

ORGANIZATION FOR TROPICAL STUDIES, INC.

Member Universities: COSTA RICA CALIFORNIA FLORIDA GEORGIA HARVARD INDIANA KANSAS
LOUISIANA STATE MIAMI MICHIGAN SOUTHERN CALIFORNIA TEXAS A & M WASHINGTON
Connecticut Hawaii Smithsonian Institution Texas Tech.
Apartado 16
Ciudad Universitaria
Costa Rica, C. A.

January 17, 1967

Dr. Donald E. Stone
Associate Professor of Botany
Duke University
Durham, North Carolina, 27706

Dear Dr. Stone:

Thank you for your letter of January 3. I too am sorry that I did not have an opportunity to meet with you while I was visiting Duke University.

I am enclosing a copy of a paper describing the Organization for Tropical Studies and its programs. This is probably very similar to the draft that Ted Hubbell showed you several years ago but is more up to date.

The current status of the Organization with respect to its finances is as follows:

The obligation incurred by a member institution is the same as it has been from the beginning; namely, an initial payment of \$2,500 and an obligation to pay \$2,000 per year up to five years. As of this time we have called on the initial payment and the first \$2,000 payment from each institution. We expect to call for the second \$2,000 payment from the member institutions this year. At its last meeting the Board of Directors authorized me to write to the presidents of the member institutions to explore the feasibility of changing the institutional obligation to provide for a regular dues structure at the level of \$2,000 a year. These explorations are now in the process of being made.

The financial status of the Organization with respect to external financing is good. We have a National Science Foundation grant for the support of our educational programs that will carry us through the summer of 1967. We are preparing a proposal to be submitted in March for continuation of this support, and we have every reason to believe that the Foundation intends to carry on its support of these course programs at approximately the same level. We have received a grant from the Ford Foundation for approximately \$200,000 which will enable us to support in a small manner faculty and graduate student research. We have a proposal before the National Science Foundation for support of a long-term research program across the board in ecology and involving three distinct and different environments in Costa Rica. Another research proposal supplementing this one is being completed.

Dr. Donald E. Stone

-2-

January 17, 1967

This second one will be submitted to one of the funding agencies for support. I cannot, of course, predict the success of these proposals; but, in general, the climate for support of O.T.S. has improved greatly in the last two years. Our activities have been recognized as useful and they are now rather well known among the granting agencies.

In general, membership in O.T.S. has not provided an institution with any major advantage with respect to participation in its programs. In the long run I suspect that if the demand for participation in O.T.S. programs became a very great concern to the opportunities available it would be necessary to give an advantage to the member institutions. There are perhaps some intangible benefits to the member institutions in that membership in itself is generally meant to imply that a university was more involved in the programs and that its students and faculty were more aware of the opportunities and more likely to be interested in participating in them.

Up to now the major effort has been in Costa Rica, but we are looking very carefully at opportunities to extend our programs into other portions of Latin America and ultimately into other areas of the tropics. The University of Hawaii has now become a member of O.T.S. and has indicated its interest in developing a center for biological instruction in Hawaii for O.T.S. operations. This probably would not occur immediately, but it is being actively considered by the Board of Directors of O.T.S.

In addition to the thirteen members that we have listed in the statement you may be interested to know that at the November Board meeting last year we accepted into membership the following new institutions: University of Connecticut, University of Hawaii, Smithsonian Institution, and Texas Technological College.

I hope that this information is useful to you. I think that Duke would find it worthwhile to join the group of universities and institutions that are developing this tropical science program, and I am sure that O.T.S. would be a more active organization if Duke became a member.

Sincerely,

James S. Bethel
James S. Bethel
President, O.T.S.

Mailing address:
Dean, College of Forestry
University of Washington
Seattle, Washington, 98105

JSB:dk
Encl.

August 5, 1966

THE PROGRAM OF TROPICAL STUDIES AND RESEARCH
of the
ORGANIZATION FOR TROPICAL STUDIES, INC.

The Organization for Tropical Studies (OTS) has been established by a consortium of universities to increase our understanding of tropical environments and to provide a scientific basis for their intelligent use by mankind. With National Science Foundation support, it has already developed the nucleus of an expanding program of training, designed to equip graduate students and investigators with a detailed knowledge of, and familiarity with, a wide range of tropical environments. From the beginning, field research has been considered an essential part of the undertaking, and OTS proposes to develop a farsighted, integrated, interdisciplinary research program of basic studies which will provide information necessary for the sound use and conservation of tropical environments.

