

# Social Responsibility of Science: The Social Mirror of Science

*Ron Johnston*

Earlier chapters have examined the ways in which science has contributed to the shaping of Australasia over the past one hundred years through the development and application of new technologies in the agricultural, mining, and manufacturing sectors. The sciences have also been shown to have played a significant cultural role in the development of independent, national identities.

There is, however, a third, political dimension, through which the sciences have both shaped and reflected national and international political agendas. For the place of science in human affairs is neither natural, nor necessarily pre-eminent. Its influence and authority have varied, not only with the nature and quality of the knowledge produced, but also with its apparent relationship to what are perceived as the most important elements of the social climate. Ben-David has argued that the emergence of modern science can be linked to the developing professionalism associated with the gradual fashioning of a social *role* for the scientist.<sup>1</sup>

The interests, in the case of seventeenth century Europe, lay in establishing the basis of a 'changing, pluralistic, and future-oriented society'.<sup>2</sup> Thus, it was a scientific movement, which saw in modern science both a symbol and model for the route to truth, mastery over nature and a transformed social order, that provided the legitimation for the institutionalization of science. Such legitimation, however, was not achieved once and for all. There exists a continual process of negotiation between science and the social values of the community on which it relies. At times the relationship has been strong and supportive, at other times weak, hostile, or tinged with doubt.

Institutionalization of the social role of science in Australia has taken many forms. In this essay I argue that a recurring vehicle for expressions

of the appropriate social role of the scientist has been provided by the notion of 'social responsibility'. In particular, it is at times when the social role of science is uncertain, in the process of redefinition, or under attack, that the strongest demands or claims for social responsibility are made. This is reflected not in the presence or absence of social responsibility rhetoric, rather, we shall see that when the social role of science is unchallenged, social responsibility is presented in the form of demands from science on other social institutions. Conversely, when the social role of science is a matter of public debate, social responsibility arguments are primarily designed to defend and justify the scientific enterprise. In this sense, the content of social responsibility 'claims' provide a mirror of the social status of science.

Various attempts have been made to provide an authoritative definition of the social responsibility of science.<sup>3</sup> At least seven distinct usages can be identified. The first four usages share, in most respects, an essentially Baconian view of modern science: if properly practised, science should give rise, automatically, to social benefits and progress. The special responsibility of the scientist, then, is to ensure that science is not harmed or impeded by the forces of darkness, and that the wisdom of science is made available directly to those in power. These usages reflect an essentially positive, or optimistic view, of the social role of science:

1. the responsibility of scientists to promote the model and norms of science as an exemplar of knowledge and human conduct, and to seek to counter and overcome ignorance and superstition;
2. the responsibility to protect science, and scientists, from the attacks of those who would deny their truth and seek power for their own purposes;
3. the responsibility of scientists, because of their expert knowledge, to advise governments and politicians on courses of action and the implication of scientific advances; and
4. the responsibility to educate the public about the methods and outcomes of science, so that they will understand its value, and support and acknowledge it more readily.

In contrast, another three common usages of social responsibility have at their root a cautious, if not negative, view of science. These concern:

5. the responsibility for the application of scientific knowledge and its consequences;
6. the responsibility for the content of scientific knowledge, and in particular its congruence (or lack of it) with human and social needs; this incorporates a responsibility to be aware of the needs of society; and
7. the responsibility for the nature and values of the scientific enterprise itself.

The wide varieties in meaning reflect different perceptions of the social role of science and derivative scientific models, by, and between scientists and non-scientists, at different times. Moreover, the chosen interpretation of the social role of science is undoubtedly a reflection, at least in part, of political purposes. In other words, it may be in the interests of those seeking either to maintain or oppose the authority of

science or those seeking to draw support for their cause from the practice of science to attempt to establish a particular view of the social responsibility of science.

