ways for a sustainable, i.e. socially and environmentally friendly, design of technologies as an issue of technology studies and technology policy. How can technology studies contribute to sustainable development? Do they provide new perspectives to analyse and to actively shape technological change? Can technology studies raise the reflexivity of the discourse on sustainability? Is it functional to policy agenda building?

Approaches such as in STS studies might be useful to inform strategies for sustainable development, develop new methods and instruments and highlight a different kind of technology policy – one that does not focus solely on economic competitiveness but on the use level, on the content of technologies, one that refers to a broad range of actors in an interactive and participative way. To put it short: technology studies demonstrate that successful technological innovations require social innovations.

Programme

Each of the five working days of the academy will consist of a morning session with invited speakers, who already have significantly contributed to the conference topics, a session with presentations of participants of the academy, which will be linked to the questions of the morning session, and flexible ad-hoc meetings on upcoming issues and research questions.

The general topics of the summer academy will focus on:

I. Environmental technology policy – new paradigms and new approaches
II. Analysing the discourse on sustainability and its relevance to agenda building
III. Methods and instruments: constructive technology assessment, participative technology assessment, technology foresight
IV. Towards a green techno-economic paradigm

The venue of the academy in Austria is also intended to integrate research communities from Central and Eastern European transition economies into a context of discussion, which so far has been mainly influenced by Western European and US scholars. The City of Deutschlandsberg and the Austrian Federal Ministry of Science and Transport thus will provide grants for researchers from Central, Eastern and South-Eastern European transition economies, which will cover accommodation and fees.

Call for Papers

Participants are encouraged to present a paper related to one of the conference topics. Please submit a one page abstract and a maximum of one page on your work and research background. The deadline for submissions is Tuesday, April 6. You will be notified of acceptance until April 26. A maximum of 40 participants will be accepted.

Conference venue

The summer academy will take place at Deutschlandsberg Castle (near Graz) among the vineyards of the Styrian wine-growing district. Graz can be easily reached by plane, train or car. From the airport or railway station you can get to Deutschlandsberg by public transport (approx. 1 hour).

Fees & accommodation

Conference fees: ATS 4,000 (approx. EUR 290). Fees include proceedings and other conference materials. Hotel rooms have been reserved by the organisers at the castle (Burghotel ****) and in Deutschlandsberg. Costs will be ATS 4000 – 5000 (EUR 290 - 360), including full board and coffee breaks for the period from Sunday evening to Friday evening and social events during the week.

Further information

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EASST Review

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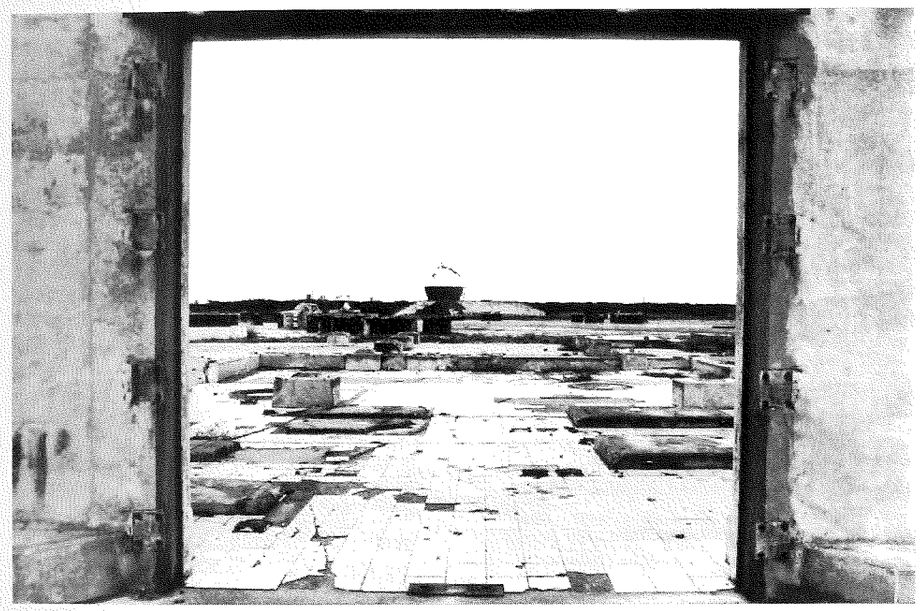

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frontpage illustration: Complex 34 (Apollo) at Cape Canaveral

Regulatory Futures: How STS Can Contribute

by Maria Eduarda Gonçalves
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Review of Roland Bal and Willem Halffman (eds.), *The Politics of Chemical Risk. Scenarios for a Regulatory Future.* Dordrecht, Boston, London: Kluwer Academic Publishers 1998, 367 pages.

In many Western countries in recent years, public authorities have been faced with major crises of credibility regarding their ability to adequately manage environmental and public health issues, based predominantly on scientific and technical advice. In controversies concerning BSE or transgenic products, for example, the relationships between science and politics have been at the center of the debate. These controversies have clearly indicated that uncertainties in science impose limits to political or regulatory solutions rationalised on technical grounds. Additional evidence indicates that public trust is a pre-condition for effective decision making. These notions, which have been acknowledged by STS researchers for at least two decades, have recently become more distinct to the public, and hopefully also to policy makers.

The Politics of Chemical Risk. Scenarios for a Regulatory Future, edited by Roland Bal and Willem Halffman, has chosen a more 'traditional' theme than the regulation of BSE or of transgenic products. It inquires into the relationships between risk assessment (science-based evaluation), and risk management (policy-oriented or regulatory decision). Analyses of the tensions at this interface are undertaken in the light of a variety of national and international regulatory systems and cultures, with different styles of using science, and different ways of doing politics. Although the theme is 'not unusual' (in the editors' own words), the perspectives from which the authors look at it are, in my view, rather innovative. The book indeed brings in new insights and thoughtful theoretical and policy-oriented suggestions for a 'regulatory future' in the area of chemical risk that may be of use for both social and policy researchers, and regulators in this, as well as in other public policy areas.

In their introductory remarks, the editors recall that the separation between science and policy in the evaluation of chemical risk has been instrumental, particularly since the 70s, in the legitimation of the regulation of chemicals. Social analysts, however, have questioned this separation by focusing on risk assessment and management as social constructs. One basic proposition of this book is exactly to combine the approaches from the natural and the social sciences, with a view to improving the regulation of chemical risk. In promoting the building of such a bridge, the endeavour of *The Politics of Chemical Risk. Scenarios for a Regulatory Future* appears to be much in line with present efforts within STS studies to put social research to practical policy use.

The book is based on a workshop. Its contents, however, represent more than just a record of 'proceedings'. The volume contains a collection of original papers authored mainly by academic researchers, but also by regulatory scientists, and public administrators. The editors' work in the structuring and balancing of the book's contents, and in introducing constructive suggestions for improving regulation, deserves special reference. Parts I, II and III are preceded by an introduction, and succeeded by a summary of the discussions that followed the presentation of the corresponding papers at the workshop. Part IV consists of a reflection on scenarios for regulatory policy. At the end of the book, the editors tell us the story of the rationale, the organisation, and the dynamics of the workshop, in a set of very useful and inspiring notes.

Part I addresses the Risk Assessment/Risk Management boundary, a topic which in fact pervades the whole book. Part II looks, in a

comparative perspective, to the National/International arenas. Part III's object is Standardisation. Part IV, authored by the editors, presents the Scenarios and Reflections for a regulatory future.

Most of the articles included in this volume provide evidence that scientific data used as a basis for chemical risk regulation, despite their apparent (quantified) precision, and the rhetoric that often accompanies their use, are the result of presuppositions and choices, and involve considerable uncertainties. As pointed out by Sue Mayer and Gillian Glegg, in the first paper of Part I, while ecotoxicology's function has been to supply scientific data for use in decisions about chemicals control, by defining the amount of a chemical that may be discharged, seldom does sufficient data exist to carry out a complete assessment of both the chemical, and its receiving environment. Besides, the ways in which such uncertainties are interpreted are unknown, which obscures the boundary between risk assessment and risk management (p. 15). That notwithstanding, scientists themselves usually regard the establishment of relevant standards as a technical problem, away from politics and economics, and tend to minimise uncertainties (p. 19). This attitude is often coupled with a propension to give industry the benefit of the doubt (p. 20-21).

Following a similar line of argument, Mark Piney calls attention to the contrast between the rhetoric of the standard setting process for occupational exposure limits (OEL), that considers the health effects of toxic substances, and the fact that potential risks to health are balanced against the practicabilities of control (p. 48). The capabilities and costs of current control technologies and methods, current exposure levels, the technical and financial situations of the industry, the relative organisational ability and power of the groups involved in the OEL setting process, as well as the perceptions by the standard setters of the seriousness of the health effects -- all these factors underlay the standard setting process (p. 55-56). Thus, political aspects clearly enter risk assessment.

