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PORTUGAL UNIVERSITY INSTITUTES DEVELOPMENT PROJECT

(Contract AID/NE-C-1701)

REPORT ON
SHORT-TERM STAFF ASSIGNMENT
AT THE
INSTITUTO UNIVERSITARIO DA BEIRA INTERIOR (IUBI)
COVILHA, PORTUGAL

October 2 - November 14, 1985

Submitted by

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REPORT OF ACTIVITIES AT THE
INSTITUTO UNIVERSITARIO DA BEIRA INTERIOR
COVILHA, PORTUGAL

Introduction

This report covers activities of R. C. Peterson, short-term advisor (STA), as part of the assistance to IUBI resulting from agreements between the Governments of Portugal and the United States and a contract between Purdue University and the Agency for International Development (Contract AID/NE-C-1701). The express purpose of the contract is to strengthen and assist with program development at IUBI, Covilha, Portugal.

Principal activities of the STA from October 2 to November 14, 1985, consisted of assisting the staff in planning and implementation of pulp and paper laboratories for the Paper Engineering program, reviewing the curriculum and plan of studies, conducting seminars for local industry, presenting a short course for students of Paper Engineering, and visiting local firms and agencies with related interests. A list of daily activities is provided in Appendix A.

Area of Consultancy

The major area of the consultancy was Pulp and Paper Science and Engineering as requested by IUBI.

Objectives of Consultancy

The specific objectives of the consultancy as stated in the scope of work were as follows:

- 1) To assist the newly established Department of Paper Engineering with the implementation of laboratory and physical plant facilities;
- 2) To analyze and assist in revising the Paper Engineering curriculum;
- 3) To assist the department staff with technical and/or research projects;
- 4) To conduct a seminar for local industry;
- 5) To visit several pulp and paper plants to provide information on production quality improvements.

Duration of Consultancy

Activities covered in this report were performed between October 2 and November 14, 1985.

Portuguese Counterparts

Several IUBI faculty worked with the STA during the assignment.

- Prof. Dr. Santos Silva, coordinator for the Paper and Engineering Department at IUBI
 - Eng^o Sant'Ovaia, Assistant in Paper Engineering
 - Eng^o Silva Fernandes, Assistant in Paper Engineering
- Other IUBI faculty were very helpful in discussions of technical and/or research projects.
- Prof. Dr^a Mona Arif, Invited Professor of Chemistry
 - Lic. Alberto F. Pereira, Industrial Management

Accomplishments with Respect to Objectives

1. A review of equipment needs was conducted and a priority list of purchase recommendations was provided by the STA in consultation with the Portuguese counterparts. A copy of the list of the equipment obtained by the STA from Betz Paperchem, Inc., Jacksonville, Florida, was given to Prof. Dr. Santos Silva. This list contained all equipment and recent prices found by Betz Paperchem, Inc. in the implementation of their new corporate research and development laboratory.

Reference books and technical journals on paper engineering, available in IUBI's Biblioteca, were reviewed. There is a need for additional reference material. The STA recommended a number of journals and reference books which should be subscribed to or purchased (see Appendix B). A number of books and journals (also listed in Appendix B) were given to the Biblioteca by the STA.

A review of the Textile Institute, Covilha physical testing instrumentation was made. Four testing instruments were specifically identified as being capable of adaptation to testing paper, after suitable modification. In the case of two instruments (Tearing Endurance and Mullen), the necessary parts to modify them for paper tests are already available. The others (Instron Model 1026 and Micrometer) require the purchase of the necessary accessories.

A tour of the IUBI physical plant was given to the STA soon after arrival. Physical building space for Paper Engineering laboratories is very adequate. However, the special constant

temperature and humidity facilities for paper testing are not presently available. Prof. Dr. Santos Silva is aware of the need for the conditioned testing laboratory and will make the necessary recommendations, as the laboratories are developed.

2. A review of Paper Engineering curriculum was prepared and submitted to Prof. Dr. Santos Silva. A copy of this review is in Appendix C. A specific problem developed with respect to the polymer course. This situation was reviewed and is also reported in Appendix C.
3. The absence of pulp and paper laboratories will limit the present scope of technical and/or research projects that can be conducted. However, this situation will be alleviated in the near future. Potential research topics were discussed with Eng^o Sant'Ovaia and a list is given in Appendix D. A possible cooperative research project was discussed with Lic. Alberto F. Pereira and is given in Appendix D. This appendix also contains a proposal to develop a closer working relationship between IUBI faculty and their counterparts in the Portuguese Pulp and Paper Industry.
4. Seminars were presented as follows:
 - October 23 - High Yield Pulping of Hardwoods: A Pulp for the 1990's and Beyond, presented at Portucel Central Laboratory, Eixo-Aveiro. Attendance was about 20 people.
 - November 5 - Basic Quality Control: A Review of the Fundamentals, and a Brief Review of Alkaline Paper Making, presented at Portucel-Setubal. Attendance list is given in Appendix E.

5. Mill visits were made to Portucel, Cacia, and the Central Laboratory near Aveiro and to Portucel, Setubal. A visit was also made to the INAPA paper mill adjacent to the pulp mill in Setubal. Very good discussions and contacts were made during all these visits.

Identification of Problems Encountered

Activities during the consultancy were conducted without personal problems because of the concern of Portuguese counterparts. The working and living conditions provided by IUBI were very high quality and the interest of the Portuguese counterparts for the well-being of the STA was exceptional. However, a problem that was encountered by the STA has also been expressed previously by others. It has to do with the availability of faculty and the tendency of the faculty to attempt to take on too much work and other activities for the time available.

Probably the most serious problem facing paper engineering at IUBI is a shortage of teaching faculty with paper industry experience. Only one member of the staff has any direct paper engineering training at the present time.

During the consultancy, the STA was able to observe other IUBI activities such as laboratories and to participate in the classroom by giving a few lectures to the paper engineering students. Some general comments about problems encountered in these areas seems appropriate. Although these comments are outside the main scope of work assignment, it is felt that they will benefit the development of IUBI as well as paper engineering.

1) The laboratory for chemistry seems crowded with students when in use. It also appears to be short of both permanent equipment (balances, drying ovens, etc.) and consumables (glassware, etc.). In addition, safety precautions such as eye protection do not appear to be common practice. Other labs appear to have more space and are not as crowded as chemistry, e.g., physics and textiles. Although a fire extinguisher and no smoking signs are prominently displayed in the chemistry lab, other safety signs are not observed.

2) Classroom audio-visual equipment appears to be limited. Videotape projectors are not readily available although I understand they have been ordered and will soon be available.

3) Students have no access to foreign language training, preferably English, and because much of the scientific and technical literature is published in languages other than Portuguese, it is, therefore, unavailable to them. Current students in paper engineering have diverse backgrounds in foreign languages (one student knows French, Spanish and English) and some do speak and understand English very well. This is a decided advantage for these students because they will be able to understand and use a large part of the scientific and technical publications that are available internationally. Other students will be disadvantaged without access to foreign languages (English) training at IUBI.

4) Access to the University and its facilities is quite restricted during the evenings and weekends. This can present problems for students and staff in meeting deadlines for class assignments and lecture preparation. Library accessibility of 7 hours per day may be

inadequate for the preparation of term papers, study of current literature, etc., for some of the University community members.

5) Another area that deserves attention is that of faculty development. The problem of attracting qualified faculty to IUBI is beyond this STA scope of work but a few remarks may be in order. The magnetic attraction of areas in Portugal, other than Covilha, needs to be seriously considered by the administration. Obtaining, developing and keeping qualified faculty at IUBI will require considerable ingenuity as well as resources. This is not to suggest that the present faculty are not fully qualified but to draw attention to the problem of faculty members who spend a good deal of their non-classroom time and energy commuting.

Recommendations and Suggestions for Solving Problems

1) It is essential that at least one full time paper engineering faculty member with experience in the industry be added to the department to assist in establishing the credentials of the program.