This array of views of the social responsibility of science, and the social role of science it implies, is well represented in the development and application of science in Australasia. In this essay, the focus will be on the period from 1938 to 1988, corresponding to the second fifty years of ANZAAS. This emphasis has been chosen not only to limit the scope of the essay, but also because the more evidently political nature of the scientific enterprise over that period, along with its greater scale, has made the issue of the social role of science, as reflected through social responsibility claims, a matter of much wider concern and debate. In addition, the activities of ANZAAS have reflected, and on occasion contributed to, the debates about the appropriate social role of science.

## SOCIAL RESPONSIBILITY AS SCIENTISM

The development in the 1930s of a strong concern about the issue of social responsibility among scientists in Britain and Australia, was led by what became labelled as the Social Relations of Science movement. This was spearheaded by a group of influential British scientists, including J. D. Bernal, J. B. S. Haldane, P. M. S. Blackett, Joseph Needham, and Julian Huxley, when the breakdown of capitalism in the Great Depression, the rise of Fascism, and the emergence of the Soviet Union as a powerful socialist nation created the climate for radical new thinking.

The essence of their view was Baconian: science, properly organized and directed, was capable of solving all the problems of humankind. Moreover, in the light of the evident failure of economics and politics, science provided the basis for the most effective organization and conduct of human affairs:

Science puts into our hands the means of satisfying our material needs. It gives us also the ideas which will enable us to understand, to co-ordinate, and to satisfy our needs in the social sphere. Beyond this science has something as important though less definite to offer: a reasonable hope in the unexplored possibilities of the future, an inspiration which is slowly but surely becoming the dominant force of modern thought and action.<sup>4</sup>

These views had strong adherents in Australia. That Australian scientists should follow the lead of their British counterparts is not surprising. At this time, the primary reference point and measuring stick for Australian scientists was British science. The Australian scientific community was still small, and the majority had received postgraduate education at either Oxford or Cambridge. Indeed, a significant number had come under the direct influence of Bernal himself.<sup>5</sup>

One line that was argued particularly strongly in Australia was the special responsibility of the scientist as an influence on public policy. As

Professor O.U. Vonwiller, professor of physics at the University of Sydney, argued in 1938:

The scientist today is gradually realising that his duty goes beyond the acquisition of knowledge for its own sake or commercialising such knowledge for private or public gain. He must insist on being heard when policies are formulated and when methods of administration are being discussed, but first he must make a critical examination of the influence of scientific endeavour on society: he must ascertain those faults of past and present methods which have led to the present unsatisfactory position; he must determine the part which he can play in effecting reform in those methods. The scientist should be able to insist, not necessarily that he take a part in the forming and administration of national policy, but that those charged with that work be educated to understand the possibilities of science and of the application of scientific methods in other fields of human endeavour.<sup>6</sup>

An informal discussion of the issue of 'science and society' modelled on the British Association meeting in 1936 was held at the January 1939 meeting of ANZAAS in Canberra. Sir David Rivett, chairman of the Council for Scientific and Industrial Research (CSIR), argued that the justification for the pursuit of knowledge rested on insistence upon two facts:

1. that the potential applications leading to social good were greater in number and significance than those leading to ill; and
2. that if the pursuit of the good of society through science were pressed forward with vigour and enthusiasm, the incentive towards an application for evil ends would largely vanish.<sup>7</sup>

Professor Vonwiller repeated his view that those in power should be trained to apply the essentials of scientific method in the attack on the problems of society, but also warned of potentially serious effects of the application of scientific knowledge:

The most important influence of development in science on society was the change it had produced in the quality of mankind. Through the advances of medicine and connected sciences everyone enjoyed a protection from disease and hardship which might introduce a lack of resistant power which would later prove costly. The present generation was flabbier in body, mind and soul than its predecessors. Flabbiness of the body was illustrated by the inability of present-day cricketers to stand up to the strenuousness of tours as adequately as could the players of 30 years ago.<sup>8</sup>

Clearly, the driving concerns of the time are not so different from those of today.

