

## Features

# A Grand Prix performance

Renée Schroeder, voted Austrian Scientist of the Year: 2002 by a group of the nation's journalists, tells **Graham Tebb** about the challenges of promoting science in the media and the many problems women currently face in pursuing a research career in the country.

'Scientist of the Year' has a nice-sounding ring to it but Renée Schroeder is the first to place her latest award in context. "The prize is given by the Austrian Club of Science and Education Journalists, who are probably not best able to evaluate my research," she says disarmingly. "It was awarded because of my work with journalists rather than because of anything I have achieved scientifically."

Nevertheless, her work has lately been receiving a considerable amount of attention and recognition. For example, Schroeder was the recipient of a L'Oréal Special Honour Award 'For Women in Science' in 2001 and was last year elected a Corresponding Member of the Austrian Academy of Sciences.

Schroeder's scientific career has been anything other than typical. Her parents were from Luxembourg but she was born in Brazil: her father, an electronics technician, had gone there to work for three years but ended up staying for fifteen. Finally, though, he decided to return to Europe and after a year in Luxembourg he settled with his family in Styria, in southern Austria. By this time Renée was fourteen. The majority of her schooling took place (in Portuguese) in Brazil, with the final few years (in German) in Austria. Following her 'Matura' (A-levels) she went to the University of Vienna to study chemistry, switching to biochemistry when this discipline was established at the university.

Schroeder traces her enthusiasm for science to her primary school in Brazil, where her education followed no fixed syllabus and children were encouraged to perform projects that interested them. Later she

was fortunate to have a first-rate chemistry teacher in Austria, who stimulated his classes with discussions of the origin of life in the primordial soup. This topic remains among Schroeder's research interests today (she is a member of the exclusive International Society for the Study of the Origin of Life). When she decided to read chemistry at university her mother was somewhat disappointed — she had foreseen a future for her daughter as an interpreter — and Schroeder readily acknowledges that there were aspects of her study that were not quite as she had expected. For example, the chemistry syllabus included an introductory course in physics and the female students were amazed to discover that the Physics Institute still had no ladies toilets.

Nevertheless, Schroeder persevered and completed her master's degree and her doctorate in Vienna, with almost a year spent at Munich in the laboratory of Rudolf Schweyen. She then took up an EMBO long-term fellowship to the Centre of Molecular Genetics of the CNRS at Gif-sur-Yvette in France, where she 'learned genetics' in the group of Piotr Slominski. Her fellowship was interrupted by the birth of her first child, with the second following shortly after the end of her stay in France. When she returned to work in Vienna she was given a position at the newly opened Institute of Microbiology and Genetics but found herself involved mainly with administrative tasks. So to help restart her research career she went on a second post-doctoral fellowship to the group of Marlene Belfort in New York State Department of Health in Albany, US.

Schroeder's research topic in Albany was the self-splicing group I intron from the *Escherichia coli* T4 phage. Shortly after returning to Vienna she was encouraged by the structural similarity between guanosine, the co-factor in the splicing reaction, and the antibiotic streptomycin to test whether streptomycin could compete with guanosine for the binding site in the intron. The finding that it did so led Schroeder to analyse the interaction of antibiotics with RNA and her results ultimately gave rise to the recognition that RNA molecules could represent targets for drugs. As a consequence, many major pharmaceuticals companies now include RNAs as target molecules in their drug testing programmes.

Since her return from the US in 1989 Schroeder has remained in the Institute of Microbiology and Genetics. Her research group has gradually expanded, although unlike other RNA researchers she has not been tempted to address other topics. Over the years her group has provided many important insights into fundamental aspects of RNA structure and function, relating for example to the co-evolution of RNA and peptides, to proteins involved in RNA folding and to RNA-RNA interactions in non-coding RNA-regulated translation.

But as her election as Austria's 'Scientist of the Year' makes clear, a considerable amount of her time and energy is devoted to talking to journalists or addressing meetings. As she explains, "It started with the referendum on gene technology in 1996. I found myself being invited to podium discussions and as a result I had a lot of contact with the press." Feeling that it is important that science is correctly portrayed in the media, she has maintained her links with journalists. Furthermore she frequently gives lectures, for example, in old-people's homes and schools, and recently spent a



**Media favourite:** Renée Schroeder found herself being invited to podium discussions and as a result had a lot of contact with the press. She feels it is important to maintain her links with journalists.

full day discussing gene technology with a group of religion teachers from the Austrian province of Burgenland. Her audiences say that she is able to explain complicated ideas without sounding patronizing and that her enthusiasm for her subject is infectious. A talk thus frequently leads to further invitations.

Schroeder was clearly an obvious choice to participate in the Commission for Bioethics founded by the Austrian Federal Chancellor, Wolfgang Schuessel, in June 2001, although she claims to have been surprised to be invited: as she says, "The Commission is full of theologians, philosophers and legal experts ... and has very few female members." The Commission's responsibilities include advising the government on how to react to the problems caused by scientific advances as well as providing information to the public on the issues involved. She is delighted it now exists.

