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**JAPANESE ENCOUNTERS
WITH
AUSTRALIAN SCIENCE
AND
AUSTRALIAN SCIENTISTS**

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**JAPANESE ENCOUNTERS WITH AUSTRALIAN SCIENCE
AND AUSTRALIAN SCIENTISTS**

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CONTENTS

	Page No
AUTHORS	iv
CONTENTS	v
LIST OF TABLES	vii
SUMMARY OF MAIN FINDINGS	ix
1. INTRODUCTION	3
2. PEOPLE MOVING BETWEEN AUSTRALIA AND JAPAN	4
3. EXCHANGE OF SCIENTISTS THROUGH THE JAPAN SOCIETY FOR THE PROMOTION OF SCIENCE (JSPS)	5
4. EXCHANGE OF SCIENTISTS THROUGH THE AUSTRALIAN ACADEMY OF SCIENCE (AAS)	6
5. JAPANESE SCIENTISTS SPEAK OUT	9
5. A. International rankings	11
5. B. Perspectives on Australia	11
5. C. Perspectives on Australian Science	14
5. D. Summary of Japanese Opinions	19
5. E. Evaluation of Japanese Opinions by Australian Scientists	19
6. ACKNOWLEDGEMENTS	21
7. REFERENCES	21

LIST OF TABLES

Table	Page No
1. Population and tourists of Australia and Japan	4
2. Number of people exiting from and entering Japan for the purpose of academic research, or study, training or acquisition of technology in the fiscal year of 1991	5
3. Number of scientists exchanged through JSPS programs in 3 fiscal years of 1992 - 94	6
4. Japanese scientists in Australia exchanged through the Australian Academy of Science and JRDC (2 years: 1994 - 96)	8
5. Research fields in Australia of Japanese scientists exchanged through the Australian Academy of Science and JRDC (2 years: 1994 - 96)	8
6. List of Japanese scientist interviews.....	9
7. Culture and society of the Japanese	10
8. International ranking of research fields by Japanese scientists working in Australia	12
9. Australians' score on Japanese opinions	20

JAPANESE ENCOUNTERS WITH AUSTRALIAN SCIENCE AND AUSTRALIAN SCIENTISTS

SUMMARY OF MAIN FINDINGS

- Japanese opinions towards Australian science and Australian scientists were collected and analysed from 14 Japanese scientists and 1 Japanese bureaucrat in Australia. Most of the Japanese scientists are males aged between 31 and 45 years. They have worked from 2 months to 3.5 years in a variety of research areas on natural science at universities or research institutes in Australia. Their attitudes regarding Australia, Australian science and Australian scientists are as follows.
 - (i) The quality of an ordinary citizen's life is wonderful, *i.e.* low consumer prices, a beautiful community environment, friendly and kind people, and short working hours.
 - (ii) There are a variety of cultures originating from many different countries living reasonably harmoniously. There is still, however, slight racism towards Asians on some occasions.
 - (iii) Not many Australian scientists know anything about Japan itself. They usually do not understand the attitude or behaviour of Japanese scientists. They do not seem interested in Japan.
 - (iv) There is plenty of support staff with quality skills.
 - (v) The system of research administration is simple and functional allowing scientists to concentrate on their research.
 - (vi) Generally people are lazy at work and work slowly.
 - (vii) It takes a long time to get research items and tools.
 - (viii) Research is heavily weighted towards applied science and practical technology. Basic science is considered less important.
 - (ix) There are more foreign scientists than Australian scientists.
 - (x) The structure of Australian science is like a few "peaks" on an almost flat land, rather than many broad hills. There is good science in the peaks but nothing in many other research fields.
 - (xi) Australian scientists do not care whether the science and technology come from Australia or not.
- Most Australian professionals in the field of research policy agreed with the above Japanese opinions (i), (ii), (vii), (x), and (xi) but disagreed with the opinion (v) and neither agreed nor disagreed with opinions (iii), (iv), (vi), (viii), and (ix).

**JAPANESE ENCOUNTERS WITH AUSTRALIAN SCIENCE
AND AUSTRALIAN SCIENTISTS**

1. INTRODUCTION

The modernisation of Japan started after the end of the Shogun era and the beginning of the Meiji period in 1868. The Meiji government settled on a policy of industrialisation, thereby importing the latest technology by inviting foreign experts to Japan and sending Japanese scholars abroad. Japan is a nation poor in natural resources. The most rational way to develop the country has been to use its human resources to produce products with high added value.¹ Therefore, it has been realised that international relations are very important for the country.

At the end of World War II in 1945, Japanese industry was at a virtual standstill. Around 668,000 Japanese civilians had been killed, the economy was critically maimed, all consumer goods disappeared, food ran short, urban housing vanished in flames, civil dwellers suffered a collapse of morale, and thus life had become constantly more difficult. But, the defeat brought great and sudden shifts to Japan, comparable only to the change to the Meiji Restoration.²

Since the end of World War II, Japan has been very successful in its technological progress and economic development. Economically, Japan at present, is the second largest nation in the world. According to 1994 statistics, Gross Domestic Product (GDP) for the USA was US\$6,738 billion (ranking it 1st in the world), GDP for Japan was US\$4,592 billion (ranking it 2nd), GDP for Germany was US\$2,048 billion (ranking it 3rd) and GDP for Australia was US\$324 billion (ranking it 14th).³ Japan imports raw material and exports manufactured and processed products made from this raw material. The economical success of Japan has been heavily dependent on relations outside Japan. Japan has sought good international relationships by exchanging many scientists with other countries in search of excellence in science and technology.⁴

From Australia's view point, Japan is Australia's largest trading partner, exporting A\$16 billion to and importing A\$12 billion from Japan in the fiscal year of 1994 - 95. This is over 20 % of Australia's total trade.^{5, 6} While agricultural, mineral and energy products constitute the bulk of Australian exports to Japan, over 33 % are manufactured or processed goods. Financially, Japan is the third largest source of foreign investment in Australia, behind the EU and the USA.