The development of a Portuguese paper engineering faculty will take some time. However, if in the interim it seems advisable, one possibility is to seek experienced teaching faculty elsewhere. If lecturing in Portuguese is deemed essential and no acceptable Portuguese candidates are available, then one alternative might be to recruit in Brazil. The Brazilian pulp and paper industry is "world-class" and experienced people may be available there. Perhaps someone within the Portucel organization could help to identify an experienced Portuguese candidate. For example, a person either recently retired

or two to three years away from retirement might consider such a position to be very attractive. Obviously many details, such as relocation to Covilha, etc., need to be arranged once a candidate is located.

2) Unsafe working practices should not be tolerated lest a very serious accident occur, with the attendant problems of lost time, physical impairment, law suit against the university, etc. It is suggested that perhaps a small group (3 to 4 persons), representative of those departments that operate labs, be selected by the Rector to examine all laboratory practices and procedures with concern for safety. The principal responsibility of this group would be to identify unsafe practices and implement their correction. This group could also have the responsibility for all safety instruction, ordering and posting safety-related materials and implementing safety procedures. Many audio-visual aids are available with regards to instruction in good lab safety procedures.

3) As the laboratory activity at IUBI expands, the University administration may at some point want to establish a central store-room. This facility would order and stock all consumable supplies for all the lab operations at IUBI. Consolidation of purchasing may save money as well as simplify department procedures and operation of department labs. It also may improve accounting procedures if this method of allocating supplies is established. In addition, the cost of conducting certain labs would probably be both more accurate and readily obtainable under a central system. The problem of lab shortage of consumables would certainly be reduced. In the future, this unit could also absorb the responsibility for equipment maintenance

and repair, analytical balance and microscope services, etc.

4) As IUBI expands, the library facilities will see increased usage. Accessibility of the library will need to be expanded. The library hours at the present time may be adequate for some user groups, but inadequate for others, such as time for the faculty to read current journals. A suggestion would be to conduct a survey of the University community to determine present usage patterns as well as anticipated future needs for expanded hours. If the students are primarily using the facility to study or as a meeting area then perhaps space should be located elsewhere. If additional hours are required, one possibility might be to keep the library open during the 12:30 to 2:00 period or extend the evening hours. Another option is to open the library on alternative Saturday mornings, etc.

5) The paper engineering scientific and technical communications printed in Portuguese, outside of Brazil, is very limited. In addition, a major part of the communication between equipment and technical suppliers (from many non-English speaking countries) and pulp and paper mills throughout the world is often conducted in English. For this reason, it is recommended that the paper engineering students be urged to develop their English proficiency. One way to accomplish this is to make the study of English (or other foreign language) available to the students by providing instruction at IUBI.

6) The importance of communication with IUBI's many audiences cannot be overemphasized. Because of the language barrier, the STA is not in a good position to judge the situation; however, some general observations may be appropriate. First, IUBI lacks a general area where faculty congregate and meet on an informal basis for

discussion. Secondly, the Rector's office issued no written communication to me during my visit, although I could not read it in Portuguese anyway. In addition, the central administration issued no newsletter during my stay, although they may publish one that I am not aware of.

Consequently, if the Rector does not publish a newsletter or bulletin with some regularity I would suggest that a publication of this nature be considered. It would offer many advantages to IUBI in dealing with its many constituents as well as helping to promote student recruitment, scholarship, new programs such as paper engineering, etc.

Acknowledgements

Thanks are gratefully extended to all those Portuguese people who made my six-week stay in Covilha not only successful but very enjoyable as well.

Special thanks go to Dr. C. M. Passos Morgado, Rector of IUBI, Dr. Santos Silva, Coordinator of Paper Engineering and Eng^O Sant'Ovaia for all their invaluable assistance in carrying out the work described in this report.

I also wish to acknowledge the advice and guidance of Ms. Vivian Rider, Purdue University, the USAID staff at the American Embassy in Lisbon and Prof. Jeff Porter, STA from Clemson University and also apartment companion during my stay in Covilha.

Dr. Mona Arif was particularly helpful. The IUBI staff and the secretaries, Lina Saraiva and Ana Bela Freire, were indispensable and they deserve special credit for all their efforts on my behalf.

APPENDIX A

Daily Itinerary

ITINERARY OF ACTIVITIES DURING ASSIGNMENT

First Week

Wednesday, October 2 Depart from U.S.

Thursday, October 3 Arrive Lisboa and visit American Embassy. Met with Maria Luisa Gomes and Isabel Caupers.

Friday, October 4 Set up office in IUBI; met with Prof. Jeff Porter (STA from Clemson), and Prof. Santos Silva and Eng^o Sant'Ovaia, Portuguese counterparts. Reviewed scope of work and obtained a copy of the Plan of Study for Paper Engineering at IUBI and equipment list for laboratory.

Saturday, October 5 Reviewed plan of study and laboratory equipment list. Reviewed past STA reports by Professors Edie, Whitehurst, Grigsby, Davis, Sello and Behery.

Sunday, October 6 Weekend

Second Week

Monday, October 7 Reviewed Portuguese government statistics on pulp and paper from the library. Began working on a review of pulp production in Portugal in comparison with Spain and other ECM countries. Continued review of Plan of Studies. Visited wool washing facilities with Professor Porter to discuss waste-water situation.

Tuesday, October 8 Visit to Portucel Central Laboratory in Eixo near Aveiro. Met with Technical Director Queiroz and Eng^o Ribeiro and discussed technical priorities in Portucel. Gave them a list of four seminar topics that I could present.

Wednesday, October 9 Continued review of curriculum. Reviewed Portucel information. Wrote to American Embassy regarding the Portuguese pulp situation. Prepared list of pulp and paper samples for class and laboratory use for Eng^o Sant'Ovaia and discussed seminars with Prof. Santos Silva.

Thursday, October 10 Worked on curriculum review and equipment priority needs. Wrote letters to Valmet, Finland, Wiggins Teape, UK and Pulp and Paper International, Belgium, about availability of back issues of pulp and paper journals for IUBI library. Wrote to Portucel about samples and the shipping of pulp short distances at 50% dry instead of the normal 90% dry content.

Friday, October 11 Continued review of curriculum. Gave Eng^o Sant'Ovaia the recommendations on equipment purchase priorities and a copy of the Betz Paper Chemical laboratory equipment list. Began planning a trip to Gureola Scott tissue paper mill in Salamanca, Spain.

Saturday, October 12 Weekend

Sunday, October 13 Weekend

Third Week

Monday, October 14 Completed draft of Comments on Curriculum and Plan of Studies with copies to Rector Morgado and Prof. Santos Silva. Also completed the introductory lecture materials for an overview on what paper engineering consists of for presentation to students.

Tuesday, October 15 Met briefly with Rector Morgado after his return from U.S. Met with Prof. Santos Silva on ordering equipment for laboratory. Completed plans for visit to Gureola Scott mill on Thursday to Salamanca. Talked with Prof. Dr^a Arif about developing industry-related experiments for the inorganic laboratory.

Wednesday, October 16 Continue developing list of paper engineering books and periodicals that should be obtained by IUBI. Wrote experiment for inorganic laboratory on causticizing for Prof. Dr^a Arif. Met with prospective graduate student Amilcar Ramalho. Met with Prof. Santos Silva about seminar schedules. High yield pulping of hardwoods is set for October 23 in Eixo at the Portucel Central Laboratory.

Thursday, October 17 Professor Porter, Eng^o Sant'Ovaia and I travelled to Border. Met by Eng^o Alfredo Solano of Gureola Scott, Salamanca, Spain. Travelled to Salamanca and visited mill.

Friday, October 18 Worked on seminar for October 23. Travelled to Madrid for visits to the Office for Hydrographic Studies and the National Institute for Agrarian Investigation (INIA) Pulp and Paper Department.

Saturday, October 13 Worked on seminar for October 23.

Sunday, October 14 Weekend.

Fourth Week

Monday, October 21 Met with Eng^o J. G. Batanero at the Office for Hydrographic Studies in the morning. Travelled to INIA, Madrid, and met with Dr. Eng^o J. A. de Los Santos Viqueira in the Cellulose Department. Toured facilities with Jose Maria Solano and discussed his Ph.D. research on pulping of *Cynara cardunculus*.

