

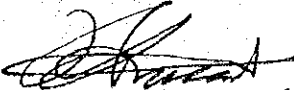
2. R / D

RECORD OF DISCUSSIONS
BETWEEN
THE RESIDENT REPRESENTATIVE
OF THE JAPAN INTERNATIONAL COOPERATION AGENCY IN CHILE
AND
THE AUTHORITIES CONCERNED OF
THE REPUBLIC OF CHILE
ON
THE THIRD COUNTRY TRAINING PROGRAMME

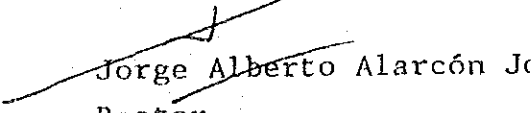
The Japanese Preliminary Survey Team headed by Mr. Tsuguo Yashima had discussions with the authorities concerned of the Government of the Republic of Chile from 7 April to 14 April 1988 with respect to the frame work of the training course in the field of molluscan culture under the Third Country Training Programme, and desirable measures to be taken by the authorities concerned of both Governments to ensure their successful operation.

Based on the above discussions, the Resident Representative of the Japan International Cooperation Agency in Chile and the authorities concerned of the Republic of Chile agreed to recommend to their respective Governments the matters referred to in the documents attached hereto.

Antofagasta, Chile, July 26, 1988



Hiroko Kuramochi
Resident Representative
of the Japan International
Cooperation Agency in Chile



Jorge Alberto Alarcón Johnson
Rector
Universidad del Norte,
Chile



ATTACHED DOCUMENT

The Government of Japan and the Government of the Republic of Chile will cooperate with each other in organizing a training course in the field of molluscan culture at Universidad del Norte, Chile (hereinafter referred to as "The Course") in the Japanese fiscal year 1988 under the Third Country Training Programme of the Japan International Cooperation Agency (hereinafter referred to as "JICA").

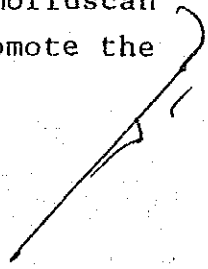
The Government of the Republic of Chile will conduct the Course with the support of technical cooperation of the Government of Japan. The Course will be operated in accordance with the followings:

1. TITLE:

The Course will be entitled "International Training Course on Molluscan Culture".

2. PURPOSE:

The purpose of the Course is to provide participants from Latin American countries with an opportunity to develop relevant techniques and knowledge in the field of molluscan and other species cultures and to contribute to promote the development of aquaculture in Latin America.



3. OBJECTIVES :

By the end of the Course, the participants are expected:

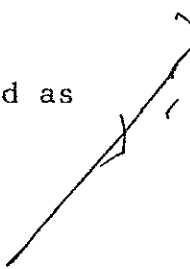
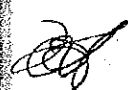
- 3.1. To acquire techniques and methods of cultures of scallops, oysters and others in natural and controlled environments.
- 3.2. To understand general aspects of molluscan cultures.
- 3.3. To have an idea of the development of molluscan cultures.
- 3.4. To set up the required link among participants to share knowledge and experience on marine culture.

4. DURATION

The Course will be held from 22 October to 21 November, 1988.

5. CURRICULUM

The tentative curriculum of the course is attached as ANNEX 1.



6. INVITED COUNTRIES

The Governments of the following countries will be invited to apply for the Course by nominating their applicant(s): Argentina, Brazil, Colombia, Costa Rica, Ecuador, Perú, Uruguay and Venezuela.

7. NUMBER OF PARTICIPANTS

The number of participants from the invited countries shall not exceed fifteen (15) in total.

And the number of participants from Chile shall not exceed five (5).

8. QUALIFICATIONS FOR APPLICANTS

Applicants for the Course are:

8-1. To be nominated by their respective Governments in accordance with the procedure mentioned in 10-1 below.

8-2. To be presently engaged in production or research in aquaculture and have more than two (2) years of occupational experience in this field.

8-3. To be more than junior college graduates or equivalent academic background in this field.

8-4 To be under forty-five (45) years of age in principle.

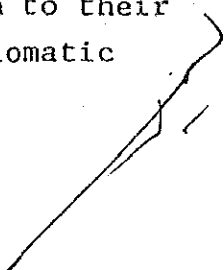


11. UNDERTAKING OF BOTH GOVERNMENTS

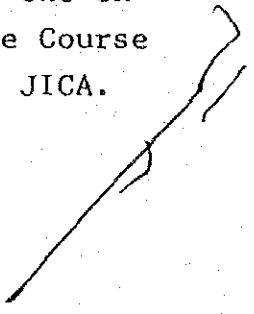
In organizing and implementing the Course, both sides will take the following measures in accordance with the relevant laws and regulations in force in each country:

11-1. The Government of the Republic of Chile.

11-1-1. Ministry of Foreign Affairs

- (1). To forward the General Information brochures (hereinafter referred to as G.I.) to the Governments of the invited countries through its diplomatic channels.
 - (2). To receive application forms and forward them to Universidad del Norte Chile, and
 - (3). To notify the result of the selection to their respective countries through its diplomatic channels.
- 
- 

11-1-2. Universidad del Norte, Chile.

- (1). To formulate the curriculum based on ANNEX 1.
 - (2). To draft and print the G.I.
 - (3). To assign an adequate number of its staff as lecturers/instructors for the Course.
 - (4). To provide its training facilities and equipment for the Course.
 - (5). To select participants in the Course, and inform the JICA Chile Office of the result of the selection.
 - (6). To arrange accomodations for participants.
 - (7). To arrange international air tickets for participants from the invited countries and to meet and see them off at the airport.
 - (8). To take budgetary measures to bear the expenses necessary for conducting the Course excluding the expenses financed by JICA.
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(9). To issue certificates to the participants who have successfully completed the Course.

(10). To submit a course report and a statement of expenditures to the JICA Chile Office, and

(11). To coordinate any matter related to the Course.

11-2. The Government of Japan

(1). To dispatch following the regular procedures of its technical cooperation scheme, short-term expert(s) who will give advice and deliver lectures for the Course.

(2). To bear the following expenses through JICA.

a) Such expenses relevant to participants from the invited countries as international economy-class flight fare, accomodation, per-diem and accidents and life insurance premiums and accident and boarding insurance.

- b) Such expenses relevant to Universidad del Norte, Chile as honoraria for external lecturers, arrangement of meeting and study tour, teaching aids, expendable supplies, copies and reprints and secretarial services.

12. PROCEDURE OF REMITTANCE AND EXPENDITURE.

The remittance and expenditure of the funds for the expenses to be borne by JICA will be arranged in accordance with the following procedure.

12-1. Universidad del Norte Chile, will open a bank account in Chile to receive the funds remitted by JICA and inform the JICA Chile Office of the name of the bank, the account code number, and name of the account holder.

12-2. Universidad del Norte Chile, will submit to the JICA Chile Office a bill of estimate for expenses to be borne by JICA not later than sixty (60) days before the commencement of the Course.

12-3. JICA will assess the bill of estimate and remit the assessed amount of expenses to the account mentioned in 12-1 above within thirty (30) days after the receipt of the bill of estimate.

12-4. Universidad del Norte Chile, will submit to the the JICA Chile Office a statement of expenditures within thirty (30) days after termination of the Course.

12-5. In case any amount of the funds remitted by JICA remains unspent, Universidad del Norte Chile, will reimburse the unspent amount to JICA in accordance with the instructions given by JICA. The funds allocated for the flight fare, accomodation, per-diem and insurance premiums shall not be appropriated for any other purposes.

12-6. By the request of JICA, Universidad del Norte Chile, will make available for JICA's reference all the receipts and other documentary evidence necessary to certify the expenditures stated in 12-4 above.

13. This Attached Document and following Annexes hereto shall be deemed to be the part of the Record of Discussions:

ANNEX 1 : Tentative Curriculum of the Course

ANNEX II : Schedule of the Course Operation

ANNEX III : Tentative Estimate of Expenses for the Course.

ANNEX 1 :

TENTATIVE CURRICULUM OF THE COURSE

The following subjects will be covered in the Course.

1. GENERAL ASPECTS OF MOLLUSCAN CULTURES

THEORY :

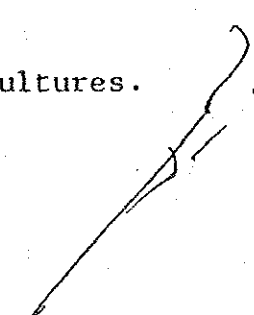
- History and development of molluscan cultures.
- The man's taking part in the life cycles of mollusks.
- Basic and applied research supporting the cultures.
- Structure and functions of Hatchery System.
- Oceanography applied to cultures
- Culture methods
- Economic analysis (cost/profit)
- Management and development of projects
- Culture models
- Micro-algae production
- Adults management: preparation, spawning and gamete management
- Larvae Culture
- Management and culture of postlarvae
- Preseed management and culture
- Management and culture of adults at sea
- Critical variables in the development of cultures.

2. DEVELOPMENT OF A CULTURE PROJECT.

Administrative/Scientific

- Economic planning
- Technical requirements
- Choosing of culture areas
- Choosing of species
- Choosing of methods and techniques
- Treatment of sea water
- Engineering: equipment and service
- Commercialization: export, local markets
- Techniques of production programming

Technical

- Floating cultures (longline, collectors, pearl-nets, lantern-nets)
 - Larvae capture
 - Seed harvesting
 - Control of bio-fouling
 - Ordinary problems in floating cultures.
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ANNEX II

SCHEDULE OF THE COURSE OPERATION

MONTH	CHILEAN SIDE	JAPANESE SIDE
Early June 1988	1. Signing of Record of Discussions 2. Preparation of G.I.	1. Signing of Record of Discussions
Late June 1988	1. Distribution of G.I. and Application Form	
Early July 1988	1. Submission of A-1 Form for Short-term Expert	1. Recruitment of Short-term Expert
Late August 1988	1. Opening of Bank Account 2. Submission of Bill of Estimate 3. Receipt of Application forms.	
Late September 1988	1. Notification of the Selection of the Participants	1. Notification of the Selection of the Short-term Expert and Submission of B-1 Form 2. Remittance of Expenses
October - November 1988	1. Implementation of Course	1. Dispatch of Expert
Late December 1988	1. Submission of Statement of Expenditures 2. Submission of Course Report	

ANNEX III

TENTATIVE ESTIMATE OF EXPENSES TO BE BORNE BY JICA

ITEM OF EXPENSES	BREAKDOWN	AMOUNT (US\$)
I. Invitation Expenses		
1. Airticket (round trip)	1,000 x 15 persons	15,000
2. Transportation (Santiago-Coquimbo)	30 x 15 persons	900
3. Perdiem	15 x 15 persons x 32 days	7,200
4. Accomodation (at Santiago)	30 x 15 persons x 2 days	900
(at Coquimbo)	15 x 15 persons x 30 days	6,750
5. Insurance	60 x 15 persons	900
SUBTOTAL		31,650
II. Training Expenses		
1. Tuition fee for invited professor (honorarium)	50 x 2 persons	100
2. Employment fee	150 x 3 month	450
3. Travelling expenses Travelling allowance	15 x (Chilean Participants(5) + Lecturers(5)) x 4 times	600
4. Material Procurement		
(1) Consumables		
a. Chemicals	46 x 20 persons	920
b. Glassware	108 x 20 persons	2,160
c. Fuels		1,130
e. Stationery		260
(2) Teaching Materials		
a. Laboratory	336 x 20 persons	6,720
b. Aquaculture	328 x 20 persons	6,560
(3) Slide Projector		2,000
(4) Meeting Expenses	13 x 50 persons x 2 times	1,300
(5) Others		
a. Printing & Copy		1,120
b. Communication		745
5. Textbooks	100 x 20 persons	2,000
SUBTOTAL		26,065
GRAND TOTAL		57,715

3. ノルテ大学海洋学部概要パンフレット



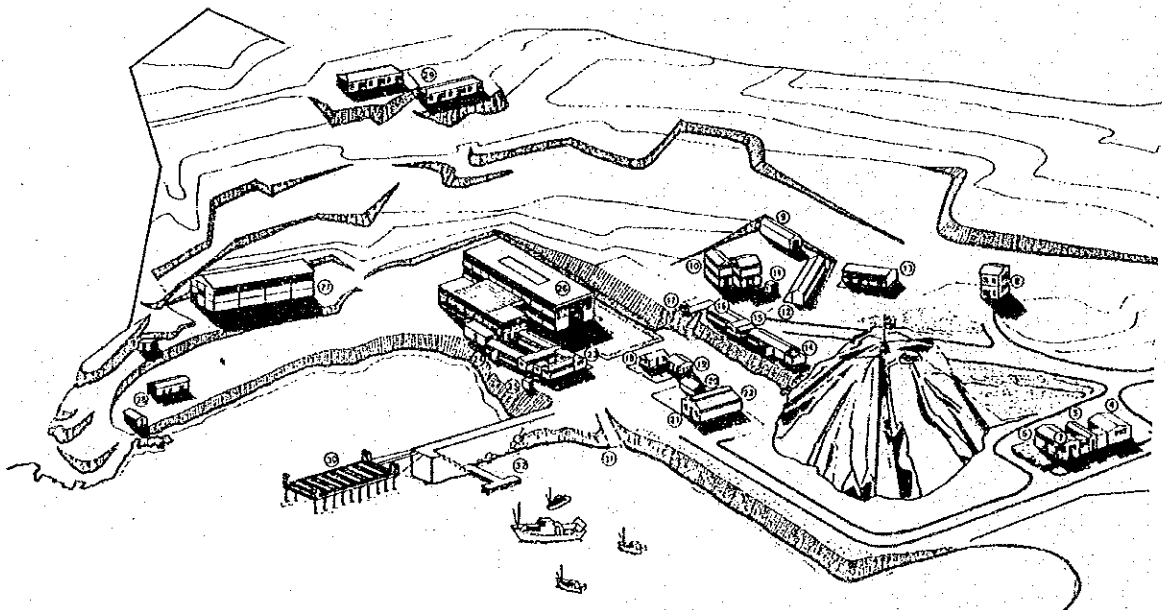
UNIVERSIDAD
DEL NORTE
SEDE COQUIMBO

**FACULTAD
DE CIENCIAS
DEL MAR**

- 1 ACCESS
- 2 REGISTER OFFICE
- 3 RESEARCH OFFICES
- 4 LIBRARY
- 5 STAFF OFFICES
- 6 REFERENCE
COLLECTION
- 7 COMPUTER CENTER
- 8 ADMINISTRATIVE
OFFICES
- 9 CHEMICAL STORAGE
- 10 STUDENT LABS.
- 11 LAVATORIES

- 12 CLASSROOMS
- 13 CLASSROOMS
- 14 CAFETERIA
- 15 PRINTING SERVICE
- 16 STUDENT SERVICES
- 17 PORTER'S LODGE
- 18 ADMINISTRATIVE
OFFICES
- 19 TELEPHONE
EXCHANGE
- 20 WORKSHOP
- 21 GENERAL SERVICES
- 22 GARAGE

- 23 RESEARCH LABS.
- 24 AQUARIUM
- 25 PUMPS ROOM
- 26 COASTAL CENTER OF
AQUACULTURE AND
MARINE RESEARCH
- 27 GENERAL STORAGE
- 28 MACHINE-SHOPS AND
STORAGE
- 29 LODGING FACILITIES
- 30 PIER
- 31 SMALL SHIPYARD
- 32 FLOATING PIER



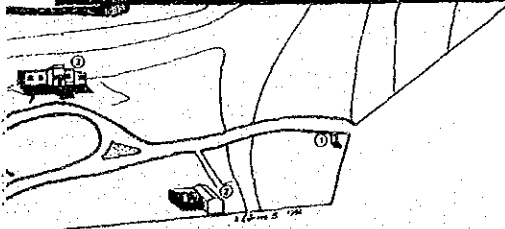
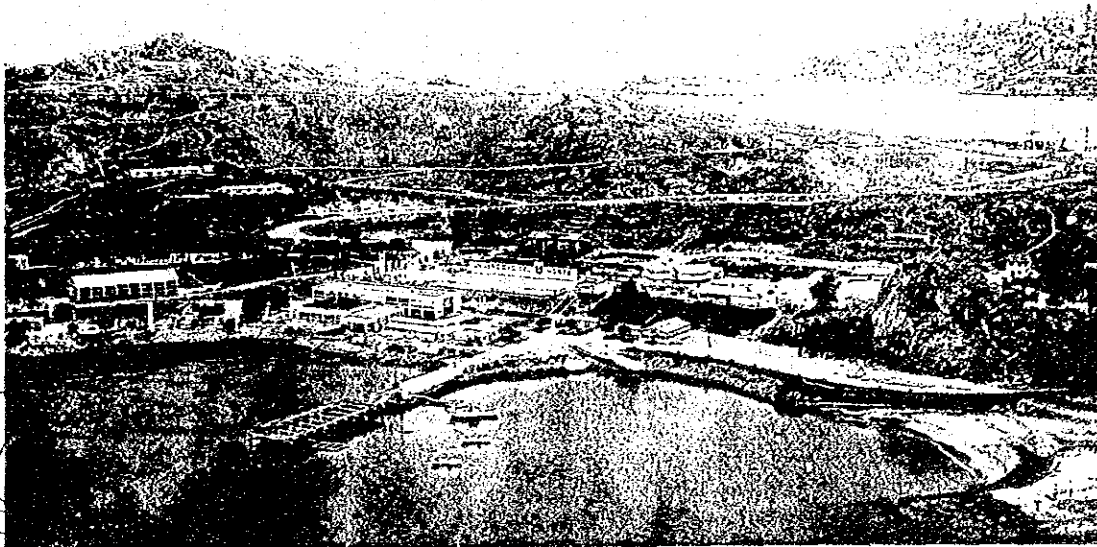
UNIVERSIDAD DEL NORTE

The academic activities of Universidad del Norte, founded in 1956, center around the Faculties of Architecture, Sciences, Economics, Humanities and Engineering in the city of Antofagasta; and Marine Science in the city of Coquimbo. There are also Departments of Theology in both cities. In addition, there is the Institute of Archeological Research R.P. Gustavo Le Paige S.J. in San Pedro de Atacama.

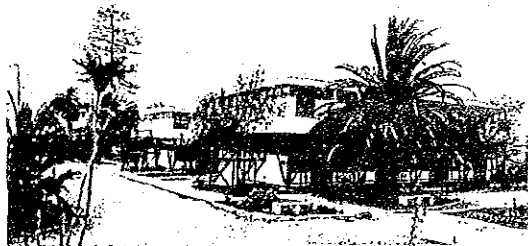
At the Coquimbo Center the Marine Science Faculty performs its activities at the Guayacán Campus, whose surface area is 18.5 hectares (46 acres). The buildings used for academic and administrative purposes occupy about 7,600 square meters.

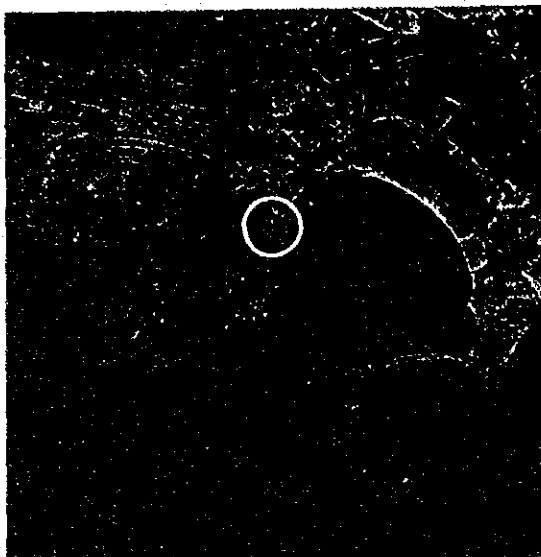
Of greatest importance in these facilities is the modern Coastal Center of Aquaculture and Marine Research donated to Chile by the government of Japan through JICA (Japan International Cooperation Agency).

Aerial view of the "Campus Guayacán"



The Miraflores Campus is located at the northern entrance of the city of Coquimbo where the Department of Theology carries out its academic activities.



