2ND EUROPEAN MEETING OF THE FACULTIES, SCHOOLS AND INSTITUTES OF PHARMACY

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PROCEEDINGS OF THE MEETING

SEPTEMBER 27th - 28th 1994

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BERLIN Humboldt University

Pr. P. BOURLIOUX

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PROGRAMME

SEPTEMBER 27th 1994

14h
- Introduction to the Meeting
- Information about the Association (P. BOURLIOUX)

14h30 - 16h - GENERAL ASSEMBLY OF THE ASSOCIATION

- President's Address (C. SOULEAU)
- Financial Report (P. BOURLIOUX)
- Election of the Executive Committee
- Discussion about the role and the actions of the Association

16h - 16h30 - COFFEE BREAK

16h30 -18h30 - SESSION I - Chairmen : Pr C. SOULEAU - Pr L. PAALZOW

"COMPUTER AIDED LEARNING"

16h 30 - 17h00	Plenary lecture : Dr. Stephen MOSS (U.K.)
17h 00 - 17h15	Presentation of a powerful CAL on CD-ROM about phytotherapy. Pr M. PARIS (France)
17h 15 - 17h30	Computer-aided visualization of pharmacokinetic concepts. Pr SUVERKRUP (Germany)
17h 30 - 17h45	Communication from KUOPIO (Finland)
Until 18h 30	DISCUSSION

20h 30 - COCKTAIL BUFFET

SEPTEMBER 28th 1994

9h - 11h - SESSION II - Chairmen : Pr W. GLOMBITZA Pr B. CASTILLO GARCIA

"EVALUATION AND COMPARISON OF EDUCATION AND TRAINING IN EUROPEAN FACULTIES OF PHARMACY"

9h - 9h30	Comparison of the curricula in the 12 countries of the EEC Pr AHLGRIMM (Germany)
9h 30 - 10h 00	Comparison of the curricula in the other European countries Pr BOURLIOUX (France)
10h 00 - 10h40	GENERAL DISCUSSION - CONCLUSIONS AND RECOMMANDATIONS

10h40 - 11h COFFEE BREAK

11h - 15h00 - SESSION III - Chairmen : Pr A.T. FLORENCE Pr O. SANTOS FEREIRA

"ERASMUS PROGRAMME IN PHARMACY = EVALUATION OF THE I.C.P."

11h-12h30 - Presentation by the Scientific Committee

11h 00 - 11h 15	General Introduction - Conclusions and recommendations of Erasmus Meeting concerning ICP in Sciences Pr L. Della CORTE (Italy)
11h 15 - 11h 30	Evaluation of Students Mobility in Pharmaceutical ICP Pr A.P. DaCUNHA (Portugal)
11h 30 - 11h 45	Evaluation of Teaching Staff Mobility in Pharmaceutical ICP - Pr P. MACHERAS (Greece)
11h 45 - 12h	Evaluation of Intensive programme in Pharmaceutical ICP - Pr F. PUISIEUX (France)
12h 00 - 12h 15	Topics developped in Pharmaceutical ICP. Pr A.H.P. PAES (The Netherlands)
12h 15 - 12h 45	How introduce credit system in Pharmaceutical Education The E.C.S.T - Pr J. BONNET (France)

12h 45 - 14h LUNCH

14h - 15h 00 ROUND TABLE ON ICP EVALUATION AND RECOMMENDATIONS

15h 00 -16h - SESSION IV Chairman : Pr Ch. SOULEAU

15h 00 - 15h 20	Presentation of SOCRATES Programme
15h 20 - 16h 00	Discussion

16h 00 - 16h 20 COFFEE BREAK

16h 20- 18h 20 SESSION V - Chairmen Pr V. TORTORELLA - Pr D. BREIMER

ROUND TABLE : FUTURE PROSPECTS FOR EUROPEAN EDUCATION AND TRAINING AND IMPACT ON PHARMACEUTICAL PROFESSION

Participants

- Pr H.J. De JONG	Industrial Pharmacy (N.L..)
- Dr C. CARNEIRO	Community Pharmacy (Portugal)
- Dr T. DELANEY	Hospital Pharmacy (Ireland)
- Mrs I VEYRON-CHURLET	European Students Association (France)
- Pr M. RASMUSSEN	Prospects in Postgraduate training in Europe (Denmark)

18h 20 CONCLUSIONS

"GENERAL ASSEMBLY OF THE ASSOCIATION"

1 - GENERAL INFORMATION (P. BOURLIOUX)

Dear Colleagues,

First of all, thanks to all of you for your participation in our 2nd European Meeting, in such a very pleasant place

Special thanks must be expressed

- to HUMBOLDT University which welcomes us
- to the Erasmus Task Force for its participation and financial support and specially Mrs VERLI for her confidence in our Association.
- to the French Ministry of National Education and Research for its financial help.
- to the Council of Europe which has covered the travel and hotel expenses of some European Eastern participants.
- to the Robert Bosch Foundation for its financial help to some other Eastern European colleagues.
- to the EUFEPS organizing committee, especially its president : Pr. MUTSCHLER.
- to the EUFEPS local organization and particularly Pr. SCHUNAK, Pr. STEINBACK, Dr. LANGNER and Mrs MORSCHNER.
- to Pr. GLOMBITZA for his great help.

I would like now, to give you some information about our Association which was created in November 1992.

The statutes which were elaborated in October 1992 have been studied and discussed by the Temporary Executive committee (T.E.C.) and will be submitted for your vote in a moment.

The T.E.C. worked in June 1993 and April 1994 in order to prepare the 2nd European Meeting which is closely linked to the ERASMUS programme.

As you have seen , we have created a Journal named "EURO PHARMA INFO NEWS" which must be the link between us, but it can only be a link if everyone participates. So, as we shall discuss it in a moment, we sincerely wish that this journal be a really European Journal. Currently, we have received the list of Professors of the main European Faculties and we have a listing of 2500 names.

This publication costs a lot of money and we need the adhesion of all the faculties of Pharmacy. Currently, in 1994, 40 faculties only have paid their membership fee . We hope that in 1995, we shall have 80 and in 1996, 120 of the 145 existing faculties in Europe.

The secretarial tasks of the Association are entirely undertaken by the faculty of Pharmacy of Chatenay-Malabry and I would like thank Pr. SOULEAU for his help and Mrs DENONFOUX-FOURRET (secretary) and Mrs MIDOL-MONNET (Pharmacology) for their great help.

I think that much other information will be given now by our President and after his address by myself with the financial report.

Thanks to all of you for your participation.

I think that much other information will be given now by our President and after his address by myself with the financial report.

Thanks to all of you for your participation.

2 - PRESIDENT'S ADDRESS (Ch. SOULEAU)

Dear colleagues, dear friends, ladies and gentlemen, I am very pleased to be here in Berlin today with the representatives and leaders of the European Pharmacy Faculties, Pharmacy Institutes and Schools of Pharmacy.

I would first of all like to thank Humboldt University for hosting our second European Meeting and for the warm welcome they have extended to us today.

It is a great honor for me to introduce the theme of today's conference : EDUCATION AND TRAINING IN PHARMACY IN EUROPE.

All of us, present today, come from the far corners of Europe and you are, I am sure, as aware as I am, of the important role of Berlin as the capital of the re-unified Germany.

I am delighted that the creation of our European Association two years ago in France at my Faculty in Châtenay-Malabry has led to this second meeting which I consider as a proof that our Association is very much alive.

I am sure that you will join with me in expressing my grateful thanks to my colleague Pierre BOURLIOUX who has been the right man for the right job, for these last two years, and who has put a great deal of time and effort into the success of our enterprise.

What exactly has he, along with the members of the first committee : Prof. BREIMER from the Netherlands, CASTILLO from Spain, FLORENCE from the U.K., GLOMBITZA from Germany, SANTOS FERREIRA from Portugal, TORTORELLA from Italy, PAALZOW from Roumania and myself from France... achieved ?

Well, what exactly have we achieved ?

I think that I would say that our main achievement is most certainly that our organization has gained the recognition of some of the Ministries of Higher Education, this is the case for France.

We have further gained the recognition of the European Commission and of the Council of Europe.

Each of us in his own country must strive to improve this recognition since our aim is to become an organization which, as a body, is capable of helping in the national decision making process of each country with regard to the national educational programmes. Our role should also be to see these decisions through, to see the changes come into effect, for all European countries alike.

This will not be an easy task since our countries have different pharmaceutical cultures, have different economic levels, have different health care systems and this especially in economic terms could prove to be a stumbling block.
It is nevertheless an urgent and an important task, not only for the existence of our individual institutions, but perhaps first and foremost to improve the practice of pharmacy in Europe, with the best Medicines, supplied in the best conditions, at the right price (which is not necessarily the cheapest) in view to giving the best public and individual health care to the citizens of Europe.

You must be as aware as I am, that our governments do not share the same view as to the role and the function of the pharmacist in their country.

We are here today to demonstrate, to prove to them, that we can afford excellence in our national health care system ; excellence achieved through top quality education provided by our faculties with, of course, the necessary financial support, the necessary grants to achieve these aims.

This is precisely the topic of our meeting here today.

With this in mind, during our last two executive committee meetings in Paris we have tried to establish a certain number of key contacts.

Firstly, we have established contacts between the educational institutions which teach pharmacy throughout Europe.

We number a total of one hundred and forty and some thirty of us have already paid their membership fees to the association.

A little later on Pierre BOURLIOUX will again raise the very important question of money and association funds.

I do believe that the publication last June of our newsletter "Europharma Info News" was perhaps our first step towards the creation of a strong bond between us.

I trust that you received your copy and that you will come forward with some suggestions for improvement.

So I now come to my **second** point : to establish contact with **the European Union** in Brussels. I am sure that many of you have already established links through this channel and have taken part in such programmes as Tempus, Erasmus, Task Force and will take part in the soon to be launched Socrates programme.

Tomorrow we shall be spending a whole session on I.C.P. programmes in pharmacy.

This brings me to my third point :

The Council of Europe

I represented the association in my discussions with Marie Jose GOMEZ GASCON who is responsible for Pharmaceutical questions at the Council last April in Dordrecht.

The Council of Europe is a much larger organization representing the European Countries than is the European Union and it is, as far as we are concerned, a very important forum because its chief goal is the discussion of ethical issues, as opposed to the European Union, which is mainly concerned with economic issues.

This brings my speech to an end so I trust that you are now ready to listen to Pierre BOURLIOUX's financial report and to elect the new executive committee.

I hope that this new committee will be as united, as efficient and as pleasant to work with as has been the outgoing committee.

I trust that the quality of my English has not been too much of a handicap for you to understand the main points I wanted to make about our association.

I renew my thanks to the organizers, to the European and National authorities who have made this meeting financially possible.

So finally, I wish you all, two fruitful days of discussion in Berlin in the hope of making our faculties, our pharmacy schools ever more efficient and ever more credible in the eyes of our respective National Education and Health Authorities.

3 - FINANCIAL REPORT 1993 (P. BOURLIOUX)

According to the statutes of the Association, the financial report must be approved by the General Assembly. On December 31st 1992, the credit from the 1st European Meeting was transferred to the account of the European Association (140.177,88 FF). During 1993, only 10 faculties have paid their adhesion to the Association (23 . 170,62 FF) and a grant from INSERM (French Institute for Health and Medicinal Research) has been obtained (10 . 000 FF) The expenses for 1993 correspond to the edition of the proceedings of the 1st Meeting, to the organization of the meeting of the executive committee and computer equipment. **The financial balance presented below is approved by the General Assembly by 29 YES votes out of the 29 Faculties present or represented (having paid their adhesion to the Association)**

For 1994, 40 adhesions are expected. The organization of the 2nd meeting will be financed, largely by ERASMUS Task Force and also by the French Ministry of National Education. The planned expenses concern mainly the meeting of the executive committee, the edition of the Journal "Euro Pharma Info News" and the 2nd European Meeting of the faculties of Pharmacy.

INCOMINGS

COMPTE BANCAIRE AU 31.12.92	140 .177. 88
SUBVENTION INSERM	10 .000 . 00
ADHESION 1993	23 .170 . 52
TOTAL	**173 .348 . 50**

OUTGOINGS

COMPTE BANCAIRE AU 31.12.93	75 . 446 . 58
EQUIPEMENT INFORMATIQUE	35 . 734 . 18
PROCEEDINGS DU CONGRES	17 . 785 . 00
DEPLACEMENTS ET REUNIONS DU COMITE EXECUTIF	41 . 907 . 17
FRAIS DE BANQUE ET DIVERS	1 . 012 .57
TOTAL	**173 . 348 . 50**

4 - STATUTES OF THE ASSOCIATION

The new statutes of the Association proposed by the T.E.C. and published in the first issue of Euro Pharma Info News is submitted to the vote of the General Assembly

Two modifications are introduced

- the number of members of the executive committee is 11 instead of 10

- to be a member of the Executive Committee, it is necessary to be in activity (not retired).

These modifications are voted by 29 YES out of the 29 Faculties present or represented (having paid their adhesion to the Association).

The new statutes will be transmitted to the Prefecture of Antony for regularization.

5 - ELECTION OF THE EXECUTIVE COMMITTEE

The Secretary of the Association has received 29 responses for the elections of the Executive Committee. The members of the TEC were all candidates to the elections and three other colleagues (Pr. RACZ - Budapest, Pr. JANSSEN - Utrecht, Pr. HINCAL - Ankara) were also candidate.

The results of the ballot are the following one

P. BOURLIOUX	28 = Elected
Ch. SOULEAU	21 = Elected
D. BREIMER	27 = Elected
B. CASTILLO-GARCIA	29 = Elected
A.T. FLORENCE	29 = Elected
W. GLOMBITZA	29 = Elected
M. COTRAU	22 Retired
L. PAALZOW	29 = Elected
O. SANTOS-FERREIRA	29 = Elected
V. TORTORELLA	28 = Elected
Pr. RACZ	20 = Elected
Pr. JANSSEN	10
Pr. HINCAL	18 = Elected

As Pr. COTRAU is retired, he cannot be a member of the executive committee. So 2 new members are elected Pr. RACZ and Pr. HINCAL who will represent the eastern part of Europe.

6 - DISCUSSION ABOUT THE ROLE AND THE ACTIONS OF THE ASSOCIATION

6.1. - Relations with the other European Pharmaceutical Associations

It exists many other European Pharmaceutical Associations and as they have all the same objective (the defence of the profession). Pr. BOURLIOUX suggests that our Association could contact their president and appeals to him to send an observer to our meetings in order to know what we could do communaly. After a good discussion, it is proposed that Pr. Bourlioux contacts the following Associations.

- European Association of Hospital Pharmacists
- European Association of Students
- European Association of Pharmaceutical Industry
- European Association of Clinical Pharmacy
- European Association of Community Pharmacy.

in order to propose the presence of observers to our meeting. Concerning EUFEPS, and after discussion with Pr. BREIMER it is decided that our Association does not need to be a member but must remain an observer. Pr. BREIMER as member of the executive committee and as future président of EUFEPS can be the link between the two societies.

6.2. - Edition of Euro Pharma Info News and Advertising

- Concerning the name of our Journal, it is proposed by Pr. BREIMER a new name

"Euro Pharma Faculties News"

which is more precise that the previous one since it indicates that it concerns the news from our faculties. This proposition is accepted unanimously.

- The first issue of the Journal has been sent to 2500 persons either personnaly (if the Association had the names and addresses of the professors) or globaly to the dean if the Association only had the dean's address. The faculties which have not send to the General Secretary the names and address of the professors, will receive 15 to 20 issues devoted to the interested persons of the faculty.

- The second issue which will contain the minutes of the General Assembly and the voted statutes will be sent before the end of the year, to more than 3000 persons. We need the help of every one for proposing interesting articles concerning the life in our faculties. They can concern all subjects related to Education and Training, Research, Industry, Hospital Pharmacy, Clinical Pharmacy, Community Pharmacy, Announcement of congress, Announcement of positions, Research of Collaborations, Students exchanges etc...

- Such a journal is expensive and we need in a first step to send it to every professor in order to stimulate the European idea in our faculties but after a time, it will be sent only to the faculties which have paid their fees to the Association.

- The Association has been contacted for advertising in our Journal. Currently we need, first, to know how it will be feeled and accepted by our community. If it is necessary, we shall have recourse to advertising in a second step.

6.3. - Participation in the meetings of the Council of Europe about Pharmaceutical questions

Our Association has been invited to the meeting of Dordrecht organized by the Council of Europe about pharmaceutical questions in April 1994. The President Ch. SOULEAU was present as an observer and the main conclusions and reecommandations will be presented in the second issue of Euro Pharma Faculties News.

6.4. - Mailing of the documents

The Association disposes of two lists of names and addresses.

- One corresponding to the Faculties, Schools and Institutes of Pharmacy (about 140 names and addresses).

- One corresponding to the names and addresses of 2500 Professors of the Faculties, Schools and Institutes of Pharmacy.

- These files will be used for sending the administrative mail and the journal respectively.

6.5. - Location of the next meeting

It had been decided previously that it was difficult to organize a meeting every year. However, as funds have been requested to TEMPUS programme for an European Meeting with the Eastern countries, it could be possible to organize the 3rd European Meeting in April-May in Eastern Europe if funds are obtained from TEMPUS. Pr. RACZ from HUNGARY proposed Budapest as location for such meeting which could be devoted to the needs of Eastern Countries in Education and Training and in Research in Pharmacy. Pr. BOJITA from

ROUMANIA proposed Cluj-Napoca. Between these two propositions, the executive committee will decide according to the decision of TEMPUS. In the case of negative response we could propose that the next meeting of the General Assembly will take place in Budapest on May at the same time of the 7th International Conference on Pharmaceutical Technology, and that the next European Meeting will take place somewhere in Europe en 1996 according to the decision of the executive committee.

SESSION I

Chairmen: Pr C. SOULEAU & Pr L. PAALZOW

"COMPUTER AIDED LEARNING"

Communications from:

- Dr. S. MOSS (U.K.)
- Pr. M. PARIS (France)
- Pr. SUVERKRUP (Germany)
- Dr. E. MAC DONALD (Finland)

Courseware for teaching Pharmaceutical Sciences -- Pharmacy consortium for Computer Aided Learning (PCCAL)

School of Pharmacy and Pharmacology
The University of Bath
BA2 7AY

Keith Brown
Steven Moss
Peter Redfern

The Pharmacy Consortium for Computer Aided Learning (PCCAL) is developing a range of courseware that is intended for use as a teaching tool in all undergraduate pharmacy degree courses in the UK. The principal objective is to exploit the technological advantages of Computer Aided Learning (CAL), so that teaching can be made more efficient and so that students will have increased access to learning resources. Although the scope of the project primarily encompasses pharmacy undergraduate courses, the multi-disciplinary nature of pharmacy means that the learning materials are relevant to teaching in areas related to the pharmaceutical sciences: For example, some PCCAL courseware packages are already starting to appear in Schools of Medicine, Biology and Pharmacology.

The benefits of using CAL in pharmaceutical science degree courses include the release of staff time (in particular during the first year of degree courses), and the increased availability of learning resources to students. This will enable undergraduates to learn at their own pace, in their own time and at a rate that is appropriate to their educational needs.

Since the start of the project in January 1993, the consortium has completed over 20 packages comprising 200 courseware modules, representing an estimated 80 hours teaching time. The packages are developed to run under Microsoft 'Windows' using PC clones with a minimum configuration of a 386SX processor, 2MB RAM and 16 colours. They can also be networked. The Packages are already being timetabled and used in pharmacy degree courses, and evaluation results are encouraging. It is anticipated that the use of CAL will become increasingly popular as more packages become available and as the educational benefits are realised by academics and students.

PCCAL is a 3 year project funded under the Teaching and Learning Technology Programme (TLTP) of the Higher Education Funding Council for England (HEFCE). The project involves all UK Schools of Pharmacy (Fig 1.), and has the full support of the professional body - the Royal Pharmaceutical Society of Great Britain. There are currently 9 Courseware Authors across the Consortium, supported by the Project Manager based at the co-ordinating centre in the University of Bath.

Fig 1. Overview of the Pharmacy Consortium

Project Objectives

The PCCAL project aims to assist and improve teaching in Schools of Pharmacy in the UK by making available to lecturers flexible Computer Aided Learning resources.

The CAL materials are being created using Authorware Professional for Windows as the primary authoring package. All areas of the pharmacy curriculum will be covered. Particular emphasis is being placed on:

- Remedial CAL programs for the reinforcement of first year lectures, aiming to even out differences in knowledge and understanding of first year students
- Courseware supporting aspects of pharmaceutical science which have a numerical content, and which can be used as aids in tutorial or workshop classes.
- Simulations of laboratory and practical experiments which are at present restricted on financial, practical or ethical grounds.
- Learning materials relating to professional aspects of Pharmacy, covering areas such as Pharmacy law and ethics, prescription validation and drug information retrieval.

It is expected that the project will bring about substantial benefits including the replacement of remedial first year lectures, and increasing the efficiency of teaching of topics which have hitherto made heavy demands on staff time. Additionally, computer simulations will enable cost effective learning together with the ethical benefits of a reduction in animal experimentation.

Design Philosophy

To achieve the degree of flexibility needed for re-usable courseware, it was necessary to establish guidelines in the earliest stages of the project. The PCCAL guidelines for CAL materials cover aspects such as the software life cycle, assessment templates, courseware house-style and structure, and development recommendations. These guidelines impart a number of benefits, the most important being the provision of a consistent and familiar user-interface for students.

The underlying strategy of developing flexible courseware is that the learning materials are prepared in modules called 'Activities', and that these are combined into a simple standardised navigational structure referred to as a 'Package'. Each Activity consists of a re-usable courseware file which is created as an independent module, and is not reliant on the presence of other Activities. The development work of the consortium is such that *default* packages are created and delivered. Once delivered it is possible for the activities contained within these packages to be taken out of the default context and reused by academics as required. Thus the process facilitates access of academic staff to CAL without dictating the way in which the CAL activities are used. An example of a package structure is shown in figure 2.

The house-style is illustrated in figure 3. This provides a standard means of navigation together with other standard facilities. The house-style is available to PCCAL authors as a template and reduces the time taken to create each program, in addition to ensuring a consistent user-interface. Features include a menu-bar with typical 'Windows' facilities, e.g. cut and paste, notepad etc, and the lower part of the screen with navigation arrows, map and a glossary.

The aim of the consortium is to produce a range of free-standing packages that can be used by individual academics as required. Thus, activities from the same package are being used in different ways at the various schools in the consortium. For example, this includes using the software (i) as the basis for small-group tutorial work, (ii) as the basis of formal workshops, or (iii) incorporating the activities into lectures. In this way, it is hoped that the benefits of CAL will quickly become apparent to academic staff and students.

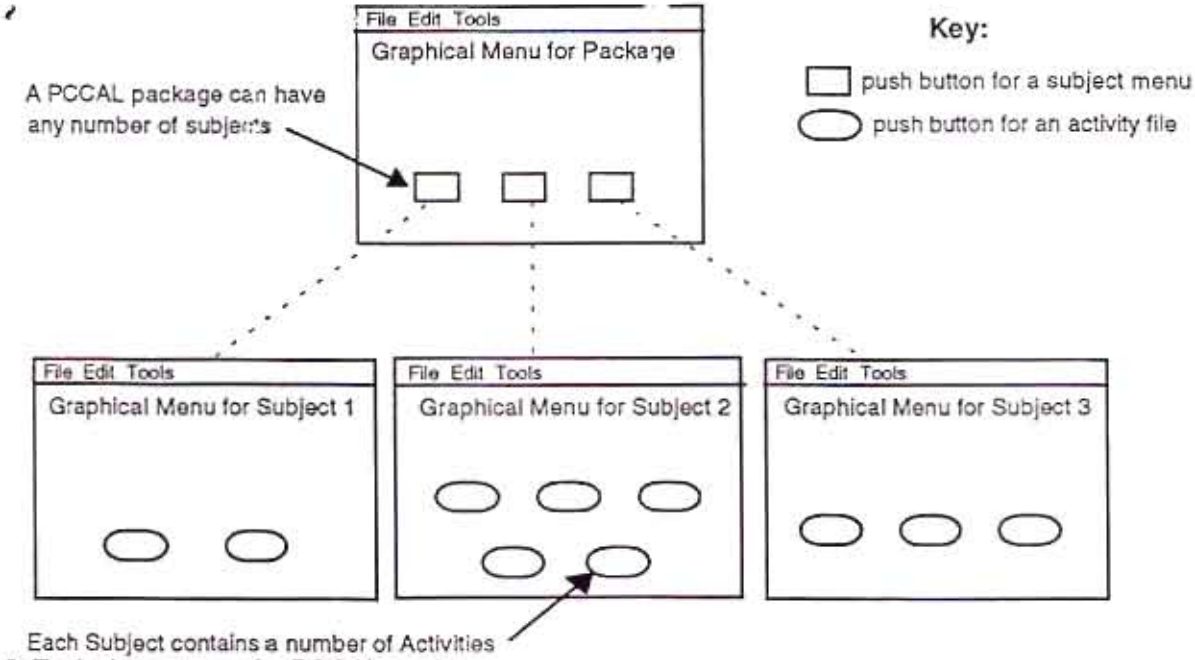

Fig 2. Typical structure of a PCCAL package.

