

CUSC

# SEMANA DE PUERTO RICO

15 al 18 de Noviembre 1971

**Lunes 15**

Exposición \*

Películas 11:00 AM - 12:00

1. Arquitectura Colonial
2. Santos
3. La Buena Herencia

**Martes 16**

Exposición \*

**Miércoles 17**

Exposición \*

Películas 11:00 - 12:00

1. El Hombre Esperado
2. Parranda Campesina

Almuerzo Criollo 12:00

Lugar: antiguo comedor Internas

**Jueves 18**

Exposición \*

La unidad móvil del Instituto de Cultura Puertorriqueña estará en el Pabellón para la venta de libros de temas puertorriqueños  
9:00 AM - 4:00 P.M.

**Viernes 19**

10:00 AM. - Ofrenda floral ante la estatua de Cristóbal Colón en la Plaza de Colón en S. Juan.

\* tema

Exposición miscelánea de motivos puertorriqueños en la antigua librería del College. Estará abierta los días arriba señalados desde las 9:00 AM. hasta las 4:00 P.M.

---



MYRNA BAEZ  
MARYANN MCKINNON  
AIDA MENDEZ  
RAFAEL MARQUEZ  
TORRES MARTINO

Cinco Profesores de Arte  
del Junior College y del  
Colegio Universitario del  
Sagrado Corazon

18 de Abril  
Salon de Exposiciones  
de la Biblioteca

EXPOSICION

*El Colegio Universitario del Sagrado Corazón, en ocasión de la Semana de la Biblioteca, se complace en exponer en su galería de exhibiciones la obra de los profesores de Arte del College y Junior College, a cuya apertura le invita cortésmente.*

Hora: 7:30 p.m.

Martes 18 de Abril de 1972

### **Myrna Báez**

Profesora de Gráfica del C.U.S.C.  
Nació en San Juan.

Cursó estudios en la Real Academia de San Fernando de Madrid, en la Pratt Graphic Center de New York y en el Instituto de Cultura Puertorriqueña.

A sus diversas exposiciones individuales y colectivas, tanto en galerías y centros culturales del país, como de otros de América y Europa, suma Primeros Premios, obtenidos en pintura y grabado, del Ateneo Puertorriqueño y en grabado, del Graphic Center de New York.

### **Mary Ann McKinnon**

Profesora de Arte del Junior College del C.U.S.C. Obtuvo con honores el Bachillerato de Bellas Artes en el Winston College. Continuó estudios post graduados en el California College of Art and Craft y en el Washington State University, para la Maestría en Bellas Artes.

Ha enseñado Arte en el Washington State College (cinco años) y en la Universidad de Idaho.

Ha expuesto en importantes Galerías y Museos de Seattle, Dakland, Reydhmon, y Washington.

### **Aida Méndez**

Profesora de Cerámica del C.U.S.C. Nació en Ensenada. Siguió el Bachillerato en Arte en el Instituto Politécnico, siendo alumna de Helem Hoffman. Realizó estudios post graduados, que incluyeron escultura, en el Rollins College. En su dedicación a la cerámica amplió estudios con el ceramista Jesse Cohn. Posteriormente viene atendiendo la dirección de su propio alumnado. Es miembro fundador de la Asociación de Cerámica Artística, de Puerto Rico.

### **Rafael Márquez**

Profesor de Dibujo y Pintura y de Técnicas Creativas del C.U.S.C. Nació en Murcia, España.

Becado para estudios de Arte en Madrid. Graduado de la Real Academia de San Fernando. Su labor, variada en experiencias, incluye la pintura mural. En actividades de Arte ha dirigido en Murcia y en Madrid, Departamentos de Arte para Juventudes. Exposiciones individuales en Murcia, Madrid, Santo Domingo y colectivas, incluyendo Primer Premio de la Universidad de Madrid. Es actualmente jefe del Departamento de Arte del C.U.S.C.

### **J.A. Torres Martínó**

Profesor de Diseño en el C.U.S.C.; de Artes Gráficas en la Facultad de Arquitectura de la UPR.

Nació en Ponce. Estudió en Pratt Institute Brooklin Museum Art School (con Rafino Tamayo); en la Academia de Florencia, Italia. Obra en Colecciones del Museo de San Juan de la U.P.R. Biblioteca del Congreso, Washington; Biblioteca de Boston, Museo de Boston, etc.



5 de junio de 1972

Sres. María José y Carmelo Parada  
Decanato de Estudiantes  
Colegio Universitario del  
Sagrado Corazón  
Santurce, Puerto Rico

Estimados profesores Parada:

Aunque tardiamente deseo excusar nuestra ausencia al Homenaje a la Madre Puertorriqueña, actividad organizada por ustedes en CUSC bajo el auspicio de nuestro Decanato de Estudiantes. Compromisos previos, por invitación del Honorable Gobernador, Don Luis A. Ferré, nos impidieron acompañarles esa noche.

Hemos oído elogiosos comentarios sobre el mencionado acto lírico y su destacada participación en el mismo. Reciban nuestra felicitación sincera.

Cordialmente,

Rafael E. García Bottari  
Presidente



*En su Homenaje a la Madre  
Puertorriqueña*

*El*

*Colegio Universitario*

*del*

*Sagrado Corazón*

*cordialmente le invita al*

*Recital de Zarzuela*

*y*

*Opera*

*a cargo de los*

*Profesores y Cantantes:*

*María José Triandor  
de Parada*

*y*

*Carmelo Parada*

*con la Agrupación de Teatro Lírico  
del C. U. S. C.*

JUEVES 18 DE MAYO — 8:00 P. M.

CAPILLA DEL JUNIOR

(Segundo Piso)

Programa

1. El Conde de Luxemburgo  
(dúo) ----- Franz Lehar  
María José Fiandor - Carmelo Parada
2. El Soto del Parral  
(donde estarán nuestros  
mozos) ----- Santullo y Vert
3. Dueto Cómico  
Lillian Ramírez, Jorge Cordero y Coro
4. La Viuda Alegre (vals - dúo) -- Franz Lehar  
María José Fiandor - Carmelo Parada
5. El manojo de rosas (dúo) -- Pablo Sorozabal  
María José Fiandor - Carmelo Parada
6. Los claveles (dúo) ----- J. Serrano  
Silvia León - Edwin del Valle
7. Luisa Fernanda (mazurca  
de las sombrillas) ---- F. Moreno Torroba  
María José Fiandor - Carmelo Parada
8. El barberillo de Lavapiés  
(dúo) ----- A. Barbieri  
María José Fiandor - Carmelo Parada
9. Alma de Dios (romanza) ----- J. Serrano  
Edwin del Valle y Coro
10. La Canción del Olvido ----- J. Serrano  
Silvia León
11. Rigoletto (la donna e móbile) ---- G. Verdi  
Carmelo Parada
12. Gianni Schicchi (aria) ----- G. Puccini  
María José Fiandor
13. Don Gil de Alcalá (Habanera) -- M. Penella  
Silvia León - Lillian Ramírez y Coro
14. El Pirata Cofresí (dúo zarzuela  
Puertorriqueña) ----- Rafael Hernández

Nota: Al finalizar el recital serán obsequiados con un refrigerio.

La agrupación teatral del C.U.S.C. comenzó a funcionar en enero de este año y está integrada por alumnos del Junior College y del College. Tiene tres facetas: Teatro Lírico, Arte Dramático y Baile.

A pesar de su corta existencia, ya ha presentado dos recitales con selecciones de zarzuelas y operetas, números de bailes y tres funciones de El Ene-gúmeno de Anton Chekov. Actualmente está en ensayo la zarzuela Los claveles y la comedia Sin Querer de Jacinto Benavente para ser llevada a escena próximamente.

DIRIGEN ESTE GRUPO

La soprano María José Fiandor y su esposo el tenor Carmelo Parada, ambos realizaron amplios estudios de canto y otras disciplinas en el Real Conservatorio de Música de Madrid, obteniendo al final de su carrera la máxima calificación, lo que les valió una beca para realizar otros estudios en Italia.

Han intervenido en los principales eventos artísticos de su país, presentándose como solistas de conciertos y ópera, y en festivales de España.

Más tarde debutan en el Teatro de la Zarzuela de Madrid y son contratados para hacer una gira por América; destacando sus actuaciones en Estados Unidos y el Canadá, donde intervienen igualmente en representaciones de ópera y conciertos, en los que sobresalen los de City Center Opera, Carnegie Hall, Town Hall en Nueva York y el Festival Tchaikovsky en el teatro Place de Arts de Montreal.

Regresan a su país e intervienen con la Orquesta de Radio y Televisión en la Novena Sinfonía de Beethoven y el "Mesías" de Haendel. Como cantantes de zarzuela han figurado en las principales compañías de España y en las que han venido a América, con una de las cuales acaban de finalizar una gira de dos años como figuras principales.

La crítica del Dr. Bover "El Mundo" ha destacado a estos artistas como "dos magníficos cantantes, con notables cualidades artísticas (voz, calor, gracia, sinceridad y musicalidad)". "Rebasaron las dotes necesarias para la zarzuela en su más alto nivel y sobrepasan las fronteras de la ópera, con sus bellísimos pianos, ataques de precisión exquisita, acoplamiento y buena escuela."

