

Just let me be a scientist

The experienced, highly qualified postdoc is a valuable resource. Is academia ready to create a niche for this species?

Earlier this year, Karl Gensberg, an academic at the University of Birmingham, UK, quit his position in favour of fitting gas appliances. Although a gas fitter's job might not be intellectually as challenging as molecular biology research, for Gensberg it will apparently pay the bills with a lot more to spare than the job of postdoctoral researcher in academia. Partly his story is merely another face of the poor funding of academic science and many of its junior-grade practitioners. However, a closer analysis raises important questions about the use of human resources in academic science. Is the practical scientist, especially the older, more experienced type, simply not recognized as a valuable commodity and, therefore, not paid a salary commensurate with his or her experience and quality? Is this desirable? Furthermore, does the tortuous promotion and selection system in academia squeeze some of the better practical researchers into positions where they actually do not practice research at all? Is academic science selecting only a narrow band of the spectrum of people who are good and motivated? Lastly, does it provide career opportunities for those who do it for the pure love of science?

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The reasons for younger scientists leaving academic research or science altogether are manifold, and have been highlighted time and again. Short-term contracts, often with

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no health benefits or retirement funds, lack of job security, unclear career structures and long working hours in the laboratory are just a few of the features of academia that postdocs all over the world deplore. However, another force, usually associated more with commercial enterprises than the academic world, appears to be at work: the pressure to move away from the bench and onto the management career ladder. Postdocs are not tolerated forever in the laboratory and have to move, usually as soon as their project funding runs out. For the more experienced the next logical step is to move up to become an independent investigator or group leader. But that may not be everybody's liking, particularly those who do not want to exchange the satisfaction of doing research at the bench for increasingly managerial duties and grant-application writing. "If you asked me: will you be a postdoc in your lab for ever, I would say yes," commented Jonathan*, a postdoc at Yale University in New Haven, CT, USA. [*Names have been changed by the editorial office.]

But the question as to whether 'super-postdoc'—highly qualified researchers with longer or permanent contracts, paid commensurately with age and experience—positions should be created, attracts widely divergent answers. And whether one believes in it or not, the fact that the concept is worthy of debate says something interesting about the present culture of academic science. The days of Fred Sanger, a brilliant scientist who was left alone for his whole productive life to work at the bench, are gone for good; or rather "gone for bad"

as Francois*, a postdoctoral scientist at the Pasteur Institute in Paris, France, remarked, lamenting the lack of flexibility in many academic systems. Recognizing that to get the best out of everyone a system has to take account of peoples' different strengths and aspirations, he continued, "what is really needed is to have the most possible options." This is an opinion shared by others who have experience of several national systems. At present, one cannot help but feel that academia is not retaining some of its best people, because they have 'other' ambitions compared with colleagues intent on ascending to higher positions.

Although many people still choose academia in Europe, it is doubtful that their number is enough to maintain Europe in a competitive position compared with other information-driven economies. When one looks to the USA—where a recent report by the National Science Foundation suggested a declining scientific output—is the situation better, or merely different? In fact, there is not much to choose between the two continents for a postdoc: "Basically it's not a real job," Jonathan said, continuing: "I was considered a trainee when working for the government [as a postdoc]." And depending on where one is as an academic, even something as vital as health insurance can be considered a fringe benefit that is not necessarily included in the stipend. "I'm 36 years old, and I find that I haven't really done much for my retirement," Jonathan said. How can people like him continue to do the practical science they love, and be able to retire one day having supported a family? The answer would be to pay him what he is really worth to society as an experienced, high-quality, practical scientist who

prefers lab work to managerial or leadership positions. But surely here is the rub, for whereas a tenured professor must demonstrate nothing short of professional misconduct to be sacked, a postdoc's shelf life without important publications is a maximum of around two years. After all, postdocs are expected to churn out papers in order to attract funding to the group. And quality control and selection pressure have to be exerted somehow. The most convenient measurables to use are the frequency and calibre of publication.

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So would the 'super-postdoc', if created as a generally recognized position, be compatible with the selection process practised in academic institutes? Iain Mattaj, Scientific Co-ordinator of the European Molecular Biology Laboratory in Heidelberg, Germany, makes no bones about this. According to him, all scientists should be encouraged to become independent, thus creating competition for the prized positions of, successively, group leader, programme co-ordinator, professor, and so on. The concept of a postdoc with a life-long position and similar pay and benefits to higher positions would, in his opinion, discourage such independence. "[Permanent postdocs] are something one does not want to encourage, because the purpose of the process at its simplest is to increase knowledge; for most people who are good at research the important thing is to give them the independence to find things out ... and direct their own programme," Mattaj said. Neither does boosting the number of people in science in Europe seem to him a good reason for keeping postdocs at the bench for more than around six years. "This would only be worthy of consideration if it is hard to get new young people in," he remarked, adding, "in my experience, people tend to stagnate." There may be grounds to keep people longer in situations where they have duties such as teaching or demonstrating at a university, but the message for the majority is clear: up or out.

But for those who are being encouraged to think bigger and more independently, the prospect of failure looms large. As Francois commented, "How many people with vision do you need, even at a large institute?" Not many, compared with all the postdocs and PhD students, that is for sure. And given that it takes so long, and is such a painful procedure, to make it to a permanent position, many of the most talented and ambitious ones simply leave "because it takes them too long to reach a position where they can use their managerial skills," he added. Hence, after such a longwinded apprenticeship and selection procedure, academia may well not get the best after all. One might also observe that, with a combination of lack of options and a slow career progression, academia loses some of the best lower grades, and some of the best higher grades too. The result is the selection of a rather stereotyped scientist who concentrates on career progression to the exclusion of everything else.

