

PRACTICAL PERSPECTIVE

Science journalism in Australia

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This paper considers the trends and current realities of science journalism in Australia. It also examines the role that science journalism is playing in setting the agenda for media coverage of science and technology in Australia, and the influence of that coverage in developing an informed public willing to be involved in science debates. Surveys show that media attention to science and technology has increased considerably over the past decade. Yet coverage seems shallow and technology-based, and does not appear to have succeeded in making a real impact on people or in changing the ways they think about science and technology and its impact on their lives. The challenges currently facing science journalism in Australia include: the need for more in-depth and critical analysis of science and technology; overcoming the negative or trivial perceptions of editors, chiefs of staff, news directors and other gatekeepers about the importance of science and technology stories; and integrating science and technology with social, economic and political issues.

Australians are among the most avid media consumers in the world. Australian society is gluttonous for entertainment, news, information or diversion. Media research has rated Australians as the fourth highest media consumers in the world. The hours spent by Australians consuming television, radio, newspapers and magazines are more than those hours spent in almost any other activity.¹

In a lifetime, for example, the average Australian will watch 1.4 million television advertisements. Australia has the fourth highest newspaper consumption in the world with about 350 papers circulated for every 1000 people. Hugh Mackay suggests that Australians have become information junkies: 'Australians' almost insatiable appetite for news and current affairs information via radio and TV is a symptom of an underlying thirst for knowledge as a pathway to security and stability'.²

National coverage by the media of science and technology (S&T), like other issues, is limited by the country's political and economic boundaries. Australia, with a population of around 18 million, is a federation of six states of unequal area and population, and also includes the Northern Territory and a separate Australian Capital Territory.

This paper describes trends and current realities of science journalism in Australia, and examines factors affecting the chances of science media coverage creating an appropriate climate of public debate about science and technology issues.

It takes the view that the goal of science journalism is not to promote science, but rather to create an informed public who are: 'aware of the social, political and

economic implications of scientific activities, the nature of evidence underlying decisions, and the limits as well as the power of science as applied to human affairs'.³ A proper understanding of how well science journalism in Australia has achieved this goal needs to be embedded in a contextual approach which examines the attitudes and beliefs of the public, media coverage of S&T, quality of coverage, and the culture and traditions of the media involved. There are a number of parallels that can be drawn with science journalism in the United Kingdom and the United States. However, differences in population sizes and historical backgrounds mean that science journalism in Australia has taken much longer to develop.

Public attitudes to science and technology

Given their media consumption, it is likely that Australians will be influenced by the dominant force the media plays in their lives. As such, their view of S&T is likely to be shaped by media coverage and images. Factors outside the media such as education, direct experiences with technological processes or products, and observable links with science within the community may influence public attitudes. However, Barns claims that: 'mass media representations are probably the most important continuing influence shaping perceptions of science and technology'.⁴ For example, a study from the Commission for the Future showed that school students found science subjects boring and difficult. Students were also likely to be reluctant to pursue a career in science because of its poor image, an image compiled from depictions of science and scientists both factual and fictional—on film, television (news and entertainment), and on radio and in newspapers.⁵ This view is supported by Nelkin who states that for most Americans 'the reality of science is what they read in the press. They understand science less through direct experience or past education than through the filter of journalistic language and imagery'.⁶

In a review of six surveys of popular attitudes to S&T in Australia, Eckersley concluded that 'Australians applaud technological progress, and fear it . . . we generally regard science and technology as a good thing, but feel threatened by their growing and seemingly uncontrolled power . . . this anxiety may be heightened by the fact that few of us feel we are very well informed about science and technology'.⁷ Despite the schizophrenic attitude with which the Australian public approaches science, recent surveys indicate ongoing support for scientific research in Australia. In a survey conducted by *New Scientist*, 61% of respondents said that the government should spend more money on research (only 9% said that less money should be spent). Respondents also strongly agreed that more money should be spent on medical research (70%), pollution control (60%) and the environment (50%). Overall support was high, with 65% saying that scientific research could solve many of the world's problems.⁸

While this indicates strong support for government funding of scientific research, it should be noted that this support may not be uniform across the population. For example, a 1987 survey found a huge difference of over 50 percentage points between the level of support for technology by male professionals and managers, and female semi-skilled or unskilled workers.⁹

It is easy to be in favour of S&T and of more funding for those activities, but such opinions may well be cast from a position of considerable ignorance. For example,

nearly two thirds of Australians in a 1986 survey did not consider that either their jobs or main activity would be affected by S&T.¹⁰ One Australian survey found that S&T were the subjects about which most Australians admitted being ignorant, and science was the only area where business, trade union and government leaders were as poorly informed as workers.⁹ Even the attentive groups—those interested in S&T—have only a *limited understanding of scientific processes or terms*. These results are similar to those found in other countries. For example, it has been reported that only 5% of the American public is scientifically literate.¹¹