Subsequently, a meeting was held in Sydney, chaired by Professor Eric Ashby, and attended by 110 people. Given that at this time the majority of Australian scientists were government employees, working in the CSIR, and that the number of university scientists was still small, this attendance reflected a high level of interest. At this meeting the

Australian Association of Scientific Workers (AASW) was established<sup>9</sup> to 'secure the wider application of science and the scientific method for the welfare of society, and to promote the interests of science'.<sup>10</sup> The twin goals of 'extended and conscious application of science for the welfare of the community', and 'the protection of the status of the scientific worker'<sup>11</sup> went hand-in-hand, for if science were to solve all human problems, the welfare and freedom of the scientist was paramount.

To the question of whether the scientist has 'a special social responsibility different from and perhaps greater than that of the non-scientist citizen',<sup>12</sup> the answer was a resounding yes, 'by virtue of their work and knowledge'.<sup>13</sup> How then to discharge this responsibility? Here a degree of equivocation entered, as the superior position and responsibility of the scientist led logically to a dictatorship of scientists. The conclusion was to call for greater education for everyone in the methods and principles of science, and for an 'extension of scientific methods to the problems of social organisation'.<sup>14</sup>

Wartime saw the full-scale application of the principles of science and the energies of scientists to the human problems presented by war. The AASW played an important role in Australia in a variety of projects.<sup>15</sup> After the Second World War various attempts were made to regain the drive of the social relations of science movement. UNESCO, for example, sought to promote and sponsor studies on the social relations of science.<sup>16</sup> The experience of war, however, had introduced two new elements. The first arose from the construction and use of the atomic bomb. The second, connected to the first, was the establishment of a pattern of secrecy in the conduct of science.

## THE ATOMIC EFFECT

It was the pattern of secrecy established in wartime conditions that first raised new problems about the social role of science after the war. Most scientists expected the secrecy requirements of wartime to be rapidly dismantled. However, the emergence of the cold war with the Soviet Union, and spy revelations in Britain and America created an environment of deep suspicion, used by demagogues—in the United States, Senator Joseph McCarthy, and in Australia, W. C. Wentworth and Joseph Abbott—to promote an anti-Communist witch-hunt. In this atmosphere, calls for the abolition of secrecy in science became interpreted as a threat to national security.

The concerns of the time are reflected in a letter to the *Australian Journal of Science* in 1957:

Holders of research studentships financed by the Commonwealth through the CSIRO must agree not to 'engage publicly in party political controversy, whether by speaking, broadcasting, writing of letters to the press, or by publishing books, articles or leaflets' (CSIRO Head Office Circular). This

restriction operates no matter what subject is being studied. Science students are deterred from taking an active interest in public affairs by the knowledge that a security check may have to be passed in order to obtain employment. When the grounds for deeming a person to be a 'security risk' are not defined by the Government, many will play safe by avoiding controversy.<sup>17</sup>

These circumstances, more than anything else, prompted the demise of the AASW and the decline of the 'social relations in science' movement. To a significant extent, as the result of the magnitude of their contribution to the war effort, science and scientists had become too important as a national resource to be allowed to return to their own devices. There was pressure from the government for scientists, particularly in the CSIR, to be treated like other public servants, and their capabilities exploited in what was seen as the national interest. Their special expertise and their well-publicized commitment to internationalism required that they be controlled all the more effectively, rather than allowed special authority in government decision making.

This view did not, however, carry through to scientists involved in the British atomic weapons tests held in Australia between 1952 and 1963. Great confidence was placed in the advice of the Australian Weapons Testing Safety Committee (AWTSC) consisting of five scientists, including Professors L. H. Martin, E. W. Titterton and J. P. Baxter. While there was considerable public concern over fallout, and regular reports were made by Titterton and his colleagues in the *Australian Journal of Science*, there was little involvement of other scientists. One exception was Hedley Marston, chief of the Division of Animal Biochemistry and General Nutrition, who prepared a report on the uptake of radioactive iodine into the thyroid of grazing animals. The report became the subject of some controversy and of a protracted, though largely private, difference of opinions between Marston and the Safety Committee, running into 1958. Claims were advanced by Marston that the Committee has acted to suppress his findings.<sup>18</sup>

The 1950s, however, were largely marked by close relations between the leaders of the scientific community and government. Under the patronage of Robert Menzies, science flourished and expanded. The Australian Academy of Science was established with a royal charter; the Murray Report led to a substantial increase in funding to the universities; and the Australian National University's Institute of Advanced Studies, with responsibilities for research and postgraduate education only, expanded greatly. The CSIRO, under the guidance of its Minister, R. G. Casey, also prospered mightily.

