

**"Ecole Polytechnique Féminine, an international engineering school
for women in France"**

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Ladies and Gentlemen,

On January 1, 1993, Europe will be united economically, and this unification will necessarily lead to the harmonization of education. Europe is lacking in engineers at every level, but especially engineers capable of working anywhere in Europe, in Germany and France as well as Greece, Hungary, and soon, Russia. Compared with Americans, who have few problems adapting to the different lifestyles of Massachusetts, California and Florida, for instance, the European student must begin at an early age if he wishes to overcome language barriers as well as social and cultural differences, and be competitive in the unified Europe of tomorrow.

The Community Programs of Brussels, which are more and more accessible to European participation, serve as a kickoff for multicultural education, for linguistic, cultural and economic exchange, bringing countries closer to one another through better understanding among individuals.

Within this process women engineers will certainly have their role to play. Although career and salary inequalities have not yet been completely abolished, European women will certainly have their say. Naturally more adaptable, gracious, communicative and open, they can convert more easily to a multicultural environment. They will not feel they are lowering themselves when speaking the other party's language, and they will tend to turn to their advantage a situation requiring a larger proportion of intuition.

In Europe today, women are either quite emancipated or still quite subordinated to men. And, curiously, it is not in the countries where one would expect to find the most women engineers that they are to be found. For example, German women rarely reach high positions, as they must stay at home to look after their children, who are not given lunch at school, and have no classes in the afternoon. By the time their children have reached a more independent age their mothers have been left behind in the race for key positions, since they lack experience and up-to-date training. This leaves the field open to a minority of unmarried women and widows, and the exceptional superwoman, who succeeds brilliantly in her career while filling the role of model wife and mother, and even finding the time to play sports and have her hair done! Admirable, but rare, especially in the long run.

Let us get back, then to higher education in Europe. If we were to study the differences among countries in detail, we would need an entire WEPAN conference to do it, so I will try to situate rapidly engineering studies in Europe, then describe those in France with the example of EPF. I will then present the educational programs of Brussels and the possible exchanges with North America, again with EPF as an example.

THE EUROPEAN LANDSCAPE

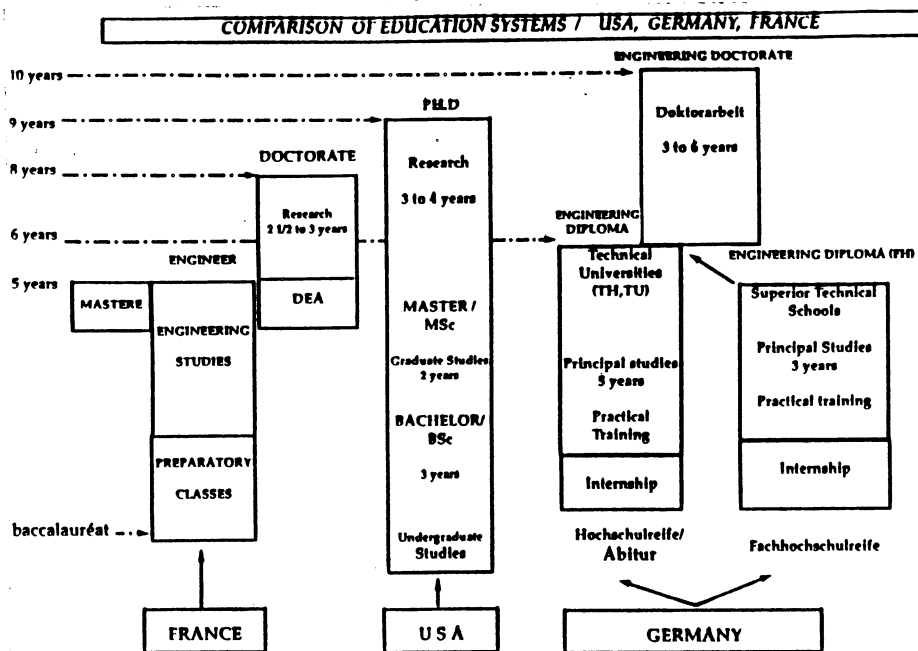
For a start, two levels of education can be observed practically everywhere: the 5 to 6 year curriculum and the 3 to 4 year one. The former is more of a preparation for top management, teaching and research, but the later very often can lead to further studies, at least in another European country if not in one's own.