ACTIVIDAD	FECHA	HORA
Graduación Escuela Asenjo	23 de mayo de 1972	8:00 A.M.
Graduación Escuela Elemental y Secundaria CUSC	24 de mayo de 1972	8:00 A.M. (Sexto Grado)
" " "	24 de mayo de 1972	(Noveno Grado) 1:00 P.M.
Graduación Escuela Ramón Power	25 de mayo de 1972	8:00 A.M.
Graduación Colegio Universitario del Sagrado Corazón	27 de mayo de 1972	9:00 A.M.
Exposición de Recursos Turísticos (EXPOTUR)	17 de julio a 19 de agosto	(Oportunamente se ofrecerán los detalles de esta exposición)

\*Servicios de cafetería (Sr. Guevara favor de coordinar con esta oficina)

Relaciones Públicas

\*\*Servicios de cafetería (Sr. Guevara favor de coordinar con esta oficina)



ACTIVIDADES A CELEBRARSE EN EL COLEGIO UNIVERSITARIO DEL SAGRADO CORAZON

SALA DE ACTOS - DIVISION JUNIOR COLLEGE

COMENZANDO EN ABRIL HASTA AGOSTO DE 1972

ACTIVIDAD	FECHA	HORA
Inicio Programa Terapia e Inhalación Junior College CUSC	11 de abril de 1972	10:00 A.M.
**Programa de Prevención de Drogras Fraternidad Nu Sigma Beta	15, 16 y 17 de abril 1972	8:00 A.M. a 4:00 P.M.
*Festival de Inglés Depto. de Instrucción Pública	27 y 28 de abril de 1972	8:00 A.M. a 3:00 P.M.
Sing Out Academia Sagrado Corazón-Pda. 19	5 ó 7 de mayo de 1972	(Sin confirmar)
Entrega de Premios Manuel A. Pérez Oficina de Personal	12 de mayo de 1972	8:00 A.M. a 5:00 P.M.
Graduación Octavo Grado Academia Sagrado Corazón- Pda. 19	20 de mayo de 1972	8:00 P.M.
Graduación Escuela José Gautier Benítez	22 de mayo de 1972	(Sin confirmar)

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COLEGIO UNIVERSITARIO DEL SAGRADO CORAZON

Santurce, Puerto Rico

SERIE DE CONFERENCIAS AUSPICIADAS POR CUSC  
PARA TODA LA COMUNIDAD ACADEMICA

Lunes 10 de abril de 1972 - Salón Audiovisual (208) - 12:00 M.

1. EL TERCER MUNDO: SU PROBLEMA BASICO

En esta conferencia se desarrollará la tesis de Dom Helder Camara, quien sostiene que el primer mundo es el problema básico del tercero. Fundamentada en circunstancias históricas y económicas, la conferencia interesará a quien se preocupe por la paz mundial y la comprensión mutua.

Lunes 10 de abril de 1972 - Salón Audiovisual (208) - 7:30 P.M.

2. TEOLOGIA DE LA LIBERACION

Aclara la diferencia entre teología de la liberación de los otros extremos: revolución izquierdista, y desarrollo derechista. Basada en las ideas de Gustavo Gutiérrez, Julio Santa Ana, Helder Camara y Antonio Alonso-Hernández.

Martes 11 de abril de 1972 - Salón Audiovisual (208) 12:00 M.

3. EDUCACION PARA LOS DESCUBRIMIENTOS FORTUITOS

Discute los aspectos no cognoscitivos de la educación: escala de valores, admiración, creatividad, etc.

Martes 11 de abril de 1972 - Salón Audiovisual (208) 7:30 P.M.

4. DEL CAOS AL CENTRO

Tres conferencias sobre la espiritualidad actual

- 1) Experiencia de la propia nada.

~~CONFIDENTIAL~~

Miércoles 12 de abril de 1972 - Salón Audiovisual (208) 12:00 M.

4. DEL CAOS AL CENTRO

Segunda conferencia sobre la espiritualidad actual.

2) El problema de Dios

Miércoles 12 de abril de 1972 - Salón Audiovisual (208) 7:30 P.M.

4. DEL CAOS AL CENTRO

Tercera conferencia sobre la espiritualidad actual.

3) La contemplación y los nuevos mitos.

CONFERENCIANTE

Herman Mary Byles

COLEGIO UNIVERSITARIO DEL SAGRADO CORAZON

Santurce, Puerto Rico

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43-10731

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4. DEL CAOS AL CENTRO

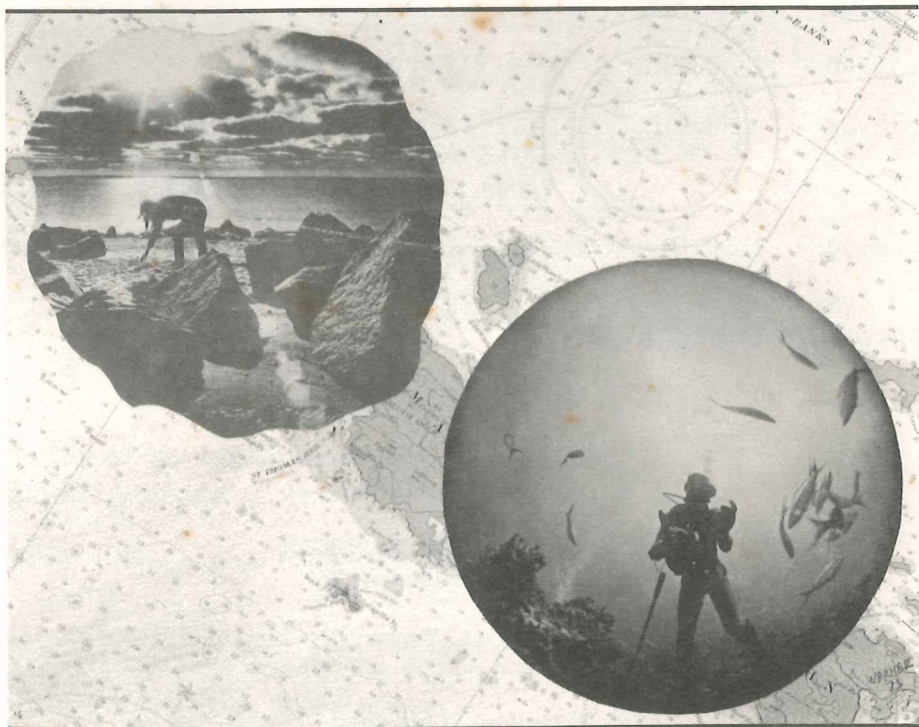
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3) La contemplación y los nuevos mitos.

CONFERENCIANTE

Herman Mary Byles

PRIMERA CONFERENCIA OCEANOGRAFICA DEL CARIBE



CENTRO NORTE-SUR

UNIVERSIDAD INTERAMERICANA

P R O G R A M

FRIDAY FEBRUARY 9

- 8:00 - 10:00 A.M. Registration - Caribbean Suite Foyer
- 10:00 - 12:00 A.M. OPENING SESSION - Arecibo Room
- 12:00 - 1:30 P.M. Free Time for Lunch
- 1:45 - 5:00 P.M. FIRST TECHNICAL SESSION  
Arecibo Room  
- Ocean Resources Evaluation -
- 6:00 - 7:30 P.M. ORUP Scuba Diving Exhibition - Pool Area

SATURDAY FEBRUARY 10

- 9:00 - 12:15 P.M. SECOND TECHNICAL SESSION  
Port O' Call  
- Research and Development of Equipment  
and Technology -
- 12:30 - 2:30 P.M. INAUGURAL BANQUET  
Theater Restaurant
- 1:30 - 2:45 P.M. Special Session for Students  
(Place to be announced)
- 2:45 - 4:45 P.M. THIRD TECHNICAL SESSION  
Port O' Call  
- Commercial Research and Development -
- 5:30 - 6:30 P.M. Tour Old San Juan  
(Meet in front of the Hotel)
- 6:30 - 7:30 P.M. Cocktails



SUNDAY FEBRUARY 11

Field Trip or Free Day

MONDAY FEBRUARY 12

9:00 - 12:15 A.M.    FOURTH TECHICAL SESSION  
Port O' Call  
- Ocean Resources Controlled  
  Development and Protection  
  of Environmental Quality -

12:15 - 2:00 P.M.    Free Time for Lunch

2:00 - 5:15 P.M.    FIFTH TECHNICAL SESSION  
- Community Education and Involvement -  
- Ocean Resources Evaluation -

6:00 - 8:00 P.M.    CLOSING BANQUET  
Arecibo Room

TUESDAY FEBRUARY 13

9:00 - 12:15 A.M.    SYMPOSIA  
Port O' Call

12:15 - 2:00 P.M.    Free Time for Lunch

2:00 - 4:30 P.M.    SYMPOSIA  
Port O' Call

## REGISTRATION/ACTIVITY

### Fee Schedule

Student Registrant \$2.00

- Open entry to all sessions.
- Set of printed Abstracts
- Conference Kit

Full Registrant \$10.00 (or \$13.00)