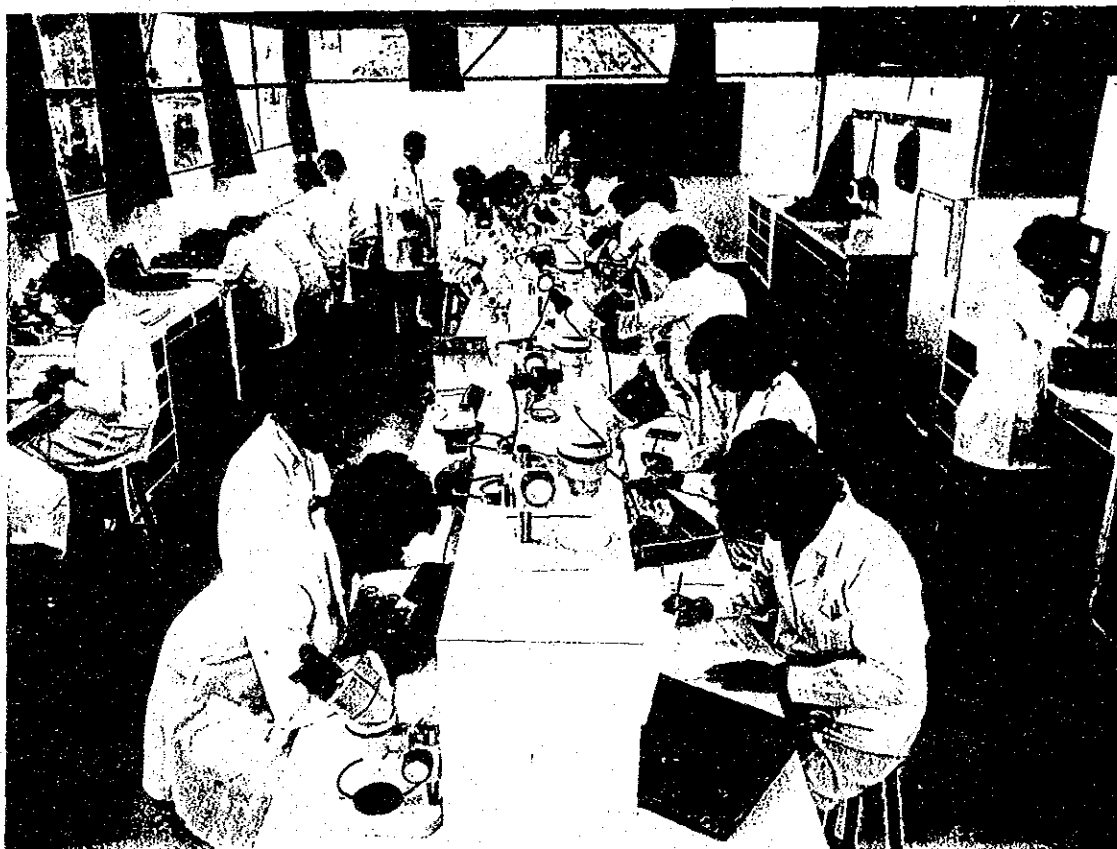


ACTIVITIES OF THE MARINE SCIENCE FACULTY

The special geographic location, the modern facilities, and the high academic level of the staff and researchers who are working in this faculty, allow the formation of excellent quality professionals and scientists in the fields of Marine Biology and Aquaculture Engineering, as well as research, marine extension and production.

The Department of Marine Biology directs its work to the research and study of the basic biology of the hydro-biological resources. Ecological and oceanographic studies are also part of the activities that this Department develops.

The Department of Aquaculture engages in applied research and technology to develop marine cultures in a natural and controlled environment, as well as the production of species for commercial purposes and re-population programs.

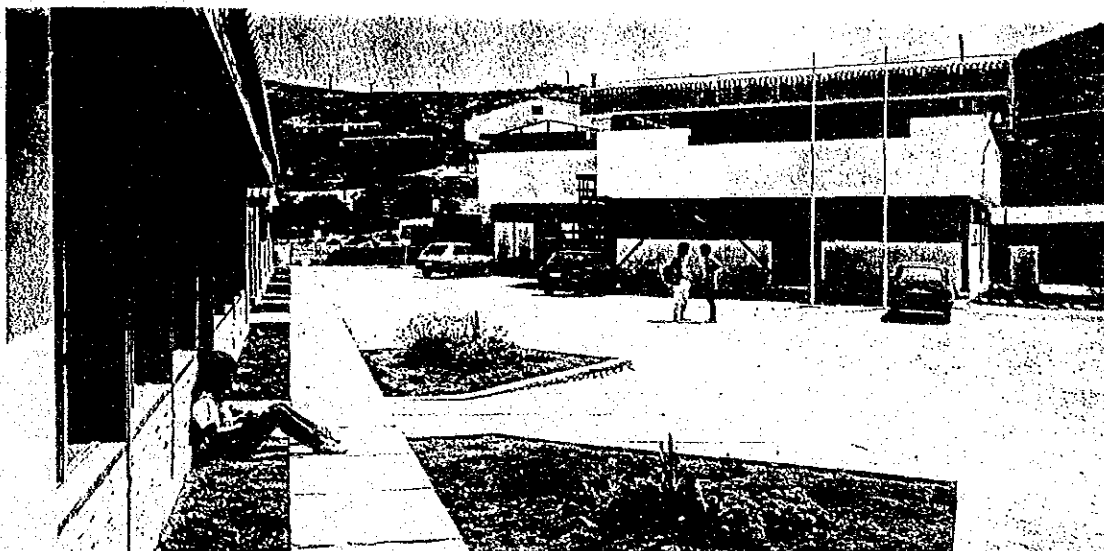


FACULTY

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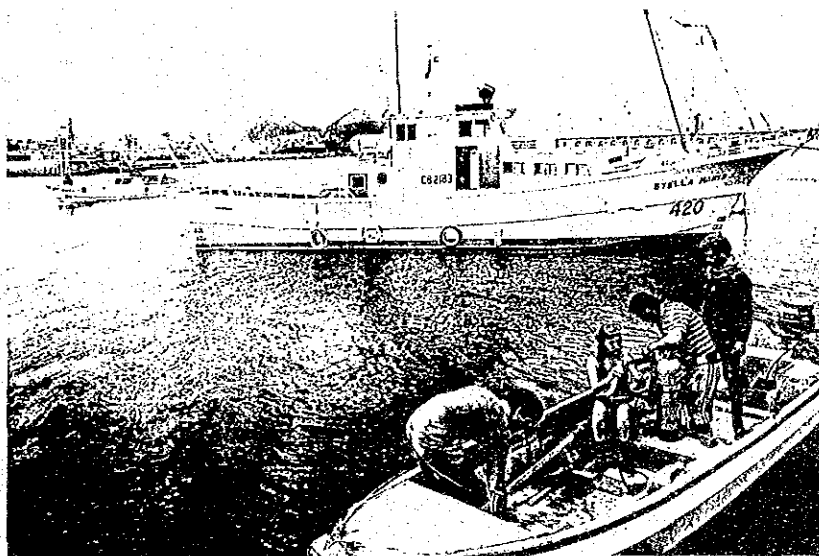
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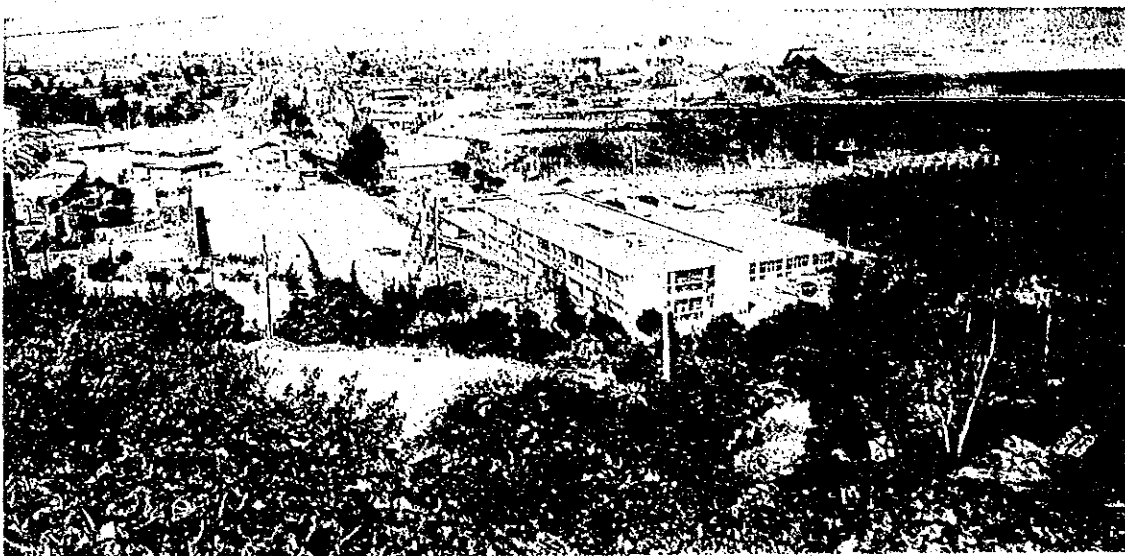


La Herradura Bay, a sea sheltered area, which offers the professors, researchers and students a natural aquarium in which to study and perform in vivo experiments, with native and introduced species.

Mild weather and tempered sea, comfortable and functional facilities where laboratories are equipped with modern instruments and all the necessary teaching elements offer a pleasant and productive atmosphere to the university community.

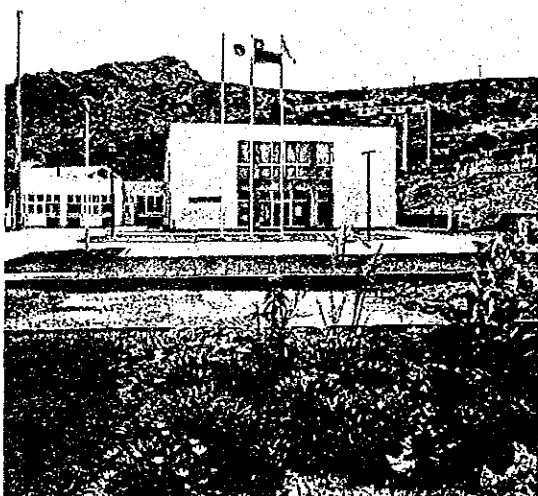
The Faculty places special importance on the students' fondness for the sea, promoting nautical and underwater activities as a complement to their professional formation.

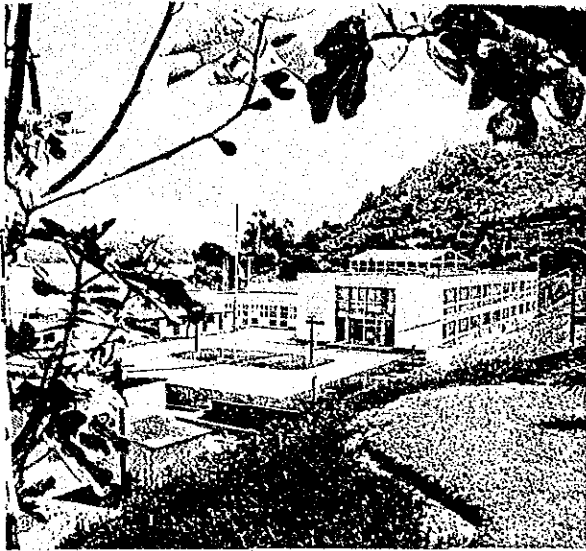




In the upper left half of the photograph are classrooms, laboratories, cafeteria, and other offices; at right: rear view of the Coastal Center of Aquaculture and Marine Research. In the background, the pier.

The front of the Center and entrance hall. Detail of one of the aquariums that decorate the hall.



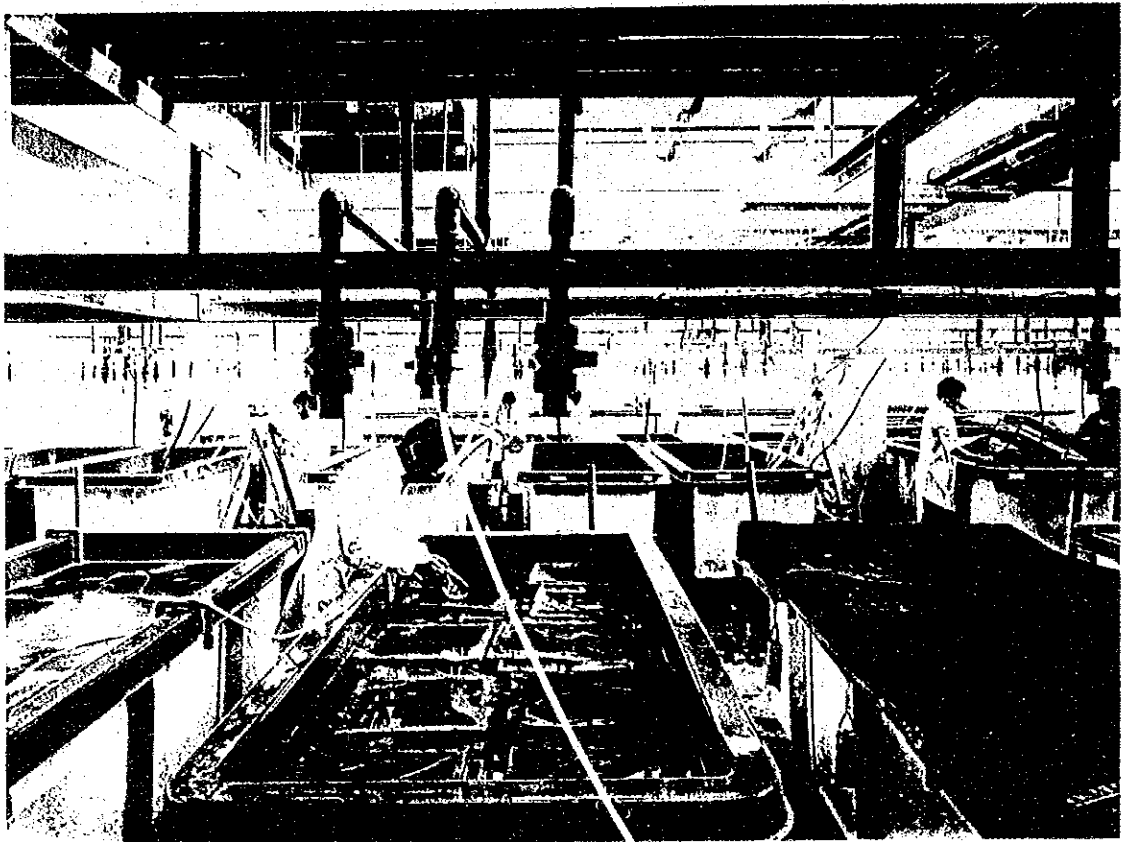


COASTAL CENTER OF AQUACULTURE AND MARINE RESEARCH

This building, which is 2,850 square meters was, specially designed to contain research laboratories; laboratories with controlled environment for the production of micro-algae, larvae, and seeds of marine species which are of commercial interest; a conference room; classrooms and a library; drawing, video and photography rooms; offices for administrators and academic staff.

This Center also has equipment for the supply and maintenance of sea water, including water pumps, air pumps, filters, heat exchangers, ultraviolet light sterilizers, and a generator, which assure the continuous function of research areas as well as production areas.

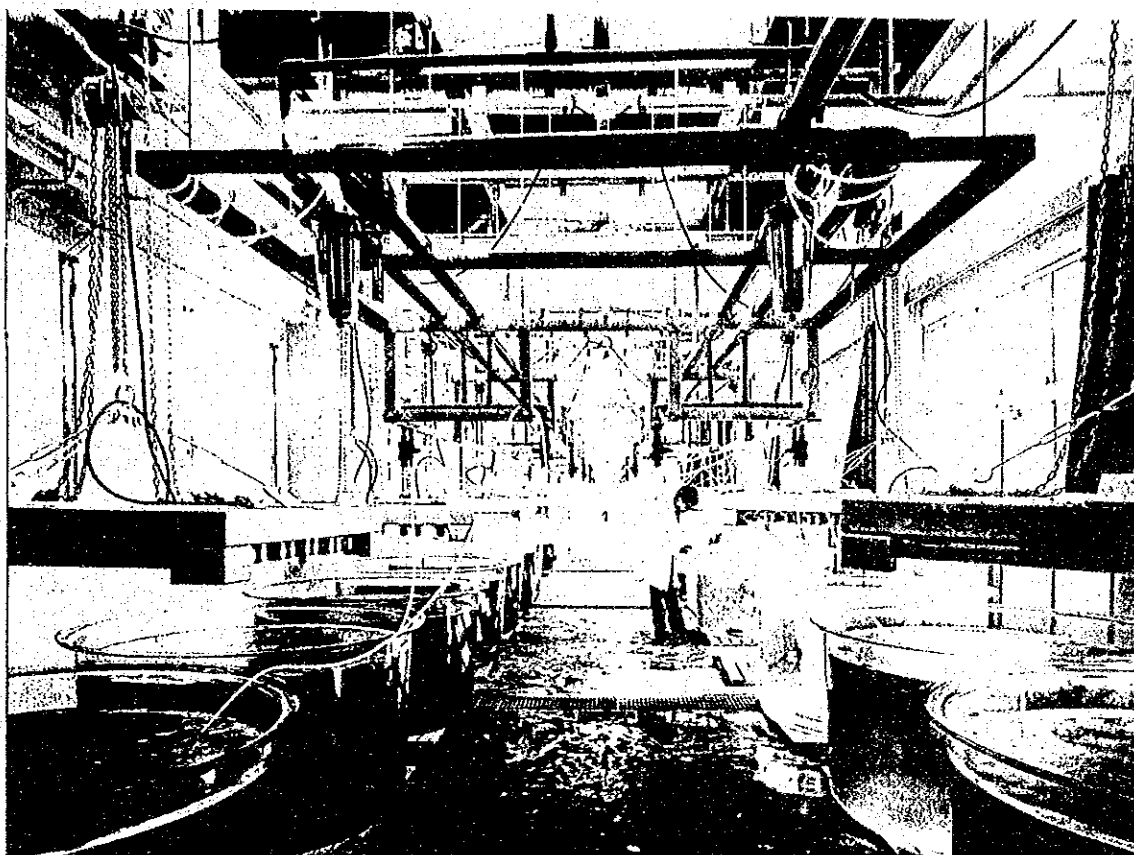




*Larvae and seeds room
(Hatchery).*



*Production of young
northern scallops
(Argopecten purpuratus), in
a controlled environment and
breeding in a natural
environment (nursery in the
pier).*

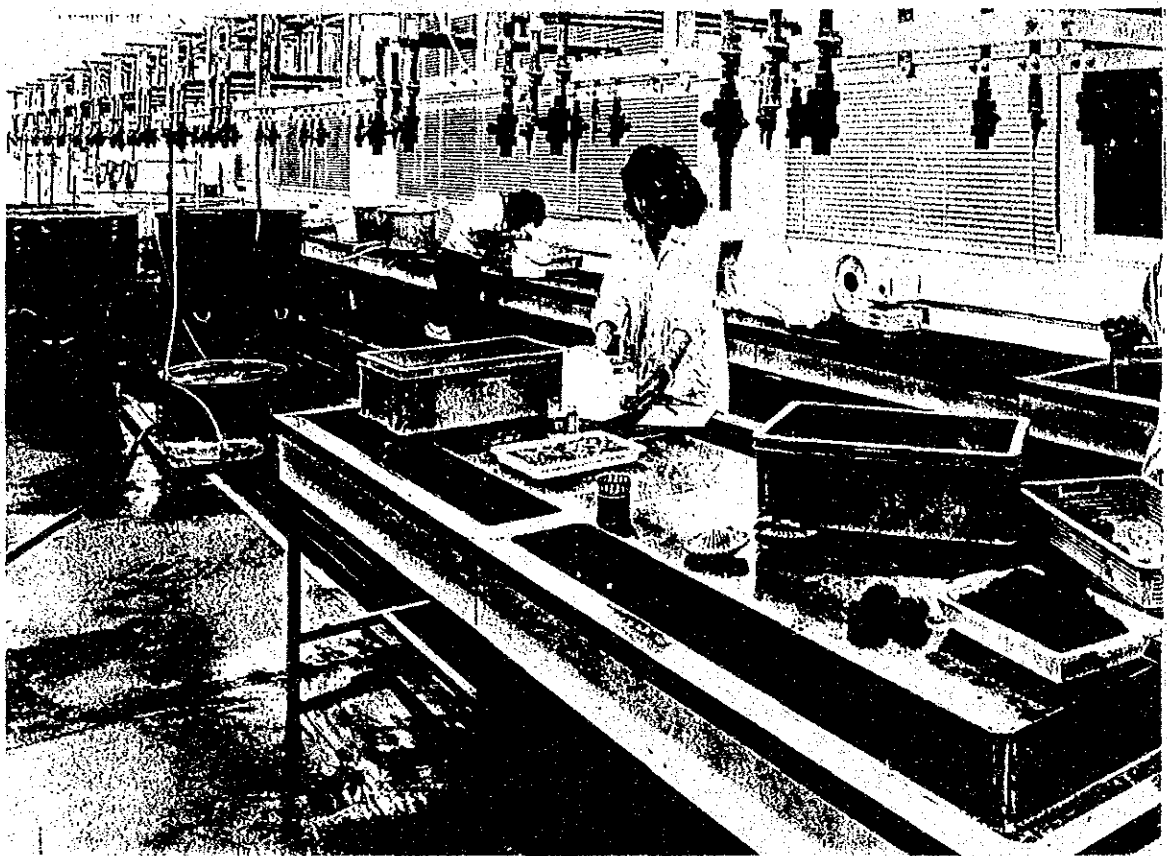


Production of micro-algae.

PRODUCING FOR CHILE AND OTHER COUNTRIES

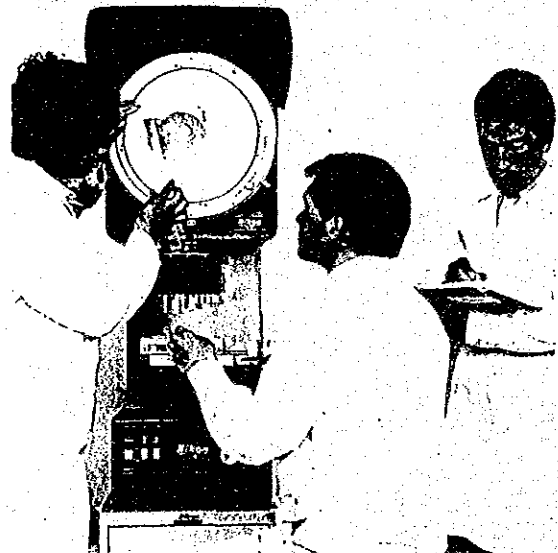
Massive production of micro-algae, larvae and seeds of many different commercial species are produced in these laboratories, developing technologies which will meet the growing demand for commercial cultures or repopulation of over-exploited areas. These facilities are also used for training of national and foreign professionals in the most recent techniques for the production of marine organisms under controlled and natural environment.





Students performing experiments in the wet laboratory.

