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ITA COMMERCIALIZATION EVALUATION

USAID-~~SENEGAL~~

PHASE I

ROBERT M. COLTON ASSOCIATES

USAID Contract No. PDC-2028-Z-00-7121-00

January 29, 1988

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## ITA COMMERCIALIZATION EVALUATION - USAID - SENEGAL

### I. EXECUTIVE SUMMARY/OPTIONS/RECOMMENDATIONS

USAID is seeking methodology to assist the Senegalese government Institute of Food Technology (ITA) in evaluating the potential for and finding ways to transfer its technologies and to enhance the use of its resources for private enterprise activities.

R.M. Colton a specialist in technology transfer (vitae attached - see Section 8) was contracted to make these assessments. His evaluation was conducted in Dakar, Senegal from 4 through 13 January 1988.

Mr. Colton conducted 18 interviews with ITA staff, medium and large scale private industries in the food processing area, financial institutions (private and public), industry associations, USAID-Senegal contractors (management assistance) and US-AID staff.

During the 10 day visit the following activities and actions were conducted and completed:

- 1) Evaluation of quality of researchers and research at ITA (see Section 1)

- 2) Assessment of responsiveness of industry to ITA output
- 3) Assessment of responsiveness of the financial and banking community to small and medium scale industry funding and development (see Section 6)
- 4) Interviews with ITA staff, medium and large scale private industries, financial institutions, industry associations, USAID-Senegal contractors and staff (see Section 2)
- 5) Recommendations/conclusions and options regarding transfer of technology from ITA to private enterprise
  - a) Assessment of ITA 5-year plan (see Section 3)
  - b) Proposed ITA public/private activities separation and structure (see Sections 4 and 5)
- 6) Development and scope of work for follow-on technology transfer implementation activities (Phase II of ITA commercialization program) (see Section 7).

Regarding the above activities and actions the most relevant findings and recommendations are as follows (numbers correspond to actions listed above):

- 1) The quality of the researchers and research is fair to good. Follow-on activity requiring specialist in quality control test

methods and management necessary to upgrade facility to "world" standards.

2) Industries responsiveness to ITA is mixed. Consensus is that ITA should be privatized and that its capabilities could be more effectively used. Follow-on activity requiring international marketing specialist in food products and local assistance in business management, structuring and operation is necessary.

3) Financial and banking community appears to be responsive to small and medium scale industries and entrepreneurial needs. Components in place for providing adequate credit, proposal development, management assistance, entrepreneurial development and use, industrial parks and associated building.

4) General attitude toward enhanced use of ITA resources is positive. Follow-on activity requires specialist in cooperation research to assist in planning and providing stimulation and continuity in implementing the ITA commercialization project.

5) Recommendations, conclusions and options regarding ITA

a) Existing 5-year plan requires considerable revision to increase detail, up-grade business development and management capabilities and enhance its responsiveness to industrial needs.

b) ITA should be separated into two distinct components:

I - Public Sector - consisting of a quality control and testing facility having technical advisory and training capabilities - utilization mandated by government test/training requirements for food industry

II - Private Sector - consisting of food product development cooperative and incubator. The Coop would output new products for existing and new companies; and the incubator would temporarily house new companies using Coop new product outputs. The Coop would be jointly owned by ITA, private banks and associations and incubator companies.

6) Follow-on scope of work - emphasizes need to bring in cooperative research specialist to provide guidance and oversight implementation of 5) above for period of 1 1/2-2 years, plus need for quality control, marketing and business development and management specialist for periods of 3-4 weeks.

This report emphasizes the option of immediately separating out and developing both public and private sector functions at ITA as described in 5) above. A second option (but not recommended) is to maintain ITA entirely in the public sector where both quality control and product development remain government functions. However, in this second option the product

development functions should have provisions for strong private sector input through a special industry controlled committee empowered to make and enforce recommendations regarding ITA product development and commercialization practices. This committee should also have powers to initiate the longer term conversion of the product development activities in the private sector through issuance of stock or other equity ownership certificates to the private sector.

Maximum benefits from ITA resources would primarily accrue to small scale industries who are in dire need of quality control and testing new product development, training and technical advisory services. However, as noted, the quality control, testing and training services are most effectively delivered as a public sector resource with the product development services provided as a private cooperative incubator.

Considerable benefits could be derived from medium and large scale industries but primarily through government mandated quality control and testing, health and safety requirements on food products developed by industry. Medium and large scale industries have little use for public product development, training, or technical advisory services as these are available "in-house" or are available from other private sector resources. This also reinforces the need to "privatize" the product development capabilities of ITA.

## II. BACKGROUND

USAID/Senegal is seeking methodology to help the Institute of Food Technology (ITA) to find ways to transfer its technologies and research results to private enterprises.

ITA has been involved in food product development and processing technologies for the last 23 years. It has a number of research results on fruit and vegetable preserves, juices, syrups, meat and fish products. ITA has a key role to play in promoting processing and consumption on locally produced cereals and other food products, in order to reduce dependency on imported foods, especially imported rice which represents a major source of the GOS balance of payments deficit.

In addition to product development ITA has a strong role in the areas of quality control and testing, training and technical advisory services all related to the food industry and food technology.

ITA now has a legal status which entitles it to commercialize its products and services, but also deprives it of some substantial government financial support.

USAID has financed the millet transformation pilot activity of ITA. It is currently supporting a cow pea transformation pilot project.

ITA has organized a number of activities (seminars, banquets, etc.) to publicize its products and to reach the business community, but has not succeeded in attracting the private sector, mainly because (A) there has never been a strong traditional linkage between research and the private sector in Senegal and (B) the staff in the research and product development office of ITA does not have all of the required skills to sell ITA products and services.

ITA has recently developed a 5-year plan that will emphasize marketing its products and services to the private sector. At the end of the period ITA is supposed to obtain 50% of its support directly from the private sector.

### III NARRATIVES OF ACTIVITIES

USAID is seeking methodology to assist the Senegalese government Institute of Food Technology (ITA) in evaluating the potential for and finding ways to transfer its technologies and to enhance the use of its resources for private enterprise activities.

R.M. Colton a specialist in technology transfer (vitae attached) was contracted to make these assessments. His evaluation was conducted in Dakar, Senegal from 4 through 13 January 1988.

Mr. Colton conducted 18 interviews with ITA staff, medium and large scale private industries in the food processing area, financial institutions (private and public), industry associations, USAID-Senegal contractors (management assistance) and US-AID staff.

During the 10 day visit the following activities and actions were conducted and completed:

- 1) Evaluation of quality of researchers and research at ITA (see Section 1)
- 2) Assessment of responsiveness of industry to ITA output

3) Assessment of responsiveness of the financial and banking community to small and medium scale industry funding and development (see Section 6)

4) Interviews with ITA staff, medium and large scale private industries, financial institutions, industry associations, USAID-Senegal contractors and staff (see Section 2)

5) Recommendations/conclusions and options regarding transfer of Technology from ITA to private enterprise

a) Assessment of ITA 5-year plan (see Section 3)

b) Proposed ITA public/private activities separation and structure (see Section 4 and 5)

6) Development of scope of work for follow-on technology transfer implementation activities (Phase II of ITA commercialization program) (see Section 7)

## IV FINDINGS/CONCLUSIONS/RECOMMENDATIONS

### A. FINDINGS

- 1) Based on my analysis the ITA staff and its capability to perform its three major functions as outlined in its draft report (1) development of vegetable products, (2) quality control, and (3) studies and trainings is fair to good (see Section 3)
  
- 2) Based on interviews with the private companies and government staff in enclosure II regarding ITA capability to carry out the above three functions my findings are that capability varies from fair to excellent and necessity for ITA to perform these functions from important to unnecessary.
  
- 3) With only one exception all interviewees (public and private) perceive that ITA should be privatized, with the possible exclusion of quality control and training functions.
  
- 4) ITA (Mr. Diop) believes ITA should not be privatized, his draft plan reflects that view, and he feels he can convince the private sector to support 50% of his budget.
  
- 5) Because of ITA's lack of business acumen and activity they have been and continue to be systematically "ripped-off" in their negotiating with business.

## B. CONCLUSIONS

- 1) The consensus of private and public views (see enclosure II) is that ITA should be privatized
  
- 2) The ITA draft plan, its current staffing, and its structure are inadequate to achieve ITA's objective of achieving 50% industrial support in 5-years (see interview XVI for analysis and recommendations for plan revision)

## C. RECOMMENDATIONS

- 1) ITA staff should be strengthened to increase its potential for achieving its 5-year objectives. Professional staffing is required in business development and management, financial management, marketing, sales, advertising and public relations.
  
- 2) The 5-year plan should be completely revised and not submitted until it satisfies the requirements shown in interview XVI.
  
- 3) In the short term the following specialist activity is recommended:
  - A) Bring in an expert to provide guidance and recommendations for revising and expanding the ITA 5-year plan to achieve 50% industrial support within 5 years and

to oversight the separation and development of ITA's public and private components.

B) Bring in an expert to review and strengthen ITA's quality control and testing capabilities to bring it to the level required as a national center for quality control and testing in Senegal.

C) Bring in an expert to determine the "true" local and export market for the specific vegetable products listed in ITA 5-year plan.

D) Bring in an expert to revamp ITA's financial accountability\* and contracting functions; including record and accounting procedures and business oriented negotiation techniques for contract development, and management functions\*\* and structure for both administration and research activities.

4) In the longer term, efforts should be undertaken to separate out those functions of ITA that are most appropriate in the public and private sectors and develop and initiate a plan to solicit support and resources to implement that plan. This plan

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\* see interview no. 7 Frank Lusby/SMFRP

\*\* see Dr. Papa Nalla Fall (CESAG)

would probably indicate that the focus of the public sector activities would be quality control and testing and that of the private sector would be product and business development. This also includes the development of a private venture capital fund for "seed" investment. All of the above resources varying degrees of consultation, advice and training, and would require about 3-5 years.

## V APPENDICES

### SECTION 1

#### ITA RESEARCH CAPABILITY/TECH TRANSFER POTENTIAL EVALUATION

##### EVALUATIONS

- 1) Quality of researchers - good.
- 2) Quality of equipment and facility - fair to good.
- 3) Quality of research - fair to good.
- 4) Potential of transfer to private sector:  
    fair - large industry  
    good - small scale industry.
- 5) Private sector potential of using ITA product development facilities or funding product development at ITA as a government facility - poor.

##### RECOMMENDATIONS

- 1) ITA concentrate on becoming the principal government quality control and contamination testing facility.
- 2) ITA concentrate on developing training capability to train testers and maintain quality of test facilities and testing

techniques at industries where quality control and contamination testing is conducted on their own or required by government statute.

3) ITA transfer product development capabilities to the private sector by establishing a private, commercial incubator to establish new companies in the areas of food processing; representing ITA's expertise and where a substantial domestic/and/or/export market has been demonstrated (market studies).

4) The ITA testing/training and product development/incubator facilities should both be located on the grounds of the existing ITA facility but should be under different directorship; testing/training under government ownership, and product development/incubator under private direction and ownership (suggest committee chaired by Moctar Sow of SIPL be established to develop plan for incubator development and funding and conversion to private funding in a 2-3 year period).

SECTION 2

RECORD OF MEETINGS:

Monday, January 4, 1988

I INTRODUCTORY: PDO OFFICE USAID

Attendance:

Mr. Terry Myers	Chief, PDO
Mr. William Hammink	PDO
Mr. Mamadhu Kane	PDO
Mr. Mike Peletier	PDO (intern)
Mr. Ousmane	PDO

Discussions:

General information on PDO activities and specific concerns about "commercialization" attempts by ITA were discussed. ITA's general mission concerns itself with many aspects of food technology relating to:

- 1) conducting research activities, studies and actions
- 2) developing new local food resources
- 3) developing and disseminating high nutritional value foods

- 4) participating in quality control of foods
  - 5) training
  - 6) promoting small scale industry
  - 7) technical transfer of ITA results to industry
- discussion focused on ITA's difficulties in transferring results because:

1) it has no direct marketing or sales capability (licenses and disseminates information)

2) it has reputation for being difficult to negotiate with regarding licensing and technology utilization and being somewhat aloof.

3) it appears that ITA negotiations and agreements have to be approved by higher authority than the director - this discourages potential industrial users because of time delays and changes in agreements.