Through this conjunction of interests, the institution of science grew at a great rate, and Australia's élite scientists played their role in supporting and reinforcing an ordered, Anglo-centric view of the world. There were costs for science, however, as their expansion was traded for a steadily increasing government influence over the direction of research.<sup>19</sup>

One issue over which the Australian government and at least a significant section of the Australian community took rather different

views was the proliferation of nuclear weapons. Through the Pugwash movement, a group of international scientists sought to put their prestige behind a move to control nuclear weapons and argued that scientists had a special responsibility to resist the use of their own research for harmful purposes.

The initiative for this movement came from a letter written by Bertrand Russell and Albert Einstein in 1955, calling for scientists to assess the perils to humanity that had arisen as a result of the development of weapons of mass destruction. With the support of Cyrus Eaton, a wealthy Canadian industrialist, a meeting of twenty scientists drawn from ten nations and widely representative of different political and economic opinions was held at his birthplace, Pugwash, in July 1957.

Three points were on the agenda: the hazards arising from the use of atomic energy in peace and war, the problems of the control of weapons, and the social responsibility of scientists. The statement issued at the end of the meeting included an assertion of 'our common conviction':

That we should do all in our power to prevent war and to assist in establishing a permanent and universal peace. This we can do by contributing to the task of public enlightenment concerning the great dilemma of our times, and by serving to the full extent of our opportunities in the formation of national policies.<sup>20</sup>

This statement reveals a partial resurrection of the claims of the social relations of science movement, though directed specifically towards the issue of nuclear weapons control. This group of eminent scientists included Professor Marcus Oliphant who, on his return to Australia, distributed the Pugwash documents widely. A Melbourne Pugwash Committee was formed to circulate the Pugwash statement, and fifty scientists registered as signatories. Subsequently Pugwash groups were formed in Melbourne, Sydney, Adelaide, and Canberra; their major activity was dissemination and discussion of the reports from the annual International Pugwash meetings. Study groups were formed, public meetings called, and a newsletter published over the period until 1968. Following an initial burst of support, however, enthusiasm gradually declined.<sup>21</sup>

The dominant form and content of arguments about responsibility of science changed significantly between the 1930s and the 1950s in Australia. Debates overseas were of major influence, but local war-related experiences also contributed. There persisted a strong belief that 'Scientists are, because of their special knowledge, well equipped for early awareness of the danger and the promise arising from scientific discoveries. Hence, they have a special competence and a special responsibility in relation to the most pressing problems of our times.'<sup>22</sup> This special expertise was, however, no longer extended to an unqualified justification and promotion of science itself: 'We believe it to be a responsibility of scientists in all countries to contribute to the education of the peoples by spreading among them a wide understanding of the dangers and potentialities offered by the unprecedented growth of

science.<sup>23</sup> Science was now part of the problem, rather than the solution.

## A NEW SOCIAL CLIMATE FOR SCIENCE

The mass blackout of the eastern United States in 1965 signalled for Barry Commoner the end of the 'age of innocent faith in science and technology.'<sup>24</sup> This can be linked to the emergence of three broad areas of social concern during the 1960s. The first of those was the state of the environment. Triggered initially by Rachael Carson's damning account of the effect of pesticides on native animals in *Silent Spring*, there swept across the United States, Europe, and subsequently Australia, a broadly based concern over the effects of pollution and over-population. Barry Commoner's *Science and Survival* and Paul Erlich's *The Population Bomb* were extremely influential, and ecology became the watchword, the fashionable discipline, and the basis of many attempts at a new ideology.<sup>25</sup> The response in Australia, as elsewhere, took two forms. There was a general reaction against science and technology, particularly as generators of pollution, and a call for a reorientation of science to objectives likely to be more beneficial to society. Second, biologists were able to claim a special knowledge and responsibility to advise.<sup>26</sup>