Tuesday, October 22 Returned to IUBI, Covilha. Worked on seminar.

Wednesday, October 23 Travelled to Cacia and visited mill. Presented seminar at the Portucel Central Laboratory in Eixo.

Thursday, October 24 Sent thank you letters to Srs. Jose Freitas Mimoso, Mill Manager, and Henrique Manuel Marmoto, Assistant Mill Manager for the Cacia Mill hospitality. Also thank you letter to Eng^o Ribeiro for arranging the seminar and participation by Technicelpa members. Brought back samples of wood chips, pulp and paper to IUBI.

Friday, October 25 Began work on next seminar scheduled for November 5 at Portucel in Setubal. Worked on prerequisite regulations for paper engineering courses. Visited Textile Institute with Eng^o Sant'Ovaia to examine textile physical testing instruments that could also be used for paper testing. Met with Pedro M. Mendes to discuss graduate study in Systems Analysis applied to Industrial Areas.

Saturday, October 26 Worked on seminar for November 5 on Quality Control and Alkaline Paper Making.

Sunday, October 27 Weekend.

Fifth Week

Monday, October 28 Prepared a list of two possible team projects for use by management, chemistry and paper engineering students and faculty and gave it to Alberto F. Pereira in management. Prepared for lectures to paper engineering students. Continued work on November 5 seminar.

Tuesday, October 29 Sent completed list of journals and pulp and paper reference books for acquisition by IUBI library to Prof. Santos Silva.

Wednesday, October 30 Discussed team projects briefly with Alberto F. Pereira. Continued work on seminar and lectured students on the Introduction to Kraft Pulping.

Thursday, October 31 Continued lecture on Kraft Pulping.

Friday, November 1 National Holiday. Worked on seminar on Quality Control.

Saturday, November 2 Worked on seminar on Alkaline Paper Making.

Sunday, November 3 Weekend.

Sixth Week

Monday, November 4 Completed work on seminars for presentation at Setubal. Travelled to Lisboa with Eng^o Sant'Ovaia and Prof. Santos Silva.

Tuesday, November 5 Travelled from Lisboa to Setubal and visited INAPA. Presented seminars at Portucel-Setubal and returned to Covilha.

Wednesday, November 6 Wrote thank you letters to INAPA and Portucel people. Lectured for Materias Primas class. Letter to Prof. Santos Silva on recruiting students and promotion of the IUBI paper engineering program.

Thursday, November 7 Prepared lecture for paper engineering students.

- Friday, November 8 Revised list of journals and pulp and paper reference books for acquisition by IUBI. Sent memo to Prof. Santos Silva and Eng^o Sant'Ovaia. Met with Sr. Simoes to discuss polymer lab.
- Saturday, November 9 Worked on polymer lab experiments. Wrote review of polymer application in the paper industry for Prof. Santos Silva.
- Sunday, November 10 Weekend.

Seventh Week

- Monday, November 11 Reviewed polymers and wrote recommendations. Wrote final report.
- Tuesday, November 12 Met with Rector and Staff and discussed paper engineering curriculum report submitted on October 15. Wrote final report.
- Wednesday, November 13 Travelled to Lisboa.
- Thursday, November 14 Departed for U.S. Travelled to New York, Cincinnati, Ohio, by air, and by automobile to Oxford, Ohio.

APPENDIX B

- Books and Journals Given to IUBI Biblioteca by STA
- Recommended Journals and Reference Books for Acquisition by IUBI

LIST OF BOOKS, JOURNALS GIVEN TO IUBI BIBLIOTECA

Books

- Environmental Engineering, H. S. Peavy, Dr. Rowe, and G. Tchobanoglous. McGraw Hill (1985)
- Wastewater Engineering Plants: Planning, Design and Operation, S. R. Qasim. Holt, Rinehart and Winston (1985)
- Handbook for Pulp and Paper Technologists, G. A. Smook. Joint Textbook Committee of the Paper Industry of the U.S. and Canada (1982)

Journals

- TAPPI (Technical Association of Pulp and Paper Industry), Vol. 68, July, August 1985
- Pulp & Paper, Vol. 59 - June, July, August, September 1985; and Vol. 58 June - September 1984

Special Publications

- Conference Proceedings on Future Technological Needs of the Pulp and Paper Industries. NSF and Suny College of Environmental Science and Forestry, Syracuse, New York. June 1973
- Viewpoints, Vol IX, No. 1. International Paper Company. 1982 Special Issue: Office Automation
- Paper Quality--New Trends and Specifications. A. A. Ibrahim. Papyrus Inc. 1984
- Spectrum. The Paper/Pulp Quarterly from C-E Bauer. Spring 1985
- Planting Seeds for the Future. Champion International Corp. 1979

RECOMMENDED REFERENCE BOOKS AND MONTHLY JOURNAL
SUBSCRIPTIONS TO BE OBTAINED FOR PAPER ENGINEERING

November 7, 1985

TO: Prof. Santos Silva, Eng^o Sant'Ovaia
FROM: R. C. Peterson

JOURNALS

Before ordering subscriptions to current technical journals for IUBI, I would suggest you get a list of current journals received at Eixo that are available at Portucel Central Lab. In future, if budget constraints limit journal subscription service, you may still have access via Inter-library loan or photocopy service with Portucel. Many of the technical journal articles are published in English, although the journal may originate in non-English speaking countries.

The recommended list of journals is as follows:

1. Pulp and Paper Magazine of Canada--a monthly Canadian journal in English.
2. Technical Association of Pulp & Paper Industry (TAPPI)--a monthly journal in English from the U.S.
3. SvenskaPapperstidning--a monthly journal from Sweden with many technical articles in English, balance in Swedish.
4. Paperi jaa Puu--a monthly journal from Finland with many technical articles in English, balance in Finnish.
5. APPITA--a monthly journal from Australia-New Zealand in English.
6. Pulp and Paper--a monthly news magazine that mainly gives news on North America.
7. Pulp and Paper International--a monthly magazine that gives news on the pulp and paper industry worldwide, similar to textile horizons in scope. Science and technology articles are very superficial in coverage.

IUBI will be given, free of charge, a 1 year subscription to PPI starting in December 1985. (Remember please to notify the mail room that it will come in my name and should be sent to Biblioteca and not to me!)

If you want to consider other journals in Spanish, French and German languages, I would suggest you contact Technicelpa or Portucel people for their advice or consider contacting the following persons:

Jose Antonio de Los Santos Viqueira
Dr. Ingº de Montes
Departamento de Celulosa
I.N.I.A.
Padre Huidobro, S/N
Aptdo. 8111
Madrid - 35
Espana

These journals should give you good basic coverage of science and technology areas of interest to the worldwide paper industry.

In addition, upon my return to the U.S., I will try to find back issues of TAPPI Monographs and some of these journals. If IUBI wants to obtain them, I will try to locate a person or company willing to donate them to the Biblioteca, providing the cost of shipping can be paid by IUBI. We can correspond on this issue, if you will.

REFERENCE BOOKS

I am attaching a rather complete list of textbooks and references and their special areas of coverage. Unfortunately all are in English and some books may be out of print. In addition, I would recommend the following be purchased as good general references on Cellulose and Lignin Chemistry:

- 1) Methods of Wood Chemistry, B. L. Browning. Interscience Publishers (1967)
- 2) The Chemistry of Lignin, I. A. Pearl. Marcel Decker (1967)
- 3) The Chemical Technology of Wood, H.F.J. Wenzl. Academic Press (1970)

In addition, a budget should be established to purchase new reference books, etc. from time to time as they are published in the future. Unfortunately, many texts in this field are very expensive because of the limited market size.

I hope this list will be of some assistance.

Sincerely yours,

R. Peterson

PULP AND PAPER TECHNICAL BOOK LIST

1. General Textbooks
 - 1.1 Introductory
 - 1.2 Intermediate and Advanced
2. Pulping
3. Papermaking
 - 3.1 General
 - 3.2 Specific Focus
4. Pulp and Paper Testing
5. Instrumentation
6. Speciality Areas

Submitted by G. A. Smook

Publishers and Information Sources
for Pulp and Paper Books Listed

Academic Press
111 Fifth Avenue
New York, NY 10003

Adam Hilger Ltd.
Techno House
Redcliffe Way
Bristol Bsl 5NX
U.K.