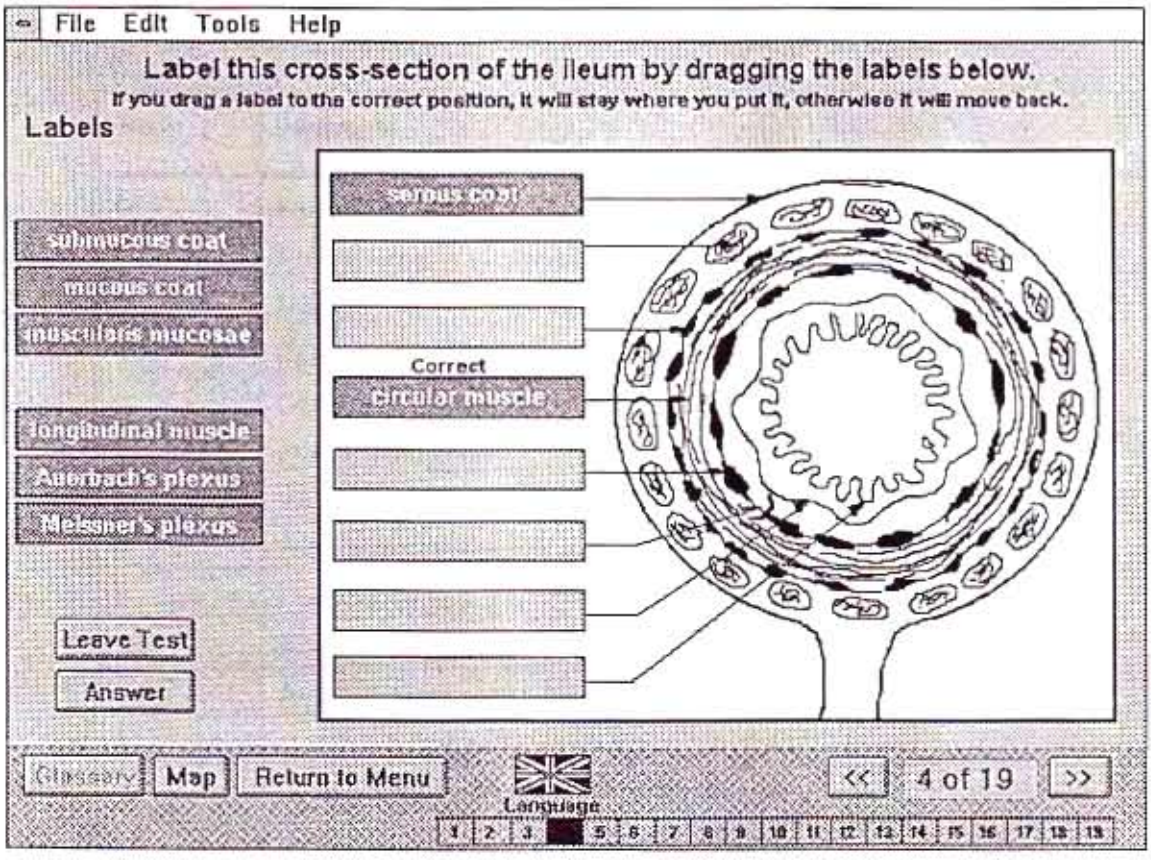

Fig 3. The PCCAL 'House-Style', which includes a standard menubar, and navigation area at the bottom of the screen

It is interesting to contemplate the financial aspects of creating flexible learning materials. It is widely agreed that the major cost of creating CAL material is represented by the labour cost of the programmers and academic subject specialists. In order to produce one hours worth of end-user material, it is generally estimated that between 50 and 300 hours of programming effort is required. Given the high cost of this process it is imperative to avoid unnecessary duplication. Thus one of the main objective of the consortium is to co-ordinate production of CAL material in an agreed programme, maximise output and prevent effort wasted in duplication.

Progress

Since the start of the project in January 1993, the Pharmacy Consortium has made substantial progress. To date, twenty default CAL packages have been delivered for use in the 1994/95 academic year (Table 1). In total the packages comprise of over 200 reusable activities and an estimated 80 hours of end user time. All packages are currently being evaluated by academics and students; the results of evaluation will be used to sharpen package requirements and to ensure that subsequent versions come closer to a fully evaluated and effective final product. In addition the consortium is currently developing a further 26 packages for pharmacy undergraduates with yet further packages in the planning stage.

A core ingredient in the development process has been to consult academics at all 16 schools of pharmacy to get feedback regarding the proposed structure and content of each package. This is facilitated by the use of analysis questionnaires which has revealed that there are many academics who are ready and willing to use the packages on their courses.

Table 1. PCCAL package available at the start of the 1994 / 95 Academic session.

No.	Packages
1	Basic Calculations in Pharmacy (version 2)
2	Radiochemistry and Radiopharmacy (version 2)
3	Nomenclature of Organic Compounds
4	Pharmlex for Windows (A guide to UK pharmacy law)
5	Cardiovascular System / Autonomic Nervous System Tutor
6	Pharmacokinetics
7	Introductory Pharmacokinetics Workshop
8	The Frog Gastrocnemius Muscle / Sciatic Nerve Preparation
9	Pharmacological Experiments on the Guinea Pig Ileum (version 2)
10	Pharmacological Experiments on the Rabbit Jejunum
11	Problem solving in Community Practice
12	Hay Fever and its Treatment
13	Molecular Visualisation and Stereochemistry
14	Introduction to Pharmaceutical Stereochemistry
15	Pharmaceutical Analysis - Titrimetry
16	Eye Disorders
17	Microbiology
18	QSAR
19	Diarrhoea
20	Constipation

Evaluation of Courseware

The software life cycle used by the consortium incorporates formative and summative evaluation procedures, and explores the issues of quality and quantity: *Qualitative* evaluation of PCCAL courseware attempts to measure how effective the software is in terms of (i) educating the students, and (ii) more efficient use of staff time. The *quantitative* evaluation is a measure of how many students are actually using the courseware and involves keeping a log.

Separate evaluation forms have been distributed for students and staff, in order to monitor the qualitative aspects. The types of question on these forms include : 'How easy was the package to use?', 'Did you feel in control when using the package', and 'Is the package a useful resource for teaching?'. So far, over 500 forms have been returned to the co-ordinating centre, and the indications are encouraging [1].

The quantitative aspects involve making a log of who is using which package, and for how long. To assist with this aspect, a commercial courseware management system called Caleidoscope is currently being beta tested within the Consortium. This system creates a log entry in a file using the students network user name, the start and end times of using a package, and the package title. All software usage is being logged, including PCCAL software and the commercial packages available to students. The data collected can later be used to create reports. In the future it is hoped that assessment results can be integrated into this system.

Availability

Technical and academic questions relating to PCCAL programmes should be directed to PCCAL at the School of Pharmacy and Pharmacology, the University of Bath. Information about the purchase of site licences is available from the approved distributors, COACS, (Commercial and Academic Services, COACS Ltd, Kimbolton House, Mount Beacon, Lansdown, Bath BA1 5QP, UK. Fax 44-225-315339).

Conclusions

The rationale behind the consortium is based on such considerations as

- reducing duplication
- increasing the access of academic staff and students to CAL
- using an agreed house style that incorporates a consistent user-interface and standard methods of navigation
- the provision of an organisational infrastructure that provides quality assurance and full documentation of all packages produced.

These considerations apply equally to the wider European dimension. An added benefit in this context is the ease with which the CAL Packages produced in one language can be easily translated into other languages, whilst maintaining the essential structure of the package. This feature has been facilitated by the choice of the authoring system, Authorware Professional. Prototype PCCAL packages are already available in German, and packages in other European languages are planned.

We look forward to using the experiences gained within the PCCAL consortium to extend the benefit of CAL to the wider boundaries of Europe, and in helping promote greater co-operation and interaction between European Schools of Pharmacy.

References

[1] PCCAL Newsletter. October 1994. ISSN 1356-5591. Ed: Brown K.

MEDICINAL PLANTS

Phytotherapy computer aided-learning on CD-ROM

This software is designed for pharmacy students, chemists' trainee dispensers students and dispensing chemists; it was developed to meet the requirements of university studies; its practical use makes it also highly suitable for permanent training in the professional field.

With this learning aid where illustrations are key (more than 1000 colours pictures), **the objectives are fourfold:**

1/ to introduce basic notions of modern phytotherapy;

2/ to enable students to learn the 70 major medicinal plants and their therapeutic uses.

3/ to familiarize students with the visual aspect of dried plants;

4/ to inform students of the main phytodrugs on sale in community pharmacies.

In addition, included in the software package, are **videofilms** on the manifacturing herbal remedies, a very practical chapter on **toxic plants** and last but not least a highly efficient self test system, which enables the student to check his knowledge.

MEDICINAL PLANTS

designed and written by

Pr Michel PARIS Châtenay-Malabry Pharmacy Faculty (Paris XI) France
François LEDARD Algo Vision Multi-media Productions, Paris.

with help of:

Ministry of Higher Education and Research
AFERP (French Association for Teaching and Research in Pharmacognosy)
French Pharmacy Faculties
OCP (the largest french wholesaler and distributer of pharmaceutical products)

Availability: end 1995, on CD-ROM (Mac and IBM), (32000 or 256 colours, screen 14 ").

For further information, contact:

Pr Michel PARIS, Faculty of Pharmacy,5 rue Jean-Baptiste Clément, 92296 CHATENAY-MALABRY, France **Tel:** 33 1/46 83 55 98 **Fax:** 33 1/46 83 57 10.
François LEDARD, Algo Vision, 5 bld de Sébastopol, 75001 PARIS **Tel:** 33 1/ 43 25 30 95 **Fax:** 33 1/40 41 98 65

Teaching Pharmacokinetic Concepts by Computer-Simulated Hydraulic Analog Models

Richard Süverkrüp
Rheinische Friedrich-Wilhelms-Universität Bonn, Pharmazeutische Technologie

Many students have difficulties to master the mathematical apparatus necessary for a rigorous treatment of biopharmaceutics and pharmacokinetics, and for some of them this important field of pharmaceutical activity remains a collection of facts and equations to be learned by rote. Discovering the internal structure, in which the beauty of the theoretical background resides, usually requires a long effort. Practitioners frequently do not ask for more than they need for solving routine problems and are content with parts of the facade.

Mathematical abstraction is a prerequisite for the general applicability of kinetic theory, but it does not suffice for a full understanding of essential relationships. Interactions between therapeutically relevant factors are difficult to assess even for those who feel at ease with mathematical models in terms of differential equations, analytical solutions , and numerical methods. A more intuitive approach serves to complement this form of understanding and helps to motivate novices struggling with the hardships of calculus and logarithms.

Hydraulic analog models are excellent tools for visualizing complex systems. Invented by L.Dettli in 1965 and modified by others thereafter, they are based on an analogy between diffusion laws, which govern many transport processes in the body, and fluid flow through capillaries or porous media. Implemented as computer simulations they are highly transportable, easy to multiply, flexible, and free of mechanical imperfections.

The models discussed below are linear and time-invariant: neither saturation of transport and metabolic processes or binding nor oscillations or trendlike shifts of pharmacokinetic properties will be considered. They are compartmental in nature, i.e. concentration gradients between kinetically distinguishable organs and tissues body are roughly approximated by steps, and concentrations within compartments are assumed to be homogenous.

Pharmacokinetic models can always be partitioned into an input section and a disposition section. Here, the input can be an inpulse or a segmentally continuous zero or first order process. There may be one presystemic receiving compartment, which is part of the input model, between the site of delivery and the central compartment. The disposition model, on the other hand, is a mammillary system. Its peripheral compartments are ordered according to decreasing rates of equilibration with the central compartments.

The simulations are based upon analytical solutions of the model equations and displayed in two forms: on the left as a system of pools and flow bands with varying levels and widths, illustrating the dynamics of fluid entry, distribution and elimination, while familiar concentration-time diagrams on the right develop as time proceeds so that any ordinate value always has the same vertical position as the fluid level in the corresponding pool.

Users are shielded from mathematical details, and models are defined in standardized model- and dosage files identified by the extension .MOD, which can also be used to specifiy starting values of parameters for a nonlinear regression routine (APIFIT). Its output files have the same form as the MOD-files and can also be read by the simulation program. Thus, the pharmacokinetics of drugs observed in individuals can be visualized without loss of precision.

APIHYD was conceived to be run by instructors commenting the processes displayed. Because use by students and commerical distribution are not intended, at least in the current version, the effort to develop an elaborate user surface was saved.

Relationships between variables in systems differing with respect to the grade of abstraction are summarized in Table 1:

Table 1: Correspondences between system and models

Biological System	Hydraulic analogy	Graphical Representation
Amounts (mass or molar)	Fluid volumes	Rectangular areas
Concentrations	Fluid levels above zero	Height of rectangles
Volume(s) of distribution	Cross sectional areas	Widths of rectangles
Rates of transfer or transformation	Volumetric flow rates	Widths of flow bands (absorption and elimination only)
Clearance	Permeability of flow restrictors	Width/thickness of flow restrictor images
Parent drug and metabolite	-	Colour: light- parent drug, dark- metabolite (presystemic and systemic elimination flow bands)
Fractions absorbed and excreted unchanged	Flow splitting rations	Horizontal position of flow splitter images

Table 2: Symbols used in parameter tables

Symbol	Meaning	Symbol	Meaning
Vd	Volume of distribution (one compartment body model)	V m.1	Volume of the central compartment of a mammillary system
lambda 1	Fastest hybrid rate constant of the mammillary system	k m21	Apparent return rate constant from the most rapidly equilibrating (shallowest) peripheral compartment
lambda 2	Second hybrid rate constant	k m31	Apparent return rate constant from the second shallowest peripheral compartment
k e	Elimination rate constant of one compartment body model	fu	fraction of dose absorbed intact excreted unchanged
fa	fraction absrobed intact	t in.0	lag time of drug input
k in.1	first order rate constant of input during the first phase	t in.1	end of first input phase
r in.1	zero order rate constant of first input phase	r in.2	zero order rate constant of second input phase
t in.2	end of second input phase	k c.1	first order rate constant of transfer from presystemic catenary compartment to central compartment of mammillary system

Examples

1. Bateman function

The one compartment open body model with first order input, implemented as an impulse input into a presystemic receiving compartment is displayed in Figure 1, where the concentration in the central compartment has passed it peak and the compartment representing the site of administration (e.g. drug in the GI tract) is nearly empty. The sum of the widths of the metabolic elimination (left, dark) and unchanged excretion flow band (right) exceeds that of the input flow band, indicating that the plasma concentration is decreasing. In Figure 3, we have reached the end of the simulation at 24 h. There is no drug left at the site of administration and the body compartment has nearly been drained.

Table 3: Pharmacokinetic parameters of Bateman function

Input model			**Disposition model**		
Name	*Value*	*Unit*	*Name*	*Value*	*Unit*
D	100	mg	Vd	30	L
t in.0	0	h	ke	0.12	1/h
k c.1	0.2	1/h	fu	0.2	-
fa	0.9	-			

2. Biphasic constant-rate input (intravenous infusion) into a two-compartment system

The model is displayed at three stages of development. In Figure 3, the steady state has almost been reached in both the central and the peripheral compartment. This is evident from nearly equal concentrations in the corresponding pools and from the almost equal widhts of the input flow band and the sum of the elimination flow bands. Looking at the graph on the right, it is clear how the concentration in the peripheral compartment lags behind that in the central compartment while the equilibrium is approached from below. In the next figure, the input rate has been reduced by half, and a new steady state is being established at a lower level. Again, the concentration in the tissue compartment is lagging behind, but in this instance it is higher than in the circulating fluids. In the last figure of this series, input has stopped completely, the system is in a pseudo-steady state, with concentrations in the peripheral and central comparments decreasing proportionally.

Table 4: Pharmacokinetic parameters of two-compartment model with biphasic constant-rate (zero order) infusion

Input model			**Disposition model**		
Name	*Value*	*Unit*	*Name*	*Value*	*Unit*
t in.0	0	h	V m.1	15.0	L
r in.1	30	mg/h	lambda 1	2.4	1/h
t in.1	10	h	k m.21	0.6	1/h
r in.2	15	mg/h	lambda 2	0.3	1/h
t in.2	20	h	fu	0.8	-
fa	0.8	-			

Notice that the central compartment and its flow restrictor are always depicted in the same size, irrespective of the volume of distribution and the clearance. They serve as a reference for scaling the proportions of the other parts of the model.

3. Therapeutic system delivering drug at a constant rate to the site of absorption with three-compartment disposition model.

The third example is rather complex, but has important counterparts in reality. In Fig. 6, a steady state is being established between delivery at a constant rate to the absorption-site compartment and transfer to the body. If input continues long enough, it can be expected that another equilibrium will be reached within the mammillary system and between input and disposition. Three kinetically distinguishable compartments are used to model the time course of drug distribution within the body. The first compartment is shallow and has a somewhat higher capacity than the central. Its rate of equilibration is fairly high, and in the steady state the amount of drug it contains is greater than that in the circulating fluids. This is indicated graphically by the wide flow restrictor, representing a high intercompartmental clearance, and the apparent width of the tube, which signifies a large cross-section. The deep compartment, on the other hand, is relatively inaccessible because the narrow flow restrictor has a low permeability, which makes the compartment fill and drain slowly. In a biological system this could mean that either the membranes separating it form the circulation are rather impermeable to the drug under consideration; an example being the blood brain barrier, or a low perfusion rate of the tissue which it represents. In the example given, its capacity or apparent volume is so small that it would hardly be recognizable from the time course of drug concentrations in plasma. Figure 7 shows the system's behaviour after exhaustion of the delivery device. The pattern is similar to the one discussed earlier: during accumulation, the central compartment fills up most rapidly and the peripheral compartments lag behind; while the same relationship with reversed order of concentrations holds when the system drains without input.

Table 5: Pharmacokinetic parameters of three-compartment-body model with zero order delivery to a presystemic compartment.

Input model			**Disposition model**		
Name	*Value*	*Unit*	*Name*	*Value*	*Unit*
t in.0	0	h	V m.1	15.0	L
r in.1	12.5	mg/h	lambda 1	0.9	1/h
t in.1	8	h	k m.21	0.3	1/h
k c.1	0.5	1/h	lambda 2	0.15	1/h
fa	0.9	-	k m.31	0.12	1/h
			lambda 3	0.1	1/h
			fu	0.8	-

The examples given may suffice for an introduction, but there are more concepts to explore, which difficult to grasp without a powerful visualization tool., e.g. the flip-flop-case, and an absorption window. It is remarkable that no mathematical skills are required on the side of the observer. Therefore, a demonstration can also help to motivate nurses and even patients to follow instructions given for clinical studies.

The program APIHYD is available to educational institutions upon request and free of charge. Please contact

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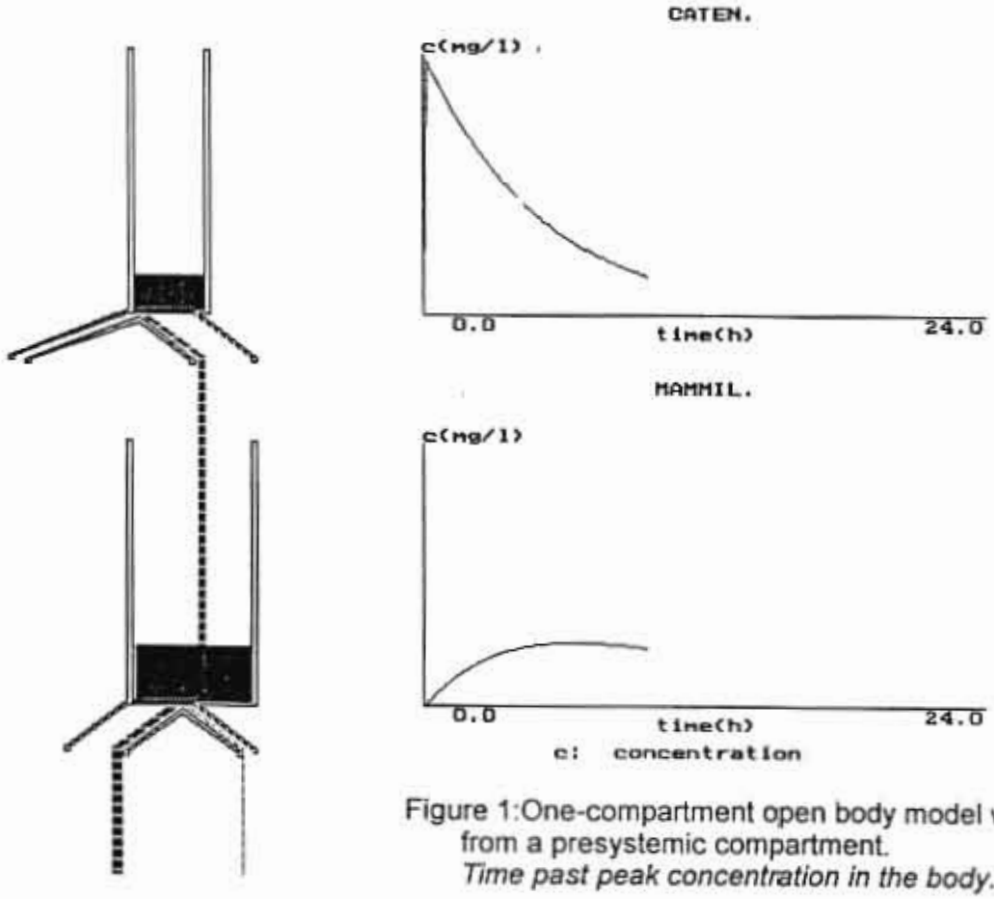

Figure 1:One-compartment open body model with first order input from a presystemic compartment.
Time past peak concentration in the body.

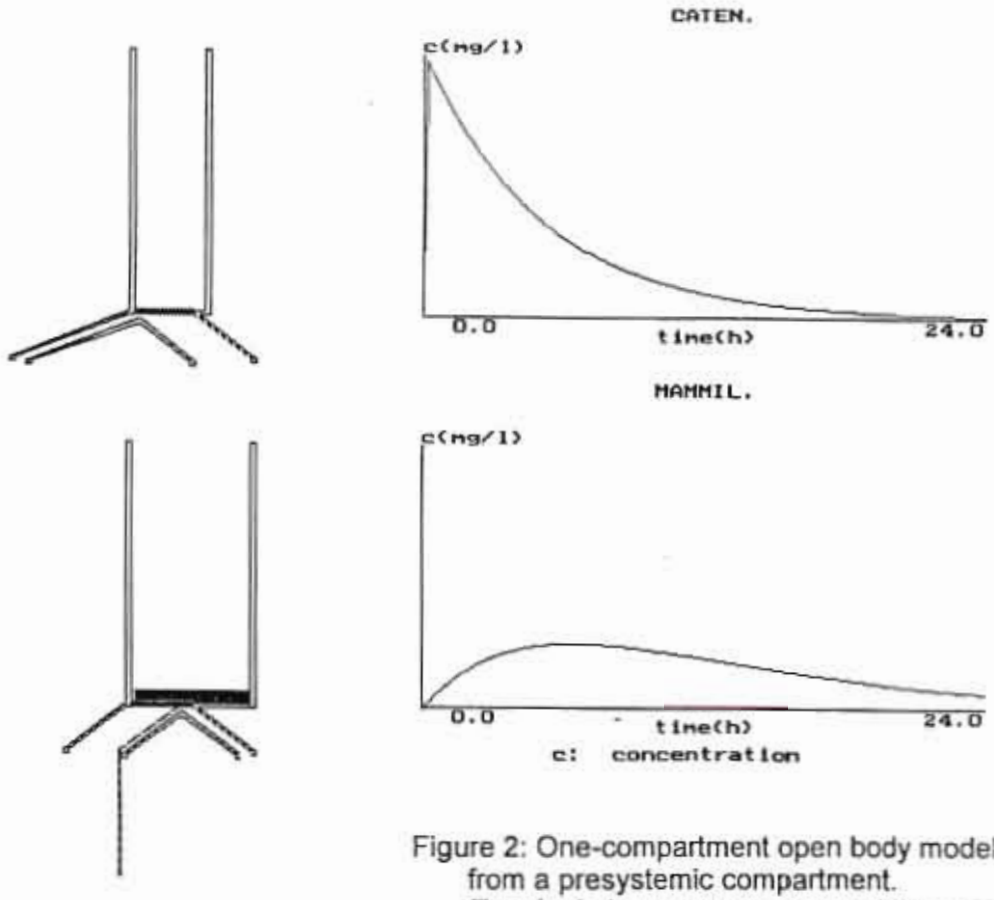

Figure 2: One-compartment open body model with first order input from a presystemic compartment.
Terminal phase, source compartment empty.

