

AGENCY FOR INTERNATIONAL DEVELOPMENT  
WASHINGTON, D. C. 20523  
BIBLIOGRAPHIC INPUT SHEET

FOR AID USE ONLY

BATCH #18

1. SUBJECT CLASSIFICATION	A. PRIMARY Agriculture	AM00-0000-0000
	J. SECONDARY Fisheries	

2. TITLE AND SUBTITLE  
International Center (for) fisheries: research & training

3. AUTHOR(S)  
(101) Auburn Univ. Int.Center for Aquaculture

4. DOCUMENT DATE 1969	5. NUMBER OF PAGES 35p.	6. ARC NUMBER ARC 639.3.A897
--------------------------	----------------------------	---------------------------------

7. REFERENCE ORGANIZATION NAME AND ADDRESS  
Auburn

8. SUPPLEMENTARY NOTES (Sponsoring Organization, Publishers, Availability)

9. ABSTRACT

10. CONTROL NUMBER PN-RAA-949	11. PRICE OF DOCUMENT
12. DESCRIPTORS Education Research	13. PROJECT NUMBER
	14. CONTRACT NUMBER CSD-1581 GTS
	15. TYPE OF DOCUMENT

639.3  
A897

**INTERNATIONAL CENTER**  
**FISHERIES**  
**RESEARCH & TRAINING**



**AUBURN UNIVERSITY**

**AUBURN ALABAMA**

A.I.D. HISTORICAL AND  
TECHNICAL INFORMATION  
ROOM 1000 HS  
AUBURN ALABAMA

**AUBURN UNIVERSITY'S INTERNATIONAL FISHERIES PROGRAM  
UNDER THE AGENCY FOR INTERNATIONAL DEVELOPMENT  
PROJECT AID/csd-1581**

**INTRODUCTION**

Under contract with USAID, the Auburn University Agricultural Experiment Station is currently operating a world wide international fisheries project entitled, "Increasing Fish Production by Improved Fishcultures".

The project is designed to assist Developing Countries in increasing their capabilities to produce adequate amounts of high-quality protein through cultures of fish, shrimp and other organisms in freshwaters, brackishwaters, and in seawaters. Auburn University assists in planning the necessary research facilities and in training host-country personnel in modern experimental methods for developing highly productive aquacultures and management methods.

The services available from Auburn University under this program include:

1. Surveys to evaluate the problems and to develop plans of operation to increase fish production in Developing Countries.
2. Planning of pondcultural research stations, including soil examination, details of pond construction, accessory research facilities and cost estimates.
3. Providing assistance to the Cooperating Fisheries Departments in host countries in developing research programs and experimental procedures for various phases of aquacultures.
4. Conducting short courses in host countries to inform fisheries research and extension personnel of newest advances in aquaculture and to help develop their competence in areas of particular need.
5. Training of personnel at B.S. , M.S. , and Ph.D. levels at Auburn

University in academic subjects and research methods under USAID and Foundation scholarships.

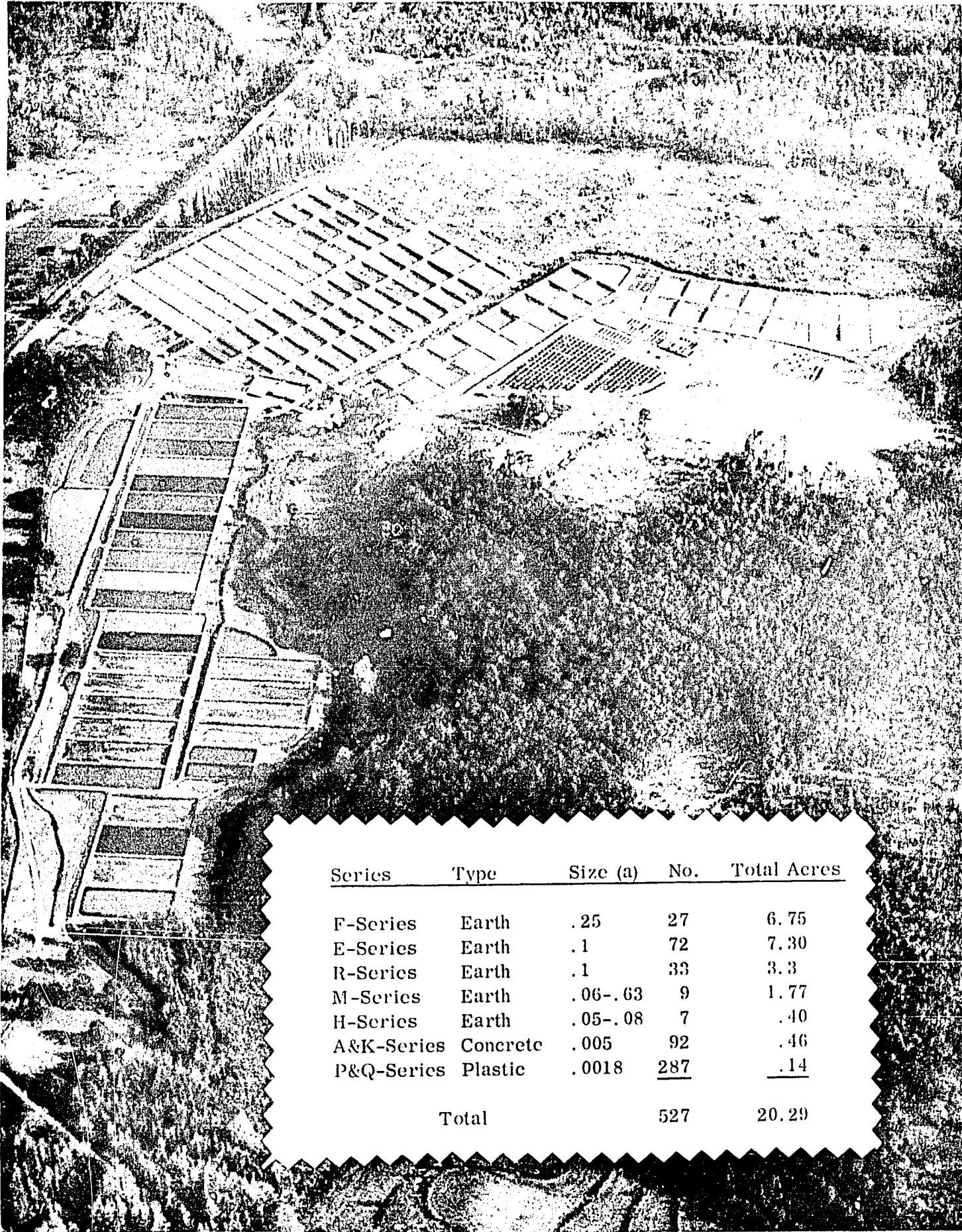
6. Providing assistance to personnel in the Cooperating Fisheries Departments of the host countries in preparation of research results for publication and more effective extension leaflets on improved methods of aquaculture.
7. Providing experts from Auburn University and other institutions in various phases of aquaculture for short-term visits of 1 to 3 weeks in Developing Countries to help solve special problems as they arise.

These may include one or more of the following subjects:

Fish feeds and feeding	Limnological surveys
Fish parasites and diseases	Reservoir fisheries management
Water chemistry problems in aquacultures	Riverine fish populations
Fish cultures	Aquatic weed control, chemical and biological
Shrimp culture	Fish technology - processing and preservation
Inventory of species - fish taxonomy	

8. Providing a limited number of persons trained in aquaculture for 2-year tours of duty in host countries.

Research in the field of Aquaculture has been in progress here since 1934 - 35 years. Students specializing in aquaculture have been graduating annually since 1948. Also, the university has access to experts in the field of aquaculture from other universities and fisheries departments. These experts can be used as needed in this program on a short-term basis. All personnel sent from Auburn will



<u>Series</u>	<u>Type</u>	<u>Size (a)</u>	<u>No.</u>	<u>Total Acres</u>
F-Series	Earth	.25	27	6.75
E-Series	Earth	.1	72	7.30
R-Series	Earth	.1	33	3.3
M-Series	Earth	.06-.63	9	1.77
H-Series	Earth	.05-.08	7	.40
A&K-Series	Concrete	.005	92	.46
P&Q-Series	Plastic	.0018	<u>287</u>	<u>.14</u>
Total			527	20.29

Aerial view of small pond experimental area showing 527 earthen, concrete and plastic ponds with a total of 20.29 surface acres of water.

have training in modern methods of fishculture and all phases of aquaculture.