## II DEPUTY DIRECTOR MEETING USAID

### Attendance:

Mr. George Carner

Dep. Dir.

Mr. Terry Myers

Chief PDO

Discussions:

General discussion on AID program in Senegal and purposes of Colton's visit.

Mr. Carner indicated that AID's interest in ITA commercialization was one of several important areas that also included:

1) seed/fertilizer use (attempt to increase sales of previously subsidized products)

2) stabilize banking industry - somewhat in disarray with little private loans to small industries

III LUNCH MEETING WITH DR. MIKE HAMDY - USAID RESIDENT ADVISOR

Attendance:

Dr. Mike Hamdy	USAID advisor
Mr. Terry Meyers	Chief PDO

Discussions:

Dr. Hamdy reviewed ITA's activities and difficulties in transferring technology. He indicated that there was not very much technical activity occurring at ITA.

IV MEETING WITH JOSEPH SIKES - U.S. EMBASSY, HEAD ECONOMIC AND  
COMMERCIAL UNIT

Attendance:

Mr. Joseph Sikes

Mr. Portia McCullum

Mr. Bill Hammink

Asst. to Mr. Sikes

PDO

Discussions:

Focused on difficulties in banking community being an effective growth stimulator. Mr. Sikes thought AID-APS (agricultural production services) funds might be used to promote investment in exploiting ITA technology.

Tuesday, January 5, 1988

V MEETING WITH RICHARD GREENE, USAID ECONOMIST

Attendance:

Mr. Richard Greene

USAID Economist

Discussions:

Mr. Greene was in Kenya until August 1986. While there he was involved in the proposing of a venture capital and loan program through the central bank and others. He believes this venture capital program may now be in operation under a private enterprise development project.

When asked about potential exploitable technical areas in Senegal he thought there might be others and his Senegalese economist associate may be helpful in this area.

Mr. Greene, as with Mr. Sikes, felt that AID-APS funds could be used to fund an ITA venture capital programs in conjunction with private banks.

He indicated that potential investor private banks having solvency were:

Citibank	---
BIAO	Mr. Meynard
BICIS	Mr. Ousmane Noel Mbaye
CNCAS	Mr. Claude Fauque

He also indicated a potential investor would be Mr. Mimran of CSS and a major owner of an international holding company controlling BIAO.

#### VI MEETING AT ITA

##### Attendance:

Mr. Mouhamadou Diop	Director General
Mr. Ababacar S. Ndoye	Technical Director
Mr. El Hadji Diao	Development Director
Mr. Bill Hammink	PDO
Mr. Mamadhu Kane	PDO

After explaining the purpose of my visit Mr. Diop described ITA's activities and plans with the following highlights:

Under government direction ITA has developed a 5-year plan to have ITA 50% industry sponsored in 5 years. Plan is to be reviewed by special committee and evaluated by industry and finally revised and submitted to the government for approval. The plan is supposed to interest large companies in sponsoring research at ITA; developing small businesses based on ITA technology (cereals/fruits/meat/training - a summary of this plan will be provided at end of this portion of report).

Mr. Diop indicated he has difficulty in dealing with businesses. They "steal" ideas and do not understand research; ITA does want to operate to some extent as a business; ITA wants an international food technology expert to authenticate its capabilities; ITA wants a food technology marketing expert to set up procedures for marketing ITA products to industry; ITA needs to "fine tune" a strategy to achieve 50% funding by industry; needs business, financial and accounting capabilities to achieve objectives.

VII MEETING WITH FRANK LUSBY - HEAD OF SRFMP

Attendance:

Mr. Frank Lusby	SRFMP
Mr. Terry Myers	Chief, PDO

Discussions:

Frank Lusby of Experience, Inc., 1725 "V." St. NW, Washington, D.C. is contracted by AID-Washington to direct SRFMP through 1990.

Purpose of SRFMP is to correct accounting excesses in AID-sponsored projects in Africa; to train sponsored personnel in financial management and accounting practices and inventory accounting.

Mr. Lusby has responsibility for inventory accounting and financial management practices training in Maitrisarc program (under direction of SONAGA - Sonabanque - Mr. Mang, Director General)

Lusby indicated that there about 500 Maitrisarc's (unemployed college graduates) and that a typical Maitrisarc business employs 2-4 college grads at about \$35,000/employee. There is usually a professional who runs the business in addition to the Maitrisarc. Maitrisarc

applications and proposals are reviewed by Ministry of Labor and Sonaga/Sonabanque personnel. Lusby's Maitrisarc activities are concerned with the baking industry. He trains them in accounting practices; trains members of the bakers association in accounting practices, who intern will train personnel in association member companies to assure long term training capabilities (Lusby has CFA 1.0M for this training). As such the Association of Bakers could be used to assist ITA-Maitrisarc baking related ventures. In addition Frank Lusby's group could assist ITA (through USAID) in developing financial and business management capability to work with larger businesses as well as new small ITA technology based ventures.

Wednesday, January 6, 1988

VIII VISIT TO ITA LABORATORIES

Attendance:

Mr. Ababacar Ndoye	ITA
Mr. Bill Mammink	PDO

Discussions:

The following laboratories were visited and comments on activities indicated:

- 1) Microbiology - organic contamination/bacteria/fermentation -- one active project under direction of

Dakar University researcher on loan. Facility - fair.  
Photos 1/2 .

2) Cereals and legumes - no activity equipment - fair  
to good (some not operable). Photos 3/4/5

3) Milling (composite flour) reasonable activity -  
production of composite flour under contract to 5  
bakeries - equipment good - some not operable. Photos  
6/7

4) Animal products - no activity - equipment fair -  
some inoperable (inspected frozen sausages). Photo 8

5) Micro-toxins (detoxification of flatulants) - no  
activity.

6) Chemistry labs (inorganic contaminants) - no  
activity. Good facility - most equipment operable.

7) Sensory lab - did not inspect.

Following product area development facilities inspected:

1) Jellies/jams/juices - excellent pilot plant  
facility (Italian donor) 380 kilo/hr capacity - not in  
use. Photos 9/10/11

2) Composite flour (15-50% millet) - in use.

Photos 12/13

3) Meat products - sausages - not in use.

4) Solar tents - fish drying. Photo 14

### General Comments on Capabilities

Laboratory facilities are at best fair by US standards; much equipment is inoperable and may not be useful; very few personnel actively engaged in research or development. Those that were available for discussion varied from well informed and bright to very dull. Overall rating of facility is fair. By Senegal standards may be higher.