It is useful to know that internships in industry are extremely important. Universities in Eastern European countries which, for political and economic reasons, cannot yet participate fully with industry, are concerned, and are counting on industrial internships in other countries. A few countries do not include the internship in their curriculum and require additional experience in industry after the diploma, before conferring the title of engineer. The time spent in industry is always paid, and allows the student to acquire real job experience without too much commitment, in career terms, from either the student or the company. Students on internships can work as semi-skilled workers, student engineers, or graduating engineers who, after completing their final project in a company, are immediately employed by it. This is often the case in Germany and France.

Companies have become more and more accustomed to accepting foreign students for training. They can thus become more informed about mentalities and methods of working in other countries and also create a network of relationships with their future European partners.

SCIENTIFIC EDUCATION IN FRANCE

Slide : Comparison of Education Systems



As you can see, there is not much difference in the length of engineering education in France, Germany and the U.S., considering individual variations among students within the same country. For instance, it is true that a German Doctor Engineer is 30 years old when he begins his career, and must begin at the bottom of the ladder, whereas his French counterpart has already been employed for two years and began his career at a higher level in the company. This difference can explain why there is a shortage of production engineers in France.

Attempts are being made to fill this gap by creating two new types of professional schools, the IUP and ITII, which represent a more technical education, and include extensive industrial experience - one third of the studies for IUP's and two academic years for ITII's, in alternation with the studies.

Engineering students begin their preparation with two years of intensive math before the Baccalauréat. Only students who have obtained the scientific Baccalauréat are allowed to apply for the Grandes Ecoles engineering schools, which graduate the elite in France. They must pass a competitive entrance exam either immediately after the Baccalauréat or two years later, after special preparatory classes for the Grandes Ecoles. Once they are admitted, they receive more academic education. They receive practical training only through internships or - at the end of their studies - research. The fifth and last year of study, leading to the Engineering Diploma, the equivalent of the MScE, can be used to begin Phd studies. To sum up, the French system differs in the following ways:

- an education that is more theoretical than practical,
- access to the position of manager at a very young age,
- less importance attached to a Doctorate in Engineering than to the school one has graduated from.

EPF - why a women's school? There is an historical reason for this. In the first half of the century women did not have the right to enter engineering schools in France. That is why, in opposition to Ecole Polytechnique, a military school, EPF was founded in 1925 by a woman engineer. Now, thanks to the creation of the EPF Foundation, parallel to our regular student body, which is still resolutely female, the school is completely coeducational at the international level, and accepts foreign male as well as female students on an equal basis.

Moreover, in the future, the school will doubtless become more and more international. As I already mentioned, women engineers are more flexible and less afraid than men of crossing language and cultural barriers. They are ready to embrace international careers. Practically all our students, provided their grades are good enough, spend a good part of their studies abroad, in university or industry.

THE INTERNATIONAL PROGRAMS

As you know, the European Community has launched several programs to help in the construction of Europe. As my time is limited I will not speak to you of research programs, but only of educational programs, which are meant to foster student and faculty mobility.

Slide : EPF : International Programs : Europe (see following page)

The three large programs are ERASMUS, COMETT and TEMPUS. The commissions decide on certain sums of money to be spent by universities (in the case of COMETT it can be by companies) who compete intensively for these funds by presenting projects that come as close as possible to the requirements set by Brussels.

In the framework of these programs, our school has proposed three major projects. The oldest one is NETS, which allows students from about twenty European schools to receive scholarships for internships that are integrated in their studies.

The program which has been followed by our ERASMUS program, is called ENC - Euronational Certificate. It consists in a qualification which has been developed by a total of 12 different institutions of Higher Education within the European Community and is now open to new member universities which satisfy the entrance criteria.