I. THE NEED FOR TROPICAL STUDIES

Encircling the earth between the Tropic of Cancer and the Tropic of Capricorn, "the tropics" includes within its boundaries vast expanses of ocean and sea and nearly one-third of the land area of the world. Within this zone lie most of Mexico, all of Central America and the Antilles, northern South America, most of Africa and Madagascar, two-thirds of India, the East Indies and southeast Asia, New Guinea and northern Australia, and most of the Pacific Islands.

The whole of this immense region is characterized by a high input of solar energy which fundamentally distinguishes it from the rest of the world. Within it, however, there is tremendous diversity of environment, including such extremes as the lowland rain forests of the Amazon and Congo basins, the perpetual snows on the summits of Chimborazo and Kilimanjaro, the arid wastes of the Sahara desert, the coral atolls of the Pacific, the cold Andean altiplano, and the vast savannas of the Brazilian Matto Grosso and central Africa. Extreme contrasts exist, both locally and between large regions, in annual and seasonal precipitation, temperature, evaporation rates, soil types and topography. The range of environmental conditions under which life exists in the tropics is far greater than in other parts of the world.

The accompanying multiplicity and variety in living organisms is not approached in the temperate zones. Probably four-fifths of all existing species of animals and plants live in the tropics. Thus there are about 40 species of bats and 120 of mosquitos in all of temperate North America, while little Costa Rica (about the size of West Virginia) has nearly 100 kinds of bats, and in Colombia 150 kinds of mosquitos have been found in a fifteen square-mile study area. The tiny island of Barro Colorado in Gatun Lake, Panama, with an area of only six square miles, has 464 species of vertebrate animals (as many as occur in the whole of France) and an estimated 20,000 species of insects.

Although tropical biotic communities include the most highly organized, most complex, and most interesting of all biological systems, little is known about them. And rudimentary as is knowledge of the qualitative makeup of tropical communities in terms of species composition and distribution, it seems advanced compared with our ignorance of processes and interrelations in these communities, and in the successional stages by which they are renewed after disturbance. Even the various aspects of the physical environment - geology, land forms, climatology, meteorology, hydrology, soils - are poorly known by comparison with those of the temperate regions, and we have little understanding of the character and role of the natural processes and human activities that have shaped the present landscapes.

It is urgent that intensive, multidisciplinary studies be made of tropical environments, without delay. The reason for this urgency is the very rapid increase of human populations in the tropics, which is one of the important trends of the times. These fantastically diverse, potentially productive and poorly understood regions are being occupied at an increasingly fast rate in one of humanity's major expansions. The invasion of new territory is precipitous. The accommodation to man's use is by axe, fire, and bulldozer, with no planning, no thought of consequences, and no inkling of the desirability of maintaining sound, long-term ecological relationships with the land. When man intrudes into these complexly organized systems he further complicates things; the time available for inquiry shortens, and we are faced with the prospect of the earth's most elaborate biological systems being wrecked before adequate samples are set aside for preservation and long before a scientific basis has been laid for maintaining optimal man-land relations in tropical regions.

If we acknowledge any obligation, either to basic science or to men of future times, it would be vastly short-sighted to allow the biological resources of the areas now being settled to go unrecorded and unanalyzed. To permit the remaining reservoirs of tropical wilderness to be exploited without the guidance of even an elementary understanding of the nature of the systems being destroyed would be to abdicate a moral responsibility that rests upon the scientific community. OTS was established on behalf of that community, to help it meet that responsibility and fulfill its obligation to science and to future generations.

OTS is not a conservation organization; it is not a humanitarian organization, except insofar as all increase of knowledge must benefit man; it is not dedicated to providing advice on how man can best succeed in the tropics. Its central purpose is to acquire and disseminate a broad understanding of the tropical environments, thus serving both science and ultimately the welfare of mankind. It conceives that all information gained by research in the tropics becomes material for making a better future for humanity. What is most needed, and what OTS has undertaken to provide, is a sound program of basic research and teaching that is not oblivious to the spread and increase of human populations in the tropics or to man's complex relations with the tropical environments.