Albany International Corp
Paper Industry Div.
P.O. Box 1939
Appleton, Wisconsin 54913

American Paper Institute
260 Madison Avenue
New York, NY 10016

Business Books Ltd.
24 Highbury Crescent
London N51RX
U.K.

Dover Publications
180 Varick Street
New York, NY 10014

Elsevier Science Publishing Co.
52 Vanderbilt Avenue
New York, NY 10017

Ernest Benn Ltd.
Sovereign Way
Tonbridge, Kent.
U.K.

Food and Agricultural
Organization
United Nations
Via delle Terme di Carcalla
00100 Rome, Italy

N.B.: FAO of UN Books are
sold in Canada by:
Renouf Publishing Co. Ltd.
2182 St. Catherine Street W.
Montreal, Quebec
H3H 1M7

GATF
4615 Forbes Avenue
Pittsburgh, PA 15213

Joint Textbook Committee
c/o CPPA Technical Section
2300 Sun Life Bldg.
1155 Metcalfe Street
Montreal, Quebec
H3B 2X9

Marcel Dekker
95 Madison Avenue
New York, NY 10016

Miller Freeman Publications
500 Howard Street
San Francisco, CA 94105

PITA
(formerly BPBIF)
3 Plough Place, Fetter Lane
London EC4A 1AL
U.K.

Pulp Chemicals Association
60 East 42nd Street
New York, NY 10165

Syracuse University Press
1011 East Water Street
Syracuse, NY 13210

TAPPI Press
1 Dunwoody Park
Atlanta, Georgia 30338

Vance Publishing Co.
(formerly Lockwood Publishing Co.)
133 East 58th Street
New York, NY 10022

Van Nostrand Reinhold Co.
135 East 58th Street
New York, NY 10020

Walden-Mott Corp.
466 Kinderkamack Rd.
Oradell, NJ 07649

John Wiley & Sons
(Wiley-Interscience)
605 Third Avenue
New York, NY 10011

PULP AND PAPER TECHNICAL BOOK LIST

1.1 GENERAL TEXTBOOKS - INTRODUCTORY

Author, Title, Publisher	Date of Public.	Text Emphasis	Remarks
Kline, G.E. "Paper and Paperboard Manufacturing and Converting Fundamentals" Miller Freeman	1982	Comprehensive	A basic introduction to manufacturing and converting operations. (232 pages, softbound)
Smook, G.A. "Handbook for Pulp and Paper Technologists" Joint Textbook Committee of the Paper Industry	1983	Comprehensive	The best overall treatment in one volume. Good coverage of current pulp and paper technology. Includes sections on specific paper grades, economic aspects, pollution abatement, control testing and mill services. Well illustrated and indexed. Highly recommended. (395 pages, softbound)
McCubbin, N "Basic Technology of the Pulp and Paper Industry and Its Environmental Protection Practices" (Training Manual EPS 6-EP-83-1) Environment Canada	1983	Comprehensive	Introduction to Canadian pulp and paper operations with emphasis on pollution abatement aspect. (304 pages, softbound)

PULP AND PAPER TECHNICAL BOOK LIST

1.2 GENERAL TEXTBOOKS - INTERMEDIATE AND ADVANCED

Author, Title, Publisher	Date of Public.	Text Emphasis	Remarks
MacDonald, R.G. (Edit) "Pulp and Paper Manufacture" 2nd Edition (3 Volumes) McGraw-Hill	1969-70	Comprehensive	This three-volume reference includes both theoretical and practical information. The treatment is uneven. A good resource. A revision is underway (see below).
Britt, K.W. (Edit) "Handbook of Pulp and Paper Technology" Reinhold	1970	Comprehensive	A general textbook in one volume. Uneven treatment from different authors with poor continuity between chapters. Is rapidly becoming dated.
Clark, J. d'A "Pulp Technology and Treatment for Paper" Miller Freeman	1979	Pulp Properties and Treatment	Useful reference. Covers some areas not given prominence in other texts. Not suitable as general text; students should read under guidance of instructor
Casey, J.P. (Edit) "Pulp and Paper Chemistry and Chemical Technology" 3rd Edition (4 Volumes) Wiley - Interscience	1980-83	Comprehensive	Perhaps the best overall treatment in one text series of technology theory and application. Somewhat deficient on equipment description. Useful as a general reference. Casey enlisted multiple authors for this edition.
Kocurek, M.J. & Stevens C.F.B. (Editors) "Pulp and Paper Manufacture", 3rd Edition, Joint Textbook Committee of the Paper Industry	1984	Comprehensive	The all-revised 3rd edition is being issued in twelve soft-bound volumes. The first volume, "Properties of Fibrous Raw Materials and Their Preparation for Pulping" has been issued (182 pages). Although multiple authors are employed, the sections appear to be well edited for continuity, and are cross-indexed.

PULP AND PAPER TECHNICAL BOOK LIST

2 PULPING

Author, Title, Publisher	Date of Public.	Text Emphasis	Remarks
Rydholm, S.A. "Pulping Process" Interscience Publ.	1965	All Pulping	The classic advanced text; covers such areas as wood structure and chemistry in more detail than other available texts. Still a useful book, but is out of date in some important areas.
Wenzl, H.F.J. "Sulfite Pulping Technology" Lockwood	1965	Sulfite Pulping	Useful reference. Good literature coverage of sulfite pulping and recovery. Now dated.
Wenzl, H.F.J., Ingruber, O.V. "Kraft Pulping - Theory and Practice" Lockwood	1966	Kraft Pulping	Useful reference. Basically a literature review. Now dated.
Gavelin, G. "Science and Technology of Mechanical Pulp Manufacture" Lockwood	1966	Mechanical Pulping	Mainly a process description. Useful reference. Now dated.

PULP AND PAPER TECHNICAL BOOK LIST

3.1 PAPERMAKING - GENERAL

Author, Title, Publisher	Date of Public.	Text Emphasis	Remarks
Mardon, J. et al "Papermachine Crew Operating Manual" Lockwood	1963	Papermachine Operation	A unique book in its time. Useful today mainly as a model.
Nuttall, G.H. "Theory and Operation of the Fourdrinier Paper- machine" S.C. Philips and Co.	1967	Papermaking	An excellent text, still relevant. Written for U.K.
BPBMA Symposium Transactions	1961 1965 1969 1973 1977	Paper Structure Web Consoli- dation Papermaking Systems Fundamental Properties Fibre-Water Interactions	These transactions are issued in book form and contain many interesting papers. They provide a useful reference, especially with respect to the theme of each respective symposium.
Higham, R.R.A. "A Handbook of Paperboard and Board" (2 Volumes) Business Books Ltd.	1971	Paperboard Manufacture & Conversion	A valuable contribution with respect to paperboard manufacture and conversion. Contains information not available in other books.
Haylock, E.W. (Edit) "Paper: Its Making, Merchandising and Usage" Longman's Green & Co.	1974	Papermaking, Sales, Print- ing, and Converting	A relatively brief introduction to pulp and paper manufacturing techniques (143 pages) followed by more detailed information on selling, printing and converting. (Written for U.K.)