The risk assessment/risk management divide is, after all, a 'myth', argue Mayer and Glegg, and the real question is how to have it recognised that choices behind risk assessment ultimately are political choices (p. 23). It would, therefore, be in the domain of democratic responsibility to make judgments about how much uncertainty over risk we wish to tolerate in relation to particular products and processes (p. 24). For the sake of clarity and effectiveness of regulatory procedures, Piney also claims there's a better separation to be made between science-based health-based standards, on the one hand, and reasonably practicable exposure limits and associated specification standards, on the other.

Roland Bal examines how organisational formats and mandates, what he calls the 'rationalistic repertoire', affect the role of different partners involved in the development of standards for occupational chemicals, thereby institutionalising the boundary between science and non-science. His history of the Dutch system shows that the institutionalisation of OELs definition and the setting of a structure where experts, interest groups and policy makers were represented, with no clear organisational boundaries between assessment and management functions, led, with time, to recognising the need for a neater boundary. This boundary became one of the main sources of the procedure's legitimacy. But the need to find ways to deal with uncertainties in scientific data across that boundary remained (p. 86).

Part II addresses the political aspects of harmonisation of standard setting at European and international levels. The central issue here is the implications of Europeanisation and internationalisation of regulation for the risk assessment/risk management distinction. The starting assumption, as laid down in the introduction to this chapter, is that the European Union regulatory system seems to favour 'technocratic' forms of expert advice (p. 117).

In the first article of this part, Vic Feron recognises that even relatively well structured systems, such as the Dutch system for the definition of occupational standards, are confronted with the difficulties raised by poor toxicological databases, procedure delays, and inconsistencies of evaluations. One crucial message coming out of this paper is the importance of the experts' experience (a different concept from that of expert knowledge), and open-mindedness to compensate for those limitations, both in the national and the international instances (p. 128). The author's belief in the 'wisdom' of experts and their capacity to promote understanding and, ultimately, the required consensus in risk assessment, across communities and nations, does not seem to depart much from the concept of 'epistemic communities'. This notion, which has been helpful in explaining the role of scientific expertise in international organisations, might, in my view, also provide insights into the role of expertise inside EU regulatory committees.

Like Roland Bal in Part I, Karel van Damme also takes an institutionalist approach to focus on two different legal frameworks under which standard setting is carried out within the EU: Articles 100 and 118 of the European Union Treaty, which deal respectively with the harmonisation of regulation in the single market, and with health protection of workers under the EU social policy. Whereas under Article 118, a clear separation between health-based and feasibility considerations appears to be guaranteed, under Article 100, the provision of scientific advice for the classification and labelling of chemicals is largely dependent on the industry (p. 148). The comparative study of the two procedures leads the author to conclude that risk assessments under Article 118 better meet the criteria of objectivity, impartiality and 'non-neutrality' (to protect public health), than Article 100. Article 100 procedures are criticised, in particular, for facilitating the dominance of manufacturers, with the exclusion of certain sciences, as well as certain 'publics', and to be more prone to political pressures.

The contribution by Robert Nilsson brings in the special case of Sweden, and the tensions that the social and political features of this country are beginning to raise for EU standards harmonisation. Environmental extremism, with low levels of acceptance of risks, and a highly centralised and powerful regulatory system, have led Sweden to introduce a number of chemical bans and regulations with no parallel in other EU countries, and the EU (p. 162). Stringent controls on industry, in particular, depart considerably from the common trend in the EU. As other papers in this book show (e.g. Mayer and Glegg, and to some extent also Irwin et al.), uncertainties involved in risk assessment tend to be interpreted so as to favour industrial interest. Not surprisingly, differences between the regulatory practices of Sweden and the EU have been at the core of political tension. Nilsson believes that Swedish participation in the EU will lead to a better balance of power (in favour of industry, in this case) between regulators, citizens, and industry.

Sheila Jasanoff attempts to answer the difficulties of harmonising standards across countries and cultures by putting forward a suggestive concept of 'harmonisation' as 'reciprocal commentary'. By 'reciprocal commentary' she means the exchange, among partners in this process, of qualitative (not only quantitative) information about prior practices, through feedback mechanisms that may enable appreciation of successes or failures across countries, thereby promoting cross learning and understanding of institutions' culture and history (p. 174). Lessons drawn from constructivist analyses could, in her view, serve to improve standard setting processes, particularly in international contexts marked by greater socio-cultural, economic and political differences among partners (p. 186). 'Letting the messiness of politics back into harmonisation', concludes Jasanoff, 'may well be more productive in many cases than leaning too hard on the supports of science' - especially at a time when science is faced with a problem of credibility, one might add.

Part III begins with Patrick McCutcheon's description of the standardisation of tests and assessment protocols for the regulation of chemicals at European level. The author focuses on the procedures for delivery of data by industry, the selection of priority substances according to relative risk, the evaluation by rapporteurs, and the function of governmental committees (p. 220). McCutcheon's central point is the role of expert judgment throughout all this process.

Irwin et al. address the workings of 'regulatory science' in the field of agro-chemicals in the United Kingdom, under the impact of European regulation. Regulatory science, the authors argue, presents a number of special features, namely its location, its ethos and its contents. As could be expected, the institutional location of regulatory research is industry. This institutional context shapes the ethos of this kind of research (p. 245). The consequences of this status quo for the intermingling of science and economic

interests are not hard to perceive. The traditionally secretive and informal nature of the British regulatory system, and its close relationships with the private sector, seem to have helped the features of U.K. regulatory research to survive for a long time. The authors, however, point to the impact of the EU regulatory environment on U.K. firms. These firms have had to adapt their practices in order to comply with the more formal and demanding requirements of European harmonisation.

Peter Calow goes further into the 'deconstruction' of risk assessment. Before any risk assessment can be undertaken, the author recalls, a number of preliminary 'management' decisions must be made, namely on what to protect, how far to standardise, and which tests to select. The same is true for the choice of habitat and species where tests are to be applied (p. 254). In spite of this, the author observes, the technical community is actually the one who takes most of these decisions. For Calow, the challenge, therefore, is to enable informed and useful input from all interested parties on either side of the technical divide, in accordance with the principles of permeability and transparency.

Based on examples taken from environmental risk assessment of chemicals in the Netherlands, the UK and the US, the last article of this volume, authored by Wilhem Halffman, centers its attention on the issue of trust, particularly on standardisation as a trust device. Standardisation of risk assessment methodology should be regarded as more than a merely technical affair, stresses Halffman. It also should be viewed as a means to establish trust among experts (p. 267). Here again, one is faced with a contrast between rhetoric and practice. Even though the standardisation of the environmental hazard of chemicals is generally presented as a technical affair, this does not imply that there are no expert judgments, which are not technical judgments, to be made.

Without wanting to diminish the solid technical reasons for regulatory scientists to standardise toxicity tests, Halffman's paper argues that a sociological approach offers additional insights that could help to understand how standardisation 'works' or does not work. Halffman emphasises that the process of establishing trust among experts has very similar traits to the process of establishing trust in experts, by those who are not members of the institutions of risk assessment (p. 267). This kind of comparison might be useful to understand sources of mistrust and contestation.

As this very brief and selective summary of contents indicates, consensus emerged among the contributors to *Politics of Chemical Risk* regarding the usefulness, for the regulatory process, of maintaining (or establishing) the separation between the risk assessment and the risk management functions. Most authors also agreed, however, that uncertainties in science, and the social and political basis of scientific assessments should be made more explicit and transparent than is often the case. Most papers also seemed to accept that the actual alternative is not between basing harmonisation efforts just on science, or understanding cultural differences and rationalities with the assistance of social scientists. It is rather in a compromise among the two kinds of action.

Drawing upon suggestions from the various papers, the editors attempt, at the end of the book, to map different scenarios for the future development of chemical regulation. Four possible scenarios are presented, in a reflexive and imaginative, though somewhat schematic manner, with particular reference to the EU (p. 310 ff.). In scenarios 1 and 2, regulation is centralised at the international or European level. In the first of these scenarios, regulation relies on a *corpus* of international experts belonging to a 'European Agency of Chemical Regulation'. Under this scenario, the boundary between risk assessment and risk management is very marked. In scenario 2, labelled 'European risk consultation', a 'European Office of Chemical Assessment' centralises the risk assessment process. The boundary between science and politics is looser. International political decisions are based on expertise in the context of an open process.

In the two remaining scenarios, by contrast, member states play the major role. In scenario 3, called 'European Coordination of Assessment', EU expertise is provided mainly by member states, the role of the EU being to harmonise standards in committees that represent national institutions. Expertise and the national context, therefore, intermingle. Scenario 3 is apparently closer to actual European regulatory practice. In scenario 4, Europe, through the 'European Office of Constructive Risk Assessment' acts as a 'translator': differences in regulatory styles and in views on risk from different countries and interest groups are the starting point for European action. Various risk assessments are compared, and ultimately standardisation is lacking (p. 317).