Researchers and students become acquainted with the most advanced technology due to the modern equipment of the center: oceanographic devices, precision instruments for analytical studies (atomic absorption spectrophotometer, spectrofluorometer, electrophoresis equipment, scintillation counter, etc.), fluorescent optical microscope and electron scanning microscope.



Microscope with screen.

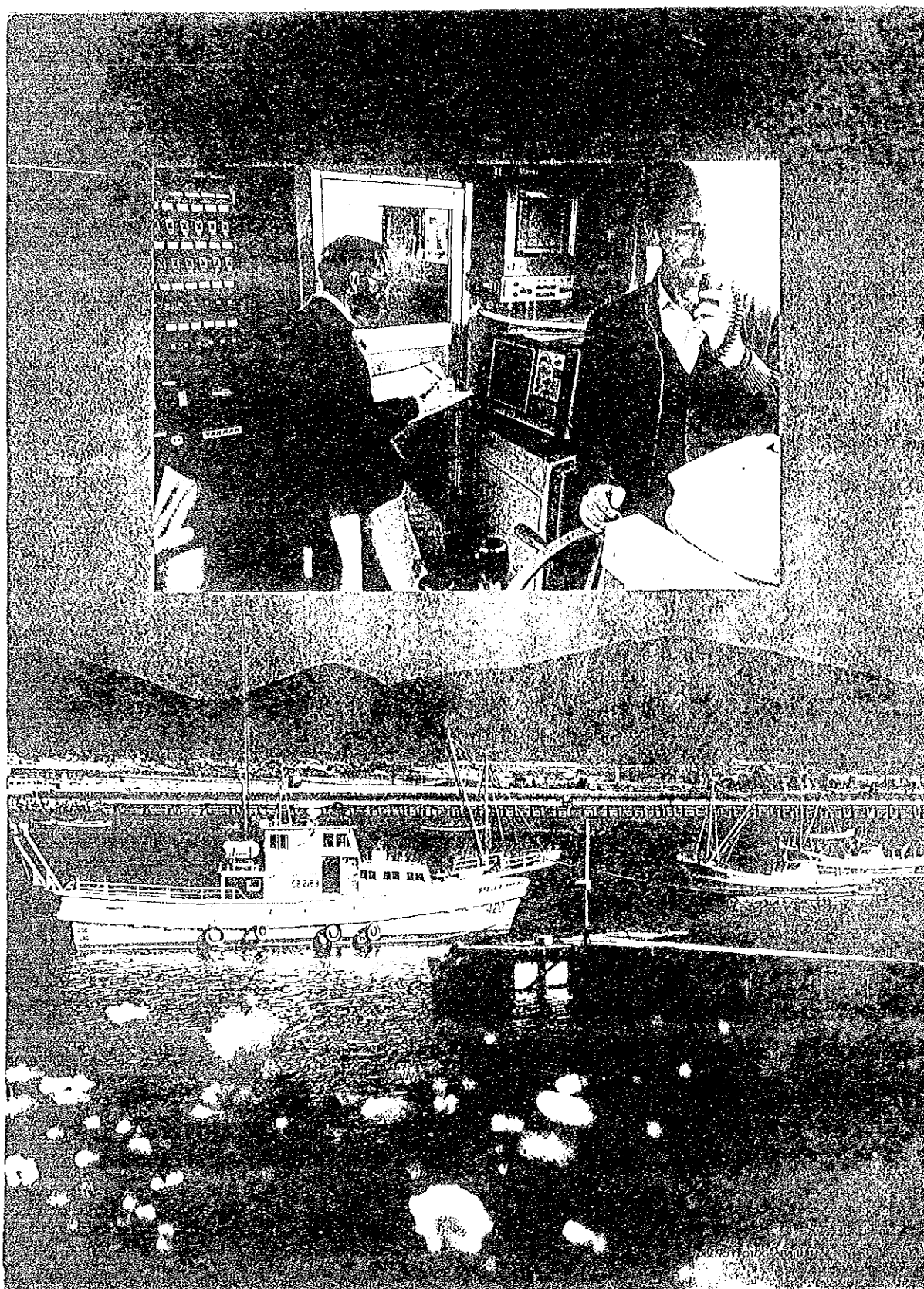


Electron scanning microscope and its images.

Back cover:

In order to support the activities of the Marine Science Faculty, there is a small fleet of YANMAR boats, consisting of 4 versatile motor boats for cultivation work and one 16 meter oceanographic boat equipped with echosounder, radar and other equipment.

Universidad del Norte
Sede Coquimbo
Larrondo 1281 - P.O. Box 117
Phones: 312388-311984-311287-312305
Telex 220015 Unort CI
Coquimbo-Chile.



4. これまでの研修実施要綱

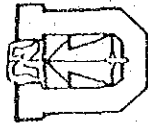
- (1) 第1回 マガキ・ホタテガイ養殖技術研究集会
- (2) 第2回 同 上
- (3) 第3回 同 上
- (4) ホタテガイ種苗の天然採苗技術研修
- (5) ペルー（ブラジル）、カキ・ホタテガイ養殖生産技術研修
- (6) 第1回 F A O 貝類養殖技術国際研修
- (7) 第2回 同 上

(1) 第1回 マガキ・ホタテガイ養殖技術研究会

UNIVERSIDAD DEL NORTE
FACULTAD DE CIENCIAS DEL MAR
DEPARTAMENTO DE ACUACULTURA
CENTRO COQUIMBO

ORGANIZA:

- Universidad del Norte - Centro Coquimbo
Departamento de Acuacultura
- Organización de Estados Americanos (O.E.A.)



SE AGRADECE LA COLABORACION DE:

- Agroproductos Baurá y Cía Ltda.
- Cía Cervicerías Unidas
- Cía Minera del Pacífico
- Cía Minera El Indio
- Cooperativa Agrícola Control Pesquero Elqui Ltda.
- Cooperativa Agrícola y Pesquera Elqui Ltda.
- Embotelladora del Sal S.A.
- Lowry Bullemore
- Molinera e Industrial Azapa
- Pesquera y Conservera Simmer Food
- Pesquera y Conservera Leyso
- Rendic Hnos. y Cía.
- Soc. Pesquera Coloso S.A.
- Soc. Pesquera Guanaye S.A.
- Viña Sta. Rita

PRIMER TALLER DE ACUACULTURA
CONOCIMIENTO ACTUAL Y PERSPECTIVAS EN
EL CULTIVO DE OSTION DEL NORTE
Y OSTRA JAPONESA

COQUIMBO - CHILE

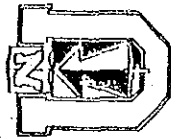


14 Y 15 OCTUBRE
1985

PROGRAMA		MARTES 15	AREA ECONOMICA
SALON AUDITORIUM: CASA DE LA CULTURA DE LA I. MUNICIPALIDAD DE COQUIMBO			
LUNES 14:			
09:00 horas	INSCRIPCIONES	09:30 horas	- Exposiciones de Acuacultores y Empresas
10:00 horas	DISCURSO DE BIENVENIDA	- Cultivos Marinos en Tongoy	- Legislación Vigente
	Dr. JUAN ENRIQUE ILLANES BUCHER Director Departamento Acuicultura	Sr. HECTOR FELIU SCOTTI Secretario Regional Ministerial de Pesca, IV Region	Dr. JUAN CARLOS GALDAMES Dirección General Litoral
SESSION 1		AREA DE INVESTIGACION CIENTIFICA	
10:30 horas	- Producción de Microalgas - Producción de Larvas - Preservilla y Semilla - Técnicas de Cultivo	- Problemáticas general de Producción de Ostiones en Cultivo	- Mercado
	Dr. Louis H. DiSalvo	Sr. SERGIO PELLEGRINI GARCIA-MORENO	Srta. BEATRIZ CELIS PROCHILE
11:00 horas	CAFE	- Cultivos comerciales y experimentales de Ostión y Ostrea Japonesa	CAFE
11:50 horas	MESA REDONDA	Sr. BERTHAN K. DAWSON Cultivos Marinos Ltda. - SERMENIA	16:00 horas
SESSION 2		- Cultivo Comercial de Ostrea Japonesa	MESA REDONDA
14:30 horas	- Tecnología de Cultivo	Sr. BRUCE TRENCH FONTANER Pesquera Flamenco Ltda.	- Análisis de Factores Limitativos de la instalación y desarrollo de los cultivos de moluscos
	Dr. JUAN ENRIQUE ILLANES BUCHER	- Cultivos Comerciales de Ostrea Japonesa y Ostión.	18:00 horas
	Dr. SHIZUO AKABOSHI	Sr. RODOLFO NAUER Cultivos Marinos Tongoy Ltda.	Visita al Centro de Acuicultura e Investigaciones Marinas y Dependencias del Departamento de Acuicultura
15:15 horas	- Materiales y Equipos de Cultivo	- Cultivos Comerciales de Ostrea Japonesa	19:00 horas
	Sr. KOJI FUJISAKI	Sr. JUAN AGUSTO MIRA Pesquera OSTRANAR Ltda.	Cóctel
	Sr. NORBERTO ROJAS Hissho Iwai Corporation		Casino - Universidad del Norte
16:00 Horas	CAFE		CHARLA:
16:30 horas	MESA REDONDA		"El Centro Costero de Acuicultura e Investigaciones Marinas"
20:30 horas	CENA		Sr. ANDRES F. HOYL SOTOMAYOR Decano Facultad de Ciencias del Mar

(2) 第2回 マガキ・ホタテガイ養殖技術研究集会

UNIVERSIDAD DEL NORTE
FACULTAD DE CIENCIAS DEL MAR
DEPARTAMENTO DE ACUACULTURA
SEDE COQUIMBO



ORGANIZA:

- Universidad del Norte
Departamento de Acuicultura
Sede Coquimbo

AUSPICIA:

- Japan International Cooperation Agency (JICA)

SEGUNDO TALLER DE ACUACULTURA
PRODUCCION Y COMERCIALIZACION
DEL OSTION Y OSTRAS JAPONESA
EN CHILE

COQUIMBO - CHILE

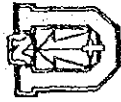


6 y 7 NOVIEMBRE
1986

P R O G R A M A		LUGAR:	
SESION I:	DISPONIBILIDAD DE SENILLA	10.15 hrs.	MESA REDONDA
15.30 hrs.	Producción en Ambiente Controlado Dr. LOUIS H. DESALVO	12.15 hrs.	EXPOSICION DE PRODUCTOS ELABORADOS Y MATERIALES DE CULTIVO
15.50 hrs.	Producción en Ambiente Natural Dr. SHIZUO AKAGISHI J.I.C.A.	SESION III:	FINANCIAMIENTO Y COMERCIALIZACION
16.10 hrs.	Café	15.00 hrs.	Crédito Estatal Sr. LUIS TORAN RIVELER CORFO
16.20	MESA REDONDA	15.30 hrs.	Exportaciones
18.00 hrs.	Visita al Centro Costero de Acuicultura y de Investigaciones Marinas		Sr. JOSE LUIS GARCIA Exportador Particular
		16.00 hrs.	Exportaciones
VIERNES 7:			Sr. JOSE JULIAN FINLAY PROCHILE - IV REGION
SESION II:	TECNOLOGIA, CRECIMIENTO Y ENGORDE	16.30 hrs.	Café
06.30 hrs.	Ostra Japonesa Sr. LUIS A. CAMOVAS Universidad del Norte	16.45 hrs.	MESA REDONDA
	Ostión del Norte	18.00 hrs.	Libre
09.30 hrs.	Café	20.00 hrs.	CENA CLAUSURA Hotel Bucanero - La Herradura
09.45 hrs.	Tecnología Procesamiento de Alimento		
	Sr. MARIO PEREZ MON Universidad de La Serena		
JUEVES 6:			
09.30 hrs.	Recepción de Participantes		
11.30 hrs.	CEREMONIA INAUGURACION - Himno Nacional, Coro - Bienvenida Sr. Rector Universidad del Norte Contralmirante (R) Dr. JORGE ALBERTO ALARCON JOHNSON - Himno Universidad del Norte		
12.15 hrs.	Café		
12.30 hrs.	Intervención Sr. Vicerrector Sede Coquimbo Dr. ANDRES HOYL SOTOMAYOR		
	Intervención Representante del Sr. Subsecretario de Pesca Dr. ALFREDO SAMHUEZA SESUEL Cocktail de Bienvenida		

(3) 第8回 マガキ・ホタテガイ養殖技術研究集会

UNIVERSIDAD DEL NORTE
SEDE COQUIMBO
DEPARTAMENTO DE ACUACULTURA



ORGANIZA

Departamento de Acuicultura
Facultad de Ciencias del Mar
Universidad del Norte, Sede Coquimbo

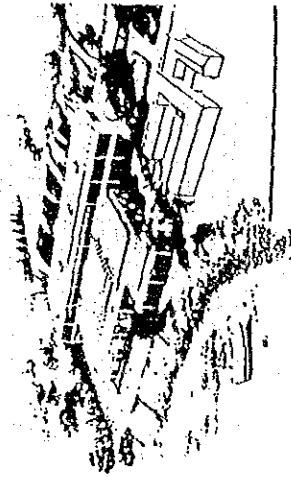
3er

TALLER DE ACUACULTURA

SEMILLA - TECNOLOGIA - MERCADO
DEL OSTION DEL NORTE Y
OSTRA JAPONESA

VALOR INSCRIPCION: \$ 8.000.-

Incluye: Carpeta, Proceeding del Taller, Cocktail y
Cena de Clausura.



COORDINADOR GENERAL

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Larrondo 1281 - Casilla 117
COQUIMBO, CHILE

TELEX 220015 UNORT CL-
FONO 311984 - COQUIMBO

2 - 4 DICIEMBRE 1987

COQUIMBO - CHILE

PROGRAMA

MIÉRCOLES 2:

- 09:00 - 13:00 Hrs.
 - Inscripción
 - Bienvenida Sr. Vicerrector Sede Coquimbo
 - Exposición Subsecretaría de Pesca
 - Cocktail

15:00 - 19:00 Hrs. SESION SEMILLA

- Exposición Universidad del Norte
- Café
- Mesa Redonda
- Exposición Equipos y Materiales.

JUEVES 3:

09:00 - 13:00 Hrs. SESION TECNOLOGIA

- Exposición Universidad del Norte
- Café
- Mesa Redonda
- Exposición Equipos y Materiales.

15:00 - 19:00 Hrs. SESION MERCADO

- Exposición PROCHILE
- Café
- Mesa Redonda
- Exposición Equipos y Materiales.

VIERNES 4:

09:00 - 13:00 Hrs. CONCLUSIONES

- Mesa Redonda
- Café

15:00 - 19:00 Hrs. ASOCIACION DE CULTIVADORES

- Aprobación Estatutos
- Elección Mesa Directiva

20:00 Hrs. CLAUSURA

AUTORIDADES DEL TALLER

Sr. Andrés F. Hoyl S. Vicerrector Sede Coquimbo
Sr. Juan E. Illanes Director Depto. Acuacultura.

Sr. Eduardo G. Uribe Secretario Investigación, Extensión y Asistencia Técnica

EXPOSITORES DE TEMAS

- Representante Subsecretaría de Pesca

- Representante PROCHILE

- Ing. Luis A. Cánovas Universidad del Norte

- Ing. Luis H. Pereira Universidad del Norte

PANEL DE CONSULTORES

Dr. Shizuo Akaboshi JICA (Japan International Cooperation Agency). Tecnología de Cultivos.

Dr. Mario Pérez Won Universidad La Serena Elaboración de Productos.

Sr. Rodolfo Hauer Cultivos Marinos Tongoy Producción y Comercialización de semilla.

Dr. Matthias Wolff DAAD Ecología Marina

Dr. Louis H. DiSalvo Universidad del Norte Producción de Semilla

MESA REDONDA

Moderador Dr. Juan E. Illanes

Secretario Lic. Elias Alarcón

La creciente demanda de productos marinos en los mercados nacionales y foráneos ha incentivado el desarrollo de la maticultura en nuestro país. En estos términos, la actividad del cultivo tiene una dinámica tecnológica y de manejo que les son propias y que requieren de una constante revisión y análisis por el conjunto de personas que realizan estas actividades. Por esta razón, como en años anteriores, el Departamento de Acuacultura de la Facultad de Ciencias del Mar, Universidad del Norte, Coquimbo, ha programado la realización del 3er Taller de Acuacultura destinado a Cultivadores privados que efectúan el cultivo de ostiones y de ostra japonesa.

Considerando que la semilla, la tecnología y el mercado son elementos de vital importancia en el cultivo, se han seleccionado estos temas para realizar el análisis de su estado actual y perspectivas futuras con la modalidad de exposición del tema y discusión de la Mesa Redonda. Se incluirá también algunos aspectos de la legislación vigente y el financiamiento de las actividades, ambos temas de permanente interés.

Como en años anteriores, se efectuará una exposición de equipos y materiales utilizados en las labores de cultivo, de procedencia nacional como de importación.

En este 3er Taller de Acuacultura se ha programado también la constitución de la Asociación de Acuicultores Privados de Chile (A.P.C.) destinada a reunir y representar a quienes desarrollan actividades de cultivo en nuestro país, para la aprobación de los Estatutos de la referida Asociación y elección de la Mesa Directiva mediante una Asamblea General.

(4) ホタテガイ 種苗の天然採苗技術研修

VACANTES Y POSTULANTES

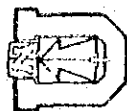
Se ofrece un total de 15 vacantes, el valor de la matrícula es de \$ 50.000 (cincuenta mil pesos) e incluye apuntes y material bibliográfico y otro material didáctico.

Los interesados deben dirigirse al Coordinador del Curso, enviando Currículum Vitae, Carta de Patrocinio de su Institución.

El plazo límite vence el 15 de Junio de 1987.

El Curso será de 32 horas (12 teóricas, 20 prácticas). Se otorgará Certificado de Asistencia.

UNIVERSIDAD DEL NORTE
SEDE COQUIMBO



CURSO DE CAPACITACION

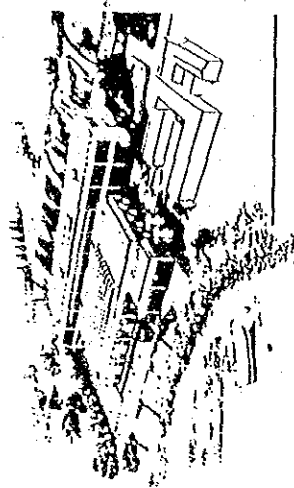
CAPTACION DE SEMILLA DE OSTION
DEL NORTE EN AMBIENTE NATURAL

23 - 26 JUNIO 1987

COORDINADOR DEL CURSO:

Luis H. Pereira
Departamento de Acuicultura
Facultad de Ciencias del Mar
Universidad del Norte - Sede Coquimbo
Larrondo 1281, Casilla 117
COQUIMBO

TELEX: 220015UNORT CL FON: 311984



CENTRO COSTERO DE ACUICULTURA
Y DE INVESTIGACIONES MARINAS

OFFSET - EDIT. DEL NORTE - BRASIL 271 - LA SERENA

Los estudios de maricultura en América Latina, se han visto incrementados en los últimos años como un efecto de la combinación de dos factores: el aumento de la demanda, particularmente de exportación, y la gradual disminución de las capturas comerciales de especies costeras causadas por la sobreexplotación de las mismas.

El desarrollo de sistemas de producción de especies marinas, se basa en la obtención de semilla natural. Sin embargo, la disminución del stock debido a la alta demanda de éste, hace necesario estudiar alternativas de producción controlada, que independicen la producción de juveniles de las fluctuaciones del ambiente natural.

El Departamento de Acuicultura de la Universidad del Norte, Sede Coquimbo, ha logrado avances importantes en el desarrollo de los cultivos marinos, consolidando en los últimos años un Centro de Cultivos Marinos en Ambiente Controlado y un Centro Piloto de Cultivo en Ambiente Natural, pudiéndose demostrar en forma práctica las metodologías y tecnologías más adecuadas para las especies que se desee cultivar, y abriendo enormes perspectivas en el desarrollo de los cultivos en Chile.

Debido al creciente interés de los Acuicultores en conocer mejores métodos y técnicas para la captación de semilla del ostión del Norte en ambiente natural para su posterior cultivo, es que la Facultad de Ciencias del Mar, ha abierto sus puertas al subsector pesquero artesanal e industrial, organismos privados y estatales, especialmente para la transferencia de tecnología en cultivos de moluscos con el objeto de efectuar cultivos comerciales.

PROGRAMA

1. Monitoreo Larval

- a) Observación Oceanográfica:
 - Medición de factores abióticos: Temperatura, Salinidad y Penetración de luz en el agua.
- b) Ciclo Reproductivo
 - Muestreo de ostiones en banco natural
 - Medición morfométrica de la muestra de ostión
 - Análisis y Cálculo de las mediciones morfométricas para la obtención de Índice Gonádico
- d) Colecta de Prueba
 - Limpieza y tratamiento de los colectores de prueba
 - Identificación, medición y cuantificación de las larvas y postlarvas de ostiones en el ambiente natural

2. Colecta de Larvas

- a) Armado e instalación de un Long Line y colectores para la obtención de semilla

3. Visita a Bahía Tongoy

- a) Observación de sistemas suspendidos Long Line, captación masiva y cosecha de semilla

PROFESORES PARTICIPANTES

Dr. Shizuo Akaboshi

Japan International

Cooperation Agency.
Experto en Cultivo de Moluscos Bivalvos, especialmente Ostra y Ostión.

Dr. Juan E. Illanes

Universidad del Norte.
Cultivos Marinos

Ing. Luis H. Pereira

Universidad del Norte
Producción y manejo de semilla de Ostión.

