Jobs – A Crisis for Everyone

Pierre Averbuch from the Centre de Recherches sur les Très Basses Temperatures, Grenoble, and until recently the Vice-Director of the Association Bernard Gregory, in commenting on the crisis in the job market for young scientists, argues that the optimism of 50 years ago should not be thrown out of the window for one risks sending young physicists the same way.

In the years following the 2nd World War, the general opinion, and especially the opinion of funding agencies, was that science represented "the new frontier", as asserted by the title of a book by Vannevar Bush. Taxpayers agreed, and in consequence politicians, notably members of Parliaments who were responsible for distributing money. Everybody thought that collective investment in research could only be a factor for mankind's progress.

The number of scientists was not so large, and the attraction of science and a relative increase of the standard of living obliged universities and, for us, the science faculties to expand. So every new PhD could become, at least to start with, an assistant professor. Thesis advisors did not have to worry about the future of their students, and could train them to become identical to their masters. Until the end of the 1960s or the beginning of the 1970s, this was the rule. Of course, some of our research students left their alma mater for industry; it was for them a deliberate choice and there was no need to specially prepare any of them for this change. Furthermore, there were major research departments in many companies, so the switch from university to industry was done without a sudden change, the industrial research centres having an activity not so very different from that of university labs. The purpose of research was different, but the methods were the same, and even if PhDs did not spend their whole life in their company's research centres, the transformation into engineers and business-people was an adiabatic one.

During the 1970s, when the expansion of universities was slowing down, the transfer of PhDs to industry became more frequent. In some countries, this was not an easy thing since few professors had the contacts with companies needed to prepare the transfers. And research students were afraid of the industrial world – it was a terra incognita for their thesis advisors and, consequently, for them. Company managers were afraid to recruit these young people, whom they knew were qualified, but they did not know for what. In France, there was a need to create a special institution, the Association Bernard Gregory, to help promote the hiring of PhDs by companies. In any event, a new "demographic" dynamical equilibrium was created, and it worked until the beginning of the 1990s.

The Equilibrium is Upset

A few years ago, following the example of United States, many countries, decided to increase the rate of PhD production. The idea was that many university professors were soon to retire. The need to recruit good people induced an increase in the number of PhD grants; it was also assumed that the volume of research done by industrial companies would increase. University professors would be satisfied: they wanted to have as many as possible research students, and they were at least given a few more. As long as one could believe that students were not going to die from starvation it was unnecessary for professors to worry about what would become of their students after their PhDs if they do not stay in university labs. If they took up a postdoc fellowship after a PhD, they would die beyond the horizon, a horizon nobody saw and nobody cared about.

The present status of the job market shows very clearly that this increase in the number of PhD grants was unjustified. One can even suggest an explanation for the source of the error. The professors who belonged to the committees where the recommendation to increase the number of the PhDs was made, were professors in old, well-established universities. It is true that many of them were soon to retire. There were also many new universities, for the growing number of students obliged governments and local authorities to create them. Their professors, trained in the old ones, were still young, so, on the whole, the percentage of departures to retirement, was not that of a system in a dynamic demographic equilibrium; it was much lower. It should also be recalled that these new campuses absorbed many PhDs in the critical period in the 1970s.

The increase in the flux of new PhDs, created by governments who followed the recommendations of scientists, came at precisely the time when the research activity of many industrial companies was slowing down. It is not so easy to understand why this slowing down happened. The cutback in military programmes that accompanied the end of the cold war does not seem to have been the only cause. Vannevar Bush's statement clearly became less popular. The general public, which had seen many changes in its way of life owing to innovations, started to be tired by them. Many people discovered that the changes were not cost free; they refused to pay the price and wanted to return to an idealised past. They forgot, of course, that in those old, golden ages, life was harder, energy was scarce and many people could not afford to eat meat as it was too expensive when animals were not fed with meat. Many people discovered that the changes were not cost free; they refused to pay the price and wanted to return to an idealised past. They forgot, of course, that in those old, golden ages, life was harder, energy was scarce and many people could not afford to eat meat as it was too expensive when animals were not fed with grass.

In any event, it is true that research became less popular, with two possible exceptions – astronomy which makes people dream, and medical research because everyone is afraid of disease and death. As for industrial companies, they have to survive in a difficult competitive environment, and they feel that it is not so easy to make long-term investments when they know that they will have to overcome an increasing number of obstacles.

Data Paint a Difficult Picture

One can look quantitatively at the present status of jobs for PhDs. Owing to a normal reflex to see the data as if they describe a steady state, life may in fact be worse than it appears. I start with France, with which I am of course relatively familiar. The production of PhDs is of the order of 9000 to 10000 a year, and increasing (this includes social sciences and the humanities, but not medical PhDs who are not research PhDs). One in three
of these PhDs is awarded to foreigners, and one in two of these foreigners will return home and not enter the national job market. The number of positions to be found is thus between 7500 and 8000. The universities and the government laboratories offer every year a few more than 3000 positions; the industrial labs about 1000. A further 1000 take up positions in administration and secondary school teaching. So the deficit in the number of permanent positions required each year is somewhere between 2500 and 3000.

Data for other countries are not so very different, the annual production of PhDs being of the order of 45000 in the European Union, and 25000 in the United States, excluding humanities. The percentage unemployed in mid-1994 to early-1995 was as follows: Italy ('88-'92; 1st deg.): 13%; Holland ('79-'86; 1st deg. + PhD): 11%; Finland (90-95): 2.4%. On the positive side, one notes that the percentages of PhD graduates in Germany and the UK who did not find employment after 1 one year has finally started to decrease following a steady increase (see figure). The next issue of Europhysics News will give a full analysis.

**Physics Employment**

Data reported at a special symposium European Opportunities for Young Physicists: Status and Trends which was organized at the EPS-10 General Conference (Sevilla; 9-13 September 1996) by young physicists showed that the employment situation differs greatly between countries. For example, while the UK, Holland and Austria have stabilised the number of first degrees awarded annually, the number awarded in Germany has been increasing continuously (see figure). Second, for physicists who started studying within a given period, the percentages unemployed in mid-1994 to early-1995 were as follows: Italy ('88-'92; 1st deg.): 8%; Holland ('79-'86; 1st deg. + PhD): 13%; Finland (90-95): 2.4%.

**Adapt According to Reality**

One solution depends on the belief that only people who have an absolute need for such-and-such a level of qualification should be allowed to achieve this level. But this is a minimal position, and if things are changing, a lack of qualified people can develop. Another possibility is not to restrict the number of people admitted to a level, but to let them know that there is no guarantee of obtaining a job which is as qualified as they would maybe hope for. This can also create disappointment. In the case of PhDs in science, it means reducing the number of grants. But is this possible? Who will forbid a city council awarding a grant to some young, local, adequately intelligent student? There is in fact no way to escape an overproduction of qualified people, especially PhDs.

There is nothing inherently wrong with this, and many interesting engineering, business and managerial positions are waiting for PhDs, if they are prepared to conquer them. They have to appreciate the true state of the job market, and to adapt their hopes to what is realistic. Great Britain has organized for more than 20 years special weekly training sessions for PhD students to prepare them to make their living in industry; a similar scheme has been experimented with in France since 1994. In United States, where people are not afraid of drastic solutions, the report quoted above speaks of "non-research PhDs". They may be going too far, but in the right direction. The description of the present situation clearly shows that something must be done if one does not want the 50 year-olds who started out with Vannevar Bush's enthusiasm to finish by throwing out science, its products and scientists, especially the younger ones.