Where necessary, they will take a refresher short-course before going abroad.

#### RESEARCH PROGRAM

Research in pond fish culture at Auburn University began in 1934, following construction of 21 experimental ponds. The objective then, as now, was to grow fish in experimental plots (small ponds) under experimental management, with periodic evaluation by draining the ponds to determine the composition of the resulting crops. Each year saw the construction of additional experimental ponds and related research facilities and employment of additional staff. As a result of continued expansion and development, Auburn University's Fisheries Research Station presently is the largest experimental facility for warm-water pond fish culture in the world. Results of research conducted at this Station over the years provide the basis for over 300 scientific publications on fish culture and related subjects. Auburn University has, in fact, acquired a world wide reputation as The International Center for Pond Fish Culture Research and Training.

#### FIELD FACILITIES

On the 1300-acre experimental fish farm, a total of 563 experimental units (earthen, concrete and plastic ponds), comprising 168.6 acres of water, is available for research on various phases of pond management, aquatic weed control, fertilization, feeding, disease and parasite control, fish biology and fish reproduction. Field research facilities are located 5 miles north of the main campus. The Small Pond Experimental Area consists of 527 ponds, with 20.29 acres of water. Also located in the area is a building containing 13 large concrete tanks supplied continuously with fresh water for holding fish following pond drainings



Aerial view of large pond demonstration area showing some of the 36 ponds ranging in size from 1 to 25.5 acres and having a total of 148.26 surface acres of water.

and fourteen 200-gallon circular raceways supplied with heated water for overwintering temperature sensitive (tropical) species of fish. The Large Pond Demonstration Area consists of 28 S-Series ponds that vary in size from 1.0 to 25.5 surface acres for a total of 130.66 acres, and 8 FP-Series ponds ranging from 1.0 to 5.0 acres for a total of 17.6 acres. Also located in this area are storage sheds for boats and river survey equipment, a machine shop, a carpenter shop, a feed storage building, a fertilizer storage building, a sawmill and several additional buildings housing heavy construction and maintenance equipment.

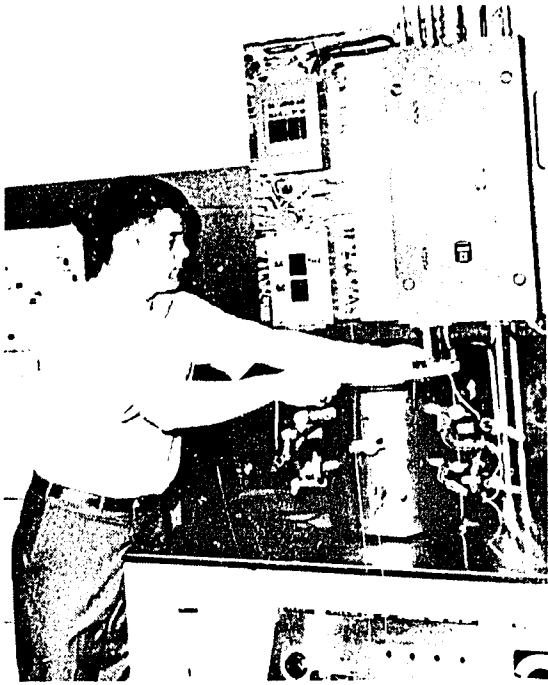
#### LABORATORY AND OTHER FACILITIES

The Fisheries Division of the Zoology-Entomology Department is housed in five buildings located on the main campus of Auburn University. The primary building, with 7,000 square feet of floor space, contains laboratories for water chemistry, fish nutrition, limnology, fish physiology, food technology, two walk-in constant temperature rooms and a large walk-in freezer room. Four adjacent buildings house personnel and laboratories of the regional fish parasite and disease project, the Alabama Cooperative Fishery Unit, with a fish museum and facilities for fish identification, offices for the staff, and a lecture room which will seat 40 students.

#### THE FISHERIES STAFF

At present 15 academic staff are employed in the Fisheries Division with experience and research interests in the following areas: Fish Culture, Limnology, Aquatic Plants, Fish Diseases, Fish Parasites, Fisheries Biology, Fish Physiology, Fish Nutrition, Water Chemistry, Fish Taxonomy, Hatchery Management, Population Dynamics of Rivers and Reservoirs, and Food Technology and Biochemistry.





Instruments such as freeze dryers and atomic absorption spectrophotometers are used in fisheries research.



Microscopic examination and wet lab facilities are necessary in many phases of fish production.

Listed below is the fisheries staff with indication of areas of major interest.

A more detailed resumé of educational background, experience in international fisheries, etc., for each staff member is attached to the brochure.

H. S. Swingle (Sc.D.) Head of Fisheries, Fish population dynamics and methods of intensive fish culture.

Ray Allison (Ph.D.) Fish parasitology and parasite induced immunity in fishes.

J. S. Dendy (Ph.D.) Limnology of impounded waters and ecology of fish food organisms.

George N. Greene (Ph.D.) Mineral nutrient relationships in water and reuse of water in fish cultural systems.

Norris B. Jeffrey (Candidate for Ph.D.)\* Development of methods to increase production of warm water fish.

J. M. Lawrence (Ph.D.) Aquatic weed control and mineral inflow and outflow relationships in impounded waters.

R. T. Lovell (Ph.D.) Technology and biochemistry of fish and shellfish and general aspects of fish nutrition.

D. D. Moss (Ph.D.) Aquaculture and factors affecting production of fish in impounded waters.

E. E. Prather (M.S.) Commercial production of minnows for bait, management of ponds for sport fishing and commercial production of catfishes.

Garland B. Pardue (Candidate for Ph.D.)\* Methods of improving warm-water fish production and genetic improvement and hybridization of fishes.

John S. Ramsey (Ph.D.) Systematic ichthyology and zoogeography of fishes.

Wilmer A. Rogers (Ph.D.) Taxonomy and ecology of fish parasites.

H. R. Schmittou (Candidate for Ph.D.)\* Culture of channel catfish in suspended baskets in ponds.

E. W. Shell (Ph.D.) Fish population dynamics and physiology of fishes.

R. O. Smitherman (Ph.D.) Aquaculture and sportfish management.

\*Ph.D. degree to be awarded June, 1969.



The first ponds at Auburn University were constructed in the early 1930's with mules, scrapes and much manual labor.



Construction of experimental ponds is a continuing program at Auburn.

### TEACHING PROGRAM

Students trained in fisheries at Auburn University are working presently in 23 countries throughout the world. Since the curriculum in fisheries was initiated in the 1940's, training of foreign students has been a major responsibility of the Fisheries Division. The fact that climate in Alabama is not unlike that prevailing in many Developing Countries in tropical and sub-tropical areas and emphases, over the years, on the practical or applied aspects of fish production accounts, to a great extent, for the large number of students from foreign countries trained in fisheries.

