# Higher Education in Europe: The French Example

Vincent Courtillot

During the 1980s and now in the 1990s there has been a remarkable desire of young people to pursue an undergraduate and then a graduate education to which few had access previously. The number of students in the French university system reached 1 million about 1988. It is expected to be 1.5 million in 1995 and 1.8 million in the year 2000. Yet, support of higher education had not been a priority of previous governments; financing was essentially level. For instance, the number of scholarships for new graduate students awarded by the ministry of research remained constant at 1900 per year and the number of Ph.D.'s awarded annually fluctuated around 7000. Financing of academic research laboratories was also rather stagnant and the morale of academics was not too high.

In the course of the last 4 years, with Lionel Jospin as education minister and Claude Allègre as his special adviser for universities, the landscape has changed enormously. The entire system has been steadily renovated, with several actions still in progress. A significant effort has been undertaken to increase the autonomy of universities and to modernize their management, in particular through the signature of all-encompassing 4-year contracts. In order to welcome the new students and improve existing facilities, a 5-year plan, called "Université 2000," has been drafted and signed with local authorities (the governments of regions, "départements," and major cities). This 32-billion-franc plan includes the building of numerous extensions (including classrooms, libraries, and student housing) on existing campuses and of seven entirely new universities (four in the outskirts of Paris, two in the North, and one in the West at La Rochelle).

The 37,000 professors and *maîtres de conférences* (equivalent to U.S. assistant professors) are not enough to train the increasing numbers of students. Given the large numbers of professors due to retire in the coming decade, more than 1500 new *maîtres de conférences* must be, and are being since 1990, recruited each year. The need to train candidates for these positions and to train researchers for both private and public research laboratories has led to a doubling of Ph.D. scholarships for graduate students (from 1900 in 1988 to 3700 in 1992). These FFr89,000-per-year scholarships are offered for 3 years. In addition, a completely new system, the *monitorat d'initiation à l'enseignement supérieur*, has been established, in which the candidates for future professor positions needed in the system are being offered a bonus and are being trained through seminars in the functioning of universities, teaching, and working one's way through research grant applications, plus an introduction to European systems of higher education. The *moniteurs* also perform 2 hours per week as teaching assistants under the supervision of tutors. The monitors are offered FFr115,000 per year, also for a 3-year period, during which their main thrust is still to obtain their Ph.D.

**Table 1.** Ph.D.'s awarded to foreign and national students refer to total population in seven countries. Figures are rounded and may not refer exactly to the same year for each country (1985 to 1990 data). Numbers have remained rather steady during this period.

| Country | Total population | Number of Ph.D.'s | Number of Ph.D.'s* | Ph.D.'s awarded to foreigners (%) | Ph.D.'s awarded to nationals* |
|---|---|---|---|---|---|
| France | 56,000,000 | 7,700 | 140 | 41 | 82 |
| Germany | 61,000,000 | 7,700 | 126 | 7 | 117 |
| Japan | 122,000,000 | 3,600 | 30 | n.a. | n.a. |
| Netherlands | 15,000,000 | 1,200 | 80 | n.a. | n.a. |
| Spain | 39,000,000 | 2,900 | 74 | n.a. | n.a. |
| U.S. | 247,000,000 | 32,300 | 131 | 16 | 109 |
| U.K. | 57,000,000 | 7,700 | 135 | 35 | 88 |

*Per million inhabitants.

The morale of professors has hopefully been boosted by this new attention, and probably not least by the introduction of new bonuses for a number of tasks. Three bonuses have been created: one for those professors who engage for a period in the government of the university at a high level (believe it or not a university president would previously get only FFr1000 per month or $200! They now get FFr48,000 per year, which is more than 2-months' worth extra). The second one is for additional teaching: the legal requirement for a university professor in France is 124 hours per year. Those who do less research and accept to increase their yearly teaching load to 200 hours will get an extra FFr37,000 (in addition to payment of the extra hours themselves in proportion to the amount taught). Finally, a FFr30,000-per-year bonus is given to those who engage particularly actively in research and training of graduate students (the threshold being presently set at four papers published in international reviewed journals and two Ph.D.'s supervised and completed over the previous 4-year period). These three bonuses are awarded for a 4-year period and are renewable upon evaluation by committees of peers.

A final aspect of the program has been a complete reevaluation of the activities of academic research laboratories. An evalutation body (previously little developed) has been established with, at the top, a 25-member European scientific committee, chaired by Nobel laureate Jean-Marie Lehn and with half its membership non-French, evaluating major trends and general policy, and 28 groups of experts for the various fields of research, each group being about 15 members strong. External reviewers both in and outside France have also been involved. Over a period of 3 years, the 80 or so French universities and 60 institutes of higher education (including Collège de France, the four Ecoles Normales, the Paris Astronomical Observatory, the Institut de Physique du Globe, the Institut d'Etudes Politiques, and the Ecole des Hautes Etudes en Sciences Sociales among others) have been reviewed for the quality and productivity of their research and their thrust to train graduate students and produce Ph.D.'s. One thousand laboratories or teams have been funded in conjunction with the major research councils (CNRS, INSERM, and so forth), 1000 laboratories have been funded solely by the ministry of education, and 300 so-called "*jeunes équipes*" (young teams established around a newly appointed professor with particular promise) have been created. This complete reevaluation, from bottom up, has led to some surprises. Based on the quality of the evaluation and also on a judgment of the adequacy of the previous level of funding, 140 new 4-year research contracts have been signed with higher education institutions, ranging from −20% to +200% compared to the previous levels (complete accounts of the evaluation and funding have been and are being regularly published and are available from the author upon request).