### Specific Comments on Capabilities

Testing and quality control - good

Training - not possible to evaluate

Product development - fair to good

Technology transfer potential - fair to good

Marketing capability - fair to poor

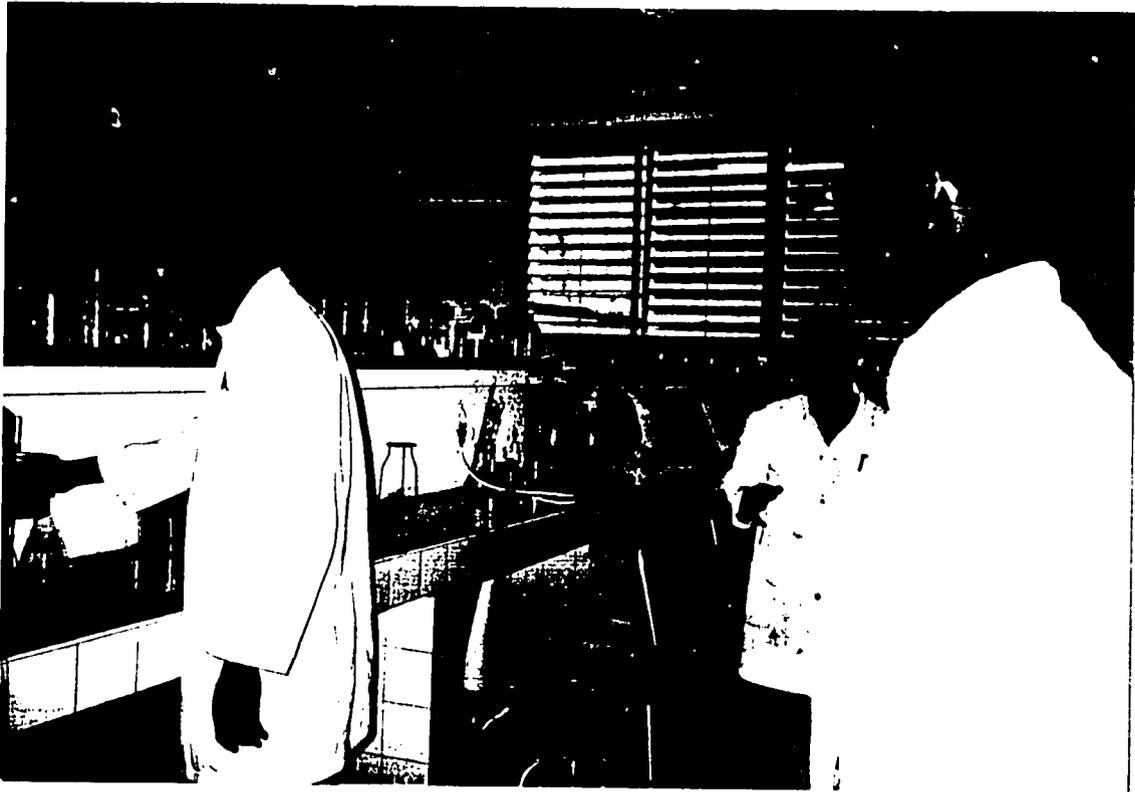


PHOTO 1

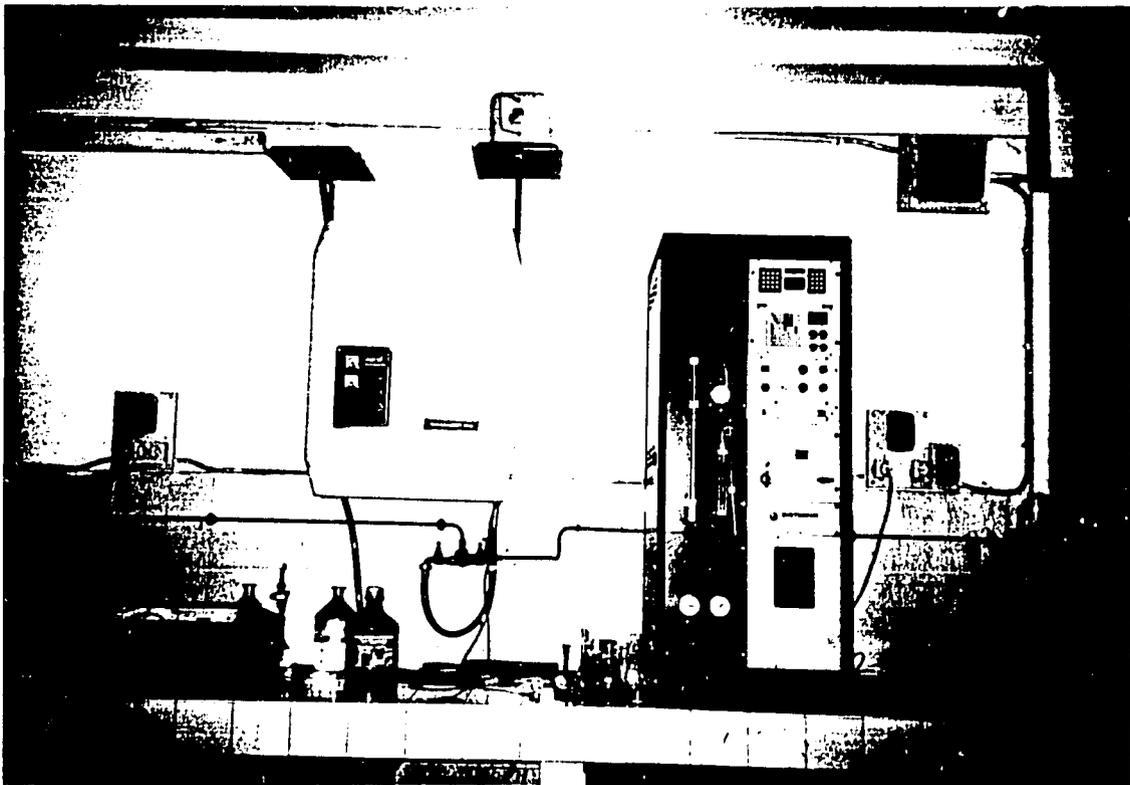


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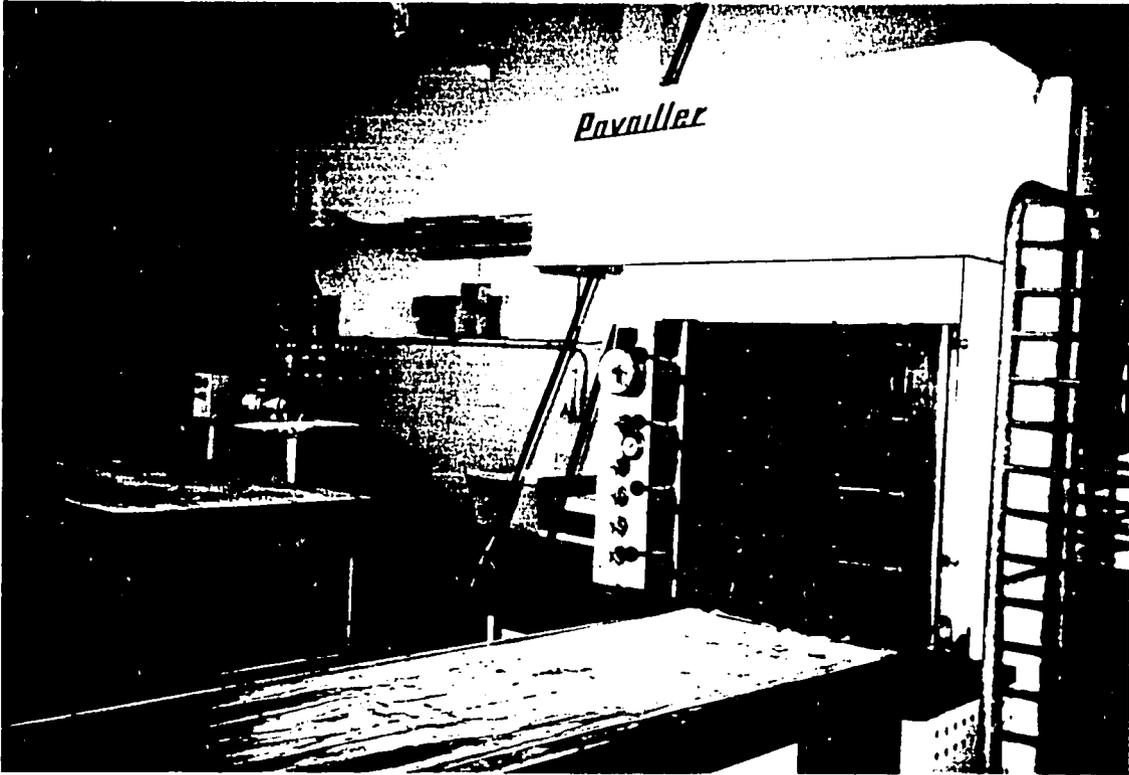


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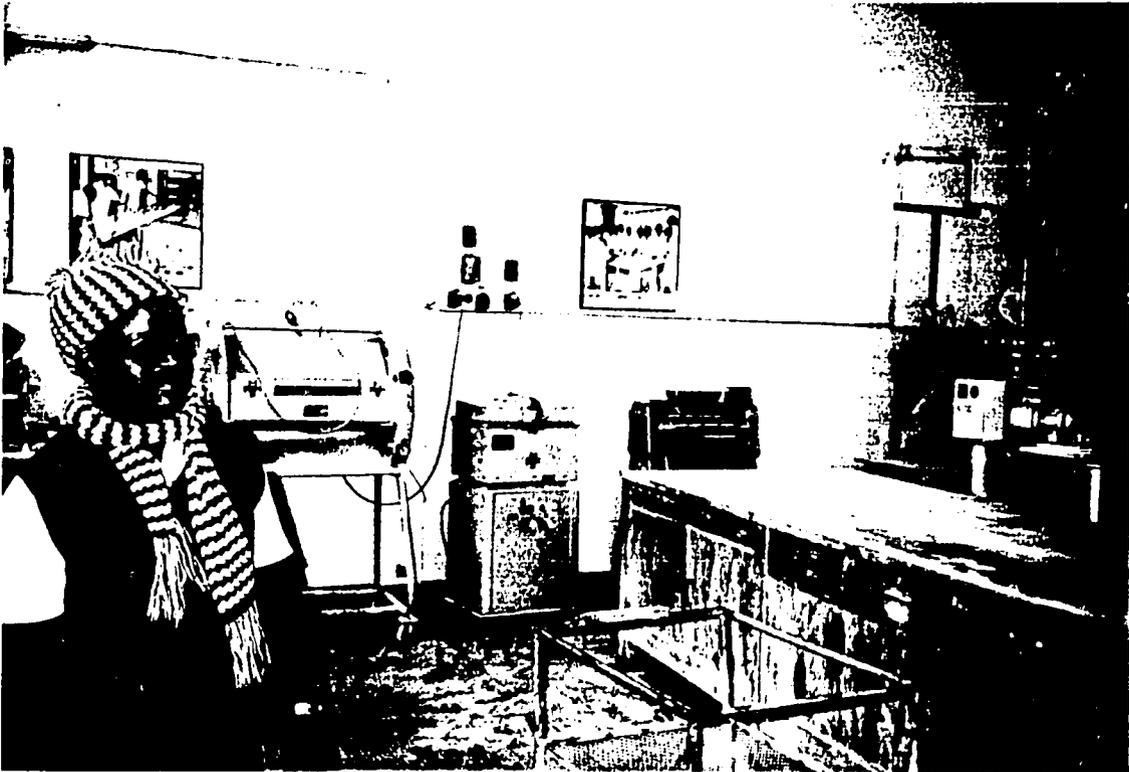


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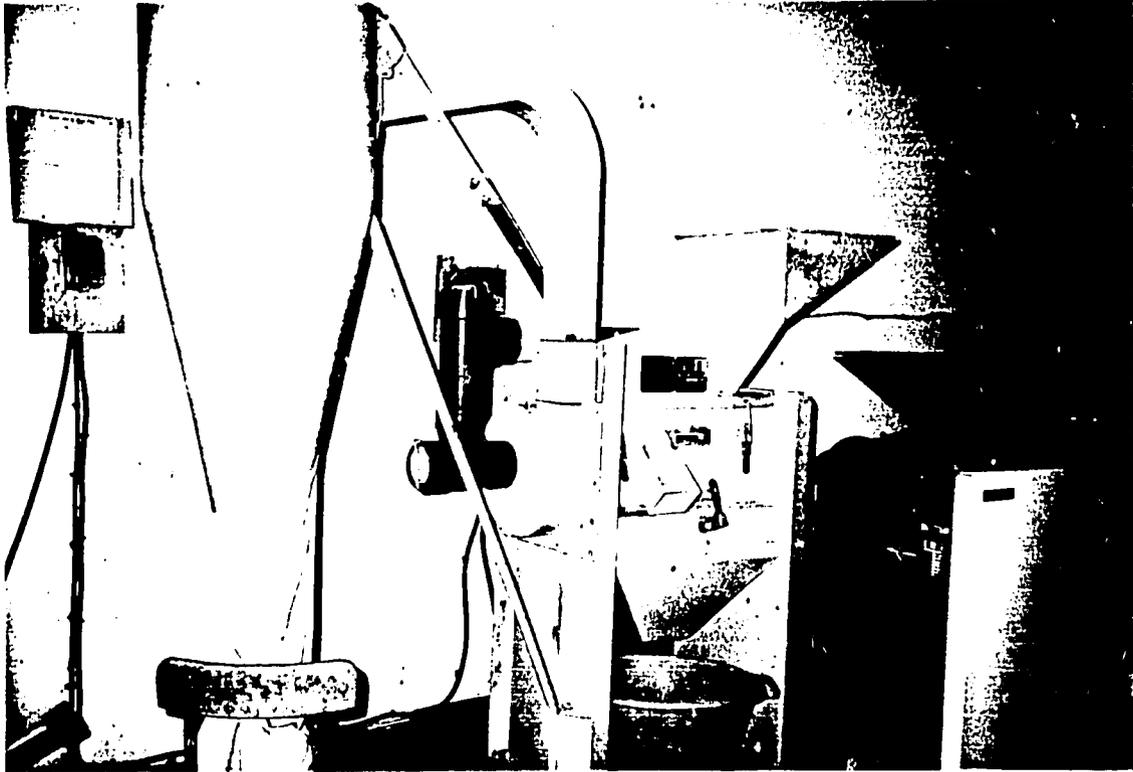


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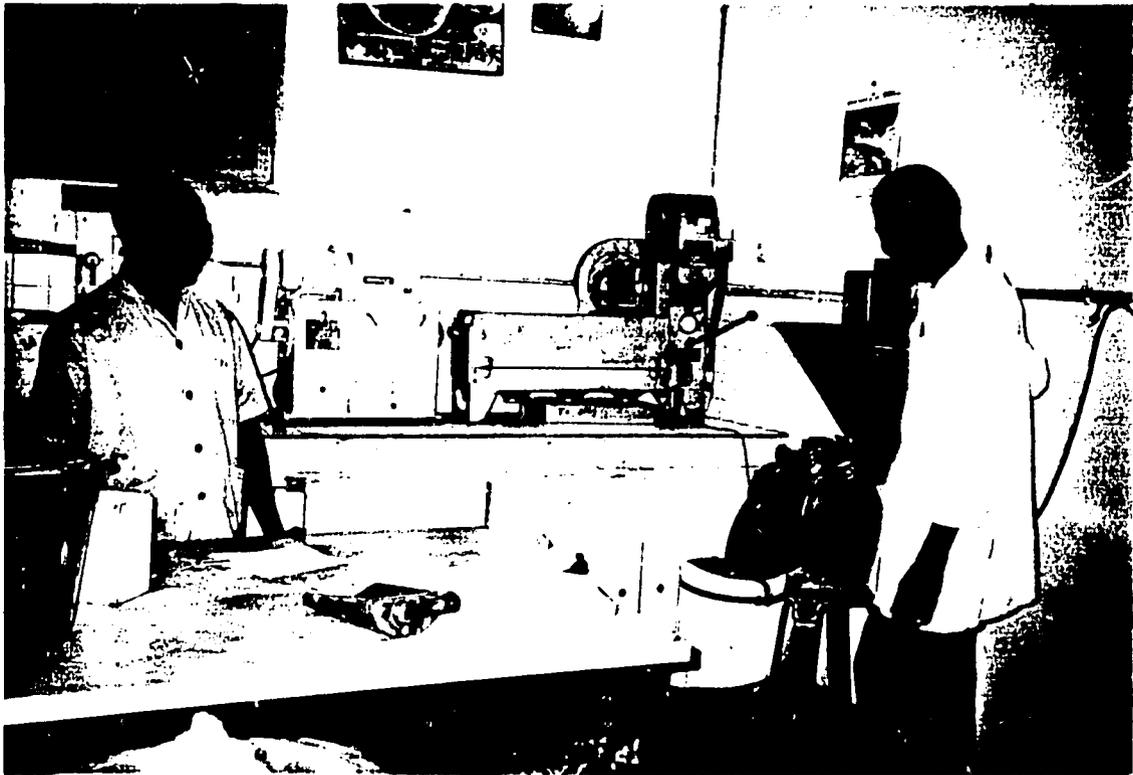