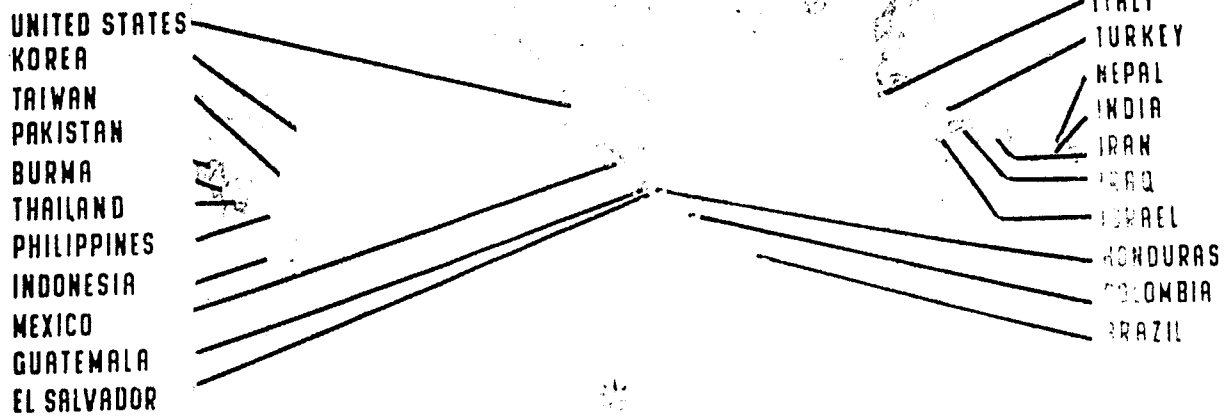
Below is a list of foreign students presently enrolled in fisheries at Auburn:

#### FOREIGN STUDENTS PRESENTLY AT AUBURN

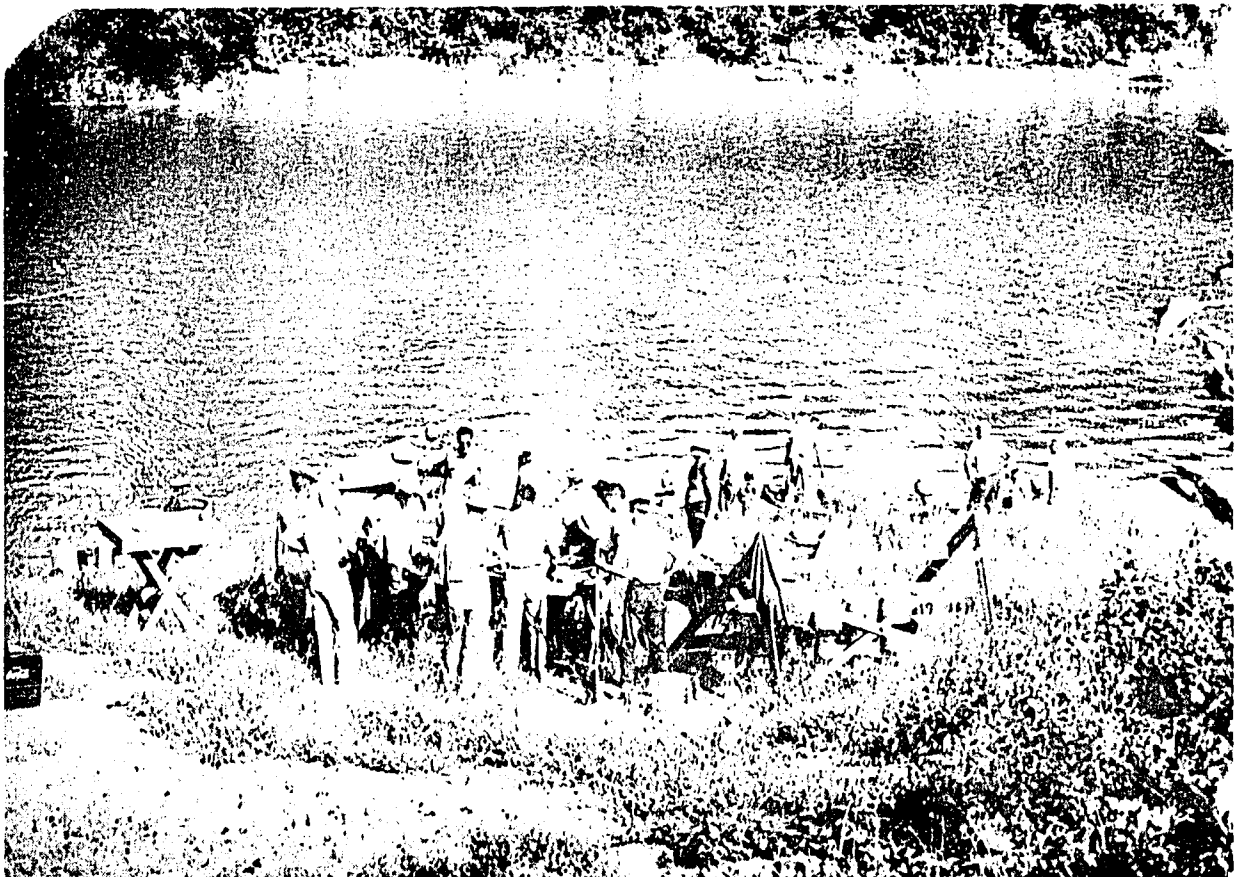
1. Najim K. Al-Daham	Iraq	Ph.D. Candidate
2. Shing Ming Chien	Taiwan	Ph.D. Candidate
3. K. V. Devaraj	India	Ph.D. Candidate
4. Jium Kuo Liang	Taiwan	Ph.D. Candidate
5. Kusman Sumawidjaja	Indonesia	Ph.D. Candidate
6. Gurken Ekingen	Turkey	M. S. Candidate
7. C. N. Lin	Taiwan	M. S. Candidate
8. Amaury Bezerra da Silva	Brazil	Special Student

Following is a list of foreign students who have received training in fisheries at Auburn from 1943 to 1968:

## AUBURN FISHERIES GRADUATES WORK IN:



The fisheries training program at Auburn has produced graduates that work in many countries throughout the world.



River and impoundment surveys are an important part of student training at Auburn.

## COLOMBIA

1. Alonso Ramos-Henao (1964)\*. Director of Fish Cultural Experiment Center, Facultad de Veterinaria, Universidad de Caldas, Manizales, Colombia.

## EL SALVADOR

1. Carlos Alberto Fuentes (1962). Chief, Fish and Game Marine Section. Ministerio de Economia, San Salvador, El Salvador, Central America.

## GUATEMALA

1. Julio Raoul Padilla (1956). Medical Veterinarian, Guatemala City, Guatemala, Central America.
2. Mario Alberto Saavedra-Paz (1964). Chief of Fisheries, Guatemala City, Guatemala, Central America.

## HONDURAS

1. Fausto Echeverria (1957). Congressman. Bolos Profesores, Camayaguela, D. C. Honduras, Central America.

## INDIA

1. Dr. Hiralal Chaudhuri (1955). Inland Fishery Biologist, FAO of the United Nations, Rangoon, Burma.
2. Indumati Das (1959). Assistant Director of Fisheries, Directorate of Fisheries, Orissa State, India.
3. A. K. Gopi Kumar (1958). Present position and address are unknown.
4. Dr. Katragadda Vijaya Lakshmi (1962). University of California at Davis.
5. Santosh Kumar Mitra (1959). Assistant Director of Fisheries, Cuttack Circle, Orissa State, India.
6. Dr. Daya Shankar Sarbahi (1950). Professor of Zoology, Mahila Vidyakaya Degree College, Lucknow, U. P., India.
7. Guptar Krisna Sarbahi (1961). Research Officer, U. P. Department of Fisheries, Lucknow, India.

\*Refers to their last year at Auburn.

INDONESIA

1. Gelar Wira-Atmadja (1966). Head, Division of Aquaculture, Department of Fisheries Production, Faculty of Fisheries, Insitute of Agriculture, 17 Djalan Rumah Sakit II, Bogor, Indonesia.
2. Sulaeman Krishnandi (1964). Associate Dean, Faculty of Fisheries, University of Indonesia, Bogor, Indonesia. (Recently entered private enterprise)
3. Chairul Muluk (1967). Instructor, Faculty of Fisheries, Bogor University of Agriculture, Bogor, Indonesia.
4. Mas Sachlan (1959). Honorair lecturer at College of Fisheries, Agriculture University, Bogor, Indonesia.

IRAN

1. Esfandiar Golesorkhi (1967). Department of Fisheries, Tehran, Iran.

IRAQ

1. Mahmoud Ibrahim Al-Hamed (1953). Director, Directorate of Fisheries, Minister of Agriculture and Agrarian Reform. Baghdad, Iraq.

ISRAEL

1. Yoel Pruginin (1959). General Advisor, Fishculture, Government of Israel, Givat Shapiro, Avichail, Israel.

KOREA

1. Hak Soo Han (1960). Chief, Aquaculture Section, Bureau of Fisheries, Ministry of Agriculture and Forestry, Seoul, Korea.
2. In Bae Kim (1960). Professor, Department of Fisheries Biology, Pusan Fisheries College, Pusan, Korea.