The battle between the images of science and technology—'despoliator' versus 'saviour'—was complicated by a second broad social movement, aroused by the Vietnam War. The passions for and against this war spilled into almost all elements of Australian society, including science. In particular, for many opponents of the war, science was seen as an agent of death and an oppressor of technologically disadvantaged nations. At the same time, the failure of extraordinary levels of technology to achieve decisive victories revealed a critical flaw in the argument that control of science led inevitably to superiority. While these two views might be inconsistent, together or apart they revealed serious doubts about the traditional values underlying the pursuit of science. The social role of science became a matter for anxiety, questioning, and potentially major revision.

The universities provided a major source of this revision. Academics were prominent at rallies and demonstrations, contributed to the membership of protest groups, and were largely responsible for importing and promoting the American 'teach-in' forum.<sup>27</sup> Scientists were well represented in this process. In 1966, a full-page anti-Vietnam newspaper declaration included a high proportion of scientific and medical academics.<sup>28</sup> Even more prominent was a statement in the *Australian Journal of Science*, in 1967, signed by 677 Australian scientists, including 61 professors, and also staff of CSIRO. Mindful of the special responsibilities of science and scientists everywhere, they registered our 'deep concern and revulsion' at the country's involvement in this war,<sup>29</sup> and argued for the scaling down of military activities by all parties, an expression of willingness to negotiate from all belligerents, and the



channeling of funds from the war into solving the 'tremendous biological and sociological problems now facing mankind, whatever their politics or persuasion'.<sup>30</sup>

With the environmental crisis, exacerbated by the Vietnam conflict, a third area of concern struck at the foundations of the institution of science itself. This became known as the 'anti-science movement'. Criticisms from a variety of standpoints coalesced to provide the basis for a widespread rejection of not only the fruits, but also the values, of western science. Commoner, along with many others, saw scientists as sorcerer's apprentices, with insufficient knowledge to control the effects of their actions.<sup>34</sup> For others, the alleged 'neutrality' of science, and its *lack* of response to social demands was the major concern.<sup>32</sup> Herbert Marcuse<sup>33</sup> combined attacks on American involvement in Vietnam with criticisms of the political status of science. He argued that, far from the Baconian ideal of science as freeing humanity from material want, science had been captured by sectional capitalistic interests, particularly those of the industrial-military establishment. As a consequence, science had become an instrument in the domination of 'man over man'. The attack was continued by Theodore Roszak, who condemned science as 'a bewilderingly perverse effort to demonstrate that nothing, *absolutely nothing* is particularly special, unique or marvellous, but can be lowered to the status of mechanized routine'.<sup>34</sup>

This 'counter culture' was transported to Australia, but there was little or no contribution here to its intellectual development. Some believed it discouraged student interest in science, though the decline in participation rates in science education may have followed more from the general anti-intellectualism of the day. However, in response to the emergence of these three broad areas of social concern, there were calls overseas for the complete separation of science from politics,<sup>35</sup> and even dire predictions of an end to the scientific enterprise itself.<sup>36</sup> In Australia, the response of some scientists was to establish organizations to promote the concept and practice of social responsibility in science.

## THE SOCIAL RESPONSIBILITY OF SCIENCE INSTITUTIONALIZED

A variety of organizations emerged to meet this challenge. In the United States these included the Union of Concerned Scientists, formed at MIT in 1969 after a 'research strike', which prepared public reports on such issues as anti-ballistic missile systems, and chemical and biological weapons, and Barry Commoner's Institute for Public Information. More radical was the Scientists and Engineers for Social and Political Action (SESPA), formed in 1969 following the refusal of the American Physical Society to take a stance on the use of physics in Vietnam. In Britain, the British Society for Social Responsibility in Science (BSSRS) was formed, also in 1969.<sup>37</sup> Eventual dissatisfaction with the 'political' drift of the British society and its failure to address what many

senior scientists considered the key issue—public education—led to the establishment of the Council for Science and Society in 1973.

