TECHNOLOGY ASSESSMENT AND FUTURES RESEARCH

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One of the more outstanding features of our time is fear of the consequences of our own achievements. We strive hard to create ever more efficient technology and to enable increased production with decreased labour inputs. Yet we fear to run out of resources, pollute our environment beyond redemption and — worst of all — to create mass unemployment. We call for economic growth and technological innovation to create new employment and we call for restraint in the use of technology to preserve employment and safeguard the natural environment. The dilemma is plain for all to see, yet the resolution of the dichotomy is anything but obvious. In this situation of recognition of a problem, two things can happen and are happening. On the one hand, extreme simplifications and consequent very clear positions, as for example that of the 'Greens' on the German political scene. On the other hand, recourse to scientific analysis as an aid to decision making — a kind of pathfinding activity — attempting to use the most rational tools we have to find a way through the complex thicket of social and natural forces which determine the use of technology. An example of the latter approach is the Office of Technology Assessment of the US Congress, which produces scientific analyses of contemporary problems related to the use of technology for the benefit of bewildered Congressmen.

The Australian government appears to have adopted a hybrid strategy in its decision to appoint a Commission for the Future. In its announced terms of reference, the Commission seems to have a small role in preparing or commissioning "studies, surveys, research reports and information dossiers". Its dominant task appears to consist of a kind of public relations for the future. Instead of extreme simplification and consequent extreme political attitudes (or *vice versa*), perhaps the task of the Commission consists of reducing the complexity of the real issues to a degree at which rational public debate becomes possible. This could well be an essential means of safeguarding the pluralism of our society.

The sceptical scientist may be forgiven for deploring the lowly status of scientific analysis and the large role of rhetoric in the Commission's terms of reference. Issues of the use of technology and options for the future are indeed so complex as to require the best available means of analysis before public debate can become meaningful. We need to know what might be the consequences of certain actions before we can meaningfully discuss whether we wish to

take such actions. While I welcome wholeheartedly every attempt to support public debate on the future and to channel it into rational paths, I would also like to see a much larger element of commitment to interdisciplinary scientific analysis in the Commission's terms of reference. We do know a great deal, but our knowledge is scattered, obscured by Pickwickian language, and full of vital gaps. Knowledge is as islands in an ocean of ignorance. I plead for systematic attempts to form at least archipelagos from the islands and thus to make knowledge more usable by decision makers and in public debate. In welcoming the Commission for the Future and wishing it every success, I would ask for more analysis in support of public debate.

It is undeniable that the public debate must play an important role in major decisions on the development and use of technology. This should be obvious on grounds of general democratic principles, but nevertheless requires some elaboration. There were periods when technology was perceived as the affair of technologists and industrialists alone and the public raised no claim for participation in decisions. There were other peiods when workers rose in anger against machines which appeared to deprive them of their skills and their livelihood. On the whole, the periods when technology was regarded with benevolence and technologists were viewed as its competent guardians predominated until recently.

Several factors have contributed to the change of heart. To the old fears of loss of jobs and deskilling, new fears of a complex creeping pollution of our environment, a fatal overloading of the life-sustaining capacity of the earth have been added. At another level, it is now being increasingly realised that our lifestyles, the way we work and play, the context and much of the content of our lives are, to a considerable degree, determined by the technologies we use. Once this perception of the role of technology takes hold, the wish to participate in decisions about technology becomes inevitable. If technolocy is a central factor in shaping our lives, it becomes inconceivable to leave it in the hands of technologists and industrialists alone. First politicians were drawn into numerous debates about support and control of technology, and now the public at large feels it ought to exercise more direct influence.

Suddenly questions of technology policy, until recently in the category of the most tedious functions of the administration, have moved to the centre of the political stage. If previously parliamentary debates on amendments to alkali (or similar) acts took place before a handful of yawning members, such debates now draw a full house, a crowded public gallery and an unending sequence of headlines in the press, comments on television and possible demonstrations and 'direct action'.

Austria is a good example of this trend. In this rather placid country, the debate about nuclear energy generates more heat than a nuclear power station ever could and the furious controversy about a new hydro-electric plant on the Danube set the government seriously adrift. What appears to be missing is a systematic attempt to collect all the scientific and economic information in a single coherent report which could serve as a basis for political decision making. Whereas there are many studies of specific aspects of the problems, there exists no attempt at an exposition which would result from the many 'single issue experts' banging their heads together. Currently it is left to the political decision maker and to the journalist to pick his or her way through a galaxy of single discipline reports and to put the pieces together to form a coherent picture. This is a virtually impossible task because nobody tried to make the pieces of the puzzle fit together.

In an extremely simplified form we might define technology assessment as an attempt by a team of relevant experts to illuminate all aspects of a project or problem involving public decisions about technology, in order to reduce the uncertainty and ignorance under which the decision makers act. The team has to collaborate in order to cover all aspects of the subject and has to distinguish between consensus scientific knowledge and conjecture or value laden opinion. This sounds simpler than it is, but in striving after this ideal some substantial improvement on the present haphazard presentation of information can be made. In order to achieve a properly democratic decision making process, the scientists carrying out the technology assessment — the assessors — should consider and incorporate the views of parties affected by the technology in question. The reports should, at least, have a version which is written in clear, normal language and which presents the essence of the problem. Such reports can serve as the basis for wide public and political debate. The search for consensus should be easier if the discussion is based on a sound foundation of facts. A neat separation of facts, conjecture and value judgements should help to bring as much rationality into the debate as the problem will permit. Unfortunately, truth is usually too complex to be credible and people tend to believe simplifying distortions of reality. Technology assessment should present a truth which is complex enough to be essentially true and simple enough to be credible.

The Austrian Academy of Sciences is currently striving to institutionalise technology assessment, without a claim to monopoly, under its roof. It is hoped that the high scientific prestige of the Academy and its political independence will lend credence to the technology assessment work carried out under its aegis. The work will, on the one hand, consist of basic research, such as on methods of TA, technological innovation, handling of technological risks and the

relationship between human work and technology. On the other hand, the team will handle acute problems requiring technology assessments. For each project, a team of internal and external experts will be assembled, so that the problem can be illuminated from all important aspects by all the relevant scientific disciplines. The teams have to work as teams and thrash out their differences, for the inter-disciplinary study must be more valuable than the sum of single discipline studies, which it supplants.

Even the very best technology assessment reports will not remove controversy from discussions of the future. At best they can remove some heat and replace it by factual information and reasoned argument. To improve the chances of this happening, it is imperative that technology assessment reports should become subject to wide discussion. In this respect it appears that the Australian government has hit the nail on the head. If the Commission for the Future puts sufficient emphasis or receives sufficient support from other agencies, to produce high quality technology assessments and high quality research on technology policy and related issues, so that a base for public debate is developed, then it should show exemplary success. If the Commission merely encourages uninformed debate, then it is doomed to failure. I hope it succeeds.