MEXICO

1. Dr. Jorge Carranza (1952). Director, National Center of Marine Sciences and Technologists, Guatemala 10-521, Mexico 1, D. F., Mexico.
2. Dr. Jose Alvarez Del Villar (1943). Professor, Escuela Nacional de Ciencias Biologicas, Calle 27, Num. 71, Mexico 18, D. F., Mexico.

1. Minerva Joshi Suwal (1966). Fisheries Officer, Department of Fisheries, H. M. G. , Singh Durbar, Kathmandu, Nepal.
2. Rohit Bahadur Thapa (1957). Director, Department of Fisheries, H. M. G. , Singh Durbar, Kathmandu, Nepal.

#### PAKISTAN

1. M. D. Zayanul Abedin (1959). Biologist, Directorate of Fisheries, Eden Building, Dacca 2, East Pakistan.
2. Ali Akbar (1968). Biologist, Directorate of Fisheries, Eden Building, Dacca 2, East Pakistan.
3. Muhammed Abul Hafiz (1960). Deputy Assistant Director of Fisheries, Directorate of Fisheries, Rajshahi Division, Rajshahi, East Pakistan.
4. Kazi Azizul Haque (1966). Assistant Director, Directorate of Fisheries, Eden Building, Dacca 2, East Pakistan.
5. Muhammed Ashraf Khan Rana (1952). Assistant Director of Fisheries, West Pakistan Fisheries Department, Madyan, Swat State, West Pakistan.
6. Ghulam Rasul (1968). Biologist, Directorate of Fisheries, Eden Building, Dacca 2, East Pakistan.
7. Dr. A. R. K. Zobairi (1955). Managing Director, East Pakistan Fisheries Development Corporation, Government of East Pakistan, 42 Dilkusha Commercial Area, Motijheel, Dacca, East Pakistan.

#### PHILIPPINES

1. Pascual A. Acosta (1948). Officer in charge, Development Bank of the Philippines, Northern Sumar, Philippines.
2. Constancia Maderazo (1948). Assistant Manager, Rural Bank of Bantayan, Inc. Cebu, Philippines.
3. Manuel E. Medina (1948). Supervising Fisheries Biologist, Philippines Fisheries Commission, Intramuros, Manila, Philippines.
4. Pedro O. Morales (1950). Supervising Educational Specialist, Fishery Education, Department of Education, Manila, Philippines.
5. Dr. Mario M. Pamatmat (1960). Senior Research Associate, Department of Oceanography, University of Washington, Seattle, Washington.



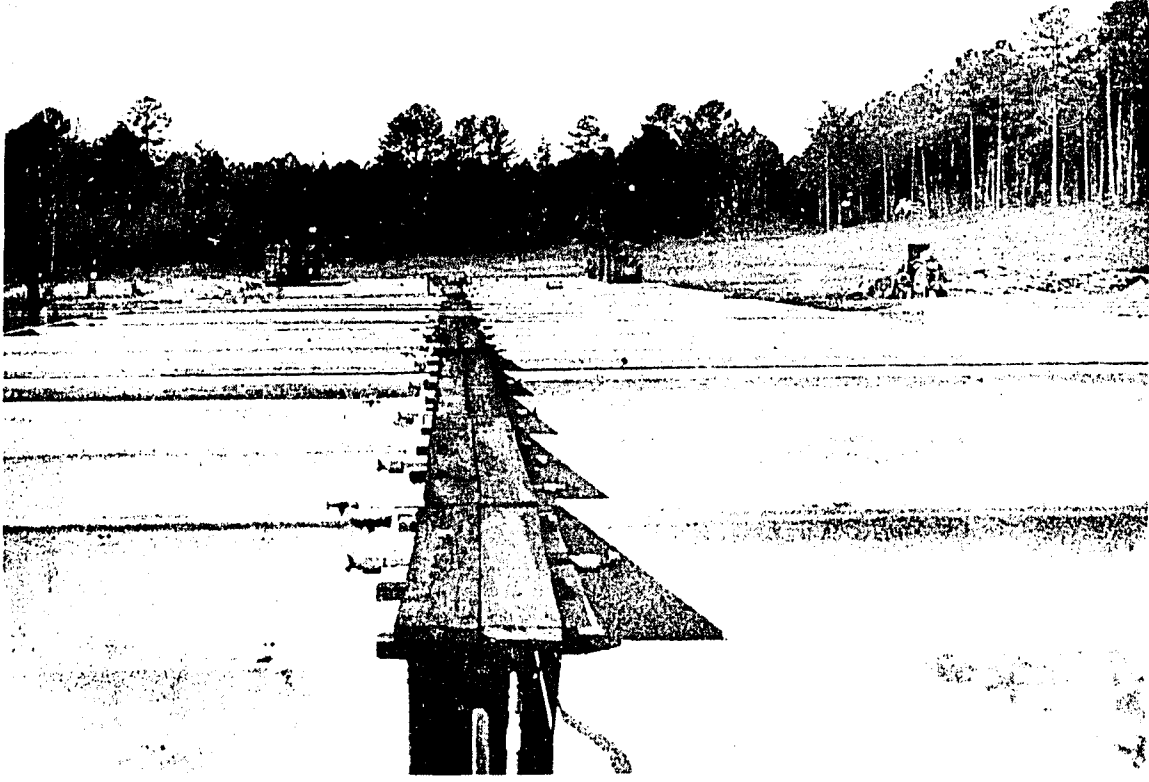
6. Dr. Herminio R. Rabanal (1960). Inland Fishery Biologist, Fish Culture Section, Inland Fishery Branch, FAO of the United Nations, Rome, Italy.

#### TAIWAN

1. Chung Ling Chu (1966). Research Assistant, College of Fisheries, University of Washington, Seattle, Washington.
2. Yun An Tang (1954). Inland Fisheries Biologist, Fish Culture Development Project of the Philippines, UNDP, P. O. Box 1864, Manila, Philippines.
3. Shu Yen Lin (1964). Professor of Fish Culture, National Taiwan University, Taipei, Taiwan.

#### THAILAND

1. Prasit Aguru (1966). Chief, Chainat Fisheries Station, Chainat Province, Thailand.
2. Chertchai Amatyakul (1953). Director, Inland Fisheries Division, Department of Fisheries, Bangkok, Thailand.
3. Prida Karnasut (1958). Director-General, Department of Fisheries, Bangkok, Thailand.
4. Umpol Pongsuwana (1960). Head, Songkhla Marine Fisheries Station, Department of Fisheries, Songkhla, Thailand.
5. Manu Potaros (1965). Fisheries Biologist, Inland Fisheries Division, Department of Fisheries, Bangkok, Thailand.
6. Suin Rithcharung (1968). Biologist, Nakornrajasima Fisheries Station, Nakornrajasima Province, Thailand.
7. Ariya Sidthimunka (1955). Senior Fisheries Biologist, Department of Fisheries, Bangkok, Thailand.
8. Jinda Thiemmedh (1955). Dean, College of Fisheries, Kasetsart University, Bangkok, Thailand.
9. Snit Tongsanga (1963). Lecturer, Department of Biology, Kasetsart University, Bangkok, Thailand.
10. Vanich Varikul (1965). Fisheries Biologist in charge of Research, Inland Fisheries Division, Department of Fisheries, Bangkok, Thailand.



**Concrete ponds are utilized in experimentation for new methods of fish culture.**



**Plastic ponds are a convenient experimental unit for research involving the aquatic environment.**

## BRAZIL

Report of Short Term Survey of Perira De Miranda Reservoir to Establish Criteria for Improved Fresh Water Fisheries Management, by J. S. Dendy, E. W. Shell, and E. E. Prather. 39 p. September, 1966.

Second Report of Short Term Survey of Perira De Miranda Reservoir to Establish Criteria for Improved Fresh Water Fisheries and Intensive Fish Culture Management, by J. S. Dendy, E. W. Shell, and E. E. Prather. 63 p. October, 1967.

Third Report of Short Term Survey of Perira De Miranda and Araros Reservoirs to Establish Criteria for Improved Fresh Water Fisheries and Intensive Fish Culture Management, by E. W. Shell, E. E. Prather, and N. B. Jeffrey. 71 p. September, 1968.

## INDIA

Research Evaluation Report on the Central Inland Fisheries Research Stations, Government of India, by H. S. Swingle. 34 p. March, 1961.