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2.A.
ESTABLISHED

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Digitized by srujanika@gmail.com

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Within it, however, there is tremendous diversity of environment, including solar energy which fundamentally distinguishes it from the rest of the world. The whole of this immense region is characterized by a high input of waste products of the Sahara desert, the coral atolls of the Pacific, the cold Andean alpine, and the vast savannas of the Brazilian Mato Grosso and central Africa. Extreme contrasts exist, both locally and between large regions, in annual and seasonal precipitation, temperature, evaporation rates, soil types and topography. The range of environmental conditions under which life exists in the tropics is far greater than in other parts of the world.

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The Organization for Tropical Studies (OTS) is a non-profit corporation incorporated in the state of Florida. It is a consortium of 17 United States universities (California, Florida, Georgia, Harvard, Indiana, Kansas, Louisiana, Massachusetts, Michigan, Minnesota, Missouri, New Mexico, North Carolina, Ohio, Pennsylvania, Texas, Wisconsin) and the University of Costa Rica. The organization has joined forces in the tropics as a group of universities acting as a consortium to promote tropical research in great fields of science in the tropics and to serve the interests of the study of humanity as a whole.

III. THE ORGANIZATION FOR TROPICAL STUDIES, INC.

Most of the world's scientists live in the temperate zones, where the great centers of education and research are located. Relatively few of them have had tropical experience, and even fewer are working on tropical problems. Although there are some outstanding scientists in tropical countries, they also are few in number. The most urgent task, therefore, is to increase the scientific manpower available for research in the tropics. We need to expose young scientists to tropical environments in the formative stages of their careers; we need to give pertinent training to the students from tropical countries attending North American universities that will enable them to do significant work at home; we need to encourage more of the established scientists working in temperate regions to extend their studies into the tropical zone.

The scope of tropical studies will expand, in part through the agency of OTS. Eventually, it is hoped, there will be so many scientists, institutions, and areas of study involved that the Organization could not, if it wished, maintain an umbrella over the whole enterprise. Many projects initiated by OTS should eventually grow into independence, and responsibilities taken effect and the number of scientists native to tropicall countries increases, those countries will themselves be able to undertake research directed toward their own problems and needs. OTS can help bring this to pass.

1. General Organizational Structure

The Organization for Tropical Studies, as a non-profit corporation, has its business office at one of the member institutions; this is currently the University of Miami. Its affairs are managed by a Board of Directors of 17 members, elected by an Advisory Council that comprises two representatives of each member institution. The officers (President, Vice-President, Secretary and Treasurer) are elected by the Board. Between meetings of the Board (held at least once annually) responsibility for OTS affairs rests upon the Executive Committee, which consists of the officers and the same Board that held the last meeting.

The University of Miami, its members, and the Board of Directors are all elected by the Board. Between meetings of the Board, the Executive Committee, which consists of the officers and the same Board that held the last meeting, is responsible for the affairs of the organization. The officers are elected by the Board. Between meetings of the Board, the Executive Committee, which consists of the officers and the same Board that held the last meeting, is responsible for the affairs of the organization.

This is an ambitious program, and in trying to achieve its objective OTS recognizes its limitations. The tropical regions are vast; many parts of them are not easily accessible; they lie in many government districts and in no one country or region are all the diverse tropical environments represented. It would obviously be very unlikely that any organization, no matter how broadly based, could work effectively in all parts of the nation, for this reason OTS is concentrating its efforts, at this early stage, in the American tropics.

(4) Promoting exchange of information and ideas among scientists actively engaged in tropical studies; and (5) Serving as a source of information concerning scientific activities in the tropics.

3) Conducting long-term cooperative research projects on tropical prob-
lems merit such attention, including recruitment of the neces-
sary scientific talents;

(2) Fosterering research on tropicocal problems by individual investors or groups of scientists, by giving them access to OTS facilities and furnishing advice and logistic assistance;

1) Provision of a sound educational program concerned with the aspects of topical science listed above. Academically this program is conducted at the high level of graduate education characteristic of member universities. It is available to qualified members of the faculty and graduates of all colleges and universities of the member institutions. It is available to graduate students of all colleges and universities of the member institutions. In the Americas, within the limitations set by OIS staff, facilities, and obligations to the member institutions.