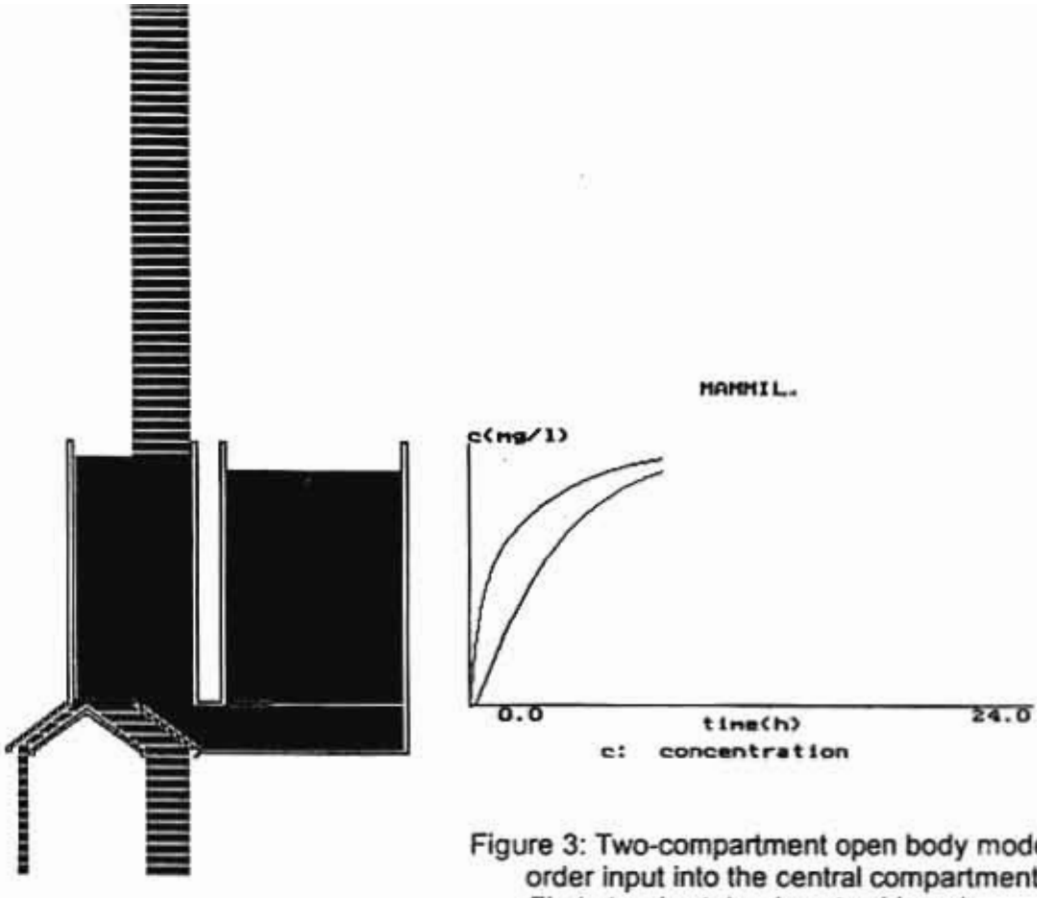

Figure 3: Two-compartment open body model with biphasic zero order input into the central compartment.
First steady state almost achieved.

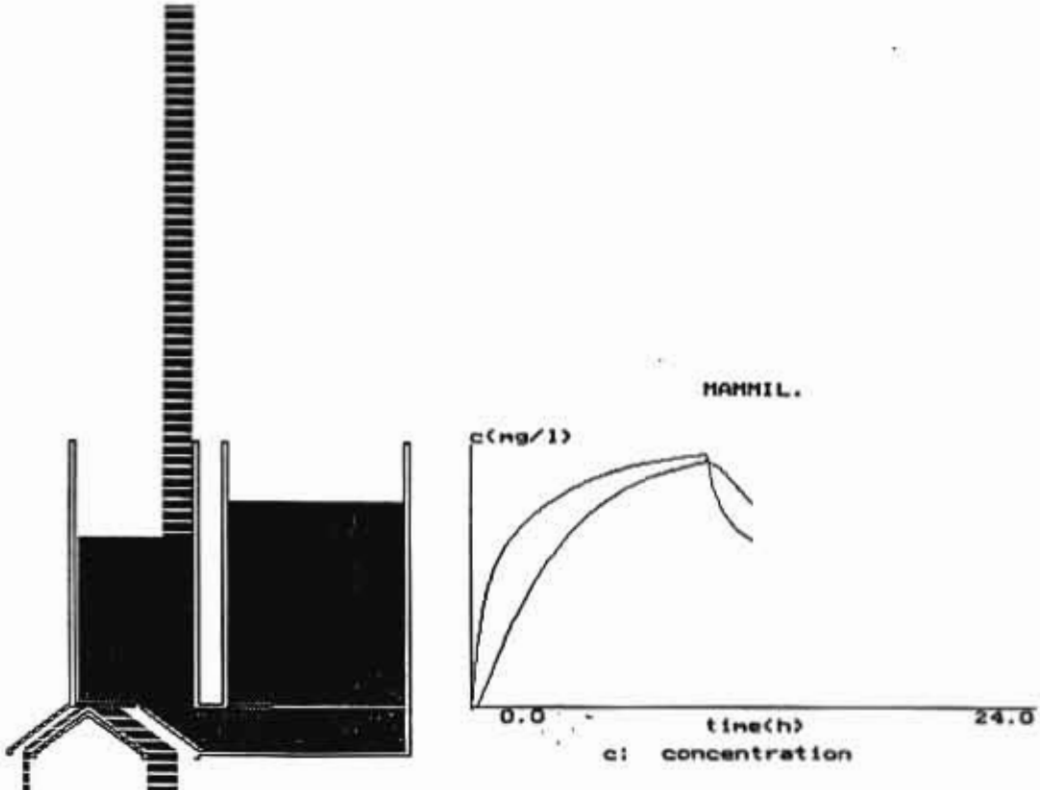

Figure 4: Two-compartment open body model with biphasic zero order input into the central compartment.
Approach to second steady state from above.

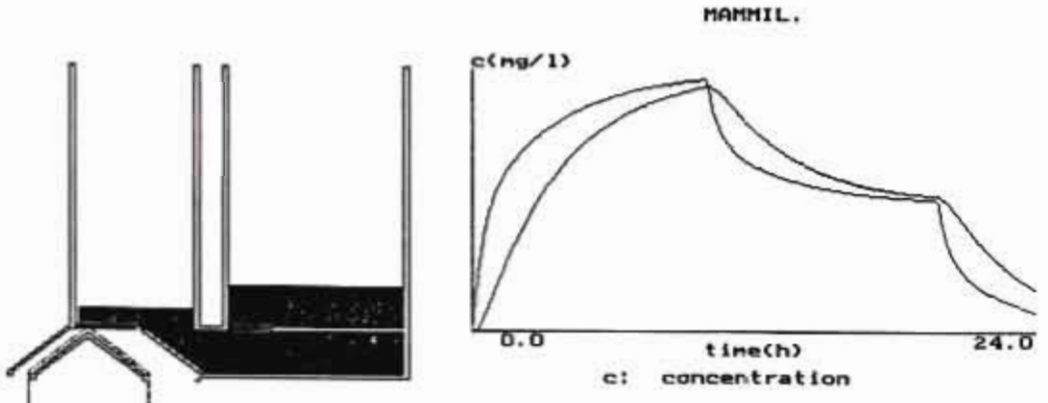

Figure 5: Two-compartment open body model with biphasic zero order input into the central compartment.
Pseudo-steady-state during terminal disposition phase

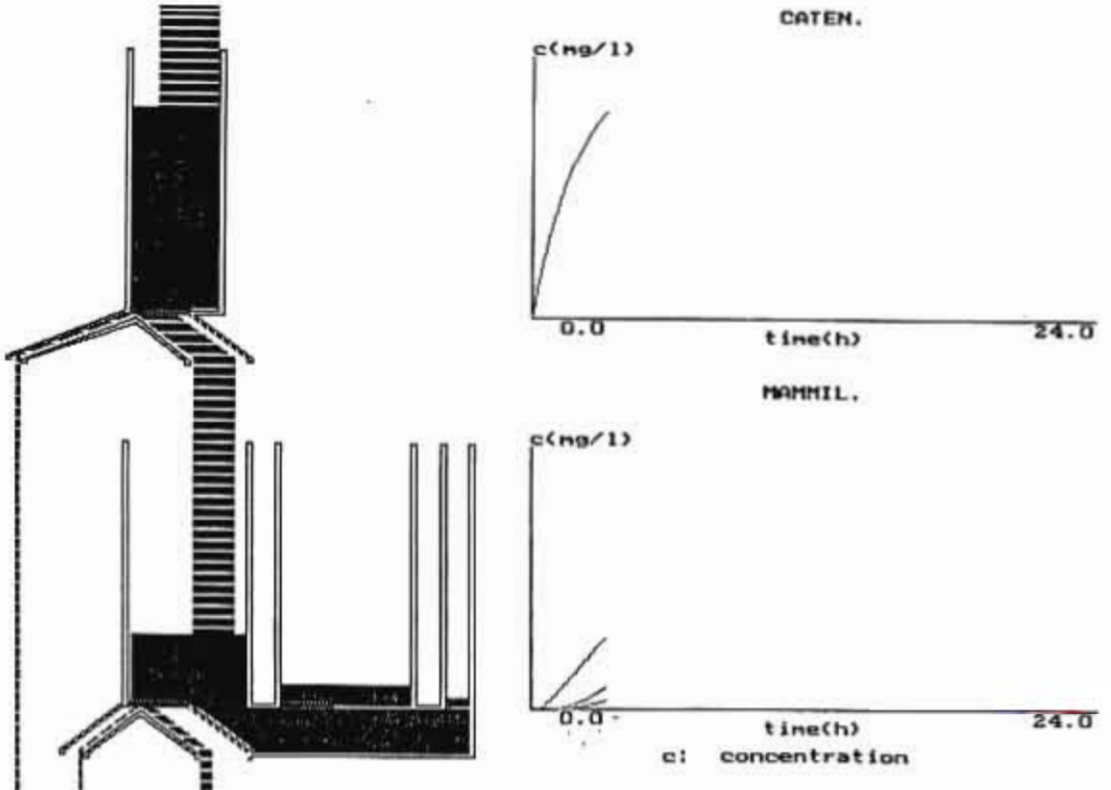

Figure 6: Three-compartment open body model with zero order delivery to presystemic compartment. *Initial fill-up phase.*

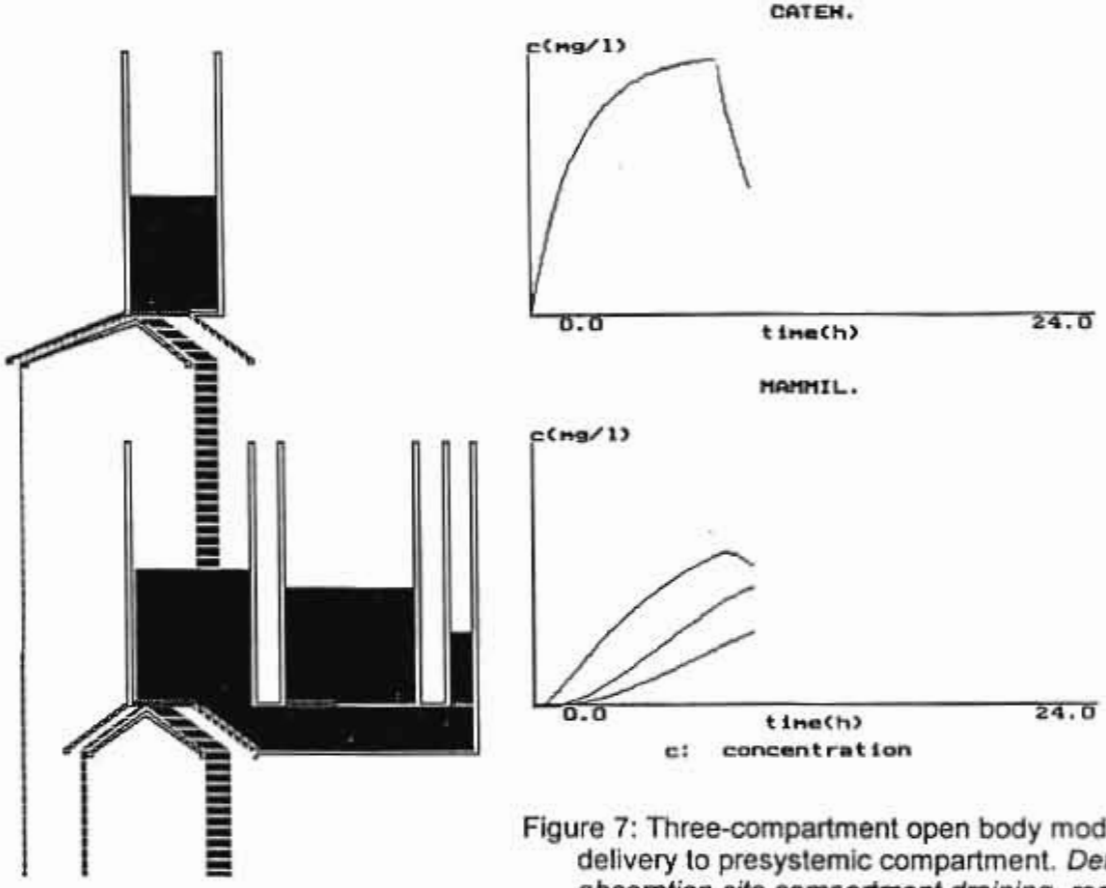

Figure 7: Three-compartment open body model with zero order delivery to presystemic compartment. *Delivery has ceased, absorption site compartment draining, redistribution in the mammillary system.*

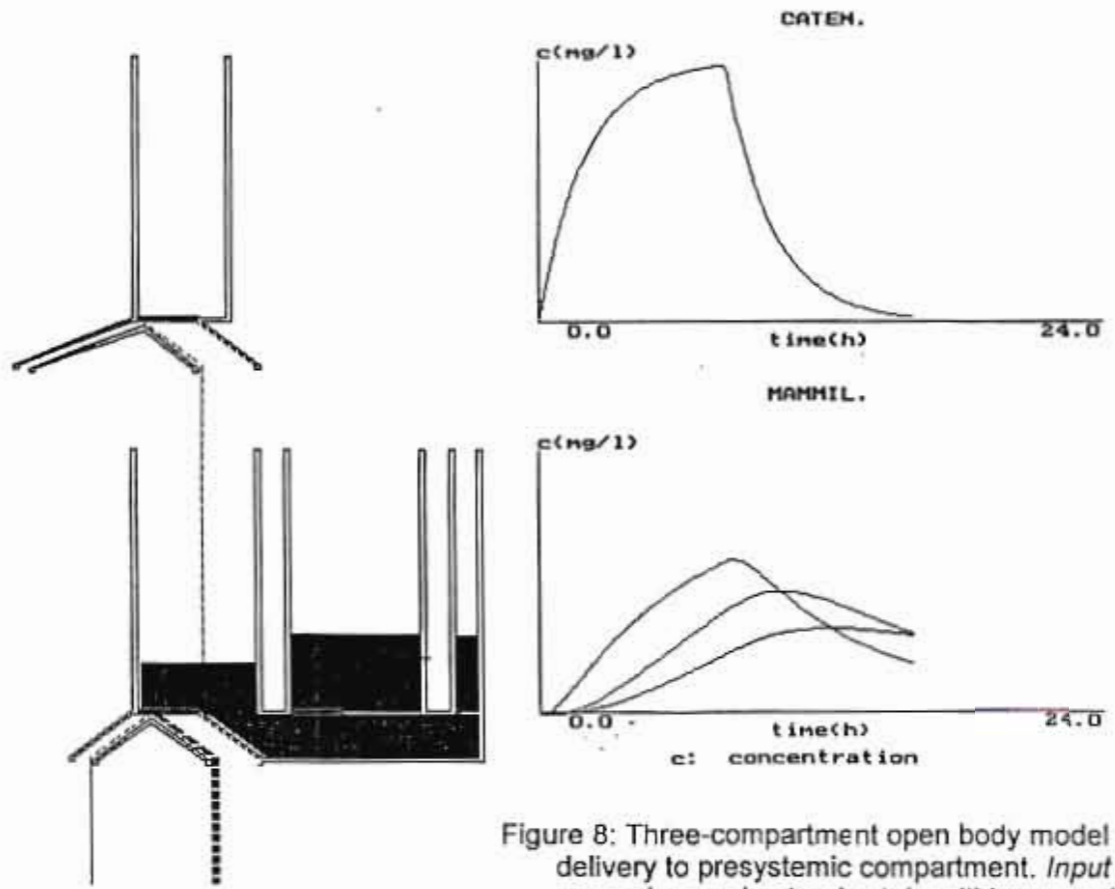

Figure 8: Three-compartment open body model with zero order delivery to presystemic compartment. *Input has virtually ceased, pseudo-steady state within mammillary system not yet established.*

Trans-Atlantic experience of a computer-based pharmacological tutorial type learning programme

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Background

The University of Kuopio was founded over 20 years ago. From its earliest days, pharmacology courses for medical and pharmacy students have been integrated. This has meant that such courses are organized in an intense manner, i.e. the systematic pharmacology given in the second year is a 7.5 study credit course which takes place during a two month period. During that time, the students will be studying only pharmacology, typically lectures in the mornings and laboratory classes and tutorials in the afternoons.

Student evaluations consistently reveal that especially tutorials are highly rated by the students and each year we are asked to organize more and more of this type of teaching. The department has complied with these requests, over the past ten years the number of tutorials has been increased. However, we have now reached the situation where any major increase in the amount of small group tutorial style teaching is virtually impossible owing to the limited number of hours available in the time allotted for the course (not to mention exhaustion of the University's supply of seminar rooms and the Department's teaching staff).

Rather than continuing down the road of offering more and more small group teaching, it was felt that it would be beneficial to wean the students away from their apparent dependence on the physical presence of a teacher to a situation where they independently used material provided by the department in their own time. Obviously, such material has to be attractive to the students, it is not enough to recommend reading textbooks or providing the students with copies of old examination papers. It was felt that if the material could be provided in some kind of "game", students might actually enjoy the experience, much as they enjoy playing games like Trivial Pursuit®. We have therefore developed a game involving the basics of pharmacology. A computer programme written with Toolbook® has been especially created by Matti Pönkänen.

Programme requirements

The programme is intended to be run on IBM-compatible PCs. It requires that the computer has Windows installed. It is recommended that the PC be at least 386 type with 4 mB RAM (though it may run on older 286 type machines if their RAM capacity has been upgraded). The entire programme needs about 11 mB of memory, though individual portions can be run with only 3 - 4 mB hard disk space. The programme can either be run off a Novell network (e.g. in a computer classroom) or on a PC standing alone. Since all operations after gaining access to the Windows program manager are operated by means of a mouse, running the programme does not need any prior computer experience.

Pharmaco-Logic© - a pharmacological quiz game

We have christened our game Pharmaco-Logic© since the idea of the game is to open sufficient clues until only one compound from an original list of five fits the information provided. To paraphrase Sherlock Holmes, when everything which is false is eliminated, what remains must be the truth. Since each clue costs more points to open than its predecesor, students have to choose whether they think they have enough information to solve the puzzle or do they need to open more clues with the resulting loss of points. The programme is designed so that only when all other options are eliminated can the correct answer be obtained, even if the "correct" answer is guessed when other options have not been eliminated, the answer is considered as premature and the student is returned back to the start of the problem.

Initially the program only contained questions written in Finnish, but the enthusiastic reception it received from our students encouraged us to write an English language version. This is based on the pharmacology textbook "Basic and Clinical Pharmacology (Editor, B. Katzung, 5th Edition, Appleton & Lange, Norwalk, CT, USA). The Finnish questions have been used by our students for two years. The English questions were tested in 1993-1994 in the Department of Pharmacology, University of California (San Francisco) (=UCSF). The programme was utilized by medical students under the supervision of Prof. Katzung. In UCSF, the game was also used by students of pharmacy, these classes being arranged by Dr. S. Masters.

Student evaluations in Kuopio and UCSF

Stucents enjoy playing the game, so much so that many come back in their free time. The present evaluations were obtained from pharmacy students using the programme in scheduled classes in the computer classroom, but those playing it on their own have also expressed their enthusiasm. It was somewhat surprising that the responses of students were very similar on both sides of the Atlantic, despite the cultural and educational background of the students (Finnish students were undergraduates, US students have already obtained a first university degree). Though the evaluation forms were different in both campuses, it is possible to compare the students' responses to certain common questions.

Do you agree with the following statement (Scale 0 -> 5 max. ± SD)	US students (n = 106)	Fin. students (n= 128)
The game was fun to play	4.4 ± 0.6	4.3 ± 0.6
The game helped me learn pharmacology	4.2 ± 0.7	3.6 ± 0.9
I would use the game on my own	4.1 ± 0.9	4.0 ± 1.0

We are now altering the programme so that it is more suitable for individual use i.e. there will be no need for the teacher to be present when the students are playing the game.

Conclusions

Our experience in Kuopio and San Francisco suggests that students enjoy playing this pharmacological quiz game. It makes the tedious task of preparing for pharmacological examinations a little bit more bearable. We hope that the programme will be available for distribution in the near future either through an established publisher (e.g. Appleton & Lange) or directly from us.

SESSION II

Chairmen: Pr W. GLOMBITZA & Pr B. DEL CASTILLO GARCIA

"EVALUATION AND COMPARISON OF EDUCATION AND TRAINING IN EUROPEAN FACULTIES OF PHARMACY"

Communications from:

- Pr. AHLGRIMM (Germany)
- Pr. BOURLIOUX (France)
- General discussion. Conclusions and recommendations.

Pr. AHLGRIMM (Germany)

When the Council of the European Community enacted in 1985 the Directive concerning mutual regocnition of pharmacist diplomas it was clear among experts that the statement of the first Directive 85/432/EEC was wrong. There was not at all a broad comparability of training courses.

Slide No. 1

Directive 85/432/EEC

Whereas, with a view to achieving mutual recognition . . . . the broad comparability of training courses in the Member States enables coordination in this field to be confined to the requirement that minimum standards be observed, . . .

Berlin 1994-01

We find in the considerations of the second Directive for the pharmacists No. 85/433/EEC the following quotation:

Slide No. 2

Directive 85/433/EEC

Fifth consideration:

Whereas, in view of the present disparities in training in pharmacy given in the Member States, it is necessary to lay down certain coordinating provisions to enable the Member states to introduce mutual recognition of diplomas, . . .

Berlin 1994-02

Part of the coordinating provisions in this Directive are the following criteria:

- A minimum education period, that means five years
- Subject areas in which the student has to obtain knowledge
- And a list of topics which have to be dealt with during the training

However, it was clear to everyone that even with these coordinating provisions a genuine comparability of educations could not be achieved. Therefore the European Commission established an "Advisory Committee on Pharmaceutical Education". As you know, in this Committee each member state is represented by a practising pharmacist, by a pharmaceutical professor, and by a representative of the Health Ministry.

One of the Committee's task was it to work out recommendations for the harmonizing of Basic Training. In order to accomplish this task the Committee had to start with a sort of inventory of the existing situation of education in the various member countries. For this "inventory" in turn, it needed appropriate parameters in order to compare the different education systems. The Committee was fully aware of the fact that it is impossible to compare "quality" of education because this depends on the capabilities of the individual lecturers. It therefore limited itself to the usual method of asking around for facts and figures.

Slide No. 3

It asked for information on:

- Access to the pharmacy studies
- Duration of total time of studies
- Organization of studies (intermediate examination)
- Number of contact hours
- Subject areas to which these contact hours are allocated

Berlin 1994-03

In order to get comparable facts the Committee had to define some terms, for example the term "Lecture Hours"

Slide No. 4

"Lecture Hours "

A lecture hour is defined as the hour that the student spends in the framework of his training in the locality of the university while attending a lecture or a seminar in direct contact with a teacher or carrying out practical work under the instruction of the teacher. Preparation time or work at home shall not be included.

Berlin 1994-04

or the term "Training Period"

Slide No. 5

"Training Period"

The training period is defined as the organization of an apprenticeship during which the student works as a principal in an independent manner and produces a result. The work can involve an analysis in a chemical laboratory, the production of a formula for a drug, working with a microscope or with a computer (for example statistics, simulation of the evolution of blood rates).

Berlin 1994-05

Since the training structure in many Member States is handled by the individual universities and not by the government the Committee had to accept average figures from these countries. In order to get a picture of the present situation it circulated appropriate questionnaires. During the meetings of the Committee the answers to these questionanaires were verified and - if necessary - corrected.