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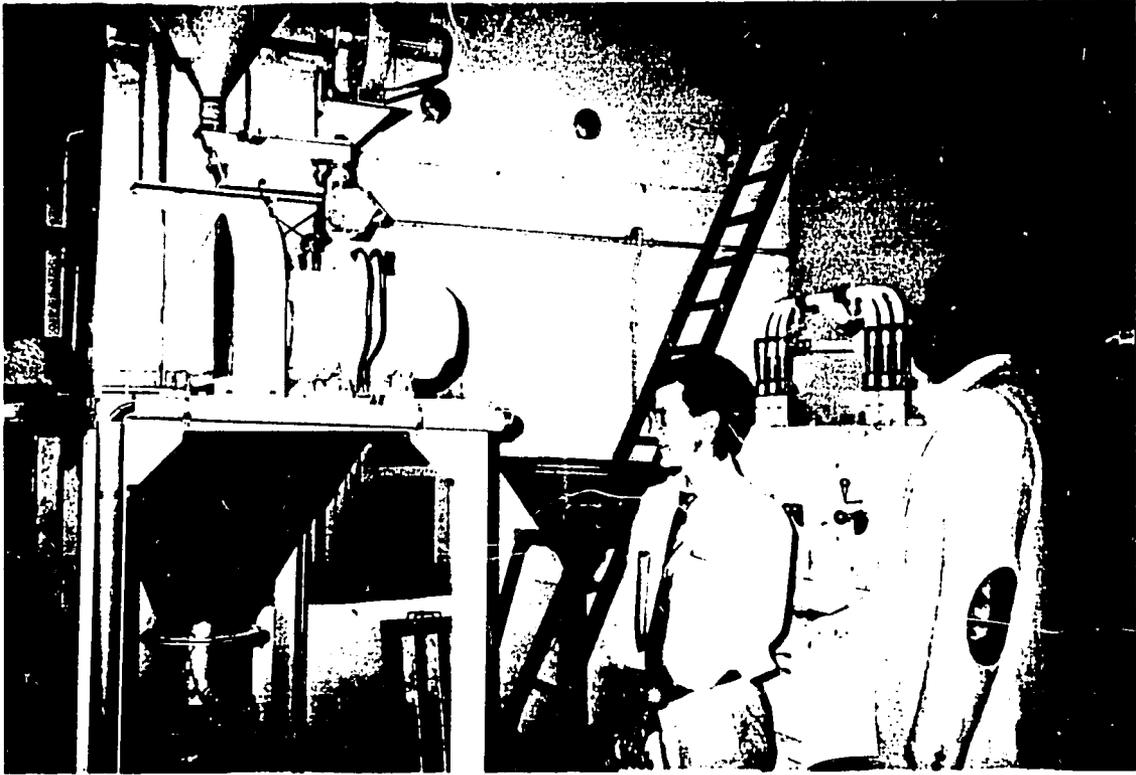


PHOTO 7

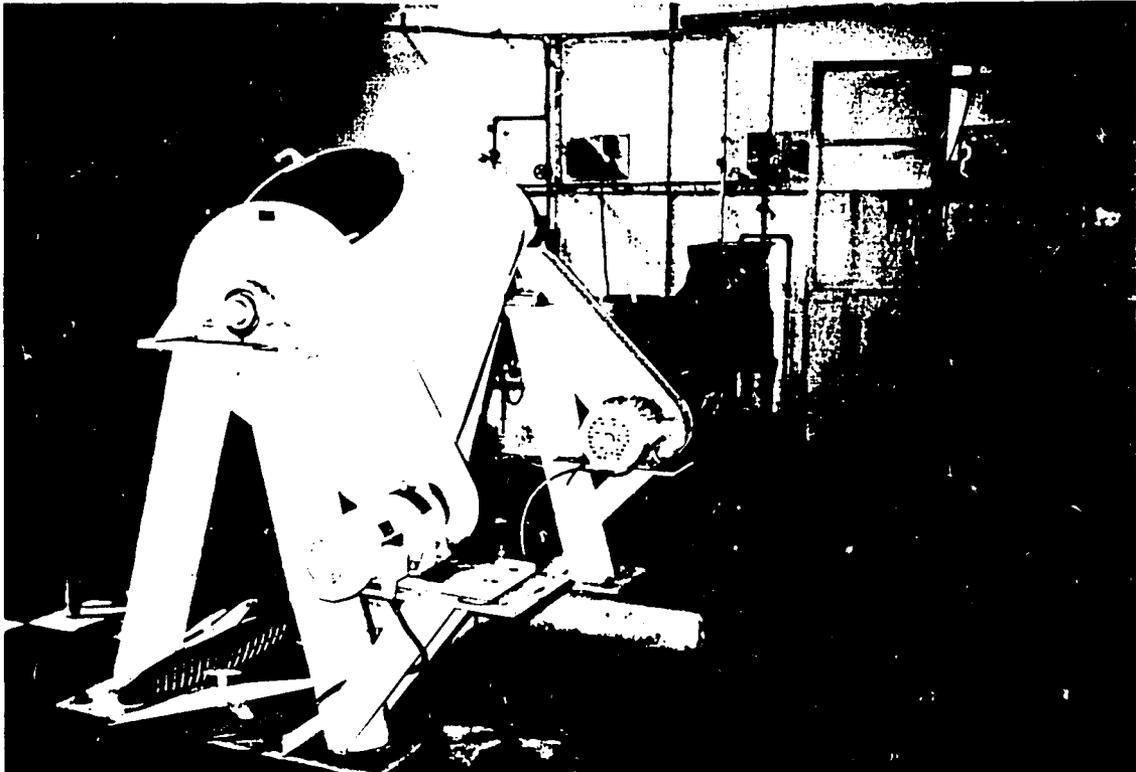


PHOTO 8



PHOTO 9

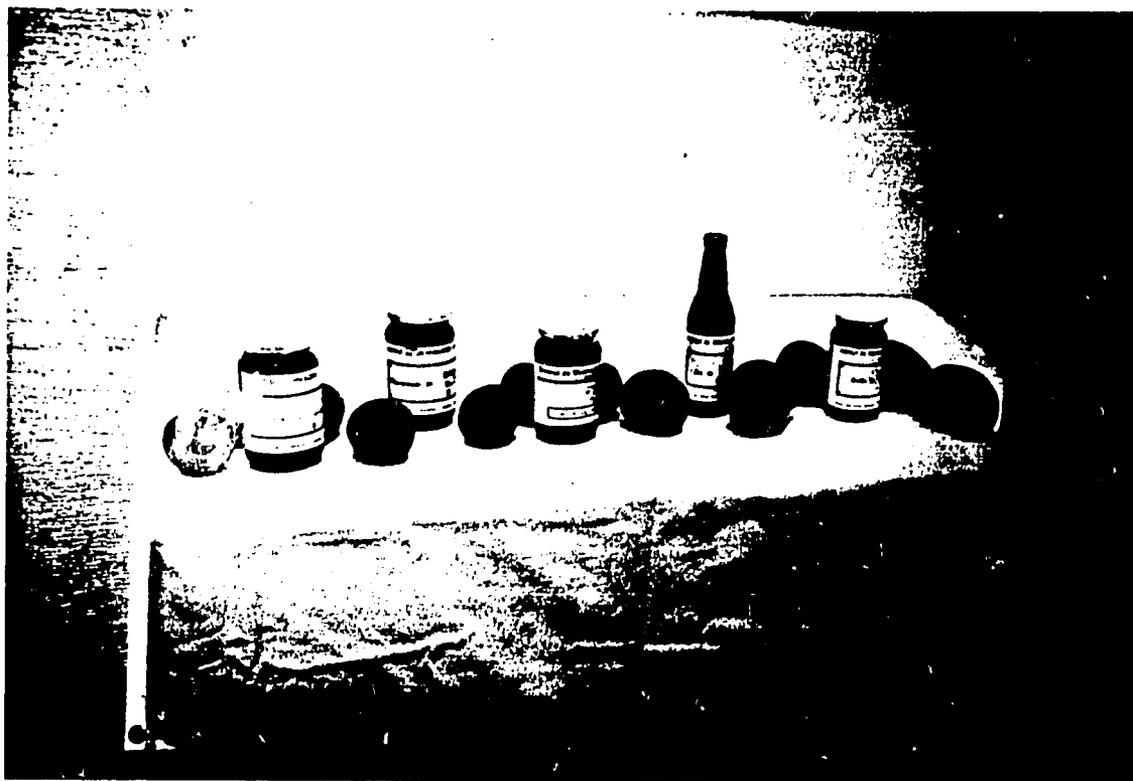


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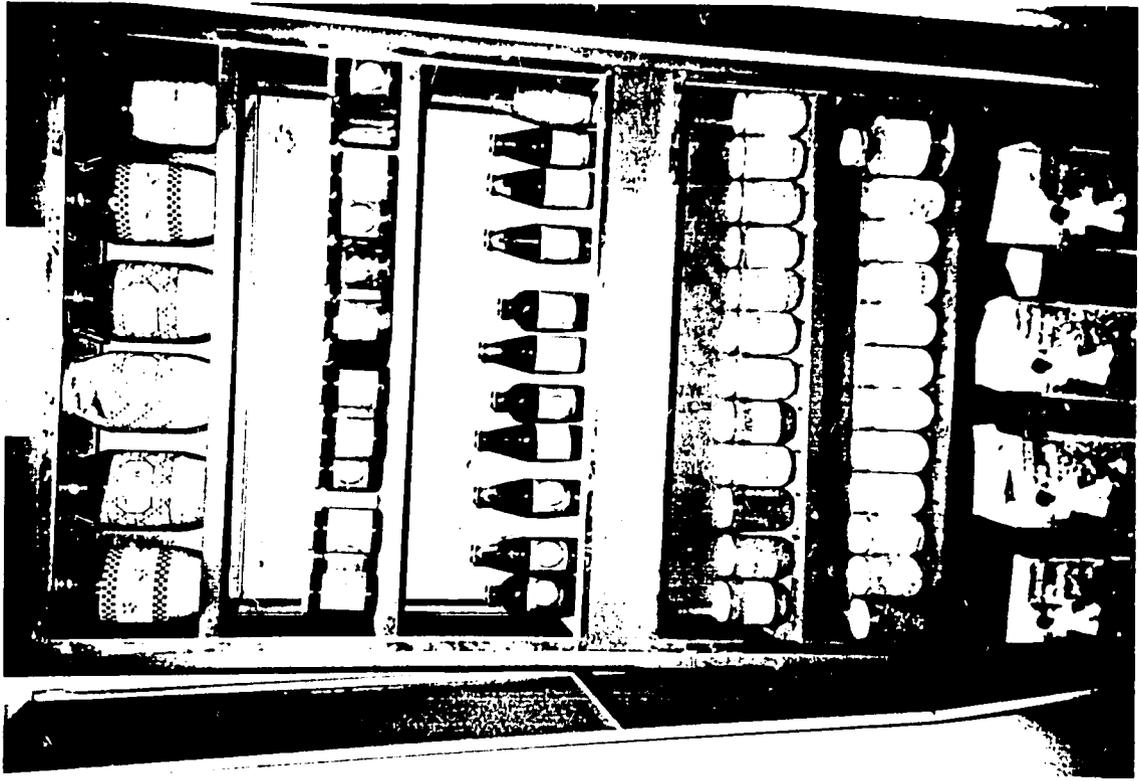


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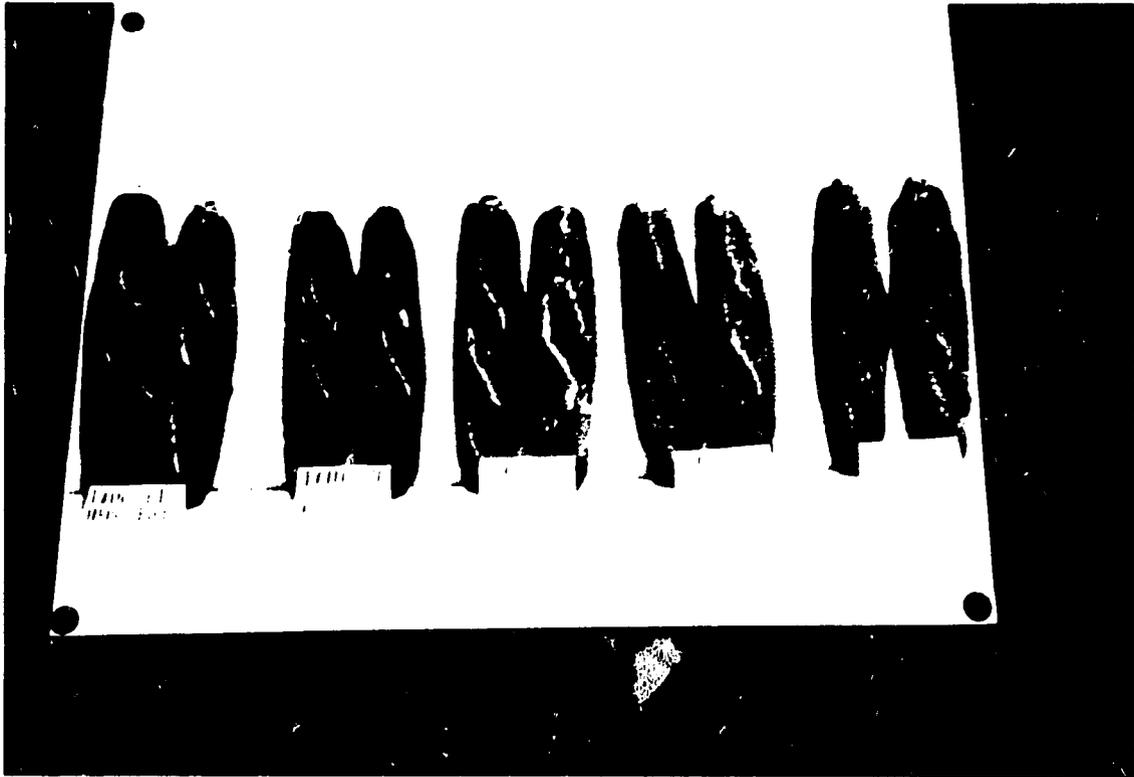