These developments in the United Kingdom and the United States and the increase in political consciousness caused by the Vietnam War produced a variety of institutional responses in Australasia. Within ANZAAS the *Australian Journal of Science* was replaced by a new journal, *Search*, revealingly sub-titled 'Science, Technology and Society', and given the mandate of publishing 'articles which deal with the social and economic consequences of advances in science and technology'.<sup>38</sup>

The contents of *Search* over the following ten years provide a fair reflection of the wider issues that concerned scientists. The essential conflicts are captured in a Bruce Petty cartoon drawn for the Brisbane Congress in 1971. The major issues addressed included science education, conservation and the environment, the crown-of-thorns starfish attack on the Barrier Reef, the supply of energy, the Concorde Supersonic Transport and its potential effects, implications of biological advances, population control, the relation of science to industry, science and the press, technology and unemployment, science in government, food supply, and health care.

It is more difficult to assess the effectiveness of ANZAAS in its role as a vehicle for expressing the social responsibilities of science. Through *Search* and the congresses, it assumed a significant level of communication with at least sections of the public. But these remained essentially passive vehicles. More activist approaches were adopted by the organizations established specifically in response to the new social climate for science in the 1960s: the Society for Social Responsibility in Science (SSRS) groups in Australia and the New Zealand Association of Scientists.

### *The Society for Social Responsibility in Science*

The establishment of a set of SSRS groups in Australia can be traced largely to the actions of Professor Charles Birch<sup>39</sup> of the University of Sydney, who returned from an overseas trip impressed by developments in the United States. He called a meeting of academics in July 1969, which led to the formation of the Social Responsibility in Science—Sydney group. Subsequent initiatives at the August 1969 ANZAAS Congress and by mail led to the establishment of two other strong groups, in Melbourne and Canberra, and a small one in Rockhampton.<sup>40</sup>

Both the Sydney and Melbourne groups soon attracted 250–300 members; they peaked in the period 1970–2, but declined rapidly afterwards. They informed the public and stimulated social awareness through lectures and public meetings on Concorde, population control, intermediate technology, chemical and biological warfare, energy, and genetics.

The ACT group, formed in March 1970, continued actively into the mid-1980s.<sup>41</sup> Their aims, as set out in the constitution, are remarkably

similar to those of ANZAAS, and also those of the British Society for Responsibility in Science.<sup>42</sup> These aims were to be pursued by public meetings, study groups, dissemination of findings, and discussions between scientific experts and decision makers. The ACT membership grew to 150, most of whom were researchers in the biological sciences employed by CSIRO. Probably as a consequence SSRS–ACT operated essentially as a community action group with a focus on environmental issues. Thus, its early activities included lobbying against the Telecom Tower proposed for Black Mountain, establishing mechanisms for waste recycling in Canberra, studying pollution in the waterways around Canberra, and opposing the Molonglo Parkway. In addition, a schools programme entitled INSPECT (Inquiry into the State of Pollution and Environmental Conservation by Thoughtful people), designed to encourage awareness of environmental problems, was established in Canberra and was rapidly taken up elsewhere. A sign of their standing in the environmental field came with an invitation to attend the United Nations Conference on the Human Environment in 1972.

The most obvious achievement of SSRS–ACT was the success of their campaign, over the period 1973–6 to persuade the Commonwealth government to withdraw its financial support from the mass chest X-ray campaign. During this period, it also addressed nuclear power and the effects of nuclear weapons testing, environmental health issues, and science and energy policy. Some of these activities led to clashes with the establishment, particularly in the medical and health fields. Perhaps as a result, by the end of the 1970s, the emphasis had shifted from political activism to the provision of information. This, together with further changes in the social climate, and an inability to recruit new members led to the effective, if not formal, demise of the organization.