According to the World Competitiveness Report 1994, Australia ranks 9th in Government and 4th in Infrastructure in the world.³ Australia, however, does not rank well in Internationalisation (31st) and in Science and Technology (20th), while Japan ranks higher than Australia in Internationalisation (9th) and in Science and Technology (2nd) in the world.

The relationship between Australia and Japan is important to both country's cooperative role, not only in East Asia and the Pacific, but all over the world. However, Grace⁷ states:

There appear to be significant gaps in exchange from Australia at the academic/research level. There are few, if any, Australian academic visitors or research workers in social sciences, natural sciences, health sciences, engineering, agricultural science or the technology in most Japanese universities.

These "significant gaps" seem the same for Japanese scientists visiting and working in Australia.

The gaps are, at least partially, based on a lack of mutual understanding. Australian scientists, particularly in the field of natural science, probably are not familiar with Japanese society and scientists, and vice versa.

This paper seeks to try to reduce the gap from the viewpoint of Japanese scientists, by describing;

- (a) the current situation of the exchange of scientists between Australia and Japan, and
- (b) analysing the opinions of Japanese scientists in Australia with regard to Australian science and Australian scientists.

This report is based on the experiences of two Japanese scientists (HM and HK) during two visits to the Centre for Research Policy at the University of Wollongong, Australia. The duration of these visits were 5 months and 2 months. The report is also based on interviews with 14 Japanese scientists working in Australia and 1 diplomatic bureaucrat working at the Japanese Embassy in Australia. We hope this report will be helpful for both Australian science and Australian scientists who are currently, or in the future may work with Japanese scientists, and it may also benefit Japanese scientists in Australia.

2. PEOPLE MOVING BETWEEN AUSTRALIA AND JAPAN

With regards to tourism, Japan is Australia's largest visiting nation with 670,000 tourists visiting Australia in 1993 (the 2nd largest visiting nation being New Zealand with 500,000 tourists. Table 1). 6.0 % of all Japanese overseas tourists visit Australia. Australia has been the most popular destination for Japanese honey mooners (besides Hawaii) for a few years. However, Australian tourists visiting Japan in 1993 numbered only 46,000 - only 2.0 % of all Australian overseas tourists. The ratio of Australians visiting Japan is 1 to 14, *i.e.* for every Australian that visits Japan, 14 Japanese visit Australia. This seems to be a great imbalance.

Table 1:
Population and tourists of Australia and Japan

	Australia	Japan
Population (1995)	18 million	120 million
Tourists (1993)	Japanese visitors to Australia 670,000	
	46,000 Australian visitors to Japan	

According to immigration statistics by the Ministry of Justice in Japan, in 1991, 196,743 Japanese went abroad for academic research, or for study, training, or acquisition of technology (Table 2). This is 1.9 % of the 10,633,777 people exiting from Japan. In the same year, 128,623 foreigners visited Japan for the same purpose. This constitutes 3.3 % of the total of 3,855,952 foreign visitors.

Australia (mainly) and the South Pacific attracted 9,314 Japanese people (4.7 % of total Japanese exiting from Japan), while Australia sent only 982 Australians to Japan (0.76 % of total foreigners entering Japan, for the same purpose). In absolute terms, roughly 10 times more Japanese come to Australia than is the reverse case. Compared with other countries, Australia was 2.5 fold more attractive to Japanese than average for the purposes of academic research, study, training, and acquisition of technology. On the other hand, Japan was 4.3 fold less attractive than average for the same purpose for Australian people.

Table 2:

**Number of people exiting from and entering Japan
for the purpose of academic research, or study, training or
acquisition of technology in the fiscal year of 1991**

Region of destination and origin	Exiting from Japan			Entering Japan		
	Academic research	Student, training	Total	Academic research	Student, training	Total
South Pacific (mainly Australia)	3,805	5,509	9,314	177	805	982
Europe	19,159	22,680	41,839	1,534	5,622	7,156
United Kingdom	6,162	11,065	17,227	491	924	1,415
Germany	2,525	2,607	5,132	271	700	971
France	2,832	4,056	6,888	216	744	960
Others	7,640	4,952	12,592	556	3,254	3,810
Asia	22,833	15,484	38,317	1,701	106,949	108,650
Africa	166	94	260	38	1,148	1,186
North America	30,045	76,289	106,334	2,329	5,964	8,293
[USA]	[26,879]	[71,279]	[98,158]	[2,075]	[4,689]	[6,764]
South America	373	306	679	43	2,261	2,304
Others	0	0	0	5	47	52
Total	76,381	120,362	196,743	5,827	122,796	128,623

Source: Science and Technology Indicator Project Team, National Institute of Science and Technology Policy, "Science and Technology Indicators: 1994, A systematic Analysis of Science and Technology Activities in Japan", Science and Technology Agency, Japan, January 1995

3. EXCHANGE OF SCIENTISTS THROUGH THE JAPAN SOCIETY FOR THE PROMOTION OF SCIENCE (JSPS)

There are three government organisations which play key roles in the exchange of scientists in Japan with the rest of the world. One is JSPS (Japan Society for the Promotion of Science). The other two are JRDC (Research Development Corporation of Japan) and Monbusho (Ministry of Education, Science and Culture of Japan). Many companies must extensively exchange scientists and technologists overseas, and private non-profit organisations may support some exchange of scientists.