I'm now going to present you the results and you will see that there are significant differences among the Member States. In any case, it is not true that there is a large degree of comparability of the standard of training, as the Directive claims.

- Already the structure of the pre-university school time varies from one member state to the other, not only regarding the duration (12 or 13 years) but also regarding the subdivision into primary schools and secondary schools.

  Admission to courses in pharmacy is subject to restrictions in seven Member States. For example school-leaving marks, especially in natural sciences, are taken into consideration and sometimes university entrance examinations have to be passed. I don't want to point out the special situation in the United Kingdom (I mean England, Wales, and Northern Ireland on one hand and Scotland on the other). Neither do I want to refer at this point to the very rigorous examination at the end of one year's studies, the as it is called "Concours", which is practised in France.

- In most Member States intermediate examinations are held during the course. In some countries a distinction is made in the structure of the course between basic scientific knowledge and the pharmacy course proper. As you know in Germany you can start the proper pharmacy studies only after having passed an intermediate examination at the end of the Basic Training

- In two Member States, namely Denmark and the Netherlands, students have to produce by themselves a major scientific paper during their university education.

- In almost all Member States students can take semi-optional subjects and thus themselves determine the emphasis of their training.

Slide No. 6

	Total number of lecture hours identical and compulsory for every student	Practical courses in total %	Lecture hours of se ni-optic nal subjects
Belgium	3080	52	-
Denmark	2256	44	660
France	2010	40	580
Germany	3250	62	-
Greece	2925	43	260 or 312
Ireland	2102	37	40
Italy	2630	31	-
Netherlands	3420	29	250
Portugal	4227	46	30 or 45
Spain	2825	30	480
United Kingdom (Scotland)	1893	28	270

- Lenght of Pharmacy courses vary considerably among the Member States ranging between 1.893 and 4.227 (!) hours of instruction.

- The proportion of courses devoted to practical classes (and I'm not talking about the "in-service-training") differs also enormously, ranging from 28 % to 62 % of the total number of compulsory course hours.

Only in some of the Member States we find Semi-optional Subjects. The proportion of these subjects in relation to the whole education period differs significantly. In The Netherlands it amounts to 7 %, in Spain and the United Kingdom it ranges between 13 % and 14 %, and in Denmark and France we notice 22 %.

The emphasis which is put on the education contents varies also substantially from country to country. A comparison of the individual courses was not possible since the subject contents - although of the same name - were different. For this reason and also in order to obtain comparable results, the Committee had grouped the 14 courses which are listed in Directive 85/432/EEC into six fields of training.

Slide No. 7

Directive 85/432/EEC

Article 2

. . . .

- Plant and animal biology
- Physics
- General and inorganic chemistry
- Organic chemistry
- Analytical chemistry
- Pharmaceutical chemistry, including analysis of medicinal products
- General and applied biochemistry (medical)
- Anatomy and physiology; medical terminology
- Microbiology
- Pharmacology and pharmacotherapy
- Pharmaceutical technology
- Toxicology
- Pharmacognosy
- Legislation and, where appropriate, professional ethics

Berlin 1994-07

These courses and other courses which are marked with an asterisk and which are often subject of the syllabi in the Member States were allocated to these six areas. There figure for instance: Mathematic/Computing, Statistics, Nutrition, Hygienics, Economics and Management.

Slide No. 8a + 8b

Breakdown of Subject Areas

I. Chemistry
- general and inorganic chemistry
- organic chemistry
- analytical chemistry
- pharmaceutical chemistry, including analysis of medicinal products
- medical physicochemistry *
- pharmacopoeial analysis *

II. Physics/mathematics/computing/statistics
- physics
- mathematics/computing *
- statistics *

III. Biology/biochemistry/pharmacognosy
- plant and animal biology
- general and applied biochemistry
- microbiology
- pharmacognosy
- phytochemistry *

IV. Pharmacy/technology
- pharmaceutical technology
- finished medicinal products *

Breakdown of Subject Areas (cont'd)

V. Medicine/pharmacology/toxicology

- anatomy, physiology, medical terminology
- pharmacology/pharmacotherapy
- toxicology
- pathology/histology *
- nutrition *
- haematology/immunology *
- parasitology *
- hygienics *
- emergency therapy

VI. Law/social aspects of pharmacy

- legislation/professional ethics
- philosophy *
- economics *
- management *
- history of pharmacy *
- public health *

Slide No. 9

Subject area I: (Chemical subjects)	25	-	46 %
Subject area II: (Physical and mathematical subjects)	3	-	13 %
Subject area III: (Biological sciences)	12	-	32 %
Subject area IV: (Pharmaceutics)	6	-	22 %
Subject area V: (Pharmacology Tox. Pharmacotherapy, basic medicinal subjects)	11	-	30 %
Subject area VI: (Law and social aspects of pharmacy)	1	-	16 %

Berlin 1994-09

On the right side I have put down the maximum and minimum percentage ratio of the total lecture hours. Please take these numbers as an average because the syllabi often are not issued centrally but by the individual universities. In Germany are only the practical course hours stipulated and not the time period of the theoretical training. Even if you take the average numbers into consideration you will find that the differences are so significant that there is a genuine demand for harmonization.

- All Member States have put the emphasis of their syllabi on chemical courses. In Germany this amounts to 46 % whereas in Ireland only to 25 %.

- Approximtaely 8 to 10 % of education is covered by courses under the Subject area II. But Great Britain allows only 3 %.

- The Biology and biochemistry proportion amounts in The Netherlands only to 12 % whereas in Spain to 32 %.

- Further remarkable differences are to be found in Pharmaceutical Technology: France 6 % and Greece 22 %

- and we see also big differences regarding to Pharmacological medical subjects. Most of the countries devote approximately 15 % of the education period to these subjects whereas the proportion is almost doubled in France, Italy, and The Netherlands.

Based on these figures the Advisory Committee came to the conclusion that it is essential to have proposals for a pharmaceutical education harmonization scheme in Europe. What we definitely do not want is a uniform education system. Each country has its own traditionally grown characteristics and this is especially true for the United Kingdom. But we think that it is necessary to coordinate the education systems and - along with this - relevant proposals concerning the future development of the pharmacist could be elaborated.

In the meantime the Committee came to an agreement on appropriate recommendations which should be submitted to the European Commission.

You will hear now my colleague, Professor Glombitza, who will inform you in detailing about these recommendations.

Thank you for your attention.

Prof. Dr. K.W. GLOMB TZA

RECOMMENDATIONS ON PHARMACEUTICAL EDUCATION UNDERGONE AT HIGHER-EDUCATION INSTITUTIONS

Advisory Committee on pharmaceutical training
Meeting May 1994.

Ladies and Gentlemen,
You have listened to a report of Dr. Ahlgrimm about the situation of pharmaceutical training in the various members of the European Union. At the May 1994 Meeting the advisory committee on pharmaceutical training discussed the necessity to achieve harmonization of pharmacy courses to.

They established considerable differences in the organization and emphasis of pharmacy courses which must be reduced.

1 - Training leading to the award of the diploma or other formal qualification must ensure :

- adequate knowledge of medicines and the substances used in the manufacture of medicines,

- adequate knowledge of pharmaceutical technology and the physical, chemical, biological and microbiological testing of medicinal products,

- adequate knowledge of the metabolism and the effects of medicinal products and the action of toxic substances, and the use of medicinal products,

- adequate knowledge to evaluate scientific data concerning medicines in order to be able to supply appropriate information on the basis of this knowledge,

- adequate knowledge of the legal and other requirements associated with the practice of pharmacy.

The committee gave the following recommendations :

- the lenght of pharmaceutical training and the minimum range of subjects in which theoretical and practical training must be undergone are fixed by the directive from 1985. It should be mentioned, that the balance between theoretical and practical training must, in respect of each subject, give sufficient importance to theory to maintain the university character of the training. Especially :

- Admission to courses in pharmacy should be conditional on a thorough grounding in sciences (chemistry, physics, biology) and mathematics having been acquired.

2 - In view of the minimum period of four years' training at a higher-education institution the number of courses should be at least **3 000** !

- At least half the higher-education course identical for every student should consiste of theoretical instruction, and at least 35 % of that course should take the form of practical training.

- During the training period pharmacy students must be provided with a sound and balanced grounding in the physical, chemical and biological sciences that represent the basis for their main training in

- the functioning of the biological systems, the chemistry of drugs and other constituents of medicines and the interaction of both systems,

- medicines design and manufacture,

- the action and uses of drugs, medicines and other products,

- the practice of pharmacy in hospital, industrial, academic and community settings, including an introduction to the relevant aspects of the social and behavioural sciences.

3 - At least one third of the whole course should be occupied by the components which collectively deal with the actions, uses and manufacture of drugs and medicines and a broad balance should be maintained between the other sections of the course.

- Intermediate examinations should be held during the course.

- Students should themselves be able to have a say in determining of their courses through taking semi-optional pharmaceutical subjects.

- A project drawn up independently by the student over a period of 3-6 months should form part of their higher-education pharmacy course.

Further discussions of the advisory committee dealt with the further education after the university training. The further education has to actualize the knowledge of the training during practising the profession. Further education is not the some like specializing in a certain field of activity.

Only in one of the 12 countries further education is obligatory : in the Netherlands after Jan. 95. In several countries further education is an ethic obligation. The percentage of pharmacists using supplies of further education is between 25 and rarely more than 50.

An informal vote to make further education obligatory to all practising pharmacists did not get a majority, but the intention in this direction was realy high. The working group got the task to think about this subject and to evaluate

- who migh be responsible in the various countries for the organization of further education,
- which restrictions by law are possible to obtain it by force.

The working group should give a report in the 1995 meeting.

Pr. Pierre BOURLIOUX (France)

EUROPEAN EDUCATION AND TRAINING IN PHARMACY

CURRICULA IN 15 COUNTRIES

DATA COLLECTED BY THE ASSOCIATION FOR THE MEETING OF BERLIN

THE MAIN OBJECTIVES

- TO KNOW WHAT IS DONE IN EACH COUNTRY

- TO ESTABLISH WHAT CAN BE DONE IN ORDER TO PROMOTE STUDENT'S EXCHANGES AND THE RECOGNITION OF DIPLOMA

EACH COUNTRY AND EVEN EACH FACULTY SCHOOL OR INSTITUTE OF PHARMACY MUST KEEP ITS IDENTITY AND ITS ORIGINALITY.

CONCERNED COUNTRIES

BELGIUM	GREECE	PORTUGAL
DENMARK	IRELAND	SPAIN
FRANCE	ITALY	UNITED KINGDOM
GERMANY	NETHERLANDS	(LUXEMBOURG)

NUMBER OF FACULTIES SCHOOLS OR INSTITUTES OF PHARMACY

BELGIUM	7	GREECE	3	PORTUGAL	3
DENMARK	1	IRELAND	2	SPAIN	10
FRANCE	24	ITALY	24	UNITED KINGDOM	16
GERMANY	18	NETHERLANDS	4	LUXEMBOURG	0

CONCERNED COUNTRIES

AUSTRIA	BULGARIA	ROUMANIA
FINLAND	ESTONIA	SLOVAK REPUBLIC
NORWAY	HUNGARY	CZECH REPUBLIC
SWEDEN	LITHUANIA	SLOVENIA
ICELAND	POLAND	SWITZERLAND

CONCERNED COUNTRIES AND POPULATION

AUSTRIA	7.5 M	HUNGARY	10 M	ROUMANIA	23 M
BULGARIA	8 M	ICELAND	0.3 M	SLOVENIA	2 M
CZECH. REP.	10 M	LITHUANIA	5 M ?	SLOVAK. REP.	5 M ?
ESTONIA	5 M ?	NORWAY	4 M	SWEDEN	8.5 M
FINLAND	5 M	POLAND	38 M	SWITZERLAND	6.5 M

TOTAL = (15) = 137.5 M

EUROPEAN COMMUNITY (12) = 312.5 M

NUMBER OF FACULTIES SCHOOLS OR INSTITUTES OF PHARMACY

AUSTRIA	3	HUNGARY	2	ROUMANIA	6
BULGARIA	1	ICELAND	1	SLOVENIA	1
CZECH. REP.	2	LITHUANIA	1	SLOVAK. REP.	1
ESTONIA	1	NORWAY	1	SWEDEN	1
FINLAND	3	POLAND	9	SWITZERLAND	5

TOTAL (15) = 37
EUROPEAN COMMUNITY (12) = 109

TOTAL COUNTRIES = 27 TOTAL POPULATION 450 M
TOTAL FACULTIES = 146

LOCALIZATION OF THE FACULTIES SCHOOLS OR INSTITUTES OF PHARMACY

AUSTRIA	VIENNA	LITHUANIA	KAUNAS	ROUMANIA	BUCAREST
	GRAZ	NORWAY	OSLO		CONSTANTA
	INNSBRUCK	POLAND	KRAKOW		IASI
BULGARIA	SOFIA		WARSZAWA		CLUJNAPOCA
CZECH.REP.	HRADEC.KRALOVE		GDANSK		TARGU MURES
	BRNO		LUBLIN		TIMISOARA
ESTONIA	TARTU		WROCLAW	SLOVENIA	LJUBLJANA
FINLAND	HELSINKI		LODZ	SLOVAK REP.	BRATISLAVA
	KUOPIO		POZNAN	SWEDEN	UPPSALA
	TURKU		KATOWICE	SWITZERLAND	GENEVE
HUNGARY	BUDAPEST		BIALYSTOK		BALE
	SZEGED				BERNE
ICELAND	REYKJAVIK				LAUSANNE
					ZURICH

NUMBER OF STUDENTS/DIPLOMAS

AUSTRIA	2 100/195	HUNGARY	1 200/220	ROUMANIA	300/280
BULGARIA	700/110	ICELAND	90/12	SLOVENIA	550/60
CZECH. REP.	1200	LITHUANIA	400/?	SLOVAK. REP.	not known
ESTONIA	200/?	NORWAY	not known	SWEDEN	800/120
FINLAND	300/80	POLAND	4 300/700	SWITZERLAND	1 000/?

TOTAL = ?/?
EUROPEAN COMMUNITY (12) = 89 000/11 000

NUMBER OF YEARS BEFORE GRADUATION

AUSTRIA	4 1/2	HUNGARY	5	ROUMANIA	5
BULGARIA	5	ICELAND	5	SLOVENIA	5*
CZECH REP.	5	LITHUANIA	5	SLOVAK. REP.	5
ESTONIA	5	NORWAY	5	SWEDEN	5**
FINLAND	3/5***	POLAND	5	SWITZERLAND	5

* New programm started in 1991
** New programm started in 1992
*** Bachelor's degree/Master's degree (new programm starting in 1994)

NUMBER OF CONTACT HOURS

AUSTRIA	3 345	HUNGARY	3 960	ROUMANIA	4 512
BULGARIA	3 627	ICELAND	3 320	SLOVENIA	3 300
CZECH. REP.	2 953	LITHUANIA	3 561	SLOVAK. REP.	2 975
ESTONIA	4 915	NORWAY	not known	SWEDEN	6 364
FINLAND	3 550	POLAND	4 590	SWITZERLAND	4 136

As previously seen, it exists great variations from one country to another

EEC : 1 893 - 4 227
15 countries : 2 953 - 5 596

NUMBER OF CONTACT HOURS

IN EEC

BELGIUM	3080	GREECE	2925	PORTUGAL	4227
DENMARK	2256	IRELAND	2102	SPAIN	2825
FRANCE	2010	ITALY	2630	UNITED KINGDOM	1893
GERMANY	3250	NETHERLANDS	3420	LUXEMBOURG	As France

PRACTICAL COURSES* IN TOTAL

AUSTRIA	1 320 /40 %	HUNGARY	2 140/54 %	ROUMANIA	2 889/64 %
BULGARIA	2 311/64 %	ICELAND	1 484/44 %	SLOVENIA	1 395/42 %
CZECH. REP.	1 935/65 %	LITHUANIA	4 204/75 %	SLOVAK REP.	1 995/67 %
ESTONIA	3 051/62 %	NORWAY	not known	SWEDEN	not known
FINLAND	2 120/59 %	POLAND	3 175/69 %	SWITZERLAND	1 749/42 %

* Same definition and exclusion that previously described

EEC : 28 % - 62 % (530 - 2015)
15 countries :42 % - 75 % (1 290 - 4 204)

PRACTICAL COURSES IN TOTAL

IN EEC

BELGIUM	1600	52%	GREECE	1258	43%	PORTUGAL	1944	46%
DENMARK	992	44%	IRELAND	778	37%	SPAIN	847	30%
FRANCE	804	40%	ITALY	815	31%	UN. KINGDOM	530	28%
GERMANY	2015	62%	NETHERLANDS	992	29%	LUXEMBOURG	As France	

ELECTIVE AND OPTIONAL SUBJECTS

- CONCERN 10 COUNTRIES

- GREAT VARIATIONS FROM ONE COUNTRY TO ANOTHER

- CONCERN EITHER AUXILLARY SUBJECTS
  (DIETETICS - HISTORY OF PHARMACY - PHILOSOPHY - PERFUMARY AND COSMETICS)
  EITHER MANAGEMENT
  (ECONOMICS - MARKETTING AND MANAGEMENT...)
  OR ADVANCED STUDIES
  (PHARMACEUTICAL TECHNOLOGY - PHARMACOGNOSY - PHARMACOLOGY - PHARMACEUTICAL CHEMISTRY)

ELECTIVE OR OPTIONNAL SUBJECTS

AUSTRIA	at least 120 h	HUNGARY	3 X 12 weeks	ROUMANIA (Iasi)	256 h
BULGARIA	136 days	ICELAND		SLOVENIA	120 hours
CZECH REP.	336 h	LITHUANIA	324 h	SLOVAK REP.	135 h
ESTONIA		NORWAY	not known	SWEDEN	355 hours
FINLAND **	according to specialization in 4th and 5th year	POLAND*	according to specialization in 3rd, 4th and 5th year	SWITZERLAND	

** 4 specializations :
- Pharmacology & Toxicology
- Pharmaceutical Technology
- Pharmaceutical Chemistry
- Social Pharmacy

* 4 specializations :
Community Pharmacy
Analytical Pharmacy
Clinical Pharmacy
Industrial Pharmacy

LECTURE HOURS OF SEMI OPTIONAL SUBJECTS IN EEC

BELGIUM	/	GREECE	260	PORTUGAL	30 TO 45
DENMARK	660	IRELAND	40	SPAIN	480
FRANCE	580	ITALY	/	UNITED KINGDOM	270
GERMANY	/	NETHERLANDS	250	LUXEMBOURG	As France

FOREIGN LANGUAGE

AUSTRIA	E optional	HUNGARY		RCUMANIA	128h (E.G.Fr.R.)
BULGARIA	Yes	ICELAND		SLOVENIA	not known
CZECH REP.	Elective	LITHUANIA	72h (E.G.Fr)	SLOVAK REP.	(E and/or G/F assumed to be spoken fluently)
ESTONIA		NORWAY	not known	SWEDEN	not teached
FINLAND	120h (E.G.Sw)	POLAND	180h (E.G.Fr.R)	SWITZERLAND	

PRE-REGISTRATION TRAINING

- MOST OFTEN — IN A COMMUNITY PHARMACY OR IN A HOSPITAL PHARMACY
- SOMETIMES IN INDUSTRY
- SOMETIMES IN UNIVERSITY (WHICH OWNS A PHARMACY)
- SOMETIMES IN OTHER STRUCTURES (SUPPLY OF ANIMAL AND AGRICULTURAL PHARMACEUTICAL PRODUCTS).

PRE REGISTRATION TRAINING

12 MONTHS	AUSTRIA (after Thesis) - ESTONIA (after Graduation) - POLAND (after graduation) - SLOVENIA (5th year) - SWITZERLAND (3rd year)
10 MONTHS	BULGARIA (during the study)
9 MONTHS	ICELAND (6 months + 3 months after graduation)) ROUMANIA (after Thesis)
7 MONTHS	LITHUANIA
6 MONTHS	FINLAND (2 X 3 months during study) - HUNGARY (5th year + 3X4 weeks during study) - NORWAY - CZECH. REP (during the study) - SLOVAK. REP (during the study)
4 WEEKS	SWEDEN (to be confirmed) SLOVENIA

MAIN SPECIALIZATIONS

COMMUNITY PHARMACY

HOSPITAL PHARMACY

INDUSTRY

MEDICINAL ANALYSIS/LABORATORY

ANALYTICAL PHARMACY

RESEARCH (Ph. D)

CLINICAL PHARMACY

WRITTEN THESIS DIPLOMA

WRITTEN THESIS AUSTRIA (After the 4th year) - CZECH REP (5th year/476h)
FINLAND (5th year/480h) - HUNGARY (4th year/30 weeks) 4/30
ICELAND (5th year/10 weeks) - POLAND (5th year/375h) "Magister of Pharmacy"
ROUMANIA (5th year) SLOVENIA (5th year/3 months)

GRADUATION - DIPLOMA
BULGARIA (Magister of Pharmacy) - ESTONIA (Magister of Pharmacy) -
LITHUANIA (Pharmacist) - NORWAY (Pharmacist) - SLOVENIA (Pharmacist) -
SLOVAK REP (Pharmacist) - SWEDEN (Master of Science in Pharmacy) -
SWITZERLAND (Pharmacist) CZECH REP (Magister - Mgr)

MATHEMATICS	1st		2nd		3rd		4th		5th		TOTAL HOURS				NAMES OF THE COURSE IN THE COUNTRY
	1	2	1	2	1	2	1	2	1	2	LEC	LAB	SEM	TOT	
AUSTRIA											30	/	/	30	MATHEMATICS STATISTICS BIOMETRY
BULGARIA											42	98		140	MATHEMATICS APPLIED MATHEMATICS COMPUTER
CZECH REP											28	42		70	BIOPHYSICS + APPLIED STATISTICS COMPUTER
ESTONIA											39	/	78	117	MATHEMATICS
FINLAND											30	/	/	30	COMPUTER SCIENCE
HUNGARY											60	60	/	120	MATHEMATICS
ICELAND											126	84	/	210	MATHEMATICS STATISTICS
LITHUANIA											18	72	/	90	MATHEMATICS AND STATISTICS INFORMATICS
NORWAY	NOT KNOWN														
POLAND											30	/	70	90	MATHEMATICS STATISTICS
ROUMANIA											64	/	64	128	MATHEMATICS COMPUTER SCIENCE
SLOVENIA											60	45		105	MATHEMATICS
											75	30		105	PHARM INFORMATICS
SLOVAK REP.											13	30		43	MATHEMATICS
SWEDEN											34	18		42	STATISTICS MATHEMATICS
SWITZERLAND											48			48	MATHEMATICS

PLANT AND ANIMAL BIOLOGY	1st		2nd		3rd		4th		5th		TOTAL HOURS				SUBJECT
	1	2	1	2	1	2	1	2	1	2	LEC	LAB	SEM	TOT	
AUSTRIA											90	60	/	150	BOTANY BIOLOGY SYST BOTANY ANATOMY PLANTS
BULGARIA											56 56	42 84		98 140	BIOLOGY BOTANY
CZECH REP											84	84		168	GENERAL BIOLOGY MOLECULAR BIOLOGY PHARMACEUTICAL BOTANY
ESTONIA											40	98	/	138	BOTANY
FINLAND					INCLUDED IN PHARM-CHEMISTRY										BOTANY
HUNGARY											132 132	48 42		174	BIOLOGY PHARMACEUTICAL BOTANY
ICELAND											12	16		28	BOTANY
LITHUANIA											36	54		90	PHARMACEUTICAL BOTANY
NORWAY	NOT KNOWN														
POLAND											30	30	105	165	BIOLOGY AND GENETICS PHARMACEUTICAL BOTANY
ROUMANIA											128	112	/	240	BOTANY - CELL BIOLOGY - GENETICS
SLOVENIA											30	15	15	60	CELL BIOLOGY
SLOVAK REP.											45	75	/	120	BIOLOGY PHARMACEUTICAL BOTANY
SWEDEN	NON TEACHED														
SWITZERLAND											213	65	53	331	GENERAL BIOLOGY BIOLOGY OF THE CELL GENERAL BOTANY SYST. BOTANY

PHYSICS	1st		2nd		3rd		4th		5th		TOTAL HOURS				SUBJECT
	1	2	1	2	1	2	1	2	1	2	LEC	LAB	SEM	TOT	
AUSTRIA											60			60	PHYSICS
BULGARIA											56	84		140	PHYSICS AND BIOPHYSICS
CZECH REP											42	56		98	BIOPHYSICS
ESTONIA											58	98		156	
FINLAND							NOT TAUGHT								
HUNGARY											64	96		160	BIOPHYSICS
ICELAND											84	15	28	127	PHYSICS
LITHUANIA											18	36		54	APPLIED PHYSICS
NORWAY	NOT KNOWN														
POLAND											30	60	30	120	PHYSICAL PHARMACY
ROUMANIA												64	96	160	PHYSICAL PHARMACY
SLOVENIA											180	75		255	PHYSICS/PHYSICAL CHEM/PHYS PHARM
SLOVAK REP.											30	30		60	PHYSICS
SWEDEN															
SWITZERLAND											106	24	29	159	PHYSICS