- Conference Kit
- Set of Abstracts
- Inaugural Banquet

Speakers: One free copy of Proceedings

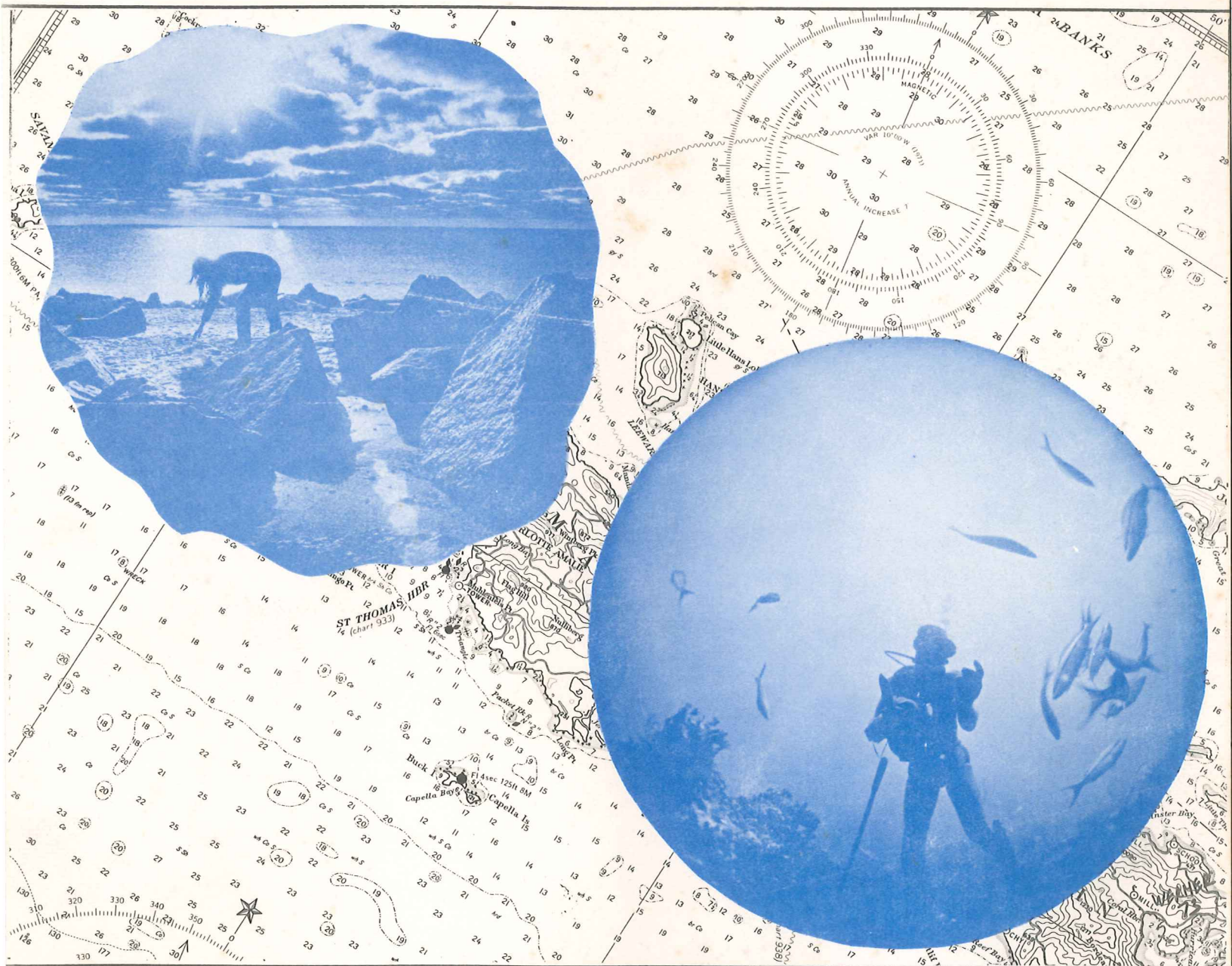
### Non-Registered Attendees

- No charge for technical Sessions
- Printed Abstracts \$1.00
- Inaugural banquet \$ 8.00/person
- Closing banquet \$7.00/person

# first caribbean oceaneering conference

SAN JUAN, PUERTO RICO

February 9 - 13, 1973



## ABSTRACTS

SPONSORED BY

INTER-AMERICAN UNIVERSITY

NORTH-SOUTH CENTER



James Lewis  
Sunshine Chemical Corporation, Conn.

Theme: Ocean Resources Controlled Development and Protection of  
Environmental Quality

Abstract

PLANNING AND TRAINING FOR GOVERNMENT/INDUSTRY

ENVIRONMENTAL PROTECTION

To protect the ocean environment from the threat of accidental oil spillage, Water Resources Commissions, covering more than eighty American petroleum handling locations prepared individual disaster plans, including details of existing equipment, maintenance methods, and procedures for use in the event of accidents.

This paper outlines the steps used to produce workable disaster plans for all foreseeable types of accidents, such as loss of storage from fire, natural or man-made destruction, security of plant installations, inspection of petroleum handling equipment, use of proper marine navigational procedures to reduce tanker-handling risks, as well as viable alternatives for total logistical contingency.

Briefly covered will be the pollution control activities of other states and territories, as well as some very successful overseas methods.

An interesting aspect is the comparison of government/industry response PLANS to actual effective ACTION dictated by field requirements and approved by the on-scene commander.

The formation and up-dating of mutual aid contingency plans, starting in 1964, is an important facet which Sunshine Chemical is well qualified to present, since more mutual aid groups have been started and supported by this firm than any other agency within the oil industry.

Colin E. Nash  
Oceanic Institute, Hawaii

Theme: Commercial Research and Development

Abstract

COMMERCIAL AQUACULTURE AND THE POWER UTILITIES

The paper contains the practical experiences of the author for the development of aquaculture using the thermal discharges from coastal nuclear and conventional electricity generating plants.

Biological problems of survival and growth are described with data from the culture of a number of marine fish and shellfish species together with associated problems in animal husbandry, such as management, behavior, nutrition, predation and disease control.

Engineering aspects of integrating the design of thermal discharge requirements with farm practices are developed together with an overview of the economics and the potential of high value commercial protein production in this way.

Hans Wm. Perl, Physical Oceanographer  
Department of Public Works, Puerto Rico

Theme: Ocean Resources Evaluation

Abstract

THE NEARSHORE COASTAL CURRENTS OF PUERTO RICO

An extensive physical oceanographic survey of the nearshore coastal waters of Puerto Rico was undertaken during 1971 and 1972 by the Oceanographic Program, Area of Natural Resources, Department of Public Works, under contract to the Environmental Quality Board, with funding in part, by Basin Planning Grant funds from the Environmental Protection Agency. Though far from complete, this is believed to be by far the most comprehensive survey of its kind ever undertaken in this area. Measurements of temperature, salinity, dissolved oxygen, biochemical oxygen demand, silicates, phosphates, coliforms, and currents were made during two cruises around the island, and relatively long term in-situ current measurements were made with recording current meters during a partially completed third cruise. The most surprising results were obtained during the third cruise, when long term net flow was in some cases found to be in a direction opposite to the direction in which it was previously generally thought to be. The present discussion will be generally limited to a discussion of the results of current measurements obtained during the third cruise, with mention of the importance of these results.



Irving Swatzburg  
University of Hawaii, Hawaii

Theme: Research and Development of Equipment and Technology

Abstract

A QUEUING STRATEGY FOR AN AT-SEA

MAINTENANCE FACILITY

Identifying the two categories of missions for ocean floor exploration as (a) Broad Search Missions with the primary purpose of locating features of interest, and (b) Detailed Investigation Missions in which the objective is to gather precise data in a relatively small region, the paper develops a queuing model for an at-sea maintenance facility for the Broad Search Mission vehicles. Defining the utilization of the maintenance facility,  $U_m$ , as the ratio of the number of vehicles in the maintenance facility to service rate capacity and the utilization of the vehicles,  $U_v$ , as the ratio of the number of vehicles in service to total number of vehicles in the system, a system objective function is generated. To determine the optimum operating strategy, the decision function  $D = aU_m + B U_v$  is defined where  $a$  and  $B$  are constants of proportionality. It was determined that for a system of 4 vehicles the optimum utilization occurred with 7 men in the maintenance facility, while with a system of 12 vehicles, the optimum occurs with 12 men in the maintenance facility.



Robert Landis  
National Oceanic and Atmospheric Administration, Maryland

Theme: Community Education and Involvement

Abstract

AN OCEANIC MONITORING, ASSESSMENT AND PREDICTION REGIONAL  
PROGRAM FOR THE GULF OF MEXICO - CARIBBEAN AREA  
AND PARTICIPATION IN IGOSS

The needs for oceanic monitoring, assessment and prediction are examined and a conceptual program for services is presented. The design is for a regional program contributing to: (1) oceanic monitoring, assessment and prediction for the ocean area surrounding the countries of North and Central America and the islands of the Caribbean and (2) regional participation in international programs such as the World Weather Watch, Integrated Global Ocean Station Systems (IGOSS), and the newly evolving "Earthwatch." The program includes a multipath approach which includes implementation of presently available technology and methods as one path and a second path of supporting research and development for implementation in later years.