However, an examination of Australian S&T policy suggests a powerful link between public opinion expressed by the media and new government policy on S&T. A look at almost all major S&T policy initiatives of recent years shows that these initiatives have followed media campaigns by scientists aimed at stopping cuts to science funding. For example, a 1984 campaign by scientists led to 150% tax concessions for industrial investment in research and development, as well as the restructuring of Australia's premier research organization, the Commonwealth Scientific and Industrial Research Organisation (CSIRO), and other government research laboratories. A more recent campaign in 1993 succeeded in stopping the Minister of Science from restructuring Australia's research organizations without proper consultation and review. According to Richard Eckersley, former journalist, media director and press secretary:

the mass media are of questionable use in making the public S&T literate, in the sense that they have a good understanding and knowledge of the subject. . . . But the evidence shows clearly that the media are a powerful group in mobilising the support of that 'attentive' group within the community and so convincing governments of the need to act.¹²

So it would appear that the media has enormous potential power in Australia for shaping public attitudes and government policy with regard to S&T. However, we doubt that the expanding coverage of S&T, as described below, has increased public debate or understanding of science and its processes.

Media coverage of science and technology

There has been very little research into the coverage of S&T by the various media in Australia. An exception has been the surveys conducted by the Science and Technology Policy Branch of the Federal Department responsible for S&T. The results from these surveys provide a quantitative scenario of media coverage of S&T in Australia and indicate a number of interesting trends.^{13,14} The first survey collected data about the quantity of S&T news over a set period in July 1989, and counted column inches and minutes-to-air of S&T stories over this period. By using circulation and ratings figures, this data was then converted to a measure of potential exposure—the number of people who watch or listen to a programme or read a print article ('potential' because they might skip the science or technology story).¹³ The second survey collected data in July 1993 and these were presented by Stephen Utick at the 1993 Australian and New Zealand Association for the Advancement of Science (ANZAAS) conference.¹⁴ Relevant data from these surveys are used below to describe the coverage of S&T in Australia.

Print media

Newspapers. There are only two national newspapers, *The Australian* and *The Australian Financial Review*. While *The Australian's* influence is national, this is not reflected in its circulation figures. In fact, the combined circulation of the main metropolitan state newspapers is about 20 times that of the country's only general national newspaper (see Table 1).

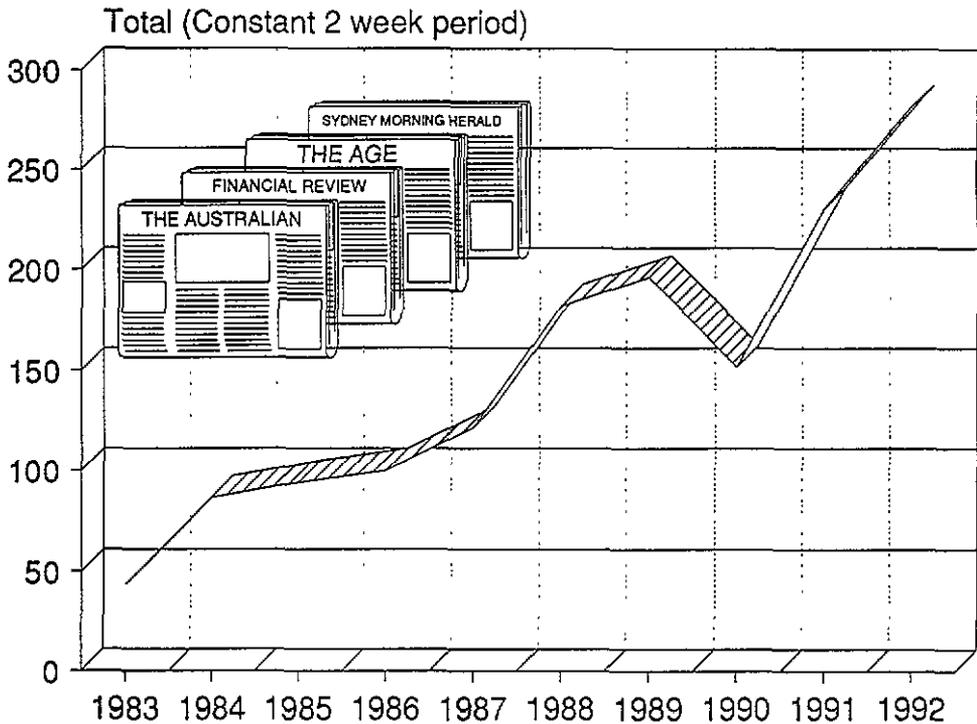
Of these metropolitan papers, only the *Sydney Morning Herald*, *The Age* and, to a lesser extent, the *Canberra Times* and the *West Australian* tackle serious issues. Each has a specialist science writer. Over the past year, the *Sydney Morning Herald* has developed a unit of science and environment writers with at least two writers specifically covering science issues. The others, in varying degrees, take a more parochial attitude to their coverage of news, entertainment, sport and politics, and generally do not have a specialist science writer (see Table 1). The two daily newspapers with the highest circulation, the *Herald Sun* and *The Daily Telegraph Mirror*, do not have a regular science writer. Other rural and regional newspapers may also cover S&T issues, but do not have specialist science journalists.