The JSPS has the following three programs which cover post-doctoral and established scientists with many countries in the world:

- Inviting foreign scientists to Japan;
- International joint research projects and scientific meetings; and
- Bilateral programs with foreign academic institutions.

Table 3:
Number of scientists exchanged through JSPS* programs
in 3 fiscal years of 1992 - 94

Region	Exiting from Japan	Entering Japan
South Pacific	31	81
[Australia]	[28]	[55]
Europe	1,015	1,452
United Kingdom	203	257
Germany	297	243
France	157	157
Others	358	795
Asia	2,180	2,837
Africa	30	12
North America	2,497	573
[USA]	[2,441]	[475]
South America	27	29
Total	5,780	4,984

* JSPS: Japan Society for the Promotion of Science

Source: "JSPS", Japan Society for the Promotion of Science, Tokyo, 1995

Through these JSPS programs, 28 Japanese scientists were selected to come to Australia in the three fiscal years of 1992 - 1994. This constitutes 0.48 % of all Japanese scientists exchanged worldwide (Table 3). On the other hand, 55 Australian scientists came to Japan - 1.1 % of all foreign scientists entering Japan through a JSPS program. In choosing countries, these percentages of 0.48 % and 1.1 % of JSPS scientists are remarkably lower than the percentages in tourism of 6.0 % and 2.0 %, respectively. Besides, even in comparison with the 4.7% of visitors for the purposes of study, training, academic meeting, and research, Australia is 10 fold less attractive to Japanese scientists. This implies that Australia has a lower priority for Japanese scientists and students than for others. On the other hand, Australian scientists as well as the average Australian tourist are not interested in Japan.

In short, Japanese visit Australia abundantly for tourism, more than average for pre-professional reasons, and very few in the higher scientist levels. On the other hand, few Australians go to Japan at all.

4. EXCHANGE OF SCIENTISTS THROUGH THE AUSTRALIAN ACADEMY OF SCIENCE (AAS)

The AAS (Australian Academy of Science) plays a similar role to the JSPS in Australia and has the following five programs with Japan:

- Science and Technology Agency Postdoctoral Fellowship;
- Japan Society for the Promotion of Science (JSPS) Postdoctoral Fellowship;
- Japan Society for the Promotion of Science (JSPS) Exchange Program (Short-term and Long-term);
- Japanese Government Research Awards for Foreign Specialists (JGRAFS); and
- Australian Science and Technology Award.

These programs seem to be almost half of the government mechanisms (the other half seems to be through CSIRO) to support all exchange of Australian scientists. Some of them overlap with the JSPS programs. Through these programs, 39 Australian scientists were invited to conduct research in Japan during the 2 fiscal years of 1994 - 96. Of the 39, short term visitors for 21 days to 3 months totalled 14 and the long term visitors for 6 months to 2 years numbered 25. This number roughly corresponds to that through JSPS as mentioned earlier, but the percentage of total Australian scientists exchanged through AAS is not known.

In contrast to that number, only 15 Japanese scientists visited and conducted research in Australia through the AAS in the same period. About half of them (7 out of 15) stayed for 21 to 42 days, 4 stayed for 6 months and 4 stayed for 1 year.

The JRDC (Research Development Corporation of Japan) supported 9 Japanese scientists conducting research in Australia during the 2 fiscal years of 1994 - 96. These 9 scientists are "long-term" visitors staying 2 years. JRDC is independent of the JSPS and the AAS.

The trends of these 24 Japanese scientists are listed below.

Australian National University accepted 25 % (6 out of 24) of all Japanese scientists and was the most attractive host in Australia (Table 4). The 2nd most attractive was the University of Queensland which attracted 21 % (5 out of 24) with the University of Wollongong attracting 8 % (2 out of 24) and ranking third.

There seems no sound reason why Japanese scientists preferred the Australian National University. In the interview with us, most Japanese scientists answered:

I was personally familiar with the present boss in Australia before I had decided to come. The affiliation did not matter.

To the Japanese people, the brand name is more important than value. From a personal point of view, there may be two other "unspoken" reasons for choosing Australian National University. One is due to the fact that it is the nation's capital. Most Japanese believe that the capital city is the best city of that nation in every way (as Tokyo is in Japan). Hence, they want to live in the "best" city. Another is due to the use of the name "National". The university system in Japan is divided into national, public (prefecture and municipal), and private universities. The national universities are almost entirely funded by the central government, the public universities by the prefectures, and the private universities by private organisations and occasionally industry. The national universities always rank highest in Japan. Therefore, Japanese scientists are apt to consider Australian "National" University *a priori* as the best. Most Japanese scientists are not familiar with Australian universities.

More than half of the visiting Japanese scientists were researching natural resources, e.g. earth science (33 %) and biology (25 %) (Table 5). This selection appears to reflect the superior fields in Australian science.