PHOTO 12



PHOTO 13



PHOTO 14

Thursday, January 7, 1988

IX VISIT TO SONAGA/SONABANQUE

Attendance:

Mr. Ahmadou Lamine Cisse	Chief, Services/Training
Mr. Mamadou Paye Ndoye	Chief, Proposal Development
Mr. Bill Hammink	PDO

Discussion:

The functions and operations of Sonaga/Sonabanque were reviewed. Between the two operations teams of "entrepreneurs" are identified, selected and assisted in developing a business plan. Finally credit is arranged.

Messrs. Cisse and Ndoye work with three groups:

- a) Maitrisarcs
- b) individuals with maximum of 10 years schooling
- c) artisans (usually in business already)

The process of review in Sonaga is as follows:

- a) perspective recipients of funds go to Ministry of Employment for screening. A preferred list is sent to Sonaga. If approved by Sonaga lines of credit are

approved at different levels for Maitrisarcs and artisans.

b) in order to qualify for credit the company must be less than CFA 200 million net worth

c) maximum credit is CFA 100 million. However, Sonaga can arrange additional credit from other banks (Sofisidet)

d) a permanent committee of Sonaga/Sonabanque/Sofisidet reviews applications for large credits

Sonaga/Sonabanque capital is 88% government and 12% private. Sonabanque capital is 70% Sonagar and 30% other donors. Small/medium size industries receive 80-90% of Sonagar/Sonabanque credits (10-20% to larger businesses).

Sonaga business plan evaluation process:

1) a business plan for a specific product is put together by Sonaga personnel.

2) Sonaga finds out who is interested for staffing from Maitrisarcs - screened by Ministry of Labor

3) Maitrisarcs are selected - however usually have little experience with product and look for professional manager having product experience - management services by consultancies

4) proposal approved and credit established

5) repayment usually 2-5 years at 18-21% interest.

Current Sonaga activities with ITA/Maitrisarc:

1) fish processing

2) juice manufacturing (with Sonapi)

Sonaga is currently developing entrepreneurial identification and training program based on CED Gujarat, India (V. G. Patel).

#### X VISIT TO SIPL

Manufacturer of yogurt (Yoplait); condensed milk; sugar milk; ice cream; plastic and metal containers for dairy products.

Attendance:

Mr. A. Moctar Sow	Director General
Mr. Khadijhatou Seck	Director, R & D
Mr. A. Ndoye	ITA
Mr. El. Diao	ITA
Mr. Terry Myers	PDO

Discussions:

Colton gave briefing on purpose of visit concerning using ITA technology.

Mr. Sow indicated his interests in ITA:

- 1) selling agents
- 2) peanut roasting/products
- 3) dried mangos (discussion by T. Myers and Mr. Sow)
- 4) develop cereal/yogurt combination

Mr. Sow related following experiences concerning ITA and SIPL interests:

- 1) Mr. Sow was on special committee (mostly government) to review ITA activities and recommend changes to increase commercial use of results.

Mr. Sow's recommendations were not approved - he wanted to create a company to use ITA results.

2) Mr. Sow feels ITA is too academic as currently constituted and should be more involved in market research for ITA products.

3) Mr. Sow felt that most new products in food processing industry came from small industries and entrepreneurs.

4) Mr. Sow has tried to formalize relationship with ITA - but no response as yet. He suggested leasing ITA equipment to industry.

5) SIPL-ITA program on weaning food had problems and promoted bad feelings.

6) Mr. Sow has worked hard to use ITA - thinks they are valuable and would like to improve relationships.

7) Mr. Sow would like ITA to be run as a private business.

8) Mr. Sow would use ITA where SIPL lacks equipment, technical capability or R & D activities such as detoxification. ITA would have to go beyond existing capabilities in quality control and testing.

9) Mr. Sow feels cooperation between ITA and industry is difficult because of differences in salaries and working conditions.

10) He encourages starting new ventures through ITA in product lines that are of interest to SIPL.

11) SIPL is interested in diversification through acquiring new products/partnerships/joint ventures.

#### General Observations:

SIPL R & D capability very limited; has no product development capability; testing limited to qualifying incoming dairy materials (opacity; acidity; composition) and bacterial growth in fermented products (E-coli bacteria - petri-dish macro culture growth and comparison)

SIPL has little use for ITA and interest is probably politically motivated - no apparent need for ITA expertise or capabilities.

#### XI VISIT TO SONEPI

Provides services to small/medium size industries / feasibility studies / problem solving / organizational structure / markets / loan guarantees

Attendance:

Mr. Cheim Sakho	Director General
Mr. Sonapi Staff	5 members
Mr. Mamadou Kane	PDO
Mr. Mike Peletier	PDO

Discussions:

Mr. Sakho described Sonapi functions (see brochure). Sonapi works in conjunction with Sonagar and could act as a marketing agent for ITA to sell its products; would like to have an agreement with ITA to market ITA output. Sonapi and Sodido were involved in mango fruit juice company using ITA technology. This is the company ITA thinks cheated them; however, Sonapi feels ITA would not come to an agreement with the company and since the fruit juice technology was public property, the company just took the information and developed the process. The company has since received credit from Sonaga (a Maitrisarc) with assistance from Sonapi and Sodida who has supplied them with a factory at the Sodida industrial park (see visit on January 8, 1988).

Friday, January 9, 1988

XII VISIT TO FILFILI

Attendance:

Mr. Papasamba Soumar}	Head, Technical Division
Mr. El. Hadji	ITA
Mr. Mike Peletier	PDO

Mr. Papasamba Soumare' is the Chief of Technical Division of Filfili. Prior to joining Filfili in 1968 he was in the agricultural inspection office of FAO and land management for Africa for the French government. Filfily started in 1923 as a family business. Now run by three brothers Elias, Habib and Faud Filfili (Lebanese).

Filfily activities:

Supermarkets

Chocolate and pastry manufacturers

Agricultural ranch and facility in Sabikotine

- agri-industry complex
- beef/pork raising complex
- test/inspection facility
- development of new products
- vacuum packing/European export
- use foreign experts for new products

- Toulouse Univ. veterinary student at residence  
- thesis activities (26 students 1987 - 25 days)
- Bambey students also use facilities
- employ permanents/temporaries/consultants
- testing and training done by Filfily and  
government test facilities (ITA and  
F.R.A.U.D.E.)

ITA work with Filfily:

- IFA conducts chemical analysis/acidity testing
- For other work poor response to Filfily
- Not interested in millet flour - not good flavor
- Not interested in investing in new businesses -  
develops all needs internally - when necessary  
or contracts out - such as baked goods.

### XIII VISIT TO SOFISIDET

Directs funds/manages FSR program

Attendance:

Mr. Amidou Diallo

Sofisidet Economist

Mr. Mike Peletier

PDO

Discussion:

SFS created with World Bank funds/Senegal govt/Central Bank of West Africa/1.38 CFA/manages lines of credit from non-owner banks.

- started off in tourism/fish processing/large scale industry

- changed to small/medium sized enterprises

- works with Sonapi/Sonaga

- works with Maitrisarc's/FSR's

- will use CED (India) entrepreneurial training and identification program

- knowledgeable of ITA activities - good product possibilities but ITA constraints interfere with setting up deals; public ownership of ITA technology makes it difficult to give exclusive rights

- Sofisidet currently giving credit to fish drying company using solar drying tents developed by Center for Renewable Energy, University of Dakar and tested by ITA.

Former high level government employee in Department of Agriculture found Belgian company interested in buying dried fish for subsidiary in Zaire. Reinserted entrepreneur adopted solar screen from ITA; sent sample fish to Belgium and Zaire for testing - found to be suitable (taste and health considerations). Belgium company ordered 200 tons/month. Entrepreneur borrowed 25.0 M CFA to start business. Fish operation in MBAO - uses local fishermen (mackerel/choff); local women for drying fish; set up packing facility (parafin seal). First year sales CFA 80.0 M; profit - CFA 20.0 M - has CFA 25.0 M loan - 6 years at 6% - only took 3 months to negotiate loan from Sofisidet.

Sofisidet has \$1.0 M capital - 50% World Bank and 50% Senegal government - current has 5 loans (maximum loan is CFA 25.0 M - all loans good except 1).

#### XIV SODIDA

Has industrial park and builds factories for small/medium industries.

Attendance:

Mr. Ba

Chief Engineer

Mr. Ousmane

PDO

Discussions:

Sodido puts up factories on a tract of land next to Sonepi.

Works with Sonaga/Sonepi/Sofisedet:

- Sodido put up building for Sonepi/Sonaga project on ITA mango fruit juice company.
  
- Sodido has 32 existing buildings (25 more in construction). See brochure - building is standard size - 300 M<sup>2</sup> - rent is 1000 CFA/M<sup>2</sup> inside and 40 CFA/M<sup>2</sup> outside; has 3-5 year lease; utilities extra.
  
- Decision to approve renting of building by Sodida/Sonepi.
  
- Building cost about CFA 28.0 M but industry only pays for rent and utilities: takes 3-4 months to put up building; about 6 months for applying for loans and putting up building.
  
- 80% of Sodido building occupants pay rent on time.
  
- Most occupants are first time or moved from other location.

- Mix of businesses (2 are Maitrisarcs; no FSR's; rest are entrepreneurs)

- clothing (Air France customer for shirts)
- wood furniture
- metal windows
- car batteries
- fruit juices
- automobile repair shop
- printing
- fish processor

- building must be located on Sodido tract of land.

Monday, January 11, 1988

XV MEETING - CNJDS - MANSOUR CISSE'

Confederation of young/professional business people.

Attendees:

Mr. Mansour Cisse	CNJDS
Mr. Nassamba Faxe	Sitraf
Mr. M. Pelletier	PDO
Mr. T. Myers	PDO

Discussions:

Privatization of ITA - prepared chart showing proposed public/private components of ITA.

Functions of CNJDS:

- 70% private ownership
- 30% public ownership
- represents club of private enterprise owners

Discussed organizing private sector committee to privatize ITA - committee would establish public and private sector areas and develop plan to purchase private components for incorporating into private sector cooperative - owned by 10-12 private companies.

Mr. Cisse and his group would very much like to see ITA under the private sector.

XVI MEETING - ITA

Discussion on ITA plan - to develop acceptable plan with the private sector.

Attendees:

Mr. M. Diop  
Mr. El. Diao  
Mr. M. Pelletier

## Discussions:

Discussions centered around the 5-year plan of ITA. Mr. Diop indicated that the plan did not contemplate any of ITA's functions/equipment or personnel being taken over by the private sector. He stated that the purpose of the plan was to make ITA more responsible to the private sector and would develop a marketing strategy to obtain that objective.