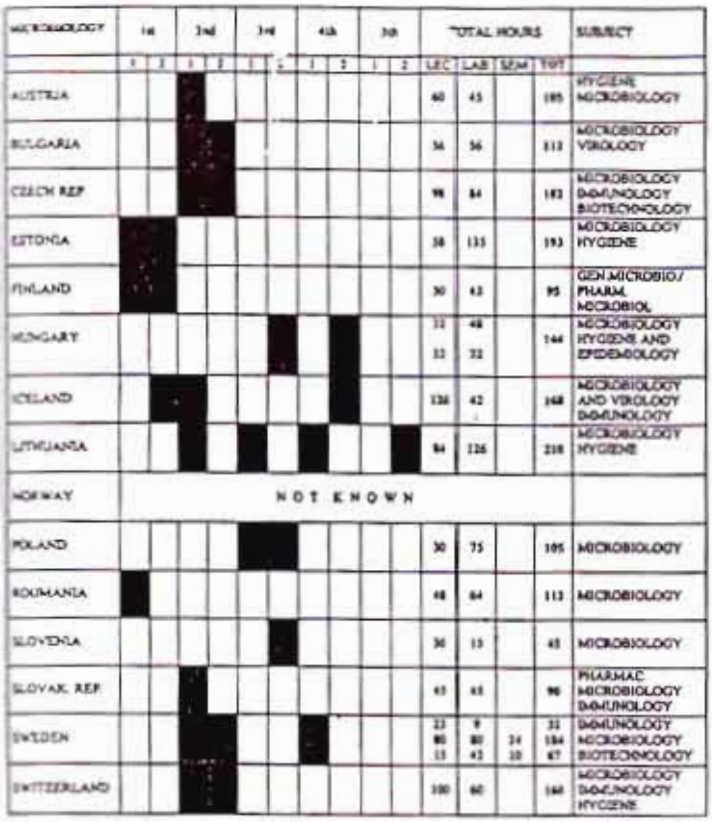
GENERAL AND INORGANIC CHEMISTRY	1st		2nd		3rd		4th		5th		TOTAL HOURS				SUBJECT
	1	2	1	2	1	2	1	2	1	2	LEC	LAB	SEM	TOT	
AUSTRIA											105	135	/	240	ANORGANICANA PHYSICAL CHEMISTRY
BULGARIA											56	98		154	GENERAL AND INORGANIC CHEMISTRY
CZECH REP											42	70		112	GENERAL AND INORGANIC CHEMISTRY
ESTONIA											58	98	/	156	ANORGANIC CHEMISTRY
FINLAND											30	45	/	72	GENERAL AND INORGANIC CHEMISTRY
HUNGARY											112	80	/	192	ANORGANIC CHEMISTRY
ICELAND											112	126	28	266	GENERAL CHEMISTRY
LITHUANIA											36	90	/	126	INORGANIC CHEMISTRY
NORWAY	NOT KNOWN														
POLAND											60	90	15	165	QUALITATIVE INORGANIC AND ANALYTICAL CHEMISTRY
ROUMANIA											96	96	/	192	GENERAL AND INORGANIC CHEMISTRY
SLOVENIA											90	75	/	165	INORGANIC CHEMISTRY
SLOVAK REP.											15	60		75	CHEMICAL THEORY OF DRUGS I
SWEDEN											180	180	216	576	PHYSICAL AND INORGANIC PHARMACEUTICAL CHEMISTRY
SWITZERLAND															GENERAL CHEMISTRY

MEDICINAL CHEMISTRY	1st		2nd		3rd		4th		5th		TOTAL HOURS				SUBJECT
	1	2	1	2	1	2	1	2	1	2	LEC	LAB	SEM	TOT	
AUSTRIA					■	■	■				240			240	PHARMACEUTICAL CHEMISTRY
BULGARIA					■	■	■				84	234		318	PHARMACEUTICAL CHEMISTRY
CZECH REP					■	■	■				84	84		168	PHARMACEUTICAL CHEMISTRY
ESTONIA					■	■	■	■	■	■	202	360		562	PHARMACEUTICAL CHEMISTRY
FINLAND			■	■							60			60	PHARM CHEMISTRY
HUNGARY					■	■	■				160	224		384	PHARMACEUTICAL CHEMISTRY
ICELAND							■	■	■	■	192	80	36	308	MEDICINAL CHEMISTRY
LITHUANIA					■	■	■	■	■	■	162	342		504	PHARMACEUTICAL CHEMISTRY
NORWAY	NOT KNOWN														
POLAND					■	■					90	165		255	CHEMISTRY OF DRUGS/ PHARMACEUTICAL CHEMISTRY
ROUMANIA					■	■	■	■			160	320 & 256			CHIMIE PHARMACEUTIQUE
SLOVENIA	■	■	■	■	■	■					283	195	45	525	PHARMACEUTICAL CHEMISTRY
SLOVAK. REP.					■	■					60	105		165	PHARMACEUTICAL CHEMISTRY
SWEDEN					■						25	5	30	60	MED. CHEMISTRY
SWITZERLAND							■	■	■	■	174			174	PHARMACEUTICAL CHEMISTRY

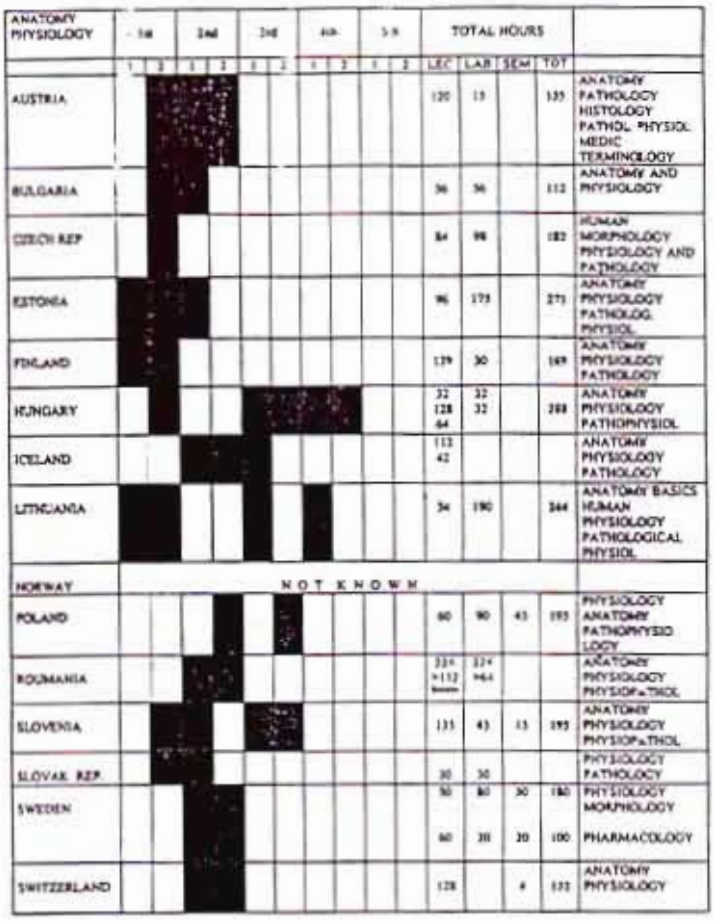
ORGANIC CHEMISTRY	1st		2nd		3rd		4th		5th		TOTAL HOURS				SUBJECT
	1	2	1	2	1	2	1	2	1	2	LEC	LAB	SEM	TOT	
AUSTRIA			■	■							135	165		300	ORGANIC CHEMISTRY
BULGARIA			■	■							84	186		270	ORGANIC CHEMISTRY
CZECH REP			■								70	112		182	ORGANIC AND BIOORGANIC CHEMISTRY
ESTONIA			■								78	196		274	ORGANIC CHEMISTRY
FINLAND	■					■					30	35		65	ORGANIC CHEMISTRY
HUNGARY			■	■							128	160		288	ORGANIC CHEMISTRY
ICELAND			■	■							112	140	56	308	ORGANIC CHEMISTRY
LITHUANIA	■	■							■		72	180		252	ORGANIC CHEMISTRY
NORWAY	NOT KNOWN														
POLAND	■	■	■								45	135	105	285	ORGANIC CHEMISTRY
ROUMANIA				■	■							96	12	108	ORGANIC CHEMISTRY
SLOVENIA				■	■						105	60		165	ORGANIC CHEMISTRY
SLOVAK. REP.	■				■						30	30		60	CHEMICAL THEORY OF DRUG
SWEDEN	■	■				■					70	140	63	273	ORGANIC CHEMISTRY
SWITZERLAND			■	■							70	300		370	ORGANIC PHARMACEUTIC CHEMISTRY

ANALYTICAL CHEMISTRY	1st		2nd		3rd		4th		5th		TOTAL HOURS				SUBJECT
	1	2	1	2	1	2	1	2	1	2	LEC	LAB	SEM	TOT	
AUSTRIA				■	■	■					180	480		660	ANALYTICAL CHEMISTRY
BULGARIA			■	■	■		■	■			36 56 28 56	168 112 28 154		234 168 56 210	ANAL. CHEMISTRY PHYSICAL CHEMISTRY BROMATOLOGY PHARMAC ANALYSIS
CZECH REP			■	■							42	168		210	ANALYTICAL CHEMISTRY
ESTONIA		■	■								78	193		272	ANALYTICAL CHEMISTRY
FINLAND			■	■							20	40		60	ANALYTICAL CHEMISTRY
HUNGARY			■	■							96	240		336	ANALYTICAL CHEMISTRY
ICELAND	■										168	126		294	ANALYTICAL CHEMISTRY INSTRUMENT
LITHUANIA			■	■	■						90	216		306	ANALYTICAL CHEMISTRY
NORWAY	NOT KNOWN														ANALYTICAL CHEMISTRY
POLAND	■										30	150		180	QUANTITATIVE ANALYTICAL CHEMISTRY
ROUMANIA		■	■	■	■	■			■		128	256		384	ANALYTICAL CHEMISTRY INSTRUMENT DRUG CONTROL
SLOVENIA	■	■			■	■			■		165	210	15	390	ANAL CHEM DRUG CONTROL INSTRUMENT PHARM ANALYSIS
SLOVAK. REP.			■	■				■			60	240		300	ANALYTICAL CHEMISTRY DRUG ANALYSIS
SWEDEN	■	■	■			■	■				112	320	192	624	ANALYTICAL CHEMISTRY
SWITZERLAND	■	■					■				148	671	13	832	ANALYTICAL CHEMISTRY

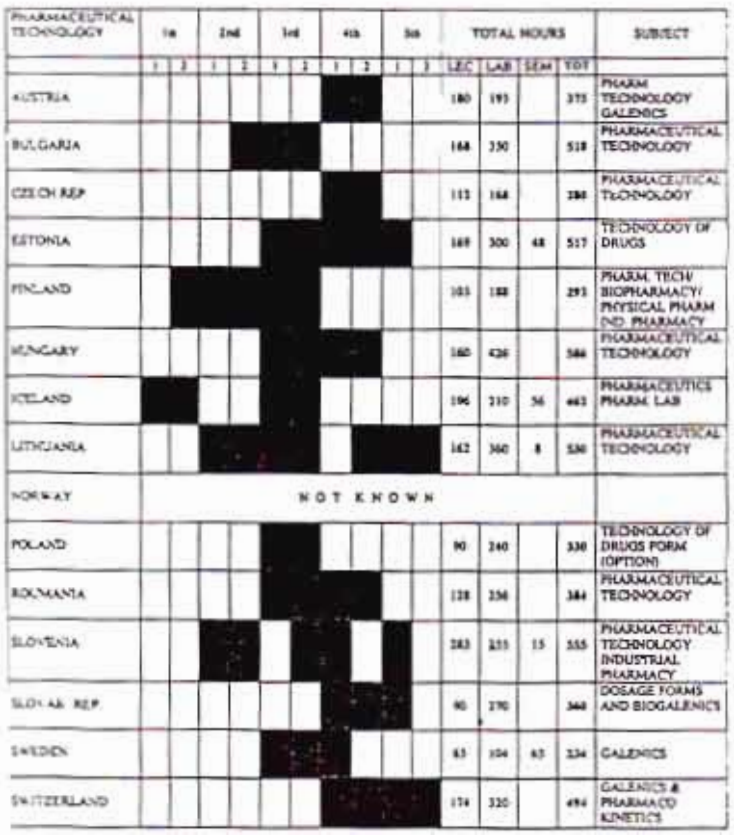
BIOCHEMISTRY	1st		2nd		3rd		4th		5th		TOTAL HOURS				SUBJECT
	1	2	1	2	1	2	1	2	1	2	LEC	LAB	SEM	TOT	
AUSTRIA			■								45			45	BIOCHEMISTRY
BULGARIA					■	■					56	70		126	BIOCHEMISTRY AND CLINICAL LABORATORY
CZECH REP				■	■						56	42		98	BIOCHEMISTRY
ESTONIA				■	■						67	98		165	BIOCHEMISTRY
FINLAND			■	■							40		4	44	BIOCHEMISTRY
HUNGARY				■	■						64	16		80	BIOCHEMISTRY
ICELAND					■	■					104	60		164	BIOCHEMISTRY I & II
LITHUANIA				■	■						72	72		144	BIOLOGICAL CHEMISTRY
NORWAY	NOT KNOWN														
POLAND				■	■						45	30	30	105	BIOCHEMISTRY
ROUMANIA					■	■					<96 >80	<128 >96			BIOCHIMIE
SLOVENIA					■	■					120	75		195	BIOCHEMISTRY + CLINICAL CHEMISTRY
SLOVAK. REP.				■	■						45 (30)	90 (60)		135	CHEMISTRY OF LIVE SYSTEMS AND DRUGS I & II (OPTIONAL) PATHOBIO CHEMISTRY
			■								80	40	40	160	BIOCHEMISTRY/ MOLECULAR BIOLOGY
SWITZERLAND			■								48			48	BIOCHEMISTRY



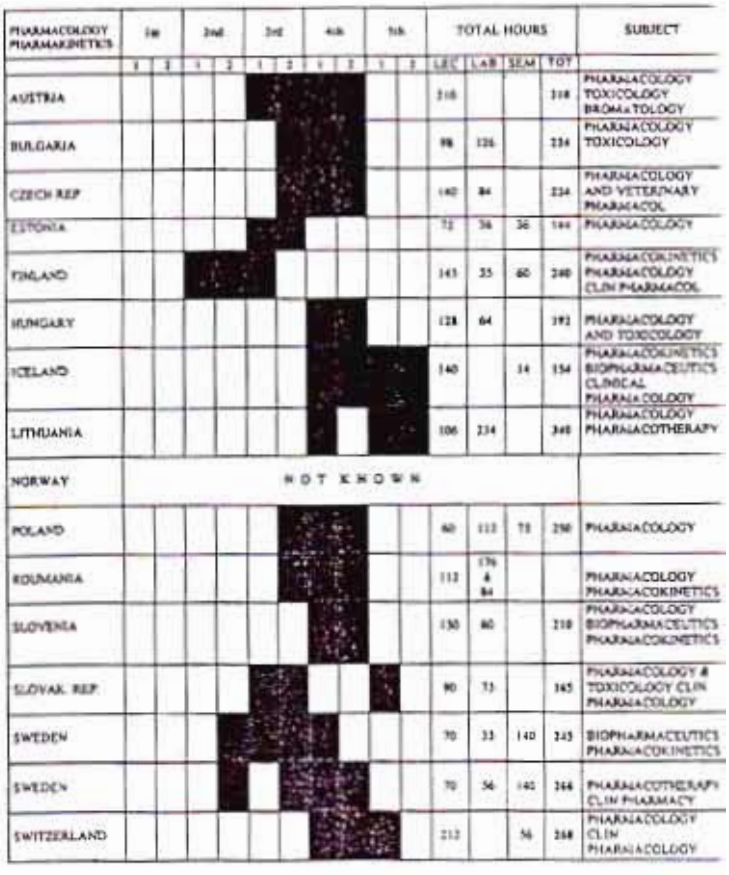
MICROBIOLOGY	1st	2nd	3rd	4th	5th	TOTAL HOURS				SUBJECT
	1 2	1 2	1 2	1 2	1 2	LEC	LAB	SEM	TOT	
AUSTRIA						60	45		105	HYGIENE MICROBIOLOGY
BULGARIA						56	56		112	MICROBIOLOGY VIROLOGY
CZECH REP						98	84		182	MICROBIOLOGY IMMUNOLOGY BIOTECHNOLOGY
ESTONIA						58	135		193	MICROBIOLOGY HYGIENE
FINLAND						30	63		95	GEN MICROBIO/ PHARM. MICROBIOL
HUNGARY						32 32	48 32		144	MICROBIOLOGY HYGIENE AND EPIDEMIOLOGY
ICELAND						126	42		168	MICROBIOLOGY AND VIROLOGY IMMUNOLOGY
LITHUANIA						84	126		210	MICROBIOLOGY HYGIENE
NORWAY	NOT KNOWN									
POLAND						30	75		105	MICROBIOLOGY
ROUMANIA						48	64		113	MICROBIOLOGY
SLOVENIA						30	13		43	MICROBIOLOGY
SLOVAK REP.						43	43		96	PHARMAC MICROBIOLOGY IMMUNOLOGY
SWEDEN						22 80 13	9 80 42	24 10	31 184 67	IMMUNOLOGY MICROBIOLOGY BIOTECHNOLOGY
SWITZERLAND						100	60		160	MICROBIOLOGY IMMUNOLOGY HYGIENE



ANATOMY PHYSIOLOGY	1st	2nd	3rd	4th	5th	TOTAL HOURS				
	1 2	1 2	1 2	1 2	1 2	LEC	LAB	SEM	TOT	
AUSTRIA						120	15		135	ANATOMY PATHOLOGY HISTOLOGY PATHOL PHYSIOL MEDIC TERMINOLOGY
BULGARIA						56	56		112	ANATOMY AND PHYSIOLOGY
CZECH REP						84	98		182	HUMAN MORPHOLOGY PHYSIOLOGY AND PATHOLOGY
ESTONIA						96	175		271	ANATOMY PHYSIOLOGY PATHOLOG. PHYSIOL
FINLAND						139	30		169	ANATOMY PHYSIOLOGY PATHOLOGY
HUNGARY						32 128 64	32 32		288	ANATOMY PHYSIOLOGY PATHOPHYSIOL
ICELAND						113 42				ANATOMY PHYSIOLOGY PATHOLOGY
LITHUANIA						54	190		344	ANATOMY BASICS HUMAN PHYSIOLOGY PATHOLOGICAL PHYSIOL
NORWAY	NOT KNOWN									
POLAND						60	90	45	195	PHYSIOLOGY ANATOMY PATHOPHYSIOLOGY
ROUMANIA						324 +132	324 464			ANATOMY PHYSIOLOGY PHYSIOPATHOL
SLOVENIA						135	43	15	195	ANATOMY PHYSIOLOGY PHYSIOPATHOL
SLOVAK REP.						30	30			PHYSIOLOGY PATHOLOGY
SWEDEN						90 60	60 30	30 20	180 100	PHYSIOLOGY MORPHOLOGY PHARMACOLOGY
SWITZERLAND						128		4	132	ANATOMY PHYSIOLOGY



PHARMACEUTICAL TECHNOLOGY	1st	2nd	3rd	4th	5th	TOTAL HOURS				SUBJECT
	1 2	1 2	1 2	1 2	1 2	LEC	LAB	SEM	TOT	
AUSTRIA						180	195		375	PHARM TECHNOLOGY GALENICS
BULGARIA						168	350		518	PHARMACEUTICAL TECHNOLOGY
CZECH REP						112	168		280	PHARMACEUTICAL TECHNOLOGY
ESTONIA						169	300	48	517	TECHNOLOGY OF DRUGS
FINLAND						105	188		293	PHARM. TECH BIOPHARMACY/ PHYSICAL PHARM IND. PHARMACY
HUNGARY						160	426		586	PHARMACEUTICAL TECHNOLOGY
ICELAND						196	210	56	462	PHARMACEUTICS PHARM. LAB
LITHUANIA						162	360	8	530	PHARMACEUTICAL TECHNOLOGY
NORWAY	NOT KNOWN									
POLAND						90	240		330	TECHNOLOGY OF DRUGS FORM (OPTION)
ROUMANIA						128	256		384	PHARMACEUTICAL TECHNOLOGY
SLOVENIA						283	255	15	555	PHARMACEUTICAL TECHNOLOGY INDUSTRIAL PHARMACY
SLOVAK REP.						90	270		360	DOSAGE FORMS AND BIOGALENICS
SWEDEN						65	104	65	234	GALENICS
SWITZERLAND						174	320		494	GALENICS & PHARMACO KINETICS



PHARMACOLOGY PHARMACOKINETICS	1st	2nd	3rd	4th	5th	TOTAL HOURS				SUBJECT
	1 2	1 2	1 2	1 2	1 2	LEC	LAB	SEM	TOT	
AUSTRIA						210			210	PHARMACOLOGY TOXICOLOGY BROMATOLOGY
BULGARIA						98	126		224	PHARMACOLOGY TOXICOLOGY
CZECH REP						140	84		224	PHARMACOLOGY AND VETERINARY PHARMACOL
ESTONIA						72	36	36	144	PHARMACOLOGY
FINLAND						143	35	60	240	PHARMACOKINETICS PHARMACOLOGY CLIN PHARMACOL
HUNGARY						128	64		192	PHARMACOLOGY AND TOXICOLOGY
ICELAND						140		14	154	PHARMACOKINETICS BIOPHARMACEUTICS CLINICAL PHARMACOLOGY
LITHUANIA						106	234		340	PHARMACOLOGY PHARMACOTHERAPY
NORWAY	NOT KNOWN									
POLAND						60	113	75	250	PHARMACOLOGY
ROUMANIA						113	176 & 84			PHARMACOLOGY PHARMACOKINETICS
SLOVENIA						150	60		210	PHARMACOLOGY BIOPHARMACEUTICS PHARMACOKINETICS
SLOVAK REP.						90	75		165	PHARMACOLOGY & TOXICOLOGY CLIN PHARMACOLOGY
SWEDEN						70	33	140	243	BIOPHARMACEUTICS PHARMACOKINETICS
SWEDEN						70	56	140	266	PHARMACOTHERAPY CLIN PHARMACY
SWITZERLAND						212		56	268	PHARMACOLOGY CLIN PHARMACOLOGY

PHARMACOGNOSY	1st		2nd		3rd		4th		5th		TOTAL HOURS				SUBJECT
	1	2	1	2	1	2	1	2	1	2	LEC	LAB	SEM	TOT	
AUSTRIA											165	225		390	PHARMACOGNOSY PHARMACOGNOSICAL EXERCICE
BULGARIA											56	140		196	PHARMACOGNOSY
CZECH REP											56	140		196	PHARMACOGNOSY
ESTONIA											147	241		388	PHARMACOGNOSY
FINLAND											40		4	44	PHARMACOGNOSY
HUNGARY											64	128		192	PHARMACOGNOSY
ICELAND											114	82		196	PHARMACEUTICAL NATURAL PRODUCTS CHEMISTRY
LITHUANIA											108	180		288	PHARMACOGNOSY
NORWAY	NOT KNOWN														
POLAND											30	90	15	135	PHARMACOGNOSY
ROUMANIA												96	160 & 96		PHARMACOGNOSY
SLOVENIA											90	120		210	PHARMACOGNOSY
SLOVAK REP											30	150		180	PHARMACOGNOSY
SWEDEN											12.5	5	10	27.5	PHARMACOGNOSY
SWITZERLAND											142	180		322	PHYTOCHEMISTRY

TOXICOLOG	1st		2nd		3rd		4th		5th		TOTAL HOURS				SUBJECT
	1	2	1	2	1	2	1	2	1	2	LEC	LAB	SEM	TOT	
AUSTRIA											210				TOXICOLOGY PHARMACOLOGY & BOMATOLOGY
BULGARIA											98	126		224	(PHARMACOLOGY AND TOX.COLOGY
CZECH REP											14		14	28	TOX COLOGY
ESTONIA											58	75		133	FORENSIC CHEMISTRY
FINLAND	INCLUDED IN PHARMACOLOGY														TOX COLOGY
HUNGARY											128	64		192	(PHARMACOLOGY AND) TOXICOLOGY
ICELAND											56			56	TOXICOLOGY
LITHUANIA											34	108		142	TOXICOLOGICAL CHEMISTRY
NORWAY															
POLAND											15	135	15	165	TOXICOLOGY
ROUMANIA											64	112		176	TOXICOLOGY
SLOVENIA														60	TOXICOLOGIC CHEMISTRY
SLOVAK REP											15	30		45	TOXICOLOGY OF XENOBIOTICS
SWEDEN											30	8	3	41	TOXICOLOGY
SWITZERLAND	TEACHED WITH PHARMACOLOGY														

LEGISLATION DEONTOLOGIE	1st		2nd		3rd		4th		5th		TOTAL HOURS				SUBJECT
	1	2	1	2	1	2	1	2	1	2	LEC	LAB	SEM	TOT	
AUSTRIA											15			15	PHARMACY LAW
BULGARIA											56		84	140	PHARMACEUTICAL ETHICS AND LEGISLATION
CZECH REP											42		42	84	FUNDAMENTALS OF LAW SOCIAL PHARMACY
ESTONIA											24		36	60	PHARM. INFORMATIONS
FINLAND											60		100	160	PHARMACY LAW & SOCIAL PHARMACY
HUNGARY											24			24	PHARMACEUTICAL SOCIOLOGY ETHICS
ICELAND											84			84	SOCIAL PHARMACY
LITHUANIA											18		18	36	ETHICS
NORWAY	NOT KNOWN														
POLAND											30		15	45	PHARMACY LAW PHARM ETHICS
ROUMANIA											32	32 & 64			LEGISLATION ECONOMIE
SLOVENIA														180	SOCIAL PHARMACY PHARM. ADM. MARKETING MANAGT
SLOVAK REP											30		45	75	ART OF PHARMACY PRACTICE
SWEDEN											112	18	29	159	SOCIAL PHARMACY
SWITZERLAND	NOT KNOWN														

Pr. B. del CASTILLO GARCIA (Spain)

2nd EUROPEAN MEETING OF THE FACULTIES OF PHARMACY

BERLIN '94

Among the topics discussed at the 2nd Meeting of the European Association of Faculties of Pharmacy, held in Berlin on 26, 27 and 28 of September 1994, were the different study plans in Pharmacy education, both in the EU (European Union) and in the rest of the European countries. The aim of this meeting was to evaluate educational problems directly affecting training in Pharmacy, as well as to discuss how future criteria at supranational level should be unified, both in subjects which integrate the pharmacist's minimum curriculum, as well as in the percentage and time dedicated to each subject.