Fishculture Project Report for India, by H. S. Swingle and D. D. Moss. 23 p. February 16, 1968.

## ISRAEL

Report on Pondfisheries and International Limnological Symposium in Israel, August 6-28, 1968, by H. S. Swingle. 25 p.

## JAPAN

Report of Fishcultural Investigations in Japan, by H. S. Swingle and D. D. Moss. 22 p. April 15, 1968.

## MALAYSIA

Fishculture Project Report for the Federation of Malaysia, by H. S. Swingle and D. D. Moss. 15 p. February 26, 1968.

Fishculture Project Report for East Pakistan, by H. S. Swingle and D. D. Moss. 16 p. January 30, 1968.

Fishculture Project Report for East Pakistan - Final Report, by H. S. Swingle, H. R. Schmittou, D. D. Moss, and W. A. Rogers. 132 p. February 1, 1969.

### PHILIPPINES

Report to the Government of the Philippines - Organization and Operation of the Limnology Project 1959-60. FAO United Nations Report 1319, by J. S. Dendy. 25 p. 1961.

Fishculture Project Report for the Philippines, by H. S. Swingle and D. D. Moss. 58 p. October 10, 1967, revised January, 1968.

Philippine Report - Survey Report II, by H. S. Swingle and R. O. Smitherman. 26 p. June 27, 1968.

### TAIWAN

Report of Fishcultural Investigations in Taiwan, by H. S. Swingle and D. D. Moss. 24 p. June 17, 1968.

### THAILAND

Report to Department of Fisheries, Bangkok, Thailand, by H. S. Swingle. 23 p. February 5, 1958.

Fishculture Project Report for Thailand, by H. S. Swingle and D. D. Moss. 35 p. January 15, 1968.

Thailand Report - Survey Report II, by H. S. Swingle and R. O. Smitherman 15 p. July 26, 1968.

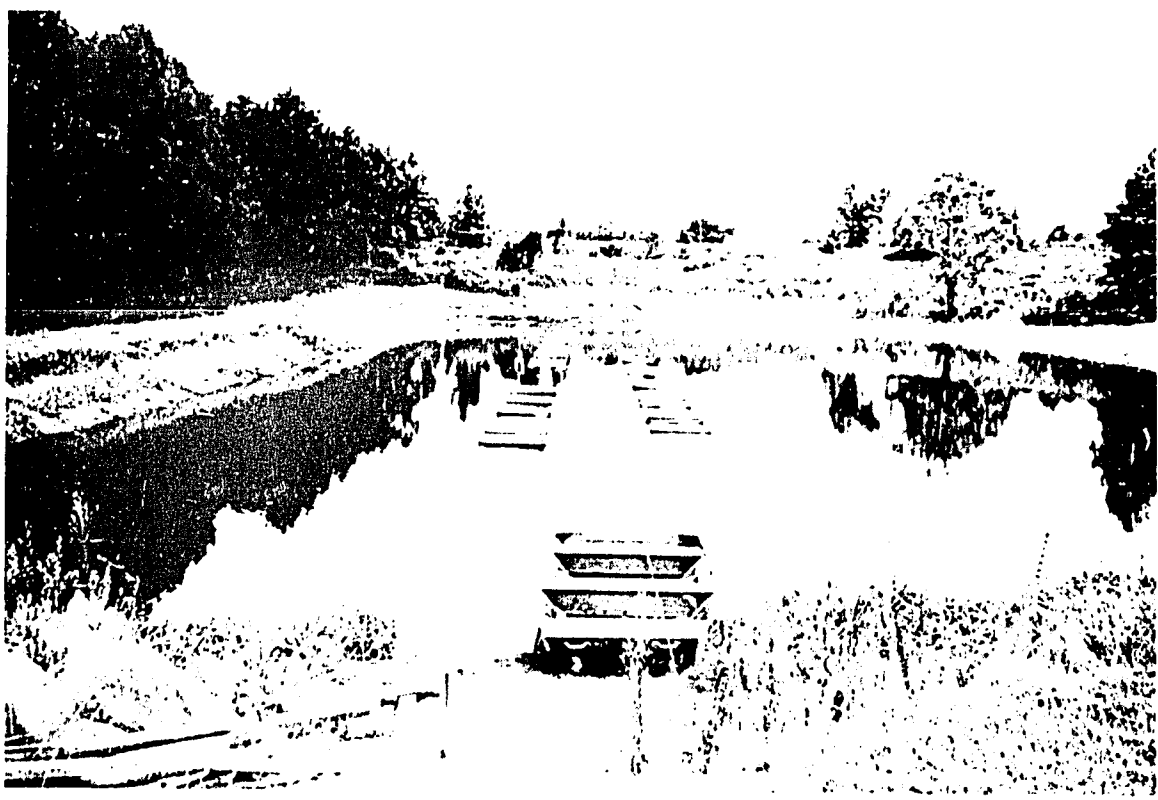
Thailand Report - Survey Report III, by H. S. Swingle, H. R. Schmittou and W. A. Rogers. In Preparation. 1969.

### VIETNAM

Fishculture Project Report for South Vietnam, by H. S. Swingle and D. D. Moss. 17 p. February 15, 1968.

### UNITED NATIONS

Report of FAO AD-HOC Advisory Committee on Inland Fisheries, October 20-25, 1968, Rome, Italy, by H. S. Swingle. 8 p. January 15, 1969.



Basket culture of fishes is one of the recent experimental programs.



Measuring and weighing of crops of fish is an integral part of the program.

RAY ALLISON - (October 13, 1920 - Swannanoa, North Carolina)

Educational Background: B.S. , 1946, Western Carolina College; Science; M.S. , 1949, North Carolina State College; Zoology; Ph.D. , 1961, Louisiana State University, Zoology.

Academic Appointment: Assistant Professor (1950); Associate Professor (1961).

Previous Positions: Served in Army Air Force with 33rd Photo Reconnaissance Squadron from 1943 to 1946. Employed as biologist, North Carolina Wildlife Resources Commission 1946 to 1950.

Present Research Interest and Teaching Responsibility: Fish parasitology and parasite induced immunity in fishes.

Honorary and Professional Organizations: Society of Sigma Xi and Gamma Sigma Delta.

Selected Publications:

Some new results in the treatment of ponds to control some external parasites of fish. Prog. Fish-Culturist, Vol. 19, No. 2, 1957.

A preliminary note on the use of Di-N-Butyl Tin Oxide to remove tapeworms from fish. Prog. Fish-Culturist. Vol. 19, No. 3, 1957.

Observations on the life cycle of the trematode, Stichorchis subtriquetrus. Proceedings of the Louisiana Academy of Sciences, Vol. XX, 1958.

Monogenetic trematodes of Alabama fresh-water fishes. Ph.D. thesis, Louisiana State University, August, 1961.

Parasite epidemics affecting channel catfish. Proc. Southeast. Assoc. Game and Fish Commr. ,17(1963): 346-347.

Experimental biological control of a trematode parasite of bluegill. Experimental Parasitology 17, 296-301, 1965.

Control of snails by the redear (shellcracker) sunfish. Proc. FAO World Symposium on Warm-Water Pond Fish Culture. Vol. 5: 399-406. Rome, 1966. (With J. L. Carothers).

New control methods for Ichthyophthirius in ponds. Proc. FAO World Symposium on Warm-Water Pond Fish Culture. Vol. 5: 389-392. Rome, 1966.

S. B. DENBY (September 23, 1901 - September 1, 1981)  
Educational Background: B. S. , 1930, Presbyterian College; Biology; M. S. , 1932, University of North Carolina; Zoology; Ph. D. , 1943, University of Michigan; Zoology.

Academic Appointment: Associate Professor (1947); Professor (1957).

Previous Positions: Held positions as teacher of biology in high school (North Carolina); Instructor in Zoology, University of North Carolina; Professor of Biology, Brevard College; Fisheries Biologist (Limnologist), Tennessee Valley Authority. He served as Fisheries Officer for FAO (United Nations) 1959 to 1960 where he implemented a program of limnological research on lakes of the Philippines. For three weeks in 1965, served in the Philippines as member of Advisory Team for United Nations to determine feasibility of proposed fisheries development program. Through U. S. Fish and Wildlife Service, was consultant in limnology to USAID Fisheries Project in Brazil during summers of 1966 and 1967.