The authors conclude that there are good reasons to maintain a division of labour between the domains of science and policy. To politicise every technical detail would, of course, increase conflictuality. Conversely, regulatory decision-making that is relegated to experts would lead to uncontrollable technocracies, as actual crises on BSE or transgenic products do confirm.

Regulators in the field of chemical risk, as well as in other fields of public regulation, in both national and international agencies, can find, in these propositions, valuable information for reflection and action aimed to improve the theory and practice of regulation.

Did NASA Become the Post Office Gone to Space?

by Noortje Marres
University of Amsterdam

Review of Howard E. McCurdy, *Inside NASA, High Technology and Organisational Change in the U.S. Space Program*, John Hopkins University Press, Baltimore, 1993.

When Pathfinder landed on Mars on the 4th of July 1997, and Sojourner was rolled out in front of the world's eyes, NASA played the role it likes best: an organisation (leading space agency in the world) capable of cutting-edge technological achievements (robotic rover), of bringing people together (this time on the internet) through a miraculous performance of good (peaceful, elegant, intelligent) high technology. Pathfinder was the inaugeral mission of the Surveyor program, another mission of which, the Mars Surveyor Lander, is now on its way to Mars. Pathfinder also can be seen as the inaugeral ceremony of the new NASA. It was the first high-visibility project realized under the 'faster, cheaper, better' policy the current Chief Administrator, Dan Goldin, introduced in 1994. The mission was directed by a young crew, in intense collaboration with industry and with a low budget. (Pathfinder is said to have cost less than *Jurassic Park*.) It would be rash to take Pathfinder as exemplary of NASA's current practice, but it showed NASA to be healthy and highly capable organisation.

The book under review testifies to the fact that only four years earlier it was far from evident that NASA could again become the centre of true excellence it had been at the time of the Moon missions. It traces the decline of NASA's capability of accomplishing technologically difficult projects during the seventies and eighties. As the book's title makes clear, the account of public affairs scholar Howard McCurdy is from the inside, and organisational change lies at the center of analysis. Starting from the culture put in place with the establishment of the space agency, McCurdy describes its blossoming during the first decade of spaceflight. The organisation's subsequent weakening is explained as the erosion of its original culture. The book is thus about the old NASA; it examines the rise and fall of NASA as it was in the beginning. Bureaucratisation is seen as the principal force of decline. Eventhough McCurdy doesn't exclude the possibility of revival, he does

consider bureaucratic take-over a structural tendency affecting high-performance organisations in the public sector.

Not only is it an unproblematic sociological insight that governmental institutions undergo bureaucratisation as they grow older, but from an STS point of view McCurdy's frame of analysis is also fairly unusual. McCurdy namely opposes bureaucratisation to culture. Instead of describing bureaucratisation as part of the organisation's overall cultural development, he sees it as going against culture. In his approach, norms and practices unify an organisation, excessive regulation and administrative growth takes it apart. Moreover, McCurdy takes strong culture as strengthening an organisation's performance, a proposition he derives from neo-functionalist studies of corporate culture.[1] McCurdy thus works with a framework where the dominance of culture over bureaucracy explains success, and the overshadowing of culture by bureaucracy accounts for failure.

Even at first sight, this approach can be judged assymetrical, and possibly also romantic. It should be taken into account that McCurdy's analysis is based on the opinions of NASA employees. It relies on interviews with NASA engineers, scientists and administrators and an additional survey, and was written as part of the program of the NASA History Office. While McCurdy takes care to meet requirements of statistical analysis and also crosschecks personal accounts with historical documents, he stresses that his observations reflect the views held by people associated to NASA. 'This is the culture as they describe it' (p. xiv). It provides an uncritical insider's view of a technoscientific institute that perceives itself ideally as a centre of pure excellence, and prefers whenever possible to downplay its managerial and political affairs.

McCurdy begins with an overview of the organisations that were brought together in 1958 to form NASA. Most of them had been part of the military, but McCurdy doesn't put a strong emphasis on this origin. Instead he focuses on the culture of 'the engineer-scientist in charge' and its constribution to early NASA culture. McCurdy observes a large continuity between the predecessor organisations and the new space agency. The research centres of NACA (National Advisory Committee for Aeronautics), those of AMBA (Army Ballistic Missile Agency, lead by Werner von Braun and other German engineers) and the Naval Research Laboratories (which was in charge of the first [unsuccessful] satellite-program), received new names and new tasks when they became NASA, but their location and composition remained largely the same. McCurdy describes the centres as distant from Washingtonian politics, as adherents to 'the triumph of technology and scientific inquiry for problem solving' (p. 13) and as cultivating a meticulous work attitude. His account is very detailed, but because McCurdy brings these characteristics together under the heading of technical culture, his analysis remains one-sided. That the above properties can be explained, not only as deriving from the techno-scientific practice of the organisations, but also from their embeddedness in the U.S. military, is largely left out of the account. When McCurdy does refer to the military context in which the organisations operated, it is treated as simply an external condition for the development of technical culture. With regard to NACA, for example, McCurdy states: 'Since much of NACA's aeronautical work was done for the military, it acquired a powerful client that could shield it from the political cross-firing affecting other civilian agencies.' He doesn't go on to treat this situation as directly constituting organisational culture; instead he concludes by stating that it allowed 'a technical rather than a bureaucratic culture' (p. 28) to blossom.

McCurdy further elaborates on 'the engineer-scientist in charge' when discussing the working assumptions of NASA management (former NACA scientists and engineers, and administrators from Washington). The testing of prototypes and developed devices is described as playing a crucial role in the young agency: it served as a source of innovation and as the dominant criterion in assessing reliability and in decision-making in general. McCurdy attributes great importance to the last aspect: he values the culture of verification for its capacity to ward off tendencies of bureaucratisation, and to shield NASA from political interference. He thus observes a great distance between the techno-scientific authority that ruled NASA and conventional policy-making in the public sector as well as the political authority of

government. While the fact that NASA management succeeded in implementing a policy where decisions were founded on technical and scientific standards is certainly significant, McCurdy falls short in his explanation of this success. He only accounts for it as deriving from the assumptions held in the predecessor organisations (NACA and AMBA). The question as to why an agency that is assigned the politically highly laden project of spaceflight, with a Washington official as its Chief Administrator, nevertheless managed to keep techno-scientific control over the decision process, is left unanswered.

By describing a substantial part of NASA's original culture as deriving from the predecessor organisations, McCurdy to a certain degree evades the political and economic factors that influenced it. While he does present cultural elements that evolved in NASA in reaction to events in the political realm, McCurdy's distinction between those that do and don't pertain to the world outside, seems arbitary. The relation between NASA and industrial contributors to the space program, for example, is described entirely in terms of the NACA and AMBA cultures. According to McCurdy, the inherited emphasis on in-house technical capability assured NASA's relative independence from commercial contractors, and allowed it to subject them to close supervision. But the high interdependence between NASA and industry (95% of NASA's budget was spend on industrial contracts), as vividly described by journalist Norman Mailer in his *A Fire on the Moon*, is not considered constitutive of NASA culture. The cultural elements of tolerance towards risk and failure and frontier mentality, on the other hand, are discussed in a political context. McCurdy describes them as having evolved in response to the task President Kennedy formulated in 1961 ("I believe that this nation should commit itself to achieving the goal, before this decade is out, of landing a man on the moon and returning him safely to the Earth"), and to the financial and public support NASA enjoyed as a consequence. NASA's willingness to put men on top of modified intercontinental ballistic missiles is thus brought in relation to America's involvement in the battle over technical supremacy with the U.S.S.R. But, as McCurdy also mentions, in reference to Tom Wolfe's docu-drama about the early days of spaceflight, *The Right Stuff*, tolerance of risk and the drive to do what no man has done before played their part as well in the cutting-edge cultures of NACA and AMBA, with their test flights of experimental airplanes and rockets. In his analysis of NASA's original culture, McCurdy doesn't make sufficiently clear how it was marked by the national goals it was assigned to realize.