*NOMINA DE PARTICIPANTES AL CURSO CAPACITACION
"CAPTACION DE SEMILLA DE OSTION DEL NORTE EN AMBIENTE NATURAL*

23 - 26 JUNIO 1987

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Sr. Antonio Abelli Correa
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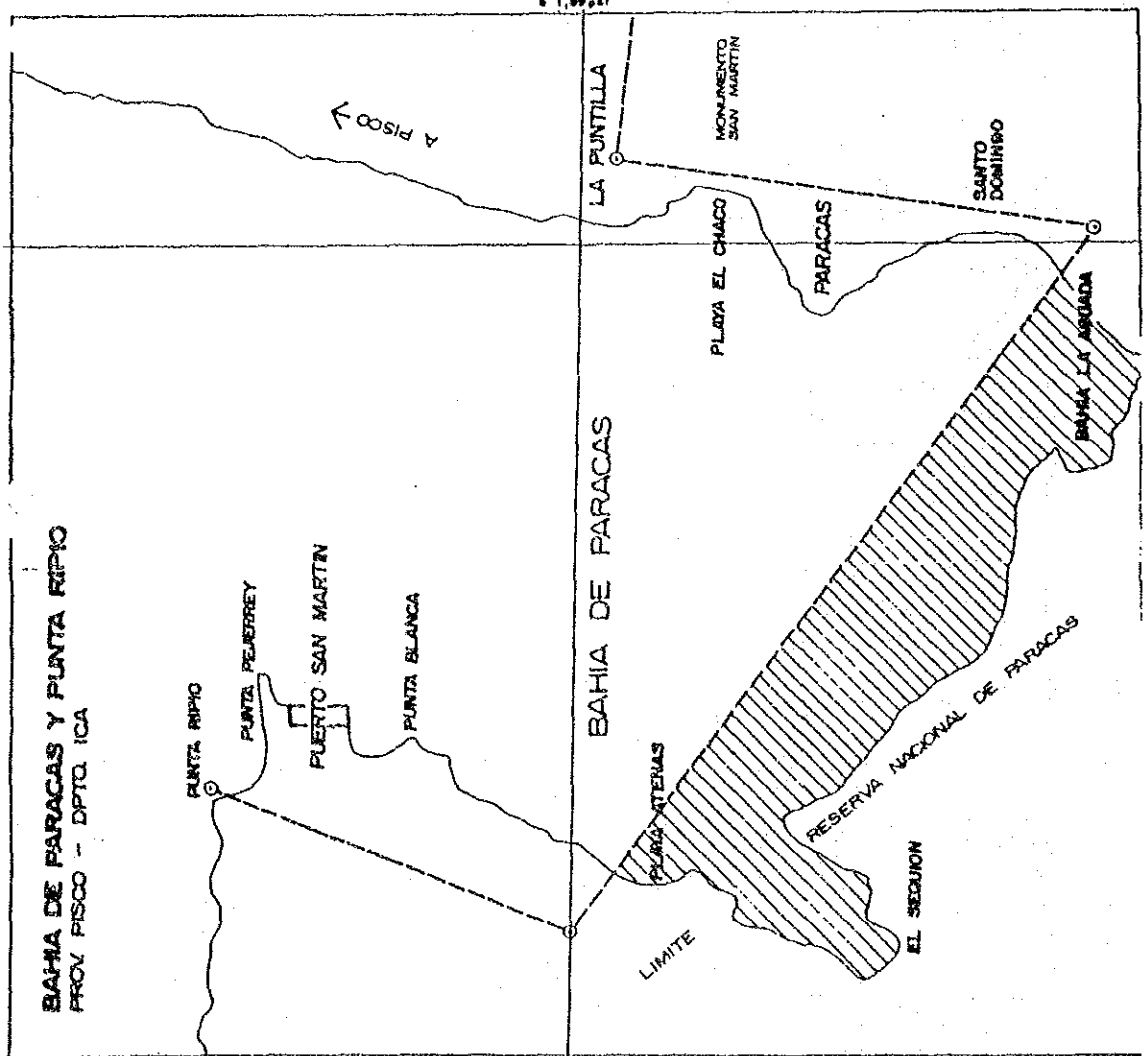
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Castro
Chile

(5) ペルー (ブラジル)、カキ・ホタテガイ養殖生産技術研修



MINISTERIO
DE
PESQUERIA

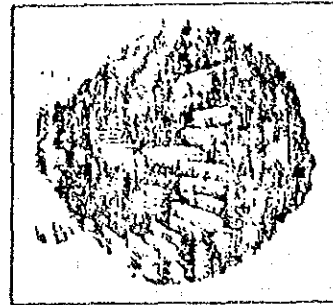


ORGANIZACION DE LAS
NACIONES UNIDAS PARA
LA AGRICULTURA Y LA
ALIMENTACION

CURSO

TECNOLOGIA DE CULTIVO DE LA
CONCHA DE ABANICO (PECTINIDAE)
Y DE LAS OSTRAS (OSTREIDAE)
EN AMBIENTE CONTROLADO (HAT-
CHERY) Y NATURAL

DEL 22 AL 27 DE FEBRERO



"CONCHA DE ABANICO"

PISCO - CALLAO (PERU)

1988

OBJETIVO:

Capacitar a investigadores y maricultores sobre las técnicas y metodología de cultivo de moluscos en ambiente controlado y natural.

METODOLOGIA:

Conferencias sobre aspectos generales de cultivo de moluscos.

Intercambio de experiencias y conocimientos entre los participantes acerca de las acciones que adoptan en todo lo relacionado con la Maricultura. Las exposiciones concluirán con prácticas de campo en las instalaciones del IMARPE, ubicadas en la Puntilla-PESCA PERU, en Pisco.

Visitas guiadas a la zona de cultivo de ambiente natural en la bahía de Paracas y a la instalación de una empresa privada de esa localidad. Asimismo inspecciones a los laboratorios del Instituto del Mar del Perú, en Chucuito, Callao.

TEMARIO:

Las conferencias del TEMARIO se realizarán en Pisco y el Callao.

EN PISCO: 22 AL 25

"Tecnología del Cultivo de Conchas de Abanico (Pectinidae) en Ambiente Natural":

- Variables críticas en el desarrollo de cultivos.
- Intervención del hombre en los ciclos de vida de los moluscos.
- Estado actual del desarrollo de los cultivos.
- Manejo de adultos: acondicionamiento, desove y manejo de gametos.

- Manejo de larvas, post larvas, pre-semilla y semilla adulta en el mar.
- Metodología de captación de post-larvas y semillas en el ambiente natural.
- Muestreo y medida de ejemplares de los bancos naturales para obtener el factor de condición (índice gonádico).
- Oceanografía para los cultivos.
- Colectores, armado y confección, - colector de pruebas y tratamiento.

EN EL CALLAO: 26 y 27

"Aspectos Generales de los Cultivos de Moluscos en Ambiente Controlado (Hatchery) :

- Estructura y funcionamiento de un sistema (Hatchery).
- Ingeniería y estructura básica de sistemas, suministro de agua, luz eléctrica, agua dulce, desagües, flujo de materiales fungibles y - otros.
- Producción de microalgas.

EXPOSITORES:

Especialista en Maricultura de la FAO:

- Dr. A. Freddi.

Expertos en Maricultura del Laboratorio de Coquimbo de la Universidad del Norte de Chile:

- Dr. Juan E. Illanes Bucher
- Lic. Eduardo Uribe Tapia
- Ing. Luis Pereira
- Dr. Luis DiSalvo.

Profesionales del Instituto del Mar - del Perú :

- Blgo. Violeta Valdivieso Milla
- Blgo. René Mayo Pérez.

PARTICIPANTES:

Intervendrán profesionales que trabajen y desarrollan actividades relacionadas con el cultivo y crianza de Concha de Abanico y otros moluscos.

Los asistentes que hayan cumplido 45 horas de dictado teórico y práctico - recibirán el Diploma correspondiente. Inscripciones del 1° al 16 de Febrero en la Dirección General de Extracción del Ministerio de Pesquería, ubicada en la Av. Paseo de la República 3103 Piso 11°, Teléfono 704118, San Isidro, Lima.

La distribución del material de trabajo se hará desde el 21 de Febrero a las 14 horas, en la Dirección Regional de Pesquería VIII, en el jirón Caillao 168, Teléfono 2009, en Pisco, Ica.

COSTO DEL CURSO:

Tres Mil Intis (I/. 3,000.00)

ORGANIZADORES:

Ministerio de Pesquería - Dirección General de Extracción
Representación de la FAO en el Perú.
Instituto del Mar del Perú (IMARPE).

ALPICIADORES:

Proyecto FAO/GCP/ELA/075/ITA - Apoyo a las Actividades Regionales de Acuicultura para América Latina.
Consejo Nacional de Ciencia y Tecnología (CONCYTEC).

COLABORADORES:

Facultad de Pesquería de la Universidad Nacional San Luis Gonzaga de Ica, con sede en Pisco.
Dirección Regional de Pesquería VIII, en Pisco.

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TECNOLOGIA DE CULTIVOS DE OSTRAS Y OSTIONES EN AMBIENTE
CONTROLADO (HATCHERY) Y AMBIENTE NATURAL

22 AL 27 FEBRERO DE 1988
PISCO - CALLAO
PERU

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 JR. CALLAO 168 - PISCO
 FONO : 2009
 PERU

BRASIL

ALUMNOS PARTICIPANTES TERCER CURSO INTERNACIONAL FAO
TECNOLOGIA DE CULTIVOS DE OSTRAS Y OSTIONES EN AMBIENTE
CONTROLADO (HATCHERY) Y AMBIENTE NATURAL

29 FEBRERO AL 14 MARZO 1988

IDILI ROCIA OLIVEIRA
INSTITUTO DE PESCA CEMERNIC
AV. PROFESSOR BERNARD SIN CEP. 11990
CANANEIA - BRASIL

NEWTON SILVA RODRIGUEZ
COORDINADOR DE ASISTENCIA TECNICA INTEGRAL
RUA LOBO VIANNA 56 SANTO
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RUTH TORTORELLA XAVIER
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ADRIANO CACCIATORI MARENZI
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KAZUKO ITO SHIBUYA
INSTITUTO DE PESCA
AV. PROF. DESNARD SIN
CAISCA POSTAL 43 11990
CANANEIA
BRASIL

(6) 第1回 FAO貝類養殖技術国際研修



ORGANIZACION DE LAS NACIONES UNIDAS
PARA LA AGRICULTURA Y LA ALIMENTACION



UNIVERSIDAD DEL MAR
SEDE COQUIMBO
CHILE

REPORT ON THE INTERNATIONAL COURSE ON OYSTER AND LARGE OYSTER
CULTURE TECHNOLOGY UNDER A CONTROLLED ENVIRONMENT (HATCHERY)
AND UNDER A NATURAL ENVIRONMENT.

Organización de las Naciones Unidas para la Agricultura y la Alimentación
Oficina Regional de la FAO para América Latina y el Caribe

Santiago, 1987

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1. INTRODUCTION

1.1. General Background.

Marine resources in many coastal areas are overexploited. Sea culture, the controlled production of plants and animals, can help correct this situation.

On the other hand, the profitable perspectives these products offer in the internal markets as well as for exportation have made the Latin American fishing industry turn to this production line as a possible activity field. In this context, ministries and universities, with the support of international agencies and countries from outside the region, are encouraging the development of this field, directing research, and qualifying a competent staff.

A course of this kind intended for researchers and industrialists interested in promoting and carrying out fish farming operations in their own countries was obvious since the course would encourage sharing and gaining knowledge on the hatchery of mollusks as well as it would allow the analysis of problems on a common basis. Besides, the fact that in South America there was already a center specialized on research, production and hatchery of sea mollusks tended to facilitate this purpose and provide the proper scientific level to the course.

Thus, an International Course on the Culture Technology of Oysters and Large Oysters under Controlled Environments (hatchery) and Natural Environments was given in Coquimbo, Chile, from the 11th to the 29th of August August, 1986. This paper reports on the organization and results of the course which are of special importance for the development of fish farms in Latin America.

1.2. Objectives of the Course.

The main objective of this course was the qualification of the participants on key areas of research, technical assistance and marine culture technology, taking advantage of the knowledge and experience on ostreidae and pectenidae

reached in this country. This way, the participants would be able to organize, design, and carry out cultures of these species in their own countries.

Basically, the working objectives were the following:

- to give the participants theoretical and practical information on the production of young oysters and their handling and planting in the sea, culture systems used, maintenance and expected yields, and the study of economical feasibility.
- To produce among the participants the proper mood to share knowledge and experiences in marine cultures and to analyze common problems concerning this activity in their countries.

1.3. Course Organization and Development.

1.3.1. Management and Financing.

This course was organized by the FAO Regional Agency for Latin America and the Caribbean region, and the Division of Research, Extension, and Technical Assistance of Universidad del Norte at Coquimbo.

The course was given at the Coastal Center of Aquaculture and Marine Research under the responsibility of the Department of Aquaculture, Universidad del Norte. This Department was in charge of preparing the course curriculum (including the theoretical aspects as well as laboratory practice and field work), the basic material and the required bibliography. Besides, the Department provided the equipment, laboratories and offices, and the staff of researchers and technicians.

1.3.2. Applications and Selection of Participants.

Five months before the beginning of the course, 150 invitations were sent to industries, government agencies, and universities of Latin America giving information on the course: date, place, sponsorship, and application procedures. Later on, a second letter was sent giving information on programs of study, subjects, and instructors as well as lodging and boarding facilities.

A total of 80 applications were received. 45 of them came from various Latin American countries and the rest, from Chilean institutions. The selection of applicants was jointly made by the Coordinators from FAO and those from Universidad del Norte, based on the information provided by each applicant on his/her professional experience and activities at the

time of application. 22 applicants were selected. 17 of them came from abroad and 9 foreign applicants were granted scholarships from FAO; 5 received financial support from other institutions, 3 came under their own financial support, and 5 Chilean professionals got scholarships granted by the Universidad del Norte.

1.3.3. Directory and Participants.

The Course Directory includes the list of Visiting professors and the rest of the professors and instructors of the course. (See Appendix 1)

The complete list of participants is found in Appendix 2.

Among the group of participants, there were professionals who hold university degrees or equivalent, carrying out both research and teaching activities (5), Heads and officials of government agencies related to fishing and aquaculture (9), and industrialists or officials of fisheries or marine culture plants (8).

2. RESULTS

2.1. Opening and Closing of the Course.

There were two main meetings during the course: The inaugural meeting was held at the Auditorium of the Coastal Center of Aquaculture on August 11th, 1986, at 10:00 a.m. Among those people who attended the meeting were Mr. Constantino Tapia, as a representative of FAO, Mr. Andrés Hoyl, Vice-President of Universidad del Norte at Coquimbo and other university and local authorities.

Mr. R. Salamé, Assistant Secretary of the Bureau of Education in Chile, Mr. Mario E. Jalil, Assistant Director FAO Regional Representative for Latin America and the Caribbean Region, Mr. I. Vladilo, Academic Vice-President, and Andrés Hoyl, Vice-President of Universidad del Norte at Coquimbo attended the closing meeting. Mr. René Mayo, as a representative of the participants, delivered a speech to thank FAO and the Universidad del Norte for the opportunity of having participated in the course.

After the closing speeches, the participants received their certificates.

The closing speeches delivered by Mr. Vladilo and Mr. Jálil can be found in Appendix 3.

2.2. Development of the Program.

The course program, which can be found in Appendix 4, was developed through lectures on different topics, debates, laboratory exercises, exercises at sea, and tours to hatchery centers at a business level.

The topics discussed were:

- Aquaculture at world level, the state of the art and future perspectives in Latin America.
- Basic Biology and Ecology, fertilization, life cycles, feeding, growing, genetic improvement, and communal impact.
- Production and handling of the young in hatchery, catching of the young at sea, and mass production of microalgae for feeding.
- Planting of the young at sea, systems and proper practice, maintenance, preharvesting and harvesting of adults.
- Mass cultures: designing and evaluation of projects, yields and income, handling and analysis of information, and models of production.
- Microalgae: means of culturing, recount, inoculation, and mass production. Larval production: handling of gametes, fertilization, metamorphosis, selection. Postlarvae: density, feeding, re-exchange, and substratum. Youngs: planting at sea, systems, maintenance, preharvesting and harvesting.
- Systems of catching the youngs, systems of planting, larval monitoring, long-line designing and installation, handling of Pearl Nets and lanterns.

During this course, the participants worked on their own research and developmental projects. They are listed in Appendix 5..

3. CONCLUSIONS AND RECOMMENDATIONS.

3.1. Conclusions.

The course provided the participants with a theoretical and practical knowledge on the technology of hatching ostreidae and pectenidae, qualifying them in the production of the young

in a controlled environment (hatchery) and the planting and handling of adults in the sea.

The Center of Aquaculture at Coquimbo and the facilities of the Department of Aquaculture were quite appropriate for the course, particularly the laboratory facilities and their equipment as well as field materials. This center was recently opened and has a technology of production and culturing of species similar to those used in sophisticated centers in Japan. In this regard, the participants considered the construction of similar centers in their own countries as being premature and agreed with the instructors in giving greater emphasis to the utilization of simpler but as effective systems to satisfy some needs.

Working in groups, with people assigned to each group according to their affinity by country of origin, proved to be a good way to let the instructors get a closer relationship with the participants, supervise their papers and explore deeper into the topics of greater interest in each group.

3.2. Course Evaluation.

Course Evaluation took place in an end-of-course meeting by means of an inquiry form that each participant had to fill out.

In a meeting with the course coordinators, some of the participants pointed out that future course should aim at a specific area. Others thought the the problem of the relationship industry-government-university is commonplace in Latin America. For them, this course was a good opportunity to look for similar points of view, considering, for instance, that in this particular case a whole culturing sequence was discussed,

On the other hand, the participants suggested that the course should be offered by this Center on a yearly basis, given the facilities and equipment available. Furthermore, they showed their interest in reaching agreements with their own agencies and in sending researchers and technicians to training periods on different subjects. Both coordinators and instructors agreed in the good quality of the projects handed in by the participants as a final requirement of the course.

In general, the answers to the questions in the inquiry form revealed that the students:

- Attended the course to acquire knowledge to be applied in their own countries. They also attended the course to exchange experiences with other specialists.
- Received enough information. The subjects taught were adequate and, at the same time, the activities performed had a close relationship with the ones required in their countries of origin.
- Pointed out that professors and instructors paid due attention to their groups and the teaching techniques were appropriate.
- Thought that the size of the course is the correct one but believed the time allotted for the course was too short in relation to some of the subjects taught (Economy, projects, computer science) and lab and field work. On the other hand, they judged the equipment used to be modern and in a few occasions comparable to the ones available in their countries.
- Had no difficulty in understanding lectures or in expressing their thought on the discussions and debates. They thought that the high-quality audiovisual material used and the sequencing of the subjects taught contributed to tj to their understanding.
- Enjoyed good comradeship and all opportunities were useful in exchanging opinions on the course and on the development of cultures in their countries.
- Thought that the administrative organization as well as lodging, boarding, and transportation facilities were quite good.

Judging by the opinions given, we can conclude that the course succeeded in reaching its objectives.

3.3. Recommendations.

According to the coordinators and participants, future courses should:

- Be addressed to people in specific areas of activity such as academicians involved in free-lance or state scientific research administration, and defining the kind of participant desired: researcher, academician, technician, administrative official, or any other type of activity.
- Enclose, along with the invitation form, a detailed program including information about subjects to be taught, a brief description of each subject, and prerequisites. Similarly, this should be done for practical field and lab work and for the equipment and materials to be used.
- Have an annotated bibliography including periodicals, newsletters, basic textbooks, manuals, etc.
- Balance the number of students with the availability of work facilities. In this course, 20 people seem to be the right number of participants.

ANEXO I

DIRECTORIO DEL CURSO

COORDINADOR GENERAL

LIC. EDUARDO URIBE TAPIA

Secretario de Investigación,
Extensión y Asistencia Técnica
Universidad del Norte
Coquimbo - Chile

COORDINADOR FAO

SR. CONSTANTINO TAPIAS

Oficial Regional de Pesca
Oficina Regional de la FAO para
América Latina y el Caribe
Casilla 10095
Santiago-Chile

PROFESORES INVITADOS

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Experto en Acuicultura
Agencia Japonesa de Cooperación
Internacional (JICA)
Universidad del Norte
Coquimbo - Chile

DR. MATIAS WOLFF

Biólogo Pesquero
Unión de Asistencia Académica
Alemana (DAAD)
Universidad del Norte
Coquimbo - Chile

ING. CARLOS CAPURRO

Economista Pesquero
Sección Económica
Embajada de Estados Unidos
Santiago - Chile

PROFESORES

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Coquimbo - Chile

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Investigador, Depto. de
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Universidad del Norte
Coquimbo - Chile

BIOL. ELLAS ALARCON

Investigador, Depto. de
Acuicultura
Universidad del Norte
Coquimbo - Chile

ING. GUILLERMO MARTINEZ

Investigador, Depto. de
Acuicultura
Universidad del Norte
Coquimbo - Chile

ING. LUIS A. CAROVAS P.

Investigador, Depto. de
Acuicultura
Universidad del Norte
Coquimbo - Chile

ING. LUIS PEREIRA CH.

Investigador, Depto. de
Acuicultura
Universidad del Norte
Coquimbo - Chile

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Investigador, Depto. de
Acuicultura
Universidad del Norte
Coquimbo - Chile

ING. ALFONSO URDINA O.