Research Interest and Teaching Responsibility: Limnology of impounded waters and ecology of fish food organisms. Teaches courses in limnology and invertebrate zoology.

Honorary and Professional Organizations: Ecological Society of America , American Fisheries Society, American Society of Ichthyologists and Herpetologists, Society of Sigma Xi, American Society of Limnology and Oceanography.

Selected Publications:

Distribution, life history, and morphological variations of the Southern Brook Lamprey, Ichthyomyzon gagei. Copeia. 1953. (3): 152-162.

Bottom fauna in ponds with largemouth bass only and with a combination of largemouth bass plus bluegill. Jour. Tenn. Acad. Sci. , 31(3): 198-207.

Food of several species of fish, Norris Reservoir, Tennessee. Jour. Tenn. Acad. Sci. , 21(1): 105-127.

Fish distribution, Norris Reservoir, Tennessee. II, Depth distribution of fish in relation to environmental factors, Norris Reservoir. Jour. Tenn. Acad. Sci. , 20(1): 114-135.

Productions of Tilapia mossambica Peters, plankton and benthos as parameters for evaluating nitrogen in pond fertilization. Proc. FAO World Symposium on Warm-Water Pond Fish Culture. Vol. 3: 226-240. Rome, 1966. (With K. Sumawidjaja and M. Potaros).

Report to the Government of the Philippines - Organization and Operation of the Limnology Project 1959-60. FAO United Nations Report 1319, 25 p. Rome, 1961.

GEORGE N. GREENE - (November 1, 1933 - Iowa City, Iowa)

Educational Background: B. A. , 1955, Rice Institute; Pre-Med; M. S. , 1960, University of Michigan; Fisheries; Ph.D. , 1964, Auburn University; Zoology (Fish Ecology).

Academic Appointment: Assistant Professor (1964).

Previous Positions: Biologist, Texas Game and Fish Commission 1957-1959, attended Harvard Law School 1955-1956.

Present Research Interest and Teaching Responsibility: Mineral nutrient relationships in water and reuse of water in fish cultural systems. Teaches courses in water quality and aquatic productivity and in marine biology.

Honorary and Professional Organizations: American Fisheries Society, Society of Sigma Xi, and Gamma Sigma Delta.

Selected Publications:

Experiments on the use of a biofilter to remove wastes from fish tanks. Proc. Southeast. Assoc. Game and Fish Commr. , 20(1966): 446-457. (With C. L. Chu).

White bass feeding: scent or sight. Trans. Am. Fish. Soc. 91(3): 326. 1962.

A reproduction control factor in the cyprinid fish, Brachydanio rerio. Proc. FAO World Symposium on Warm-Water Pond Fish Culture. Vol. 4: 86-92. Rome, 1966.

Effect of different nitrogen sources and soil on fish production and water chemistry in fertilized plastic pools. Proc. Southeast. Assoc. Game and Fish Commr. 1968. (In Press).



NORRIS B. JEFFREY - (April 16, 1940 - Goldsboro, North Carolina)

Educational Background: B.S., 1962, University of North Carolina at Raleigh; Zoology; Ph.D., to be awarded 1969, Auburn University; Zoology (Fish Culture).

Academic Appointment: Instructor (1968).

Previous Positions: Graduate Research Assistant while working off requirements for the Ph.D. degree at Auburn University. Also served as consultant in limnology during summer of 1968 for Bureau of Commercial Fisheries, U. S. Fish and Wildlife Service, under U.S.A.I.D. intensive fish culture project in Brazil.

Present Research Interest and Teaching Responsibility: Development of methods to increase production of warm water fish, specifically the use of aeration-circulation in intensively fed catfish production ponds.

Honorary and Professional Organizations: American Fisheries Society, American Museum of Natural History.

Selected Publications:

Use of aeration in catfish production ponds. Presented to the annual meeting of the American Fish Farmers Association. Stuttgart, Arkansas, 1967.

Use of aeration in Ictalurus catus, white catfish production ponds. Ph.D. dissertation, 1969.

**J. M. LAWRENCE** - (September 25, 1919 - Cedar Bluff, Alabama)

**Educational Background:** B.S., 1941, Auburn University; Agriculture; M.S., 1943, Auburn University; Wildlife Management; Ph.D., 1956, Iowa State College; Zoology and Statistics.

**Academic Appointment:** Assistant Professor (1946); Associate Professor (1956); Professor (1963).

**Previous Positions:** Served as Graduate Assistant in fisheries while in graduate school. Served as navigator in Army Air Force 1942-1946.

**Present Research Interest and Teaching Responsibility:** Aquatic weed control and mineral inflow and outflow relationships in impounded waters. Directs student research problems in ecology of aquatic plants and methods of their control, and in mineral nutrient balance in impounded waters.

**Honorary and Professional Organizations:** Society of Sigma Xi, Phi Kappa Phi and Gamma Sigma Delta.

**Selected Publications:**

Aquatic herbicide evaluation tests using plastic pools. Proc. SWC. 14: 309-317, 1961.

Aquatic herbicide data. U.S.D.A. Handbook Series No. 231, 133 p. 1962.

Water quality in plastic pools before and after treatments with bipyridyl compounds. Proc. SWC. 16: 366-367, 1963.

Effectiveness of herbicidal combinations on alligatorweed growing in flowing water. Proc. SWC. 18: 558-566, 1965.

Aquatic weed control in fish ponds. Proc. FAO World Symposium on Warm-Water Pond Fish Culture. Vol. 5: 76-91. Rome, 1966.

Dynamics of chemical and physical characteristics of water, bottom muds, and aquatic life in a large impoundment on a river. Zoology-Entomology Department Series, Fisheries No. 6, Auburn University, 1968. 216 p.

R. T. LOVELL - (February 21, 1934 - Lockesburg, Arkansas)

Educational Background: B.S., 1956, Oklahoma State University; Dairy Science; M.S., 1958, Oklahoma State University; Animal Nutrition; Ph.D., 1963, Louisiana State University; Animal Nutrition and Biochemistry.

Academic Appointment: Associate Professor (1969)

Previous Positions: Served as Graduate Assistant Oklahoma State University 1957-1958, and Louisiana State University 1960-1962. Instructor of Dairy Science Oklahoma State University 1958-1960; Assistant Professor of Food Science 1963-1965 and Associate Professor of Food Science 1965-1968, Louisiana State University.

Present Research Interest and Teaching Responsibility: Technology and biochemistry of fish and shellfish and general aspects of fish nutrition.

Honorary and Professional Organizations: American Association for the Advancement of Science, American Dairy Science Association, Institute of Food Technologists, Alpha Zeta, Gamma Sigma Delta, Society of Sigma Xi, Phi Sigma, Phi Kappa Phi.

Selected Publications:

Radiation pasteurization of Gulf oysters. Presented to the 25th annual meeting of the Institute of Food Technologists, Kansas City, Mo., 1965. Also published in Food Techn., 20:103, 1966. (With A. F. Novak, R. M. Grodner, and J. A. Liuzzo).

Freshwater crayfish (Procambarus clarkii Girard) as a food product. Presented to the 63rd annual meeting of the Assoc. of Southern Agricultural Workers, Jackson, Mississippi, 1966.

Bacterial studies with freshwater crayfish (Procambarus clarkii Girard). Presented to the 64th annual meeting of Assoc. of Southern Agricultural Workers, New Orleans, Louisiana, 1967. (With N. A. Cox).

Tests for quality deterioration in tail flesh of freshwater crayfish (Procambarus clarkii Girard). Presented to the 64th annual meeting of Assoc. of Southern Agricultural Workers, New Orleans, Louisiana, 1967. (With G. J. Flick).

Chemical composition of non-edible crayfish by-products. Presented to the 64th annual meeting of the Assoc. of Southern Agricultural Workers, New Orleans, Louisiana, 1967. (With F. H. Hoskins, S. J. LeBlanc, and J. R. Lafleur).

Nutritional value of freshwater crayfish waste meal. Submitted (5/17/67) for publication to J. of Agric. and Food Chem. (With J. R. Lafleur and F. H. Hoskins).