The program design is based on oceanic environmental services using the existing facilities of national weather service or similar organizations for product preparation and disseminations, and regional research include warnings of hazardous oceanic phenomena such as high winds and waves including storm surge; predictions of marine weather and ocean conditions which would support recreation and improved marine resource development; and assessments and trend analysis of the marine environmental quality.

C. Peter Benedict  
Memorial University of Newfoundland, Canada

Theme: Research and Development of Equipment and Technology

Abstract

UNDERWATER ICEBERG PROFILE

The report "Project Ice" deals with the measurement of the profiles of icebergs; specifically with the underwater cross section of free floating icebergs. Experimentation was conducted in a controlled area at Saglek in the North Atlantic region off the east coast of Canada.

The design stage of an underwater profile system incorporating practical knowledge gained from experimentation on the C.S.S. DAWSON cruises of 1971 and 1972 has been realized. A cylindrical transducer array was procured and modified to produce under-the-water contours. These will be correlated with above-the-water topographical work to provide a complete overview of the iceberg studied.

In the scheme, the cylindrical fanshaped beam transducer was lowered and raised while being rotated in the horizontal plane. The iceberg is isonified in this way from a succession of stations on a circumference of minimum radius.

Thirteen bergs were assized in this mode. Even the drafts of icebergs with peculiar and unstable shapes were taken.

Knowledge of the similarities and differences between scattering profiles for icebergs and submarines would assist in any patrol strategy which uses active sonar in the North. Information on size, trajectories, deterioration times, and stability would facilitate navigation across the Canadian Arctic. Ocean shipping, fishing industries, and the offshore oil industry are confronted with the threat of collisions with bergs.



James J. Sullivan  
Scripps Institution of Oceanography, California

Theme: Ocean Resources Controlled Development and Protection of Environment  
Quality

Abstract

CONCEPTS AND PRINCIPLES FOR ENVIRONMENTAL ECONOMICS

The main purpose of this study is to contribute to a common understanding of the concepts and principles involved in Environmental Economics. The precise exposition of concepts and the improvement of measurement techniques can help to clarify the nature of the problems and provide the setting necessary to formulate and apply principles for possible solutions to the complex problems of the environment.

The traditional concept of natural resources must be broadened to include non-commodity aspects which are normally not reflected in the exchange system. Qualitative aspects of the environment are inextricably associated with commodity producing natural resources and to a large degree they should be incorporated as determinants of production costs.

An environmental system may be divided into subsystems with similar general characteristics. The urban subsystem is the most important one since it is where most economic activity occurs. This subsystem can be described in terms of its nodal characteristics. The advantage of this approach is to develop a framework for environmental decisions at the regional level. The principles of conservation, development and use of natural resources well applies to environmental resources. From a physical point of view resources are clarified as stock or non-renewable and flow or renewable resources. A critical zone is defined for flow resources when changes may threaten the continuation of the flow. Irreversible changes in flow may prove to have adverse effects on the environment. The creation of Indicators of the State of the Environment can help to improve policies directed toward the protection of the environmental quality. Benefit-cost analysis is an adequate method to evaluate policies and their effects on society's welfare.

An overall view of the environment suggests that material and energy resources are limited. Man's recognition of resource finiteness must direct him toward an efficient allocation of resources for present and future generations.

James J. Sullivan  
Scripps Institute of Oceanography, California

Theme: Community Education and Involvement

Abstract

FREE MARKET AND PLANNING

The purpose of this paper is to present arguments for some degree of economic planning in an economy using the price mechanism for the allocation of resources.

A free market economy using the price system as a method for resource allocation is found to suffer from some difficulties which preclude the optimal allocation of resources. Allocative inefficiency is observed in the presence of monopolies and trade restrictions. The existence of externalities is recognized as a complex phenomenon whose evaluation and solution is beyond the power of the price system.

Ignorance of market and resource information is found to prevent the optimum resource allocation in the sense that it may lead to excess capacity, resource depletion, etc. Another source of misallocation is found in the cumulative effect of small, individual decisions. In this case it is argued that society may disapprove of the aggregate result if they could appraise the total effect once it occurred. Individuals maximizing their respective personal interests does not necessarily promote society's welfare.

Extra-economic influences are observed in the behavioral aspects of entrepreneurs in their investment decisions. It is further stated that certain social groups may have a disproportionate degree of control of the socio-economic life of a country. The influence of this interest group in resource allocation may tend to be a source of allocative inefficiency.

A few concluding remarks attempt to present basic guidelines to increase the efficiency of the price system.



James J. Sullivan  
Scripps Institution of Oceanography, California

Theme: Ocean Resources Evaluation

Abstract

PLANNING TECHNIQUES AND THE ENVIRONMENT

The purpose of this paper is to present some of the basic guidelines, considerations, and methods involved in the decision process known as economic planning. In general, society's aspirations and objectives are expressed through its socio-political system and planners must use the best available techniques to realize society's desires through a decision process leading to a specific plan. The careful selection of means to achieve the objectives is a crucial question. Adequate knowledge of resources involves the gathering of relevant data in order to provide planners with useful information. This is normally a difficult and lengthy task.

The choice of technology to implement certain projects is another consideration to be carefully analyzed. For example, the locational choice of industry now requires better information on such input requirements as water and residual outputs. Perhaps the most controversial issue concerns the institutional arrangements which must be established to implement policies. Institutions are subject to external influences, pressures, etc. from interest groups such as privileged industries and political groups. Simulations and gaming provide a vehicle for analysis of all such influences on a decision process and should incorporate the best decision making aids available.

Several commonly-used planning techniques are presented in a simple form to illustrate their advantages and shortcomings in dealing with actual planning problems. The scope of the paper is not to give detailed analysis of each one of the existing techniques, but merely to introduce a few fundamental concepts that should be incorporated in a decision process. Over time there is an increasing reliance on mathematical and computerized methods in solving planning problems which involve optimum decisions. Familiarity with and understanding of such techniques must be brought to the attention of the planners who, after all, must plan what to do in the real world and to decision makers who must choose which plan to implement.

Edward L. Towle, Island Resources Foundation, Inc. and  
John McEachern, Cornell University, St. Thomas

Theme: Commercial Research and Development

Abstract

ENVIRONMENTAL MANAGEMENT OF ISLAND BASED OCEAN

ENGINEERING PROJECTS

Extensive research on insular ecosystem environmental stress factors originating from coastal industry, offshore oil exploitation, shoreline alteration, dredging and waste disposal suggest that not only are island and coastal tropical ecosystems particularly fragile, but that even well meaning, ostensibly "clean", ocean and coastal development projects require both sound social and environmental monitoring in the development and operational phases if they are not to have serious negative implications.

Emerging coastal zone planning procedures, standard BCA approaches, and existing development methodologies all leave much to be desired when applied to tropical island ecosystems, and extensive adaptation appropriate to insular conditions in the Caribbean is essential in the political and social, as well as in the environmental sphere. In effect, a thorough pre-investment evaluation should be made of the viability, compatibility, durability of all proposed projects within the terms of reference imposed by island values, aspirations and manpower requirements.

A series of West Indian case studies are examined and a planning matrix for improved island resource development strategy and methodology in ocean and coastal engineering projects is presented.



Carl J. Sindermann  
National Oceanic and Atmospheric Administration, New Jersey

Theme: Ocean Resources Controlled Development and Protection of Environmental  
Quality

Abstract

THE ROLE OF CONTAMINANTS IN OPEN-SYSTEM MARICULTURE

The development of mariculture in coastal waters of the planet is being paralleled by increasing levels of pollution of those waters from industrial and other sources. Effects of pollutants on fish and shellfish products from coastal waters encompass a broad spectrum, including (but by no means limited to) mortalities caused by chemical pollution or by overenrichment of local areas by domestic sewage, physical and physiological abnormalities caused by environmental stresses created by pollutants, viral and bacterial contamination, development of toxic phytoplankton blooms in mariculture areas, mortalities and retardation of growth in shellfish hatcheries associated with poor water quality, neoplasms and other abnormalities in polluted zones, and a host of other effects. Existing information illustrating these effects -- particularly that concerned with mariculture species -- will be reviewed. Of particular interest and concerns is the interaction of pollutant-induced stresses on the occurrence and severity of bacterial and other diseases of fish and shellfish.

It is obvious that the great productivity of inshore coastal and estuarine waters is being threatened, and that substantial steps must be taken to protect present and potential mariculture areas from degradation by man's activities. Proposals for action -- local, national, and international -- will be presented.

Xavier J. R. Avula  
University of Missouri, Missouri

Theme: Research and Development of Equipment and Technology

Abstract

THE ROLE OF SEDIMENT PARAMETERS IN THE LOCOMOTION  
OF UNDERWATER TERRAIN VEHICLES

The potential of the oceans for minerals and food is universally acknowledged. Various scientific organizations in the United States and the rest of the world are moving in the right direction to exploit the oceans for the benefit of mankind by underwater research and development activities. A large volume of deep sea research is being done from the surface of the sea with remote-controlled instrumentation. For a thorough understanding of the various processes in the deep seas, the investigator must go down to the abyssal zone. For operations such as underwater mining, construction, and aquaculture it is essential to be able to move on the ocean bottom in vehicles built with a safe environment. In all these operations, the sediment on the ocean-bottom provides a large part of the necessary resistance to sustain the propelling effort of the vehicle.