McCurdy's account is susceptible to the critique that he mainly explains success by internal factors, not by external ones. But the other half of this criticism does not fully apply. McCurdy doesn't switch to an external explanation in order to account for failure, but largely remains inside NASA. He considers budget cuts, fading public support and bureaucratisation of government as a whole only partly responsible for the decline, and locates the epicenter of change in NASA's inability to negotiate with government and the preponderance of management over technical culture within NASA. On the basis of statistics of the size and age of the work force, internal promotions and the ratio of administrative to scientific and technical employees, McCurdy shows that the weakening of NASA began in 1967. This moment of turnabout is also recognized in other studies of U.S. science and technology policy. McCurdy describes it as the point at which political considerations took over from techno-scientific ones. This rather naive separation of the political and the techno-scientific again approaches an all too familiar asymmetry, but McCurdy does conceptualize the conflict between the two as an internal dynamic. He lays bare the grounds on which a previously technocratically run centre of excellence experiences the mixing of techno-science and politics as an unhappy marriage. He gives a detailed account of how the slow-down of the decision-making process, inconsiderate interference of managerial considerations in design affairs and incessant project presentations made it impossible to direct programs as efficiently as before. Describing the overspending, delays and technical problems that infested the Space Shuttle, space station Skylab and the Hubble Space Telescope, McCurdy makes clear how *'NASA became the Post Office gone to space'*, as one employee expressed it. (It's a comment I've also heard being made about the European

Space Agency, in a bar at ESTEC, ESA's research centre near the picturesque coastal town Noordwijk, the Netherlands. There an employee said that ESA has always resembled a space-faring Post Office).

While McCurdy's discussion of bureaucratisation is revealing, his analysis of the sources and consequences of the process is slightly dissapointing. The latter are almost exclusively described as the erosion of NASA's original culture. The elements that McCurdy put in place in the first part of the book, are taken up one by one to report on their decline: instead of letting test results decide, managerial factors became decisive; instead of keeping up the technical capability inside NASA, the agency increasingly came to rely on industry; instead of acknowledging risk, people closed their eyes to it; instead of looking for projects that no man had undertaken before, employees grew conservative. This account is extremely homogeneous. Besides the Space Shuttle Program, which he describes as an partially failed attempt at the routinisation of space flight, McCurdy pays little attention to the other types of space missions that NASA continued to develop after the ending of Project Apollo in 1972. The unmanned planetery probes, for example, that NASA launched during the seventies and eighties, are only mentioned very briefly. While these missions[2] didn't produce the shock effect of the manned missions to our nearest celestial body, and didn't come near to the sense of victory and heroism attached to the first moonlanding (the culmination point of the space race), they seem to point at a change of the space agency, more subtle and open-ended than the simple loss of original culture. With regard to the sources of change, McCurdy's mainly attributes it to organisational aging, a concept he derives from studies of government. It suggests that organisations go through a life-cycle, moving from a period of expansion, characterized by a growing work force and high flexibility, to a period of contraction, where budgets decline and maintaining the organisation becomes the main challenge. Apart from the question what status can be ascribed to this movement (is it natural?), the concept of aging remains silent on the different role NASA came to play within the govermental realm at large.

McCurdy states that govermental agencies have to compete with other agencies for funding. But he doesn't draw the conclusion that it is important how NASA formulates the relevance of going to space.

At this point one wonders whether McCurdy rates the situation to which NASA attempted to adapt itself at its own value, or whether he judges it by standards that fit past but not present circumstances. Generally speaking, the integration of spaceflight in the socio-economical landscape has been a major occupation of space agencies from the seventies onwards. As part of this undertaking, NASA tightened its relationship with the private sector and scientific institutions. The agency increasingly relied on contracts with industry, offered itself as a service provider to military and commercial satellite owners, and collaborated with Earth and climate sciences. While McCurdy recognizes that NASA had to adapt to the loss of its monopoly on astronautical expertise, he mainly interprets NASA's partnerships as signs of the sapping of its superiority and independence. While he doesn't explicitly refer to the fact that the Challenger disaster of 1986 has been attributed to an engineering mistake made by an industrial partner, he exclusively describes increased subcontracting as compromising innovation and reliability. He fails to see in NASA's bonding with industry a new way of making itself socio-economically indispensable. The fact that the high-technology industry developed itself into an equal partner of government (as Chris Hables Gray, a student of Haraway, points out in his study of the U.S. military, *Postmodern War, The New Politics of Conflict*, Routledge, 1997) is presented as doing no good but only wrong to NASA.

McCurdy's account shows a strong bias towards NASA's early years. Especially in his conclusion, it becomes apparent that his view of the development of the older NASA as one of unambiguous decline partly results from his preoccupation with the original NASA. Here McCurdy stresses that the run-up to the moonlanding was a crash program: it demanded a huge innovative effort, and goverment was willing to provide the funding for it. He states that the blossoming of innovative cultures is dependent on circumstances like these. This raises the question whether McCurdy's narrative of downward movement is not the outcome of his narrow definition of innovative culture. One could argue that in the fields of Earth observation, communication and unmanned planetary probes, NASA did make headway in the decades that followed Apollo. It is just that these successes were of another kind than those of the space race era. The projects had less public visibility, lower budgets, and were developed in negotiation with industry and scientific institutes. One might even ask if it isn't the case that NASA's big problems occured precisely in the projects it approached as if still working under a crash program regime. McCurdy doesn't ask these questions; he takes the crash program as the ideal situation for space exploration. He also doesn't take into consideration that the crash program paradigm is one of one-time victory and short-term success, bringing forth the assumption that some steps and a little cruising around in a rover equals 'doing' the moon. It makes a Mars walk seem the only satisfying next step, the only next frontier worthy of that name. It is a typical insider perspective on NASA's future, which McCurdy takes over uncritically. While McCurdy's lack of distance made him an attentive observer in previous passages, it here results in a narrow view of what may count as progress.

The central role attributed to the young NASA is also problematic in another way. McCurdy claims that the NASA experience, as he calls it, is generalisable to high-performance agencies in the public sector. Since most of these agencies, with the exception of the military sector, didn't start out as crash programs, the generalization is questionable.

NOTES

1. T. Peters and R. Waterman, *In Search of Excellence*, Harper and Row, 1982, and H. Kilmann, M. Saxton and R. Serpa, *Gaining Control of the Corporate Culture*, Jossey-Brass, San Francisco, 1985, among others. The former traces the business success of Walt Disney and IBM back to the distinctive cultures of these companies. Success is approached as dependent on the incorporation of certain key-tenets (hands-on orientation, bias for action etc.) in a company's internal culture. In the latter the histories of AT&T and Chrysler Corporation are equally described in terms of the development of corporate culture.

2. An example of a NASA unmanned planetary probe of the seventies is Pioneer 10, launched in 1972, which became the first to reach an outer planet in 1973 and the first to leave the solar system in 1983. Viking 1, the first to make a soft landing on Mars in 1976, is another.

Recent Ph.D. Dissertations

Sally Wyatt, *Technology's Arrow, Developing Information Networks for Public Administration in Britain and the United States*, Ph.D. dissertation, Technology and Society Studies, University of Maastricht, 5 November 1998.

This dissertation has three purposes: to tell the fascinating stories of three information systems developed during the 1980s in Britain and the United States; to demonstrate why it is necessary and important to follow both actors and analysts; and, to retrieve technological determinism from its ignominious position within science, technology and society studies. Three government information systems provide the empirical focus for this book. One is the Operational Strategy, the second attempt by the British Department of Social Security to develop a computer-based system for administering the huge volume of social welfare benefits for which it is responsible and which had previously been administered by the movement of vast quantities of paper. Throughout the 1980s, the problems which the Operational Strategy sought to solve were simplifed by the groups which came to dominate it, in an effort to deliver some sort of system on schedule. In the early days of the project, there was a high level of interpretative flexibility around its aims. Over time, a high degree of stabilisation occurred, permitting a temporary closure of the Strategy as a centralised mainframe-based system. Even if the closure is not permanent, it served to structure future developments. This story exemplifies the way in which the conceptual building blocks of social constructivism can be used to develop a framework to understand the development of large technical systems emerges; moreover, a framework which allows for the rhetoric and reality of technological determinism.

The other two systems analysed were developed by the central administrations of the UK and the US during the 1980s. The British Government Data Network (GDN) was an attempt to develop a data communication network; The US Federal Telecommunication System for the year 2000 (FTS2000) was an attempt to develop an integrated voice, data and image communication network. Both of these were to be shared by different government departments and both were provided by a third party supplier. Both are very odd stories. The British case is odd because exchange of data across departments is prohibited. The US case is odd because what began as a single, integrated network became two incompatible networks provided by two different suppliers.

The major methodological contribution of this dissertation is that actors and analysts can and must learn from one another. If we simply follow the actors, which is what some suggest is what the 'new' sociology of technology advocates (in the dissertation, I explain why I think this is a misreading of Latour and Bijker), then we end up with very partial accounts of technological change. In two of the case studies, following the actors would have meant missing the users, both those people who use the systems to do their paid work and also those people whose livelihoods depended on the systems. Yet anyone with even a cursory knowledge of the economics and management of innovation literature knows that users are important. These case studies only make sense when the invisibility of users by other social groups is taken into account.