PULP AND PAPER TECHNICAL BOOK LIST

3.1 PAPERMAKING - GENERAL (cont.)

Author, Title, Publisher	Date of Public.	Text Emphasis	Remarks
Zabel, L.W. "Lectures on Papermaking" University of Maine	1975	Papermaking	Thorough discussion in most areas. Some omissions and lack of continuity due to independent effort by various contributors. (265 pages, softbound)
Saltman, D. "Paper Basics" Van Nostrand Reinhold Co.	1978	Papermaking, Sales, Converting	Good non-technical introduction with emphasis on paper buying and utilization.
Grant, J. et al "Paper and Board Manufacture" Tech. Div. of BPBIF	1978	Paper & Board Manufacture	Precise application appears difficult to identify. Covers wide spectrum, very unevenly. Not recommended (written for U.K.).
Rance, R.E. (Edit) "Handbook of Paper Science" 2 Volumes Elsevier Scientific Pub. Co.	1) 1980 2) 1982	Raw Materials and Processing Structure and Phys. Properties	These advanced books provide a consolidation of recent developments in fundamental knowledge of paper and papermaking. Highly recommended.
"Walden's Handbook" Walden-Mott Corp.	1980	Reference	A "fact book" for paper salespeople and buyers of printing paper. Includes a comprehensive glossary of terms.
Bureau, W.H. "What Every Printer Should Know About Paper" GATF	1982	Papermaking & Paper Proper-	Designed to provide a basic understanding of paper manufacture and properties as related to printing and converting operations.

PULP AND PAPER TECHNICAL BOOK LIST

3.2 PAPERMAKING - SPECIFIC FOCUS

Author, Title, Publisher	Date of Public.	Text Emphasis	Remarks
Booth, G.L. "Coating Equipment and Processes" Lockwood	1970	Coating	Good when published, but now dated. A new book is needed.
Gavelin, G. (Edit) "Drying of Paper and Paperboard" Lockwood	1972	Drying	This remains a first-class text. Drying has changed relatively little compared to other aspects of papermaking.
- "Paper Machine Felts and Fabrics" Albany International	1976	Felts and Febrics	Good reference on felt and fabric construction. Now requires updating because of rapid changes.
Schiller, F.E. "Manual of Supercalender Operations" Miller Freeman	1976	Supercalendering	This book is essentially non-technical. Mainly useful to operators.
Hunter, D. "Papermaking, The History and Technique of an Ancient Craft" Dover Publication	1978	History of Papermaking	Takes us back to the good old days. Pleasant and interesting reading. No collection of papermaking books can be complete without this text.

PULP AND PAPER TECHNICAL BOOK LIST

3.2 PAPERMAKING - SPECIFIC FOCUS (cont.)

Author, Title, Publisher	Date of Public.	Text Emphasis	Remarks
Atkins, J.F. (Edit) "The Paper Machine Wet Press Manual" TAPPI Press	1979	Pressing	Essentially an introduction for newcomers to the industry; inadequate for most purposes. (104 pages, hardbound)
- "The Dictionary of Paper" 4th Edition American Paper Institute	1983	Dictionary	Definitions of industry terminology, with emphasis on explanation of various paper grades.
- "An Operator's Guide To Aqueous Coating" 10 Sections PITA	1979-83	Coating	Complete coverage of theory and application. Issued in 10 separate sections as follows: (1) Basic Science, (2) Base Sheet, (3) Coating Pigments (4) Coating Binders, (5) Paper Coating Additives, (6 & 7) Coating Equipment and Processes, Parts I & II (8) Drying Equipment and Processes, (9) Formulating and Preparing the Coating Mix, and (10) Technical Control. (written for U.K.)

PULP AND PAPER TECHNICAL BOOK LIST

4. PULP AND PAPER TESTING

Author, Title, Publisher	Date of Public.	Text Emphasis	Remarks
Strelis, I. & Kennedy, R.W. "Identification of North American Commercial Pulpwoods and Pulp Fibres" University of Toronto Press	1967	Fibre Identification	Provides key to microscopic identification of woods and fibres.
Streit, F. "Paper Quality Control" Lockwood	1968	Paper Quality Control	A unique book, still very useful.
Browning, B.L. "Analysis of Paper" Marcel Dekker	1969	Paper Testing	An important book for the paper analyst. Well referenced.
Cote, W.A. "Papermaking Fibres" Syracuse University Press	1980	Fibre Identification	A photomicrographic atlas of softwood, hardwood, plant and man-made fibres. Of special interest to research and mill laboratories.
Parham, R.A., Gray, R.L. "The Practical Identification of Wood Pulp Fibres" TAPPI Press	1982	Fibre Identification	Provides complete information on the identification of fibres from 76 wood species. Includes section on microslide preparation. A good reference.
Mark, R.E. (Editor) "Handbook of Physical and Mechanical Testing of Paper and Paperboard" 2 Volumes Marcel Dekker	1983	Paper Testing	This advanced text provides in-depth coverage of paper testing theory and practice. Only the 1st volume has been issued to date.

PULP AND PAPER TECHNICAL BOOK LIST

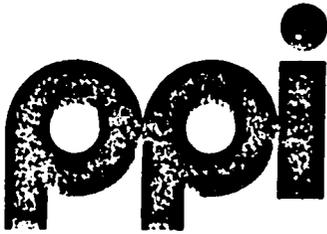
5. INSTRUMENTATION

Author, Title, Publisher	Date of Public.	Text Emphasis	Remarks
Evans, J.C.W. "Pulp and Paper Mill Process Instrumentation" Lockwood Publ.	1969	Basic	Covers control techniques in all process areas. Now quite dated.
Lavigne, J.R. "An Introduction to Paper Industry Instrumentation" 2nd Edition Miller Freeman	1982	Basic	Excellent description of basic instrumentation utilized in the pulp and paper industry.
Lavigne, J.R. "Instrumentation Applications" Miller Freeman	1979	Application	Excellent review of instrument applications including extensive flow sheets to support text.
McGill, F.J. "Measurement and Control in Papermaking" Adam Hilger Ltd.	1980	Basic	This excellent book provides a comprehensive introduction to instrumentation in the paper industry. Includes a chapter on hydraulics. Does not include pulp mill applications.

PULP AND PAPER TECHNICAL BOOK LIST

6. SPECIALITY TEXTS

Author, Title, Publisher	Date of Public.	Text Emphasis	Remarks
Osborn, H. (Edit) "Paper Finishing" Ernest Benn.	1972	Paper Finishing	Comprehensive coverage of paper finishing. Well illustrated. Aimed at U.K. No references.
Wayman, M. (Edit) "Guide for Planning Pulp and Paper Enterprises" FAO of U.N.	1972	Planning	A useful book with a unique focus. Covers all factors to be considered in the planning of a new mill, with particular emphasis on projects for developing countries.
Hall, D.D. "Finishing of Fine Papers" Joint Textbook Comm.	1975	Paper Finishing	A good practical text for operators covering most areas of finishing. No references.
Singh, R.P. (Edit) "The Bleaching of Pulp" TAPPI Press	1979	Bleaching	A first-class reference on all types of bleaching. Highly recommended.
Hatton, J.V. (Edit) "Chip Quality Monograph" Joint Textbook Comm.	1979	Chip Quality	A first-class reference on chip manufacture, handling, and quality. Highly recommended.
Drew, J. & Propst, M. (Edit) "Tall Oil" Pulp Chemical Assoc.	1981	Tall Oil	An excellent book, well referenced and indexed. Of interest to anyone dealing with tall oil.
Sjostrom, E. "Wood Chemistry Fundamentals and Applications" Academic Press	1981	Wood Chemistry	This thorough text begins with a discussion of wood structure, then reviews basic carbohydrate and lignin chemistry, and examines the chemistry of pulping and bleaching. A recommended book, well referenced and indexed.



pulp & paper International

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B-17

Instituto Universitario
da Beira Interior
Rue Marquês d'Avila e Bolama
6200 Covilha
PORTUGAL

Attention: R C Peterson

Brussels, 25th October 1985

Dear Sir/Madam

Thank you for your letter of 11th October, to hand this morning. PPI is happy to help in developing the Paper Engineering Program at Covilha, and we are pleased to send you, under separate cover, the following PPI publications:

- (a) PPI editions for 1984 (dependant on stocks)
- (b) PPI editions for 1985 (dependant on stocks)
- (c) PPI European Pulp and Paper Map
- (d) PPI Publication Papers from Conferences
in Amsterdam in 1982 and London in 1984
- (e) Free subscription to PPI for one year with
effect from December 1985.

All the staff of PPI wish you and your colleagues - and the students - much success.

Keep us informed of your progress, and we can report this in PPI.