D. D. MOSS - (February 28, 1926 - Bunker Hill, Indiana)

Educational Background: B.S., 1949, Auburn University; Fish Management; M.S., 1950, Auburn University; Fish Management; Ph.D., 1962, University of Georgia; Zoology.

Academic Appointment: Associate Professor (1967), Assistant Director, USAID Fisheries Project.

Previous Positions: Fisheries Biologist and Assistant Chief of Fisheries, Alabama Department of Conservation 1951-1958. Research Assistant, University of Georgia 1958-1961. Served nearly four years (1962-1965) as visiting professor of fisheries with the University of Kentucky USAID Contract Team to the Institute of Agriculture in Bogor, Indonesia. During this overseas tour, study trips were made to Malaysia, Thailand, India, Taiwan, the Philippines, and Japan. A staff member of the Department of Biology at Tennessee Technological University 1965-1966, and served as Acting Chairman of the Department during 1966.

In present position, participated in survey trip to various countries in Asia during the period of September-December, 1967.

Research Interest and Teaching Responsibility: Aquaculture and factors affecting production of fish in impounded waters.

Honorary and Professional Organizations: American Association for the Advancement of Science, American Institute for Biological Sciences, American Fisheries Society, American Society of Limnology and Oceanography, Society of Sigma Xi.

Selected Publications:

The effect of the slider turtle, Pseudemys scripta scripta on the production of fish in farm ponds. Proc. Southeast. Assoc. of Game and Fish Commr., 9(1959): 97-100.

The production and management of Alabama's state-owned public fishing lakes. Trans. Am. Fish. Soc. 85(1955), 16 p. (With I. B. Byrd).

Farm pond investigations in Alabama. Prog. Fish-Culturist. Vol. 18(1956), No. 4, 7 p. (With J. M. Hester).

Dissolved oxygen requirements of three species of fish. Trans. Am. Fish. Soc. 90(1961), 16 p. (With D. C. Scott).

Respiratory metabolism of fat and lean channel catfish. Prog. Fish-Culturist. Vol. 26(1964), No. 1, 5 p. (With D. C. Scott).

Handbook of Tennessee reservoirs. Dept. of Biology, Tenn. Tech. University, 1967, 144 p.

GARLAND B. PARDUE - (November 23, 1941 - Elkin, North Carolina)

Educational Background: B.S. , 1962, University of North Carolina; Zoology; M.S. , 1965, University of North Carolina; Fisheries; Ph.D. , to be awarded 1969, Auburn University; Zoology (Fish Culture).

Academic Appointment: Instructor (1968).

Previous Positions: Served as Fisheries Aid, Bureau of Sport Fisheries and Wildlife 1963-1964, Graduate Assistant at North Carolina State University 1964-1965, N.D. E. A. Fellow at Auburn University 1965-1968.

Present Research Interest and Teaching Responsibility: Methods of improving warm-water fish production. Genetic improvement and hybridization of fishes.

Honorary and Professional Organizations: American Fisheries Society, American Society of Limnology and Oceanography, American Museum of Natural History, National Wildlife Federation, Alpha Zeta, and Tau Alpha Sigma.

Selected Publications:

Variation in the growth rate of known-age largemouth bass under experimental conditions. Proc. Southeast. Assoc. Game and Fish Commr. , 20(1966): 300-310. (With F. E. Hester).

Effects of increased attachment surface for fish food organisms on fish production. Ph.D. dissertation, 1969.

E. E. PRATHER - (November 22, 1919 - Autaugaville, Alabama)

Educational Background: B.S., 1941, Auburn University; Agricultural Science; M.S., 1942, University of Michigan; Zoology (Fisheries).

Academic Appointment: Assistant Professor (1945); Associate Professor (1950).

Previous Positions: Served as Assistant in fisheries 1941, Auburn University prior to attending Graduate School. Served in the Army Air Force 1943-1945 and 1951-1954 - discharged as Captain. Served as consultant in Brazil during summers of 1966, 1967, and 1968, with U. S. Fish and Wildlife Service under the U.S.A.I.D. Fish Culture Project.

Research Interest and Teaching Responsibility: Commercial production of minnows for bait, management of ponds for sport fishing and commercial production of catfishes. Teaches courses in fish culture and hatchery management.

Honorary and Professional Organizations: American Fisheries Society, Alpha Zeta, Gamma Sigma Delta.

Selected Publications:

Production of bait minnows in the Southeast. Auburn University Agr. Exp. Sta. Cir, No. 112, 72 p.

Experiments on the commercial production of golden shiners. Proc. Southeast. Assoc. Game and Fish Commr., 10(1956): 150-155.

Preliminary experiments on winter feeding small fathead minnows. Proc. Southeast. Assoc. Game and Fish Commr., 11(1957): 249-253.

Further experiments on feeds for fathead minnows. Proc. Southeast. Assoc. Game and Fish Commr., 12(1958): 176-178.

Preliminary results on the production and spawning of white catfish in ponds. Proc. Southeast. Assoc. Game and Fish Commr., 14(1960): 143-145. (With H. S. Swingle).

A comparison for production of albino and normal catfish. Proc. Southeast. Assoc. Game and Fish Commr., 15(1961): 302-303.

Experiments with white catfish as sport fish. Auburn University Zoology-Entomology Department Series, Fisheries No. 2, 9 p.

JOHN S. RAMSEY - (June 23, 1939 - Tsingtao, China)

Educational Background: B.S., 1960, Cornell University; Ichthyology; Ph.D., 1965, Tulane University; Zoology.

Academic Appointment: Research Lecturer and Leader, Alabama Cooperative Fisheries Unit, Auburn University (1967).

Previous Positions: Recipient of National Institute of Health predoctoral research fellowship during graduate training. Assistant Professor and Associate Investigator of Marine Biology, University of Puerto Rico 1965-1967.

Present Research Interest and Teaching Responsibility: Systematic ichthyology and zoogeography, teaches courses in ichthyology and directs graduate student research in ichthyology.

Honorary and Professional Organizations: Society for Systematic Zoology, American Society of Ichthyologists and Herpetologists, American Fisheries Society, American Society of Parasitologists, Society of Sigma Xi.

Selected Publications:

Etheostoma ditrema, a new darter of the subgenus Oligocephalus (Percidae) from springs of the Alabama River basin in Alabama and Georgia. *Tulane Studies in Zoology* 12(3): 65-77. (With R. D. Suttkus). 1965.

Barbulostomum cupuloris gen. et sp. n. (Trematoda: Lepocreadiidae) from sunfishes (Lepomis spp.) in Lake Pontchartrain, Louisiana. *Journal of Parasitology* 51(5): 777-780. 1965.

Zoogeographic studies on the freshwater fish fauna of rivers draining the Southern Appalachian region. *Dissertation Abstracts*. 1966.

Percina aurolineata, a new percid fish from the Alabama River system and a discussion of ecology, distribution, and hybridization of darters of the subgenus Hadropterus. *Tulane Studies in Zoology* 13(4): 129-145). 1967. (With R. D. Suttkus).

The optic tracts of two species of sharks (Galeocerdo cuvier and Ginglymostoma cirratum). *Brain Research* 8: 36-53. 1968. (With S. O. E. Ebbesson).

Freshwater fishes, In F. K. Parrish (ed.), *Keys to water quality indicative organisms (southeastern United States)*. U. S. Federal Water Pollution Control Administration. 15 p. 1968.

WILMER A. ROGERS - (August 17, 1933 - Mount Dora, Florida)

Educational Background: B.S., 1958, Mississippi Southern University; Biology; M.S., 1960, Auburn University; Fish Management; Ph.D., 1967, Auburn University; Zoology (Fish Parasitology).

Academic Appointment: Instructor (1964), Assistant Professor (1967).

Previous Positions: Served in United States Navy 1951-1954; District Fisheries Biologist, Alabama Department of Conservation 1960-1962; Assistant Director U. S. Fish and Wildlife Service Warm-Water Fisheries Training School at Marion, Alabama, 1962-1964. Participated in survey of fisheries in East Pakistan, October-December, 1968, under U.S.A.I.D. Fish Culture Project.

Present Research Interest and Teaching Responsibility: Taxonomy and ecology of fish parasites. Teaches a course in fish parasitology and directs graduate research in parasite taxonomy and ecology.