The plan, as currently constituted, only represents a concept and contains insufficient detail and information to be convincing that such a plan would achieve its objective or be viewed positively by these private sector companies that it is supposed to influence. I suggested that the plan be re-written and delayed if necessary until March or later, for presentation to a seminar of private and public sector people. The plan needs to convincingly show that ITA will increase its strength in or obtain strong capability in the following areas:

- business management
- marketing of products
- management of personnel
- business development and contracting expertise
- accounting and financial planning procedures
- public relation and advertising expertise

The plan should include a year by year analysis, over the 5-year period of existing and proposed public and private sector projects in each of the ITA line item areas including: quality control; testing; training; technical advisory services and product development. The analysis should detail project scope, budget, personnel required, time to complete, anticipated output and whether funded by the public or private sector. The 5-year analysis should show a provable growth in the private sector budget; a decrease in the public sector budget with a positive sustained growth in total budget. The budget should show personnel required for this growth and itemize their salaries and point at which time they will be added to the ITA staff. The plan should be developed with the assistance of appropriate administrative and professional personnel from these private companies ITA expects to have as long term clients. This process should be initiated as soon as possible through an organization meeting, co-chaired by Mr. Diop, Mr. Cisse' and Mr. Sow at which the assistance of specific company personnel will be volunteered by the attending company directors to assist Mr. Diop and his staff in revising the 5-year plan such that it meets the approval of the participating companies. Only then should the plan be submitted to the government and private sector seminar now scheduled to occur following the next election.

Mr. Diop indicated he would initiate actions to accomplish the above and would discuss his progress at our meeting on January 13, 1988.

XVII MEETING WITH SETEXPHARM - MR. SEKOV DIALLO, DIRECTOR

Attendance:

Mr. S. Diallo	Director
Mr. Diallo's staff	
Mr. El. Diao	ITA
Mr. M. Peletier	PDO

Discussion:

Mr. Diallo indicated that he started his business with his own money, CFA 3.0 M, six years ago after working at the National Bank.

He is in the export business primarily supplying processed raw material for gum manufacture by the pharmaceutical industry. He primarily exports to Western Europe and is starting to sell in the US. He also sells dried hibiscus flowers to the US for use in "sachets."

He recently took over an old business "Paul Gorot" that sells pickled products and other food stuffs. Mr. Diallo

wants ITA to develop products for his new businesses - starting off with a hot pepper sauce. He is negotiating with ITA for a contract to make a sample of the sauce for initial market evaluation by Setexpharm - though contract is for CFA 200,000. Following that Mr. Diallo will contract ITA to train his personnel to process the sauce and then Mr. Diallo will set up his own production facility. If this works he will ask ITA to develop other products. ITA will make very little money on this - this is an example of lack of business acumen by ITA staff. I have a strong feeling once Mr. Diallo gets his initial evaluation and "low cost" training from ITA that will end it for that project.

A second example of ITA's lack of experience was evidenced during a discussion of selling previously developed ITA products versus developing new products. Mr. Diao said it would be only proper to sell the developed products for a low cost as no more money would be needed to perfect them; and that new products would cost more as they still needed to be developed. Of course the opposite is true; one recovers past expenses and a proven product is worth much more than one still to be developed!

Wednesday, January 13, 1988

XVIII MEETING - ITA

Attendance:

Mr. Diop	ITA
Mr. Ndoye	ITA
Mr. Diao	ITA
Mr. Kane	PDO
Mr. Pelletier	PDO

Discussions:

Wrap-up of previous discussions. Diop agreed to establish schedule for revising 5-year plan - taking into consideration interruptions posed by the upcoming presidential election in February. All agreed the plan should be revised in conjunction with a special industry committee to be organized by Mr. Diop and possibly chaired by Moctar Sow of SIPL. The industrial committee would be responsible for revising the ITA 5-year plan to make it more detailed in its projects, funding and support as well as being more responsive and reflective of industry needs.

### SECTION 3

#### ANALYSIS OF ITA - MEDIUM AND LONG TERM DRAFT DEVELOPMENT PLAN

A) Original ITA Mission (see Section 2 - Record of Meetings - Monday January 4, 1988 I - Introductory)

B) Emphasis on 5-year Plan

1) vegetable products

2) quality control\* (10% of budget)

3) studies and training\*

#### Sector Recommendations

##### Private\*\*

##### Vegetable Products

a) cereals - flours/farina/sankal/millet/maize at ITA  
bakery - bakery and confectionary products - compound  
flours - for supermarkets and local bakeries

\* Main income generating activities of ITA

b) horticultural products - multipurpose fruit and vegetable processing line producing juices, jams, stewed fruit for sale to supermarkets, superettes and hotels - better labeling and packaging; also markets outside of Dakar and international

Public\*\*

#### Quality Control

Service to third parties for foods meant for export and importation - ITA lab is most appropriate facility in country (add training to quality control activities in all sizes business - domestic/international)

Public\*\*

#### Studies and Training

High level professionals - national food sector - small scale enterprises, industries, international agencies, foreign countries

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\*\* Colton recommendations - not in 5-year plan

### C) Funding Sources

- 1) government pay salaries of ITA permanent staff
- 2) ITA can undertake commercial type transactions. However has failed to make the most of opportunities of its (new) industrial and commercial statutes because of no follow-up measures:
  - no money for conversion
  - statutes on commercialization and increased national quality control function still pending
  - upcoming seminar will determine if new statutes are sufficient (enforceable) or should be further modified

### D) Organizational/Functional/Funding/Statutes

Restatement of Mission

### E) Recommendations - Colton

#### 1) Proposed ITA Structure/Functions

(located on existing ITA grounds)

PUBLIC

- I - Quality Control (required)
- II - Training Programs
- III - Technical Advisory Service  
(ITA quality control and  
testing labs and instrumentation)

PRIVATE

- I - Incubator (private  
companies)
- II - New Product Development -  
(COOP owned by incubator  
companies)
- III - Industrial Research Park -  
development with Sodido  
(ITA production development  
facilities and equipment)

SECTION 4

ITA STRUCTURE RECOMMENDATIONS

<u>Areas of Activity:</u>	<u>Current Status</u>	<u>Proposed Status</u>
Quality control/testing	Public	Public
Microbiology	Public	Public
Chemical Analysis	Public	Public
Standards	Public	Public
Training	Public	Public
Quality Control	Public	Public
Process Development	Public	Public
Research Development	Public	Private
Process Development	Public	Private
Product Development	Public	Private
Research and Development	Public	Public/Private
Consulting		

SECTION 5

ITA ORGANIZATION CHART/FUNCTIONS

ITA-PUBLIC

- Quality Control/Testing
  - Microbiology
  - Chemical Analysis
  - Standards
  
- Training
  - Quality Control/Testing Methods
  - Product/Process Development Methods
  
- Technical Advising
  - Quality Control/Testing
  - Product Process Development

ITA PRIVATE (SONATA-COOP)

- Research & Development
  - Product Development
  - Process Development
  
- Incubation
  - New Business Development
  - Product/Process Technology Transfer to Existing Companies

Funding Sources:

- Coop Companies SONATA (COOP)
- External Companies
- Donors
  - Private/Public

Ownership:

- Coop Companies

FUNCTIONS OF COOP

INCUBATION

- Incubates New Companies Using Products/Processes From R&D Activity

RESEARCH & DEVELOPMENT

- New Products
- New Processes

SECTION 6

BANKING SUPPORT AND FINANCIAL STRUCTURE EVALUATION

GENERAL OBSERVATION ON SUPPORT MECHANISMS (GOVERNMENT) TO  
STIMULATE DEVELOPMENT AND GROWTH OF  
SMALL/MEDIUM SIZE INDUSTRIES

I Current Organizations/Functions

Credit

Sonaga/Sonabanque - Maitrisarc

Sofisidet/Sonapam - FSR

(Bank of Senegal/World Bank)

Capital

\$35K/person

\$1.0 M

\$100K/loan max.

Services

Varied but Extensive:

Sonaga - Maitrisarc/FSR

Sonapi - Maitrisarc

SRFMP - Maitrisarc

AID - All

Buildings/Structures/Real Estate

Sodida - 32 existing/25 in process      \$100K/bldg

COMMENTS:

It appears that sufficient credit, services and building structures are available for 2-3 years to satisfy needs of

entrepreneurs to initiate market responsive small scale industries. Methods of obtaining these services appear to be well known and not time consuming (3-6 months for credits and buildings).

It also appears that a good entrepreneurship identification and training program will be adopted (CED - India) and this will greatly improve chances for successful business. This will also require expansion of credit/services and building programs.

## SECTION 7

### SCOPE OF FOLLOW-ON PROJECT

#### SCOPE OF WORK AND PROGRAM DESCRIPTIONS

#### ITA COMMERCIALIZATION PROJECT

### PHASE II

#### I BACKGROUND:

USAID/Senegal is seeking methodology to help the Institute of Food Technology (ITA) to find ways to transfer its technologies and research results to private enterprises.

ITA has been involved in food product development and processing technologies for the last 23 years. It has a number of research results on fruit and vegetable preserves, juices, syrups, meat and fish products. ITA has a key role to play in promoting processing and consumption on locally produced cereals and other food products; in order to reduce dependency on imported foods, especially imported rice which represents a major source of the GOS balance of payments deficit.

In addition to product development ITA has a strong role in the areas of quality control and testing, training and

technical advisory services all related to the food industry and food technology.

ITA now has a legal status which entitles it to commercialize its products and services, but also deprives it of some substantial government financial support.

USAID has financed the millet transformation pilot activity of ITA. It is currently supporting a coupea transformation pilot project.

ITA has organized a number of activities (seminars, banquets, etc.) to publicize its products and to reach the business community, but has not succeeded in attracting the private sector, mainly because (A) there has never been a strong traditional linkage between research and the private sector in Senegal and (B) the staff in the research and product development office of ITA does not have all of the required skills to sell ITA products and services.

ITA has recently developed a 5-year plan that will emphasize marketing its products and services to the private sector. At the end of the period ITA is supposed to obtain 50% of its support directly from the private sector. This plan needs considerable modification and direction in order to marshal support from the private sector. Considerable assistance from foreign experts is necessary.

## II SCOPE OF WORK

A team of US experts and local training facilities will help organize and develop the capacity of ITA to work with the private sector (this includes small and medium scale enterprises in the industrial and commercial sectors, as well as financial and banking institutions).

The experts will review the report developed by Mr. R.M. Colton under Phase I of this project in which he identified the specific nature of ITA constraints and developed a strategy to assist ITA in achieving its commercialization objectives. This strategy which will evaluate both maintaining ITA in the public sector as well as privatizing certain of its functions, requires that the following actions be taken:

- 1) ITA staff should be strengthened to increase its potential for achieving its 5-year commercialization objectives. ITA will need training and additional staff having in-depth expertise in business development and management, financial accounting and management, marketing, sales, advertising and public relations.

- 2) The ITA 5-year plan should be revised for submission to a special seminar of government and

industrial personnel on/about March 1988 (considerable oversight guidance and monitoring is necessary for this revision).

3) ITA quality control capability should be assessed, strengthened and brought up to a "world" standard.

4) The marketability of products developed by ITA (fruit juices, jams, jellies, cereals, etc.) should be carefully evaluated for both domestic and export markets.

5) A special plan should be addended to or made part of the current 5-year plan to separate out those functions of ITA that are most appropriate to the public and private sectors and to establish a procedure to solicit support and resources to implement the separation. The addenda plan would indicate that the focus of the public sector activities would center on quality control and testing and that of the private sector would center on product and business development. It is possible that two distinct operations would develop at the current ITA facility - one run by government and the second by a private sector cooperative or consortia. This latter sector could be associated with a newly developed private venture capital fund for "seed" investment.

### III PRODUCTS/OUTPUT:

The contractors shall provide a single unified report in English in form and substance acceptable to AID.

### IV TEAM COMPOSITION:

The contract team will be composed of three U.S. members and two or more training organizations currently located in Senegal.

A. Cooperative research planning specialist (required initially for 6-8 weeks then quarterly for 1-year) - assist and provide direction leadership and coordination in the modification of the existing ITA 5-year plan to make it more responsive to the needs of industry and reflect the possible potential of privatizing the product development components of ITA (see details of MTG XVI for specific activities). This specialist should have an advanced degree in science and engineering and been involved in for a minimum of 10 years in developing plans for and guiding the development of collaborative research activities, cooperation between companies and research and development institutions similar to ITA. This specialist must have an engineering or science background and 5-10 years experience in identifying technologies having commercial potential. He must have shown ability to work with the business community

as well as researchers and must have experience developing conditions for researchers and industrial users of research to work together and develop mutually agreeable research agendas.