This issue reached its acme in the second session corresponding to 27 September, entitled "Evaluation and Comparison of Education and Training in European Faculties of Pharmacy". The lectures were given by Prof. Ahlgrimm (Comparison of the curricula in the 12 countries of the EEC) and Prof. Bourlioux (Comparison of the curricula in the other European countries).

A special mention should be made on the excellent exposition made by Prof. Alhgrimm who focused his discussion on the necessity for criteria unification at the European level, in terms of mutual recognition of university education imparted at every European Faculty of Pharmacy.

Prof. Alhgrimm provided very interesting data on the experience in Germany where Pharmacy studies are developed over 5 years time, distributed in 6 month courses.

He also commented the recommendations of the Expert Committee on the characteristics of access to Faculties of Pharmacy, as well as the importance of unifying the duration of the studies and the organization of exams. In this point he indicated the need to introduce, as differentiated concepts, the following: lecture hours, theoretical courses, laboratory practice and seminars. These issues constituted the central point of discussion in the subsequent Round Table.

The differences currently existing between the European Union countries demand a new agreement on the unification of the studies in Pharmacy. According to Prof. Ahlgrimm, an important problem arises in certain countries, as a consequence of different level of requirements and knowledge at high school which directly influence subsequent pharmaceutical studies.

He indicated that the duration of training in Pharmacy also differs from country to country within the EU, both in number of total hours as well as in percentage of hours dedicated to practical courses.

He considered it recommendable to dedicate 30% of lecture hours to practical training. In the Round Table which followed the exposition of the German representative, the need to unify criteria for comparative evaluation of education, by means of "credit" system, with differentiation between theoretical and practical credits, was made evident.

In any case, the difficulty found for the quantification of the quality of education was made clear.

An emphasis was also placed on the necessity to harmonize the percentage of time dedicated to training of large subject groups, such as Pharmacology (dedication of 11-30%) or Chemistry (a 25-46% variation in different countries). The need for an adequate distribution of subjects throughout the five years (85/432/EEC) of education in Pharmacy was made evident.

As a conclusion it was observed that these issues underline the necessity to coordinate the studies in Pharmacy in the EU member countries.

Likewise, Prof. del Castillo, one of the moderators of the Round Table suggested the possibility of introducing subjects of humanistic nature, such as Bioethics, History of Pharmacy, Sociology and Psychology, Pharmaceutical Food Sciences and Drug Analysis and Control. He also mentioned the need to define and describe the 14 essential subjects of the Directive 85/432/EEC.

Thereafter, during the discussions headed by Prof. Bourlioux, the differences existing in the study plans of the four countries adhered to the EU (Sweden, Norway, Finland and Austria) and in the Central and East European countries, as well as in Switzerland and Island were described in detail, emphasizing one of the main objectives: the necessity to be knowledgeable on what was being done in those countries in the field of Pharmaceutical Education. To this end, it is of utmost importance to foster pertinent exchange in terms of education and then, to study the issue of academic recognition of pharmaceutical diploma.

Considering around 90,000 Pharmacy students in the EU, which account for approximately 11,000 new pharmacists a year, it is deemed necessary, for the future, to harmonize both the number of years required for Pharmacy education in the rest of Europe as well as the number of lecture hours, in order to avoid significant differences existing at present (Switzerland, Austria, Lithuania, Hungry, etc.).

Also, he indicated it would be desirable to reach an agreement on the diverse denominations or terminology applied to similar disciplines, which are named differently in different countries, both in the EU and in the rest of Europe; to this aim, it would be necessary to establish and define, in advance, the contents or descriptors of the subjects.

Sometimes, scientific contents of traditional subjects appear interweaved, for example, Anatomy, Physiology or Physiopathology, or Microbiology, Bacteriology or Virology, among others.

He insisted again on the importance of unifying criteria, both with respect to optional subjects (where a high divergency exists), as well as in the number of hours imparted therein, and which, in his opinion, should not exceed 300 hours.

Finally, Prof. Bourlioux suggested interested issues which were discussed in the Round Table, such as bibliographic or research works (thesis) or stage (in community pharmacy, hospital pharmacy, pharmaceutical industry, etc.), prior to the obtention of Pharmacist diploma.

Also, the issue of the different regulations or legislation existing on the pre-registration, membership or similar situations in the various countries to practice a profession of pharmacist, as well as the Continuing Education and Specialization, were approached.

Finally, Prof. Glombitza from Germany, as the host and moderator of the Round Table emphasized the unifying and harmonizing consciousness prevailing throughout the entire session, in issues of major importance as the duration of Pharmacy studies, subjects to be imparted and their denomination, shown by the participants in this rewarding and fruitfull Round Table on the evaluation and comparison of education in Pharmacy in those countries which belong or will belong in the future to the European Union. At this point, the session dedicated to the "Evaluation and Comparison of Education and Training in European Faculties of Pharmacy" was closed.

Prof. B. del Castillo

SESSION III

Chairmen: Pr A.T. FLORENCE & Pr O. SANTOS FERREIRA

"ERASMUS PROGRAMME IN PHARMACY EVALUATION OF THE I.C.P."

Communications from:

- Pr. L. DELLA CORTE (Italy)
- Pr. A.P. DA CUNHA (Portugal)
- Pr. P. MACHERAS (Greece)
- Pr. F. PUISIEUX (France)
- Pr. A.H.P. PAES (Netherlands)
- Pr. J. BONNET (France)
- Round Table

General Introduction - Conclusions and Recommendations of the ERASMUS Meeting of ICP Co-ordinators in the Sciences

Prof. Laura Della Corte (Italy)

The ERASMUS Programme has proved to be of tremendous benefit both to students and teaching staff, and not only those involved in the exchanges.

As might be expected from a programme as diverse and ambitious as ERASMUS, most of us have experienced difficulties: that is to say when dealing with the system, in convincing our colleagues of its value, and in ensuring that our students receive the maximum benefit from the limited funds available.

It was in occasional meetings held with those from other ICPs that we came to realise that not only were some of the frustrations common to all of us, but that some colleagues could actually exchange suggestions for solutions and new approaches that could be of advantage to all of us.

This was the reason for which we asked the Commission to support the meeting whose Proceedings are reported in this volume (see cover page).

We are most grateful to the Commission for the generosity shown in agreeing to do so and for sending a representative whose advice was greatly appreciated. Further for the funds provided for the publication of this booklet, copies of which have been enclosed in your folder.

The initial invitation to the Meeting was sent out to 250 Co-ordinators of ICPs in the subject areas of Medical Sciences (codes 12) and Natural Sciences (codes 13). A direct interest in the meeting was expressed by about 100 co-ordinators and they were those consulted for choice of the topics to be treated.

A total of 59 participants, representing 62 ICPs., attended the meeting. The main subject areas of the ICPs represented at the meeting were: Biology (24%), Medicine (18%), Chemistry (16%), Pharmacy and Natural Sciences (each 13%), Physics and Dentistry (each 5%), whereas some participants (6%) were ERASMUS administrators rather then ICP co-ordinators. All EU member states were represented at the meeting. The mostly represented countries were UK (25%) and Italy (24%) followed by France (12%), Belgium (8%) and The Netherlands (5%). Germany, Greece, Ireland, Portugal and Spain had 2 representatives each, whereas Denmark and Luxembourg had each 1 representative. Furthermore, there were two EFTA countries, Sweden and Finland, represented by 2 and 1 participant, respectively.

The topics that were treated at the Meeting, chosen after consulting the 100 ICP co-ordinators interested in the Meeting, covered a wide range of aspects. Namely those related to the Service, dealing with the Consumer, the Assessment and the possible future Developments.
The speakers that were chosen from as many different countries as possible, while dealing with a specific topic, had to report on national problems possibly encountered whilst working on the projects.

We further allowed half a day on small group discussions, each group led by a rapporteur, dealing more accurately on topics that had emerged during the meeting as being ones of particular concern. They were:

A. Specific Problems in the Natural Sciences
B. Specific Problems in the Clinical Sciences
C. Recognition of Qualifications

Following the group discussions, we met later so to discuss the conclusions reached by each group and to formulate a concise list of all the recommendations to be presented to the Commission, which have been listed in appendix 1 of the Proceedings booklet.
Just to summarise them I would like to draw your attention to the major points highlighted, as they are of particular concern:

1) ECTS
The main concern about the problem of recognition was "the risk of losing diversity", a further recommendation on this point comes from our ICP.

2) Diminishing support to existing ICPs (Recommendations A6 and A10).
As an example I would like to show the financial support (ECUs/partner) received by our ICP since 1989. In the last 2 years, in spite of the consistent expansion of the group, funds have been dramatically cut down, thus seriously threatening the already planned out activities. Within this context, the concern expressed about the high cost of didactic materials due to the experimental nature of the exchanges in the Sciences must be pointed out.

3) SOCRATES
A third point of major concern was regarding SOCRATES for we feel seriously threatened by the avaricious administrators and the loss of the willing hard work and expertise of the ICPs.

Finally, I would like to express on behalf of all of us, how grateful we are to the Commission for having aptly considered the importance generally felt for subject area meetings such as the one we are now attending, and I wish to thank the organisers for giving me the opportunity to voice you this presentation.

EVALUATION OF STUDENTS MOBILITY IN PHARMACEUTICAL ICPs

Pr. A.P. DA CUNHA (Portugal)

First of all, I would like to thank Pr. BOURLIOUX and ERASMUS Bureau for my presence in this Meeting and for giving to me the opportunity to talk about the ICPs in Pharmaceutical studies.

If some students prefer community pharmacy, others have the possibility and the knowledge to have a job in Pharmaceutical Industry, Food Industry or in Cosmetology or in a Clinical Laboratory. These possibilities give a complex character to the studies of Pharmacy, with differences between the countries, especially between latin and anglo-saxon countries.

The development of ERASMUS Programme and ICPs (with free mover students) shows the richness of those differences, allowing the students to move freely in an other University to perfect their formation with courses, trainings and post-graduations.

The success of ICPs is linked to the opportunity for the students to have another different scientific education on a precise subject and, in the same time, to find another culture.

On these transparencies, you can see the good evolution of ICPs during the last six years of ERASMUS Programme.

About my own experience, I can say that our ICP began in 1988/1989 with Salamanca and is going on now with Granada, Madrid, Nantes, Paris-Sud, Liege and Athens. The number of concerned students is over 20.

This year, the students of the 3rd cycle will have trainings in many fields, in community pharmacy (6 months of compulsory training in Portugal), in hospital pharmacy .

The students of the 2nd cycle take courses with the other students and we did not have any problem for validation in the original country.

Until now, there were no difficulties to have students and even it happened that the demands were greater than the number of the scholarships.

We have 9 ICPs in our Faculty, I coordinate one of them and I am involved in another one.

In conclusion, I can say that the free mover condition in ICPs must be supported because the students are more and more interested and until now it has given very good results.

Pr. Françis PUISIEUX (France)

INTER - UNIVERSITY COOPERATION PROGRAMMES (I C P s)

Organized forms of cooperation which usually link Faculties or Departments but wich all involve the full committment of the Institutions concerned

- Students Mobility Programmes
- Teaching Staff Mobility Programmes
- Joint Development of New Curricula
- Intensive Programmes *

EVALUATION OF APPROVED INTENSIVE PROGRAMMES IN PHARMACY IN 1988 -1994

- Qualitative criteria for selection of IP
- Number of approved IP in Pharmacy
- Intensive Programme N° 94 F 4003.12
  (Coordinator : F. PUISIEUX)
- Intensive Programme N° 94 NL 3011.012
  (Coordinator : W.C. Van SANTEN)
- Why so few IP in Pharmacy ?

QUALITATIVE CRITERIA FOR SELECTION AIMS - ORGANIZATION

- AIMS :

Development of teaching programmes which are " multinational " in terms of participating students and focused on specific themes not normally available at any one of the participating institutions

(Programmes consisting largely of research activities or international conferences are not eligible)

- ORGANIZATION :

. Full - time ; 1 week - 1 month

. Number of students ; Staff - students ratio

. Academic credit.

QUALITATIVE CRITERIA FOR SELECTION (CONTENT , FINANCIAL SUPPORT)

- Content :

Should contribute to the dissemination of knowledge in new or rapidly evolving areas , should stimulate new student mobility programmes .

- Use of the financial support :

. Cost of travelling and staying abroad (teaching staff , students)

. Cost of meetings to plan the courses

. Expenses incurred in producing and circulating information and teaching material.

NUMBERS OF APPROVED ICPs IN PHARMACY BY STRAND IN 1988-1994

YEAR	ICP	SM	TS	CD	IP
1988	4	4	0	0	0
1989	9	8	0	0	1
1990	8	8	1	0	0
1991	15	15	1	0	0
1992	16	16	1	0	0
1993	22	22	2	0	0
1994	22	21	4	0	2

INTENSIVE PROGRAMME 94 F 4003 12

(approval = May 1994)

(financial support : 13.500 Ecus)

- Partners
- Training programme
- Organization
- Overall aims

IP 94 F 4003 12

(PARTNERS)

Country	Program Director	University
Belgium	Pr. MOES	Bruxelles
Denmark	Pr. KRISTENSEN	Copenhagen
Germany	Pr. KIESSEL	Marburg
Greece	Pr. CHOULIS	Athens
Ireland	Pr. CORRIGAN	Dublin
Italy	Pr. COLOMBO	Parma
Portugal	Pr. de SOUZA	Coïmbra
Spain	Pr. VILA JATO	Santiago de Compost.
The Nether.	Pr. CROMMELIN	Utrecht
Unit.Kingdom	Pr. MARRIOT	London

TRAINING PROGRAMME

(New forms and new routes of administration for drugs)

- Rationale : Physico-chemical, biological, pharmacokinetic problems posed by the administration of certain drugs (15 hours)
- Principal barriers encountered by drugs between their site of administration and their site of action
- Dosage forms designed to circumvent the above problems : targeted systems, controlled release delivery systems, " on demand " - release delivery systems.

OVERALL AIMS

- To give the students an overall view of the state of the knowledge in the scientific field covered by the programme

- To make the students aware of the absolute necessity for a multidisciplinary spirit and for a European dimension in the pharmaceutical industry

- To show to the students how much mobility to another European country could be beneficial.

ORGANIZATION

. Full-time teaching in English (lectures, case studies) - 10 days -

. Number of students : 33

. Staff-student ratio : 8 / 33

. Certificate

. First session in Lisbon.

INTENSIVE PROGRAMME 94 NL 3011.12

(Coordinateur : W.C. Van SANTEN;
Support : 10.700 Ecus)

- Partners : " ULLA " Institutions (Uppsala - London - Leiden - Amsterdam)
- Training programme :
  . Enabling courses : research management, statistics, drug registration ...
  . Science courses : molecular biological methods, HPLC, drug transport accross membranes, protein structure and function, vesicles, toxicology, pharmacokinetic - pharmacodynamic modelling.
- Organization : Ph D students Theorical courses and " hands - on ".
- Aims : To provide students with a broader experience and European outlook.

WHY SO FEW IP IN PHARMACY ?

- Probably not due to the criteria of selection
- Might be due to common reasons
  - . Lack of information
  - . Lack of time
  - . Heterogeneity of languages
- Might be due to more specific reasons
  - . Diversity of topics covered by existing pharmaceutical studies
  - . Heterogeneity of curriculae
  - . Heterogeneity of carrier paths
  - . Primary efforts devoted to cooperations between a limited number of countries
  - . Pharmacy not rated very highly on the priority list of the EEC .

Pharmaceutical topics and the Erasmus' Inter-University Cooperation Programs.

dr. A.H.P. Paes
Department of Pharmacoepidemiology and Pharmacotherapy
Faculty of Pharmacy,
Universiteit Utrecht,
The Netherlands

As a matter of fact every pharmaceutical subject can lead to an Inter-University Cooperation Programs (ICP) within Erasmus. Also every pharmaceutical education institute can participate. These diversity of possibilities make it very difficult to give a general overview of the different pharmaceutical programs within Erasmus. In general can be said that not every institution in Europe participate in a ICP and that some subjects are more popular than others. But also that some institutions participate in more than one ICP and that one topic can be integrated in more than one ICP.

In 1994, twenty four requests for an ICP were send to Brussels. From these, twenty two were approved. Almost all ICPs (21) include student mobility. Because one ICP may include more than one topic, there are more topics (27) included in the programs then the total number of ICPs.
The number of topics published at the reports of the Erasmus Bureau, may differ from the topics reported by the participants. Some times the participant reports more and some time less topics than the Erasmus Bureau does. In this general view the topics as reported by the participants is used. There are also three multidisciplinary ICPs were 'pharmacy' is included as topic. By this ICPs is not always clear which pharmaceutical subject they include. One of these ICPs reported that no specific pharmaceutical subject was included, but 'pharmacy' means 'drug related'.

These ICPs would permit (theoretically) the mobility of 526 students. However the data from Brussels shows for 1991 and 1992 an achievement of 54%.

11 Countries from the EU (Luxembourg does not have an own pharmaceutical faculty) and 4 countries from the EFTA (Switzerland, Austria, Sweden and Finland) participate in Pharmaceutical ICPs. In total 99 pharmaceutical institutions participate in one or more programs.

As been said one ICP can involve more than one topic. Also there is a great diversity of number of participants, which make it very difficult the give a simple total overview.

As it can be observed in Fig. 1, seventeen from the twenty five ICPs (22 pharmacy and 3 multidisciplinary ICPs) are coordinated by South European countries. The differences are remarkable: Spain for example coordinates six ICPs, Germany one and Great Britain none at all. It can be assumed that the southern countries have taken more frequently the initiative to start an ICP. If we take in account the number of topics being coordinated, then it can also been observed that the South European countries coordinate 51 of the 68 topics included (different ICPs may include the same topic).
As it can be seen at Fig. 2, the distribution of the number of institutions participating shows a different picture. The South European countries are still well represented, but also other countries participate in different ICPs.

If we observe the number of 'participants' (number of topics x number of participating institutions), then also the southern countries are in the majority: 282 of the 523 'participants'.

To arrange the different topics, a division in basic sciences, applied pharmacy sciences and pharmacy practice has been made. The four ICP's with as topic 'pharmacy' were not included.

Basic sciences:

biochemistry (1)[1] , food technology (1), microbiology (2), molecular pharmacology (1), parasitology (1), pharmaceutical biology (3) and pharmaceutical chemistry (9).

Applied pharmacy sciences:

- galenic pharmacy (5), pharmacognosy (3) and phytotherapy/phytopharmacy (1).
- biopharmacy (7), drug manufacturing (1), pharmaceutical technology (4) and pharmaceutics (4).
- pharmacokinetics (3), pharmacology (5) and toxicology (1).
- clinical pharmacy (1), drug information systems (1), pharmacoepidemiology (1), pharmacotherapy (1), social pharmacy (1), therapeutic drug monitoring (1).

Pharmacy practice:

community pharmacy (2), hospital pharmacy (2), industrial pharmacy (2).

This division can be criticized but is has been used as a way to make a clear arrangement. As it can be observed applied pharmaceutical sciences are the most popular topics and pharmacy practice topics are less popular (Fig. 3). This perhaps the result of the fact that pharmacy practice differs in the different countries of the European Union. Only one ICP has as goal student mobility at the level of practical training in community or hospital pharmacy of one of the other participating countries.

If we only observe the ICPs with as goal teachers mobility, then only applied pharmaceutical sciences are included.

Only ten topics are included in more than two ICPs. Nine of the 22 ICPs include pharmaceutical chemistry as one of the topics. Biopharmacy is mentioned in 7 ICPs, etc (Fig 4).
The more 'classical' (drug oriented) pharmaceutical subjects more frequently coordinated by southern countries. The more 'patient oriented' topics such as clinical pharmacy, therapeutics, social pharmacy, etc. are more frequently coordinated by northern countries.

As a general conclusion, it can be said that within pharmaceutical ICP-programs there is a great diversity of combinations. Analytical and technical topics are more popular than pharmacy practice and patient related topics.

[1](...) = number of ICPs including this subject.

Fig 1: Number of ICPs and countries coordinating them.