Yours faithfully

pp John Kalish
Publisher & Editor



APPENDIX C

- Review Comments on Paper Engineering
- Plan of Study

REVIEW COMMENTS: PLANO DE ESTUDOS, IUBI

Licenciatura em Engenharia do Papel

I. General:

1. The Technical Communications area, both written and spoken, needs to be encouraged. These skills are essential, as indicated by Miami University Paper Science and Engineering survey response as published in Pulp and Paper, September 1985 (see attached). People skills are very important!
2. The biological foundation of the industry needs to be introduced. For example, the biological aspects of tree growth and the impact of the new developments in molecular biology on this source of raw material is important. The application of biological systems for secondary wastewater treatment processes is important. Also, the future use of biological systems for pulping (enzymes) and the production of new byproducts (fermentation, etc.) should be mentioned. This area of research and development will see important changes in the next decade.

II. Specific Curriculum:

1. In examining the entire 5 year degree program, a few observations can be made:
 - Only 13 credit hours of business related courses are available and they start in the fourth year (semester 8). In the material to be presented to students, it is important that they be exposed to the areas of accounting, marketing as well as management and environmental regulations.

The use of off-campus speakers or visiting lectures (industrial, governmental, etc.) is not mentioned. A possibility is to invite speakers to address certain areas or specific topics of common interest to the paper and textile engineers. For example, seminars on import/export regulations, quality control, changes in environmental control, technology impact of entry to EEC, etc. might be suggested talks. A seminar could be offered for credit (0.5 or less) for advanced students and should be of interest to the entire university community. Students could submit a 1 or 2 page (or more) written summary after the seminar and discussion period, for evaluation purposes, if credit is to be allowed.

- Economics appears only briefly in the plan and the financial aspects are not treated until the last year (semester 9). It is essential that engineers be aware of "cost-effective engineering." In many engineering programs a two semester course in Macro and Micro Economics and one semester course in Engineering Economics are required.

- Without the detailed description of each course it is difficult to determine the extent of coverage or overlap, if any exists, for a given area. For example, Physics (Fisica) and Mechanics of Materials (Resistencia de Materiais) could exhibit a degree of similarity in some areas. One should be concerned about the extent of redundancy in the program, if it exists, although slight repetition of theory in the practical treatment is often beneficial to the student.

Text books in Portuguese may not be available on the subject related to pulp and paper. Materials from other countries (Spain, France, UK, USA, etc.) might be helpful in the introductory course work. Also audio visual materials are available that will assist the teaching. These include videotapes, 16mm movies as well as 35mm color slides and audiotape presentations. Materials of this type should be used if they can be obtained in a timely fashion.

- Today, computer technology is changing rapidly. Its application in the pulp and paper industry has changed dramatically during the past 25 years. This trend will accelerate in the future as the price of computer systems decreases. The application of computers and hierarchical systems of computers within the industry needs to be emphasized. Information and data manipulation as well as process control are important now and their applications will be expanded in the future. The single course that can clearly be related is identified in semester two as computer programming. Student accessibility to computer terminals is needed for many of the subjects. The use of Basic, Fortran, etc., will be very important skills that the paper engineer will need to master. If internal funding prohibits near-term acquisition of suitable hardware, then outside sources of money for the purchase should be sought.

III. Overall Observations and Comments:

1. The academic program is very rigorous.

2. It will take time to implement the IUBI Pulp and Paper laboratories. Therefore, practical training in the mills should be sought for the students during the school holiday. This experience will assist the students in applying the knowledge gained at the University and will assist the University in developing the industrial contacts that lead to applied research of interest to the mills. In addition, the mills will find these young men and women engineers to be very useful in conducting process examinations, special projects, etc., that cannot be conducted normally because of production restraints, maintenance supervision and other responsibilities.

PAPER ENGINEERING

Subject of Prerequisites

Suggested Regulations:

1. Students cannot take Tecnologia do Papel II before passing Tecnologia do Papel I.
2. Same applies to Tecnologia das Pastas do Papel I and II.
3. Students should have passed Quimica Organica I and II and Quimica Analitica before taking Quimica do Papel.
4. Processos Quimicos Unitarios II cannot be taken before passing P.Q.U.I.
5. Almost all third, fourth and fifth year course work required the Mathematics and Physics and Chemistry taken in the first two years be passed successfully before enrolling in third through fifth year.
6. Mecanica dos Fluidos probably should not be taken without passing the Mathematics and Physics courses.
7. Manipulacao do Papel I and II probably will stand alone enough so that they do not have to be taken sequentially but could be taken in either order.
8. Introducao do Projecto should not be taken before all relevant course work is passed.

Note: Students who want to take a course of action different than the one suggested should write a letter to the faculty documenting their argument for the change in procedure.

POLIMEROS: REVISION OF SUGGESTED CHANGES

November 9, 1985

TO: Prof. Dr. Santos Silva, Eng^o Sant'Ovaia
FROM: R. C. Peterson

On Friday afternoon, November 8, the young man, Simoes came to see me with a question about the lack of paper-related experiments for use in the Polimeros lab. This is the first time that I had really thought about this course in any depth. Attached is a brief review of the polymer use in the paper industry. He showed me the photocopy of Henry Bolker's book on Polymers and evidently thought that because Professor Bolker is at the Pulp and Paper Research Institute of Canada (PPRIC) in Montreal, that the book must be related to polymer application in paper. Professor Bolker is a physical-organic chemist and has a position at PPRIC but the book has very little, if anything, to do with polymer applications in paper making. Because I have not seen a course outline for the polimeros subject matter to be covered, I am going to make a few suggestions that may help the laboratory situation. They are as follows:

- (1) One option is to drop the lab and use strictly lecture.
- (2) Perhaps you can develop some experiments in conjunction with textiles or the Textile Institute, if you decide to keep the lab as it is scheduled.
- (3) Perhaps you can send to Lisboa or Coimbra for the lab experiments that they conduct in a beginning polymer course. Do you have the necessary equipment?

- (4) Perhaps you can develop a few experiments and describe (talk only) how they are applied in the paper industry. Obviously you cannot demonstrate applications in paper making without a paper making laboratory!

I will attempt to "conjure-up" a few cellulose related, improvised experiments that might be useful. However, I am not very optimistic that this will meet the needs of a true first course in polymers for paper engineering. What are the objectives for polymer chemistry as given in the plan of study? I will agree that polymer chemistry is a very important subject and that polymers are widely utilized in paper making as well as in the pulp and paper industry in many, many areas. However, I am not sure that you have to have experiments related to paper to teach the basic principles of polymer chemistry. Don't the chemical engineers and textile engineers have to take this course? If so, does it not have experiments dealing with the measurement of molecular weights and molecular weight distributions? Where is this done at IUBI? What about measurements of polymer physical properties as a function of polymer density? Do you have a "density-gradient column" somewhere that could be employed to measure basic polymer density and relate that to physical properties? Isn't this an important measurement for textiles?

I could go on, but I hope you understand. I will be more than happy to discuss this in more depth, if you wish.

Sincerely,

R. Peterson

APPLICATIONS OF POLYMERS IN PAPERMAKING

- A) Many Polymers are used. They can be grouped as follows:
1. Natural Polymers
 - Starches, natural or unmodified; chemically modified
 - Gums, natural and/or chemically modified
 2. Cellulose Derivatives, derived from chemically purified cellulose (wood or cotton)
 - Cellulose esters
 - Cellulose ethers
 3. Synthetic Polymers
 - Phenolics
 - Polyamines
 - Polyacrylamides
 - Urea and Melamine Formaldehydes
 - Polyamides
 - Others, latices derived from emulsion polymerization, etc.
- B) Applications
1. A number of the above are water soluble or water dispersible and are added during the sheet forming process to improve the physical properties of the dry paper sheet. This process is referred to as internal addition. The physical property improvements may be called: sizing, internal strength, wet strength development depending on the type of polymer used, etc.
 2. A special process of treating the surfaces (one or both) of the paper sheet during the manufacturing step is called surface sizing and is done on machine in the size press. A number of polymers may be employed. The main objective is to provide the treated paper with resistance to the penetration of fluids--aqueous and unaqueous. This process is surface sizing.