Analysts can also learn from the concepts used by actors. Technological determinism is used by some of the actors as a mode of explanation both to justify courses of action and to mobilise other resources. Technological determinism can be very effective as part of a strategy. Despite valiant attempts by analysts to discredit and ignore technological determinism, actors are very persistent in continuing to deploy it. The major theoretical contribution of this book is that technological determinism needs to be treated with more respect and subtlety than is usually the case. Dismissing technological determinism as a reductionist and inadequate explanation of socio-technical change is not enough. Technological determinism persists: in the actions taken and justifications given by many actors; in analysts' efforts to make sense of the introduction of technology in a variety of social settings; in manifold theoretical and abstract accounts of the relationship between the social and the technical; in the responses of policymakers to challenges about the need for or appropriateness of new technologies; and in the reactions we all experience when confronted with new machines and new ways of doing things.

The final chapter maps the varieties of technological determinism found in the words and actions of analysts and actors. Four types are identified: justificatory, explanatory, methodological and normative. Taking technological determinism seriously is important for 'big' and 'small' politics. In order to be able to intervene in the big politics of public life, we have to understand how and why some actors use technological determinism. Understanding the types of technological determinism will also help us in the politics of knowledge, to analyse how the dualisms of internal/external and social/technical are produced and reproduced.

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Adrienne van den Bogaard, *Configuring the Economy: The Emergence of a Modelling Practice in the Netherlands, 1920-1955.* Ph.D. dissertation, University of Amsterdam. Published at Thelathesis, Amsterdam.

This thesis studies the emergence of economics in use in this century. In the Netherlands, economists have acquired huge influence on economic policy making through the Central Planning Bureau (CPB). The CPB is an advisory expert-institution on economic policy, which was founded in 1945. The CPB achieved a monopoly position in Dutch economic policy-making mainly through their modelling practice. In this book the emergence of the CPB is analysed as the result of two simultaneous processes: one process of mathematisation of the Dutch economy and another process of the emergence of planning.

The concept of "planning package" is used to describe the network of planning, which consists of heterogeneous actors and objects: planners, concepts, experts, and numbers which must be aligned through time in such a way that a configuration emerges which "works". This book consists of three empirical chapters, which study the emergence of the CPB from different perspectives. A fourth chapter compares the Dutch case with France and Norway, to show that different national planning packages have emerged since WW II. This comparative chapter shows that macro-econometric modelling was not necessary to planning: France and Norway each had their own planning systems and their own methodologies, but no model as in the Dutch case.

One chapter analyses the socio-economic and cultural context in which the modelling methodology has been developed since the early 1920s, and finally adopted in 1955 as the dominant planning methodology. It shows that economic numbers fulfilled a cultural role by excluding profound religious and social differences from the economic debate how to solve the huge economic problems of the time. Moreover, it shows that the actual economic debate was transformed into a debate about macro-economic aggregates. This required (among other things) the abolishment of different kind of planning institutions (inherited from the war) on the micro-level. This was also internationally stimulated by (among other things) the Marshall Aid and the formation of the Benelux.

The second empirical chapter analyses the emergence of the macro-econometric model as a series of translations of mathematical representations of the economy. It starts with a discussion about the measurement of unemployed and ends with a mathematical structure of equations between macro-economic aggregates and the national accounts. This chapter shows the complexities of gathering data, measuring, and representing the economy in terms of a data-structure and a mathematical model. It also challenges the model-data distinction which is usually taken for granted, at least in the modelling world.

The third empirical chapter analyses the emergence of one specific macro-aggregate used in the model: Consumption. In the 1930s consumption was connected to people, groups of people and to what was actually consumed. "Who consumes what, for what reason" is a

one sentence summary on the 1930s discourse. Consumption was also a normative issue, for example related to the labour class position. During the war, consumption was planned on the micro-level via the rationing system. This gradually changed after the 1950s when consumption became a macro-aggregate. Planning Consumption had become a technical matter around 1955. This development included a change in the measurementsystem from budget-statistics (people writing down their expenditures) towards national accounts.

The concluding chapter discusses what kind of objectivity it is that is attributed to the modelling practice. While one would expect that it is some form of mechanical objectivity, it is argued that it is by not questioning the internal dynamics of the model that its objectivity is continued. Finally, it argues that we live in a socio-economic number culture.

The book can be ordered at Thelathesis: 31-20-6255429, office@thelathesis.nl

Ibo van de Poel, *Changing Technologies. A Comparative Study of Eight Processes of Transformation of Technological Regimes.* Ph.D. thesis, University of Twente, 407 pages. ISBN 9036511143.

In our modern industrial society, technology is seen as a motor of change. It is welcomed as bringing progress, but also feared as disrupting existing social order and introducing unintended side-effects. In both cases, it is the novelty introduced by technology which captures the imagination. But it is the combination of continuity and change that makes up technological development. As sociologists and economists of technology have demonstrated, technological change is cumulative and patterned, and its patterning derives >from technical as well as social determinants. This is not to say that there is nothing new, only to emphasize the aspect of continuity in technological development, perhaps even inertia. Continuity, in the form of inertia, that is resistance to attempts to influence the course of technological development, becomes a problem when the effects of development and societal embedding of technology are criticized.

The author's interest in the mechanisms and determinants of technological development derives its relevance, apart from his scholarly goals, also from the challenge to influence technological development, and to influence it for the 'better,' whatever that exactly means.

This book builds on insights developed in the field of technology and innovation studies. The author uses the concept of 'technological regime' to attack the issue of continuity and change in technological development. While technological regimes enable particular forms of technical innovation, they constrain others. Building on the sociological theory of Boudon, the author extends the analysis of technological regimes to an analysis of the transformation of technological regimes. He argues that outsiders, people not sharing the rules of an existing technological regime, may play an important role in initiating the transformation of a technological regime and in bringing about radical technical change.

The author discusses four types of structures or innovation patterns that technological regimes may, and he describes for each pattern two case studies of transformation of existing technological regimes: Household refrigerators and paints, regimes with a supplier-dependent innovation pattern; Chicken husbandry systems and sewage treatment plants, regimes with a user-driven innovation pattern; Coastal barriers and waterside banks, regimes with a mission-oriented innovation pattern; Aero-engines and nuclear reactors, regimes with an R&D-dependent innovation pattern.

Based on the findings of his empirical research, the author analyses how the four innovation patterns enable and constrain processes of transformation differently. He further describes the different mechanisms that can be used to explain the dynamics of processes of transformation against the background of existing technological regimes.

This book is of interest to scholars in the field of technology and innovation studies, policy makers in the field of technology and public interest groups.

Copies of the dissertation can be obtained through: j.vaneerden@fb.utwente.nl

Elke Duncker. *Multidisciplinary Research at the University of Twente: The Challenges of Heterogeneous Cooperation.* Ph. D. Dissertation, University of Twente 239 pages. ISBN 9036511186

Multidisciplinary research is especially interesting for two reasons. Firstly, although multidisciplinary research is important for problem solving and for scientific advances, it is difficult to handle and not well understood yet. The second reason is related to changes in the knowledge production and in the organization of science. On the work floor, knowledge production has never been monodisciplinary; it always mobilized cognitive and technical resources across disciplines as they fitted.

With the advent of strategic science multidisciplinarity as well as cooperation across groups and across institutions (e.g. university-industry cooperations) is becoming the rule. This is not to say, that such cooperations operate smoothly: Differences in work content and work style, patterns of explanations, frames of reference, and institutional context can be large and have to be bridged. Multi-professional workplaces are often described as a turf of contest.

The author's main argument is that multidisciplinary cooperations have mechanisms at their disposal to work together despite giant, multiple problems that counteract such a cooperation.

A technical university, like the University of Twente, is an interesting place to delve into such questions. In technical universities the academic tendency to create and maintain disciplinary boundaries is counteracted by the need of engineers and technologists to confront and accept the heterogeneity of their tasks. In the late 1980s two cases of emerging R&D cooperations, a multidisciplinary project and a multidisciplinary research institute, became available at the University of Twente that made it possible to study the 'birth time' of a multidisciplinary cooperation.

Three analytical approaches provide concepts for the empirical analysis of multidisciplinary cooperations: The SCOT approach (Social Construction of Technology), Actor Network Theory and Social World Theory. Most important to the analysis is Leigh Star's concept of boundary objects which conceptualizes the transformation of information between different frames of reference.

The author traces the emergence of multidisciplinary research at the University of Twente. She studies the division of labor within such cooperations and analyzes the (symbolic) communication across disciplinary and cultural boundaries. Another important question regards the convergence (and non-convergence) of the multidisciplinary research cooperations. She analyzes multidisciplinary research cooperations as arenas that emerge, when departmental research sites commit themselves to the subject of a project, to a shared facility, or to a research field. Boundary objects and boundary transcending infrastructure are found to facilitate this process.

Boundary objects and multidisciplinary cooperations are found as co-evolving: They mutually influence, enhance and need each other. Thereby different boundary objects emerge serving the same purpose; these systems of boundary objects are called 'composite boundary objects'. The author concludes that the latter are indispensable for multidisciplinary cooperations, because they facilitate a process of distributed collective 'learning by doing'.