Three major priorities have been set in

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order to correct for recognized inequalities: a boost has been given to the younger professors, to the humanities, and to the provincial universities. The total share of the humanities has been pushed from 15 to 25% of a budget that itself increased by more than 30% between 1989 and 1992. In much the same way, we have tried to correct for the historical concentration of funding in the capital city. It is a difficult problem to avoid, particularly in the humanities: Claude Allègre has called it the "law of inverse square distance from the Pantheon" since it seems that the only aim of certain professors is to end their career as close as possible to the Pantheon (even if not eventually being buried there—recall that the Pantheon is where our national heroes are buried). Parisian budgets have therefore been increased by 11%, whereas provincial ones were receiving a +18% boost. Another idea has been to create the Institut Universitaire de France (IUF) to which 15 senior and 25 junior members, outstanding professors from all fields, are appointed each year. They are awarded a special bonus for their research (FFr500,000 to be used over a 5-year period), are given a promotion, and are relieved from two-thirds of their teaching duties. In addition, the university in which they are elected gets a "free" additional full professor position in the same field, permanently. Only one condition: that the appointed IUF member remains for the 5-year period in the university in which he or she established his or her reputation. Moving from the province to Paris, which often in the past has led to the death of lively teams in provincial universities, would cause one to lose membership. Creating the IUF is a clear message that one can address both quantity and quality in renovating and promoting graduate studies and academic research.

Remaining problems lie with student and professor mobility at all scales (within France, within Europe, and outside of it). Mobility is traditionally and unfortunately low within France. In 1988, out of 2000 recruitments or advancements, only 10% occurred with a change in university! In 1992, 5000 recruitments or advancements will take place and there are indications that mobility has increased quite significantly. European programs such as ERASMUS and now Human Capital and Mobility should encourage the flow of students and academics. It is interesting to note differences in the relative numbers of Ph.D.'s awarded to national and foreign students by several countries (see Table 1). France and the United Kingdom appear to produce much larger relative numbers of "foreign" Ph.D.'s than the United States and Germany. As far as postdocs are concerned, a small program has been launched under which 150 positions are offered to students from OECD countries coming for 1-year stays in French laboratories. Several countries have already indicated their interest and willingness to reciprocate (first Australia, now possibly the United Kingdom and the United States). This program comes in addition to others jointly funded with the ministry of foreign affairs and the ministry of research and technology aimed among others at African countries, and also at the new Eastern and Central European countries.

Academic leaders in many Western European countries seem to share the same concerns: shortages in certain areas of research considered to be of strategic importance and a need to ensure flows of innovation into industry and to improve efficiency in training graduates. What has been achieved in France has been based on the recognition by the highest authorities that education and research are the topmost priorities and the basis for any investment toward the future (particularly for a country with no large natural resources). This priority has held for 4 years during which the total budget of the ministry of education has increased by more than 50%. It has involved the buildup of a new, largely international evaluation scheme: this harsh evaluation was not always easily swallowed at first but is now steadily gaining acceptance. Another asset has been the will to accept making choices and to largely redirect financing, rather than following a more traditional policy of marginal evolution (where one thinks that a 1% change in trend or budget is a great achievement). However the future of this renovation rests on very stringent conditions: a steady continuation of efforts during this whole decade and an opening to European countries, which are expected to eventually follow the same trend. Should these not be met, France could easily find itself beginning the 21st century a loser in the race toward the future.

# Genome Research in Europe

Sir Walter Bodmer

The idea that polymorphic genetic markers and linkage analysis could be used to study human diseases goes back to J. B. S. Haldane and R. A. Fisher in the 1920s and 1930s. The development of recombinant DNA technology and of increasingly powerful techniques for long-range physical analysis of DNA has made it possible to clone genes for phenotypically defined human variation simply from a knowledge of their map position and so to elucidate the functional defect of many diseases. All this requires the availability of polymorphic markers spaced throughout the genome at a high density and physical maps that show the locations of the functionally expressed genes and their sequences. The aim of the Human Genome Project is to provide this resource as a basis for the elucidation, and eventual prevention and cure, of human diseases. The same approach applies to the study of normal human variation and to the analysis of variation in other organisms of economic or fundamental interest. But the major impetus for all genome projects is undoubtedly the drive to understand the human organism.

The Human Genome Project is too large for any one laboratory, funding agency, or country sensibly to undertake on its own. Furthermore, the information it will provide is a common good that should not be the property of any one organization, however large. The wide availability of the materials and resources needed for human genome analysis provides the opportunity for many scientific groups worldwide to participate in the project.

Collaboration works best when those involved see that they are going to get at least as much out as they put in. Participants, whether laboratories, whole countries, or even regions such as Europe, must be convinced that working together for the common cause is more efficient than going it alone, competitively, and without coordination. Collaboration also works best when the partners are well balanced in terms of their respective contributions to the overall project. For all these reasons, I believe it to be essential that Europe develop a coordinated genome program that can be an effective partner to the ones developing in the United States and in Japan and elsewhere. For the European contribution to be effective, I believe that each country should have a well-developed program of its own, both as a basis for participating in international collaboration and in order to exploit genome

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