The number of newspaper articles dealing with S&T has grown rapidly over the past decade, as illustrated in the figure which shows a two-week index of four major papers. The data in this graph includes 1992 figures that indicate an increase in the number of newspaper stories of 282% since 1986.¹⁵

The surveys examined the potential exposure to S&T for readers of 17 major newspapers. The average share of science news in newspapers rose from 1.3% in 1989 to 2.9% in 1993, although the quantity of total news space in the newspapers surveyed slumped in 1993 with the impact of the recession. The most significant coverage of S&T was found in *The Australian*, *Sydney Morning Herald* and the *Canberra Times*. Coverage was particularly poor by Brisbane's *Courier-Mail*. However, overall coverage of S&T was more extensive in newspapers than in any other medium.

Table 1. Australian newspaper circulation. Figures for metropolitan and national dailies are for six days, Monday to Saturday, where applicable. From Gee, M., 1995, *Media Guide* (49th edn) (Sydney: Margaret Gee Media Group).

Newspaper	State/national	Circulation	S&T journalist
<i>The Australian</i>	national	148 000	Julian Cribb
<i>Australian Financial Review</i>	national	81 000	None
<i>Sydney Morning Herald</i>	New South Wales	260 000	Bob Beale, Leigh Dayton, Gavin Gilchrist
<i>The Daily Telegraph Mirror</i>	New South Wales	435 000	None
<i>Canberra Times</i>	Australian Capital Territory	47 000	Simon Grose (formerly David Mussared)
<i>Courier-Mail</i>	Queensland	219 000	Brendan O'Malley
<i>The Advertiser</i>	South Australia	203 000	Chris Brice
<i>The Age</i>	Victoria	230 000	Tania Ewing (formerly Graeme O'Neill)
<i>Herald Sun</i>	Victoria	563 000	None
<i>West Australian</i>	West Australia	263 000	Carmelo Amalfi
<i>The Mercury</i>	Tasmania	53 000	None
<i>Northern Territory News</i>	Northern Territory	22 000	None



Index of the number of newspaper science and technology articles for 1980 to 1992 (1986 = 100%), from a Department of Industry, Technology And Regional Development (DITARD) survey, unpublished data, courtesy of Stephen Utick.

The coverage by subject matter for 1989 and 1993 is illustrated in Table 2. In both years, life sciences and medicine dominate stories while mathematics and physical sciences get very little coverage. However, since 1989 there has been a significant drop in the percentage of stories focusing on astronomy, space and on environmental sciences. Technology and agriculture, along with life sciences and medicine, have increased their domination of news exposure.

Australian media are tending to draw an increasing number of their S&T stories from overseas. A 1973 study of the *Sydney Morning Herald* revealed that only 18% of science stories came from overseas.¹⁶ However, Hendy found that the proportion had risen to 27% in 1988, although this had dropped to 23% in his 1991 study.¹⁷ This later study also included *The Australian*, which had 36% of its science stories derived from overseas wire services.¹⁸ This could possibly reflect a healthy interest in world affairs. On the other hand, it might suggest an editorial belief that Australia has few newsworthy S&T stories on offer. It may also reflect the globalization of news where it is cheaper to use stories from international wire services or other newspapers from the same publishing stable than to send a local reporter out to find new stories.

Magazines. Margaret Gee's *Media Guide* lists 31 S&T magazines from a total list of 2602 magazines. Many of the magazines are local scientific publications rather than popular magazines. According to the circulation figures listed in the *Guide*, only

Table 2. Newspapers' (July 1989, 1993) S&T news coverage broken down by subject matter. From Australia Department of Industry and Technology and Commerce (DITAC), Science and Technology Branch, 1991, Science and technology news in the media. *Australian Science and Innovation Brief 1991* (Canberra: Australian Government Publishing Service); and Utick, S., 1993, *Tuned in or switched off?* Address to 1993 ANZAAS Congress.

Subject	S&T coverage (circulation × % news area)		
	1989	1993	Change
Mathematics and physical sciences	1	1.5	+0.5
Earth sciences	7	9.2	+2.2
Information science/other	7	12.5	+5.5
S&T policy and issues	12	13.6	+1.6
Technology and agriculture	13	22.0	+9.0
Environmental sciences	17	9.1	-7.9
Astronomy and space	19	0.6	-18.4
Life sciences and medicine	24	31.5	+7.5

New Scientist (circulation 16 328), *Ascent Technology Magazine* (circulation 15 000) and *Soft Technology* (circulation 13 000) have a significant potential audience. The majority of the other magazines have circulation numbers below 1000.¹⁹

Science stories can also be reported in general magazines, but most of these popular magazines do not employ science journalists or run a science column. For example, the *Bulletin*, which is targeted at influential and well-educated Australians, has never employed a S&T journalist or columnist.²⁰

