The flight from European science

The attraction of the American research system for young European scientists

From the declaration of independence onwards, the USA has always been the 'promised land' for all sorts of people from Europe. The promise of 'Life, Liberty and the pursuit of Happiness' attracted liberals fleeing oppression in post-Napoleonic Europe and Irish farmers seeking a better life during the potato famine. The attraction of the USA for Europeans has not changed since, although many people these days immigrate for reasons other than oppression or starvation. Notably, young scientists from Europe, but also from Asia, leave their countries because they find better conditions for their research in the USA. Indeed, the list of US noble laureates reads like a Who's Who of international science.

The reasons have been analysed in numerous statements and articles. The USA spend a higher percentage of the gross domestic product on research than European and most Asian countries. And the amount of money the National Institutes of Health and the National Science Foundation is spending has been steadily increasing compared with the stagnating budgets of most European research councils. The high quality of research is more visible in the USA than in Europe, making it easier to define 'centres of excellence'—universities and research institutes with a high reputation among scientists worldwide. Europe faces the additional problem of complex language and cultural differences that make it harder for scientists to change from one country to another. Indeed, in some European countries it has become obligatory for scientists to put a stay in the USA on their curriculum vitae in order to get access to higher positions within their countries' research hierarchies.

Many PhD students and postdoctoral fellows, however, have additional, more personal reasons to leave Europe. For them, it is mainly the access to funding that has become the decisive argument. Salaries for researchers in the natural sciences have never been comparable to those of, say, stock brokers and corporate lawyers in spite of more training, and it is certainly not the prospect of becoming

rich that attracts young students to follow a career in the sciences. But for a growing number of PhD students and postdoctoral fellows in Europe, the access to money has worsened, not improved, over the last decade. Not surprisingly, a dire financial situation and uncertain future prospects force many young European scientists to leave for the less bureaucratic and more resourceful funding system that the USA offers.

In fact, salaries for many European researchers are in the same range as those of their American colleagues. A postdoctoral fellow in the USA with a NIH stipend receives between 31 000 Euro (US\$ 29 000) and 40 500 Euro (US\$ 38 000). In the UK, at the renowned Imperial Cancer Research Fund, a postdoctoral fellow is paid between 34 000 and 46 000 Euro a year depending on her or his experience. The Wellcome Trust pays a person in the same position an annual salary of up to 47 000 Euro, and even more if he or she works in London. A postdoctoral fellow in Germany can earn more than 40 000 Euro—if she or he is lucky enough to get a government-funded grant. But government-paid jobs that

include health insurance, social security and pension funds are the exception for many young European scientists. A lot of postdoctoral fellows and PhD students receive grants from private institutions with limited or no access to the social security nets of their countries.

Jobs that include health insurance, social security and pension funds are the exception for many young European scientists

'It is not primarily the level of salary which is the problem, but how the system of research functions in Europe,' thinks Anke Steinmetz, a postdoctoral fellow at the Institute de Génétique et de Biologie Moléculaire et Cellulaire at the University of Strasbourg. Basically, decisions made by national research councils in Europe are often influenced by economic or political interests rather than being judged strictly by the scientific excellence of the proposals submitted. The victims of this decision making are usually scientists working in basic research. Another drawback is the strictures placed on the uses of the money provided by research councils, because they deter primary investigators from shifting funds to continue paying their researchers. Postdoctoral fellows often have to change their area of specialization in pursuit of new funding opportunities when their initial grant runs out. As a result, many PhD students and postdoctoral fellows have to rely on monetary sources outside of research funding simply to finish their work. 'I have been shocked to learn that, in Germany and France, graduate students and postdoctoral fellows can be obliged to finish their thesis or project without being paid,' Steinmetz says, '[with] social security and parents being systematically calculated on by some principal investigators.' Compared with this situation, the UK seems like a paradise, with many postdoctoral

fellows finding enough support from the government as well as other organizations like the Wellcome Trust. But even there, the rising number of PhD students and the scant growth of permanent positions make it increasingly difficult for junior scientists to find employment after their postdoctoral training.

The result, Steinmetz thinks, is a two-class society among European scientists: those with a safe position and funding, and those without—particularly PhD students and postdoctoral fellows. And even those with a safe position, such as group leader or professor, find it difficult to obtain money for their research, often having to concentrate more on writing proposals that match the difficult requirements of European research programmes than on producing high-quality scientific results.