Honorary and Professional Organizations: Society of Sigma Xi, American Fisheries Society, American Society of Parasitologists, Helminthological Society of Washington, Wildlife Disease Association, Society of Systematic Zoologists.

Selected Publications:

Studies on Dactylogyridae (Trematoda: Monogenea) with descriptions of 24 new species of Dactylogyridae, 5 new species of Pellucidhaptor, and proposal of Aplodiscus gen. n. *Journal Parasit.* 53: 501-524.

Food habits of young largemouth bass in hatchery ponds. *Proc. Southeast. Assoc. Game and Fish Commr.*, In Press (New Orleans, 1967).

A key to the common parasitic protozoans of North American fishes. Auburn University Zoology-Entomology Department Series, Fisheries No. 4. 1966. 17 p. (With T. L. Wellborn, Jr.).

The biology and control of the anchor worm, Lernaea cyprinacea L. *Proc. FAO World Symposium on Warm-Water Pond Fish Culture*. Vol. 5: 393-398. Rome, 1966.

A study of two streams receiving domestic sewage. *Proc. Southeast. Assoc. Game and Fish Commr.*, 16(1962): 449-463.



H. R. SCHMITTOU - (September 14, 1936 - Waverly, Tennessee)

Educational Background: B.S., 1962, Tennessee Technological University; Biology; M.S., 1965, Auburn University; Fish Management; Ph.D., to be awarded 1969, Auburn University; Zoology (Fish Culture).

Academic Appointment: Instructor (1968).

Previous Positions: Graduate Research Assistant while working off requirements for the Ph.D. degree. Worked as District Fisheries Biologist, Alabama Department of Conservation 1964-1966. Participated in fisheries survey of East Pakistan, October-December, 1968, under U.S.A.I.D. Fish Culture Project.

Research Interest and Teaching Responsibility: Culture of channel catfish in suspended baskets.

Honorary and Professional Organizations: American Fisheries Society, American Museum of Natural History.

Selected Publications:

Sex ratios of bluegill in four populations. Trans. Am. Fish. Soc. 96(4): 420-421. 1967.

Some effects of supplemental feeding and controlled fishing in largemouth bass-bluegill populations. Proc. Southeast. Assoc. Game and Fish Commr., 1968. In Press.

The intensive culture of channel catfish and other fishes in baskets suspended in ponds. Ph.D. dissertation, 1969.

E. W. SHELL - (June 16, 1930 - Chapman, Alabama)

Educational Background: B.S., 1952, Auburn University; Fish Management; M.S., 1954, Auburn University; Fish Management; Ph.D., 1959, Cornell University; Fishery Biology, Biochemistry.

Academic Appointment: Assistant Professor (1959); Associate Professor (1965); Alternate Director, USAID Fisheries Project.

Previous Positions: Graduate Assistant in fisheries while graduate student. Consultant in Fishery Biology for U. S. Fish and Wildlife Service under USAID Fish Culture Project in Brazil during summers of 1966, 1967, and 1968.

Research Interest and Teaching Responsibility: Fish population dynamics and factors affecting fish production. Directs student research problems in fishery biology and fish physiology. Teaches courses in fishery biology and in management of streams and large impoundments.

Honorary and Professional Organizations: American Fisheries Society, American Association for the Advancement of Science, Society of Sigma Xi, Alpha Zeta, Gamma Sigma Delta, Phi Kappa Phi.

Selected Publications:

Columnaris disease in warm-water fish and lethal toxicity levels of some chemicals to the casual organisms, Chondrococcus columnaris (Davis). Thesis submitted to Graduate Faculty of Auburn University.

Chemical composition of blood of smallmouth bass. U. S. Fish and Wildlife Service, Research Report 57. 36 p.

Feeds and feeding of warm-water fish in North America. Proc. FAO World Symposium on Warm-Water Pond Fish Culture. Vol. 3: 310-325. Rome, 1966.

Mono-sex culture of male Tilapia nilotica Linnaeus in ponds stocked at three rates. Proc. FAO World Symposium on Warm-Water Pond Fish Culture. Vol. 4: 353-356. Rome, 1966.

Relationship between rate of feeding, rate of growth and rate of conversion of feeding trials with two species of tilapia, T. mossambica Peters and Tilapia nilotica Linnaeus. Proc. FAO World Symposium on Warm-Water Pond Fish Culture. Vol. 3:411-415. Rome, 1966.

Utilization of casein and soybean protein by channel catfish Ictalurus punctatus (Rafinesque). Proc. Southeast. Assoc. Game and Fish Commr., 19(1965): 205-209. (With S. Krishandhi).

R. ONEAL SMITHERMAN - (August 26, 1937 - Randolph, Alabama)

Educational Background: B.S., 1959, Auburn University; Fish Management; M.S., 1961, North Carolina State College; Animal Ecology; Ph.D., 1964, Auburn University; Zoology (Fish Pathology).

Academic Appointment: Assistant Professor (1967).

Previous Positions: Assistant in Fish Culture, Auburn University 1961-1964; Leader, Louisiana Cooperative Fisheries Unit (LSU) 1964-1967. Participated in fisheries survey of Thailand and Pakistan during May-June, 1968, under the U.S.A.I.D. Fish Culture Project.

Research Interest and Teaching Responsibility: Aquaculture and factors affecting production of fish in impounded waters, and sportfish management. Teaches course in management of small impoundments. Directs student research in aquaculture.

Honorary and Professional Organizations: Society of Sigma Xi, American Fisheries Society, Alpha Zeta, Gamma Sigma Delta, Phi Kappa Phi.

Selected Publications:

Effect of the strigeid trematode, Posthodiplostomum minimum, upon growth and mortality of bluegill, Lepomis macrochirus. Proc. FAO World Symposium on Warm-Water Pond Fish Culture. Vol. 5: 380-388. Rome, 1966.

Host specificity of Posthodiplostomum minimum with twelve species of fish and two sunfish hybrids. Proc. Southeast. Assoc. Game and Fish Commr., 18(1964): 434-437. (With J. W. Avault, Jr.).

Procedures for overwintering tilapia. Proc. FAO World Symposium on Warm-Water Pond Fish Culture. Vol. 4: 343-345. Rome, 1966. (With J. W. Avault, Jr. and E. W. Shell).

Evaluation of eight species of fish for aquatic weed control. Proc. FAO World Symposium on Warm-Water Pond Fish Culture. Vol. 5: 109-122. Rome, 1966. (With J. W. Avault, Jr. and E. W. Shell).

Artificial propagation of sunfishes, with meristic comparisons of three species of Lepomis and five of their hybrids. Trans. Am. Fish. Soc. 91(4): 333-341. (With F. E. Hester).

H. S. SWINGLE - (July 29, 1902 - Columbus, Ohio)

Educational Background: B.S., 1924, Ohio State University; Agriculture; M.S., 1925, Ohio State University; Zoology-Entomology; Sc.D., 1958, Ohio State University, honorary.

Academic Appointment: Assistant Professor (1929), Professor (1939), Alumni Research Professor (1968), Director of USAID Fisheries Project.

Research Interest and Teaching Responsibility: Fish population dynamics and factors affecting fish production. Particular interest in aquaculture as means of providing high quality protein for rapidly increasing populations in developing countries. Experience in international fishery affairs include: appointed the U.S. Representative on Pond Fish Culture to the Eighth (1953), Ninth (1957), and Tenth (1961) Pacific Science Congresses held respectively in the Philippines, Thailand and Hawaii. Fisheries advisor to Israel and Thailand in 1957, to India in 1961. Chairman of FAO Symposium on Warm-Water Pond Fish Culture in Rome, May 18-25, 1966. In 1968, was invited member of Ad-Hoc Committee appointed by FAO to review and advise United Nations on Inland Fishery Development Programs carried out through United Nations. Chaired Symposium, Fishpond as a Limnological Model, Seventeenth International Congress of Limnology in Israel, 1968. Directed numerous fishery surveys in various countries in Asia under the U. S. A. I. D. Fish Culture Project. Teaches course in aquaculture.

Honorary and Professional Organizations: American Fisheries Society (President of Society in 1958 and elected to honorary membership in 1966), American Society of Limnology and Oceanography, Society of Sigma Xi, Phi Kappa Phi.

Publications: Has authored over 100 scientific papers in fisheries research and management and fish production.