- The program of OTS is conducted by an Executive Director, appointed by the Board and operating under its direction and that of the Executive Committee. He is responsible to the Treasurer for all use of funds, and both he and the Treasurer are bonded. He maintains a central administrative office in the United States at one of the member institutions (currently The University of Michigan), and has one or more operating centers in the tropics. At present the only operating center is at the University of Costa Rica. Both at the central office and the Costa Rican center the Executive Director has secretarial, clerical and other help. Provision has been made for the appointment in 1966 of an Assistant to the Director, to handle managerial and logistic details of the operation in Costa Rica, and addressees must have tropics for its teaching and research operations. Such centers must have housesitting, laboratories, classrooms, and equipment for field and laboratory studies appropriate in kind and amount for the work to be done at them. Vehicles, field equipment and microscopes are among the most essential needs. A small reference library of works pertaining to the region and small refer- ence collections of local plants, animals and geological specimens are highly desirable. Other things being equal, it would be best to locate such centers at or near universities or existing research institutions in the tropics.
- The first OTS center of operation has been established at the University of Costa Rica, a member university. Because the first major activity of the organization has been in tropical biology, the suitability of the region for biological studies was a paramount consideration. Among the factors that determined the choice were the following:
- a) Extremely diverse tropical environments are represented in a small geographic area under a single political jurisdiction;
- b) By road, train and plane all these environments can be reached quickly and easily, with minimum logistic problems in movement of classes;
- c) Transportation between Costa Rica and all parts of North America is fast and inexpensive, which is important because most of the participants in OTS programs live in the United States;
- d) Costa Rica welcomes U.S. nationals who come for study and research, and find it easy and pleasant to work there. The Costa Rican government is stable, progressive, and cooperative toward OTS and other U.S.-supported projects.

2. Centres of Operation

Load now resting on the Executive Director.

As soon as possible, also, an Assistant Executive Director will be appointed to aid in general administration of the program and share the heavy work of logistic details of the operation in Costa Rica, and addditional such positions will be required as other centers of operation are established. Both at the central office and the Costa Rican center the Executive Director has secretarial, clerical and other help. Provision has been made for the appointment in 1966 of an Assistant to the Director, to handle managerial and logistic details of the operation in Costa Rica, and addressees must have housesitting, laboratories, classrooms, and equipment for field and laboratory studies appropriate in kind and amount for the work to be done at them. Vehicles, field equipment and microscopes are among the most essential needs. A small reference library of works pertaining to the region and small refer- ence collections of local plants, animals and geological specimens are highly desirable. Other things being equal, it would be best to locate such centers at or near universities or existing research institutions in the tropics.

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The need for intensive tropical study has long been recognized by informed members of the academic community, and a number of North American universities have made sporadic efforts to extend their activities into the tropics, with varying success. It is not surprising that these uncoordinated and inadequate efforts resulted in no outstanding achievements. The importance and urgency of biological research in the tropics were stressed at three conferences held in 1960 and 1962, and soon thereafter the Organization for Tropical Studies was established to promote not only biological but all kinds of needed investigation of tropical environments. The idea and impetus behind this action came from individual scientists who felt deeply the obligation of this generation to learn all

THE ROLE OF THE UNIVERSITIES IN THE D

field stations situated in the environmental centers to be studied are essential as are operating centers. The tropical rain forest cannot be invested in San Jose. Several such stations are needed as adjuncts to the Costa Rican operating center, but OTS has decided to move slowly in developing its own. Whenever possible it will use existing installations, especially for research projects that require elaborate and expensive equipment, or for courses such as marine biology that have similar needs. Before establishing field stations under its own control an OTS committee will determine whether existing stations can serve its purposes, what cooperative arrangements with other organizations might be made, and how OTS stations could be financed and maintained. Classes have already made use of the Smithsonian's Barro Colorado Laboratory and the Tropical Science Center's quarters on the Osa Peninsula, and concessions at places such as Lancretilla in Honduras, biltites for terrestrial studies at its own private and publicly owned stations in Costa Rica, those of the Smithsonian Institution in the Canal Zone, and others in northern South America. If it is decided that OTS must set up one or more field stations of its own, inexpensive buildings that provide simple living and working facilities for classes will probably suffice. The feasibility of equipping one or more mobile truck-laboratories to be used along with locally available buildings or temporary camps is also being considered for OTS field courses.