Investigador, Depto. de
Acuicultura
Universidad del Norte
Coquimbo - Chile

ING. MIGUEL RIVERA

Investigador, Depto. de
Acuicultura
Universidad del Norte
Coquimbo - Chile

LIC. ENRIQUE DUMPRE

Investigador, Depto. de Biología
Marina
Universidad del Norte
Coquimbo - Chile

LIC. ELIZABETH VON BRAND

Investigadora, Depto. de Biología
Marina
Universidad del Norte
Coquimbo - Chile

INSTRUCTORES

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SR. HUGO TEJADA

Técnico, Depto. de Acuicultura
Universidad del Norte
Coquimbo - Chile

SR. EDWIN MARTINEZ B.

Técnico, Depto. de Acuicultura
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Coquimbo - Chile

SR. CARLOS SOLAR

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Universidad del Norte
Coquimbo - Chile

SR. BERNARDO CARVAJAL

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SR. PATRICIO GONZALEZ

Técnico, Depto. de Acuicultura
Universidad del Norte
Coquimbo - Chile

SR. PABLO CESTEDES

Técnico, Depto. de Acuicultura
Universidad del Norte
Coquimbo - Chile

SR. BORIS GARCIA

Técnico, Depto. de Acuicultura
Universidad del Norte
Coquimbo - Chile

SECRETARIAS PERMANENTES

SRA. MARIA E. DIAZ

Relaciones Públicas

SRA. ENCILIA VEDA

Secretaría

SRA. MARIA A. ALFARO

Secretaría

SRIA. YOLANDA URIBE Z.

Secretaría

ANEXO 2

LISTA DE PARTICIPANTES

CLADYS DEL PILAR ANIADI REYMUÑO
ASISTENTE DE PRODUCCION
COMPAÑIA PRODUCTORA DE ALIMENTOS
AV. MANCO CAPAC 1524
LIMA-PERU

LEONARDO JUAN ARAYA ESTAYORIN
JEFE DE CULTIVO AGUA DULCE Y DESARROLLO
PESQUERA MARES AUSTRALES LTDA.
LOTA 187
PUERTO MONIT-CHILE

JUAN CONSTANCIO BARRILES SAMUELA
INSTITUTO INVESTIGACIONES OCEANOLOGICAS
UNIVERSIDAD DE ANTOFAGASTA
AVENIDA COLOSO S/N
ANTOFAGASTA - CHILE

CARLOS ALBERTO ROBBIO GARCIA
GERENTE DE PRODUCCION
LIMPIA MAR S.A.
AV. NICOLAS ARRIGOLA 290 OF. 306
LIMA-PERU

GUSTAVO W. CALVO DAINSKO
INSTITUTO NACIONAL DE PESCA (INAPPE)
MONTEVIDEO - URUGUAY

ITALO CESAR CAMUÑONICO GARCIA
PROFESOR ASOCIADO
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CASILLA 113-D
PUNTA ARENAS - CHILE

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SOCIEDAD PESQUERA GUANAYE LTDA.
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REJILLONES - CHILE

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JEFE SECCION PESCA Y FAUNA
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SOCIEDAD PESQUERA COLOSO S.A.
PLAYA BLANCA S/N
COQUIMBO - CHILE

HARTEL EDUARDO NIÑO GONZALEZ
ENCARGADO PROYECTO CULTIVO OSTION TONCOY
SERVICIO NACIONAL DE PESCA
ANIBAL PINTO 1130
COQUIMBO - CHILE

SEBASTIÃO COSTA
PESQUEADOR CIENTIFICO
INSTITUTO DE PESCA
AV. FRANCISCO MANTANAZZO, 455
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OLGA ELENA VASQUEZ CARRERA
MINISTERIO DE DESARROLLO AGROPECUARIO (MIDA/DINAG)
APARTADO 5390, ZONA 5
PANAMA - PANAMA

EDISON VEWJANA HAJHEIRO
PESQUEADOR ASISTENTE
INSTITUTO DE ESTUDIOS DO MAR
ALMEIDA, PAULO HONELMA-JEAPH
RUA KIOTO 256, ANAIAI DO CABO
RIO DE JANEIRO - BRASIL

OSCAR CHAPARRO TORRES
CENTRO DE INVESTIGACIONES MARINAS
UNIVERSIDAD AUSTRAL DE CHILE
CASILLA 567, FON: 3911 ANEXO 455
VALDIVIA - CHILE

SILVIO NICOLAS ESPINOZA PERDUEZA
DIRECTOR GERENTE
PUNTA BLANCA S.A.
SANTA ISABEL N° 390
LIMA 21 - PERU

RICARDO FRANCISCO GONZALEZ LORENCEO
CENTRO DE DESARROLLO DE ACUICULTURA MARINA "CENDAMAR"
UNIVERSIDAD CATOLICA, SEDE TALCAHUANO
PRAT 88
TALCAHUANO - CHILE

GERARDO LOUIS WILDER ROQUEVEZ
UNIVERSIDAD SIMON BOLIVAR
SANTOESPAS, BARUTA
EDO. MIRANDA
VENEZUELA

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BIOLOGA
UNIVERSIDAD ESTATAL
AVDA. QUITO
GUAYACIL - ECUADOR

RENE MAYO PEREZ
ASESOR DE ACUICULTURA
INSTITUTO DEL MAR (IMARPE)
BOLOMESTI 125 MIRAFLORES
LIMA - PERU

COURSE PROGRAM

Monday, August 11

ACTIVITIES:

- Registration and teaching material delivery
- International Course Inaugural Meeting
- Welcoming speech by Mr. Andrés Bloy Sotomayor, Vice-President Universidad del Norte at Coquimbó.
- Beginning of the Sessions: Aquaculture: World Significance, present and future. Lecturer: Mr. Constantino Tapias; FAO/IMAC
- Introduction to the Course. Lecturer: Mr. Eduardo Uribe, General Coordinator.
- History of the Development of Sea Cultures in Coquimbó. Lecturer: Mr. Elías Alarcón
- Introducing the participants.

Tuesday, August 12

ACTIVITIES:

- Oyster and Large Oyster Life Cycles. Lecturer: Dr. Louis Di Salvo
- World mollusk Culture. Lecturer: Dr. Juan E. Illanes.
- Hatchery and Mass Culture Development. Debate with the participation of the students. Lecturers: Dr. Juan E. Illanes, Dr. Shizuo Akaboshi and Dr. Louis Di Salvo.
- Beginning of lab and field practice. Lecturer: Mr. Hugo Tejada
- Work Group Formation: microalgae, larvae, preseeding, culture technology. Lecturers: Mr. Carlos Solar, Mr. Edwin Martínez, Mr. Bernardo Carvajal, Mr. Pablo Caspades, Mr. Donis García, and Mr. Patricio González.

Wednesday, August 13

ACTIVITIES:

- Practical Variables in the Development of Cultures. Lecturer: Dr. Louis Di Salvo
- Comparative Structures in Hatchery systems. Lecturer: Dr. Juan E. Illanes.
- Structures and function of Culture Systems: Perspectives. Debate with participants. Lecturer: Guillermo Martínez, Juan E. Illanes, Shizuo Akaboshi, Dr. Louis Di Salvo and Luis Pereira.

- Lab and Field Practice. Team of Instructors.

Thursday, August 14

ACTIVITIES:

- Microalga Species and Means of Culture. Lecturer: Eduardo Uribe
- Microalga Culture Technology. Lecturer: Eduardo Uribe
- Microalga Culture Technology. Lecturers: Eduardo Uribe and Luis Pereira
- Microalga Culture. Debate with participants. Lecturers: Eduardo Uribe and Luis Pereira.
- Lab and Field Practice.

Friday, August 15

ACTIVITIES:

- Examination. Designing of Culture Projects by the Participants.

Saturday, August 16

ACTIVITIES:

- Field Work. Tour to Culture Centers in Tongoy and Guanaqueros. Lecturers: Guillermo Martínez and Juan C. Maureira.

Sunday, August 18

ACTIVITIES:

- Genetics of Culture Species. Lecturer: Elizabeth Von Brandt.
- Histology. Lecturer: Dr. Juan E. Illanes and Enrique Dupré
- Handling of Breeders. Lecturer: Alfonso Urbina
- Seeding and spawning Techniques: handling of gametes. Lecturer: Dr. Louis Di Salvo
- Fertilization. Lecturer: Enrique Dupré
- Advisory Meeting: Questions and Answers on the Participants' Projects. Lecturers: Dr. Louis Di Salvo, Dr. Juan E. Illanes, Luis A. Cánovas and Guillermo Martínez.

Thursday, August 19

ACTIVITIES:

- Larvae Culture until Fixing Period. Lecturer: Dr. Louis DiSalvo
- Postlarval Handling: preseedling and seedling. Lecturer: Luis A. Cdnovas P.
- Seed Handling. Lecturer: Luis A. Cdnovas P.
- Debate with Participants. Lecturers: Luis A. Cdnovas P., Alfonso UrbinaO. and Guillermo Martínez.
- Lab and Field Practice. Team of Instructors
- Advisory Meeting: Questions and Answers on the Participants' Projects. Lecturers: Team of Advisors.

Wednesday, August 20

ACTIVITIES:

- Technology of Cultures, systems, Planting, Catching, Rec-change, Preceding, Seeding, Growing and Fattening. Lecturers: Dr. Shizuo Akaboshi, Luis Perera, and Luis A. Cdnovas.
- Coastal Oceanography. Extra Lecturer: Eduardo Uribe
- Advisory Meeting: Questions and Answers on the Participants' Projects. Lecturers: Team of Advisors.

Thursday, August 21

ACTIVITIES:

- Diseases: Diagnosis and Control. Lecturer: Dr. Louis DiSalvo
- Depreciation and biological incrustations: effects and Control. Lecturers: Dr. Louis DiSalvo, Dr. Shizuo Akaboshi, and Luis A. Cdnovas
- Lab and Field Practice. Lecturers: Team of Instructors.
- Advisory Meeting. Team of Advisors.

Friday, August 22

ACTIVITIES:

- Ecological Considerations. Lecturers: Dr. Matías Wolff and Dr. Louis DiSalvo
- Culture Biology and Technology. Lecturers: Dr. Louis DiSalvo, Dr. Juan E. Illanes, Debate with Participants. Lecturer: Dr. Shizuo Akaboshi

- Examination. Unit on Biology and Technology
- Lab and Field Practices. Team of Instructors.
- Advisory Meeting. Team of Advisors.

Saturday, August 23

ACTIVITIES:

- Field Work. Sailing on a scientific boat and observation of work in commercial culture fields. Narrators: Juan C. Neufreia and Alfonso Urbina.

Sunday, August 24

ACTIVITIES:

- Fishing Economy. Economical Decisions. Computer science workshop. Lecturer: Dr. Carlos Capurro.

Monday, August 25

ACTIVITIES:

- Evaluation of Investment Projects. Lecturer: Dr. Carlos Capurro.
- Computer Science Workshop. Economical Models. Lecturer: Dr. Carlos Capurro

Tuesday, August 26

ACTIVITIES:

- Materials Corrosion and Durability. Lecturer: Luis A. Cdnovas
- Debate with participants.
- Data Handling. Biological and Technological Production Models. Computer Science Workshop. Lecturers: Elías Alarcón and Miguel Rivera.

Wednesday, August 27

ACTIVITIES:

- Lab and Field Work. Team of Instructors
- Evaluation of Practical Work. Evaluator: Dr. Louis DiSalvo.

- Debate with the Participants. Moderators: Luis A. Cánovas Luis-Pereira and Alfonso Urbina.

Thursday, August 28

ACTIVITIES:

- Handing in of participants' projects.

Friday, August 29

ACTIVITIES:

- Closing Meeting of International Course and Delivery of Certificates.

PROJECTS SUBMITTED

- Installation of a Pecten Purpuratus farm in the area of Huacho, Perú. Gladys Artadi
- Experimental Introduction of Crassostrea gigas in Uruguay. Gustavo Galvo.
- Growing of Chlamys ziczichlamys patagonica in discontinued cultures and Study of Seed Catching for resettling. Italo Campodónico
- Catching of oyster larvae (Crassostrea rhizophorae at Mallorquín Bay Colombia. Stella Quesada.
- Seed Production of Ostrea chilensis at the laboratory to provide fishermen starting activity in the field with seeds. Oscar Chaparro.
- Pecten zigzag culture potential evaluation in the Cariaco Gulf, Venezuela. Louis G. Holder
- Experimental culture of Mytilus edulis platensis in San Matías Gulf, Argentina. Mario Lasta y E. Zampatti.
- Study of Conatic Cycle in Crassostrea columbiensis. María V. Loo.
- Experimental Hatchery of Argopecten purpuratus in Perú. René Mayo
- Evaluation of Natural Banks of Argopecten circularis in Panama y feasibility study of cultures in a natural environment. Vielka Morales
- An Experience in the Production of Chlamys purpurata seeds through a combined technique of catching in a natural environment and temporal maintenance in a semicontrolled environment. Manuel E. Miño
- Ly ropekten nodosus culture feasibility in the Northern seashore of the state of Sao Paulo, Brazil. Sergio Ostini.
- Study of Crassostrea rhizophorae culture potential in a laboratory using techniques applied to Crassostrea gigas. Olga E. Vásquez
- Mexillores culture basic technology transfer to fishermen in the area of Arraial do Cabo, Rio de Janeiro, Brazil. Edison Vergara

RESUMEN DE POSTULANTES

PRIMER CURSO INTERNACIONAL

AGOSTO 1986

POSTULANTES CURSO FAO 1986.

VENEZUELA	:	4
COLOMBIA	:	2
MEXICO	:	1
BRASIL	:	3
ARGENTINA	:	15
ECUADOR	:	4
PERU	:	2
CHILE	:	21
TOTAL POSTULANTES	:	52

1. German Orlando Robaina Gómez
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Universidad de Oriente Venezuela
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Venezuela
2. Dolores Marante González
Universidad de Oriente Núcleo de Nueva Esparta
Apartado 147 Porlamar - Isla Margarita
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3. Luis León Salazar
Universidad de Oriente Núcleo de Nueva Esparta
Venezuela
4. Luis Ernesto Trocoli G.
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5. Aquiles cesar González Salazar
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6. Henando José Quiros F.
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México
8. José Jarbas Studart Gurgel
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9. Naoyo Yamanaka
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14. Teddy Griffiths
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15. Angel Alfredo Gennarelli
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16. Marcelo Fabian Alonso
Universidad nacional del Comahue
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17. Luis Dellin Compagnucci
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18. Andrés Martínez
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19. Gustavo Wicki
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20. Tironi Mariano Javier
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21. Edgardo Omar Wiltchinsky
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22. Brun Alejandro Marín
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Argentina
24. Mario Oscar Perroni
Universidad Nacional del Comahue
P. Moreno 514- 5 F
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(7) 第2回 F A O貝類養殖技術国際研修



ORGANIZACION DE LAS NACIONES UNIDAS
PARA LA AGRICULTURA Y LA ALIMENTACION



UNIVERSIDAD DEL NORTE
SEDE COQUIMBO
CHILE

2° INTERNATIONAL COURSE OF MOLLUSCAN CULTURE

Coquimbo, Chile, 17 al 29 de agosto, 1987

Organización de las Naciones Unidas para la Agricultura y la Alimentación
Oficina Regional para América Latina y el Caribe

Santiago, 1987

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INTERNATIONAL COURSE OF MOLLUSCAN CULTURE

INTRODUCTION

1.1. General Background

Sea resources on many coastal areas are overexploited. Sea culture, the controlled production of plants and animals, can help us correct this situation.

On the other hand, the profitable perspectives that these products offer in the internal markets as well as for export have made the Latin American fishing industry turn to this production line as possible activity field. In this context, ministries and universities, with the support of international organizations and countries from outside the region, are encouraging the development of this field, directing research, and qualifying a competent staff.

Qualification directed to researchers and industrialist interested in promoting and carrying out sea culture activities in their own countries was obvious since this would be the best way of obtaining and sharing knowledge on hatchery of mollusks and analyzing the field on a common basis.

Furthermore, the fact that in South America there is already a center which specializes on research, production and hatchery of sea mollusks tended to facilitate this purpose and provide a proper scientific level.

This Second Course was organized based on the experience obtained from the First International Course on Technology of Hatchery of Oysters and Large Oysters in a Controlled environment and in a Natural One which took place in August 1986. The second Course took place from the 17th to the 29th of August 1987 in the coastal Center of Aquaculture, Universidad del Norte, Coquimbo, Chile.

This paper reports on the organization and results of the course which are of special importance for the development of aquaculture in Latin America.

1.2. Objectives of the Course

The main objective of this course was the qualification of the participants on key areas of investigation, technical assistance and sea culture technology, taking advantage of the knowledge and experience on ostreidae and pectinidae existing in Chile. This way, the participants would be able to organize, design, and carry out cultures of these species in their own countries.

In brief, the working objectives were the following :

- To give the participants theoretical and practical information on the production of young ostreidae and pectinidae, their handling and planting in the sea, culture systems used, maintenance and expected yield, and analysis of economical feasibility.
- To produce among the participants the proper mood to share knowledge and experiences in sea culture and to analyze common problems concerning this activity in their countries.

1.3. Course Organization and Development.

1.3.1. Management and Financing.

This course was organized by the Regional Office of FAO for Latin American and the Caribbean region, and the Division of Research, Extension and Technical Assistance of Universidad del Norte at Coquimbo.

The course was given at the Coastal Center of Aquaculture and Sea Research under the responsibility of the Department of Aquaculture, Universidad del Norte. This Department was in charge of preparing the course curriculum (including the theoretical aspects as well as laboratory practice and field work), the basic material and the required bibliography. Beside, the Department provided the equipment,

laboratories and offices, and the staff of researchers and technicians.

1.3.2. Applications and selection of participants.

Five months before the beginning of the course, 250 invitations were sent to industries, government agencies, and universities in Latin American giving information on the course and application procedures. Later was sent giving news on programs, subjects and instructors as well as lodging and boarding arrangements.

A total of 55 applications were received. 40 of them came from different Latin American countries and the rest, from Chilean institutions. The selection of applicants was jointly made by the FAO coordinators and those from the Universidad del Norte, based on the information provided by each applicant on his/her professional experience and his/her own activities at the time of application. 13 applications were selected. The course program and the list of participants can be found in appendices 1 and 2. The list of instructors and other administrative and teaching staff can be found in Appendix 3.

2. RESULTS

2.1. Opening and Closing of the Course.

There were two main meetings during the course: the opening meeting on the seventeenth of August, 1987, was held at the Auditorium of the Coastal Center of Aquaculture at 10:00 a.m. The opening speech was given by the Vice-President of Universidad del Norte at Coquimbo, Mr. Andrés Hoyl Sotomayor. The audience included university and regional authorities and the course participants. The speech transcript can be found in Appendix 4.

The closing meeting was presided by Government Administrator of the IV Region, Mr. Hernán Reyes Santelices. The Vice-president of Universidad del Norte at Coquimbo, Mr. Andrés Hoyl Sotomayor and Mr. Constantino Tapia, Regional Fishing Official, and Mr. Luigi Loria, Director of the FAO-ITALIA Regional Project for the support of aquaculture activities as representatives of FAO were among those present. Mr. Hernando Quiroz, as a representative of the participants, delivered a speech to thank FAO and the Universidad del Norte for the opportunity of having participated in the course.

After the closing speeches, the participants received their certificates.

2.2. Development of the Program

The course program was developed through lectures on different topics, debates, laboratory exercises, exercises at sea, and visiting sessions to hatchery centers at business level.

The topics discussed were :

- Aquaculture at world level, the state of the art and future perspectives in Latin American.
- Basic Biology and Ecology, fertilization, life cycles, feeding, growing, genetic improvement, and communal impact.
- Production and handling of the young in hatchery, catching of the young at sea, and mass production of microalgae for feeding.
- Planting of the young at sea, systems and proper practice, maintenance, preharvest and harvest of adults.
- Mass culture: designing an evaluation of projects, yields and income, handling and analysis of information, and models of production.
- Microalgae : means of culturing, inventory, inoculation, and mass production.

- Larval production : handling of fertilization metamorphosis, selection. Postlarvae : density, feeding, reexchange and substratum. Youngs : planting at sea systems, maintenance , preharvesting and harvesting.
- Systems of catching the youngs, systems of planting, larval monitoring, long-line designing and installation, handling of pearl-nets and lanterns.
- At the end the course, the participants submitted the projects prepared (See list in Appendix 5).

3. CONCLUSIONS AND RECOMENDATIONS.

The course provided the participants with a theoretical and practical knowledge of the technology of hatching ostreidae and pectinidae, qualifying them in the production of the young under a controlled environment (hatchery) and the planting and handling of adults in the sea.

The center of Acuaquilture at Coquimbo and the facilities of the Department of Acuaquilture were the proper ones for the course, particularly the laboratory facilities and equipment as well as field materials. This Center was recently inaugurated and has a technology of production and culturing of species similar to the ones in use in modern centers in Japan. In this regard, the participants considered the construction of similar centers in their countries as being

premature and agreed with the instructors in giving greater emphasis to the utilization of less sophisticated systems but of similar effectiveness to satisfy certain demands.

Working in groups, with people assigned to each group according to their affinity by country of origin, was appropriate since it allowed the instructors a closer relationship with the participants as well as the supervizing of the papers to be delivered and a deeper exploration into topics of greater interest to each group.

3.2. Evaluation of the Course.

The Course was evaluated with the help of a inquiry form which each participant had aut anonymously. Braside, and of-course meeting was held to discuss the conclusions and recommendations.

The participants were of the opinion that the problem of the relation ship industry-government-university is common to all Latin American countries. This courses was a good opportunity for them to look for similar viewpoints considering, for instance, that in this particular case a whole culturing sequence was discussed.

On the other hand, the participants made explicit that the course should be offered each year throught this center, considering the facilities and available. Furthermore, they pointed out to their interest in reaching agreements with

their own organizations and sending researchers and technicians to training periods on different subjects. Coordinators and instructors agreed in the good quality of the projects handed in by the participants as a final requirement of the course.