The TEMPUS program opens Western Europe to Eastern Europe, and our MECC project



INTERNATIONAL PROGRAMS

EUROPE

ERASMUS

(European Community Action Scheme for the Mobility of University Students)

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EURO-NATIONAL CERTIFICATE

=> "ENC"

TEMPUS

(Trans-European Mobility Scheme for University Studies)

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MEASUREMENT-MICROELECTRONICS-CHIP DESIGN- COMPUTER SCIENCE COLLABORATION

=> "MECC"

COMETT

(Community Exchange Program for Training and Technology)

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NETWORK FOR THE EXCHANGE OF TECHNOLOGICAL STUDENTS

=> "NETS"

consists of several parts:

- 1) a regional mobility program, the MECC MOB, which specifically involves mobility of students, professors and staff. It allows people at every level to get acquainted, visit new universities, learn by training, etc.
- 2) the different national programs, which will help to restructure university labs or set up new courses. One program is dedicated to Czechoslovakia, one to Slovenia and one to the Baltic states.

The purpose of the program is not only to link universities, but to establish contacts with industry. It is not limited to the European Community. Stockholm's Technical University and the University of Cincinnati are partners, and we hope to do good work together.

This American university, our latest American partner, leads me to talk about our programs with the United States. We have bilateral programs which range from a few months of practical training in laboratories, or occasionally in companies, supervised by the host university, to a double degree, which is to say, a master's simultaneously with the EPF diploma.

Slide : EPF : International Programs : United States (see following page)

We have exchange programs with many universities, but one of the most attractive one resulted from the internship of an EPF student at NASA, obtained by Texas A&M University. Our student had done excellent work there, and the USRA (University Space Research Advanced Design Program Association) invited the school to participate in their annual meeting. Today, two teams of EPF students are working with two teams of American students, one from Ohio State University, the other from UCLA, on a common aeronautical program which seven of our students will be proud to present at the 8th Annual Summer Conference, from June 15 to June 19, hosted this time at the NASA Headquarters in Washington.

As you can see, we are fortunate in having friendly relations with many American universities. Unfortunately it is much more difficult to find partners in American industry - companies that would be prepared to accept our students for training periods. You know now that European companies are very open to this kind of practical training, and would be quite ready to receive your students. Problems caused by language difficulties and cultural shock can be overcome with joint preparation between the partner universities on each side of the Atlantic. We have been trying for two years to set up a program called AE3. This program has had a good start on the European side, but it is very difficult to find partners in American industry who would be aware of the benefits of accepting European students who would return to their home countries to finish their studies. For one thing, American students would receive training in Europe at the same time, and would come back with a knowledge of European industry, would know how to do business with Europeans since they would have become familiar with their way of living and working. On the other hand, the European students sponsored by American universities would return home to become special partners of the companies in which they discovered the American way of life and work.

This program is getting a very slow start. But when we think international, we must be prepared to be patient. In 1984, when I came to the States for the first time, I was welcomed everywhere with great kindness. However, in many American universities, people found it difficult to understand that High Tech was also taught in European universities, and when I explained to them that in addition to being high level engineers we were women, they fell over backwards!

Eight years later, everything has changed. We are receiving more and more requests from students, and we believe the time has really come to formalize our agreements in order to allow the American universities to control the quality of their exchange programs, by selecting and preparing their students and professors who, alone, can guarantee a really successful cooperation.

Thank you for your attention.

Dr. Gertud Humily

Director, International Affairs



INTERNATIONAL PROGRAMS

UNITED STATES

BILATERAL AGREEMENTS

**STUDENTS EXCHANGE
FOR INTERNSHIP OR STUDY PERIODS
IN AMERICAN UNIVERSITIES**

PARTICULAR PROGRAMS

USRA

(University Space Research Association)

ADVANCED DESIGN PROGRAM

(With the Universities of Ohio and Los Angeles)

AE3

(American-European Engineering Exchange Program)