Table 4:
Japanese scientists in Australia exchanged through
the Australian Academy of Science and JRDC*
(2 years: 1994 - 96)

Host in Australia	Japanese scientists
Australian National University	6
University of Queensland	5
University of Wollongong	2
Griffith University	1
University of New South Wales	1
Monash University	1
CSIRO, Division of Water Resources	1
CSIRO, Division of Applied Physics	1
CSIRO, Inst. Plant Production & Processing	1
CSIRO, Ultrasonic Laboratory	1
Austin Hospital	1
Bureau of Meteorological Research Centre	1
Australian Institute of Marine Science	1
AUSLIG	1
Total	24

* JRDC: Research Development Corporation of Japan

Table 5:
Research fields in Australia of Japanese scientists exchanged
through the Australian Academy of Science and JRDC*
(2 years: 1994 - 96)

Research fields	Japanese scientists
Earth Science	8
Biology	6
Engineering	5
Medical Science	2
Chemistry	1
Physics	1
Space Science	1
Total	24

* JRDC: Research Development Corporation of Japan

5. JAPANESE SCIENTISTS SPEAK OUT

In cooperation with CSIRO, the AAS, the Japanese embassy in Australia, and the Deans from the Faculties of Medicine, Science and Engineering at the University of Sydney, the University of New South Wales and Macquarie University, we interviewed 14 (13 males and 1 female) Japanese scientists conducting their research in Australia and one diplomatic bureaucrat in charge of science and technology at the Japanese Embassy in Australia (Table 6). The interviews were conducted face to face (10 interviews) or by phone (5 interviews). The subjects were aged between 31 and 45 years, with the exception of one who was 67 years old. They have worked in Australia for a duration of 2 months to 3.5 years with the exception of two who have worked for 10 and 28 years respectively. Their fields of research include: Bioscience and Biotechnology (6 subjects), Medicine (1 subject), Materials Science (2 subjects), Applied Physics (1 subject), Earth Sciences (3 subjects), and Oceanography (1 subject). Four have permanent visas for Australia.

We did not interview post-doctoral fellows who do not have permanent positions in Japan. Generally, the post-doctoral fellows aged between 28 - 35 were the largest group among Japanese scientists, working outside of Japan. There is, for instance, an institution called the National Institutes of Health in the USA which researches biomedicine. There are more than 300 Japanese scientists working as post-doctoral fellows, with approximately 30 Japanese (-Americans) working as research staff.

Table 6:
List of Japanese scientist interviews

Research Field	Age	Affiliation	Residence in Australia	Permanent Visa Holder	Cited as
Bioscience and Biotechnology	36	CSIRO	2 mo		Bio-A
	45	CSIRO	3 y 3 mo	O	Bio-B
	40	CSIRO	2 mo		Bio-C
	39	Univ Sydney	2 mo	O	Bio-D
	67	Australian National Univ	28 y	O	Bio-E
	35	CSIRO	2 mo		Bio-F
Medicine	41	Univ Sydney	2 y 1 mo		Med-A
Material Science	35	Univ Wollongong	4 mo		Mat-A
	33	Australian National Univ	6 mo		Mat-B
Applied Physics	32	CSIRO	2 y 0 mo		Phy-A
Earth Science	37	Australian National Univ	2 mo		Geo-A
	38	Bureau of Meteorological Research Centre	1 y 0 mo		Met-A
	44	Australian National Univ	10 y	O	Ear-A
Oceanography	31	CSIRO	3 mo		Oce-A

We asked the 15 subjects the same questions (in Japanese) as follows:

1. How long have you been in Australia? Do you have a permanent Visa?
2. What is your field of research? How do you rank countries including Australia and Japan in the quality of your research field?
3. What do you think about Australian science, science policy, and scientists? Which are good and which are bad?
4. How do you feel about Australia in general? What is your impression about Australia? Tell us anything that you have been feeling.
5. How old are you?

Each face to face interview took approximately 2 hours with the phone interviews averaging 20 minutes. Questions were carefully chosen so as not to bias responses. The interviews were held in comfortable conditions and the interviewees spoke freely and were relaxed.

We analysed the data and categorised the responses accordingly:

- A. International rankings,**
- B. Perspectives on Australia, and**
- C. Perspectives on Australian Science.**

As often occurs with interviews of this type, responses may be somewhat unreliable and opinionated. We did not omit or modify responses in any way. We believe that frank, honest answers are of more benefit for the development of good relations between Australia and Japan in science, technology and society.

Table 7:
Culture and society of the Japanese

Homogeneous society
Inadequate housing
Long commutes
Government policy favouring producers over consumers
Collectivism
Attitude of cooperation
Work ethics
Low crime rate
Low unemployment rate

Source: Edwin O. Reischauer and Marius B. Jansen, "The Japanese Today: Change and Continuity", The Belknap Press of Harvard University Press, Cambridge, Massachusetts, 1995

Before presenting the responses of the Japanese scientists, we would like to explain briefly some of the culture and society of Japanese scientists (Table 7). Japan is a homogeneous society with regard to language, race, and culture. Japan had been isolated for a long time from other countries and most Japanese still feel uncomfortable with foreigners. The Japanese frequently have linguistic problems with the English language. Most Japanese live in inadequate housing and commute long distances to work in packed trains. Government policy has tended to favour producers over consumers. Almost everything is expensive. Essential parts of work ethics are still backgrounded hierarchically with feudalism. People's behaviour is based on collectivism with attitudes of cooperation rather than independence and individuality. The catchword of Japan is "success in life". All in all, the modern Japanese are motivated by career incentives and financial incentives. So, they tend to work hard. They tend to compete with each other. They are basically out to make as much money as they can. The crime rate and unemployment rate are remarkably low.