The 1989 survey of 13 popular magazines showed that S&T accounted for an average 4.1% of published news area, over double that of newspapers. A very significant finding was that these magazines gave a very high coverage to life sciences and medicine (83%) to the general exclusion of other S&T topics (environmental sciences may be an exception at 8%).²¹ Since 1989, coverage of S&T news has improved in the *Bulletin*, *Time Australia Magazine*, *New Idea* and *Portfolio*. In 1993, over 95% of science news in the women's magazines covered medicine and life science, with environment accounting for the rest. In the general and business magazines, 50% of science news dealt with technology and computers.²²

Electronic media

Television news. ABC Television is the only national network to employ a full-time S&T reporter for news and current affairs programmes. This reporter has a national focus, and presents two to three science stories on the nationally screened ABC news each week. A number of other television stations or networks employ environment, medical or rural reporters who may also cover S&T stories. During the 1993 survey period, S&T coverage on television fluctuated between 1% and 5% of the news broadcast. Compared with 1989, the results showed improvements in coverage for all networks in Victoria and Queensland. Melbourne commercial television stations had also overtaken Sydney stations for the amount of coverage of S&T on television news.

The 1993 survey also showed that current affairs programmes such as ABC's *Lateline*, Channel 7's *Real Life* and *Eleven AM* and Channel 9's *Nightline* and *Today* averaged between two and three minutes of science coverage per programme. Channel 9's business-orientated *Sunday*, and ABC's rural programme *Landline*, averaged 10 minutes per programme, while ABC's *7.30 Report* covered no science during the survey period.

There was significant variation from other forms of media when coverage was analysed by subject area for both years. Newspapers emphasize medicine/health and technology issues, whereas television coverage is weighted toward environmental sciences (42%) and life sciences and medicine (35%) with some coverage of engineering, agriculture and science policy or issues.²³ In 1993, there was greater coverage by television news of science policy issues (25% of TV S&T coverage) because of the debate which began when the Minister for Science tried to restructure Australia's research organizations.²⁴

Television S&T programmes. There are two regular weekly specialist science programmes in Australia: *Quantum* (30 minutes) on the ABC television network, and *Beyond 2000* (one hour with breaks) on a commercial network. Both programmes are screened nationally and attract about 700 000 viewers per programme.²⁵ The ABC television Science Unit also produces programmes such as *A Question of Survival*, the *Quantum Interviews*, and other special science programmes.

Radio. Australian science reporting reaches its greatest heights on radio. Radio coverage may include straight news items, day-time 'chat show' interviews of between five and eight minutes, or specialist programmes which tend to be more detailed and technical. The government-funded ABC radio dominates the coverage. The flagship of the ABC's offerings is the long-lived (20 years on 31 August 1995) *The Science Show* which runs on Saturday afternoons on Radio National.

Other science-based programmes run by the ABC include: *Ockham's Razor*, a Sunday morning programme devoted to ideas and opinions about science; *The Health Report*; *Green and Practical*; and *The Food Program*. These programmes go to air on the Radio National network, and although they can be heard across Australia, the ratings for that network are much lower than for commercial radio and other ABC networks.

The total number of people who listen to the Radio National science programmes for at least 15 minutes each week for the five main capital cities, and based on a mid-1993 survey, is as follows: *Green and Practical* 122 000, *Science Show* 117 000, *Health Report* 67 000, *Food Program* 77 000, *Ockham's Razor* 80 000.²⁶ Although commercial radio stations lag far behind the ABC, they may also be keen consumers of S&T stories. Editor of *New Scientist* in Australia, Ian Anderson, notes that a 'string of science writers are now bobbing up regularly on radio offering comments about the latest science'.²⁷

However, in the past five years, S&T news and information has become even more concentrated in ABC radio stations. During the 1993 survey period, over 80% of S&T coverage by radio is broadcast from ABC Radio stations. Most commercial stations now appear to cater for niche markets, particularly the FM bands, and are music rather than information orientated.

Quality of science and technology coverage

While a limited amount of research has been done on the quantity of S&T media coverage, there has been less effort to look at the quality of media coverage.

The type of stories covered by the media are one indication of quality. Paul Hendy, from the Australian Centre for Independent Journalism at the University of Technology Sydney, has carried out unpublished studies on science reporting in the *Sydney Morning Herald* (1988, 1991) and *The Australian* (1991) which indicate that there is a dominance of technology (products of research) reporting over science (process of research) reporting.²⁸ His 1988 study of the *Sydney Morning Herald* indicated that 'technology (with its non-military and military components) dominates the quantity of articles reported, while science is at the bottom' (see Table 3). When Hendy broke down *Sydney Morning Herald's* S&T coverage into its component parts, he found that the space given to science in 1988 was extremely low:

In square centimetre column area, science covers only 16 771 cm² of the total newspaper area of 6 079 825 cm². This corresponds to 0.26% by area of the one month study—or the equivalent of 7.4 pages out of the 2989 total. Even with the 1026 pages of regular advertisement area removed from the newspaper total space, the science percentage is still only 0.45%.²⁹

Hendy further observed that: 'the number of lighter tone "entertaining" stories and "whiz-bang" breakthroughs clearly represents a flawed perception that the readership cannot cope with articles of interpretive depth'.³⁰ This trend toward superficiality has also been noted in the UK and the USA. For example, Hansen noted in the UK that:

Science *per se* is not seen as hard news . . . and science stories tend to get squeezed out if set in direct competition with other mainstream types of news, particularly political news. With the exception of the 'weird-and-wacky' or the 'implications-for-the-individual' types of science. . . .³¹

Nelkin noted that there was little in the US press about the methods and social organization of research and that the focus of media coverage was on dramatic

Table 3. Percentage of S&T coverage by newspaper area of the four main topic categories for: *Sydney Morning Herald*, 1988; *Sydney Morning Herald*, 1991; *The Australian*, 1991. From Hendy, P., 1988, *Analysis of Science and Technology Issues in the Sydney Morning Herald*. An analytical report, unpublished; and Hendy, P., 1991, *Content Analysis of Science Reporting in the Sydney Morning Herald and The Australian*. Australian Centre for Independent Journalism, University of Technology Sydney, unpublished.

Topic category	S&T coverage (%)		
	<i>Sydney Morning Herald</i>		<i>The Australian</i> , 1991
	1988	1991	
Military technology	9.6	9.07	15.35
Non-military technology	26.7	27.11	32.57
Science	17.1	18.43	18.85
Medicine/health	26.8	35.22	23.38
Energy	19.8	10.17	9.85

breakthroughs, 'be they new superconducting materials, patented mice, the fastest computers to date or the latest medical cures'.³² However, as Utick points out, there will always be a greater emphasis on technology because of the effect it has on people's lives, as opposed to the 'pure ideas' of science.¹⁵ The emergence of industry-supported supplements in the major papers on computers, engineering and education has further increased the profile for technology in newspapers. Yet, the possibility for in-depth analysis, often cited as a strength of print media, does not appear to have been fully exploited by newspapers to date.

Hendy noted in his 1991 study that few newspaper S&T stories looked 'behind the scenes' to explain the 'why' of science. For example: 'the few articles on medical science . . . and the overwhelming reportage on clinical medicine and health, is a clear indictment on the decline of the 'why' of science by medical reporting journalists'.³³

Questions of quality are not limited to the print media. Analysis of the *Towards 2000* TV series (the precursor to *Beyond 2000*) led Schibeci to conclude that 'with its emphasis on the novel, unusual and extravagant, *Towards 2000* was afflicted by the "breakthrough syndrome" that is all too common in media treatment of S&T'.³⁴ A content analysis of Australia's two key S&T television programmes, *Quantum* and *Beyond 2000*, indicated that both programmes, especially *Beyond 2000*, were weighted to providing entertainment with 'high tech, gee-whiz' stories with an emphasis on new technologies.³⁵

On the other hand, Anderson makes the point that while the media are searching for 'breakthrough' news, so are the scientists. But he does call for more media coverage on the impacts as well as the technology *per se*: ' . . . coverage should be more probing and critical, not less'.³⁶ The current Executive Producer of *Quantum*, Alison Leigh, says that the programme aims to present items in their social context rather than as simple 'breakthrough' stories, and the programme tries to show the process of science so that people are more aware of the limitations of scientific method: 'We need to guard against presenting science as if all breakthroughs and developments are beneficial. . . . We are aware of the dangers of presenting scientists as if they can do no wrong'.³⁷

Although the quantity of S&T coverage has dramatically improved in the past decade in Australia, it appears that the media are still struggling to provide in-depth analysis of scientific processes and developments. This has led to a lack of critical analysis of science, its processes, institutions and influences.

Science journalists

Journalist Graeme O'Neill says science journalism is:

a general purpose solder that can help to secure imperfect connections in the circuitry of modern society—done well, it can facilitate the flow of ideas, energy and money around the system, linking scientists, technologists, business people, politicians, bureaucrats, educators, students and citizens.³⁸

Perhaps the biggest development in science journalism in Australia over the past decade has been the emergence of the specialist science journalist. It is largely these specialists who are helping to shape Australia's media coverage. Utick goes so far as to say that these people are responsible for the increased coverage of S&T that Australia has experienced over the past 10 years.¹⁵ Certainly there can be no doubt that prolific

S&T specialist writers such as *The Australian's* Julian Cribb (with over 1000 published stories within a two years and ten month time-period) are improving coverage of S&T in Australia.

A recent study which surveyed 1068 journalists in Australia found that science journalists as a group had the following characteristics:

- they comprise about 6% of the news reporting workforce (about 140 people); this includes science, medical, environment, technology and computer journalists
- women outnumber men by two to one
- they are better educated than other journalists; most have university degrees (but not normally in scientific disciplines)
- they are younger than the average journalist
- they earn a higher than average salary
- they tend to be left-liberal in their politics
- they value their professional autonomy and are very conscious of the issue of managerial interference.³⁹

Given this estimate of the number of science journalists in Australia, it would appear that Australia is better served than the USA, where it is estimated that 1% of all journalists are science journalists.⁴⁰ However, it is important to recognise that many of the journalists included in the estimated figure of Australian science journalists would spend more time on policy issues than on S&T, especially those on environment and medical rounds. In reality, there are only a handful of journalists whose only round is science and technology.