In general, the answers to the questions in the inquiry form revealed that the students:

- Attended the course to acquire knowledge to be applied in their own countries. They also attended the course to exchange experiences with other specialists.
- Received enough information. The subjects taught were adequate and, at the same time, the activities performed had a close relationship with the ones required in their countries to support the development of sea culture.
- Pointed out that professors and instructors gave due attention to their groups and the techniques of teaching were appropriate.
- Thought that the size of the course is the correct one but believe the time allotted for the course was too short in relation to some of the subjects taught (Economy, projects, computer science) and lab and field work. On their hand, they judged the equipment used to be modern and in a few occasions comparable to the ones available in their countries.

- Didn't have any difficulties in understanding classes or in putting through their thought in discussions and debates. They understood that the high-quality audiovisual material used and the sequencing of the subjects taught contributed to their understanding.
- Enjoyed good comradeship and all opportunities were in exchanging opinions on the course and on the development of culture in their countries.
- Thought that the administrative organization as well as lodging, boarding, and transportation facilities were quite good.
- Unanimously made it known that the course should have lasted three weeks.
- Considered adequate to keep in touch with this Center. In this their opinion that the Center should back up the development of their activities in their countries of origin.

3.3. Recommendations.

According to the Coordinators and participants, future activities should:

- Be oriented to longer stayings in the Center (1 to 3 months) in order to deepen their knowledge on specific aspects such as hatchery, catching at sea.

- Consider giving courses in selected countries. This national courses should take in to consideration the local conditions and should be able to qualify a greater number of people.
- Separate participants in groups of people with similar activities, e.g. research, development, and, at the same time, take care encouraging the exchange of opinions among the members of the groups.
- The number of participants in accordance with the availability of working facilities. In this course, 13 seemed to be a proper number of people.
- Keep a follow-up system in order to control the accomplishments made by the participants in activities where they apply the knowledge and techniques learned in the course.

COURSE SCHEDULE

Monday, August 17

- Registration
- Inaugural Meeting
Speech delivered by the Vice-president of
Universidad del norte, Mr. Andrés Hoyl
Sotomayor.
- A guided visit to the Coastal Center of
Aquaculture and Sea Research, Dr. Juan E.
Illanes Bucher.

Tuesday, August 18

- Introduction to Sea Cultures
Dr. Juan E. Illanes Bucher
- Critical Variables
Dr. Louis DiSalvo
- Laboratory Practice

Wednesday, August 19

- Microalgae
Lic. Eduardo Uribe Tapia
- Laboratory Practice
Microalgae (I Group) Carlos Solar
Larvae (II Group) Edwin Martínez
Seed (III Group) Luis A. Cánovas

Thursday, August 20

- Handling of Breeders
Ing. Alfonso Urbina
- Spawning
Dr. Louis DiSalvo
- Fertilization
Lic. Enrique Dupré M.
- Laboratory Practice
- Larvae (I Group) Edwin Martínez
- Seed (II Group) Luis A. Cánovas
- Microalgae (III Group) Carlos Solar

Friday, August 21

- Cultures of Larvae
Dr. Louis DiSalvo
- Preseeding
Ing. Alfonso Urbina O.
- Seed
Ing. Luis A. Cánovas
- Laboratory Practice
- Seed (I Group) Luis A. Cánovas
- Larvae (II Group) Edwin Martínez
- Microalgae (III Group) Carlos Solar

Saturday, August 22

- Culture Technology
Dr. Juan E. Illanes B.- Dr. Shizuo Akaboshi
Ing. Alfonso Urbina- Ing. Luis A. Cánovas
Ing. Luis Pereira

Sunday, August 23

- Visiting Tour (B/I "Stella Maris II) Tongoy and Guanaqueros Bays.

Monday, August 24

- Genetic Improvement
- Lic. Elizabeth Von Brand
- Contamination and Diseases
- Dr. Louis DiSalvo
- Roundtable-Hatchery
- Lic. Elias Alarcón (moderator)

Tuesday, August 25

- Ecology
- Dr. Matthias Wolff
- Oceanography
- Lic. Eduardo Uribe Tapia
- Round Table-The Sea
- Lic. Elias Alarcón (Moderator)

Wednesday, August 26

- Economy and Projects
- Mr. Carlos Capurro

Thursday, August 27

- Data Handling
- Lic. Elias Alarcón
- Ing. Miguel Rivera
- Computer Practice
- Ing. Miguel Rivera
- Revision of Projects

Friday, August 28

- Presentation and discussion of projects
- Closing Meeting and delivery of certificates

ANEXO 2

LISTA DE PARTICIPANTES

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Maria Eliana Díaz de Orrego, Relacionadora Pública.

Marcela Andueza Badia, Secretaria
Maria Angelica Alfaro Duran, Secretaria

PROJECT PROPOSALS

- Experimental Culture of *Crassostrea columbiensis* in a closed system.
Azucena del Rocio Naranjo Sanchez
Ecuador
- Experimental Culture of *Crassostrea gigas* starting from the pedi-veliger larva in a natural environment.
Gloria Jovita Butierrez
Peru
- Experimental Culture of *Argopecten purpuratus* under a controlled environment, until reaching the stage of the one-eyed larva.
Gladys Chavez
Peru
- Installation of a pilot plant in Pisco-Peru for the production of 500,000 large oysters 25 mm. per week.
Eduardo Seuzeville
Peru.
- Experimental Breeding of *Argopecten circularis* under a controlled Environment.
Virginia Quiróz R.
Panamá
- Attainment of *Crassostrea rhizophorae* at an experimental level.
Luis Troccoli.
Venezuela
- Larval Cultures of *Ostrea puelchana* at an experimental level: dietary samples, density of larvae per ml and settlement over articulated substratum.
Eduardo Zampatti.
Argentina
- Development possibilities of *Crassostrea rhizophorae* at Disputa Bay. Department of Cordoba.
Hernando Quiróz
Colombia
- Experimental Culture of *Lyropecten nodosus* and *Pecten ziczic* under natural conditions along the northern Seashore of the state of Sao Paulo.
Orlando Martins Pereira
Brasil
- Determination of species with best growing conditions in the Tenth Region; Patagonian Chlamys (*Zygoclamys*) and *Chlamys purpurata* (*Argopecten*).
Juan C. Hernández.
Chile
- Culturing of Large Oysters at the Pacific Mining Company Seaport in the Guayacán Bay, Marcelo Bachelet
Chile.

LARVAL HANDLING METHODOLOGY

Dr. Louis DiSalvo
Departamento de Acuicultura
Universidad del Norte

(Sperm density is measured by routine hemacytometer count).

Determination of percent fertilization :

- Place 5 ml egg suspension in sedimentation chamber
- Observe in inverted microscope, and count number fertilized eggs of aminim total of 100 eggs.
- Calculate percentage fertilization
- Over 80% fertilization is acceptable minium: if less than 80% fertilization, discard all eggs.

Management of fertilized eggs : (Zygotes)

- Using density determination methods (above) adjust final tank density to 40-50 eggs per ml
- Maintain water temp. at 20 C for 24 h.
- Use slow rate of aeration in water

Determination of sperm motility :

- Observe sperm in microscope at high/dry magnification under cover slip
- Sperm must show highly active side to side motion

Fertilization procedure :

- Place eggs in 10 lt seawater (1 filtered and UV) at temp. 20 C.
- Add 6-10 sperms per egg, by dilution, and verify numerical ratio in inverted microscope
- Agitate periodically for 10 min.
- Allow sedimentation for 20 min.
- Discard 75% of supernatant (containing light eggs)
- Replace 8 lts with treated seawater and observe development.

INITIAL HANDLING OF GAMETES.

Determination of egg size :

- Uniformly suspend eggs
- Obtain 10 ml egg suspension
- Place in sedimentation chamber for 10 min.
- Observe sample in inverted microscope
- Measure and determine mean value of with ocular micrometer. (minimum 20 of eggs)

Determination of egg density

- Uniformly suspend eggs in 10 lt seawater
- Sample 1 ml egg suspension
- Place in sedimentation chamber
- Fix with Lugol's Iodine and wait until sedimentation is complete
- Count the total number of eggs in the sample using inverted microscope
- Repeat counting procedure total of 3 times and obtain mean value. (If values do not within 10%, repeat procedure)

LARVAL MANAGEMENT

DR. LOUIS H. DISALVO
Departamento Acuacultura
Universidad del Norte

Observation of embryonic stages :

- Agitate developing eggs and place 10 ml in counting chamber.
- Observe progress of development using the inverted microscope.

Quantitative determination of larval development :

- Obtain 10 ml. from water column and fix with a few drops Lugol's Iodine soln.
- Observe in inverted microscope in sedimentation chamber, counting various stages of development per minimum of 100 specimens (blastula, trocophora, D Larva)
- Calculate percentage of each stage in sample

PHYSICAL MANAGEMENT, DILUTION AND CLEANING

- Capture larvae on calibrated nylon screen according to size (see numbers in Class Notes).
- Discard bottom material from tank
- Wash larvae for observation and measurement (see above)
- Obtain sample for density measure (see above)
- Wash larvae with treated water, and return to new water.

PRACRICAL GUIDE : SEED PRODUCTION

Ing. Luis A. Cánovas P.
Departamento de Acuacultura
Universidad del Norte

1. Nursery Infrastructure

- a) Support system
 - water
 - light
 - electricity
- b) Installations
 - Dockside hanging cultures
 - Raft cultures
 - Long-line cultures
 - Seed refinement
 - Adult refinement

2. Production methods for early seed of Chilean

- scallop (*A. purpuratus*)
 - a) Nursery management
 - b) Culture systems
 - c) Seed handling
 - d) Fouling control
 - e) Predator control
 - f) Packing
 - g) Sales
 - h) Transport to culture area

CULTURE TECHNOLOGY : FIELD

3. Methods for production of Pacific Oyster

(Crassostrea gigas).

- a) Nursery handling
- b) Culture systems
- c) Seeding
- d) Fouling control
- e) Predator control
- f) Seed refinement
- h) Packing
- i) Sales
- j) Transport to culture area.

Ing. Luis A. Cánovas P.
Ing. Luis Pereira Ch.

1. Assembly of log-line

2. Installation of long-line

PRACTICAL GUIDE MICROALGAE

Lic. Eduardo Uribe Tapia
Departamento de Acuacultura
Universidad del Norte

5. Measurement of microalgal growth
 - Use of hemacytometer
 - Initial culture count
 - Final culture count
6. Round Table Discussion.
 - Consultations concerning algae culture
 - Questions concerning algae cultures
 - Nutritional requirements
 - Inter laboratory coordination (larvae/algae/nursery)

1. Infrastructure

- Seawater system, filters, UV systems
- Compressed air network, filters and CO₂ supply.

2. Sterilization

- Wash room (demonstration on use of equipment)
- Washing, chemical sterilization, and drying
- Sterilization in autoclave

3. Culture Media

- Preparation of aged seawater
- Media preparation

4. Inoculation

- Demonstration of incubator and microalgae stock cultures
- Inoculation of stock cultures. 250 ml. in sterile hood
- Inoculation of cultures of 1.8, and 1000 lts.
- Initiation of cultures with control of light and temperature.

RESUMEN POSTULANTES
 SEGUNDO CURSO INTERNACIONAL
 17 AL 29 AGOSTO 1987

COLOMBIA	:	4
BRASIL	:	4
URUGUAY	:	1
PERU	:	6
ECUADOR	:	1
PANAMA	:	1
ARGENTINA	:	9
COSTA RICA	:	1
MEXICO	:	1
CHILE	:	7
VENEZUELA	:	4
TOTAL POSTULANTES	:	<u>39</u>

POSTULANTES 2° CURSO INTERNACIONAL
 TECNOLOGIA DE CULTIVO DE OSTRAS Y OSTIONES
 EN AMBIENTE CONTROLADO (HATCHERY) Y AMBIENTE NATURAL

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14. Silvio Espinoza
Punta Blanca S.A.
Pérez Figuerola 237. Pisco
PERU
15. Elena Icochea Barban
Universidad Nacional de Trujillo
San Martín 380- Apartado 315- Trujillo
PERU
16. Jaime Barragan
Instituto Nacional de Pesca
Letamend 102 y la Ria - Guayaquil
ECUADOR
17. Jaqueline O' Uwyer
Dirección Nacional de Acuicultura
PANAMA
18. Andrés Martínez
Asociación Argentina de Acuicultura
Ayohuma 1178-San Carlos Bariloche
ARGENTINA
19. Carlos Bosch
Universidad Nacional del Comahue
Rivadavia 381- Oeste
ARGENTINA
20. Luis Bala
Centro Nacional Patagónico-CENPAT
28 Julio, Pto. Madryn
ARGENTINA
21. Jorge Revenga
Universidad del Comahue
Bariloche
ARGENTINA

22. Liliana Scioli
ARGENTINA
23. Veronica Iasparra
Ministerio de Economía Instituto Nacional de Investigaci
Almirante Brown 1588- Mar del Plata
ARGENTINA
24. José María Molina
Ministerio de Economía Servicio Obras Públicas
Provincia Chubut Abraham Mathews 1409
ARGENTINA
25. Miriam Julia Gómez
Universidad nacional de La Pampa
ARGENTINA
26. Gabriel Bambill
Instituto Nacional de Investigaciones y Desarrollo
Pesquero
ARGENTINA
27. María Luis Fournier
Universidad de Costa Rica
San José
COSTA RICA
28. Rangel Davalos
MEXICO
29. Lillian Espinoza Aroca
CHILE
30. Héctor Herrera Araya
Instituto de Investigaciones Oceanológicas
Universidad del Antofagasta
Camino Coloso sin
CHILE
31. Elio Segovia Mattos
Empresa Aucanor Ltda.
CHILE
32. Waldo Salas Alfaro
Bioctemar Ltda.
Urbe 961
CHILE
33. Jorge Torres Balchen
Servicio Nacional de Pesca
CHILE
34. Marko Grusic Barrios
Pesquera y Conservera Proteus S.A.
Palazuelos N° 80
CHILE
35. Manuel Avendaño Díaz
Instituto de Investigaciones Oceanológicas
Universidad de Antofagasta
Camino Coloso SIN
CHILE
36. Dolores Marante González
Universidad de Oriente- Boca de Río
Apartado 147-Portamar
VENEZUELA

37. Germán Robaina Gómez
Universidad de Oriente Boca de Río
Apartado 147-Portomar- isla Margarita
VENEZUELA

38. Luis León Salazar
Universidad de Oriente - Boca de Río
Apartado 147-Portomar-Isla Margarita
VENEZUELA

39. Domingo Díaz González
Universidad Nacional Experimental
VENEZUELA

5. チ リ の 概 要

- (1) 概 況
- (2) 経 済
- (3) 水 産 業
- (4) 第 4 州 の 漁 業

チ リ の 概 要

(1) 概 況

- ① 南米大陸南西部に位置し、国土面積は75.7万km²で南米第7位、人口は約1,200万人で南米第6位、また銅の生産では世界一の国である。
- ② 1810年9月スペインから独立、現在は73年9月のクーデターにより成立したピノチェット軍事政権が政権を担当している。同政権は、政権樹立後数年間で治安を回復し、経済の健直しにも顕著な成功を収めて国民の支持を得たが、80年代に入り世界経済の不況の影響をまともに受け、経済活動の低迷と失業の増大に見舞われたことから国民の不満が高まり、現政権の退陣と民主化の早期実現を要求する動きが活発化している。また、外交的には反共・自由主義路線を旗印としており、東側諸国とは中国及びルーマニアを除き国交を有していない。
- ③ 経済的には豊富な鉱物資源を背景に、経済発展及び経済安定のため製造業の保護育成に努力し、一時は工業製品の輸出シェアが30%台に達したが、依然として一次産品（特に銅は輸出総額の半分を占める）の国際市況に大きく左右される経済構造である。

同国経済は、70年代後半に目覚ましい回復を見せたが、80年に入ると世界的な景気の後退及びそれに伴う一次産品価格、特に銅価の低迷により輸出所得が大幅に減少し、82年には深刻な不況に陥った。その後、原油価格の下落、金利の低下、生鮮果実の輸出増加により徐々に回復傾向を示しており、中南米諸国の中では極めて堅調な推移を示している。

- ④ 我が国と同国との関係は、第二次世界大戦の一時期を除き、伝統的に良好である。また、同国には集団移住は行われたことはないが、ペルー、ボリヴィア等からの再移住等が行われ、現在約2,000名に近い日系人・在留邦人が在住している。

我が国と同国の経済関係については、貿易ではわが国が鉄鉱石、銅、食料品、木材等を輸入し、機械機器、鉄鉱製品を輸出するという相互補助関係にあり、近年では81年を除き我が国の大幅入超となっている。

また、わが国の対チリ投資は、51～86年度累計で計60件、総額1億8,200万ドルとなっている。

(2) 経 済

① 主要経済指標等

		84年	85年	増 加 率 (73~85 年 平 均)	資 料
人 口 (千 人)		11,807	11,990	1.7 %	世 銀
G N P	総 額 (百万ドル)	20,200	17,230	1.8 %	
	一 人 当 り (ドル)	1,710	1,440	0.1 %	
経 常 収 支 (百万ドル)		-2,060	-1,307	-	I M F
財 政 収 支 (十億ペソ)		-56.16	-60.73	-	
フ ァ イ ナ ン ス *	海 外	14.18	66.19	-	
	国 内	41.98	5.46	-	
消 費 者 物 価 上 昇 率 (%)		19.8	30.7	-	
D S R (%)		26.2	26.2	-	世 銀
対 外 債 務 残 高 (百万ドル)		18,045.1	18,553.2	-	
為替レート (年平均 1ペソ=USドル)		0.0101	0.0062	-	I M F
分 類 (D A C / 国連)		高中所得国 / -			
面 積		757 km ² (国連統計年鑑)			

* 純借入れのみ

(資料：外務省)

② 経済成長及び貿易

ア. 86年 GDP 5.7 % (目標5 %)

部門別

水 産 業 10.0 %

農 業 8.7

製 造 業 8.0

消費者物価上昇率 17.4 % (前年26.4 %)

支 業 率 8.4 % (過去12年間最低)

4. 貿 易

チリの主要商品別輸出入

(単位：100万ドル、%)

	84年	85年	86年	伸び率
輸出総額(FOB)	3,657	3,823	4,222	10.4
銅	1,584	1,761	1,771	0.6
生鮮果実	292	356	477	34.1
魚粉	276	279	315	12.9
セルロース	196	141	193	37.2
輸入総額(CIF)	3,481	3,007	3,157	5.0
消費財	520	341	422	23.8
中間財	2,160	1,841	1,822	△ 1.0
資本財	510	561	670	19.4
フリーズン	290	264	243	△ 8.2

(注) 通関ベース

(出所) チリ中央銀行

資料：ジェットロ

a 貿易収支 86年の貿易黒字幅は大幅な拡大をみた。

1.1億ドル(対前年比 29.6%)

b 輸 出

(イ) 農水産物 32.6%増(対前年比)

特に生鮮果実の伸びが著じるしい。

(ロ) 工業製品 26.5%

特に魚粉、魚缶詰の伸びが著じるしい。

(ハ) 対日輸出 日本の入超

食料品 48.9%増(対前年比)

魚粉(220%増)ウニ、クラゲ、ナマコ(52.3%増)

カニ(51.9%増)

その他、パルプ、木材(製材)、銀および同メッキ金属の伸長が著じるしい。

(3) 水 産 業

① 年間漁獲量(1985年)

年間総水揚げ量 4,986,840 Ton.

産業型漁業 4,515,566 Ton. (90.5%)

小規模漁業 228,112 Ton. (9.5 %)

1982年～1984年の平均

水揚げ	4,051,368 トン
産業型漁業による水揚げ	3,670,695 トン
小規模漁業による水揚げ	380,668 トン
輸入	2,505 トン
輸出	171,077 トン
食用	219,882 トン
人口	11,666,000 人
1人当り年間消費量	18.9 kg/年

② 産業型漁業分野の漁獲物組成 (1985 年)

イ フ シ (SARDINA ESPANOLA)	63.7 %	2,876,415.5 Ton.
ア ジ (JUREL)	32.2 %	1,454,012.2 Ton.
アンチョビー (ANCHOVETA)	2.6 %	117,404.7 Ton.
そ の 他	1.6 %	67,733.6 Ton.

合計 4,515,566.0 Ton.

③ 産業型漁業分野における州別漁獲高 (1985 年)

第 1 州 (60.8 %)	2,743,250 Ton.	生産順位 1
第 2 州 (10.3 %)	463,348 Ton.	3
第 3 州 (4.0 %)	181,348 Ton.	4
第 4 州 (2.1 %)	96,968 Ton.	5
第 5 州 (0.8 %)	34,520 Ton.	6
第 6 州 (0.0 %)		
第 7 州 (0.0 %)	462 Ton.	9
第 8 州 (22.0 %)	992,545 Ton.	2
第 9 州 (0.0 %)		
第 10 州 (0.0 %)	2,378 Ton.	7
第 11 州 (0.0 %)	738 Ton.	8
第 12 州 (0.0 %)		

④ 産業型漁業（1985年）

州別、魚種別、水揚げ量 合計 4,515,566トン

州	海藻	魚類	軟体類	甲殻類	その他	合計
I	131.	2,747,981.	5,379.	15.	167.	2,753,673.
II	7,115.	471,895.	3,238.	38.	12.	482,298.
III	20,695.	185,605.	2,081.	1,663.	26.	210,070.
IV	8,720.	100,979.	6,201.	2,821.	1,573.	120,294.
V	581.	50,401.	5,467.	3,905.	337.	60,691.
VI	1,947.	759.	1,305.	135.	197.	4,348.
VII	1,043.	2,420.	611.	69.	574.	4,717.
VIII	24,070.	1,027,233.	3,697.	5,056.	817.	1,060,873.
IX	26.	583.	278.	0.	0.	887.
X	116,598.	14,794.	53,884.	1,345.	30,604.	217,225.
XI	1,111.	1,351.	2,284.	415.	87.	5,248.
XII	373.	118.	4,671.	2,797.	65.	8,024.
首都	0.	320.	0.	0.	0.	320.
工船	0.	55,573.	6.	2,598.	0.	58,177.
合計	182,410.	4,660,012.	89,102.	20,857.	34,459.	4,986,840.