This book is of interest to scholars in the field of science and technology studies, to managers and researchers of multidisciplinary and multi-professional cooperations and to everybody who wants to know why the transcending of disciplinary and professional boundaries is so difficult.

Copies of the dissertation can be obtained through: j.vaneerden@fb.utwente.nl

Opportunities Available

The **Max Planck Institute for the History of Science in Berlin** announces the Lorenz Krueger Postdoctoral Fellowship for 1999/2000 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 fellowship is named in honor of the late Professor Lorenz Kruger, of the University of Gottingen, whose work sought the connect philosophy with the history of science. The Lorenz Kruger Fellowship is awarded for a one year stay at the Institute in Berlin, beginning October 1999. It is open to scholars of all nationalities who have completed their Ph.D. no earlier than 1994. 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 (maximum 1000 words), and two letters of recommendation by 1 April 1999 to: Max Planck Institute for the History of Science, Abt. Personal, Wilhelmstrabe 44, 10117 Berlin, Germany.

The **Department of Communication in the College of Agriculture and Life Sciences at Cornell University** invites applications for visiting assistant professor, a 9-month, non-tenure track position. The starting date is Aug 20, 1999 or as negotiated. This position has 100 percent teaching responsibilities. Teaching involves four courses. The candidate will teach an undergraduate research methods course. The candidate should be able to teach three courses from the following: public opinion, impact of communication technology, health communication, or persuasion. There may an opportunity for the candidate to teach a course in his/her area of expertise. The candidate will be expected to mentor undergraduate students and to participate in service and outreach activities of the university, college and department. Ph.D. in communication or in a related social science discipline with strong emphasis in communication theory and research methods. Strong ABD candidates will be considered. Evidence of teaching potential and commitment must be provided. Competitive salary, commensurate with background and experience. An attractive fringe benefits package is available. Send letter of application addressing position qualifications and goals, vita, official academic transcripts and names, addresses and information of three references. Please also have each reference send a letter of recommendation. All materials should be sent to: James Shanahan, Department of Communication, 314 Kennedy Hall, Cornell University, Ithaca, New York 14853-4203, USA. Applications will be reviewed beginning April 2, 1999 and will continue until position is filled.

The **Franke Institute for the Humanities of the University of Chicago** invites applications for a one-year postdoctoral fellowship which will run from mid-September to mid-June 1999-2000 as part of the Sawyer Seminar on "Computer Science as a Human Science: The Cultural Impact of Computerization." The successful applicant will be expected to participate actively in the Seminar and present a paper at one of the three conferences held throughout the academic year. The stipend is $32,000. All applicants are expected to have received the Ph.D. degree within the past five years and no later than 1 September 1999. To apply please submit a c.v.; a chapter-length piece of work; statement (1-3 double-spaced pages) about your research and one or more of the Seminar's themes; and have 3 letters of recommendation sent. The application deadline is 1 MARCH 1999 (Negotiable). Send application to: Sawyer Seminar Program, Franke Institute for the Humanities, The University of Chicago 1100 East 57th Street Chicago, IL 60637 USA For more information: email <sawyer-seminar@uchicago.edu> or see our website at <http://humanities.uchicago.edu/sawyer/CSasHS>

News about Education

The University of Southampton announces the new M.A. in the Culture and History of Science, examining the relation of science to culture in terms of questions such as 'what is science?'; 'do science and culture share a common ground in their investigations of "the natural" and "the human"?'; 'in what ways are literary forms of interpretation bound up with questions of scientific method?' The greatest strengths of this MA programme lie in the social, cultural and intellectual history of early modern and nineteenth-century science, and in the social and cultural history of medicine. The departments of English, History, and Philosophy offer research supervision over a range of topics--from the Renaissance period to the twentieth century. MPhil and PhD research is facilitated by two good libraries, numerous seminars, and a lively and diverse community of staff, students, and visiting scholars. The Faculty of Arts is strongly committed to interdisciplinary work. For futher details contact: Dr. Lucy Hartley, Dept. of English, University of Southampton, Southampton, SO17 1BJ. Tel: 01703 593168. Fax: 01703 592859 (Departmental Office: 01703 593409). Email: lh2@soton.ac.uk

Awards and Competitions

The 1999 **Prix Roberval** Competition is announced. The Award aims to contribute to a technological culture in the french language. There are four awards, for books aimed at the general public, books for higher education, television programmes, and Multimedia CD-roms. Candidates have to present themselves before April 15. For more information: prix.roberval@utc.fr

The **International Symposium on Technology and Society** (ISTAS 99) announces a student paper competition for presentation at the ISTAS 99 conference to be held at Rutgers University, New Brunswick, NJ, July 29-31, 1999. Abstracts are due on 1 April 1999. The conference theme is this Women and Technology: Historical, Societal and Professional Perspectives. The roles of women in technology are more diverse, controversial, and important today than ever before. Historically, women's involvement in the creation, manufacture, and use of new technologies has been seriously neglected. Even today, the public has an understanding of society that usually treats women as "technological illiterates". Yet since the 1950s women have tried to technologically empower themselves, particularly by entering the engineering profession. Graduate and undergraduate students are encouraged to submit papers for topics related to this general theme. Papers in additional general areas of interest to the members of SST will be accepted: Environmental, health, safety, and peace-related implications of technology; Social, economic, and ethical issues involving energy, information, and telecommunications technologies. · History of technology. etc. Abstracts submitted for this competition will be reviewed and evaluated by a committee from SSIT with the top 3 receiving invitations to present their papers at a special session at the conference. Travel, registration, and lodging expenses will be paid by the conference for the 3 presenters. It is anticipated that approximately $700 for each presenter will be available to cover these expenses. Notification of Winners and Invitations to present: May 14, 1999. For individuals interested, submit a one page abstract by mail to: Kenneth R. Foster, Department of Bioengineering, University of Pennsylvania, 220 S. 33rd St., Philadelphia, PA 19104-6392, USA, or by fax: 1-215-753-2071. Questions should be directed to Kenneth R. Foster at the above address or to Laura Swibel by email at lswibel@sas.upenn.edu, For updates, visit www4.ncsu.edu/unity/users/j/jherkert/ist99cfp.html

Conferences and Calls for Papers

Science in the Nineteenth-Century Periodical, an interdisciplinary conference, organised by the Universities of Sheffield and Leeds, will be held at **Leeds** on 10-12 April 2000. A call for papers has been issued. The collaborative project 'Science in the nineteenth-century periodical' (SciPer), recently launched at the Universities of Sheffield (Centre for Nineteenth-century Studies) and Leeds (Division of History and Philosophy of Science), is designed to identify and analyse representations of science, technology and medicine in the general periodical literature of nineteenth-century Britain. The specific objectives are to publish several volumes of analytical essays on the portayal of science and scientists, and to publish a printed descriptive catalogue and searchable electronic index to the science content of selected periodicals. In addition, it is intended that the project should serve to draw together an interdisciplinary community of scholars with interests in this area, and to this end a series of international conferences is planned. The project's inaugural conference, to be held at Oxley Hall in the University of Leeds, will explore all aspects of the subject. Papers of wide interest and broad scope are invited. Possible themes include: Public images of scientific and medical practitioners; Representations of key scientific ideas (eg. evolution, energy); The construction of scientific orthodoxies/heterodoxies; Gender and science; Interactions of literary, political and scientific discourses; Editors, contributors and proprietors Science and the politics of the press; Science and the development of periodical audiences; journalism; The positioning of science within journals; Periodicals of empire / science and imperialism; Science in the literary marketplace; Reviewing science - books and meetings; Science education; Science as entertainment; Illustrations and caricatures; and Moral and religious representations of science. We welcome proposals for individual papers or complete sessions of two or three papers. Approximately thirty minutes will be allowed for each paper. We plan to publish a selection of the papers from the conference, for which we have a publisher interested. Abstracts of 200 words should be sent by 1 June 1999 to: Dr. J. R. Topham, School of Philosophy, University of Leeds, LS2 9JT, UK, email: j.r.topham@leeds.ac.uk (no file attachments please), tel: 44- 114-2228484, 44-113-2333280; fax: 44 114-2228481, 44 113-2333265