The history of this particular phase of the social responsibility of science reveals a pattern commonly experienced in Australia, in both political and cultural movements. Their origin is elsewhere, in Europe or the United States. The ideas are transported, frequently by visiting academics, but if they find a fertile environment in Australia, their flourishing will produce rapid mutation to correspond with the special needs, interests, and opportunities of the local climate, but its foreign origin can also mean that it never effectively takes root, and quickly withers and dies.

When measured against the sheer size as well as the political and economic basis of the forces shaping science and technology, it was perhaps naive to expect too much from the approach. The present structure of Australian science is probably such that it prevents any movement towards greater social responsibility having much effect on the actions, and beliefs, of Australian scientists.<sup>43</sup>

The effect of the groups on both the scientific community and the public was limited. SSRS provided the organizational context for some scientists to work out their views of an appropriate social role of science. It was, however, unable to disseminate this view into the mainstream of the scientific enterprise, and as the social role changed, so the support for its particular perspective on the social responsibility of science weakened.

### *The New Zealand Association of Scientists*

The institutionalization of social responsibility in New Zealand took a different form, with one organization, the New Zealand Association of Scientists (NZAS), in many ways performing the combined functions of AASW, ANZAAS, and SSRS in Australia.

The Association was formed in the wartime conditions of 1941 with the aim of securing the widest application of science and of the scientific method for the welfare of society and to protect the interests of scientific workers.<sup>44</sup> Its initial aims were a mixture of promotion, social responsibility, and employment protection. After the war, secrecy became a major issue in New Zealand. Cold-war politics led to a severing of connections with the World Federation of Scientific Workers, because of alleged Marxist bias, and the adoption by the New Zealand Association of a determinedly non-political stance. In the 1960s and early 1970s, the Association's major preoccupation was with salaries. It was not until the mid-1970s that its focus broadened to include such topical issues as the 'Limits to Growth' debate, women in science, and the New Zealand fishing industry.

The commitment to a non-political stance led to a fairly cautious approach to social responsibility:

The Association remained strictly imparital over the issue of nuclear power, as it has in general over the issues in science. However, during the past year [1978] it has taken a stand on genetic engineering, not because it is opposed to such work . . . but because it believes that the public has a right to be fully informed about possible risks.<sup>45</sup>

It organized a conference on Social Responsibility in Science in 1979,<sup>46</sup> but thereafter interest in these issues and the membership of the Association declined.

The prominent position of the Department of Scientific and Industrial Research in New Zealand has undoubtedly played a significant role in the country's economic, social, and cultural development. But the fact that the majority of scientists are employed by government has restricted the development of an independent and more critical conception of social responsibility.

### *The Australian Academy of Science*

The response of the Australian Academy of Science to the changing social climate for science was inevitably different from that of younger and more radical scientists, showing a greater concern with the protection of the science enterprise itself. The first organized activity of the Academy specifically dealing with social responsibility was a symposium on 'Science, Technology and Society' in conjunction with its annual meeting on 3 May 1968.<sup>47</sup> For the Academy, at least as reflected in this Symposium, the changing social climate did not raise problems for the values, organization, and practice of science. Rather, it was only a matter of linking research more effectively to economic and social objectives.

In 1972 the Academy published two reports on environmental issues: the use of DDT and the atmospheric effects of supersonic aircraft. The approach revealed the Academy's self-image as a purveyor of definitive knowledge:

Knowing that important matters of public interest were imminent in this country relating to supersonic transport, knowing that the public had been assailed by propaganda from both sides and might well have become confused, the Academy instituted an enquiry by a group of uncommitted scientists to review the various dangers which have been suggested, and put the risk of climatological impact into perspective.<sup>48</sup>

However, the Academy's findings—that the hazards of DDT and SST were not great—met with considerable opposition, something for which the Academy did not appear to be prepared. Its report on Concorde was even described as an exercise in 'social irresponsibility'.<sup>49</sup> The working group that produced the supersonic transport report comprised technical experts in a number of fields, including atmospheric physics. It collected and analysed data, consulted with experts, and arrived at conclusions. The group's opponents disagreed not only with the interpretation of technical data, but also with the values inherent in the analysis, and the research procedure itself, claiming it was designed to manufacture a consensus that the limited state of knowledge did not justify.

