

A SPECIAL PLACE IN HISTORY - PROFESSOR NANCY MILLIS

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Professor Millis has had a profound influence on the regulatory framework for Gene Technology in Australia. Her leadership in this and other fields has been an inspiration to younger women in science. Her use of humour in all her interactions is legendary.

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It is a great privilege to participate in this special tribute to one of Australia's most valued National Living Treasures.

In the sisterhood of women biologists, there is no one more loved and admired than Nancy. Her contributions have indirectly affected the lives of all Australians. She has shaped science policy and water policy, and had a profound effect on agriculture and food production particularly through her work in gene technology regulation.

At The University of Melbourne, she pressed for and saw implemented, a scheme for employment of women academics so that they could return to work part time after the career interruptions that they often encounter. This scheme was well ahead of its time. Nancy recognized the difficulties women of the '80s encountered as they struggled with the conflict of raising a family and keeping a thread of their academic career alive.

She was an inspiration to many women in science. By just being Nancy, she showed us that it was OK not to conform to the norm of a woman in a man's world. Indeed her way of responding to the conscious and unconscious ways in which men asserted their positions are legendary, at least amongst this sisterhood of women in science. (More of that later).

Nancy's career spanned the twentieth century. She lived through some extraordinarily disruptive global events:

- The stock market crash and the great depression of 1929. (when she was a child).
- World War II in the 1940's (when she was trained to earn her living as a typist).

- The description of the structure of DNA in 1953 (Watson and Crick 1953) (which ushered in the Age of Biology and coincided with her appointment as Lecturer in Microbiology).
- The Women's Movement of the 1970s (which was after her appointment as Lecturer in Microbiology).

(The recession of 2009 may turn out to be worthy of this list too.)

She foresaw at an early stage, the impact that the solution of the structure of DNA by Watson and Crick and the subsequent development of molecular genetics would have on medicine and agriculture. She took a leading role in Australia as this technology was developed and products were registered for commercial sale. This was through chairing Australia's regulatory body, the Commonwealth Government Recombinant DNA Monitoring Committee from 1981. When the Genetic Manipulation Advisory Committee was established in 1987 she continued her contribution as Chairman until the Gene Technology Act was passed in 2000. The Act came into force in 2001 and the Office of the Gene Technology Regulator was established.

During all this very formative time for gene technology research and development in Australia, Nancy's commonsense and focus on risk assessment meant that the system worked. This whole exercise required great wisdom, patience and persistence. She had to manage the balance between rational risk assessment and the scare mongering based on belief systems lead by much of the anti-GM lobby.

Apart from that she had to manage the bureaucracy. There was a time in between the recombinant

DNA monitoring committee and GMAC when the committee was in limbo. For 18 months, Nancy wrote letters to the Department of Science & Technology trying to get the committee administratively supported. After 18 months of frustration and inaction, she wrote a letter to the Minister, John Button, a very factual letter:

- Letter sent on such and such a date – no response
- Phone calls made on such and such a date – no response
- And so on and so on.

She said there must be something really troubling the Department and the committee stood ready to help at any time to resolve whatever the issues were and that she would very much appreciate a response. Apparently John Button was on the phone within a minute of receiving the letter and finally galvanised his Department into action. All this time Nancy and the committee kept working issuing permits and so forth without any formal connection to Government.

Through her efforts and leadership, rational risk assessment processes prevailed, at least in the main part. It was a very difficult time for all involved in research leading to more productive crops which had less adverse effects in the environment. I can recall my own efforts to explain the technology and the risks to community meetings and so on. They were difficult audiences and often very hostile. It was difficult to get a forum in which one was able to present the facts, the unknowns and risks. Nancy was magnificent. She made radio and television appearances and made the issues very clear. After one appearance, I met someone who had seen her on television. He said “it was amazing - there was this lady who looked just like someone’s grandmother, explaining the value and the risks, in words he could understand.” He said, “I believed her as she was so direct, so straightforward and seemed utterly trustworthy.” What a tribute!

Her contributions to the water industry, to aquaculture, to brewing and to other fermentation industries are well known and are presented in other sessions today.

Nancy’s sphere of influence was very wide and spanned the fields of science, politics and industry. This is very unusual for a scientist. More commonly, scientists focus on their chosen field and don’t venture out into other cultures. Stamina, a focus on keeping logic and data to the fore in decision making and an ability to tune out negative messages are prerequisite

sites for spanning these different cultures. Nancy had what it takes. Not many of us, having had the experience of working with Government, can imagine how Nancy persevered in the face of all the difficulties and frustrations in dealing with politicians and bureaucrats. But, she did – to the lasting benefit of us all.

In trying to put Nancy’s career in context with that of other women scientists, I turned to the Academies of which Nancy is a member, The Australian Academy of Science and The Australian Academy of Technological Sciences and Engineering. However, the best analysis of the experiences of women in science was from a study in the US National Academy of Sciences (Wasserman 2002). It may not be precisely translatable to the Australian situation, but it seemed to me to reflect the experience of Nancy rather well. The numbers of women in each of these academies is given in Table 1.