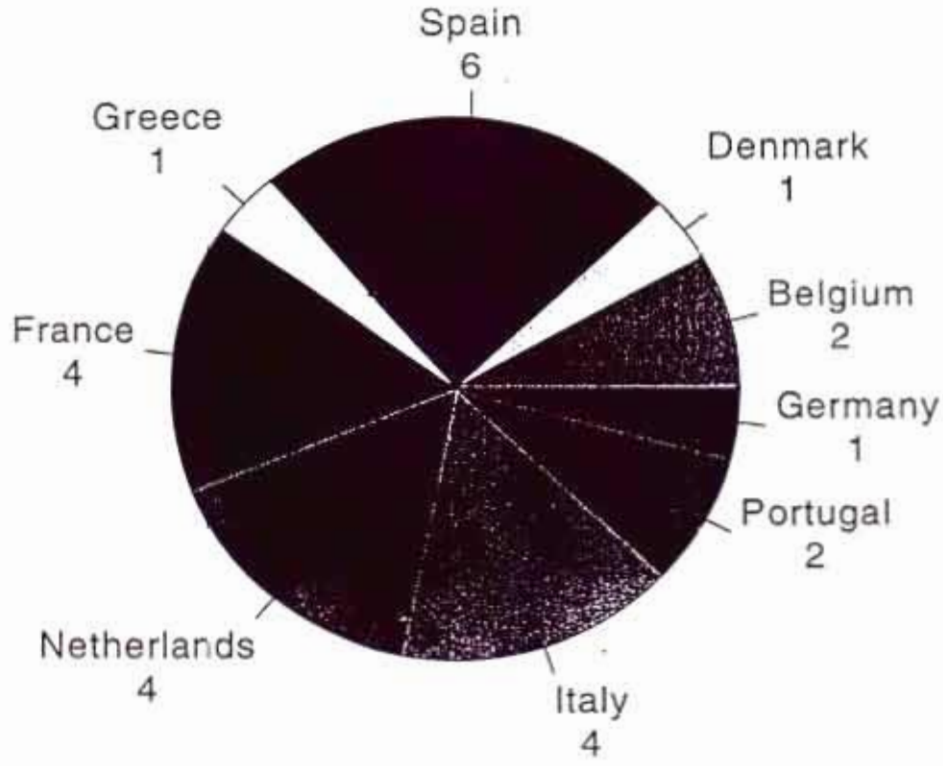


Fig. 2: number of participating institutions

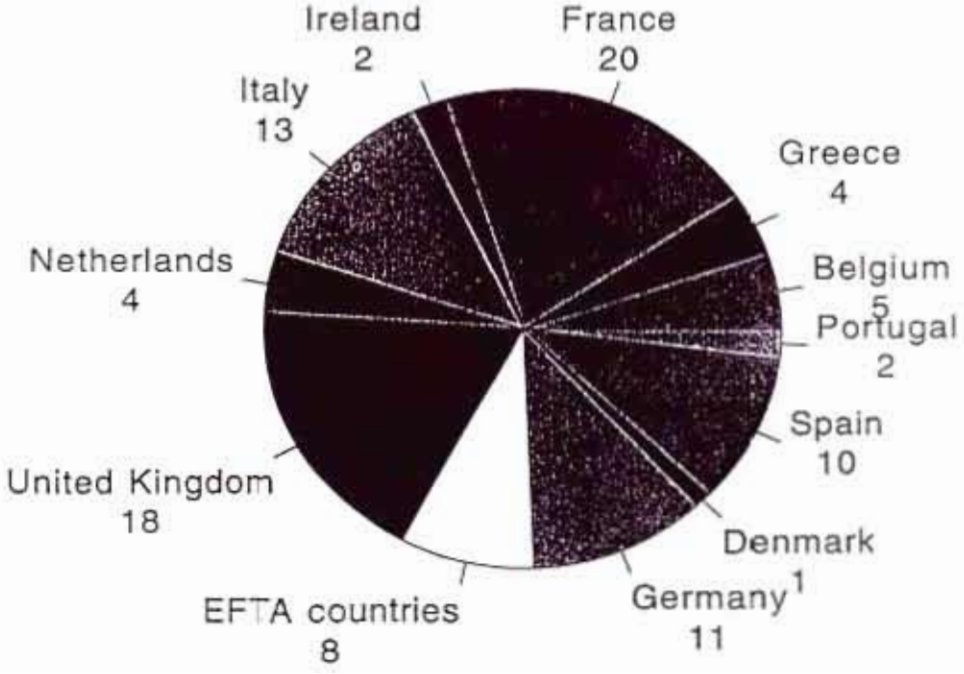


Fig. 3: Distribution of topics

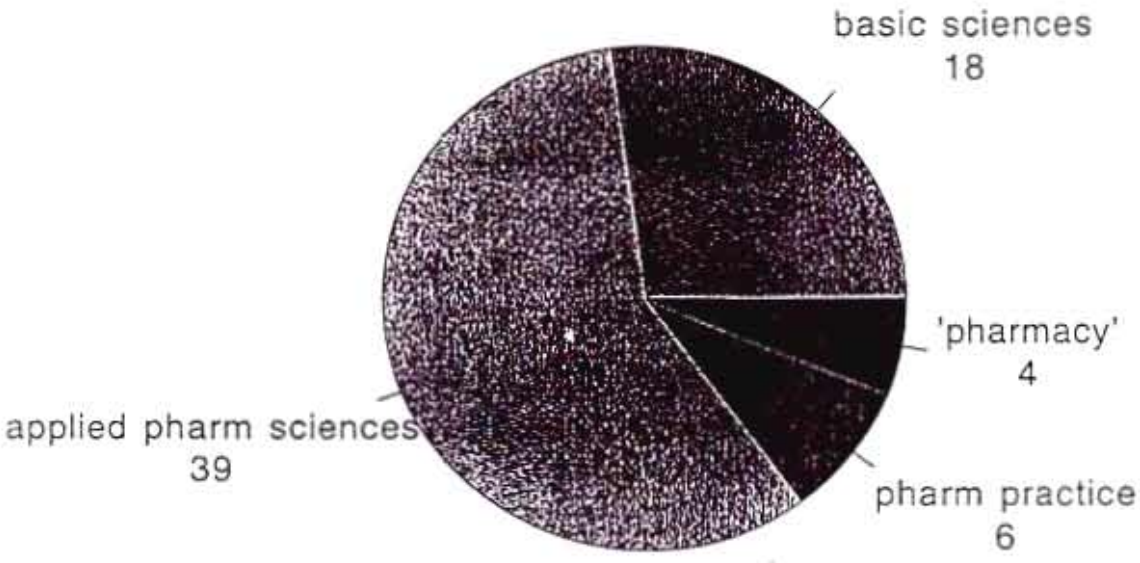
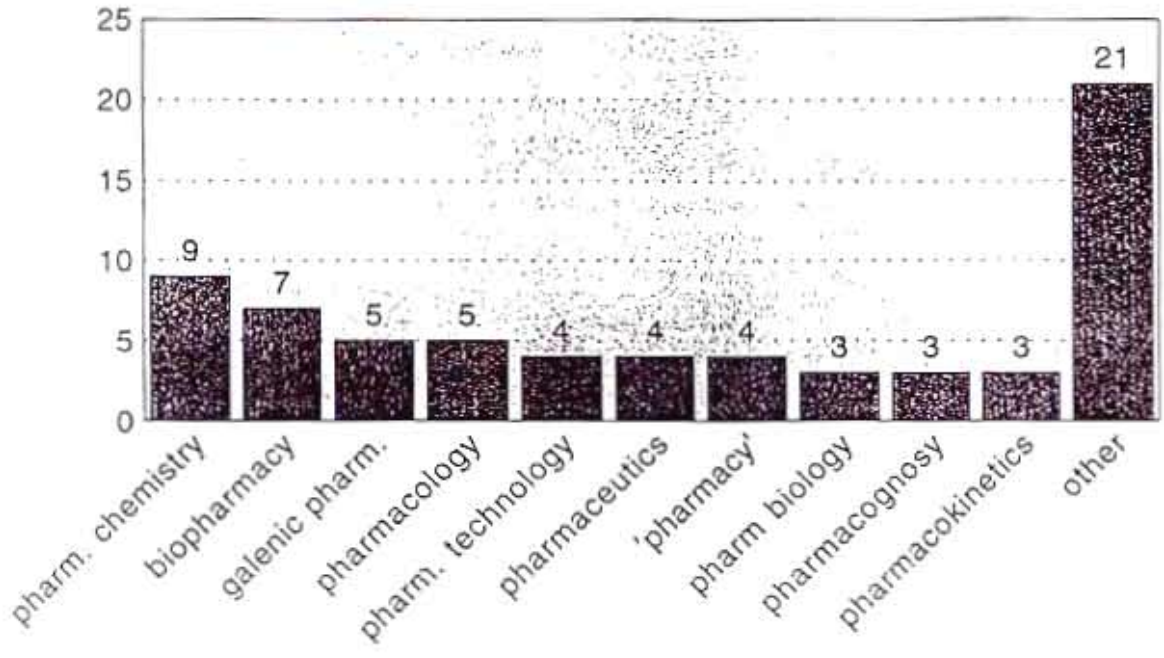


Fig. 4: Most popular topics



EUROPEAN COMMUNITY COURSE CREDIT TRANSFER SYSTEM (ECTS)

Pr. J. BONNET (France)

TARGET GROUPS

Students	to help students put together their programme of study
Academics	to help academics make academic recognition decisions
Institutions	

ECTS IS NOT AUTOMATIC RECOGNITION

There has to be agreement between institutions
The student must pass examinations
All decisions remain the sole responsibility of the institutions

ADDED VALUE OF ECTS

For Academics
- autonomy and diversity
- facilitates finding new partners
- facilitates programme negotiations — simple standard procedures; easy access to information on foreign curricula
- catalyst for reflection on — content; level; quality; learning outcomes; student workload

For Students
- broadens choice for students
- enables access to regular programmes alongside local students
- guarantees academic recognition

WHO CAN USE ECTS?

All European Higher Education Institutions
Students from Institutions using ECTS

PILOT SCHEME

145 Institutions (1993)
5 Subjects areas
- Business administration
- Chemistry
- History
- Mechanical engineering
- Medicine

HOW DOEST IT WORK?

Transparency	Information package transcript of records
Agreement	Signature of a learning agreement
Credits	One academic year equals 60 credits

INFORMATION ON CURRICULA

Content
Level
Relevance of courses towards a degree
Pre-requisites
Credits

CREDITS

Allocated to **EACH COURSE** by the Institution itself
Reflect the workload usually expected from a student in
- lectures
- laboratory work
- library work
- home work
- in-company placement

The work of one full academic year = 60 ECTS Credits
The student obtains credits only when he/she passes examination
Credits and grades must not be confused: credits reflect student workload
grades measure student achievements

GRADE TRANSFER SYSTEM

provide a mechanism to convert grades from one grading system to another without amendment to exixting systems

CURRICULUM TRANSPARENCY

Allocation of a number of credits to each course
Information package
- structure of curriculum
- courses' content
- number of credits allocated to each course
- examination system
- grading system
- general information

Distribution of information package to all partners

FURTHER INFORMATION FROM:

ERASMUS Bureau
ECTS Unit
Rue Montoyer 70

B-1040 BRUXELLES
Tel. : (32) 2-233 01 11
Fax : (32) 2-233 01 50

ÉVOLUTION DES PROGRAMMES EUROPÉENS EN MATIÈRE D'ÉDUCATION

* ECTS - PHASE PILOTE SE TERMINE

(dernière année universitaire prise en compte : 1994-1995)

- LES RÉSEAUX ECTS SERONT PEUT ÊTRE TRANSFORMES EN PICS (31 Universités en Chimie).

* ERASMUS

- FAVORISER LA CONSTITUTION DE

RÉSEAUX UNIVERSITAIRES

regroupant, par domaines d'études, les PIC.

DÉVELOPPEMENT EN COMMUN D'ÉTUDES,
EXTENSION DU SYSTÈME DE TRANSFERT DE CRÉDITS.

- ENCOURAGER LA CRÉATION DE

PÔLES UNIVERSITAIRES

permettant à plusieurs institutions de mettre leurs moyens en commun pour mieux répondre à des besoins spécifiques des étudiants

AUGMENTATION DE 40% DES CRÉDITS POUR L'ÉDUCATION POUR LA PÉRIODE 1995-1999 (Retombées du traité de MAASTRICHT, Article 126).
Renforcement en particulier des programmes ERASMUS et LINGUA.

Total > 1 Milliard d'Écus entre 95 et 99.

SYSTEME EUROPEEN D'UNITES CAPITALISABLES TRANSFERABLES DANS TOUTE LA COMMUNAUTE
ECTS

1. MISE EN PLACE DE L'ECTS

La préparation de l'ECTS aura lieu principalement au sein des établissements d'enseignement supérieur participants. La Commission facilitera la mise en oeuvre du programme ECTS en assurant la coordination et une structure financière de base.
Les sujets fondamentaux suivants devront faire l'objet de discussions préalables:

1. Attribution des crédits académiques
2. Schéma du cursus d'étude, description des cours
3. Répertoire des cours

1.1. Attribution des crédits académiques

Les crédits académiques sont attribués comme suit: 60 crédits par année d'études, 30 crédits par semestre ou 20 crédits par trimestre. Il est important qu'aucun cours spécial ne soit créé pour l'ECTS et que tous les cours du programme soient des cours normaux que les étudiants suivent dans des conditions normales à leur institution d'origine.

En fonction de l'importance des cours offerts, les établissements doivent répartir les crédits académiques suivant les différents cours. Les stages pratiques et les cours facultatifs qui font partie intégrante du cursus d'étude donneront lieu à des crédits académiques. Les stages pratiques et les cours facultatifs qui ne font pas partie intégrante du cursus ne donneront pas lieu à des crédits académiques. Les cours sans crédits académiques peuvent être mentionnés dans la transcription des dossiers.

Les crédits académiques ne sont accordés que lorsque l'étudiant a terminé le cursus d'étude et réussi tous les examens requis. Les étudiants qui ont obtenu moins de crédits que le nombre nécessaire peuvent soit être refusés et invités à terminer leur programme dans leur établissement d'origine avant de se rendre à l'autre établissement, soit être invités à combler leurs lacunes à l'établissement hôte avant de passer à l'année, le semestre ou le trimestre suivant. Si l'étudiant poursuit ses études avec succès, il pourra circuler librement entre certains ou tous les établissements participant au programme ECTS, à condition qu'il ait une connaissance suffisante des langues concernées.

Les étudiants devront satisfaire aux conditions légales et institutionnelles du pays et de l'établissement où ils effectuent les études. Par conséquent, lors de leur retour à l'établissement d'origine après n'avoir effectué qu'une période d'études limitée dans l'établissement hôte, les étudiants devront consulter le conseiller de la section ou de la faculté ou un autre membre du personnel de l'établissement d'origine afin de se renseigner sur les cours de l'établissement hôte qui correspondent le mieux au cursus d'étude de l'établissement d'origine. A cet effet il est essentiel que l'établissement hôte soit très souple et permette à l'étudiant ECTS de suivre tous les cours dont il a besoin, même si ces cours ne sont pas normalement inclus dans la période d'études (par exemple, troisième année d'études) pour laquelle l'étudiant s'est inscrit.

Lorsque l'étudiant retourne ensuite à son établissement d'origine et achève avec succès le cursus d'étude imposé par ce dernier, les crédits seront automatiquement transférés et l'étudiant continuera ses études à l'établissement d'origine sans aucune perte de temps ou de crédits. Par contre, si l'étudiant décide de rester à l'établissement hôte en vue d'y obtenir son diplôme, il devra éventuellement adapter ses études aux règles imposées par le pays, l'établissement et la section ou faculté hôtes.

1.2. Schéma du cursus d'étude, description des cours

Afin de fournir aux établissements, aux étudiants ou à d'autres parties intéressées des informations sur le cursus d'étude et de son contenu, une description succinte des cours et de leur contenu est nécessaire. Le schéma du cursus d'étude doit décrire de manière succinte les principaux éléments relatifs à la structure du cours, le nom des cours par unité (trimestre, semestre, année ou toute unité plus longue), sa valeur en terme de crédits ainsi que toute information importante complémentaire.

Le schéma du cursus d'étude doit être suivi d'une brève description (5 à 10 lignes) du contenu des cours proposés par la section ou la faculté. Le type de cours (cours normal, séminaire, laboratoire, etc.) devra être indiqué, de même que sa valeur en terme de crédits. La description du contenu du cours est sous la responsabilité de la personne qui l'enseigne.

1.3. Répertoire des cours

Le schéma du cursus d'étude et la description du contenu des cours doivent être établis sous forme écrite et, par la suite, de préférence aussi sous forme informatisée.

Par conséquent, il y aura un ensemble d'informations qui sera celui de chaque faculté ou section participante. Le coordinateur de faculté ou de section est responsable de son élaboration et de sa mise à jour; il fournira ces informations à tout étudiant ou établissement qui souhaite en prendre connaissance. Le coordinateur de section ou de faculté recevra les informations correspondantes des autres établissements participants à l'ECTS. Les informations des sections ou facultés constitueront le catalogue ECTS de faculté ou de section.

2. NEGOCIATION DES CREDITS ACADEMIQUES

Le programme ECTS sera fondé sur le principe de la confiance mutuelle et le respect des jugements émis par les enseignants du ou des établissements précédents de l'étudiant. Ce principe signifie que les décisions quant à l'organisation et au contenu du cours ainsi que les crédits appropriés seront prises par les établissements eux-mêmes.

European Association of Faculties of Pharmacy
Association Européene des Facultés de Pharmacie

Second Meeting, September 1994, Berlin

Presentations and Round Table Discussion on Erasmus Inter-University Cooperation Programmes (ICPs)

Session III of the meeting of the representatives of the faculties of pharmacy, chaired by Professor O. Santos Fereira (Lisbon) and Professor A.T. Florence (London), heard presentations outlined in the programme attached to these notes. Student exchange and scientific cooperation were vital elements of the Association's *raison d'etre*; in spite of the difficulties posed by language and the very large differences in the duration of study and curricula of pharmacy between the member states, pharmacy has had many successful exchanges under the ICP arrangements.

The meeting was reminded that ICP programmes comprised schemes for encouraging Student mobility, Teaching staff mobility, the arrangement of Intensive programmes, and Curriculum development. The first two had been more successful than the others in pharmacy, there being in fact no scheme involving the much needed subject of pharmaceutical curriculum development.

Professor Laura Della Corte (Florence) outlined the discussions that had taken place in Siena in September 1993 of the Erasmus Coordinators in the Sciences, whose recommendations discussed the specific problems faced by the sciences, specific problems in clinical exchanges and the question of recognition of qualifications. The coordinators had discussed the great strengths in the diversity of education in Europe in styles of teaching and learning, and were concerned that there should be no loss of diversity. The lack of a European education policy, referred to elsewhere, had perhaps meant a fall in resources which particularly hit the sciences, with their increased costs when laboratory work was involved. Some concern was also voiced over the changes introduced under SOCRATES and the transfer to administrators of some powers.

Professor Da Cunha (Coimbra) gave a comprehensive account of the movement of students in pharmacy ICPs and drew attention to the mismatch in many countries of the numbers of incoming and outgoing students. Again the richness of the diversity of experience in Europe was discussed . The growth in ICPs in pharmacy was particularly noteworthy, involving latterly about 100 institutions and over 500 students. Effectiveness when small numbers of students were involved was discussed.

Professor P. Macheras (Athens) drew attention to the very small numbers of staff who had participated in staff mobility schemes, yet he pointed out how vital it was if we were to develop curricula and develop new scientific cooperations, and developments such as the European Masters degree programme. This was an area that needed greater impetus.

Professor F. Puisieux (Paris-Sud) discussed the intensive programmes, whose aims were the development of multinational programmes on themes that were not available at any one of the participating institutions; they were educational rather than research programmes in new and rapidly evolving areas with the additional aim of stimulating new schemes of student mobility. Reference was made to the ULLA consortiums postgraduate summer schools which now had support from ERASMUS.

Professor A.H.P. Paes pointed out in his presentation that the majority of coordinators came from the Southern Mediterranean countries, and that the UK, for example, was coordinating none but participating heavily. Germany was not significantly involved in many schemes. The need to develop ICPs in the areas of pharmacy practice was pointed out.

It was clear that in analyses of curricula in the Member States (as addressed in Session I) or in any discussions of ICPs and student transfers, that a common pharmaceutical lexicon needs to be established, single definitions of pharmaceutical technology, galenic pharmacy and pharmaceutics (these three, as examples, sometimes being used as synonyms in curricular summaries) must be developed.

Professor Bonnet (Toulouse) described ECTS which guaranteed students academic recognition of their study abroad. It did not, however, allow automatic recognition, nor did it demand harmonization of curricula and courses. Decisions on recognition and credits remained the province of the institutions concerned. The pilot scheme in which 145 institutions had participated in Chemistry, History, Medicine worked on the basis of 60 credits being equivalent to an academic year, credits being obtained only after passing an examination. There were many ways of reaching the total of 60. The system guaranteed autonomy and diversity, and discussion on credits in institutions had acted as a catalyst for reflections on the content, quality and workload of their courses.

ROUND TABLE DISCUSSION

The meeting was reminded that, in response to UK concerns about selection and funding in the ERASMUS programmes, Prof. Ruberti had written, "bearing in mind the limited funding for education..the Commission's responsibility in selection criteria must ensure a balance between the subject areas covered and a geographical balance at the level of Member States, as well as ensuring flexibility..to allow a number of newcomers to European cooperation to take part.... Community funding is always a small contribution to the costs of an activity..."

"In the absence of a European education policy, the Commission's role is to act as a catalyst..supporting and supplementing activities that already have the commitment of Member States and institutions..I am disappointed that excellent cooperations may be threatened. This clearly shows how far there is yet to go in building a robust body of European universities and justifies ..our desire for increased activity in education under the SOCRATES programme.."

RECOMMENDATIONS

The following recommendations were put forward:

1. That increased emphasis be given to schemes which will allow curricular development in pharmacy, due to the diversity of programmes in pharmacy in Schools of Pharmacy in Europe. Emphasis should be placed on new subject areas, rather than on attempts at uniformity and to ensure the development of best practice and to develop superior educational programmes in these new areas.

2. Movement of University teachers to examine trends and best practice in other European faculties of pharmacy should be encouraged, and schemes developed to allow the development of pan-European programmes in new disciplines such as biotechnology, gene therapy.

3. That more publicity and emphasis be given to intensive programmes with greater guidance as to the nature of topics that could be considered for such programmes;

4. The development of a credit transfer system in pharmacy would rely heavily on the clarification of the nomenclature for the subject disciplines in Schools of pharmacy throughout the EU: this does not imply uniformity, but should encourage diversity, but from a common subject language (discussed above). Assistance towards this would allow easier movement of students at all levels;

5. Schemes which allow the movement of small numbers of students should not be discouraged;

6. Cross-disciplinary movements which encourage study of subjects such as pharmacoeconomics and health care studies should be encouraged.

7. Inequivalence of curricula between faculties should not be a deterrent to movement at undergraduate level, but appropriate contractual arrangements are required between institutions to ensure that students are provided with a satisfactory course.

8. Cultural aspects of pharmacy, such as the history of pharmacy, should not be neglected in exchange schemes.

9. Teaching of the appropriate European language is essential at the base University prior to movement of the students to their host institution to allow maximum benefit from the time spent there.

10. Schemes which encourage the study of pharmacy practice in member states should be encouraged

SESSION IV

Chairman: Pr C. SOULEAU

"SOCRATES PROGRAMME"

Communication from:

- Mrs OGDEN (Bruxelles)

THE SOCRATES PROGRAMME

Mrs Elizabeth OGDEN

The subject area evaluation meeting in the field of Pharmacy was the first to be arranged in a series of such meetings under the auspices of Erasmus programme. Others currently planned include the subjects of business studies, communication, archaeology, teacher-training/education, women's studies, languages, biology, chemistry, tourism, law and physics. Evaluations for all subjects are intended, in the long run, in order to get a thorough overview of Erasmus activities; so you can see that Pharmacy has been particularly quick to get organised. The evaluation meetings are seen as particularly important in the process of reflection and self-examination at a time of incipient change. This will not only inform us all about the successes of Erasmus-style cooperation in developing the European dimension to study, but also help to identify areas where more effort is still needed, or where there may be particular obstacles to overcome. It is very timely, given that the overall theme of Socrates, stemming from Article 126 of the Treaty of Maastricht, is to contribute to the development of quality in education, that these evaluations should provide the "state of play" after some 6 years of Erasmus.

European cooperation in higher education enters a new phase with Socrates programme. Nevertheless, Socrates is firmly rooted in Erasmus activities, and continues the main mobility actions (student mobility, teaching staff mobility and intensive programmes). But if Socrates is to build on Erasmus, it is crucial to know what Erasmus has done and what it has been unable to do - and more importantly, to analyse why this should be so. Erasmus to Socrates can be summarised as a move from the (more or less) purely quantitative to a more qualitative approach. This can be seen most clearly by the emphasis on a "European dimension for all students", and the associated activities concerned with joint development of curricula, institutional commitment, and recognition mechanisms. It can also be seen in the current pilot projects on the evaluation of quality in Europe - being undertaken on a Europe-wide basis - which will examine the various existing methodologies of assessing quality, and consider what might constitute a European approach.

How do we encourage the more qualitative approach, in practice? Perhaps the first and very important point to emphasise is the enormous value of the work done by Erasmus participants until now. This has provided a firm base of experience across a wide range of individuals. There are now people in many universities, and all subject areas, who know what is to cooperate whith their counterparts from another Member State. They have faced considerable difficulties. Some of these difficulties have been identified in the formal Erasmus evaluations and studies, others through the more normal reporting processes of the programme, others by anecdote. Even basic quantitative analysis of the programme is able to indicate problem areas, such as the difficulty in guaranteeing recognition (a programme requirement) when every Member State has different quality requirements, all apparently needing to be satisfied. Another indicator is the continued need for the Commission to execise post-hoc balancing (ie after eligibility and quality criteria have been met) to ensure sufficient European coverage by Member State or by subject area. Socrates aims to provide some of opportunities for dealing with such issues.

In Pharmacy, as we have seen, there has been no curriculum development project, little mobility of teaching staff, a low take-up rate by students when programmes have been approved, and relatively low participation by Germany and UK - both large states, which are normaly strongly represented in Erasmus. Mobility can be seen as a "shorthand" for the state of a subject in relation to the development of European cooperation. Mobility, indeed, tests the result or the effectiveness of all the cooperation arrangements. If, therefore, mobility is difficult or imbalanced in some way on normal expectations, it is a sign of one or more problems that need to be adressed. Under Socrates, the activities, themselves, within the programme can act as mechanisms to adress any weaknesses - something which may have been desirable, but was not possible, under Erasmus. It is now time for universities - and, where appropriate, professional bodies - to get involved in the process of European cooperation by helping their staff, and supporting them, so that their expertise can spread to all parts of higher education, and all students, not just a few.

So, under Socrates we look for universities to take up their responsibilities to help programmes of inter-university cooperation really work. It does this principally via two new mechanisms: first, the development of an institutional contract, and second, via the development of European university projects on a common subject or theme. I stress that these are mechanisms, since the main focus of the programme - contributing to the development of quality European education - remains on academic staff and students.