(4) 第4州の漁業

① 人口

総人口に対する州人口 4% / 約48万人

都市人口の集中化 コキンボ 30% (都市) — (地方)

② 主要産業

州のGDPに占める各産業の割合

水産業 1.5% 製造業、工業 9.3% 鉱業 17.6% 農牧業 8.8%

* 水産加工業は製造業、工業に含まれる。

③ 主たる漁獲物（1986年）第4州の総水揚げ高 156,103トン

全国の水揚げ高に占める第4州の水産物水揚げ高

総水揚げ高 2.7%

イワシ (SARDINA) 110,132 Ton. 20.3%

アンチョビー (ANCHOVETA) 6,448 Ton. 0.4%

サバ	(JUREL)	21,151 Ton.	1.8 %
高瀬貝類似	(CHOCHA)	1,372 Ton.	92.0 %
大フジツボ	(PICOROCO)	241 Ton.	23.9 %
笠貝	(LAPA)	410 Ton.	19.0 %
シオフキ	(MACHA)	655 Ton.	5.7 %
ホヤ	(PIURE)	1,553 Ton.	34.5 %
ワタリガニ	(JAIBA)	458 Ton.	11.1 %
海藻	(CHASCON)	4,753 Ton.	17.5 %

④ 小規模漁業分野における漁獲高(1986年)

16,759 トン(総生産量) / 0.3 % (全国の総生産量に対して)

第4州の小規模漁業は全国の同分野の5.8%を占め、その活動はやや低調である。

魚類の漁獲組成はイワシが53%、その他アンチョビーが7%と続く、軟体類の高瀬貝類似、笠貝、シオフキ、ホヤ、ワタリガニ等の生産はすべて小規模漁業分野に依るものであり、他州に比べこれらの生産が高い。

高瀬貝類似の(CHOCHA)は全国水揚げ量の92.0%、1,372 Ton. に達している。

⑤ 産業型漁業分野の特徴

海藻(CHASCON)の生産は4,753 Ton. は全国水揚げ量の17.5%に達し、その殆どの生産を産業型漁業によっている。北部の3州に比較しアンチョビー、イワシ、サバの漁獲量が少ない。

⑥ 水産加工(1986年)

コキンボの漁港に20社の水産物加工工場がある。

冷凍庫	13	缶詰め工場	12	冷蔵庫	3	魚粉工場	2	塩干場	2
魚油工場	1	燻製場	1						

⑦ 社会一般状況

第4州では同国の約半分に当たる金、銀、が産出される。1980年の資料によると、就労人口の40%はサービス業、商業に約20%、鉱業で約10%、農業で約10%、程度となっている。国家開発計画1985年~1987年の第4州への投資の33%が公共投資にまわされる事になっている。

6. ノルテ大学側第三国研修実施計画書

UNIVERSIDAD DEL NORTE
SEDE COQUIMBO
CHILE

INTERNATIONAL COURSE
TECHNOLOGY OF MOLLUSCAN CULTURE AND OTHER SPECIES IN
CONTROLLED (HATCHERY) AND NATURAL ENVIRONMENTS

PRESENTED TO
JAPAN INTERNATIONAL COOPERATION AGENCY

JICA
1987

1. IDENTIFICATION OF PROJECT.

1.1. Name : TECHNOLOGY OF MOLLUSCAN CULTURE
AND OTHER SPECIES IN CONTROLLED
(HATCHERY) AND NATURAL ENVIRONMENTS.

1.2. Institution : UNIVERSIDAD DEL NORTE, Sede Coquimbo
Marine Science Faculty.
Larrondo 1281 - P.O. Box 117 Coquimbo,
CHILE.

1.3. Assistant Director : Mr. ANDRES HOYL SOTOMAYOR

1.4. Executive Unit : AQUACULTURE DEPARTAMENT
Head: Dr. Juan E. Illanes

1.5. Duration : 5 years (Courses of 1 month each
year)

1.6. Possible Date : October - November

1.7. Cost of Project :

J I C A YEAR 1988	US\$	67.177
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NATIONAL COUNTERPART	US\$	120.000
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T O T A L	US\$	187.177
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2. BROAD DESCRIPTION OF PROJECT.

2.1. Antecedents.

The development of Aquaculture has had great economic and social importance for all Latin American countries, not only owing to its major contribution to the production of high proteinic foods and generation of employment, but it also allows to generation of hard currency by means of the export of high priced cultivation products with a high demand in international markets.

The areas which can be cultivated and the characteristics of native and foreign species which have been transplanted and acclimatized, lead us to state that this so called "Mariculture" depends upon the strengthening of research and the training of human resources. This is necessary to reduce our technological dependency, especially in the case of cultivation for subsistence on community and medium scales.

This course has as a main objective to train national and Latin American professionals in techniques and methods of cultivation of mollusks and other species, especially scallops, oysters and sea urchins, in natural and controlled environments making use of the experience gained by the specialized staff of the Coquimbo Marine Faculty and facilities of the Coastal Center of Aquaculture and marine Research of the Universidad del Norte at Coquimbo.

The Coastal Center of Aquaculture and Marine Research has a building of 2,850 square meters specially designed for the development of research, technical assistance, training and production of species by means of marine cultivation.

It contains research laboratories and mass production of juveniles and larvae, classrooms, specialized library, workshops, boats and vehicles, as well as two marine concession for cultivation. All of these facilities and equipment, available for the course, allow the most modern cultivation technologies, thus the Center becomes a valuable tool for repopulation programs of overexploited areas, and the development of Aquaculture in Latin America.

A first International Course on "Technology for Oyster and Scallop Cultures in Controlled (hatchery) and Natural Environment" was given between August 11 to 29, 1986 in Coquimbo, Chile. The same course will be given again in August 1987. Furthermore, other training courses on scallop cultures have been given to Peruvian (3) and Chilean (5) professionals. Courses to train skilled technicians in surface cultures have also been given to train technicians required by industries for the management of their cultures.

The Coastal Center of Aquaculture and Marine Research, donated to Chile by the government of Japan, has shown itself to be an important support for the development of marine cultures in Latin America. This is indicated by the growing interest in Chile and abroad for courses on marine cultures. Ninety applications were received at this Center for the first International Course in 1986, forty-five of them coming from different Latin American countries.

2.2. Background.

The Faculty of Marine Science of the Universidad del Norte, Coquimbo branch, through its Aquaculture Department, has been developing projects on molluscan studies for commercial purposes in natural and controlled environments since 1980. Such projects have aroused considerable interest, supporting the development of culture activities in the region and other places of the country. this, on its turn has caused a growing demand by public and private enterprises for assistance, training, technology and seeds (juveniles) of mollusks. A remarkable improvement has been made in the case of oysters and scallops and it has been possible to transfer it to interested sectors such as artisan fishermen, private enterprises, goverment department officers, and Latin American institutions. Through a series of courses, it has been possible to take advantage of the expertise and specialization of professionals who work at the Coquimbo Center, and also from the facilities, laboratories and culture equipment which are unique in Chile.

All of these allow us to guarantee the success of this type of course.

2.3. General Objectives:

2.3.1. To train and prepare national and Latin American professionals in techniques and methods of cultures of scallops oysters, and others, in natural and controlled environments; taking advantage of the existing facilities in Coquimbo, in this way promoting the development of Aquaculture in Latin America.

To set up among participants the required link to share knowledge and experience on marine cultures, through group analysis of problems that may appear in this activity in their countries of origin.

2.4. Participation of JICA.

A course on Marine Cultures has been programmed for October-November 1988, in order to fulfill the objectives mentioned above. The cooperation asked to JICA is required on the aspects mentioned below.

2.4.1. Name of Course: (year 1988)

"TECHNOLOGY OF MOLLUSCAN CULTURES AND OTHER SPECIES IN CONTROLLED (HATCHERY) AND NATURAL ENVIRONMENTS".

2.4.2. Duration:

30 days. 187 hours (78 theoretical, 104 practice)

Proposed Time: October - November

2.4.3. Number of Participants:

15 students (15 foreign students)

2.4.4. Program:

GENERAL ASPECTS OF MOLLUSCAN CULTURES.

a) Theory.

Subjects:

- History and development of Molluscan Cultures.
- The man's taking part in the life cycles of mollusks.
- Basic and applied research supporting the cultures.
- Structure and functions of Hatchery System.
- Oceanography applied to cultures.
- Culture methods.
- Economic analysis (Cost/profit).
- Management and development of Projects.
- Culture Models.
- Micro-algae Production.
- Adults' Management: Preparation, spawning and gamete management.
- Larvae culture.
- Management and culture of postlarvae.
- Preseed management and culture.

- Managemnt and culture of adults at sea.
- Critical variables in the development of cultures

DEVELOPMENT OF A CULTURE PROJECT.

a) Administrative/Scientific.

Subjects:

- Economic planning.
- Technical requirements.
- Choosing of culture areas
- Choosing of species.
- Choosing of methods and techniques.
- Treatment of sea water.
- Engineering: Equipment and servicing.
- Commercialization: Export, local markets.
- Techniques of production programming.

b) Technical:

Subjects:

- Floating cultures (Longline, collectors, Pearl Nets Lanterns).
- Larvae Capture.
- Seed harvesting.
- Control of Encrustations.
- Ordinary problems in floating cultures.

3. ORGANIZATION AND DEVELOPMENT OF THE COURSE.

3.1. Management and Finance:

The Universidad del Norte, Coquimbo Center, will manage the course, with the purpose of assisting, solving and evaluating the aspects connected with the development of the course.

All the course activities will take place at the Coastal Center of Aquaculture and marine Research, sponsored by the Aquaculture Department of the Universidad del Norte. This Department will have the duty of preparing the plans of theoretical studies, lab and field practice, as well as all the basic materials and required bibliography, allowing the use of its equipment, facilities and the staff of researchers and technicians.

JICA will provide the necessary funds in order to perform the programmed activities and pay the transportation, enrollment and per diem expenses of the selected participants.

3.2. Applications and selection of participants.

A number of 200 invitations will be sent six months before the course starts, to industries, Government offices and Latin American universities; making known this event, as well as the date, place sponsors and applications. Later on, more information will be sent, telling about the work programs, subjects of study, and staff of teachers, including lodging and food services. A secretary's office will be set up permanently from this time on, answering the inquiries from our country and abroad. The information about the

course will be emphasized through the mass media and scientific magazines.

The applicants' selection will be done at the Universidad del Norte Center Coquimbo, based upon professional antecedents and present activities of the applicants. The selection for countries will be as follows: Argentina (2), Brazil (3), Colombia (1), Ecuador (2), Panamá (1), Perú (3), Uruguay (1), Venezuela (1) and Costa Rica (1), all of which is subject to change according to each country's application, 15 applicants, in total.

The foreign participants will be received in Santiago Chile and taken by bus to Coquimbo, where they will be installed at their lodgings in Boarding Houses belonging to the University, with meals included.

3.3. Participant Teachers:

Dr. Shizuo Akaboshi	Japan International Cooperation Agency. Expert on Bivalve Molluscan Cultures, specially Oysters and Scallop.
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Dr. Louis H. DiSalvo, Ph.D.	Universidad del Norte Development of Molluscan Larvae and Microbiology.
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Dr. Juan E. Illanes	Universidad del Norte Marine Cultures.
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Lic. Eduardo Uribe	Universidad del Norte Microalgae Cultures.
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Ing. Luis A. Cánovas	Universidad del Norte Breeding and management of Molluscan seeds.
Ing. Luis H. Pereira	Universidad del Norte Production and Management of Scallops
Mr. Jaime A. Meruane	Universidad del Norte Marine Cultures.
Biol. Elías S. Alarcón	Universidad del Norte Population Biology.
Lic. Héctor Flores	Universidad del Norte Fish Cultures.

3.4. Evaluation of Course.

The evaluation of this Course will be performed by the teachers and the participants at a final meeting, by means of a Questionnaire form (Annex 1). The students will receive An Attendance Certificate for the Course.

4.- EXPENSE BUDGET (YEAR 1988)

4.1.- Foreign students: (Argentina,
Brazil, Colombia, Ecuador,
Panamá, Perú, Uruguay, Costa
Rica and Venezuela)

- Fares (15)	US\$	13.950
- Stay at Santiago for two days and fares Santiago/ Coquimbo/Santiago.		1.900
- Traveling Expenses (US\$ 30 for 30 days)		13.500
	US\$	29.350

4.2.- Operation

Adverting: - 200 booklets /	US\$	120
- 100 posters /		70
Mail		295
Communications: - 9.000 photocopies		800
- 50 handbooks		250
- 100 slides		120
- 200 transparencies		110
- 40 video cassettes		685
- 50 cassettes		83
Telephone and Telex		250
Transportations: 3 Professional visits to Tongoy		762
Reception		750
Closing		1.389
Secretary for 3 months		560
Stationery		240
Typewriter		950
2 Technical Assistants for 3 months		1.650
Computer rental expenses		852

Fuels: Lubricants and travelig expenses for 30 van trips to Tongoy.	US\$	
4 trips in full time, vessel STELLA MARIS II		1.870
Attendance Diplomas		50
Unexpected or unforeseen expenses		160
Folders		260
Print Final Copy		1.850
	US\$	14.126

4.3.- Investements :

4.3.1. Laboratory Materials

1 Microtome Knife	US\$	179
2 Dissection sets		300
2 Hemacitometers		175
200 Filters 0.45 no sterilized		220
3 Boxes of microscope lighth bulbs		427
1 Luxometers		485
10 Plastic buckets		155
200 Mts. hose		157
45 Pairs of gloves		187
2 Gas burners		10
2 Tape measures		24
1 Calipter		95
1 Scale		58
2 Checking-up valves		48
1 Set of fitting pipes		210
4 Sterile pipette holders		120
5 Flow reducer taps		133

10 Nipples	US\$	154
10 Connexion tubes		46
20 Reducer tubes		240
10 Connexion tubes diam. differents		86
30 Angles		245
Cleaning materials		160
	US\$	3.914

4.3.2. Fungible Materials

Reactives		
5 lts. absolute alcohol	US\$	120
12 lts. alcohol 95 %		50
20 grs. mercury chloride		35
1 lt. glacial acetic acid		18
3 lts. formalin		108
10 grs. trichloroacetic acid		20
20 Kgs. potassium nitrate		40
10 Kgs. triple superphosphate		34
15 mg. Vitamin B		90
100 mg Thiamine		20
30 Kgs. sodium bicarbonate		38
2 Kgs. agar-agar		215
5 Kgs caustic soda		22
100 grs.iron sulfate		20
40 Kgs. CO ₂		85
	US\$	915

Glass Materials

50 pipettes 10 ml	US\$	179
50 pipettes 5 ml		165
2 boxes of Pasteur pipettes		46
200 Petri capsules		373

10 test tubes 500 ml	US\$	96
40 mattraces 250 ml		175
20 mattraces 500 ml		110
100 test tubes with lids		180
10 test tubes 250 ml		40
50 sterilizing bottles		130
150 sample flasks		630
10 volumetric mattraces		187
10 boxes cover objects		170
10 boxes of object holders		190
5 precipitate vases 1.000 ml		50
5 precipitate vases 2.000 ml		68
2 thermometers		320
	US\$	3.190

Working Materials

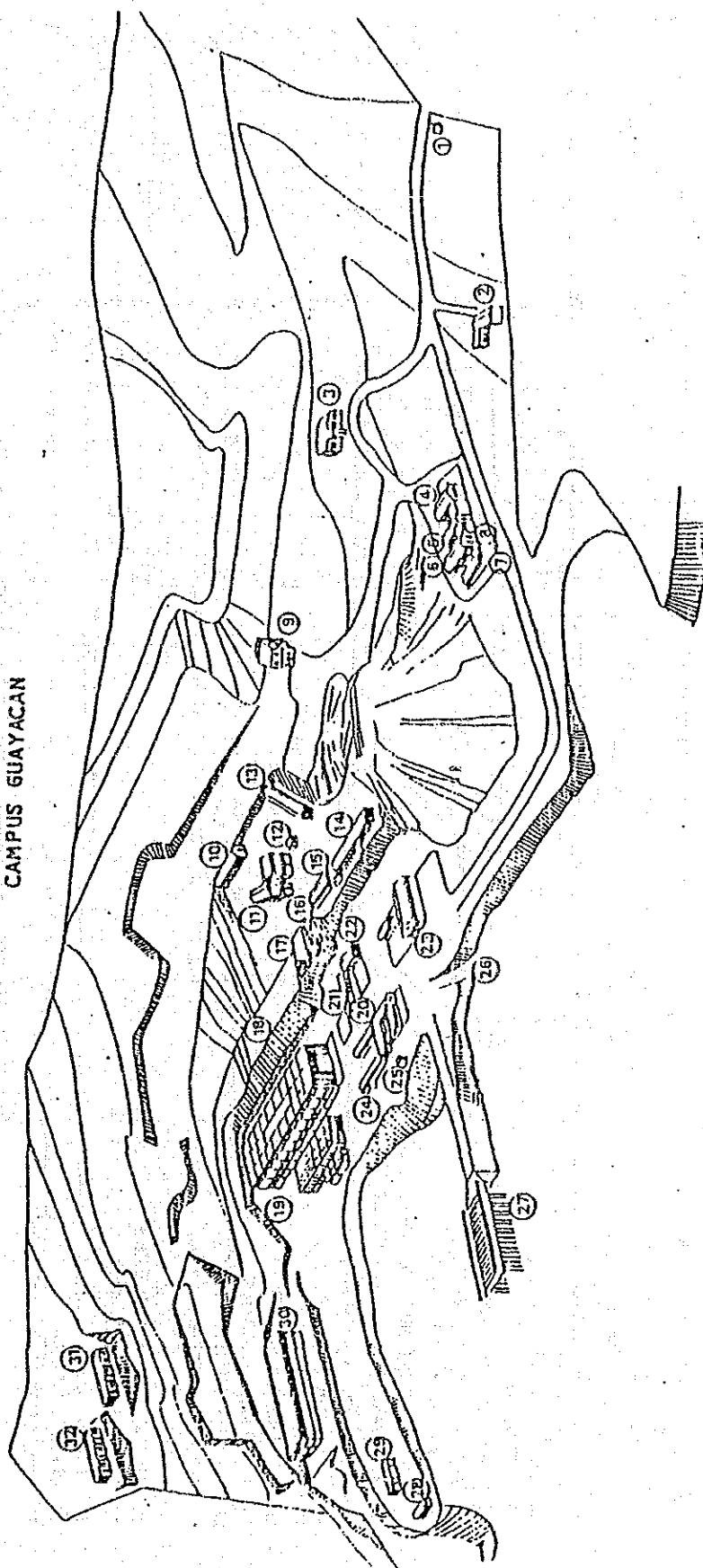
15 pairs of boots	US\$	260
15 aprons		152
15 waterproof garments		522
15 pairs of asbestos gloves		450
2 wheelbarrows		105
15 knives		125
15 pairs of scissors		230
	US\$	1.844

4.3.2. Culture Materials

Cordage polypropylene	US\$	
200 mts. 14 mm		145
60 mts. 10 mm		43
70 mts. 6 mm		10
160 mts. 10 mm		23
100 mts. 10 mm		73
70 mts. 6 mm		10

35 buoys 30 cm diam, plastic	US\$	1.400
800 units of Pearl-net 9 mm opening		1.280
2 tanks rectangular 1.500 lts		1.000
wooden winches		400
plastic materials, misc.		700
1 hookah diving compressor		1.150
20 1 micron filters		643
10 5 micron filters		321
10 10 micron filters		321
10 0.45 micron filters		571
240 watt lamps with quartz tube		350
nytal net material		958
1 submersible pump		240
	US\$	9.368
4.3.3. Bibliography	US\$	3.000
Books and Juornials on Culture		
4.3.4. Slide projector	US\$	1.200
TOTAL	US\$	67.177