3. Field Stations

As OTs expand its activities into fields other than biology it is anticipated that additional centres of operation will be required. Although the Costa Rican centre is likely to remain the principal base for the teaching program, courses in some subjects could not easily be given there or would be more suitable in some other location. Depending upon need, opportunity and support, operating centres may in future be established outside of the American tropics.

The University of Costa Rica provides a stimulating local intellectual climate, and has provided space, facilities and cooperation that have contributed much to the success of the initial OTS operations.

The reality of the commitment to OTS by the member universities is attested by the direct and indirect involvement of so many of their high administrative officials. Dr. Charles E. Odgaard, President of the University of Washington, Dr. Marvin L. Niethus, Executive Vice-President of the University of Minnesota, Dr. Roger W. Heyns, Chancellor of the University of Michigan, and Dr. Stephen H. Spurr, Dean of the School of Graduate Studies of the University of Michigan, Vicer-Presidet of the University; Dr. Henry Leigh, Chairman of the Department of Biology of the University; Dr. Herbert G. Baker, Professor of Botany and Director of the Botanical Garden, member of the Board of Directors and the Advisory Committee of OTS at present consists of the Gray Herbarium and Chiarman of the Systematic Botany, Director of the Gray Herbarium and Gray Professor of Botany, Treasurer; Dr. Reed C. Rollins, Asa Gray Professor of Botany, Secretary; Dr. Associate Dean of Faculties of the University of Kansas, and Dr. William J. Aggerisling, Associate Dean of the University of Miami, Treasurer; Dr. Henry Leigh, Chairman of the Department of Biology of the University; Dr. Herbert G. Baker, Professor of Botany and Director of the Botanical Garden, member of the Board of Directors and the Botanical Past President; Dr. Robert S. Scitney of Harvard University, Immediate Past President; Dr. George H. Hubbell, Professor of Zoology and Director of the Museum of Zoology of The University of Michigan, member. Other men on the Board of Directors and the Advisory Council hold similarly influential positions in their respective institutions. The commitment of leadership to OTS by its member universities is obvious.

The universities have also made other significant contributions to the OTS enterprise, in the following ways:

- 1) Each original member institution made an initial payment of \$2,500 to provide funds for setting up the Organization and developing its additional, each new member pays the same amount as entrance fee.
- 2) At the rate of \$2,000 per year, as a reserve to insure continuity of operation and meet needs not covered by grant support. At present this amounts to a backlog of \$120,000. It is anticipated that the member institutions will be asked to provide modest contributions to the Organization to a backlog of \$120,000. It is anticipated that the member institutions will be asked to provide modest contributions to the Organization to insure annual support.

- 2) The universities, under various arrangements, have provided OTS with essential equipment to enable the program to get under way. This equipment includes two field vehicles donated to OTS, three placed on permanent loan at nominal rental for OTS use in Costa Rica, and three others sent from university motor pools for temporary use by OTS courses. Microscopes and other items needed for teaching and research have been lent and much collecting apparatus and many small research instruments have been donated to the organization by its member institutions.
- 3) Several universities, including California, Kansas, Michigan, and Washington, are giving off-campus assignments of duty to faculty members to enable them to teach OTS courses and prepare themselves to participate in OTS programs. Other institutions have similar policies under consideration.
- 4) Each member university has a Local Committee on Tropical Studies, composed of faculty members representing various scientific fields. These committees, though not integral parts of OTS, are valuable adjuncts to it. They provide advice to the institution representatives on the Advisory Council, publicize the activities, make suggestions about the teaching and research programs and their staff, and advise and help graduate students who want to attend OTS courses, to send faculty members to Costa Rica to teach a field course or plan a new one, or to buy a vehicle or other equipment for OTS use. The University of Michigan Committee on Tropical for OTS use. The University of Michigan Committee on Tropical
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- 5) The universities have paid for a large amount of travel by officers and members of the Executive Committee and Board of Directors, to enable them to attend executive meetings, meet with representatives of granting agencies, and attend to other OTS affairs.
- 6) The universities have paid travel allowances and honoraria to visit-ting professors from other institutions who have given lectures and seminars on aspects of science in the tropics on their campuses.
- 7) The University of Miami has contracted fiscal services to OTS, including the banking, accounting and auditing of its funds during the early stages of the undertaking. It also provided the legal services incident to incorporating OTS under Florida law.
- 8) The University of Costa Rica has made offices and classrooms available for OTS use, has shared its laboratory facilities with OTS courses, and has performed many services vital to the operations of the Organization in Costa Rica.