5. A. International rankings

In the interview, many of the interviewees were unable to answer international rank with regards to their research field. Many of them expressed themselves ambiguously such as:

Well, it is my private opinion. I have never thought about it. I might be wrong. It depends on the definition of research field.

As a result we were unable to collect all the data with regard to rank. As shown in Table 8, Australia does not always rank no.1. Only 4 out of 11 said Australia ranks no.1 in their research field. Only 3 out of 11 said that the level of Australian science in their research field is higher than that of Japan, 3 people said it was similar, and 5 people said it was lower.

Table 8 shows another attitude of Japanese scientists. Almost all (10 out of 11) think the USA is the best in the world. They think Japan is worse than the USA, and that Japan does not rank no.1 (except for one who thinks Australia, the USA and Japan rank the same).

According to the World Competitiveness Report 1995,³ the competitiveness in Science and Technology ranks the USA 1st, Japan 2nd, Germany 3rd, and Australia 20th (Table 8). No Japanese scientists, however, mentioned Switzerland, Finland, Taiwan, Austria, nor Singapore, all of which rank within the top 10 countries. Therefore, Australia is much more favoured by Japanese scientists over those countries listed in the World Competitiveness Report 1995. These Japanese scientists are people who have chosen to work in Australia themselves.

5. B. Perspectives on Australia

Parentheses after statements indicate interviewees listed in Table 6.

Bright Sides

- The environment and the community are terrific here. Security for safe living is tight here. Towns are beautiful. Tokyo lacks greenness. Sydney Harbour is beautiful. (Med-A)
- The cost of living is low compared to Japan. For example, food probably costs 1/3 or 1/4 of that in Tokyo. (Med-A)

Table 8:

International ranking of research fields by Japanese scientists working in Australia

Rank	Bioscience and Biotechnology		Medicine	Materials Science		Applied Physics	Earth Sciences			Oceano-graphy	Science and Technology
	Bio-A	Bio-D		Bio-F	Med-A		Mat-A	Mat-B*	Phy-A		
1	<u>Australia</u>	USA	<u>Australia</u>	USA	<u>Australia</u>	USA	USA	USA	USA	USA	USA
2	USA	Italy	Japan	Japan	USA	UK	France	UK	Germany	Japan	Japan
3	UK	France	UK	Germany	Japan	Japan	Germany	Germany	UK	Germany	Germany
4	Canada	Sweden	Italy	Hungary	UK	Australia	France	Japan	France	Switzerland	Switzerland
5	Germany	Japan	Germany	Netherlands	France	Canada	Canada	Australia	Australia	France	France
6	Japan	Australia	France	France	France	Germany	Germany	Japan	Japan	Sweden	Sweden
7			Sweden	UK	UK	Japan	Japan	Japan	Finland	Finland	Finland
8			Australia	China	China				Taiwan	Taiwan	Taiwan
9				Italy	Italy				Austria	Austria	Austria
10				Australia	Australia				Singapore	Singapore	Singapore
									<u>Australia(20th)</u>	<u>Australia(20th)</u>	<u>Australia(20th)</u>

* Australia is no.1 in his more specific research topics.

** WCR: "The World Competitiveness Report 1995", 15th ed., International Management Development, Lausanne ; World Economic Forum, Geneva, 1995.

- I was a workaholic in Japan. I am envious that Australians are good at enjoying life and leisure. (Med-A)
- When I went home from my research institute in Japan around 9 or 10 pm, I saw a primary school boy in a commuter train. He seemed to be going home from a crammer school (juku) and was eating a bento (portable dinner). I was shocked. I no longer wanted my children growing up in such a society. The quality of life in Japan is very poor. (Bio-D)
- I lived in a 3rd floor unit of a 4-storey building in Tokyo. The unit was better than average. When my kids were noisy, however, we were always concerned when the neighbours, especially the ones beneath our unit, complained. I could not stand this situation. (Bio-D)
- I can spend plenty of time with my family here. It was almost impossible in Japan. (Mat-A)
- I love the multiculturalism that exists here. My colleagues here are Chinese, Croatian, Romanian, and Australian. There are rarely foreign scientists in Japan. (Mat-A)
- There are plenty of natural resources here - rainforests, wilderness, beaches and mountains are abundant and spectacular. Food and houses are cheap. Life is much more colourful here than in Japan. (Mat-A)
- Australians are very friendly and very kind. This is a relaxed country. (Bio-B)
- A variety of cultures exist well in Australia. There is no discrimination towards foreigners. (Bio-B)
- The weather is nice here. I frequently play golf after work around 5:30 pm. Can you imagine doing this in Japan? (Bio-A)
- Warm hospitality is my strongest impression of Australia. People in Australia are very kind. They help me in all situations. Relaxation in life and at work is wonderful. (Geo-A)
- I live in Perth and I do not know of places other than Perth. I am amazed that people are very friendly, kind, and modest and that the environment of the community is very beautiful. Before coming here, I expected Australia to be similar to London and Paris where I visited for a short time. But, I was wrong. Australia is much better. I hate to say this but Japanese people in Japan are very closed-minded. (Bio-F)