In comparing the characteristics of Australian journalists with those from the USA and the UK, it is interesting to note that there are many similarities. For example, American journalists are also better educated than their colleagues (although not necessarily in science), and also enjoy autonomy in their work.⁴¹

Seven of Australia's specialist S&T print journalists responded to a brief questionnaire (see the Appendix). Six of them are among Australia's most recognized and respected science newspaper writers. Brendan O'Malley is a cadet from Brisbane's *Courier-Mail* who was appointed in 1992 and is having difficulty persuading his editor to run science stories. However, he was the first science reporter to be appointed by this paper. Other newspapers appointed science writers during the 1980s, although the *West Australian* had a science writer during the early 1960s.

Most of the newspapers also have environment, medical and computer rounds and have a specialist writer or a generalist appointed to cover those areas. Four of the papers have a regular weekly column devoted to S&T while the others may have regular supplements on computers, environment or particular industry sectors.

Table 4 indicates the percentage of news and feature stories written by each journalist during an average week, as well as the estimated percentage that appear in print. With the exception of the *Courier-Mail* journalist, the respondents indicated that S&T was their main subject area and that they were unlikely to cover other areas unless they were related in some way.

The seven journalists gave a mixed response on the question of status for S&T within their newspaper. Former *Canberra Times* journalist David Mussared said the status of S&T was very high and that 'management recognizes the large number of scientists among the readership and will give science front-page treatment if it is worth it'. The *West Australian* reporter also described his newspaper as having a 'healthy' attitude to S&T.

Table 4. S&T newspaper stories written by science journalists and their success rate on a weekly basis.

Journalist	News stories on S&T produced per week		Features stories on S&T produced per week	
	written (% (no.))	published (%)	written (% (no.))	published (%)
Carmelo Amalfi	90 (-)	50-90	10 (-)	50-90
Julian Cribb	75 (8-12)	50	25 (2-3)	40
Tanya Ewing	90 (4-5)	close to 100	10 (-)	close to 100
David Mussared	70 (8-12)	close to 100	30 (1-3)	70-90
Graeme O'Neill	70 (5-60)	80	30 (1-2)	90
Brendan O'Malley	95 (5)	less than 10	5 (1)	less than 10
Peter Pockley	- (-)	-	(2 weekly columns)	90

However, S&T journalists from the larger circulation newspapers were less enthusiastic. Graeme O'Neill, formerly from *The Age*, said S&T were 'not regarded as main stream but appreciated as relief from politics/crime/foreign affairs . . . they [Editor/Chief of Staff] like science, but do not understand its role in modern society'. In an article written in 1991, O'Neill further complains about the ignorance of editors who lack experience in the area of S&T and still see politics as the 'king of the mountain'. Tania Ewing, who replaced O'Neill at *The Age*, said that S&T were getting increasing coverage and that the Chief of Staff was very interested in S&T issues and 'often knows more about some of the issues than me'. Julian Cribb described the status of S&T in *The Australian* with one word—'arcane'. Former ABC TV news journalist Gavin Gilchrist has said that news editors at the ABC regard science as a 'warm filler' to offset the heavier items such as disaster, war, accidents, political and recessional items.⁴² This view is supported by science journalists covering S&T for the British press: 'Science reporters are resigned to seeing science covered as 'soft news' which tends to be squeezed out when set in direct competition with political or crime news . . .'.⁴³

Public support and interest in S&T is not reflected by the coverage or by the attitudes of non-science journalists or media managers. This was demonstrated in a survey of television viewers and journalists from Brisbane, Sydney and Melbourne. Journalists were asked to rank a list of 15 different news subjects, first in terms of their own interests, and then in terms of what they thought their audience's interests were. They ranked science and medicine sixth when asked for their own interest, and thirteenth on behalf of their audience's interest. But viewers themselves ranked science and medicine as first in their list of interests.⁴⁴ This study reveals fundamental tensions between television viewers' tastes and journalists' biases, and is supported by a national Saulwick Age poll that showed that 'more Australians would rather read stories about medical and scientific discoveries than about politics or sport'. This poll actually separated medicine from science with 59% of people saying they were very interested in reading news about medical discoveries and 54% in scientific discoveries. This compared with only 36% being very interested in sports news and 22% in politics.⁴⁵

In O'Neill's last column in *The Age* before resigning, he bemoans the emphasis by the media on 'politics, crime and courts, mayhem and disaster, economics and

business'. He further says that media proprietors may be ignoring their viewers' or readers' tastes and interests at their own peril: 'All newspapers must consider the real possibility that their present news balance, with its excessive—some would say obsessive—interest in personality politics might be impeding their circulation growth'.⁴⁶

Another study examined the power of the advertising dollar in determining media coverage. Rural science journalist Simon Pickering compared advertising and S&T coverage in three newspapers: *The Australian* (national), *Courier-Mail* (state), and *Southern Star* (suburban). He found that computing and engineering/applied science categories were dominant in *The Australian* which published a weekly 'Computer and Higher Education' supplement that attracted strong advertising support. In comparison, the other two papers had a dominance (65% of total articles) of medicine/health and environmental stories.⁴⁷