The supersonic transport report provided an occasion for a clash within the scientific community between two distinct sets of assumptions about the social role of science. For the Academy team, the issue was a matter for objective determination; for the critics, science and politics were inextricably mixed. That the debate was conducted in public, and over issues of some community interest, served only to diminish the authority of the first view of science as the source of superior wisdom, and to reinforce the claims of the second. The lesson apparently drawn by the Academy of Science was that it should avoid, or at least handle far more circumspectly, potentially controversial issues.

There was, however, another move within the Academy, or more properly among some of its Fellows, to address the new social responsibility of science. This was led by Sir Otto Frankel, who, in delivering the second John Edwin Falk Memorial Lecture in Canberra on 3 March 1972, on conservation of crop genetic resources, emphasized the need for proper debate through a Science and Society forum where 'dissent and constructive criticism are given the orderly freedoms of institutionalization'.<sup>50</sup>

The establishment of the Science and Society Forum was not announced until August 1973, the major delay being a result of difficulties in obtaining appropriate membership of the steering committee, particularly suitable 'younger scientists'. Among the first projects selected for study were the value of environmental impact statements, water and its uses (in particular the feasibility of towing icebergs), the 'limits to growth' concept, and the value of nature conservation.

The first forum was held on 9 November 1974, under the title *Science and Society in Australia*. The topics to be discussed were, *Major Issues Confronting Science and Society in Australia*, *Medical Science—Are Our Priorities Right?*, and *The Wired City—Science and Urban Life*. Sir Macfarlane Burnet chaired the meeting, and speakers were to include the Ministers for Science and for Health, John Gorton, (the former Prime Minister), Sir Otto Frankel, and Professor Gus Nossal. Despite this prestigious guest list, the proceedings could hardly have been less auspicious.

First, the opening of the meeting was interrupted by what the press described as a 'wild brawl'. Thirty students attempted to break up the meeting, accusing the first speaker, Professor Roger Russell, (vice-chancellor and professor of psycho-biology at Flinders University) of being an agent of the United States Department of Defence. Second, Mr Bill Morrison, Minister for Science, used the occasion to make a long-awaited announcement of the establishment of the Australian Science and Technology Council. Third, the Minister for Health, Dr Everingham, announced a plan to introduce a diploma of community nursing to ease the shortage of general practitioners. Under these circumstances the principal objective of providing a Forum for discussion of issues of scientific and social relevance was totally undermined.

This first meeting sounded the deathknell for the *Science and Society Forum*. After some discussion, it was dissolved in July 1975. Various committees met sporadically to consider the matter until 1979, but there was little pressure for action. It appeared that the experiences of physical violence and of being used by Ministers persuaded the Fellows to withdraw into their dome. With the passage of time, the pressure for visible expressions or affirmations of social responsibility declined.

## SOCIAL RESPONSIBILITY IN THE 1980s: AND STILL THE WHEEL TURNS

The period from 1978 to 1983 witnessed a remarkable turnaround in Australian public and political attitudes to science and technology. Indeed, the very success of scientists in promoting the value of their research to economic progress had the effect of tying the public image of science very close to that of technology.

By 1978 there was growing concern with the effects of technology on employment. ANZAAS had perhaps been rather percipient on this issue, organizing a symposium on the consequences of automation in 1968,<sup>51</sup> when there was interest in the United States, but little in Australia. By the late 1970s, however, computers and other modern technology were widely presented as 'job killers', and a threat to the Australian economy and social order.<sup>52</sup> The growing body of literature on the beneficial role of technology in the advanced economies, a strengthening Department of Science and Technology, and an awareness of the Silicon Valley, and other similar, spectacular commercial and