Dark Sides

- It took time to get used to the Australian accent, as Japanese usually learn "American" English. (Oce-A, Bio-C)
- The Australian people are friendly but some seem to dislike Asians. For example, when I am waiting to be served in a store with other customers, the shop assistants always serve me last. (Oce-A)
- The Japanese are interested in Australia and try to understand Australia. But, Australians do not know about Japan and mostly they are not interested in Japan. (Med-A)

Both Sides

- In Australia the food is good and the environment is good. Life is rich. People do not need to worry about the fundamentals of living. On the other hand, people do not work as I expected. (Met-A)
- Generally, Australians do not take work seriously and enjoy their life. (Bio-D)

5. C. Perspectives on Australian Science

Bright Sides

- Each researcher has high research potential. They are enthusiastic in their research. (Met-A)
- There are some very clever scientists performing outstanding research in Australia. (Med-A)
- I am surprised by the multiculturalism of the people working in the laboratory. There is no discrimination, no confrontation, no friction between the different races. (Mat-B)
- Australian scientists work short hours compared to those in Japan. They work from 9 am to 4 or 5 pm, while Japanese scientists work from 9 am to 6 or 7 pm. Sometimes the younger scientists do not go home but work all night in Japan. Productivity is based on the number of papers published, however, this is similar here to there. So, Australian scientists perform efficiently. (Phy-A)
- I had worked in the USA for 5 years before coming to Australia. I have worked for the Australian National University for 10 years. Compared to being in the USA, we have plenty of "free" time to think about science here. In the USA, we were forced to get results in a short period of time in an effort to obtain research money. The Australian government provides research money almost automatically to the Australian National University. This is called "block funding" and is exclusive. We do not have to apply to ARC for grants. As a result of "block funding" I am able to plan experiments in the long term and on a large scale. (Ear-A)
- In Japan, when planning, researchers are required to negotiate with non-academic staff and administrative bureaucrats within the division, or sometimes with bureaucrats in central government. The negotiations are required as a form of necessity. Sometimes they require excessive explanations. In Australia, research is planned by discussing with just a leader of the research group. It is quite reasonable and simplistic. (Met-A)
- My strongest impression here at CSIRO is with the support staff. They are numerous and have high quality skills. For example, they keep the computers in good condition. Their skills are good. One of them took care to hunt down my accommodation - this was one of his duties. In Japan, we do not have such support staff. (Oce-A)
- In Japan, scientists do their research in a step by step fashion concentrating only in their own narrow field. In Australia, scientists frequently communicate with each other and collaborate with overseas as well as local scientists. (Oce-A)

- Statistical analysis is excellent here. There is a Statistics Centre operated by 5 professional and 15 support staff. I have learned more statistics here. (Med-A)
- There is plenty of research money here. I guess BHP must provide the money. (Mat-A)
- Facilities for common usage and the system supporting researchers here is very efficient. (Bio-B)
- There is no sexism here. (Bio-B)
- There is almost no barrier between laboratories. I can talk freely and hold discussions with scientists from other laboratories. (Bio-A)
- I am studying plant science. The Australian government has made plant science a priority. The scale of research is huge. The research is linked directly to farmers. Such a system for research is wonderful. (Bio-A)
- Support staff work quite well. They provide me with research supplies quickly when asked. (Bio-C)
- Equipment and research technique levels are similar in Japan. So, I can perform similar experiments here. (Bio-C)
- I work for the CSIRO in Australia and a university in Japan. Professionals in the same research field gather here from all over the world, *e.g.* from Germany, France and Japan. There seem to be approximately 3 times more foreign scientists than there are Australian scientists. We can discuss our work on a global basis in great detail as a result. This situation is wonderful. (Bio-F)
- People in the laboratory have a 3 breaks a day at - 10 am, noon and 3 pm. The time for work and for rest is clearly defined. In Japan, often it is not separate. People work with a cup of tea or chat in the work time. (Bio-F)
- I do not know much about how laboratories in Europe and the USA are managed, but the management of the laboratory where I am working in Australia is dynamic. Many of the foreign scientists and post-doctoral fellows in the laboratory make me feel a part of the team. Equipment runs efficiently and is always ready for use. There are many support staff whose skills are quite high. We did not have any technicians in Japan. (Mat-B)
- I have heard that it is time consuming to write a grant proposal in the USA. In Australia, most scientists are allowed to do their experiments and research and do not need to waste time with such "desk tasks". (Geo-A)
- Expenditure of research money is flexible here. For example, it is easy to order A\$10,000 worth of equipment here. In Japan, we require a lot of paper work for that amount of expenditure. In Japan, we have to spend all the research money by the end of each fiscal year and we are never allowed to leave even 1 cent. In Australia we can use research money for travel expenses *etc.*, if it is within the budget. In Japan the budget is divided between research goods, travel, equipment and so on and it is almost impossible to interchange. (Phy-A)