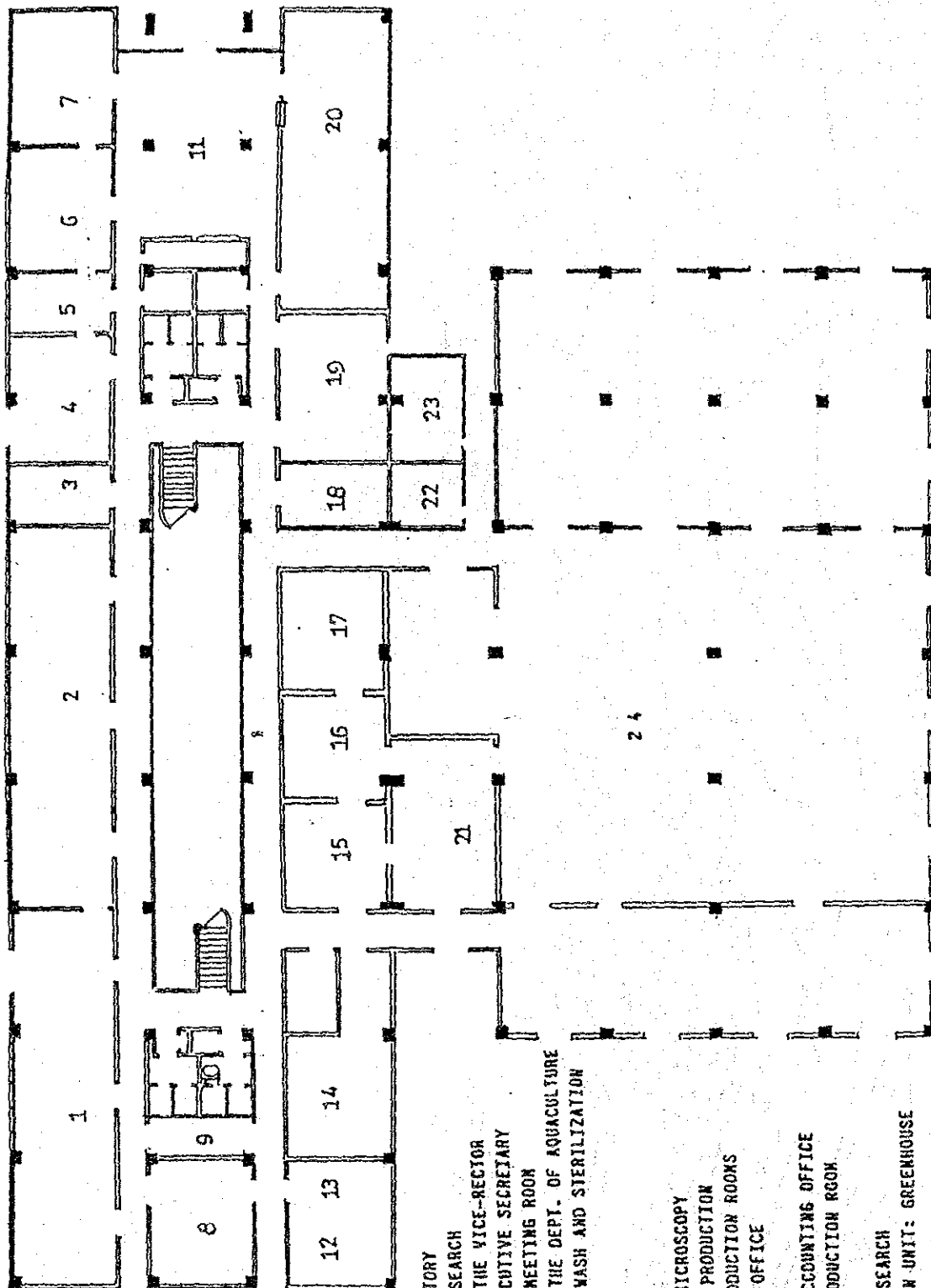
UNIVERSIDAD DEL NORTE - SEDE OCCIDENTAL
CAMPUS GUAYACAN



- 1 ACCESS
- 2 REGISTER OFFICE
- 3 ADMINISTRATION OFFICE
- 4 LIBRARY - OCEANOGRAPHIC
CHEMISTRY LAB
- 5 PHYTOPLANKTON LAB
- 6 REFERENCE COLLECTION
- 7 COMPUTER CENTER
- 8 CLASSROOM
- 9 RESEARCH AND ACADEMIC OFFICES

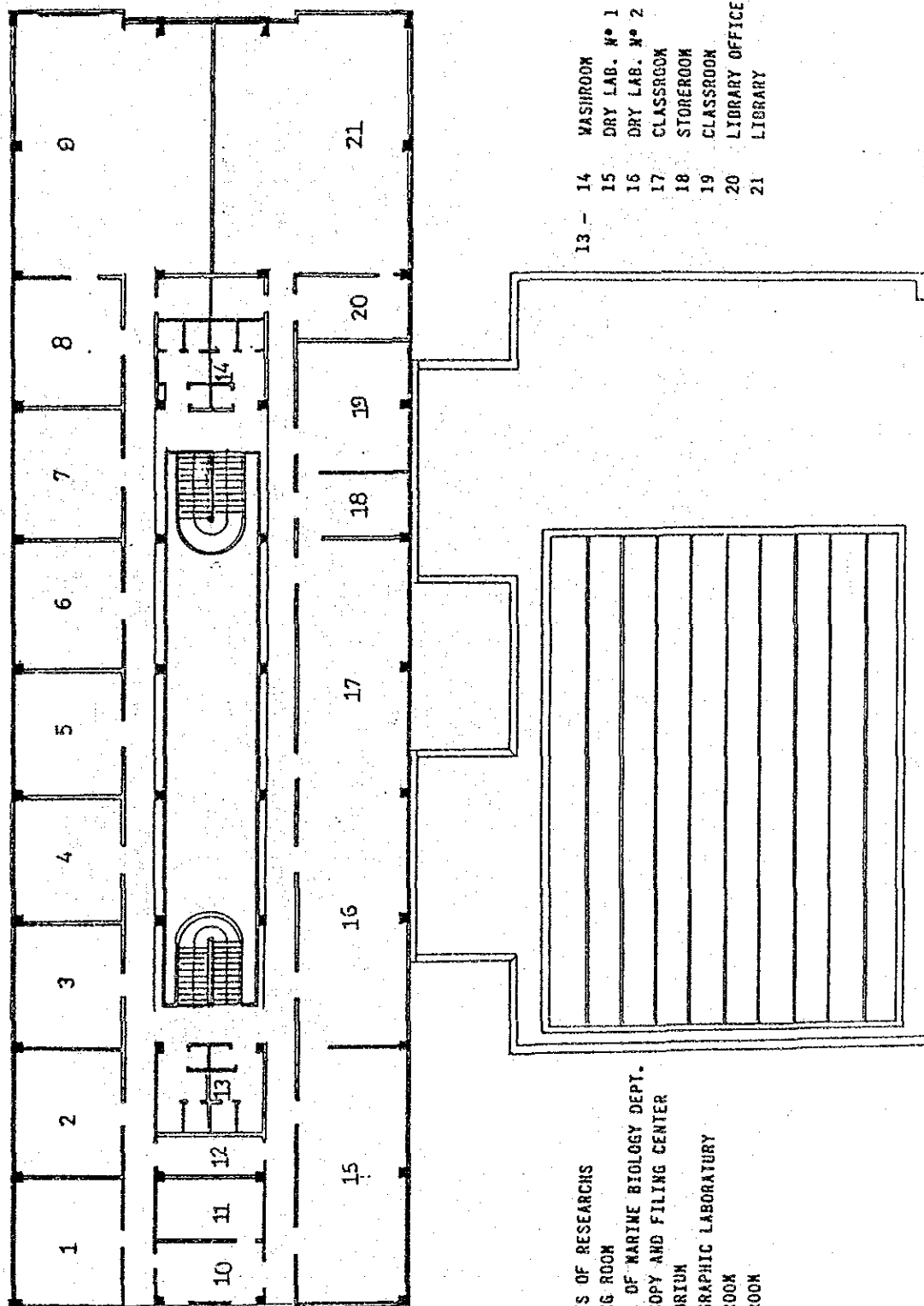
- 10 WAREHOUSE
- 11 STUDENTS LABS
- 12 LAVATORIES
- 13 CLASSROOM
- 14 CAFETERIA
- 15 STUDENTS SERVICES
- 16 STUDENTS SERVICES
- 17 INTERIOR GUARDHOUSE
- 18 COASTAL CENTER OF AQUACULTURE
AND MARINE RESEARCH

- 20 RESEARCH LABS
- 21 ADMINISTRATIVE OFFICE
- 22 GENERAL SERVICES
- 24 AQUARIUM
- 25 PUMPS ROOM
- 26-27 SMALL SHIPYARD AND PIER
- 28-29 MACHINE SHOPS AND STORAGE
- 30 GENERAL
- 31-32 LODGING FACILITIES



- 1 - 2 WET LABORATORY
- 3 OFFICE, RESEARCH
- 4 OFFICE OF THE VICE-RECTOR
- 5 OFFICE, EXECUTIVE SECRETARY
- 6 EXECUTIVE MEETING ROOM
- 7 OFFICE OF THE DEPT. OF AQUACULTURE
- 8 GLASSWARE WASH AND STERILIZATION
- 9 STOREROOM
- 10 WASHROOMS
- 11 HALL
- 12 - 13 ELECTRON MICROSCOPY
- 14 MICRALGAE PRODUCTION
- 15 - 17 LARVAE PRODUCTION ROOMS
- 18 PERSONNEL OFFICE
- 19 CAFETERIA
- 20 GENERAL ACCOUNTING OFFICE
- 21 LARVAE PRODUCTION ROOM
- 22 SHOWERS
- 23 OFFICE RESEARCH
- 24 PRODUCTION UNIT: GREENHOUSE

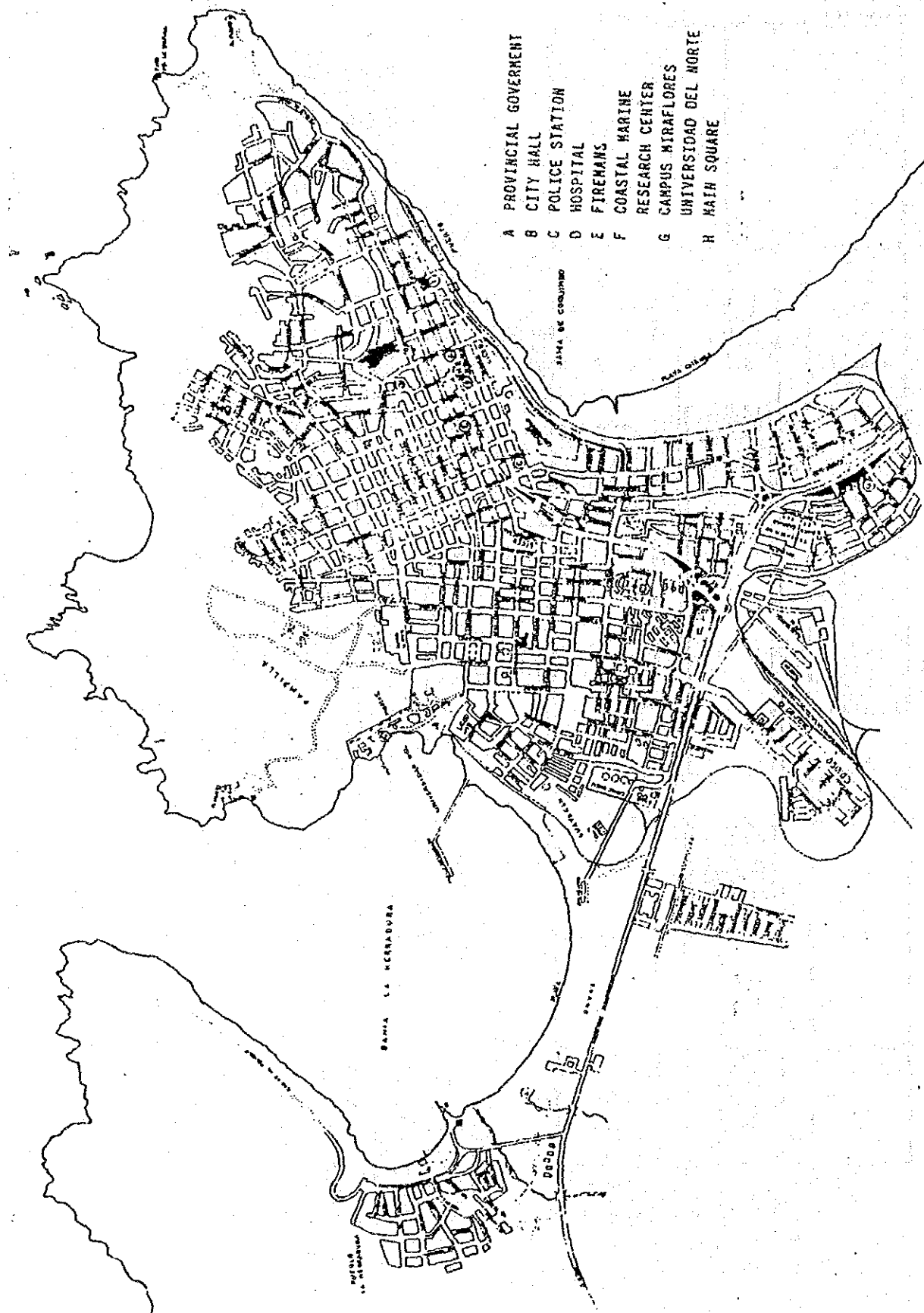
FIRST FLOOR
 CENTER FOR AQUACULTURE AND MARINE RESEARCH
 UNIVERSIDAD DEL NORTE



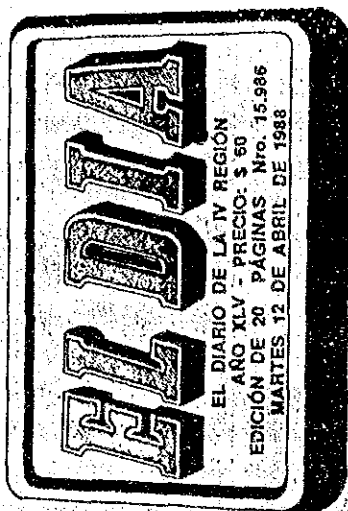
- 1 - 5 OFFICES OF RESEARCHS
 6 DRAWING ROOM
 7 OFFICE OF MARINE BIOLOGY DEPT.
 8 PHOTOCOPY AND FILING CENTER
 9 AUDITORIUM
 10 PHOTOGRAPHIC LABORATORY
 11 DARK ROOM
 12 STOREROOM

- 13 - 14 WASHROOM
 15 DRY LAB. N° 1
 16 DRY LAB. N° 2
 17 CLASSROOM
 18 STOREROOM
 19 CLASSROOM
 20 LIDRARY OFFICE
 21 LIBRARY

2nd FLOOR
 CENTER FOR AQUACULTURE AND MARINE RESEARCH
 UNIVERSIDAD DEL NORTE



7. 現地新聞報道



La delegación de la Japón, International Cooperation Agency, visitó ayer al Intendente para presentarle sus saludos. Visitarán la región para imponerse de la marcha del Centro de Acuicultura de Coquimbo.



MISIÓN JICA PATROCINARÍA

CURSO DE CULTIVOS MARINOS

En virtud de un convenio existente entre Chile y Japón, visita la región una delegación de la Japan International Cooperation Agency, JICA, para acordar el respaldo a un curso internacional sobre cultivo de moluscos que está organizando el Centro de Acuicultura de la Universidad del Norte.

Para dar a conocer estos aspectos y otros de sus interesantes trabajos, se reunieron con la presencia de la delegación, presidida por Yasuhiro Yashima, Takakazu Okamoto, asistente del director, Iryo Sasaki, de la División Producción y Takeda Masuura.

Indicaron que Japón, en razón a su política de intercambio y acercamiento con otros pueblos había decidido auspiciar y apoyar económicamente el Centro de Acuicultura, puesto que le era favorable trabajar con países que tuvieran materia prima, luego que ellos carecían de la misma.

Dijeron que esta situación la entendían desde el punto de vista que durante su historia han recibido ayuda de inmigración de China y Corea y luego de la Segunda Guerra Mundial, apoyo tecnológico de los Estados Unidos.

Precisaron que el viernes resolverían si apoyaban con recursos la realización del curso internacional de Cultivos Marinos.

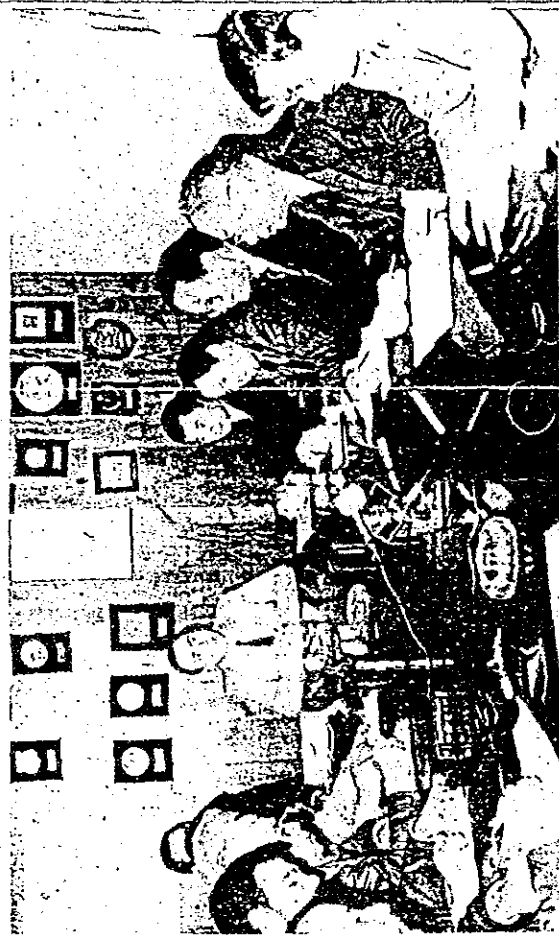
Respecto a esa materia, Andrés Hoyt, vicerrector de la Universidad del Norte, indicó que poseía fundadas razones que la respuesta nipona sería favorable al proyecto.

Consultado en torno al desarrollo marítimo de Chile, el responsable de la delegación señor Yashima indicó que antes de salir de su país, se habían informado que Chile mantenía un continuo desarrollo, especialmente en cultivos marinos y muy específicamente en ostras.

Explicando las funciones de JICA, Japan International Cooperation Agency, la describieron como una agencia dependiente de los Ministerios del Mar, Agricultura de su país, y mantenían relaciones con apoyo tecnológico, con muchos países del mundo, no precisando cuáles.

La delegación visitó ayer en la mañana al Intendente Regional, presentando sus saludos protocolares.

Mañana y pasado visitarán el Centro de Acuicultura, con sus centros de Quaiyudin y Tongoy.



Miembros de la misión JICA, quienes el viernes darán a conocer su decisión de apoyar un curso internacional sobre Cultivos Marinos, que está realizando el Centro de Acuicultura de la Universidad del Norte de Coquimbo. La delegación visitó a la primera autoridad regional y luego ofreció una conferencia de prensa, donde dio a conocer diversos antecedentes sobre su gestión en nuestro país.

Firmaron minuta U. del Norte y misión japonesa

8 países participarán en curso cultivos de moluscos

Al mediodía de ayer se procedió a la firma de la Minuta de Discusión entre el Gobierno de Japón y la Universidad del Norte, sede Coquimbo para efectuar en este puerto un Curso Internacional de Entrenamiento sobre el cultivo de moluscos con la participación de expertos de Argentina, Brasil, Colombia, Costa Rica, Ecuador y Perú.

La Minuta fue firmada por el jefe de la delegación japonesa Ysuguo Yashima y el Vicerrector Andrés Hoyl Sotomayor.

Sobre el particular la autoridad universitaria manifestó su agradecimiento a la misión japonesa luego de haber firmado este convenio que hará posible reunir en la Universidad del Norte, sede Coquimbo a destacados expertos marinos en el cultivo de moluscos.

Destacó la importancia que tiene este curso para el país y para Latinoamérica. La Universidad ya tiene experiencia en este campo y sería el cuarto curso internacional que se estaría dando sobre cultivos marinos. "Reitero nuestro agradecimiento al señor Yashima por su buena disposición para facilitar este

entendimiento entre ambas instituciones".

A nombre del Rector de la Universidad del Norte Jorge Alberto Alarcón hizo entrega al señor Yashima de un galvano como testimonio de aprecio y el respeto que merece esta misión.

Por su parte el señor Ysuguo Yashima se dirigió a los presentes señalando a través de su intérprete: "Nosotros hemos venido a Chile el 9 de abril y estaremos hasta el día 16 del presente. Y llegados, especialmente, a Coquimbo y La Serena para investigar la posibilidad de poder efectuar un curso internacional latinoamericano sobre cultivos de moluscos".

"Llegando a Chile, en Santiago, hemos conversado con el Ministerio de Relaciones Exteriores, Fao, con la Embajada de Japón y con la Oficina de "Jica" en la capital, donde tuvimos una extraordinaria acogida".

Agregó que agradecía sinceramente el recibimiento por parte de autoridades, directivos y profesores de la Universidad del Norte, especialmente a los señores Hoyl e Illanes.

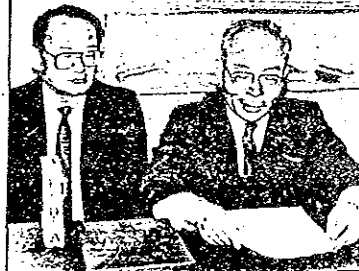
La delegación japonesa visitó las instalaciones de la sede universitaria y Tongoy. Agregó que todos los antecedentes serán entregados a través de un documento oficial al Gobierno japonés a objeto de que se disponga de los recursos económicos para la realización del curso internacional.

El "Jica" además está efectuando cursos sobre inseminación artificial en Universidad Austral y otro sobre el cáncer gástrico en el hospital Pablo Jaraquemada.

El curso en cuestión será por un mes y se realizará entre el 24 de octubre y el 19 de noviembre. Lo importante de la firma del convenio es que se refina y se subraya que el curso internacional se realizará en Coquimbo durante cinco años seguidos participando expertos de muchos países.



Ayer se procedió a firmar la minuta que da paso a la realización de un curso internacional sobre cultivos de moluscos. En la fotografía se observa al jefe de la misión japonesa Ysuguo Yashima y el Vicerrector Andrés Hoyl Sotomayor.



El Vicerrector de la Universidad del Norte, sede Coquimbo, Andrés Hoyl Sotomayor en los momentos que entrega un galvano recordatorio al señor Ysuguo Yashima. Más abajo leyendo los agradecimientos por la favorable acogida que tuvo en La Serena y Coquimbo.

JICA