The study of the US National Academy of Science points out that:

1. The Women elected to the Academy are an elite group. In the US 60 new members are elected to the academy each year from more than 25,000 science PhDs. So the Academicians as a group are elite and there are a relatively small number of women in this group. In 1996 there were 86 women from a total of 1,600 members, so about 5% (this was up from about 1% in 1973). The percentages are of the same low side for the Australian academies. Nancy is certainly a member of the elite group of scientists who have been recognized and honored by their peers, but she has never made a fuss of her honours. She is very low key and absolutely down to earth and approachable. Kath and Kim (Kath and Kim 2002) would never have said “tickets!”¹ about Nancy.
2. Secondly, there are some common qualities and attitudes of this elite group of women.
 - A first order requirement is sheer ability. In some cases, especially after the Equal Opportunity Rules of the 1970s, a woman might be invited to serve on board or a government panel or a scientific review, just because she was a woman. However, she would not have been invited time after time if she were not extremely good. Nancy was invited time after time. Her sheer ability was widely recognized. (Furthermore she was such fun to be with - an added reason to have Nancy on any team or indeed in charge of any team!)

¹ A reference to words coined to describe someone who has a particularly high opinion of themselves. Hence – has “tickets on themselves” or simply “tickets” as a descriptor.

Table 1. Comparison of the numbers of women in science academies in Australia and USA. NAS = National Academy of Sciences, USA; AAS = Australian Academy of Science; AATSE = Australian Academy of Technological Sciences and Engineering.

	Women	Total	% Women
NAS, USA (1996)	86	1,600	5
AAS (2009)	26	427	6
AATSE (2006)	27	716	4

The other qualities listed are:

- extraordinary energy and cheerfulness
- unusual persistence, resilience and stamina
- innate stubbornness and doggedness
- a willingness to take risks
- a willingness to compete
- courage and ingenuity.

Nancy certainly has all these qualities. She persisted through early disappointments and setbacks to finally arrive at an academic career in microbiology. These qualities were also very evident later during her years chairing GMAC. Anyone would have needed all these qualities in abundance to carry the day on GM issues.

3. Thirdly, the study found that the women's experience led them to develop certain attitudes which helped them through the many obstacles which they encountered:

- they mastered the art of deflecting criticism and outright harassment without becoming derailed. This was described as: "A Teflon reaction to setbacks and criticism that enabled them to tune out negative messages."
- they defied societal norms of a woman's role and were very comfortable being non conformists in a man's world
- they didn't waste energy on self doubt. They tended to minimize negative experiences without dwelling on them.

In thinking about these attitudes and whether they applied to Nancy, I was struck by my perception that I had never heard anyone criticise Nancy! Perhaps I had been "tuning out" but I cannot recall anyone saying anything critical or otherwise adverse about Nancy. I would say that she has been very comfortable being a nonconformist in a man's world and I can't imagine Nancy wrestling with self doubt, although in our darker moments, perhaps we all do.

Nancy is known for her capacity to cut to the heart of any debate quickly and she is known not to mince words, or stand on niceties if the facts or the logic of any issue or debate are flawed. This direct response to any "humbug" as Nancy describes it, is wonderful to behold and is legendary. For example, at a particular scientific meeting in the '90s a presentation was given which showed a range of flowers in all different colours and the statement that these could be created on demand with the new gene technology in any species. "Bullshit" rang out from the audience. We may have all been thinking the same thing, but Nancy said it in no uncertain terms.

For lesser transgressions of male puffery and pomposity, she had a special form of humor which usually went completely over the transgressor's head. It did no harm, but bystanders who understood what was happening were well rewarded. For example, a not uncommon situation was being informally regaled by male colleagues about their own wonderful and amazing achievements. Nancy would listen politely (as would other women in the group), but then as we walked away:

Three hearty cheers!

"Well, three cheers for Pooh!

(For Who?)

For Pooh

(Why what did he do?)

I thought you knew;

He saved his friend from a wetting!" (Milne 1926)

They didn't often get the next lines of :

"Three cheers for Bear

(for Where?)

For Bear --

He couldn't swim

But he rescued him!" (Milne 1926)

Mostly, the targets were not familiar with the classic children's literature or The Hums of Pooh. However the other women present were, as reading aloud to children was an off campus duty and joy. This made the whole scene extremely satisfying, and no one got hurt.

Another wonderful situation I recall was when a male colleague was, in conversation with us, making assertions based on his beliefs rather than facts. He was laying down the law with an unsubstantiated certainty. He knew it and he knew it all. He repeated his performance in case we'd missed the point.

He was greeted with:

“Just the place for a Snark! I've said it twice:

That alone should encourage the crew

Just the place for a Snark! I've said it thrice

What I tell you three times is true.” (Carroll 1876)

He too had missed the joy of reading the children's classics aloud, had no idea what that was all about, and went off rather bemused. The women, being familiar with the works of Lewis Carroll went off chuckling to themselves. Again no harm was done but a certain solidarity amongst the women present was strengthened. I could go on

I've been so happy and so privileged to have been with Nancy on some of these classic “Nancy occasions”, to have benefited from her wisdom many times in my career, and to have been one scientist and one citizen who has truly valued and appreciated the parts of her life that she dedicated to service.

Nancy is one of the greats of Women in Science and has shown we others, ways of doing things, ways of coping with adversity and ways of responding to some of the conscious and unconscious ways that some men can use to belittle their women colleagues or dismiss their views. Our lives would have been different and I am sure less fun, if you had not been part of them.

“O frabjous day! Callooh! Callay!”(Carroll 1876)
We chortle in our joy! – when we think of Nancy.

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