Dark Sides

- There are plenty of natural resources in Australia. Australians have been able to sell these natural resources profitably and are able to import consumer goods from other countries. As a result they have not needed to make products and invent new technologies. But once realised, at least in areas of science and technology, Australia is now behind many developed countries and even some developing countries. (Anonymous)
- In science and technology, Australia has been dependent on the UK. Australia has not been confident with science and technology. Australia has asked the UK to evaluate its work. Even today, this situation has not changed much. (Anonymous)
- The major concern for science policy in Australia is one of economics. For the purpose of economic development, Australia needs to concentrate on its industry. Science and technology are required as tools for the development of industry. Then Australian science will have strong links with the economy. They cannot afford to encourage just basic science. (Anonymous)
- Australian science has few "peaks" like the Matterhorn. The Matterhorn is very high and sharp. There is nothing other than a "peak". I believe this policy is wrong. I know research money is limited. The Australian economy has not been very prosperous. But, the higher the peaks reach, the lower other fields become. You cannot predict the field in which scientific breakthrough will happen. This is the nature of science. So, for national policy's sake, many "hills" are better than a few "peaks". Diversity is important in science and technology. If there is no seed, nothing will grow. (Bio-E)
- I hope Australian scientists understand the attitude and behaviour of Japanese scientists, who usually cannot speak English fluently. But they work hard and steadily. It is better that Australian bosses patiently accept the character of Japanese scientists, train them, direct them, and then pick the fruit from their labour. (Med-A)
- Australian scientists are too concerned with publishing their work. With every step of their experiments they are concerned whether the data can be published in a paper or not. I think that the most important thing in science is originality. Publishing should be a consequence of experimentation not a driving force. (Bio-F)
- Consumer goods in this country are rarely "made in Australia". I do not know whether or not Australians care about where something is made. I feel that this "rarity" of Australian-made goods is linked to the lack of originality in science and technology. Producing something of their own is very important for Australia even if the quality is poor in the early stages. Even "borrowing" is better than producing nothing. (Bio-F)
- We have a lot of support staff here, but they work slowly. I have to be patient. When I first worked in Australia 10 years ago, I found it very frustrating. (Ear-A)
- Australia should provide more money for researchers from overseas. International exchange of scientists would result in making this country greater in science and technology. (Med-A)
- I hate the "White Australian Policy". I still observe racism towards Asians from some (not many) Australians. (Med A)(Anonymous)
- Australian staff work very slowly. It is terrible. I have been very frustrated. I no longer ask Australian staff for help. I do it by myself. Research cannot be done fast and efficiently as a result. (Med-A)

- Research money is in short supply in Australia. Australian science does not perform well as a whole, but some scientists are extremely productive. Such scientists work very hard and make excellent progress. Australia should support such scientists by providing more research money. (Med-A)
- Buying chemical reagents is terrible in this country. It usually takes 3 days in the USA, 1 week in Japan, but 1 month here. If you are lucky, it may only take 1 week, but if you are unlucky, it may take 3 months. This has a considerable affect on the competitiveness of my research. (Bio-D)
- Reagents are very expensive. They are expensive in Japan too but cheap in the USA. (Bio-D)
- The libraries that have research journals usually close at 5 or 6 pm. I cannot believe this. In the USA, libraries are open 24 hours. I want to spend my day doing experiments and go to library at night afterwards. Here, I have to spend time in the library in the afternoon rather than working on my experiments. (Bio-D)
- There is not enough equipment here. I cannot make efficient progress without more equipment. (Bio-D)
- Someone I work with takes 3 hours for lunch daily. It is not any of my business, scientists should be evaluated by their productivity, not by the time they spend at their lunch. But, don't you think 3 hours daily is too much? (Bio-D)
- Australia is not interested in basic science. Australia prefers application-oriented science and practical products. I understand that Australia needs applied science for its economic development. However, if Australia does not shift more towards basic science, science will become more neglected in the future. (Mat-A)
- My first impression can be expressed in one phrase "Australian science progresses slowly". (Bio-B)
- The director of the CSIRO is from the United Kingdom, even though there were plenty of suitable scientists in Australia. I feel sad that Australian scientists lack spirit. (Bio-B)
- I am studying plant physiology. One experiment can span a few weeks. Australian scientists do not work on Saturday or Sunday, but plants continue to grow. Research in Australia sacrifices quality because of holidays and weekends and the fact that experiments are not scheduled around this. (Bio-F)
- Ironically, as a consequence of having good support staff, researchers and students become unfamiliar with the basic principles of handling equipments here in Australia. (Mat-B)
- I am working for the CSIRO. Before coming here, I thought that the CSIRO was a kind of research centre and that my job was to do research and publish papers. To my surprise, we assemble equipment for sale. We need to make a profit by selling products we produce. All 8 members of my research team are involved in some way. It seems that basic science is not as important. (Phy-A)
- Material for research is always running short here. It is difficult to get experimental goods and tools easily. Australian manufacturers make nothing except Koala souvenirs. Australia must import all experimental goods and tools from the USA and Japan. Delivery is often delayed. When an Australian says 3 days, it will take 3 weeks. So, 3 weeks will become 3 months and so on. (Phy-A)

- There is less competitiveness and less stimulation with regards to research here. (Geo-A)
- There are few Australian scientists in contrast to foreign scientists here. I am concerned for the future of Australian science. The few human resources in Australian science will not be able to sustain or develop Australian science and technology at a higher level. (Mat-B)
- There are few young scientists here. Young means around 35 years old. Young scientists work for short periods, 2 or 3 years, as a post-doctoral fellow and they move on quickly. The average age of staff researchers is getting older. That will be a problem in the future in Australia. (Phy-A)