The OTS program will yield important results for the economic development of the emerging tropical nations, and hence should be eligible for support by agencies concerned with foreign aid. The Department for Education and Welfare, charged with responsibility for international science education, could well make use of OTS advice and services in planning its activities in tropical countries, in preparing U.S. faculty members to participate in such activities, and in bringing foreign scientists to OTS member universities or field centres for advanced training.

During its first few years of existence OTS has received generous support, though on a short-term basis, from the National Science Foundation for operating its teaching program in Costa Rica. Continued operation of this support with the aid of longer-term grants is contingent upon its expansion of the successes of the program and increasing demand for its expansion. Assured

support for several years in advance is necessary for proper planning and

OTS should be viewed as an agency operated by a consortium of institutions to accomplish a task of major importance to the nation. In its breadth of scope, its multi-institutional and multidisciplinary character, and the importance of its mission, the Organization for Economic Cooperation and Development has not yet achieved this status, its claim to it is belittled both valid and demonstrable.

IV. THE ROLE OF THE FOUNDATIONS

The Organizational for Tropical Studies was established to serve the national interest, as well as all mankind, through its contributions to an understanding of tropical environments. The funding universities did not expect, and have not received, any special benefits from it that have not been equally available to students and investigators of non-member institutions. To get OTS started, the universities gave seed-money and contributions. In the other ways already mentioned, they will continue to do all that they can to insure the success of the undertaking. In the long run, however, they have only three major assets to give to it: (1) intellectual and organizational leadership, (2) teachers and investigators, and (3) students. The universities cannot heavily underwrite the costs of OTS, for their resources are scarcely sufficient to take care of their immediate needs and responses at home.

Several universities made less tangible but very real contributions to the undertaking prior to the formal creation of OTS by the consortium. Members of the consortium were enabled to devote much time and effort to their faculty consultations on planning, and in general laying the foundations on which the Organization was established. This involved travel in the United States and foreign countries, extensive correspondence, the publication of reports, meetings with foundation representatives and with foreign scientists and officials, and attendance at conferences on tropical diseases and other topics of interest to the universities which are now members of OTS.

- As a matter of policy, OTS would like to include a number of universities in the language countries in its membership, and to offer instruction in English by appropriate foundations, both governmental and private.
- Support for OTS research programs and projects has been or will be requested from the National Science Foundation, the Ford Foundation, and other granting agencies. The nature of the proposed studies is discussed under heading VI, below.
- Some of the special problems, relating primarily to the teaching program, that will require foundation help for their solution are as follows:
- 1) Expansion of the Operating Center in Costa Rica. The University of Costa Rica has been most generous in allocating space and facilities for OTS use. However, even accommodation taking the present level of OTS operations has placed a considerable strain on its limited resources. It cannot, without detriment to its students and faculty, meet the increasing demands of the expanding OTS program for office, classroom, laboratory, library and collection storage space.
- 2) Equipment Needs. Acquisition of equipment required for operation of the teaching program in Costa Rica has proved difficult. Very little could be provided by the University of Costa Rica, and the NSF grants thus far received have not included funds sufficient to meet the needs. Vehicles have been one of the most difficult items to purchase by member universities on a gift, loan or rental basis.
- This has involved negotiations with the Costa Rican customs authorities, time-consuming negotiations with the Costa Rican government and its own vehicles, suited to the poor roads and other troubles. OTS needs its own vehicles, suitable to the study sites. In Costa Rica this has been complicated by logistic problems, the most serious of which is staffing, because advance commitments must be obtained from the persons best qualified to teach OTS courses.

The courses are strongly field-oriented, with about seven of the eight weeks full-term instructors, several visiting scientists from local institutions for periods of two or more weeks, and lectures from the classes during the season of rains. The faculty for each course includes two or more and March during the Costa Rican dry season, the second in July and August courses are now given in two eight-week sessions, the first in February and the season of rains.