In the present investigation equations which govern the dynamic weight transfer of a wheeled vehicle under completely submerged conditions are derived. A sediment value system based on off-the-road locomotion soil parameters is proposed and applied to the above equations to evaluate its effect on the dynamic weight transfer of a submerged vehicle. The effects of drag and buoyancy are included in the derivation. The results showed that the improved properties of the ocean-bottom sediment in a high pressure environment contribute to an increased weight transfer which, in turn, has an adverse effect on the stability of the vehicle. Therefore, the vehicle design parameters must be altered in relation to the sediment parameters for a desirable operation of the vehicle. The derived equations are useful to vehicle designers.



Carlos Nazar Sepulveda  
Relbec Company, Puerto Rico

Theme: Community Education and Involvement

### Abstract

#### TSUNAMIS

After a catastrophic earthquake shook Chile on May 21, 1960, the people from Corral, a little coastal town close to the epicenter of the quake, saw the sea rise by about 16 feet. This stage of the sea is called the "smooth one". By centuries of experience the people know that this is the beginning of a wave. For about five minutes it stayed there, as if at slack of water, fifteen to twenty feet above its normal level. Three ships, the San Carlos, the Canelos and the Santiago broke their moorings.

The wave, like an enormous hand crumpling a long sheet of paper, crushed all the houses, one after another, with a horrendous crackling of shattered planks. In twenty seconds it had heaped up eight hundred houses, smashed to matchwood.

Waves of the type which destroyed Corral in Chile are called Tsunamis by the Japanese, who have experienced many of them. It is none too clear how Tsunamis originated but H. Tazieff in his book "When the Earth Trembles" suggest that the sudden collapse of part of the sea bed suddenly deprives the whole body of water above it of its support; this water drops at the same time and a depression forms on the surface, the depth and orientation depending on the subsidence. Liquid masses instantly rush in from every side, the surface depression rapidly spreads at right angles to its axis; the sea is put into a stage of oscillation, and waves of very great length and period rush out across the ocean.

The period of oscillation varies from twenty to sixty minutes, and the length depends on both the period and velocity, which itself varies according to the available depth.

The Velocity may be found by a well known formula:  $V = (gh)^{1/2}$  where "g" is the acceleration of gravity and "h" is the ocean depth.

The wave length h, may be found by  $h = vT$ , where "v" is the velocity and "T" is the period.

In the case of the Chilean Tsunami, the velocity was such that it reached Hawaii, 6,600 miles from the source, in fourteen hours, fifty-six minutes; it reached Japan, at a distance of 10,600 miles, by at least three different paths, with an average time indicating a velocity of about 480 miles per hour.<sup>2</sup>

Tide gages around the Pacific showed that the Tsunami waves have a period of about one hour, therefore by substituting in the formula, we find that the wave length  $T$ , is about 480 miles. In the open sea the wave has an amplitude of only a few feet; a ship rising and falling these few feet with a period of one hour does not produce any sense of motion. For this reason the wave is never observed at sea. However, as the wave approaches the beach, the depth decreases and consequently the velocity decreases, and the only way for the wave to maintain its energy is to build up its height.

The U.S. Coast and Geodetic Survey has set up a detecting and warning service for these waves with headquarters in Honolulu.

The warning system was fully operative at the time of the Chilean earthquake.

The wave arrived within one minute of predicted time. Even though several warnings had been made, there were 61 dead and 282 seriously injured in Hawaii, 180 dead in Japan and property damage of millions of dollars.



Frederick A. Kalber  
Aquatic Sciences, Inc. , Florida

Theme: Commercial Research and Development

Abstract

MARICULTURE MEDICINE: THE ERA AHEAD

A survey of the state of development of a new veterinary science and its meaning to plans for developments in commercial culture of marine organisms. Both basic and applied aspects are discussed in relation to present and future forms of large scale mariculture. Interconnections are made between engineering design and operations of culture systems, diet, development, behavior, and the biology of diseases prominent in today's mariculture. Suggestions are advanced concerning the research and development efforts required to prevent extensions of present problems in tomorrow's mariculture.

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Gilberto Cintrón  
Environmental Quality Board, Puerto Rico

Theme: Ocean Resources Controlled Development and Protection of  
Environmental Quality

Abstract

A MANGROVE LAGOON SYSTEM-RESULTS OF MODIFICATION BY MAN

The Torrecilla-Piñones lagoons are part of the largest estuarine system of Puerto Rico. Into these lagoons drain 3,500 acres of mangroves, the largest remaining forest of this type in the island. The lagoons are shallow (averaging about one meter in depth) and have areas of  $2 \times 10^6 \text{ M}^2$  and  $9 \times 10^5 \text{ M}^2$  respectively. The shallow depths of these lagoons create favorable conditions for a thorough mixing and aeration of the waters. However recent dredging operations have increased the depth to up to 10 meters in an area comprising  $3 \times 10^5$  square meters located between the two lagoons. The reduction of the surface to volume ratio in this area has resulted in the formation of anoxic conditions in the dredged basin. Besides the shallow sill depth; the accumulation of sewage sludge and the salinity stratification are some of the factors responsible for the poor vertical mixing of the waters and therefore the anoxicity of the bottom layers. Sewage sludge coming from Quebrada Blasina is constantly being deposited in the basin. The salinity stratification varies from weak to strong depending on the discharge of this creek. Surrounding urban development has probably enhanced the discharge of this canal resulting in marked and persistent salinity stratifications.

Arsenio Rodriguez  
Environmental Quality Board, Puerto Rico

Theme: Ocean Resources Controlled Development and Protection  
of Environmental Quality

Abstract

DISSOLVED OXYGEN REGIME OF THE SALT WATER WEDGE OF SOME

PUERTO RICAN RIVERS

Many rivers in Puerto Rico have salt water wedges which intrude several miles inland. Usually this condition results in a stratified flow within the stream. The surface layers have a net downstream movement while there is a concurrent net upstream movement of salt water in the deeper layers. The inland penetration of salt water is normally advantageous to marine species which can invade the relatively more productive estuarine areas and to migratory species that can penetrate the estuary at earlier stages of development. In Puerto Rico the formation of sand-bars at the mouth of rivers restricts the flushing of the intrusive lens creating favorable conditions for stagnation.

Oxygen depleted (Anoxic) conditions were found throughout most of the salt water wedge of the Rio Grande de Manatí although relatively high oxygen concentrations were found at the surface. The accumulation of solids with a high oxygen demand in the river bed, coupled with the almost stagnant conditions of the intrusive sea water, are thought to be responsible for this condition. This situation may contribute to the periodic fish kills observed in this river.

The implications at these findings on sanitary survey and outfall design are discussed. Presently work is in progress which will allow comparison of this wedge with that of a relatively unpolluted stream.



Konstantin Kokkinowrachos  
Institut fuer Leichtbau , W. Germany

Theme: Research and Development of Equipment and Technology

Abstract

LOAD ANALYSIS FOR OCEAN STRUCTURES

For design and dimensioning of ocean structures a sufficient information about the environmental factors is of great importance, in order to achieve the system's objectives.

In this paper the methods of analysis of the loads acting on ocean structures (drilling platforms, ships, buoys, riser, submersibles) are discussed from the design engineer's viepoint.

A comparison with the load classifications recommended in the several Rules for Building and Classing of Offshore Structures is given.

As the acting forces (wind, seaway, internal currents, iceload etc.) are of random nature the prediction of the loads on the base of probabilistic method is necessary. Consequently a probabilistic formulation of the dimensioning requirement for the structure must be established.

The principles of the risk criteria for dimensioning offshore structures are also given in this paper as well as some methods qualified to calculate the reliability standard for an economical-technical optimization of the structure.

Stanley Eugene Dunn  
Florida Atlantic University, Florida

Theme: Research and Development of Equipment and Technology

Abstract

WET ENCLOSED TOWED SUBMERSIBLE

The subject of the wet enclosed towed submersible is discussed. Wet towed submersibles can provide economical, versatile and safe vehicles in which to transport scientific and engineering personnel engaged in marine biology, engineering and oceanographic data gathering. These uses are to a large degree a result of the fact that the vehicle is tethered to the surface by a tow line which can also serve as a life support umbilical and communication line. The fact that propulsion is provided by existing surface "ships of opportunity" is one of the major factors contributing to the economy of the vehicle. These factors, in addition to isolating the crew from the pressures of hydrodynamic forces as well as possible predators, provide a secure survey vehicle which may be used in depths of at least that equaling Scuba depths. A review of enclosed, towed submersible technology and uses is presented together with the operational and design factors which are important in the building and utilization of these vehicles. A summary of several recent projects in which these vehicles have been used is included. Based on past and current experiences, recommendations are presented on future design and uses of these vehicles.