The key failures of science journalism over the past 10 years, as perceived by the seven newspaper journalists, are:

- emphasis on 'gee-whizz' rather than difficult mainstream science such as molecular biology (Graeme O'Neill)
- failure to forge the link between scientific progress and national economic success (Julian Cribb and Carmelo Amalfi)
- the ignorance of gatekeepers in appreciating the importance of science (Brendan O'Malley)
- the tendency to confine science to specific columns when it can compete for the front pages with politics (Tania Ewing)
- the lack of penetration of science and technology into daily news and features in all media, especially commercial media (Peter Pockley)
- the domination of the news agenda by politics (and politico-economics), mostly because science stories are hard and expensive to find while politics is easy and cheap (David Mussared).

The S&T specialist reporter is an emerging force in Australian media. However, there are many challenges yet to be met in convincing news editors and newspaper proprietors of this, and in extending the depth and relevance of science reporting.

Discussion

Media attention to S&T has increased considerably over the past decade. Yet coverage is shallow and technology-based, and seems not to have succeeded in making a real impact on people or in changing the ways they think about S&T and its impact on their lives.

There are clearly a number of issues challenging science journalism in Australia today. Perhaps the biggest challenge lies in integrating S&T with other issues facing society—if science can be made relevant to the economic, social and political pressures facing Australia then it has a better chance of surviving. Stephen Utick says there is a danger of S&T journalism developing its own 'ghettos'.¹⁵ This is particularly true with the rise of the science specialist reporter. Utick says that there is a need for coverage of S&T by general reporters and reporters on other rounds. In this way science can be put into context with the rest of society rather than separated out and mythologized.

On the other hand, perhaps the popularity of science stories with media audiences is due to the fact that science can still be an exciting voyage of discovery in a boring world. There is also the danger of making science mundane and killing popular interest.

Hendy agrees that S&T journalists need to work from a broader knowledge base in order to be able to interpret the relevance of science to society:

Journalists will have to embrace a whole new tool-kit (of philosophical, ethical, spiritual, and journalistic skills) to interpret and evaluate . . . and that responsibility lies as much with the Australian Journalism Education Association as it does with the general educators and science teachers. But the bigger question is 'who is training the trainers?', many of whom are failing to see connections, such as that between economic rationalism and science for instance, because of a lack of philosophical tools at their disposal.⁴⁸

He further argues that 'general' journalists who use different language bases and world views can keep the tension going in the science-technology debate, whereas specialist 'expert' reporters are more likely to focus on narrow perspectives. On the other hand, unlike in Europe,⁴⁹ science journalists in Australia are still expected to cover all disciplines, not just one narrow science field. As O'Neill argues, science reporters in Australia really need to be the most versatile of generalists to cope with the 'hundred different branches of science, and how they interdigitate with most other rounds on the paper'.⁵⁰

Anderson says the rigour of science journalism will be improved by the academic courses now available at the University of Technology Sydney, the Australian National University, the Royal Melbourne Institute of Technology, Deakin University and the University College of Central Queensland.⁵¹ Along with new courses for science journalists, better education of generalist journalists in the culture and process of scientific research should assist them to be more discerning about their coverage of S&T news.

Further improvement in the quality of S&T coverage will result from more probing behind the scenes. Hendy challenges the media to look behind the 'technological veil' presently shrouding coverage of S&T. He points to the uncritical coverage of technology and the virtual zero evaluation of its likely social and economic consequences. Hendy's study of *The Australian* identified that newspaper's affinity for the 'technofix' solution to problems that were not fully explored. These included: 'the technological band-aid for cleaner coal burning, the endoscopic laser to blast kidney stones, a high temperature arc to produce less hazardous waste, robots to remove nuclear waste, artificial wetlands to manage sewage'.⁵²

Has the media's emphasis on marvelling at new technology dazzled the audience so much that they never stop to think about the implications for quality of life? Media audiences in Australia are not being encouraged to debate issues relating to the future in terms of employment, environment or social health. If uncritical coverage of S&T by the media is raising ill-informed and unrealistic expectations among the general public, this may, in the longer term, lead to a backlash. There are certainly an increasing number of issues confronting science at the moment—from the greenhouse effect to genetic engineering—for which the media could usefully provide a forum for informed debate.

Another related challenge for science journalists is to balance the 'sale of science' with its critical evaluation. Nelkin notes that American science writers have a strong

attitude of awe and admiration for their subject area, compared to political writers who are inclined to be much more critical of the events and subjects they cover:

their biases lead them to identify more closely with their subject and their sources than do journalists in many other fields . . . They strive to maintain the respect of their scientific sources and to satisfy the ideals of science but they *must, first and finally, meet the constraints of their own profession.*⁵³

In response to the survey question about future challenges (see the Appendix), one journalist said:

the biggest challenge is that enormous efforts are being made by science institutions to promote their brand of scientific truth, while science journalists are still badly tainted and reluctant to rock the boat. We need a school of critical, questioning, even aggressive journalists in science. Instead we have tended to have science institutions trying to spoon-feed uncritical information to the media.