Both Sides

- Researchers in Australia do not work late at night. They usually end at 5 o'clock. I also go home at 6 o'clock here. Few people remain at work after that time. I do not know how long those that do stay work after 6. In Japan, I usually work until 8:30 - 9:00 at night and Saturdays. That is the normal working time in Japan. (Met-A)
- Americans always think that America is no.1. They discriminate against the Japanese in their minds. I feel that Australians also discriminate against the Japanese. You want evidence? I cannot show you evidence, but I feel it. Now, I have realised, I myself am apt to have empathy with Asian people! I feel that racism will be inevitable for many people. (Bio-D)
- Scientists in Japan feel "at home" in the lab. In Japan I often eat and drink with my colleagues after work. People in the same laboratory have several parties a year, with alcohol. But, there is no personal relationship after work here. Social events are non-existent here. (Phy-A)
- Earth sciences in Australia are distinct from those in the USA and Japan. The research links considerably to the mining industry here. Research is directly connected to the industrial economy of Australia. This uniqueness has both good and bad sides. (Ear-A)
- Australian scientists work shorter hours than Japanese scientists. Australian scientists work from 8 am to 4 or 5 pm, while Japanese scientists work from 9 am to 7 or 8 pm. The difference is only 1 - 2 hours a day. But over a year this accumulates to 300 hours. When I was in Japan my life was work, work, and work! My brother and father tried to get me to play golf with them on Sundays, but I refused. I needed to rest all day Sunday. What about Saturday? Saturday was a working day, of course. In Australia, I have gradually come to realise that family and leisure are important. I now play golf which I refused to do in Japan. So, I am not sure that working hard as the Japanese do in Japan is always valuable for quality of life. (Med-A)
- There is one research topic for each research group in Japan. Researchers coordinate each group towards the one goal. In Australia researchers study their own topics independently. (Mat-A)

To Japan

- I have been a staff scientist at the Australian National University. Recently, Japanese scientists, as well as Japanese students have visited Australia from Japan more frequently. Many of the exchange scientists from Japan seem to enjoy living with their family in

Australia and do not work seriously. I do not like this. I would rather like the policy of JSPS and the Japanese government to support post-doctoral fellows than established scientists. Post-doctoral fellows do not have permanent positions in Japan. They must work hard. The present Japanese program of sending established scientists seems to just be providing a long vacation for these established scientists, resulting in "spoiling" them. When we accept a visiting scientist in our laboratory in Australia, we have to provide an office and laboratory space, therefore, we expect to benefit from them, scientifically.

(Ear-A)

5. D. Summary of Japanese Opinions

The opinions of the Japanese scientists in categories **B** and **C**, of course, depend on their experiences, personality, history, research field, affiliation and current personal situation. Each statement is verbatim and at times statements were opinionated. In spite of this, there are some common attitudes with regard to Australia and its science policies. These are listed by these Japanese scientists as follows.

- (i) The quality of an ordinary citizen's life is wonderful, *i.e.* low consumer prices, a beautiful community environment, friendly and kind people, and short working hours.
- (ii) There are a variety of cultures originating from many different countries living reasonably harmoniously. There is still, however, slight racism towards Asians on some occasions.
- (iii) Not many Australian scientists know anything about Japan itself. They usually do not understand the attitude or behaviour of Japanese scientists. They do not seem interested in Japan.
- (iv) There is plenty of support staff with quality skills.
- (v) The system of research administration is simple and functional allowing scientists to concentrate on their research.
- (vi) Generally people are lazy at work and work slowly.
- (vii) It takes a long time to get research items and tools.
- (viii) Research is heavily weighted towards applied science and practical technology. Basic science is considered less important.
- (ix) There are more foreign scientists than Australian scientists.
- (x) The structure of Australian science is like a few "peaks" on an almost flat land, rather than many broad hills. There is good science in the peaks but nothing in many other research fields.
- (xi) Australian scientists do not care whether the science and technology come from Australia or not.

5. E. Evaluation of Japanese Opinions by Australian Scientists

Portraying the opinions of Japanese scientists only is probably not fair and perhaps a bit biased. So, we have added the evaluations of 5 Australian scientists who are researching in the area of research policy. The criteria and score are as follows:

Criteria	Score
Strongly disagree	1
Disagree	2
Neither disagree or agree	3
Agree	4
Strongly agree	5

Their scores and the mean are presented in Table 9. Most Australian professionals in the field of research policy agreed with the above Japanese opinions (i), (ii), (vii), (x), and (xi) but disagreed with the opinion (v) and neither agreed nor disagreed with opinions (iii), (iv), (vi), (viii), and (ix).

Table 9:
Australians' score on Japanese opinions*

Item	Score					mean
	A	B	C	D	E	
(i)	4	4	5	4	4	4.2
(ii)	4	5	4	5	5	4.6
(iii)	4	4	2	4	3	3.4
(iv)	3	4	3	3	3	3.2
(v)	3	2	2	2	2	2.2
(vi)	3	4	4	2	3	3.2
(vii)	3	5	3	5	4	4.0
(viii)	4	5	2	3	4	3.6
(ix)	--	5	2	3	2	3.0
(x)	4	5	4	4	3	4.0
(xi)	4	5	2	5	4	4.0

* Items (i) - (xi) are the opinions presented in section D of the text.
A - E are 5 individual scientists.

One of the Australian professionals left the following comment.

My understanding is that most Japanese science is oriented to technology and industry and is usually successful, but now more money is being spent on basic research.

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