The institutional contract is really a formalisation of each institution's European strategy, so is highly individualised and dependent on what that institution's priorities are. But how does an institution assemble all its diverse activities into a strategy, and how might they relate such activities to the needs of the various subjects concerned? This is precisely why meetings such as the subject evaluation series, amongst others, need to take place. As negotiations on Socrates continue - as they are planned to for the rest of this year, with a decision at the earliest in December - it is time for the Commission to listen to the reaction on the proposals in order that the best possible arrangements for implementation of the programme, as eventually agreed, can be set up.

What then, is the current stage on Socrates? Socrates both continues and extends Erasmus. It continues it, because all the current activities found under Erasmus programme can be found in Socrates. Thus, under Chapter 1, Higher Education, may be found transnational projects between universities for the purpose of organising student mobility, mobility of teaching staff, curriculum development, and intensive programmes. It also includes provision of individual student grants for those able to study abroad as part of such cooperations. All such activities, including the student mobility side, are highly dependent on the initiative of individuals who are keen to develop the European dimension of their field. However, their success frequently is dependent on the amount of support the university - as safeguard to academic quality, assurer of recognition of study abroad, recruiter and promoter of teaching staff, and ultimate authority on the institution's mission - is prepared to guarantee. The administrative facility of an institutional contract is intended to raise the profile of international activity within an institution, and to encourage internal debate and organisational restructuring.

Socrates also extends Erasmus - and not only by adding completely new areas of education, such as the involvement of school-level study (Chapter 2). Within higher education, one of the main new areas for Socrates is the development of opportunities for the "non-mobile" student (that is, the remaining 90% of students who are not specifically targetted by mobility programmes, and do not have the option to visit another country to study) to experience a European element in their study. This is brought about by a greater emphasis on curriculum development projects, and on the so-called thematic networks or University projects in areas of mutual interest. Both these areas draw on the longer-term effects of cooperation and mobility, and provide opportunities for staff to embed their hard won experience in lasting university policy of courses. Curriculum development clearly focusses on the latter, but may require development of policy alongside; it includes opportunities to develop a range of different types of course, and to use open and distance education expertise or methodology to reach new audiences or to link students who would otherwise not have any contact points in Europe. The university projects, on the other hand, are seen more as large-scale discussion fora, where the future perspectives of a subject can be examined, along with its impact on, or relationship with, research, the economic and professional worlds, and different policy or practice across Europe. This is also where the suite of subject evaluations will be particularly helpful in gauging the current state of play.

A further development is the inclusion of ECTS (European Credit Transfer System) activities within the scope of Socrates. This is seen primarily as part of the actions that favour mobility. Recognition being such a key aspect of successful mobility, and ECTS having proved itself as a facilitating mechanism in this area over the six years of its pilot programme, it is noteworthy tat Socrates now not only demands recognition for programme participants, but actively includes an activity which helps universities to fulfill that obligation.

As you may know, the first part of th negotiations on the proposal, between the Council and the European Parliament, was concluded by the agreement on the Common Position, reached in July. A number of amendments has been introduced, but considerably fewer than those originally proposed by the Parliament. The proposal is currently undergoing the second stage of discussions both by the Council and through a second reading of the European Parliament. Contentious issues outstanding concern the level of budget and the type of committee that will oversee the programme's activity. Reservations as to the precise nature and role of the "thematic networks" have been cited, and the institutional contract itself has required further explanation. At this stage, therefore, we would very much welcome your recommendations, your ideas, your questions, in order that we can take them into account when developing sensible criteria. We are also in position to pass on your views to other relevant areas of the Commission, should the need arise, such as in the field of research, professional recognition or teaching the subject (or elements comprising prerequisites) at school level.

SESSION V

Chairmen: Pr V. TORTORELLA & Pr D. BREIMER

ROUND TABLE: FUTURE PROSPECTS FOR EUROPEAN EDUCATION AND TRAINING AND IMPACT ON PHARMACEUTICAL PROFESSION

Participants:

- Pr. H.J. DE JONG	Industrial Pharmacy (Netherlands)
- Dr. C. CARNEIRO	Community Pharmacy (Portugal)
- Dr. J. KOTWAS	Hospital Pharmacy (Germany)
- Mrs I. VEYRON-CHURLET	Pharmapole (France)
- Pr. M. RASMUSSEN	Prospects in Postgraduate training in Europe (Denmark)

Pr. H.J. DE JONG

THE PHARMACIST IN THE PHARMACEUTICAL INDUSTRY

R & D
- CHEMISTRY, EXTRACTION, BIO TECHNOLOGY
- PHARMACOLOGY
- PHYSICOCHEMISTRY
- ANALYTICAL CHEMISTRY
- PHARMACEUTICAL TECHNOLOGY
- PHARMACOKINETICS
- METABOLISM
- TOXICOLOGY

- CLINICAL STUDIES
- REGULATORY AFFAIRS
- QUALITY ASSURANCE
- PLANNING
- SUB-CONTRACTING

THE PHARMACIST IN THE PHARMACEUTICAL INDUSTRY

PRODUCTION

- PURCHASING
- PRODUCTION (CHEMICAL, PHARMACEUTICAL)
- QUALITY CONTROL
- QUALITY ASSURANCE
- AUDITING SUPPLIERS
- REGULATORY AFFAIRS

MARKETING SALES

- MARKET ANALYSIS (REAL TIME, PROSPECTIVE)
- PUBLICITY
- SALES

MANAGEMENT

THE PHARMACIST IN THE PHARMACEUTICAL INDUSTRY

THE FRENCH SITUATION

	1988	1991	Δ
Production Q C Regulatory	1 026	1 260	+ 23 %
R & D	767	819	+ 11 %
Marketing Sales	644	768	+ 20 %
Administration Finances	323	303	- 7 %
TOTAL	**2 730**	**3 150**	**+ 15 %**
Male	1 618	1 593	
Female	1 112	1 557	

INTERVENTION DE Mme le Dr. Clara CARNEIRO (Portugal)

La pratique de la pharmacie officinale est largement guidée par un certain nombre de travaux récents: document de Madrid, 1988 (OMS), standards de qualité, Tokyo, 1993 (FIP), action contre le cancer, la toxicodépendance, l'alcoolisme , le Sida (Conseil de l'Europe), directives communautaires, Europharm Forum en janvier 1992, le Livre Blanc de la Pharmacie Européenne, les normes des Bonnes Pratiques de la Pharmacie (GPP), qui permettent de mieux savoir comment le médicament doit être utilisé à la fois par les médecins et par les malades.
Le pharmacien est responsable "du choix correct et de l'emploi correct", ce qui l'oblige à avoir une attitude consultative, interactive et personnelle avec les autres professions de santé et les malades. La thérapie médicamenteuse est dispensée dans le but d'améliorer la qualité de vie d'un malade.
Le pharmacien, selon les Bonnes Pratiques de la Pharmacie, a le devoir d'assurer le maximum de qualités aux services rendus. Pour cela, elles émettent quatre principes:

- le bien-être du public est primordial
- le travail du pharmacien consiste à délivrer des médicaments ou autre produits de soins, conseiller le patient, et suivre les effets de ces médicaments.
- le pharmacien doit assurer l'exécution d'une prescription rationnelle et économique, et l'usage correct des médicaments.
- l'objectif de chaque prescription doit être clairement défini, approprié à l'individu.

Je n'aborderai ici que quatre points de la pratique actuelle de la Pharmacie:

1. L'information

Renseigner le malade est fondamental.
Une étude faite par l'International Benefit/Risk Foundation en Europe, Japon, Etats-Unis a montré que 50% des gens diminuent ou augmentent précocement leur traitement. Un manque d'information ou une mauvaise compréhension peut être à l'origine de l'échec d'une thérapie conduisant à un gaspillage et une augmentation des frais de santé. Pour optimiser les résultats des soins pharmaceutiques, il faut:

- permettre au patient de prendre des décisions claires concernant son traitement.
- faciliter la communication pharmacien-patient, particulièrement importante en matière de pharmacovigilance.
- encourager l'usage rationnel des médicaments.

"Posez des questions sur vos médicaments" est un travail de réflexion lancé par Europharm Forum et l'OMS-Europe et le rôle du pharmacien est de répondre à 5 questions fondamentales:

- à quoi sert le médicament ?
- comment et quand doit-on le prendre ?
- quelle est la durée du traitement ?
- quels sont ses effets secondaires ?
- peut-on conduire pendant le traitement ?

2. Sélection du médicament

Le pharmacien possède la compétence professionnelle pour choisir éventuellement des médicaments de remplacement similaires à ceux prescrits (composition qualitative, quantitative, dosage des principes actifs, forme pharmaceutique, bioéquivalence).
Pour les médicaments non prescrits sur ordonnance, le pharmacien doit tenir compte de leurs qualité, efficacité et sûreté. Pour cela, le pharmacien doit pouvoir accéder à tout renseignement sur la qualité et la bioéquivalence des médicaments.

3. Automédication

C'est un sujet de plus en plus important, notamment avec les changements des politiques de remboursement des systèmes de santé de divers pays d'Europe. Il faut créer un équilibre entre la participation de l'Etat et la responsabilité individuelle, et assister les gens dans leur désir personnel d'assumer une plus grande responsabilité dans le domaine de la santé.
Une politique d'automédication a un grand impact économique. Elle allège le financement des systèmes de santé en diminuant:

- le nombre de médicaments prescrits
- le nombre de consultations médicales
- les frais associés à l'absentéisme.

Il faut développer un système réunissant information, conseil choix et accès aux médicaments non prescrits. Cela demande la collaboration de tous les responsables des systèmes de santé:

gouvernements, médecins, pharmaciens, assurances de santé, industrie pharmaceutique.
Les pharmaciens trouvent dans les Bonnes Pratiques des directives spécifiques concernant l'automédication, avec des protocoles, l'évaluation des besoins, la délivrance du médicament et le suivi du malade.
Le nombre des médicaments d'automédication devient de plus en plus important. D'autre part, la conscience que les maladies bénignes et fréquentes peuvent se soigner sans voir le médecin augmente la responsabilité du pharmacien en tant qu'éducateur, informateur et conseiller. Il est donc ici le seul technicien de santé à intervenir auprès du malade: "knowledge, skill and attitude".

4. Promotion de la santé et prévention

Le document de l'OMS "Targets for pharmacy for the year 2000" et le Livre Blanc de la Pharmacie Européenne ont lancé les bases de la participation du pharmacien à la promotion d'une vie sanitaire en général et à la prévention, au dépistage des maladies dans le domaine des soins prophylactiques. Là encore les Bonnes Pratiques de la Pharmacie émettent des directives dont l'orientation est détaillée:

- conseils généraux sur les questions de santé.
- concertation avec d'autres professionnels de santé pour engager des campagnes spécifiques.
- dépistage, tests biochimiques et physiologiques.

Dans cet esprit, il existe au Portugal, deux centres d'information, dépendant de pharmaciens, agissant auprès du public en distribuant gratuitement des dépliants informatifs, en intervenant dans la grande presse, dans les suppléments réservés à la santé, par des articles généraux, faciles à comprendre soit sur l'emploi des médicaments, soit sur l'éducation sanitaire ou la promotion de la santé.
Par l'Europharm Forum, nous sommes engagés dans deux programmes de sensibilisation: l'un sur le Tabagisme, l'autre sur le Diabète sucré. Pour ce dernier, le Portugal coordonne l'action faite à l'échelon européen. Ce programme comprend la surveillance de cette maladie, son dépistage chez les sujets apparemment sains, l'orientation des cas détectés vers une prise en charge médicale.
En 1992, le gouvernement portugais et l'Ordre des Pharmaciens ont signé on protocole "Projet de Vie-Combat de la drogue" traduisant ce la part des pouvoirs publics la reconnaissance de la compétence des pharmaciens dans ce domaine. L'Ordre est tenu à trois actions:

- organisation de cours de formation professionnelle pour les pharmaciens sur l'abus de drogues et la prévention des toxico-dépendances (7 cours - 128 pharmaciens).
- élaboration d'un manuel distribué aux pharmaciens qui n'ont pu accéder aux actions de formation.
- attribution de 4 bourses d'étude (2 ans) dans le domaine de la toxicologie des drogues.

Enfin notre campagne "Refuse une seringue ayant déjà servi", développée par les pharmaciens portugais ayant collaborés avec la Commission Nationale de Combat contre le Sida, a pris une importance indiscutable en matière de santé publique. Les objectifs sont la prévention du Sida auprès des toxico-dépendants et la diminution des risques de contamination accidentelle. Il s'agit d'un accord tacite entre toxico-dépendants et pharmaciens: une seringue usagée échangée contre un "kit" contenant une seringue stérile, un tampon désinfectant, un préservatif et un dépliant informatif. Financée par les pharmaciens pendant les 3 premiers mois, cette campagne continue de l'être par le Ministère de la Santé.

Je ne veux pas abuser davantage de votre patience, et je n'ose, devant un auditoire constitué essentiellement de professeurs, suggérer des réajustements des études pharmaceutiques. Le cursus du pharmacien d'officine est bien plus court que celui de l'enseignant. Cela signifie que ce sont les conditions extérieures et la pratique professionnelle qui commandent les transformations et l'adaptation de l'Université, comme un dialogue permanent qui conduirait à la meilleure adéquation sociale possible de chaque métier. [...] Un exercice professionnel amélioré en permanence et actualisé est un grand stimulus pour aborder de nouveaux domaines résultant de la convergence des domaines scientifiques et professionnels.
[...] Nous avons maintenant des directives communautaires qui nous forcent à adapter notre enseignement traditionnel. Tous les pays représentés ici ont les mêmes matières obligatoires dans leurs programmes. Peut-être devons nous développer un plan d'évaluation européen de la qualité des enseignements des diverses Facultés, car nous avons tous la conviction que le plus important l'essentiel de la formation universitaire est d'inculquer à tout moment les meilleurs modèles de conduite professionnelle. Je pense que cela est l'objectif et le rôle de l'Association Européenne des Facultés de Pharmacie. Merci.

Mrs. I. VEYRON-CHURLET (France)

Second European Congress of Pharmaceutical Sciences

September 28th 1994

Round table :
Future prospects for European education and training and impact on pharmaceutical profession

Pharmapole's aim in 1993 was to find in pharmaceutical industry the posts wich can be occuped by the pharmacists.

That's why different workshops were aborded with the follwing plan :

- the knowledges required to be employed at these posts
- the place of the pharmacist in the market
- the education he need
- a few proposition in conclusion

RESEARCH CONCEPTION

1. KNOWLEDGE

The pharmacist must know above all :

- the know-how available within the company
- prospective evaluations
- chemical synthetisizing and biotechnologies
- the "clever" pharmaceutical forms
- animal and clinical pharmacology

2. THE MARKET

There are few pharmacists working in drug research, such as the chemical and extractive fields. Specialists are needed to bring new models of new techniques all the time.

3. EDUCATION : 3 possibilities

3.1 Doctorate studies

- **In the most of countries** : there is the PhD grade, after graduating in Pharmacy.

- **In France** and in a few state members of the European Union we can find "student / researcher" starting from the 3rd year of Pharmacy.

3.2 Combined honours degree : pharmacist/engineer

Especially in the fields of chemical synthesis, drug and pharmaceutical form design.

3.3 Post Doctorate

It is necessary in order to obtain a post with responsibility (not just a research assistant post), preferably in a well-known laboratory.
For example : drug design

During these studies the main probleme is the financial aspect, at both national and international levels : there are grants and contracts with industry.
ubventions allocated by organisations, and completed by industrial firms

4. CONCLUSION

If the pharmaceutical industry wants to keep pharmacists among its staff, it has to invest more into their doctorate and under graduate education, where financial contracts to support students and researchers are needed.

DEVELOPMENT

It is defined as the applied research, which follows fundamental research.

1. KNOWLEDGE

The pharmacist must especially know :
- The fields concerned with development : such as chemistry, toxicology, clinical testing, new analytical tquality testing.
- The importance of the Education within the company in order to find out : the functionning and the requirements of the firm.

2. THE MARKET

There are needs for competent specialists in Toxicology, Pharmacology, and Formulation, such as, for instance, in the domain of "delivery systems" , in conventional and new dosage forms.

Specialists in the clinical field, clinical research assistants are also sought. The Clinical Research Assistant takes part in the writing of protocols, the follow-up of clinical studies, the quality audits.

3. EDUCATION

- In general : several choices

- pharmacist diploma + experience in a firm
- pharmacist diploma + thesis
- pharmacist diploma + specialization in biological/clinical pharmacy (3 years)

- Particularly case : Clinical trials

- pharmacist diploma + related training
- pharmacist diploma + Clinical Research Assistant (2 or 3 years)

4. CONCLUSION

A lack of pharmacists in Toxicology, Pharmacokinetics and in Clinical trials has been observed.

If the Universities trained their pharmaceutical students better, so as to adapt them to the current needs, would the pharmaceutical industry engage these students ?

PRODUCTION

Strictly speaking, production is THE pharmaceutical operation, as it is the role of Pharmacists to make drugs.

1. KNOWLEDGE

The pharmacist has to know that productibility technology and quality controle are essential aspects of production.

- **Aims in production :** to improve quality, to increase production, to reduce costs.

- **Means :** GMP, manufacturing executive system,- organizing ability, human relations.

2. MARKET

The pharmacists play an important role in quality testing and quality assurance. They are specialists, consulting pharmacists in Quality Science.

Production departments are in permanent evolution, with the development of new technologies, automatisation, and the generalization of external audits.

3. EDUCATION

3.1 - In the technical domain : combined honours pharmacist + engineer

3.2 - In the domain of quality : In the most of countries there are related training after graduating in pharmacy and continuing education.

4. CONCLUSION

With the development of mechanisation techniques, the production field needs engineers specialized in these production techniques, and pharmacists specialized in quality assurance/testing.

MARKETING

1. KNOWLEDGE

We have to take count of two distinct aspects :

- medical information / promotion
- marketing (strictly speaking)

It is crucial to know both the product and the firm : knowing only one or the other should not even be considered.

2. MARKET

Pharmacists and Physicians can be found at all levels in this field.

3. EDUCATION : 2 cases

- diploma in pharmacy + related training , in a business school such as master of business administration
- business school diploma + additional work experience in the pharmaceutical industry, for several years

4. CONCLUSION

The scientific knowledge is essential in the marketing domain : the pharmaceutical industry must be convinced of this.

REGISTRATION

Registration is prior to obtaining a "marketing authorisation"

1. KNOWLEDGE

The Candidate must have :

- industrial experience
- diplomacy
- scientific background in order to be able to discuss with scientists during the compilation of the registration file, and to be able to defend this file in front of the Agency.
- full knowledge of international rules.

2. MARKET

- The pharmacist has got all the qualities required for this kind of work ; he has enough knowledge to dialogue with all the different departments of the firm.
Nowadays, all European pharmaceutical companies are aware of this.

- If pharmacisits can be engaged without any further education, they have to follow training within their company.

- The pharmaceutical industry needs people who can manage projects , and act as leaders.

3. EDUCATION

- pharmacist
- pharmacist + related training

4. CONCLUSION

With his educational background, the pharmacist is well prepared to work in this field, but he must not abuse of this position, as all the credibility of the company lays in his hands.

DISTRIBUTION

1 It is difficult to build up a European distribution network.

2. MARKET

The role of the pharmacist is aknowledged in most of states members of the European Union, without being a monopoly.

The posts are situated at the company's head office, and in its different establishments.

3. EDUCATION : 3 cases

- diploma in pharmacy in Italy, Spain, Greece, Portugal, Luxembourg and Ireland
- diploma in pharmacy + related training, in France
- other diploma for Germany, Nerderlands, Belgium and U.K

4. CONCLUSION

Efforts are necessary to harmonize distribution troughout Europe.
What kinds of education could we create for which kinds of responsabilities ?

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DOES THE EDUCATION CORRESPOND TO THE NEEDS ?

CONCLUSION : A FEW PROSPECTS

* **The monopoly of the pharmacist** in the European pharmaceutical market does not exist everywhere in the European union.

* **The pharmacist has a general education**, which allows him to adapt himself to various posts and tasks.

Nonetheless, this pharmaceutical education is **sometimes inadequate**.

- It can then be completed by a **related training** during or after the normal degree course.

- **Part-time contracts** can be set up for young workers under 26, who will use the rest of their working time to follow a course at University. This kind of contract permits the employee to get both professional and academic qualifications. The company must be a place for training, as well as production.

-After pharmacy studies, one can also complete one's education by **"on the job training"** within the company.

* **The University**

- They should participate in the **national Job commissions**.
- Universities should also **inform companies** on the different courses they offer.

* **What kind of carrer evolution is offered to pharmacists ?**

- Formulation, Quality assurance, Registration departments are good places **to begin,** because they allow a career evolution in others departments.

- There are **many possibilities for career evolution,** in and outside the E.U with the harmonization of the degree courses of Pharmaceutical studies.

- The pharmacist can therefore expect to have an interesting career evolution . It depends on the individual , his environment, and the possibilities of the company.

In the end one has to create, innovate to adapt oneself to the jobs of Today and of Tomorrow ; this means also, remaining open to any new courses, both vocational and academic.

COMMENTS ON THE ROUND-TABLE REGARDING THE ROUND TABLE ON THE FUTURE PROSPECTS FOR EUROPEAN EDUCATION AND TRAINING AND THE IMPACT ON THE PHARMACEUTICAL PROFESSION

(Vincenzo Tortorella)

The topics chosen by the speakers of the Round Table, as well as those of the contributions from the floor during the final discussion have made clear the following points:

1). The professional activities carried out by graduates from European Pharmacy faculties varies from nation to nation. This is all the more true for those graduates who work in community pharmacy: indeed the organisation of health systems is profoundly diversified from one European state to another.

In many European countries, diferently from others, there are no laws establishing that the number of pharmacies be a function of the size of the local population and of the distance between pharmacies. Likewise, the duties and the type of professional activities which a graduate can carry out is quite heterogeneous within EC countries.

2). There is also a profound difference to be seen in the undergraduate training curricula. These differences are both quantitative (number of years of undergraduate training) and qualitative (type and duration of the teaching modules and related examination programmes).

From a qualitative point of view, EEC directive 85/432 which sets out the disciplines which must be found in the curriculum of a Faculty, while being a highly praiseworthy attempt to bring harmony to Pharmacy studies, is unable to make the degree courses in the various countries homogeneous, since in each country the amount of time dedicated to each of the disciplines set out by the EEC as well as the cultural contents of the disciplines can vary enormously. The attempt of fixing the total number of hours was unsuccessfull also for the exaggeration indicated in these choices.

These variations cannot easily be eliminated, as they are linked to the different cultural training of the teaching staffs of the Pharmacy faculties in the different countries, to the numbers of teachers available, to the numbers of students enrolled on the courses, and, in some cases, also to the routine and to the cultural policies laid down by the professional organisations.

3). Neither is the organisation of postgraduate courses homogeneous.

Hospital pharmacists are seeking to create, within a well-defined specialisation school for their area, a set of cultural contents that would be identical throughout Europe.

There is considerable confusion over the institution of specialisation schools which would bring about a more responsible form of professionalism within community pharmacies. In any case, for these schools, which are not well accepted by the students, the need for a common cultural base has been expressed.
Many of the contributions highlighted the need for a commitment to creating greater uniformity.
The free movement of graduates from the European Pharmacy faculties throughout in Europe under present conditions creates a problem, and this makes it indispensable to make the whole system more homogeneous. This task should be taken on by the European Association of the Faculties of Pharmacy which in the initial stages should direct all its efforts at making degree training more homogeneous as set out in point 2 above. The problems set out in points 1 and 3 cannot be dealt with immediately as they do not constitute a specific sector for intervention on the part of academia, but involve on a wider scale governments and professional organisations in the various countries.
Even finding an optimal resolution to point 2, although limited to teaching questions alone, raises several difficulties and will be a lengthy process. Laws based on coercion will be unable to achieve their aims (EEC directive 85/432 managed to make changes in European degree course curricula that were more formal than substantial). Teaching staff and students from the Pharmacy faculties will need to develop their own personal convictions as to what are the most effective changes that need to be made.
As soon as possible the various study-programmes in the disciplines of each Pharmacy faculty in the Federation should be published, with an indication of the set texts used by the students. Wherever possible, the text in English which is closest in content to that indicated in the programme should be indicated. Only through a knowledge of the set texts will it be possible to comprehend the contents of the programmes more precisely.
This process of consciousness and integration will benefit from increasing as much as possible the number of exchanges of teachers and students between countries on the various projects such as Erasmus, Socrates, Tempus etc. which are currently under way in Europe.
Further action is required in order to define the number of graduates produced by each member country. Now in Europe only the Faculties of Medicine and Veterinary have a controlled number of students. The introduction of the free movement of graduates in health-related disciplines within the European Union means that it should no longer be permitted to the Faculties of Farmacy to prolong the current situation in which some member-states maintain low numbers of students in their courses, while other states produce a surfeit of graduates for export.