Frederick M. Casciano  
University of Hawaii, Hawaii

Theme: Research and Development of Equipment and Technology

Abstract

DEVELOPMENT OF A SUBMARINE SAND RECOVERY SYSTEM FOR HAWAII

A unique system for mining ocean bottom sand from a small vessel was conceived and developed under the University of Hawaii's Sea Grant Program. Called the Submarine Sand Recovery System, or SSRS, it consists primarily of a suction probe which buries itself in thick deposits of sand by hydro-jet action and removes large cones of sand for transfer directly to shore for beach replenishment. The probe is handled on the bottom by divers with the aid of a special underwater lifting drum, which presently limits use of the system to diver depths.

An important feature is a hydraulically-powered roller crusher, mounted at the sand inlet, to grind up coral, rock and shell fragments which could otherwise clog the inlet and choke off the sand flow.

As compared to conventional suction dredging the SSRS is expected to

- (1) reduce operating costs through the use of a small vessel and crew;
- (2) increase the capability to operate in heavy seas;
- (3) reduce adverse effects to the coral reef environment through elimination of turbidity and risk of physical damage;
- (4) eliminate the need for constant suction head attendance and vessel positioning; and,
- (5) simplify direct pumping to shore.

Laboratory tests of one-tenth scale models were carried out followed by half-scale pilot model tests in the ocean. A full-scale (6' diameter pipe) prototype is under construction to be evaluated during the coming year.



Ivonne Pierce  
Inter-American University, Puerto Rico

Theme: Community Education and Involvement

### Abstract

#### A SYSTEMATIC APPROACH TO INSTRUCTION

"Each teacher begins a new term (or course) with the expectation that about a third of his students will adequately learn what he has to teach. He expects another third to learn a good deal of what he has to teach, but not enough to be regarded as "good students". This set of expectations, supported by school policies and practices, is transmitted to the students through the grading procedures and through the methods and materials of instruction. The system creates a self fulfilling prophecy such that the final sorting of students through the grading process becomes approximately equivalent to the original expectations--" says Benjamin Bloom, Professor of Education at UCLA in his book, Formulative and Summative Evaluation of Student Learning. He goes on to say that "most students (perhaps 90%) can master what we have to teach them, and it is the task of instruction to find the means which will enable our students to master the subject under consideration." It is to this end we in educational technology address ourselves. Sweeping changes in instructional methodology are necessary to accomodate not only the educational aspirations, but the fundamental and pervasive learning problems of large and growing segments of college populations which are obviously not composed of competently prepared college-level students and therefore we can surmise that in the K-12 programs they also are teaching to the hypothetical middle of the normal curve of learners' achievements in the educational institutions of today.

Thus a strategy must be devised to meet the learning needs of the large majority of students, not just 30%. We in educational technology propose an instructional system's approach to meeting this need.

Although the system's approach to instruction is a fairly new concept to many instructors, it does not represent new thinking. Ralph Tyler was conceptualizing such an approach to instruction as early as 1935. Shortly thereafter the military demonstrated its feasibility and effectiveness. It is closely related to programmed instruction and other types of independent study, but differs in that the system takes into account the difference in the amount of time a student takes to learn a concept and the fact all students do not learn best in the same way. It is indeed these two variables in learning that research indicates spells the success of mastery of a learning task.

The system's approach involves 6 basic steps: (1) a rationale (2) specific instructional objectives (3) pre-assessment (4) choice of learning activities (5) post assessment (6) revision. These are combined in an empirical manner to produce a viable and efficient learning system. The system's proven capability is that of producing measurable learner achievement.

We must study this system at the operational level and the theoretical construction level. The system's approach gives focus to instruction and to learning, while accomodating most methods of teaching, whether it be lecture, discussion, audio-tutorial, or various approaches to self-paced learning. The system is not a methodology, but a rational framework into which will fit any mode of instruction or instructional intent.

This paper will examine every facet of the system and its implications for utilization in the oceanography technology educational program.



E. D. Wood, Oceanographer  
Puerto Rico Nuclear Center, Puerto Rico

Theme: Ocean Resources Controlled Development

Abstract

CONTROL AND MONITORING OF THERMAL EFFLUENTS

The increased demand for electrical power in Puerto Rico has put a strain on the power generating plants. If the industrial growth and up-grading of the standard of living in Puerto Rico is to continue, the present facilities must be expanded. A major waste product of power generation is heat. The disposal of the excess heat can create an environmental problem if not handled properly. Limited land area and tropical conditions make a conventional solution difficult. The power project at Aguirre on the south coast will take in sea water from the Caribbean Sea through Jobos Bay to cool the electrical generation plants, and then discharge the heated water back into the Caribbean Sea through the Aguirre Ship Canal. The thermal plume will be directed into mid-channel of the Aguirre Ship Canal at a velocity of 1.83 m/sec. This high velocity discharge rate will cause rapid entrainment of dilution water and minimize exposure time for organisms in the dilution water. The plume will be directed away from biologically sensitive areas. Transport and distribution of thermal waters will be monitored by three different methods to ensure that mangrove and turtle grass communities are not affected by the heated waters: first, by fixed temperature recording stations; secondly, by transecting the plume with mobile strings of thermistors; and thirdly, by aerial infra-red scanning. Data gathered will be analyzed by computer to predict and model plume behavior, and to determine the capacity of the system.



Jean L. Dulemba  
Franca University, Sao Paulo, Brazil

Theme: Ocean Resources Evaluation

Abstract

PRELIMINARY OBSERVATIONS CONCERNING FUTURE EXPLOITATIONS OF LIQUID  
AND GASEOUS HYDROCARBONS IN THE MEDITERRANEAN

Actual exploitation of various mineral resources in the sea bottom has recently reached its full level of effectiveness. Taking into account the present continued increase in the consumption of petroleum, different oil companies are becoming increasingly interested in the hydrocarbon beds buried in the sea bottom; so much so that in the light of certain evaluations, "the black gold" has not yet been dethroned by nuclear energy.

The French Petroleum Company (C.F.P. for Compagnie Francaise des Pétroles) has recently conducted some preliminary investigations on the east side of the Corsican oriental coastline. Also, a pronouncement appeared in June 1972 on a series of permits for research on liquid or gaseous hydrocarbons called hesperiens. The undersigned will give an appraisal on future oil sources in the Western Mediterranean dividing the aforesaid sources into two types: sedimentary soils and diapiric structures (fig. 1).

In short, this writer has come to the conclusion that just as the Moon, or even more so than the Moon, the sea bottom is begging to be exploited.

(Translated by: Judith Vilanova  
University of Puerto Rico)

Rafael Cruz Pérez, Carl-Axel P. Soderberg  
Quality Environmental Board

Theme: Ocean Resources Controlled Development and Protection  
of Environmental Quality

Abstract

THE PREPARATION OF QUALITY STANDARDS FOR  
ESTUARINE AND COASTAL WATERS

The technical elements which constitute the essential requirements to achieve the preservation of estuarine and coastal waters for aesthetic and ecological reasons in the midst of a continuous industrial growth are thoroughly discussed in this paper. The water quality aspects of most relevance in the light of current knowledge are identified, and if possible quantified. In the event that quantification is not feasible, narrative guidelines are provided.

A system whereby coastal waters are classified according to one of the several uses that can be given to this resource is included in the presentation together with the corresponding water quality parameters. Moreover, the mixing zone concept for thermal discharges is also discussed. The concepts contained in this document are applied in some instances to the specific case of Puerto Rico. However, these concepts are applicable to tropical waters surrounding islands of limited territorial extent faced with a real or potential industrial boom.



Chi-Ming Cham, Oceanographic Program  
Area of Natural Resources  
Department of Public Works

Theme: Ocean Resources Controlled Development and Protection of  
Environmental Quality

Abstract

TOTAL COLIFORM AND BIOCHEMICAL OXYGEN DEMAND

AT CAÑO CORAZONES

Total coliform and biochemical oxygen demand were studied at Caño Corazones from 21 July to 2 August 1972. 110 samples were taken for total coliform analysis, and 80 samples were taken for biochemical oxygen demand. The samples were collected at ten stations at selected locations in the area. Sixty-five percent of the total coliform values were higher than 2,400 MF/100ml, with the lowest eleven day median at 1,400 MF/100ml (at station VI), and the highest eleven day median at 117,000 MF/100ml at station III). These values indicate an acute level of sewage pollution. It is suggested from the findings that the major source of pollution in Caño Corazones is the outfall from the sewage treatment plant of Guanajibo Homes. The other source of pollution in this area is the artificial stream carrying sewage water from the cattle farms. The concentration of eight day average BOD<sub>5</sub> varied from 3.52 mg/l (at station I) to 7.44 mg/l (at station III). BOD<sub>5</sub> values were higher at the more island stations than at the stations in the estuarine area, closer to the sea. Possibly, mangrove leaves fall into the water, and are decomposed by bacteria, thus increasing BOD<sub>5</sub> values at the more inland sites.

Comparison of variance values of total coliform and biochemical oxygen demand indicates that the ten stations at Caño Corazones show larger significant differences in total coliform levels than in biochemical oxygen demand levels.