B. Quality Control Specialist (required one time for 2-3 weeks) - review and strengthen ITA's quality control and testing capabilities to bring it to the level required as a national center for quality control of food products in Senegal.

This specialist should have a Ph.D. or equivalent in biochemistry, biology, or chemistry; should have 5 years experience in developing and conducting tests for the food processing industry for quality control purposes; and should have 2 years experience in management of a major quality control test facility, be familiar with the management and structure of the facility, designation and evaluation of tests, costing of tests; test specifications and test protocols.

Fluency in French is desirable.

C. Market specialist in food products (required one time for 2-3 weeks) - review and analyze the potential of existing and proposed ITA food products for domestic and export markets.

This specialist should have an advanced degree in marketing; have 5 years experience in marketing of food products for a major organization; have 2 years specific knowledge in marketing of fruit, vegetable and grain products for domestic and export use; should have 3 years experience in developing organizational plans for researching and marketing food products, including research and administrative components.

Fluency in French is desirable.

D. Business management and functions and organizational structure specialists (specific specialists required intermittently for 2-3 years) - specialist in a variety of business oriented areas are needed to upgrade the capability of ITA's capacity for operating in a "business like" manner.

The desired areas of expertise where training and consulting is needed are as follows:

- 1) business operations - management and coordination of activities - MBA required

- 2) organizational structure and functions - MBA required

3) financial accountability/costing controls contract administrator - CPA or MBA required

4) marketing/advertising - MA or MBA

5) public relations/sales - MA or MBA required

This function can be carried out by:

1) Frank Lusby - SRFMP - financial accountability

2) Papa Nallafall - CESAG - business management

V BUDGET

\$75-\$100,000/year for 2 years.

SECTION 8

VITAE OF COOP RESEARCH SPECIALIST

ROBERT M. COLTON  
3204 Brooklawn Terrace  
Chevy Chase, MD 20815  
(301) 654-6203

Robert M. Colton received his Bachelor of Science degree in metallurgy from the Massachusetts Institute of Technology in 1953 and a Master of Science degree in automotive engineering from the Chrysler Institute of Engineering in 1956. He is 54 years of age, married, has three grown sons, and is in excellent health.

Mr. Colton was employed by Chrysler Corporation as a development Engineer from 1953 to 1956. From 1956 to 1973, he was associated with the U.S. Army Materials and Mechanics Research Center in Watertown, Massachusetts, where he held increasingly responsible management positions as Chief of the Engineering Materials Branch and Chief of the Materials Engineering Division, supervising thirty-five professional personnel.

From 1973 through 1987, he was associated with the National Science Foundation as a supervisory program manager. He established the Foundation's University/Industry Cooperative Research Centers Program and the Technological Innovation Centers Program. He is considered the "Father" of the Innovation Center and "Incubator" System concepts. He is an expert consultant in several fields of engineering, innovation, product development and evaluation, industry/university cooperation and new venture development and evaluation.

He has been responsible for the establishment, management development and general supervision of twenty-five national centers, each with budgets ranging to \$2,000,000 per annum. These National Centers promote industry/university research cooperation and the development and evaluation of new products and businesses. The Centers currently have over 250 industrial members, most of which are found in the Fortune "500" listing. Each member company contributes from \$10,000 to over \$100,000/year annually as part of their center participation that involves over 250 individual R&D Projects.

He is on the Advisory Board of Twenty-First Century Partners, I, L.P., and has consulted with, chaired committees and evaluated programs for many International organizations and companies and Federal Government and State agencies. These include the National Aeronautics and Space Agency, The Agency for International Development, the United States Information Agency, The Small Business Administration, The National Institutes of Health, the Departments of Energy, Education and Commerce, State government organizations and International companies and foreign government organizations. He has authored over 30 publications and lectured at over 40 conferences, seminars, and professional meetings in this country and abroad on cooperative research and new product and new business development.

Mr. Colton who is a member of ASM and ASEE has been referenced or quoted as an international authority in the areas of industry-university cooperation, entrepreneurship, technological innovation and

December 1985 - January 1986 - Chaired Team to evaluate AID - Entrepreneurial Identification and Training Program, Malawi East Central Africa

November 1985 - National Science Foundation University/Industry Cooperative Research Centers, Research Management, November 1985.

10 - 13 October 1985 - Technology Transfer - A focus on university-industry interactions; Proceedings of First International Technical Innovation and Entrepreneurship Symposium, Salt Lake City, Utah.

16 -19 July 1985 - Lecturing at USAID Entrepreneurship Development Research Progress Conference, Oxford, England.

23 - 25 June 1985 - Lecturing at Conference on "University Spinoffs," University of Illinois, Champaign, Illinois.

10 -14 December 1984 - Invited lecture on Industry/University Cooperative Research at Third International Symposium on Advances in Electrochemical Science and Technology, Madras, India.

30 October 1984 - Lecture on University/Industry Interactions and Small Business Development at USIA sponsored seminar for Developing Nations, Washington, D.C. (Hosted by Academy for Educational Development).

12 October 1984 - Lecture on Industry/University Interactions and Small Business Development at the University of Maine, Orono, ME.

20 - 21 September 1984 - Lecturing and Consulting to Mexican Government on Industry/University Interactions and Small Business Development and Industry, Mexico City, Mexico.

18 September 1984 - Testified on Industry/University Cooperation and Small Business Development at U.S. Trade Representative hearings with Japan, Washington, D.C.

13 - 17 August 1984 - Lecturing and consulting to Colombian Government on Industry/University Interactions and Small Business Development and Industry, Bogota, Colombia.

3 - 7 June 1984 - Lecture series on Industrial Innovation; Invited lecture series Chinese Academy of Sciences, Beijing, China.

15 May 1984 - Chaired session on High Technology and Regional Economic Development ISTI Conference, Raleigh, NC.

9 May 1984 - Lecture on Industry/University Centers, NIH, Bethesda, MD.

16 -17 April 1984 - Paper on National Science Foundation Experiences in Industrial Innovation; Presented at Design and Innovation; Policy Management Seminar, Royal College of Art, London, England.

entrepreneurial development. Gave 7 lectures and 5 seminars in total in Melbourne, Canberra, Sydney and Perth.

Delivered invited lecture on cooperative research and cooperative education at 3rd World Conference on Cooperative Education at Melbourne, Australia. Formal paper published in proceedings of conference.

23 November 1982 - Invited by Brazilian Government to inspect entrepreneurial development program in Brazil and provide consultation and advice on future areas of emphasis and lecture to various state and Federal universities and departments in Sao Paulo, Brasilia, and Rio de Janeiro.

30 October 1982 - Invited luncheon speaker and dinner speaker at seminars on "Starting Your Own Business," St. Louis Regional Growth Association/University of Southern Illinois/St. Louis, MO.

29 August - 12 September 1982 - Selected by AID to evaluate entrepreneurial development program in Ahmedabad, India. Lectured in India & Pakistan on industry/university centers and entrepreneurial development.

17 August - 1982 - 85 - Selected as Chairman of AID panel for preparing RFP and evaluating Entrepreneurial Development program for lesser developed countries for the Agency for International Development.

15 August 1982 - Invited lecturer on technological entrepreneurship by International Council for Small Business, New York, NY.

1982 - A. Gerstenfeld, R.M. Colton, "University/Industry Cooperation Projects," published by Academic Press in 1982.

5 -9 October 1981 - "National Science Foundation University/Industry Centers, Proceedings of Annual Meeting of American Institute of Chemical Engineers, Montreal Canada.

August 1981 - National Science Foundation Experience with University/Industry Centers for Scientific Research and Technological Innovation, "Technovation", Volume 1, No. 2, pp. 97-108.

SECTION 9

COOP RESEARCH CENTER - U.S.A.

# RESEARCH MANAGEMENT

FOR MANAGERS OF RESEARCH • DEVELOPMENT • TECHNOLOGY

March-April 1987 Volume XXX No. 2

Published by Industrial Research Institute, Inc.

**Economic Competition: A Research and Education Challenge**

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**'Technological Management Will Be the Key To Success'**

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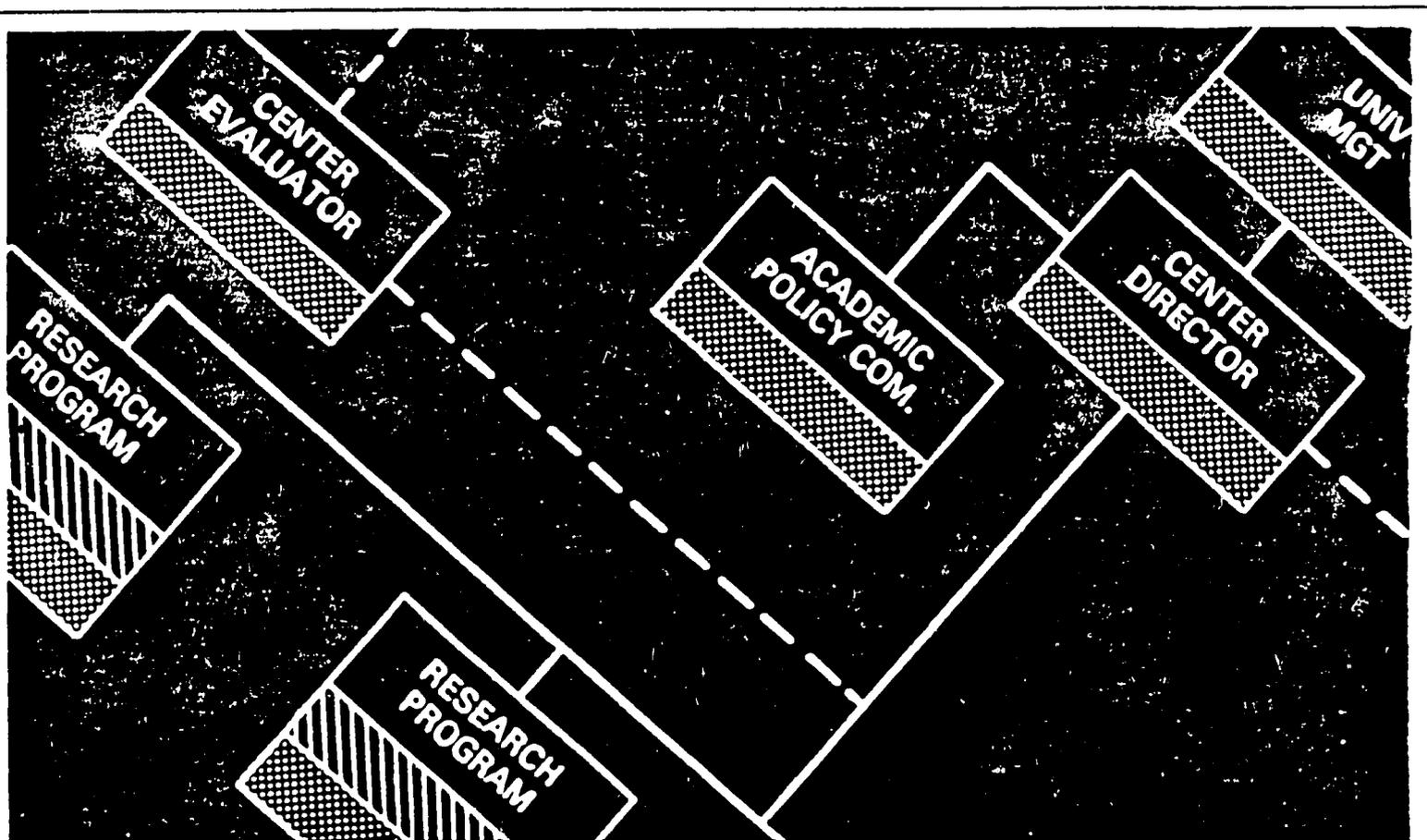
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**University/Industry Cooperative Research Centers Are Proving Themselves**

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# UNIVERSITY/INDUSTRY COOPERATIVE RESEARCH CENTERS ARE PROVING THEMSELVES

*Thirty-nine centers are now operating, seven are self-sufficient and all exhibit six factors that NSF considers predictive of success.*

Robert M. Colton

Significant progress has occurred since the status of the National Science Foundation's University/Industry Cooperative Research Centers Program was reported in the November-December 1985 *Research Management*. The number of operating centers has jumped from 20 to 39, seven of which are self-sustaining and primarily funded by industry; the number of supporting companies has increased from 150 to 250; and industry and non-Federal government support has grown to well over \$30 million.