Despite her scientific success and her relatively high profile in Austria, Schroeder is still only an Assistant Professor at the University of Vienna. She herself gives two reasons for this: since 1989 she has not held any position outside Austria; and she is a woman. The explanation for

why she has not been abroad for so long stems from her reluctance to disrupt her children's education. Only now, with her second son about to leave school, does she again feel 'free to travel'. And it is still the case that candidates applying from abroad are given preferential treatment when professorial positions in Austria are awarded.

Her second reason bears closer scrutiny. It is striking how few female professors there are in Austria in general and in the University of Vienna's Faculty of Natural Sciences and Mathematics in particular (two out of the 78 occupied positions are held by women and there is little hope that any of the 30 positions currently being filled will be given to a woman). On the other hand, Austria has the highest proportion of female to male members of the European Molecular Biology Organization (EMBO) and is the only country whose scientists have received three L'Oréal 'Women in Science' awards. Schroeder feels that this discrepancy provides clear evidence that female Austrian scientists receive more recognition internationally than they do at home.

The background to discrimination against women in

Austria is complex. Student fraternities ('Burschenschaften') are still widespread in the country and their members — exclusively male — swear oaths that they will help one another throughout their lives. And latent sexism is never far from the surface in the highly traditional Viennese society, where many men are still reluctant to shake (rather than kiss) a woman by the hand. The consequence of an ingrained belief that women are somehow inferior to men is that they are either not noticed or else examined much more closely — and critically — when they apply for positions.

Schroeder notes, "We plan to increase our spending on research enormously in the next few years but where are the people going to come from? Women represent a huge but still largely untapped potential. Approximately equal numbers of men and women graduate in science at university but the subsequent drop-out rate among women is much higher."

To attempt to address the problem, she and her colleagues have established a mentoring group at the University of Vienna. In a two-year pilot project, ten established scientists (both male and female) are providing guidance and supervision to 40 young female scientists to help them plan their research and their careers. Such career guidance centres are standard at many more progressive universities outside Austria and Schroeder hopes that the Viennese initiative will in the future be extended and expanded, also to include young male scientists.

Another major problem Schroeder sees is that the universities have no means to reward good performance or to punish poor performance. Far too much depends on when positions happen to become available and there is the widespread belief that, "Those who are offered positions are not the good ones but the well-behaved ones." Furthermore, the universities are organized such that each institute director is responsible for spending his institute's budget

and for filling the scientific positions allocated. It is thus his choice whether to fill the institute with PhD students and post-docs, who will work for him, or with independent scientists. The latter will naturally be in a better position to secure additional funding but are often viewed by directors as a threat to their power.

Schroeder believes that, "Too many mediocre professors currently have too much power. They are frightened of novel ideas and prefer to ensure that their institutes continue to operate along well-tested paths." The British and US systems, with a much less rigid hierarchy, are far more conducive to innovative research. That they can be applied successfully in Austria is shown by the Institute of Molecular Pathology in Vienna and by several institutes of the

Austrian Academy of Sciences. The recent reform of the Austrian universities could have been used to address some of these issues but, as Schroeder says, "it unfortunately goes in the other direction."

Reforms may also be due also in other parts of the Austrian education system. For example, the science syllabus used in schools, in contrast to the way Schroeder was taught in Brazil, tends to reward repetition and discourage creativity. "Children are naturally inquisitive but this side of their nature is drilled out of them in school," Schroeder says. She believes that it is important to let children know that science can be both fun and stimulating; doing so would both encourage them to pursue a career in science and increase the receptiveness of future generations to science.

Given the variety of Schroeder's other commitments it is a wonder that she is still able to supervise closely a research group that consists largely of PhD students and it is a tribute to her that her group is so successful. She herself feels that comparing university research with that performed in independent research institutions is like, "organizing a grand prix race where some of the drivers are in Ferraris and others are in Volkswagens." In view of this, an obvious question is why she has not sought a position in a non-university institution. Her answer is that, "what matters to me is not only performing good research but also training students, which is the main function of a university. And I am in a much better position to work for change in the system if I remain a part of it," she says.

## Singing from his supper

Bird song is now known as a sexually selected male trait where females choose males on the basis of song quality. It has recently been suggested that the quality of the adult male song may be determined by nutritional stress during early development. Now, a team of researchers based at the universities of Cardiff, Bristol and London have tested the 'nutritional stress hypothesis' using the complex song of the European starling (Proc. R. Soc. B, published online). Newly fledged starlings were kept in outside aviaries where they were either provided with a continuous source of food or found their next meal unpredictable: they were deprived of food for a few hours at irregular times throughout the day for a period of three months.

The team measured physiological and immune responses during the treatment and then examined the song patterns in both groups the following spring, months after the experiment had ended and both groups were provided with constant access to food. The

researchers found that birds in the experimental group actually gained weight over their control counterparts but that they showed a significantly suppressed humoral immune response. In the following spring males in the experimental group were found to spend less time singing, sang fewer bouts, took

longer to start singing and also sang significantly shorter bouts.

The authors believe their results show that both the quality and quantity of song produced by individual birds reflect past developmental stresses. Erratic feeding may just be one stress factor. Females' attention to a male's singing prowess may help discern a more general quality of the individual in voice.



**Voicing it:** new studies suggest that stresses during development may affect the quality and quantity of song in the adult European starling (*Sturnus vulgaris*). Photograph: Oxford Scientific Films.