The *Third European Social Science History Conference* will be held in **Amsterdam**, the Netherlands, 12-15 April 2000. The ESSHC aims at bringing together scholars interested in explaining historical phenomena using the methods of the social sciences. The conference is characterized by a lively exchange in many small groups, rather than by formal plenary sessions. The Conference welcomes papers and sessions on any topic and any historical period. It is organised in a large number of networks: Africa - Antiquity - Asia - Childhood - Criminal Justice - Culture - Economics - Education - Elites - Ethnicity - Family/Demography - Geography - Government and Politics - Health - Labour - Latin America- Middle Ages - Migration - Nations - Oral History - Political Movements - Quantitative Methods - Religion - Rural - Sexuality - Social inequality - Technology - Theory - Urban Gender. The Conference fee will be dfl. 300 (at present this is about US $150). The deadline for sending in an abstract is 30 April 1999. Further information can be obtained at http://www.iisg.nl/ESSHC or from the conference secretariat: European Social Science History Conference 2000, c/o International Institute of Social History, Cruquiusweg 31, 1019 AT Amsterdam, Netherlands; Telephone: +31.20.6685866; Fax: +31.20.6654181 E-mail: ESSHC@iisg.NL

The *9th European Doctoral Summer School in Technology Management* will be held at the **University of Twente**, August 16-28, 1999. During the intensive ten-day course, the participating students have an opportunity to visit R&D establishments and to be involved in interactive workshops. Senior managers from industry and research organisations will be invited as guest speakers or as workshop leaders. The programme will use tutors from several leading European institutions to give (informal) presentations and/or lead workshops. It will also incorporate company visits and presentations by technology managers and consultants. Topics to be discussed by the tutors include: Trends in Technology Management; Quality in R&D; Concurrent Engineering/New Product Development; Continuous Improvement; Networking; Performance Measurement; Management of Technology in Society; Knowledge Management/R&D-Marketing Interface. A variety of methodological approaches is striven for. Students will be selected according to the relevance and the quality of their research interests. Students will be required to make a presentation, based on the key aspects of their doctoral research. Therefore, they must submit (with their application) a short paper (5-15 pages, in English) describing their research topic. This paper will be circulated among all participants and read and commented on by one of the tutors. Applications and nominations are encouraged from appropriate institutions in all European countries; students from institutions in Eastern Europe are especially welcomed. Students are required to pay a fee of 600 Dutch guilders. Students must also pay for their own food. Based on taking meals in the 'mensa' of the University of Twente, estimated costs for food consumption is 200 Dutch guilders (for the two weeks, excluding breakfast). Students will be accommodated in a hotel in the city centre of Enschede, close to the railway station. Estimated cost for the hotel is 65 Dutch guilders per night, based on sharing a double room, including breakfast. A 'Welcoming' Buffet will be provided at lunchtime on 16 August, and a 'Farewell' Dinner will be organised toward the end of the Summer School. It may also be possible to subsidise through scholarships the travel and accommodation costs of participants, if funds are not available to them from their own institution. For further information on the Summer School please contact: Professor Dr. Ir. Olaf Fisscher or Dr Ir Petra de Weerd-Nederhof/Inge Kerssens-van Drongelen, Faculty of Technology Management, University of Twente, P.O.Box 217, 7500 AE Enschede, The Netherlands, E-mail: p.c.deweerd@sms.utwente.nl / i.c.kerssens@sms.utwente.nl, Tel: ++ 31 53 4893499, Fax: ++ 31 53 4892159, Web pages: http://www.sms.utwente.nl/vakgr/teno/eng_news.html, http://www.eaism.be, http://www.techman.org/Conferen (DSS_99.htm)

The *Meaning of Medicine*, a conference to be held on 10-12 September 1999, in **Amsterdam**. In contrast to the social history of medicine, the cultural history of medicine is yet underdeveloped. Although culture has been explained in many ways, it can generally be taken as forms of behaviour (including speaking), forms of material products and meanings attached to both. Moreover, the study of culture is especially concerned with symbols and rituals, with consensus and conflict and, on a more abstract level, with patterns, rules and exceptions. Historical anthropology, the discipline most focused on all aspects of culture, has shown that the best way to study culture is to 'situate' it, and to concentrate on concrete, actual instances, in which the interrelation between forms and meaning and human actors becomes manifest. If this micro-history is applied to the history of medicine it will transform the object of study. Since there is no compelling reason to limit the area of investigation to specific groups of actors (such as physicians or female patients), to specific forms of medicine or even to specific definitions of illness, a more narrowly defined medical culture is transformed into cultures of healing. To study the cultural history of medicine implies a recognition of synchronical divergence as well as diachronical paradoxes. Within these parameters, or by questioning these altogether, the conference will explore different sources, methods, theories, interpretations and presentations of diverse and specific healing cultures in Europe over the last five hundred years. Organized in collaboration with the Huizinga Institute, Amsterdam. Conference organizers: Dr. Willem de Blecourt,c/o Huizinga Instituut, Spuistraat 134, 1012 VB Amsterdam, The Netherlands. - Dr. Cornelie Usborne, Department of History, Roehampton Institute, Roehampton Lane, London SW15 5PH, email: c.usborne@roehampton.ac.uk

Problems of Participation and Connection is the name of the conference to be held in **Amsterdam**, The Netherlands, Monday April 5 through Friday April 9, 1999. Biannually, a conference is held in Amsterdam to consider, in a free and generous spirit, questions that emerge as fundamental to research. These prestigious meetings are entitled: "Problems of .....". The 11th meeting, in 1999, aims to explore Problems of Participation and Connection. Co-ordinator PPC (Drs.Ilona Walraven), Center for Innovation and Cooperative Technology, Faculty for Mathematics, Computer Science, Physics and Astronomy, Valckenierstraat 65, 1018 XE AMSTERDAM, The Netherlands, The PPC Co-ordinator may also be reached through: ilona@wins.uva.nl (e-mail), +31 20 525 5788 (fax).

The *Computer Support for Collaborative Learning '99* is to be held at the **Stanford University**, Stanford California USA on December 12-15, 1999. CSCL '99 is the third international conference devoted to the exploration of the roles for technology in collaborative forms of learning and teaching. Participation in this conference is invited from designers, educators, researchers, and students in a diverse set of disciplines including: education, cognitive and educational psychology, didactics, computer science, anthropology, sociology, speech communication, semiotics, technology design, linguistics, engineering, ergonomics, and subject matter specialties. Topics of Interest include all tool designs, theoretical contributions, & empirical studies which advance support for collaborative learning. Submissions are solicited for full papers, poster and demonstration sessions, tutorials, and the doctoral consortium. Guidelines can be found at the CSCL '99 web site: http://learninglab.stanford.edu/CSCL99/

Technological Innovation in a Sustainable Perspective, the ESST Annual Scientific Conference, in collaboration with the first POSTI meeting, will be held on May 29-30, 1999, EPFL, **Lausanne**, Switzerland. Many policy decisions in modern societies necessitate an understanding of the interactions between science, technology and society. There is, however, a lack of systematic knowledge about the dynamics of scientific and technological change, within households, workplaces, the media, government and elsewhere. In Europe, there exists, however, a tradition of research and training in the 'science, technology and society' (STS) field which has produced new insights on these issues. The main objective of the POSTI project is to extract the policy implications from this academic production within the STS-tradition. During recent years several hundred young academics have graduated from STS programs, and as part of this they have submitted theses based on their own research. Very little is done, however, to systematise the content of that research, and the ideas, insights and policy conclusions that originate from it. The POSTI project intends to map a part of this source of knowledge and create an European forum for interaction between young academics in the field, their seniors, business and policy makers. The deliverables will include a database on work by young researchers in this area, four workshops as well as a final report which summarises the main conclusions from this mapping process and the policy discussions that follows. The database and the four workshops planned within the POSTI project will cover work hitherto completed at the participating institutions. Needless to say this research covers a large number of aspects of science, technology and society. The network will bear in mind the variety of approaches taken thus far, while at the same time focus on the policy implications of a theme identified as common within much of the conducted research. This is the theme of sustainable technological innovation and its relevance to the formulation of modern policies. The ESST Annual Conference / First POSTI Workshop entitled Technological Innovation in a Sustainable Perspective is an opportunity for researchers to contribute to a knowledge building process in the field of sustainable innovation, by participating, debating and submitting papers. We want to identify and document, on the one hand, various types of innovation - technical, method-oriented, organisational and systemic - and on the other, the pressures or restraining factors, the context and particular dynamics of such innovation processes. Presentations and papers should show original empirical findings on innovations and experiments, in addition to elements which could lead to the progressive construction of a theoretical framework built upon STS concepts and tools. In the choice of the selected presentations and papers, we wish to give an opportunity to both the POSTI network of senior and junior researchers, and also non-POSTI scholars, to report on their activity and participate in discussions within a specialised group. In order to stimulate such debate, we have divided time and topics into four sessions, each one lasting half a day, dedicated to the exploration of a particular problem.

1st session: How are macro-policies and regulations translated into sustainable innovations? Sustainable development has progressively become a public sphere at local, national and international levels, and opens an era of socio-technical change. In the near future, we will be confronted with the following key questions: How is global reality translated into local initiatives? Who are the relevant actors? What are the best core conditions favouring sustainable innovations? How to balance public and private responsibilities and initiatives? Participants are invited to present examples, cases and experiments documenting successful or failed innovations, with the aim of enhancing the existing theoretical framework.