NSF considers the program highly successful. It anticipates that from now on a minimum of five new centers will be starting each year and another five will become self-sufficient, leaving 25-30 centers in the process of becoming self-sufficient. In addition, six major factors have been identified which are characteristic and predictive of successful, self-sufficient centers.

Of the 39 operating centers, the seven listed in Table 1 are self-sufficient, while 32 are still in the five-year funding cycle. All 39, however, exhibit the six factors, which are:

- 1. Strong Leadership**—The center director is a recognized expert in his/her field, has notable technical achievements, has a tenured position, is respected by the university administration and faculty, and has been sought after as a consultant by industry.
- 2. Strong Industry Commitments**—Upon completion of the one-year planning phase, commitments from six to ten companies totaling \$200,000-\$300,000, have been obtained.
- 3. Industry-University Research Compatibility**—The participating company has research personnel and facilities comparable in sophistication to that of the center.
- 4. Extensive University Support**—The university has taken steps to encourage center growth and industrial participation by: dedicating space, equipment and facilities to the center; reducing overhead cost for industry support; expressing support at the president's level for industry/university interaction; seeking

additional center support through state programs and private foundation funding sources; and encouraging faculty and staff to participate, thus building center activity as part of the university reward system.

**5. Extensive Industry Personnel Participation**—Industrial representatives have taken an active role in proposing, reviewing and approving the center research agenda at a minimum of two or three meetings a year at the center.

**6. Advanced Industrial Development Activities**—The participating companies have developed internal capabilities for using and transforming, into applications, knowledge generated by the center researchers.

## Your Company Can Participate

NSF initiated the University/Industry Cooperative Research Centers Program in 1973 to stimulate industrial support and increase the use of university research. The program initiates university research programs with co-funding from NSF and a group of industrial firms whose research objectives are compatible with those of the university. Thus, NSF and industry's joint support provide for a focused research program that is of interest to industry and corresponds to the university's scientific and engineering areas of expertise.

All centers are expected to increase their industrial support covering both direct funding and equipment for their research program as NSF support is phased out and the center becomes self-sufficient after five years. After the five year period, centers level off at the \$500,000-\$1 million annual level in non-federal support and become completely self-sufficient.

The program usually starts with a one-year NSF-funded planning grant to study alternatives to both structure and content of the research and management plan to be pursued, and to evaluate industry's interest in supporting a potential center. Successful planning is then followed by a five-year NSF operations grant leading to self-sufficiency after five years. There are now 39 operating centers of which seven have achieved self-sufficiency after the normal five-year NSF funding period.

Table 2 lists the 39 operational centers and their directors. Companies interested in joining a specific center should contact the center director. Direct discussions with the director can provide guidance as to whether or not membership would benefit both the new member and the center. ©

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Robert Colton has been associated with the National Science Foundation since 1973 as a program director. He was instrumental in establishing the University/Industry Cooperative Research Centers program and continues to be active in its administration. He holds a B.S. degree in metallurgy from MIT and an M.S. in automotive engineering from the Chrysler Institute of Engineering.

**Table 1—Self-Sufficient Cooperative Research Centers**

Location	Research Area	Year Initiated
Massachusetts Institute of Technology	Polymer processing	1973
Rensselaer Polytechnic Institute	Computer graphics	1979
University of Massachusetts	Polymers (properties)	1980
Ohio State University	Welding	1980
Case Western Reserve University	Polymers (applied)	1981
University of Rhode Island	Robotics	1982
Worcester Polytechnic Institute	Automation technology	1983

**Table 2—The 39 University-Industry Cooperative Research Centers and Their Directors**

<p><b>Alfred University—Center for Glass Research</b></p> <p>L. David Pye New York State College of Ceramics Alfred University Alfred, NY 14802 (607)871-2432</p>	<p>Case Western Reserve University Cleveland, OH 44106 (216)368-4186</p>
<p><b>University of Arizona—Microcontamination Control Center</b></p> <p>Konrad Stokes Department of Electrical and Computer Engineering University of Arizona Tucson, AZ 85721 (602)621-3397</p>	<p><b>Colorado School of Mines—University-Industry Steel Research Center</b></p> <p>George Krauss Department of Metallurgical Engineering Colorado School of Mines Golden, CO 80401 (303)273-3774</p>
<p><b>University of Arizona—Optical Circuitry Cooperative</b></p> <p>Hyatt Gibbs Optical Sciences Center University of Arizona Tucson, AZ 85721 (602)621-2941</p>	<p><b>Dartmouth College—Center for Cold Regions Science and Engineering</b></p> <p>Erland M. Schulson Thayer School of Engineering Dartmouth College Hanover, NH 03755 (603)646-2888</p>
<p><b>University of California, Berkeley—Center for Research on Integrated Sensors</b></p> <p>Richard S. Muller University of California, Berkeley C/O Sponsored Projects Office M-11 Wheeler Hall Berkeley, CA 94720 (415)642-2301</p>	<p><b>University of Florida/Purdue University—Center for Software Engineering</b></p> <p>Roger W. Elliott College of Engineering 512 Weil Hall University of Florida Gainesville, FL 32611 (904)392-2371</p>
<p><b>Carnegie-Mellon University—Center for Iron and Steelmaking Research</b></p> <p>R. J. Fruehan MEMS Department Carnegie-Mellon University 3325 Wean Hall Pittsburgh, PA 15213 (412)268-2677</p>	<p><b>Georgia Technological Institute—Material Handling Center</b></p> <p>John A. White Department of Industrial and Systems Engineering Georgia Institute of Technology Atlanta, GA 30332 (404)894-2362</p>
<p><b>Case Western Reserve University—Center for Applied Polymer Research</b></p> <p>Anne P. Hiltner Department of Macromolecular Science Olin Hall</p>	<p><b>Illinois Institute of Technology—Center for Integrated Information and Telecommunications Systems</b></p> <p>Andre G. Vacroux Illinois Institute of Technology IIT Center Chicago, IL 60616 (312)567-3009</p>

(continued)

Table 2—(continued)

<b>Iowa State University—Center for Nondestructive Evaluation</b>	<b>New Mexico Institute of Mining and Technology—Center for Energetic Materials</b>
Donald O. Thompson Iowa State University 225 Applied Science Center Ames, IA 50011 (515)294-7803	Per-Anders Persson CETR New Mexico Tech Campus Station Socorro, NM 87801 (505)835-5818
<b>Lehigh University—Center in Chemical Process Modeling and Control</b>	<b>University of North Carolina/Duke University— Center for Monoclonal Lymphocyte Technology</b>
Christos Georgakis Process Modeling and Control Center 445 Whitaker #5 Lehigh University Bethlehem, PA 18015 (215)758-4781	Willard C. Hamilton North Carolina Biotechnology Center 4501 Alexander Drive Research Triangle Park, NC 27709 (919)541-9366 ext. 313
<b>Lehigh University—Center for Innovation Management Studies</b>	<b>North Carolina State University—Center for Communications and Signal Processing</b>
Alden Bean Lehigh University Drown Hall 35 Bethlehem, PA 18015 (215)758-3427	Sirus Chitsaz Center for Communications and Signal Processing North Carolina State University Raleigh, NC 27695-7914 (919)737-3015
<b>University of Massachusetts—Center for Industry Research on Polymers</b>	<b>Northeastern University—Center for Electromagnetics Research</b>
S. W. Kantor Polymer Science & Engineering Dept. University of Massachusetts Lederle Research Center—701 Amherst, MA 01003 (413)545-2236	Michael B. Silevitch The Center for Electromagnetics Research 235 Forsyth Building Northeastern University 360 Huntington Avenue Boston, MA 02115 (617)437-5110
<b>Massachusetts Institute of Technology— Polymer Processing Program</b>	<b>Northwestern University—Center for Engineering Tribology</b>
Timothy Gutowski Assistant Professor of Mechanical Engineering Laboratory for Manufacturing & Productivity Massachusetts Institute of Technology Cambridge, MA 02139 (617)253-0256	Herbert Cheng Department of Mechanical Engineering The Technological Institute Northwestern University Evanston, IL 60201 (312)491-7062
<b>University of Minnesota—Center for Biocatalytic Processing</b>	<b>Ohio State University—Center for Welding Research</b>
Michael Flickinger BioProcess Technology Institute University of Minnesota—St. Paul St. Paul, MN 55108 (612)376-1787	David W. Dickinson Edison Welding Institute 1100 Kinnear Road Columbus, OH 43212 (614)486-9400
<b>New Jersey Institute of Technology—Hazardous and Toxic Waste Management Center</b>	<b>Oklahoma State University—Center for Web Handling</b>
John W. Liskowitz New Jersey Institute of Technology 323 Martin Luther King Blvd. Newark, NJ 07102 (201)596-3233	Karl N. Reid Oklahoma State University Web Handling Research Center 111 Engineering North Stillwater, OK 74078 (405)624-5140

(continued)

**Table 2—(continued)**

**The Pennsylvania State University—  
Center for Dielectrics**

James V. Biggers  
260 Materials Research Laboratory  
The Pennsylvania State University  
University Park, PA 16802  
(814)865-1638

**Rensselaer Polytechnic Institute—Center for  
Interactive Computer Graphics**

Michael J. Wozny  
Center for Interactive Computer Graphics  
Rensselaer Polytechnic Institute  
CC 121  
Troy, NY 12180  
(518)266-6752

**University of Rhode Island—  
Center for Robotics**

Hermann Viets  
Dean, College of Engineering  
102 Bliss Hall  
University of Rhode Island  
Kingston, RI 02281  
(401)792-2186

**Rutgers University—Center for  
Ceramics Research**

John Wachtman, Jr.  
College of Engineering  
P.O. Box 909  
Rutgers University  
Piscataway, NJ 08854  
(201)932-2724

**Rutgers University—Center for  
the Plastics Recycling Institute**

Malcolm G. McLaren  
College of Engineering  
Department of Ceramics  
Brett and Bowser Roads  
P.O. Box 909  
Piscataway, NJ 08854  
(201)932-2220

**University of Tennessee—Measurement and  
Control Engineering Center**

Emil C. Muly  
Measurement and Control Engineering Ctr.  
119 Perkins Hall  
Knoxville, TN 37996-2000  
(615)974-2375

**Texas A&M University—Center for  
Hydrogen Technology**

John O'M. Bockris  
Department of Chemistry  
Texas A&M University  
College Station, TX 77843-3255  
(409)845-5335

**University of Texas at Arlington—Center for  
Advanced Electron Devices**

John M. Owens  
University of Texas—Arlington  
P.O. Box 19016  
Arlington, TX 76019  
(817)273-3379

**University of Texas Health Science Center at  
San Antonio—Center for Cell Regulation**

Barbara D. Boyan  
University of Texas Health Science Ctr.  
7703 Floyd Curl Drive  
San Antonio, TX 78284  
(512)691-7734

**University of Washington—Process Analytical  
Chemistry Center**

Bruce Kowalski  
Laboratory for Chemometrics  
Department of Chemistry  
University of Washington  
Seattle, WA 98195  
(206)543-1610

**Washington University—Center for  
Computer-Aided Process Engineering**

R. L. Motard  
Department of Chemical Engineering  
Washington University  
Campus Box 1198  
St. Louis, MO 63130  
(314)889-6082

**West Virginia University—Fluidization and  
Fluid Particle Center**

Joseph D. Henry, Jr.  
Department of Chemical Engineering  
West Virginia University  
Morgantown, WV 26506-6101  
(304)293-3351

**Worcester Polytechnic Institute—  
Center for the Management of  
Advanced Automation Technology**

Arthur Gerstenfeld  
Department of Management  
Worcester Polytechnic Institute  
Worcester, MA 01609  
(617)793-5471

**University of Wyoming—Center for  
Mathematical Modeling**

Richard E. Ewing  
Enhanced Oil Recovery Institute  
University of Wyoming  
Box 3295 University Station  
Laramie, WY 82071  
(307)766-4933