Stephen G. Martin  
Puerto Rico Nuclear Center, Puerto Rico

Theme: Commercial Research and Development

Abstract

SURVEY OF THE POTENTIAL FOR OYSTER MARICULTURE

IN PUERTO RICO

Biologists at the Puerto Rico Nuclear Center, Mayaguez, have recently initiated studies related to the potential of oyster mariculture in Puerto Rico. Specifically, experiments are being planned that should determine the possibility of increasing the populations of the local oyster, Crassostrea rhizophorae, and to study the economics of rearing this species to a greater size before harvest. In addition, disease-free seed of two foreign species, the Pacific oyster, Crassostrea gigas, and the American Eastern oyster, C. virginica, will soon be imported into Puerto Rico and their growth studied under a variety of environmental conditions. Although all oyster importations into Puerto Rico have failed thus far, it is thought that by monitoring such variables as food availability, absence or presence of disease and predation, temperature, and salinity, that mortalities can be controlled and the introduced species survive and eventually compete favorably with the local species.

Frank Torres  
Department of Natural Resources

Theme: Ocean Resources Evaluation

Abstract

ECOLOGICAL STUDY OF THE CORALS OF PUERTO RICO

Coral Reefs exercise great influence on the coastal resources of tropical islands. The high productivity and complexity of this community produces the principal fishing resource of the litoral area. Further they form barriers which protect our coasts from the ocean, creating at the same time beaches with calm waters. Recent studies demonstrate that in some areas of Puerto Rico the coral reefs are undergoing a rapid process of degeneration.

Utilizing the facilities of the underwater laboratory "La Chalupa" of PRINUL, a series of intensive studies was undertaken, during a period of two weeks, of the El Negro Reef located 6 miles to the west of Punta Ostiones. This study was undertaken to determine some of the factors that regulate the growth and health of the reef.

Measurements were taken of the illumination, turbidity, plankton, and sedimentation at depths to 55 feet (base of the reef) and 30 feet. Values for illumination and its variation with depth are given for the hours between 10:30 A.M. to 2:00 P.M. Turbidity averaged 0.31. Sedimentation was measured over a period of 10 days at which time there was an accumulation of 0.10 inches at a depth of 58 feet (bottom), 0.8 inches at 50 feet, 0.6 inches at 40 feet and 0.50 inches at 30 feet. The measurements of turbidity, illumination, and sedimentation indicate that the waters surrounding the reef contain a considerable amount of material in suspension. This has been determined to be detrimental to the growth of the reefs.

It was possible to identify 19 species of Stony Coral growing under the conditions of low illumination and heavy sedimentation. This study was limited to depths of 55 and 35 feet. Eight transects covered a total area of 61 square meters to determine the frequency of each species and the area covered in each square meter. The analysis of the areas covered and distribution of species demonstrated a pattern of zonation.



Fifty corals of different species were selected to determine their growth rate as a function of illumination and sedimentation. In agreement with this study, both parameters are factors of the depth. The low values for the percentage of live coral appear to be a direct result of the high level of sedimentation.

Translated by Edgar Werner



Owen H. Wheeler,  
Omni Research Incorporated, Puerto Rico

Theme: Ocean Resources Evaluation

Abstract

ANALYSIS OF TRACES OF MERCURY IN FISH

A method has been developed for the routine analysis of a large number of fish samples for trace amounts of mercury. Samples of 2.0g of fish tissue were digested with 7 N nitric acid and sulfuric acid by heating in flasks in a boiling water bath. For high mercury fish, samples as low as 0.01g were used. The digested solutions were oxidized twice with potassium permanganate and analyzed for mercury using the Coleman MAS-50 analyzer. Results with different types of fish will be briefly discussed.

Chin Y. Kuo  
University of Puerto Rico, Mayaguez, Puerto Rico

Theme: Ocean Resources Evaluation

Abstract

FRESH WATER FROM SUBMARINE SPRING: AN OCEAN RESOURCE

The loss of fresh water into the ocean in a form of submarine spring can be recovered as an ocean resource to meet the increasing water demand due to the rapid growth of the population. The discharge of fresh water behaves like a submerged buoyant plume (or a jet) which is greatly influenced by the current and the density field in the environment and the buoyancy and the initial velocity of the spring. The characteristics of the turbulent jet mixing which entrains the ambient sea water are discussed for the aid of locating the submarine spring. They are: (1) centerline dilution of the jet, (2) density prediction at the sea surface, (3) rational estimation of the limiting height of rise of a buoyant plume, for both a point source and a line source, in homogeneous and density stratified environment. Example of submarine spring explorations along the northwest coast of Puerto Rico is presented. Possible engineering approaches to extract this particular type of the ocean resource is also discussed.

Oficina del Presidente

EXPOTOUR  
5 de junio de 1972  
Actividades CUSC

Sr. Angel L. de Jesús, Tesorero  
Colegio Universitario del  
Sagrado Corazón  
Santurce, Puerto Rico

Estimado señor de Jesús:

Es de su conocimiento que desde el pasado año hemos venido concertando un compromiso con la Oficina de Turismo Español en P. R., para alojar en nuestras facilidades físicas la Exposición de Recursos Turísticos de España (EXPOTOUR).

En carta reciente, 3 de abril de 1972, el señor Román Arango López, Director de la Oficina Nacional Española de Turismo confirma que el gobierno español por conducto del señor Sánchez Pachón, Ministro de Información y Turismo de España, hará un donativo de \$5,000 al CUSC por el uso de nuestras facilidades. Acompaño copia de dicha carta.

Deseo que se entienda en vista de mi renuncia como Presidente que CUSC debe honrar este compromiso en todas sus partes y que deben hacerse arreglos para evitar conflictos en procesos de matrícula para el primer semestre 1972-73. Esto, entendiendo que las fechas comprometidas con la Expotour son desde el 17 de julio próximo hasta el 19 de agosto de 1972.

Esta exposición traerá un gran número de visitantes de toda la isla y del extranjero a nuestro campus, lo que significa una gran ventaja publicitaria para esta institución. Por esta razón deben proveerse todas las facilidades posibles para que la actividad se desarrolle sin inconvenientes que tengan que lamentar tanto el CUSC como los oficiales de Expotour.

La instalación de la Expotour, según nos han informado de la oficina del señor Arango, tomará cerca de dos semanas, luego se abrirá la exposición por quince días consecutivos y se desmantelará en el resto de los días hasta el 19 de agosto. El equipo español de montaje, ingenieros, carpinteros, etc., vendrá al CUSC con todo preparado para su trabajo, no obstante, creemos conveniente que nuestras facilidades de carpintería



u otras que puedan necesitar se pongan a la disposición del Jefe de la Expotour, quién se pondrá en comunicación con usted a su arribo a Puerto Rico.

Cordialmente,



RAFAEL E. GARCÍA BOTTARI  
Presidente

Anejo: Carta señor Román Arango López

c.c. Lcdo. José G. González, Presidente Junta de Síndicos  
Sister Mary Pierre, Decana de Estudios  
Padre Enrique Méndez, Decano de Estudiantes  
Sr. Jesús M. Figueroa, Director Junior College  
Sra. Lydia L. de Rosario, Directora Escuela Elemental y Sec.  
Sra. Consuelo Rivera, Registradora  
Sr. Ramón L. Torres, Director Planta Física  
Sra. Rita A. Rincón de Rubiano, Directora Desarrollo  
Sr. Eladio Guevara, Saga Food Service



OFICINA NACIONAL ESPAÑOLA DE TURISMO

*San Juan de Puerto Rico*      Abril 3 1972

Calle Fortaleza 367

P. O. Box 463

Tel. 725-0625

Sr. Andrés Quiñones Vizcarrondo  
Director de Relaciones Públicas  
Colegio Universitario del Sagrado Corazón  
Santurce, P.R.

Estimado señor Quiñones Vizcarrondo:

Me es grato comunicarle que, a la vista de los informes presentados por el Sr. Sánchez Pachón, Jefe del Negociado de Exposiciones del Ministerio de Información y Turismo de España, el Sr. Ministro ha aceptado la oferta del Colegio Universitario del Sagrado Corazón, en el sentido de celebrar la Exposición de Recursos Turísticos de España (EXPOTUR) en la primera quincena del mes de agosto.

En consecuencia tendremos ocupados los locales desde el lunes 17 de julio hasta el sábado 19 de agosto, ambos inclusive.

A título de compensación por la utilización de los mismos, el Ministerio de Información y Turismo hará al Colegio Universitario del Sagrado Corazón un donativo de cinco mil dólares.

Queda entendido que, una vez desmontada la exposición en la fecha señalada, los locales serán entregados en las mismas condiciones en que se encontraban antes de su ocupación.

Estoy a su disposición para cualquier ulterior aclaración que pueda solicitar, y le envío un saludo muy atento,

Román Arango López  
Director



31 de julio de 1972

Sr. Eduardo Alonso  
Administrador de "Expotur"  
Ministerio de Información y Turismo  
Madrid, España

Estimado señor Alonso:

A nombre de la Junta de Síndicos, de la Administración del Colegio Universitario del Sagrado Corazón y en el mío propio, deseo expresarle nuestro agradecimiento más sincero por el donativo de \$5,000 que hacen ustedes a esta institución.