2nd session: Normative measures or incentives: two complementary philosophies? Normative measures or incentives through partnerships or fiscality, for instance, appear at first glance as two different approaches to encourage new environmental processes and ideas among actors involved in technological change. One operates by imposing constraints and limits, and the other via stimulation and incentives. Intentions and practices linked with such instruments, however, sometimes produce paradoxical results. In addition, it seems necessary to take into account such operational guidelines as ISO 14000 or EMAS standards, which constitute primarily a recommendation framework. These may be considered a cultural methodology favourable to a general learning dynamic regarding the environmental consequences of technological innovation. Empirical findings and theoretical analysis should demonstrate the depth or superficiality of these claims.

3rd session: Towards a sustainable territory: user- vs. technology-oriented experiments. In the past, environmental problems encountered within the framework of territorial management have generally resulted in the implementation of technological solutions often involving the construction of new infrastructures. Over the past decade, public authorities have recognised the limits of such an approach, which tends to transfer problems to future generations. Consequently, they attempt to involve users and citizens. Whether in the area of transport, energy supply or waste management, there is an increasing number of experiments aimed at improving user and citizen behaviour. In this context, it is interesting to note that technological innovation often remains a key success factor. Participants should thus demonstrate to what extent both technological and social innovation can contribute to sustainable territorial development.

4th session: Technology transfers in quest of a convincing sustainability perspective. Recent research on development programmes (ODA) and on the overseas of activities of multi-national corporations has increasingly focused on whether such activities include a concern for the natural environment of the receiving countries or not. This session focuses especially on the question in what ways such activities aim at reaching a state of compatibility between the two types of aims. This 4th session should bring to light documented cases as well as new knowledge on some of the dilemmas linked with technology transfers and development issues when considered in a sustainable innovation perspective.

In particular, all former ESST Master degree's holders are welcome to introduce us to their current research activity, provided that it is related to the POSTI conference topic(s). Finally, on Saturday night, a dinner party will allow all the participants to meet in a more informal manner. Proposals for papers should include a title, a 20-30 line abstract, a 10-line CV, with if possible relevant information on the topic presented. Deadline for proposals: March 29th, 1999. Proposals will be refereed by a committee lead by ESST Vice-President for Research, Prof. Patrick Llerena (BETA-ULP-Strasbourg), POSTI coordinator Dr. Terje

Gronning (TIC-Univ. of Oslo) and Workshop organiser, Dr. Pierre Rossel (ESST-EPFL). A draft programme will be issued by April 25th, 1999. Contact person: Dr. Pierre Rossel, ESST-EPFL, CM1 620, EPFL CH-1015 Lausanne. Tel. +41 21 693 71 91 Fax +41 21 693 71 90 email: pierre.rossel@epfl.ch or Prof. Patrick Llerena <pllerena@cournot.u-strasbg.fr>, BETA-ULP-Strasbourg, or Dr. Terje Gronning <Terje.Gronning@esst.uio.no>, Centre for Technology, Innovation and Culture, University of Oslo. For more information, see the URLs http://www.esst.uio.no/ and http://www.esst.uio.no/posti/ All querries should be directed to: Anna Szczesna (caracol1@psk2.am.lodz.pl)

The *Second School for Theory of Knowledge*, sponsored by the Batory Foundation (Poland), the Higher Education Support Program (Hungary), KBN(Poland), and the Institute of Philosophy and Sociology of the Polish Academy of Sciences, will be held in **Warsaw-Madralin**, Poland on August 8 - 20, 1999. See http://hektor.umcs.lublin.pl/~zlimn/school. Rather than having series of lectures, we will have main lectures (2-4-hours each) followed by seminars organized around the main topics of the lecture. A few auxiliary lectures are planned. Moreover, two days are planned which will be devoted to Polish philosophy of knowledge.

The 1st IEEE *Conference on Standardisation and Innovation in Information Technology* will be held in **Aachen**, Germany on September 15-17, 1999. See http://www-i4.informatik.rwth-aachen.de/~jakobs/siit99/home.html.

Digital Knowledge III, Information Technology: Tracking the Impact of the Internet, presented by Canada's Coalition for Public Information (CPI) in association with Ryerson Polytechnic University, will be held at the Rogers Communications Centre, 80 Gould Street, **Toronto**, Ontario, Canada, Thursday, May 13 and Friday, May 14, 1999. For information contact Kevin Riley <riley@interlog.com>.

Historicizing Literature, Science, and the Arts, the Society for Literature and Science 1999 Conference, sponsored by the University of Oklahoma with the University of Texas at Dallas, will be held October 7-10, 1999 in Norman, Oklahoma. For information contact Ronald Schleifer, Dept. of English, Univ. of Oklahoma, Norman, OK 73019, USA, or schleifer@ou.edu.

On May 31 and June 1 1999 the Department of Theory and History of Psychology (**University of Groningen**, the Netherlands) will host a symposium on *the history and status of objectivity in the social sciences*. The symposium will deal with matters like the various meanings of objectivity in social science and society, the increase of standardized procedures in 20th social science and society, the decline (but also the persistence) of personal authority and indvidual treatment, the manufacture of precision, and the ways in which tools of objectivity create the very phenomena they measure. Theodore Porter (UCLA), author of "The Rise of Statistical Thinking, 1820-1900" (1985) and "Trust in Numbers. The Pursuit of Objectivity in Science and Public Life" (1995) will be our guest reviewer. It is possible to take part without a paper, but you are encouraged to submit your work for discussion. Please let us know whether you want to attend. If you would like to discuss one of your papers at the symposium, please submit the full paper or an abstract of 500-700 words before April 15 1999. For abstract submission and/or registration email <D.G.van.Tol@ppsw.rug.nl>.

Net News

Cyber-Geography Research Bulletin, Vol. 1, No. 4, 8th March 1999 has been published at www.cybergeography.org/bulletin-1-4.html.

The March 1999 issue of First Monday (volume 4, number 3), the peer-reviewed journal, is now available at http://firstmonday.org/issues/issue4_3/

Cybersociology Magazine (www.cybersociology.com) is a non-profit, multi-disciplinary webzine for the critical discussion of cyberspace, virtual communities, and life online. Each issue contains feature articles, field/project reports, site reviews, and book reviews. Message boards, a chat room, and an email list provide readers with the opportunity to provide feedback on articles and reviews. Issue Five of Cybersociology will tackle the topics of "grassroots political activism online" and "digital democracy". The issue will also contain multi-media interviews conducted at the Next Five Minutes Tactical Media Conference in Amsterdam (12-14 March). We aim to publish scholarly articles and papers alongside field reports from digital activists themselves (text or multi-media).

The European Parliament is supporting a project to gather information about the current state of research into the Ethics of Science and Technology. A survey is available at //www.uclan.ac.uk/facs/ethics/stoa/index.htm.

The Winter 1999 issue of Technoscience has been posted at //www.cis.vt.edu/ technoscience/99win/99win.htm

Evidence to the Parliamentary Select Committee on E-Commerce and the Living in Cyberspace report have been posted on the Virtual Society web site at http://www.brunel.ac.uk/research/virtsoc.

The first edition (vol. 14, number 1) of Archaeoastronomy: the Journal of Astronomy in Culture (formerly Archaeoastronomy: the Journal of the Center of Archaeoastronomy) will appear in June, 1999 under an expanded editorial board and a new publisher (The University of Texas Press). The Journal's style guide and further details on submission can be found at: www.wam.umd.edu/~tlaloc/archastro/style.html

Does philosophy drive science? See http://www.columbia.edu/cu/21stC/issue-2.3/sciphilo.html.

The Global Reproductive Health forum announces the launch of a new discussion list: Cyber-fem. Cyber-fem is a moderated list for activists and scholars to discuss contemporary reproductive technologies and population policies in the context of broader cultural change. Send a message to: majordomo@hsphsun2.harvard.edu with the following command in the body of your email message: subscribe cyber-fem Leave the subject blank. Cyber-fem is part of the Reproductive Technologies Web accessible at http://www.hsph.harvard.edu/rt21/ and is dedicated to bringing different perspectives on contemporary developments in science and technology on-line. If you need more information please contact Tal Halpern at thalpern@hsph.harvard.edu .

The resource center for cyberculture studies is at http://otal.umd.edu/~rccs. If you are interested in joining a low volume announcement list for rccs events and updates, please email: majordomo@majordomo.umd.edu. No subject is required. In the body, type: subscribe cyberculture Further information is available from David Silver American Studies, University of Maryland, Resource Center for Cyberculture Studies, dsilver@glue.umd.edu.

There is a new website for the Wellcome Institute for the History of Medicine Library at: http://www.wellcome.ac.uk/library.