Lack of critical evaluation in reporting S&T must be of some concern. Given the current funding pressures on scientists, they can be tempted to make premature or exaggerated claims about their worth. Emeritus Professor John Passmore from the Australian National University was a member of the Australian Research Council and he comments that 'many scientists now exaggerate a lot about technological outcomes and spin-offs from their science research because of funding pressure criteria'.⁴⁸

However, the experience of communicators working with scientists to get their stories into the media does not always tally with Passmore's comment. The potential benefits of some research is exaggerated in the media—but this is the result of the media's need for bold stories in simple direct language. Such stories emphasize newness and play up potential impacts, while muting the scientist's natural tendency towards caution and qualifying statements. A study of 178 CSIRO scientists across Australia indicated that the majority of scientists are still very wary of the media, and do not know how to handle the media to get their messages out.⁵⁴ They are more likely to play down their science than to exaggerate its significance. Scientific peer pressure and 'tea-room' gossip (and its suggestions of grandstanding) are still powerful inhibitors to scientists taking their research to the media.

It is perhaps more helpful to focus on the underlying tensions that exist between scientists and journalists. A 1976 British Association for the Advancement of Science study suggested the following sets of tensions were useful in examining science journalism:

- to inform or to educate
- to support science or to criticize it
- to inform or to publicize
- fact or opinion
- accuracy or simplification
- newsworthiness or verification.⁵⁵

The challenge for S&T journalists, given time constraints and the mass of easily obtainable material generated by science institutions, is to provide a more careful and critical coverage that helps develop a more aware and informed public which is willing to enter into public debates about the progress, process and ethics of science.

Conclusion

Although Australia has some excellent media coverage of S&T, and total coverage of S&T has dramatically improved over the past 10 years, the lack of analysis and depth in that coverage means that the mythical stereotype of scientists and science remains in the public eye.

However, the responsibility for change does not lie just with the media agencies. If the media are truly a mechanism for exchange of ideas in society, then scientists need to be more forward in interacting with the media to promote open, informed and vigorous debates about S&T issues, rather than simply to announce breakthroughs. And while science must be willing to participate in and be open to informed debate, the media should provide the appropriate mechanisms, investigation and prominence for debate to occur.

Scientists must also be willing to shrug off peer pressure and media shyness and seek to understand the media and the way it works. Media skills training, involving working journalists, is one way to help overcome the communication barriers between science and the media. The former Federal Minister for Science, Senator Chris Schacht, said at the 1993 Australian Science Festival:

I want the science community, the researchers, to get out and explain themselves to other parts of the community, particularly the finance sector, to make them more comfortable in dealing with science and technology issues. They've got to go out and sell themselves. . . . If they don't, Australia is not going to prosper.⁵⁶

However, this challenge is only part of the equation. Science and technology journalists should also seek to critically evaluate the ongoing 'sale of science' and provide in-depth analysis of S&T stories relevant to society.

Appendix. Questionnaire sent to newspaper science journalists

Name:

Newspaper:

- 1 When (the approximate date) did your newspaper first employ a 'science and technology' journalist?
- 2 Does your newspaper currently employ any other specialist journalists in the area of science and technology? If so, please name and describe their position.
- 3 Does your newspaper have regular pages or columns devoted to science and technology topics? If so, please describe in terms of topics, frequency, length (column inches), etc.
- 4 Could you please give a rough breakdown of the types of stories you write (e.g. 60% news stories, 40% features stories). About how many of each type of story would you write each week?
- 5 What is the percentage (roughly) of stories that you write that actually get into the paper each week (e.g. about 40% of my feature stories make it to print and about

- 60% of my news stories)? About how much of each story gets cut on average (e.g. most stories get cut in half)?
- 6 Do you write stories that are not related to science and technology? If so, what percentage of your time is taken up with these other stories?
 - 7 Do you have a background in science through education or work? If so, please describe. What attracted you to the field of science journalism?
 - 8 How would you describe the status of science and technology in your paper?
 - 9 How would you describe the attitude of your Editor or Chief of Staff to science and technology stories?
 - 10 Where do you source most of your stories (i.e. media releases, personal contacts etc)?
 - 11 What are the most successful science and technology stories you have had (e.g. front page stories, big news stories, in-depth features, etc.)?
 - 12 Do your science stories need a good picture with them to get up in the paper?
 - 13 How easy do you generally find scientists to deal with (e.g. can they put complex ideas in simple terms, do you get good clear media releases, etc.)?
 - 14 What is your reaction to the following quote from the new Science Minister, Senator Chris Schacht? 'I want the science community, the researchers, to get out and explain themselves to other parts of the community, particularly the finance sector, to make them more comfortable in dealing with science and technology issues'.
 - 15 If you could give scientists one bit of advice, what would it be?
 - 16 What do you think have been the key successes and failures of science journalism in Australia over the past 10 years?
 - 17 What are the future challenges for science journalism in Australia?

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