3. Another special process is called coating. A coating is applied to the surfaces (either one or both) of paper either on the machine or in a subsequent operation (e.g., INAPA). The coating formulation is generally a binder that is polymeric and a fine pigment and miscellaneous components added to modify rheological properties, etc. The objective is to provide a very smooth, attractive surface for high quality printing, e.g., magazines.

4. Extrusion of thermoplastic polymers onto the surface of paper is also carried out to produce special papers with barrier (resistance to penetration) properties. Many such papers are used in packing a variety of products.

5. Polymer uses in other, non-paper product areas include:

- Forming fabrics and machine clothing (felts)
- Materials of construction in many, many areas
- Roll coverings and covers for special uses
- Packing (Polyethylene and Polypropylene) of paper products
- Corrosion resistance applications
- Etc.

APPENDIX D

- Promoting Contact of IUBI Faculty with the Portuguese Pulp and Paper Industry
- A Draft for Discussion
- Possible Research Topics for Pulp and Paper

PROMOTING CONTACT OF IUBI FACULTY WITH THE
PORTUGUESE PULP AND PAPER INDUSTRY

Problem:

Many IUBI faculty members have had limited contact with their industrial counterparts in the Portuguese pulp and paper industry. As a consequence, their ability to work on industry related and significant research projects is reduced. Many such cooperative efforts begin with the development of personal contacts between a faculty member with specific research expertise and an industrial counterpart with an industrial problem, awaiting solution. It is important for the future of the IUBI paper engineering program that this kind of relationship be cultivated early in the development of the program.

Solution:

One possible solution suggested for paper engineering at IUBI is to begin making the appropriate contacts for the non-paper engineering faculty by arranging a visit to the Portucel Central Laboratory and the pulp and paper mill at Cacia. The paper engineering faculty have already or soon will develop a close working relationship with their counterparts in the Portuguese pulp and paper industry through many avenues of contact. However, IUBI faculty in math-statistics, management and economics, chemistry and physics are less likely to have such contacts and be able to take advantage of them to the mutual benefit of all parties. A visit to the Portucel facilities is one way to accelerate the development of this process. In the future, reciprocal visits could be arranged, particularly where IUBI could host or co-sponsor a conference, short course, etc., for the Portuguese paper

industry technical group, Tecnicelpa. Other approaches are equally valid in an attempt to promote cooperation between the interested parties.

Sufficient preliminary planning should be done before arranging the visit to Eixo and Cacia that the benefit obtained is the maximum. One possible format is to choose the coordinators for each area as the IUBI participants and ask each to develop a profile of their respective departments for presentation to the Portucel people. This profile should be brief but it should give a list of faculty and their backgrounds and research interests. This faculty profile should be in writing perhaps issued as a printed booklet. Sufficient printed copies should be left for Portucel so they can distribute it widely within the company. The Rector or a designated representative should participate in the discussions to clearly demonstrate to them that IUBI is very serious about developing a long term working relationship with Portucel.

IUBI paper engineering faculty should also plan on assuming an active leadership role in Tecnicelpa, both now and in the future. These kinds of contacts are extremely important in recruiting new students, job placement of graduates in the pulp and paper mills, obtaining industrial donations of equipment, etc.

Another benefit that will be achieved by this is a sincere appreciation of the similarities as well as differences between the industrial and academic groups. Furthermore, teaching and laboratory work can often be made more relevant to the students after this type of experience. Lastly, equipment similarities in industrial and academic facilities is another area for cooperation in troubleshooting problems,

validating test procedures, etc. Often one of the two can assist the other in a very beneficial manner. Hence, the objectives of both organizations are achieved and the rewards of cooperation are apparent to all.

A DRAFT FOR DISCUSSION

30 October 1985

TO: Alberto F. Pereira
FROM: R. C. Peterson
RE: Small paper mill situation in Portugal and the effect of
entry into the Common Market in January 1986

According to Eng^o Alegre Ribeiro, Direccao Tecnica, Portucel, Eixo-Aveiro, many small mills are going to be adversely effected by Portucel's entry to the ECM. According to information (see attached) available, many of these paper mills are probably marginal economic ventures, although additional data is necessary to prove or disprove this claim. Entry to the ECM will probably lead to closure according to Eng^o Ribeiro. This situation may be an ideal opportunity for IUBI faculty and perhaps students to work on a project of merit to local industry. IUBI will need the assistance of Portucel people, Tecnicelpa people, etc., to assist in identifying the mill location that could be used for the project. The basic concept is to evaluate the mills' current situation, grades of paper produced, flexibility in changing product mixture, etc., and determine the impact of Common Market entry.

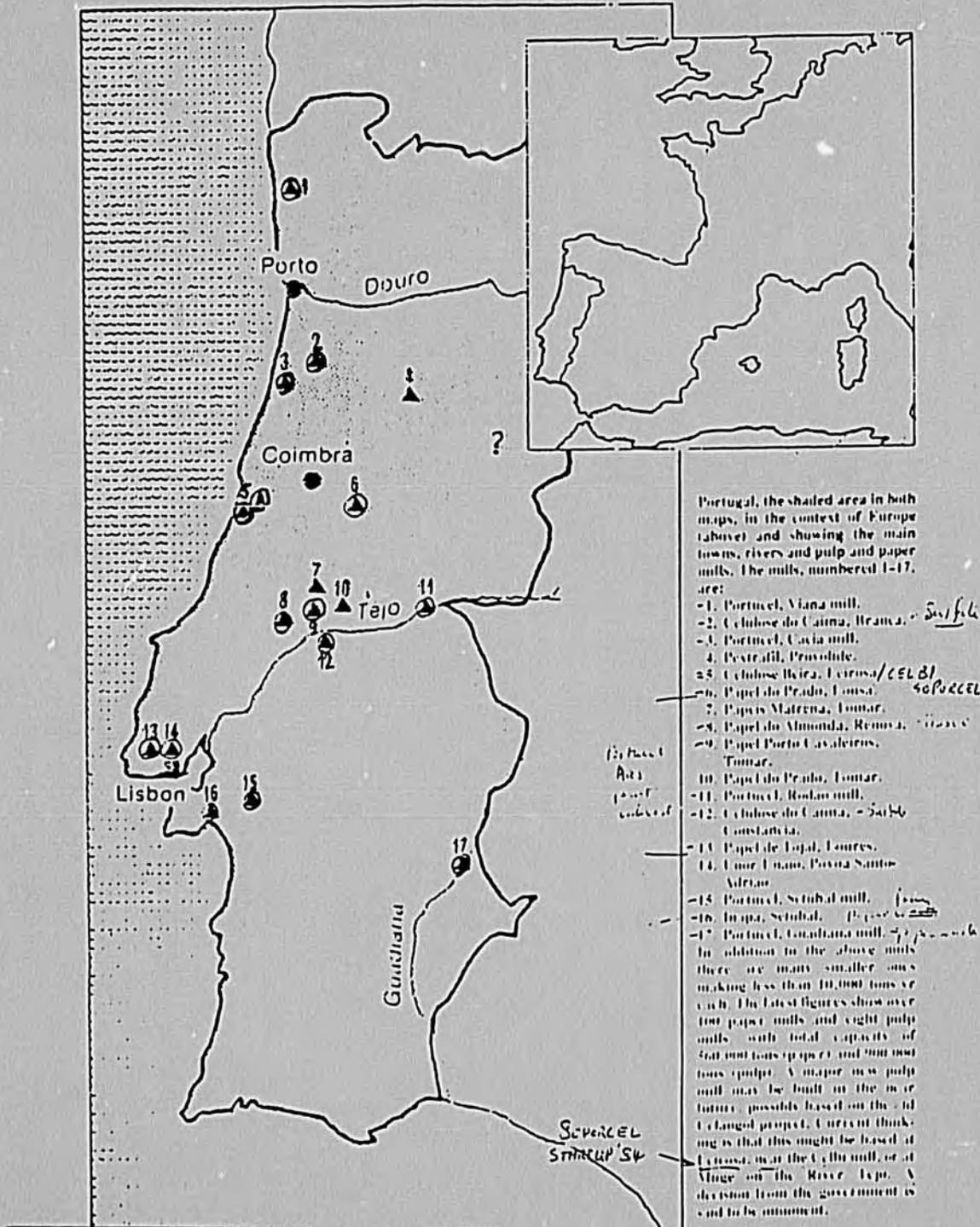
A review of the market and technical situation with reference to capital investment requirements, grade changes, mill personnel availability, quality procedures, etc., are all part of the overall study to determine the changes to be recommended to management to insure the economic viability of the mill. The nearest mill to Covilha is in Viseu and it is my understanding that Portucel has a financial position

in the company. I am unaware of the exact situation and really can not determine the possibility of a project like this being:

- Accepted by the mill management as a good idea.
- Within IUBI faculty and student capabilities in view of time and financial contents.
- Availability and cooperation of Portucel people, etc.