Es para nosotros un honor y motivo de gran satisfacción que se haya seleccionado un local en este Colegio para presentar el "Expotur" en Puerto Rico. Estamos seguros de que esta actividad estrechará más los lazos de amistad entre Puerto Rico y la Madre Patria.

Esperamos que los vínculos de CUSC con "Expotur" continúen para nuestro beneficio mutuo.

Le reiteramos las gracias por su generosa ayuda y le deseamos el mayor éxito.

Cordialmente,

Pedro González Ramos  
PRESIDENTE



COLEGIO UNIVERSITARIO DEL SAGRADO CORAZON • COLLEGE OF THE SACRED HEART  
APARTADO 12383, CORREO CALLE LOIZA, SANTURCE, PUERTO RICO 00914

*Juntacinos*

*Fils*

1ro. de octubre de 1970

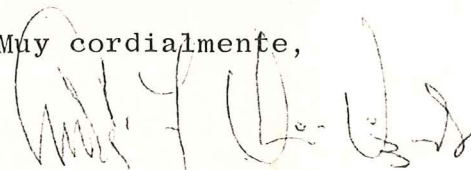
Biblioteca  
Universidad de P. R.  
Colegio Regional de Arecibo  
Arecibo, P. R.

Estimados señores:

Agradezco a nombre del señor Rafael Enrique García Bottari, Presidente del Colegio Universitario del Sagrado Corazón la invitación que nos hace el Director, Facultad y la Biblioteca del Colegio Regional de Arecibo para la exhibición de óleos de Don José Azaustre Muro.

Por encontrarse fuera de Puerto Rico el señor Presidente de esta institución se verá imposibilitado de asistir a esta exhibición. No obstante, les deseo éxito al señor Azaustre Muro y a la institución que le auspicia.

Muy cordialmente,



Andrés F. Quiñones Vizcarrondo  
Ayudante Ejecutivo del Presidente

AQV/ga

# Lileana Acosta Exhibirá Dibujos En Colegio del Sagrado Corazón

Con motivo de la celebración de la Semana de la Biblioteca, el Colegio Universitario del Sagrado Corazón auspicia una exposición de dibujos de la artista Lileana Acosta, ex alumna de este plantel universitario.

Sus dibujos se exhibirán en la Sala de Exposiciones de la Biblioteca Madre María Teresa Guevara de CUSC desde el lunes 19 de abril a las 7:30 P.M.

La señorita Acosta estudió en la Academia Santa Monica

de Santurce, donde tuvo a su cargo la dirección del Club Dramático por espacio de cuatro años. Continuó sus estudios en el Colegio Universitario del Sagrado Corazón, aquí se destacó en múltiples actividades culturales. Dirigió el Club Dramático, tuvo a su cargo la composición e ilustración del periódico del Colegio, y además trabajó en la oficina de Relaciones Públicas.

En el 1969 obtuvo su Bachillerato en Artes con grandes honores. Su tesis la realizó sobre "El Nacimiento Puertorriqueño", trabajo de modelado y policromía.

La señorita Acosta cuenta en su experiencia de trabajo con el montaje de escenografías de teatro escolar y universitario para 16 obras. Además, ha trabajado para el Teatro de Títeres del Departamento de Instrucción en la realización de muñecos; ha realizado decoraciones ornamentales para actividades sociales, diseño de modas, trabajos de modelado y preparación de moldes y en la creación de carteles serigráficos, pintura mural e ilustraciones.

En 1969-70 fue profesora de Historia del Arte en la escuela Lucchetti de Santurce y en la actualidad es profesora de Arte en la escuela José Julián Acosta de San Juan.

Este año ganó el primer premio en el concurso de carteles anunciadores del Festival de las Artes convocado por el Departamento de Instrucción Pública.







Srta. MARIA ISABEL MENDOZA





Don José Azaustre Muro es un pintor español que vino de turista a Puerto Rico. Motivado por la belleza tropical de la Isla decidió quedarse. Paisajista de grandes aspiraciones vio como gigantes que retaban su paleta y sus pinceles, los colores variados, las olas batientes, las suaves montañas. Y lo que del Quijote corre en sangre convertido por su ser, le incitó a luchar y a vencer. Desde entonces ha captado en sus lienzos las escenas campestres más borincanas; pintando hasta de las brumas su color trasluce, hasta de la lluvia el olor del agua. Ha plasmado tradiciones y costumbres del pueblo puertorriqueño, cooperando así a la inmortalización de las mismas. Nuestras frutas han sido modelos que él ha trocado en magníficos bodegones.

La especialidad del pintor Azaustre es el retrato. Es para él la mayor motivación en su amplio campo de Pintura. Para el Sr. Azaustre cada retrato es un estudio físico y psicológico de la persona. Cada uno prueba el gran dominio del pintor en la figura humana y en la gama de los mejores colores. Es por ello que en cada uno se observa un gran parecido, una técnica muy suelta; y sobre todo una personalidad impresionante.

Quizá la obra maestra del Sr. Azaustre es su interés por fomentar el auge artístico en Puerto Rico. Prueba de ello son las ventitrés exhibiciones que ha montado en siete años de residencia en la Isla. Prueba es también su Academia de Pintura en Ponce, que ha producido ya más de un talento bien entrenado, grandes promesas al cada día más sonoro nombre de Puerto Rico. Quizá sea también la admiración que por él sienten sus discípulos y todos aquéllos que le ven consagrado en amor y sacrificio, el mayor tributo que Puerto Rico pueda dar en cambio al pintor Azaustre.

Nada es suficiente a cambio de la fe que tiene este malagueño pintor en los valores artísticos de Puerto Rico. Por todo ello, muchas gracias.

Leonor García

*El Director, la Facultad  
y la Biblioteca del  
Colegio Regional de Arcibo,  
tienen el honor de invitar a usted  
y a su distinguida familia  
a la exhibición de óleos del  
pintor español*

*Don José Azaustre Muro*

*La inauguración será  
el día tres de octubre de  
mil novecientos setenta  
en la Biblioteca del Colegio.*

*Refrigerios: 7:30 p. m.*

# CATALOGO DE OBRAS

## RETRATOS :

- 1- Srta. María Isabel Mendoza, Aguadilla, P. R.
- 2- Sra. Rosa Esteves de Mendoza, Aguadilla, P. R.
- 3- Sr. Epifanio Irizarry, Ponce, P. R.

## CUADROS :

- |  |                            |
|--|----------------------------|
| 4- Estudiantes                                 | 22- Paisaje                |
| 5- Colmado de Don Cholo                        | 23- Flamboyanes en flor    |
| 6- El Riachuelo                                | 24- Jugo de China          |
| 7- Aguacate con Pan                            | 25- El Velocípedo          |
| 8- El Flamboyán                                | 26- Guayabas               |
| 9- Bodegón de Langostas                        | 27- Sol de la tarde        |
| 10- En la Loma                                 | 28- Escena del Puerto Real |
| 11- A la Central                               | 29- Cielo, rocas y Mar     |
| 12- Patio Granadino, Museo de<br>Arte de Ponce | 30- Silueta                |
| 13- Puesto de la Plaza                         | 31- La Carreta             |
| 14- Marina                                     | 32- Rosas Variadas         |
| 15- La Calabaza                                | 33- Arcos de La Fortaleza  |
| 16- Pollitos                                   | 34- Panorama               |
| 17- Cacharros de Cobre                         | 35- Melocotones            |
| 18- Palmeras                                   | 36- Garita del Morro       |
| 19- El Jibarito                                | 37- Gente Menuda           |
| 20- A la vera del Río                          | 38- La abuela              |
| 21- El Camino                                  | 39- Primeras letras        |
|  | 40- Conversación           |

LA EXHIBICION SE EXTENDERA HASTA EL DIA 10 DE OCTUBRE.

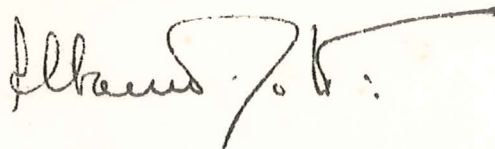


COLEGIO UNIVERSITARIO DEL SAGRADO CORAZON

9 de noviembre de 1970

A: Todos los miembros de la Comunidad Académica del  
Colegio Universitario del Sagrado Corazón

DE: Rafael Enrique García Bottari



En nombre del pintor puertorriqueño Francisco Rodón, tengo a bien invitar a todos los miembros de esta comunidad académica y a sus familiares a la apertura de la exposición:

3 PINTORES FIGURATIVOS

Fernando Botero (Colombia)  
Rafael Coronel (México)  
Francisco Rodón (Puerto Rico)

que tendrá lugar el viernes 13 de noviembre de 1970, a las 8:00 P.M., en la Sala de Exposiciones del Museo de la Universidad de Puerto Rico.

REGB/avm

EL MUSEO DE LA UNIVERSIDAD DE PUERTO RICO

tiene el honor de invitar a usted y a su distinguida

familia a la apertura de la exposición:

3 PINTORES FIGURATIVOS

FERNANDO BOTERO (Colombia)

RAFAEL CORONEL (México)

FRANCISCO RODON (Puerto Rico)

que tendrá lugar el viernes 13 de noviembre de 1970,

a las 8:00 de la noche, en la Sala de Exposiciones.