At present, wittingly or unwittingly, most academic systems are moving in this direction. But striving to define the path that leads to particular stages of the academic career is not incompatible with recognizing alternative niches. A definition of the upward pathway is, of course, vital for those looking for the signposts, but it need not represent a one-way track that one cannot leave. Just as different people are productive in different ways, the system should be able to harness this productivity and optimize itself to deal with a wider variety of styles. Highly focused scientists working on defined projects may not need significant 'management', nor do they need to rise through the hierarchy to become managers or professors, in order to make a significant contribution to science—in fact, for them, it is best made at the bench. However, they do need to receive respectable salaries and benefits.

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The kind of stress that is involved in climbing up the academic career ladder is not everyone's cup of tea. And if one proves to be the stuff of which group leaders and, finally, tenured professors, are made, then one might as well say goodbye to family life or free time for 10 years of incredibly hard grind. The pay may increase—slowly—but given that one can earn more, and have a family life, as a gas fitter or project manager in industry, many of the people with vital skills both in practical science and in science management are doubtless not staying where they are needed. After all, industry also does not take second-rate project managers when the revenue, or very survival, of the company depends on them.

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This raises the question as to whether academia depends less on these people for its survival. "There is a certain slack or redundancy in the academic machine," remarked Jonathan, commenting on the way in which seeming lack of productivity can be absorbed for a time without destroying the system. This has its advantages too, for it creates enviable intellectual and practical freedom. "[Academia] is the last bastion of freedom in the modern world. It's a beautiful and horrible thing at once," he said. But does this freedom to do things that would not be possible, let alone allowed, elsewhere, come at rather a high price?

Berthold Rutz thinks so; he is a PhD graduate of the European Molecular Biology Laboratory in Heidelberg, and is now, as a result, elsewhere. His job as a patent examiner at the European Patent Office in Munich, Germany, is a competitive position that pays more, and has much better standard benefits, than any postdoctoral position that he could have found in academia. Furthermore, it also allows him to lead a more balanced life with a young family: "Had I stayed at the bench, I would be working my butt off, just to stay alive; I

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can't imagine working in such a stressful field for a long time." And given that luck certainly has a role, sometimes a crucial one, is it all worth it if one's very existence could depend on something other than intelligence and hard work? "The competition in science has got a bit absurd; you slave away on a project, other people are doing the same thing, and if you're a little too slow, you can't even publish your work anymore," said Rutz, continuing, "I never felt so dependent on luck before or after my PhD." Clearly, luck and a good measure of 'streetwiseness' do have a significant role in pushing the correct hypothesis, working in the right place, getting crucial experiments to work, and even choosing the 'right' subject.

But for the 'super-postdoc', there would be no 'right' subject; they should have the freedom to go where their curiosity takes them. As funding for research that is not of direct medical relevance becomes ever harder to obtain, the intellectual freedom of this hypothetical 'super-postdoc' also seems ethereal. As Jonathan pointed out, "If you're not working in the area of cancer research, Alzheimer's or cardiovascular diseases, using human cells, you're going to find it pretty hard to find funding these days; not many agencies will fund you for working on some obscure dinoflagellate, however exotic or fascinating." To compound the growing inflexibility of career direction, it seems that soon academia will not offer much more freedom for curiosity-driven research than industry. Then he can finally sell up to industry and invest for his retirement after all. In the meantime, an enquiry to the Department of Biological Sciences at the University of Birmingham reveals that Karl Gensberg has indeed left; one must assume this is to start his course to become a qualified gas fitter.

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doi:10.1038/sj.embor.7400199

Who's afraid of Darwin?

Failing in the academic arena, schools and theme parks have become the new battleground for religious conservatives' fight against evolutionary theory

In 1925, the American state of Tennessee passed the Butler Law to explicitly ban evolution from all university and public school curricula, prohibiting teachers "to teach any theory that denies the story of the Divine Creation of man as taught in the Bible, and to teach instead that man has descended from a lower order of animals." Faced with many Southern states with similar laws, the American Civil Liberties Union (ACLU) initiated a court case in the summer of that same year, to test the constitutionality of the law. In a Tennessee courtroom, a jury was to decide the fate of John T. Scopes, a young high-school biology teacher charged with illegally teaching that man originates from monkeys. This trial, later known as the Scopes Monkey Trial and the first ever US trial to be broadcast live on national radio,

ended with a guilty verdict for Scopes, although this was reversed in 1927 by the Supreme Court of Tennessee, albeit on technical grounds.

Almost an entire century later, there are still storms over the teaching of the theory of evolution. Ever since the publication of *The Origin of Species*, Darwin's thoughts have been criticized and attacked by creationists who defend their religious beliefs. And their attitude has been contagious, spreading in different local and national environments. However, it seems that, as in the Scopes trial, what is most crucial in current disputes is not just the legitimacy of teaching evolution or the resistance to it on the basis of scientific arguments. Also at stake are underlying social, intellectual and political values.



John Thomas Scopes as he stood before the judges' stand and was sentenced in July 1925 in Dayton, Tennessee, USA © Bettmann/CORBIS