Financial quagmires, which affect scientists at a time in their lives when they are considering settling down and founding a family, are some of the reasons that many younger scientists leave Europe and head for the USA. Furthermore, postdoctoral grants there are often awarded for a longer term than the 2 or 3 years that are usual in Europe. This gives a postdoctoral fellow a better opportunity to develop her or his skills and to produce more and better results—a prerequisite to reaching a higher position as group leader or assistant professor.

Another reason for young scientists to value the American research system is the fact that primary investigators at US research institutions are generally interested in extending the funding of their PhD students and postdoctoral fellows in order to obtain results and publications. For Steinmetz, it meant being able to finish her PhD thesis on a paid basis at Brandeis University in Boston, MA, after her initial grant expired. 'After some time my advisor had to pay me out of her grants,' she says, adding: 'That's an example of how people are taken care of in the US.' Indeed, NIH or NSF grants give researchers greater flexibility than European grants do. Investigators can decide how much of the money they will use for salaries, equipment or other material. In addition, European postdoctoral fellows and graduate students find a better social environment in most American laboratories. Sidney Cambridge, who moved to the Max Planck Institute of Neurobiology in Munich after he received his PhD from

Carnegie-Mellon University in Pittsburgh, PA, explains that this results from having smaller departments, a more casual atmosphere between researchers and their superiors, and a less hierarchical system in American research institutions.

There is another aspect of the American research system that gives primary investigators an incentive to take care of their researchers. Hartmut Land, director of the newly founded Centre for Cancer Biology at the University of Rochester, NY, points out that the overhead that comes with NIH and NSF grants is a particularly strong motive for American universities to attract, keep and support those researchers that produce results. 'The dean of a university is measured by the success of the scientists,' he says, 'so people are keenly interested in helping people to be successful.'

The attraction of the American funding system extends to established European scientists too. 'You go to the US because there you have the best research environment and because you get a lot of money for your research,' says Marek Mlodzik, who left a group leader position at the European Molecular Biology Laboratory in Heidelberg to become a full professor at Mount Sinai in New York, NY. 'Plus, they offer additional incentives,' he adds. 'It was absolutely not a problem to take eight people with me and pay them.' The same holds true for Land who has left the Imperial Cancer Research Fund in the UK. 'The attraction for me was that building a new centre doesn't happen every day—particularly in Europe,' he says. Both Land and Mlodzik value the competitiveness and the multiple funding avenues they find in the American life sciences. Furthermore, the high competitiveness of NIH grants is a guarantee of the high quality of research performed in the USA, even when Congress limits or decreases funds. 'If you have more trouble to get funding for your work, it weeds out the mediocre ones,' Land explains.

The brain drain from Europe may have economic and political consequences in the future. Researchers who leave Europe not only fertilize US science and the economy, but they also take away the considerable investments that their countries have made in their education. And many European scientists choose to stay in the USA as they face difficulties in getting adequate positions in the European research system after coming back. But

the net flux of scientists from Europe to the USA is not only a reflection of the inflexibility of European research systems. The US sciences have always imported people, which may explain why most of the scientists Land has recruited for his new cancer centre come from Asia and Europe. In 1998, the US Immigration and Naturalization service provided nearly 2500 immigration visas to foreign scientists. The figure was 3500 in 1997. Another reason, Steinmetz thinks, may be that Europe simply produces too many scientists for the positions and funding opportunities that are available.

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A great step towards greater efficiency, output and attractiveness of the European research system would be to increase both competitiveness and flexibility at the level of funding and to force universities to take better care of young promising scientists. This could mean adopting the overhead system as well as making decisions about stipends exclusively on the ground of scientific merit. But another reason for the difficulties of non-established researchers in finding financial support for their work may be the critical and sometimes even negative attitude towards science in many European countries. Here, the perception of science, particularly of the life sciences, is still more that of a danger than an enrichment for society and the economy. In the USA, the general view of science is more positive; Land says that this is in part because research institutions work hard to educate the public about the positive aspects of their research. For European science to become more efficient and attractive, society, business and politicians have to realize that scientists and their work are an asset rather than a liability to their societies. 'Good science breeds money,' as Land puts it.

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