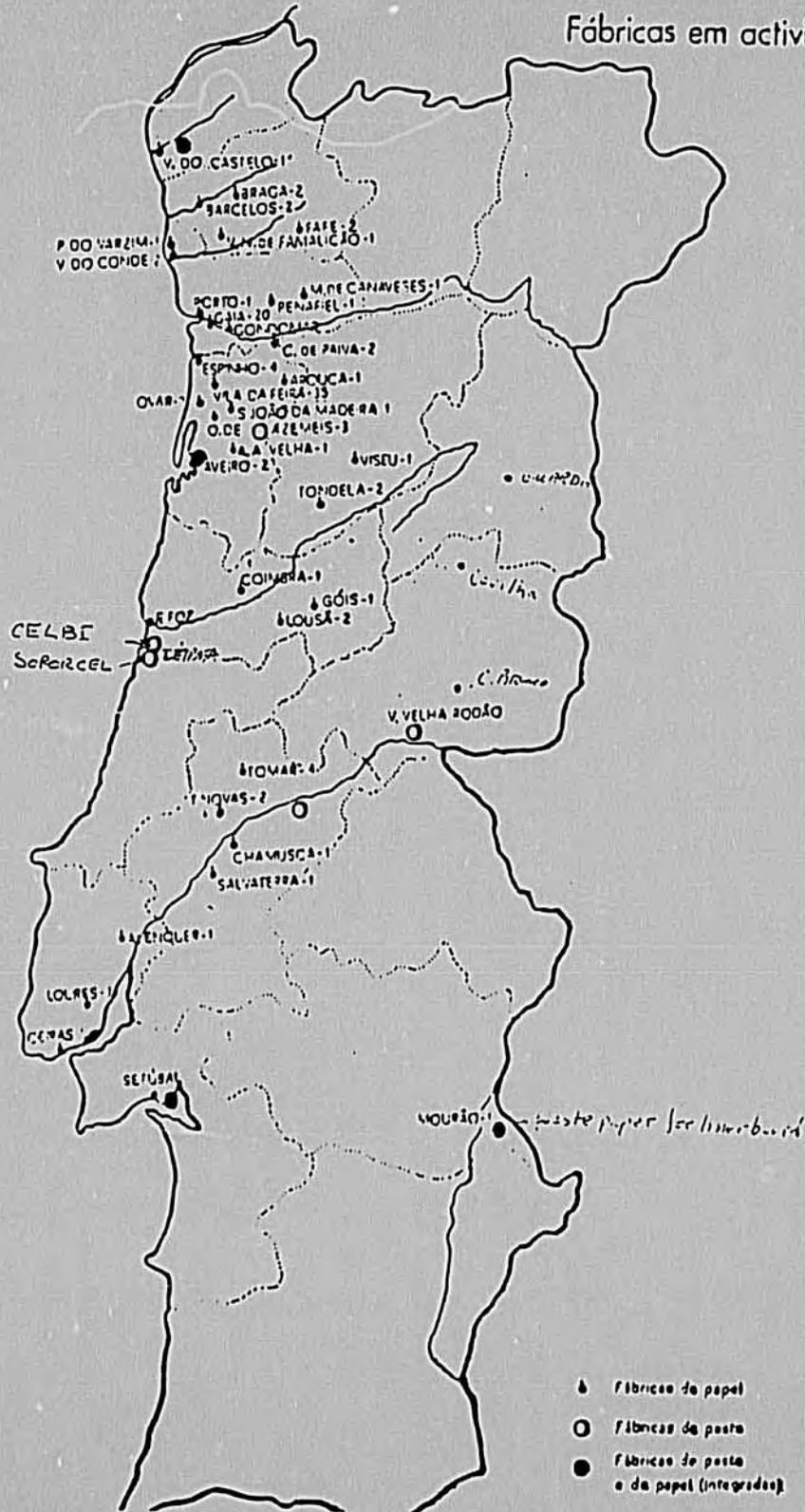
In other words, I don't know enough about the Portuguese situation to make a judgement.

Caíma - Sulfile 71k
 Celbi - Kraft Swedish (100%)
 Soporcel - Kraft 21k (43%)



LOCALIZAÇÃO DA INDÚSTRIA PAPELEIRA

Fábricas em actividade



POSSIBLE RESEARCH TOPICS FOR PULP AND PAPER--IUBI

1. Study the reaction of high yield hardwood pulps with compounds such as ethylene oxide to promote bonding development of lignin.
2. Study the Eucalyptus pulp properties with respect to the end use properties of paper made from this material. Try to develop a combined strength parameter for bleached hardwood eucalyptus pulp using a statistical study and analysis.
3. Investigate the extractives of Eucalyptus, with respect to the problems of forest fires. Volatility of bark extractives from Eucalyptus suggests possible value in recovery for industrial use e.g., solvent, gasoline extender, etc.
4. Study the deterioration of wood chip piles in outside storage in the various regions of Portugal. Some regions may be more susceptible to problems than others because of rainfall conditions, time in storage, etc.
5. Investigate the use of $\text{Na}_2\text{CO}_3/\text{NaOH}$ or $\text{Na}_2\text{CO}_3/\text{Na}_2\text{SO}_3$ chip impregnation at elevated temperature for high yield pulp production. Follow this with the addition of $\text{Ca}(\text{OH})_2$ to causticize before the second refiner stage. Study the effect on refining condition. The precipitated CaCO_3 should be distributed more uniformly within the fibers.

APPENDIX E

Attendees at Setubal Seminar

CONFERENCIA DA TECNICALPA

LOCAL - C.F. SETÚBAL

DATA : 85.11.05

PARTICIPANTES

INAPA

- . ENG^o FERREIRA LOPES
- . ENG^o ÂNGELO LOUREIRO
- . ENG^o EDUARDO SILVA

CELBI

- . ENG^o SILVA GOMES

MATRENA

- . ENG^o LUIS FILIPE HENRIQUES BONINA
- . ENG^o JOÃO TEODORO GRAVE BATISTA
- . SR. JOAQUIM JOSÉ DE SOUSA AROCHA

RENOVA

- . ENG^o ANTÓNIO JOSÉ SIMÃO
- .

FAPAJAL

- . ENG^o JOÃO ABREU NETO

PRADO

I.U.B.I.

- ENG^o SANTOS SILVA
- ENG^o SILVA FERNANDES
- ENG^o RUI SANT'OVAIA

PORTUCEL

- ENG^o MÁRIO VINAGRE (MARKETING)
- ENG^o ROGADO PEREIRA (MARKETING)

- ENG^o ADOLFO BARBOSA (C.F. SETÚBAL)
- ENG^o HENRIQUE FIGUEIRA (C.F. SETÚBAL)
- ENG^o CELESTE BARBOSA (C.F. SETÚBAL)
- ENG^o DOMINGOS MOURA (C.F. SETÚBAL)
- DR^a FRANCISCA NORONHA (C.F. SETÚBAL)
- SR^a D. DOMITTLIA SILVA (C.F. SETÚBAL)
- SR. JOSÉ ESTEVÃO C. REIS (C.F. SETÚBAL)
- ENG^o VITOR TAVARES DA SILVA (C.F. SETÚBAL)
- SR. ORLANDO R. FORTUNATO (C.F. SETÚBAL)