done. Courses who can be expected to return as instructors, as some have already become available, and this will be added to by former students in OTS staff. As the program is publicized and gains reputation teaching talent fortunate in attracting some very distinguished scientists to its teaching making the advance commitments that most of them would need, OTS has been making the advance commitments that most of them would need, OTS has been not numerous, and the exigencies of short-term grant support have prevented other institutions throughout the Americas. Although qualified persons are one. Instruction is provided by visiting professors from universities and OTS does not have a resident full-time faculty, and sees no need for

capacity. Courses, predoctoral students have priority and almost always fill them to although post-doctoral students and faculty members may be admitted to the courses receive full hour and residence credit; others receive transfer credit. automatically sent to their home institutions. Students at member universities living expenses and round-trip transportation to Costa Rica from grant funds. They enroll in the University of Costa Rica, and their courses record are private bases. No tuition is charged, and their courses receive petty expenses and universities in the Americas. Admission is on a competitive basis. No tuition is charged, and successive applicants receive from all colleges and universities in the Americas. Admission is on a competitive basis, however, widely advertised, and are open to graduate students courses are, however, widely advertised, and are open to own offerings. The listed in the catalogues of member universities as their own offerings. The Executive Director of the Organization, the "charter" of this "department" is school of each member institution, and OTS courses are or will be listed in the Executive Director of the Organization, the "charter" of this "department" is the university which constitutes an extension of the graduate department" of the institution, through OTS, have in effect set up a joint "department" of tropical studies, which constitutes an extension of the graduate department" of the institution, through OTS, have in effect set up a joint "department" of tropical studies, which constitutes an extension of the graduate department" of the institution, through OTS, have in effect set up a joint "department"

In OTS, as in the universities, graduate teaching and research go hand in hand. In this presentation they are separately considered only for convenience.

V. THE OTS EDUCATIONAL PROGRAM

The situation was somewhat improved in 1966 by arranging to use the simple field station erected that year on the Osa Peninsula by the Tropicaal Science Center of San Jose, and government-owned housing at a site in Guanacaste. OTS, as already explained, is not anxious to build field stations of its own, but it may prove necessary to establish one or a few in Costa Rica to meet the needs of its classes. They would be kept simple and inexpensive, one or more vehicles equipped as mobile laboratories for use at temporary study sites may also make class field work more effective. Funds from non-university sources would be required to meet either need.

These are specialized courses given by outstanding biologists on selected topics. They are designed for advanced graduate students who have the necessary background and whose field of specialization is related to the subject matter to be dealt with by the course. Enrollment is limited to ten students. Nearly all the work is done in the field, and is in addition to regular studies.

2. Advanced Courses in Tropical Biology.

This course is offered twice each year and was given for the fifth time in the summer of 1966, when because of demand two sections had to be taught. It has been continually modified and improved, and applications for it are so numerous that the students admitted are of exceptionally high ability. About one-third of the one hundred or so who have taken it were from non-member institutions. It has proved to be an effective and economical way of introducing persons without previous tropical experience to the special opportunities for biological research afforded by the tropics.

This course for 8 hours credit, limited to 20 participants, is intended for students in the early stages of their graduate work. It constitutes an introduction to the principles of ecology as they operate in the tropics. For admission to it students must have had a minimum of four courses in biology, including at least one in general ecology. The course is equally suited to students specializing in botany and zoology. It deals with biotic communities considered as integrated dynamic systems, with stresses on the interrelationships and adaptations of animals and on phenomena characteristic of tropical environments. Nearly all the work is done in the field in about five contrasting different situations. At each site, after orientation, the students work as groups on assigned exercises designed to yield ecological information and illustrate techniques of study. A part of their time is also devoted to individual research on problems of limited scope which they select. The course concludes with seminars reviewing the work accomplished, preparation of reports on individual research, and a final examination.

Ecological Rhotology: An Ecological Approach.

The courses already established include the following:

In general, the OTS teaching program will include formal introductory courses at the graduate level, advanced graduate courses in selected sub-fields, seminars, conferences and symposia, and both directed and independent study and research. The initial concentration on practical botany reflects the specific interests of those persons who did most to bring the organization into existence. The program is now being extended into other fields, as is later described.

During spending at sites representing the various kinds of tropical environments to be found in Costa Rica. They emphasize aspects of science that can be studied only in the tropics.

The Organization plans to bring together leaders in various sciences and fields to exchange information and ideas about research in the tropics and on-going research of one of the visiting scientists.

Seminars, Symposia and Conferences

In addition to formal graduate courses, the OTS educational program provides opportunities for student research and independent study. Each field course includes a certain amount of such activity as a requirement. Students may also undertake the study of problems of their own choice, small enough to be completed in the time available; or they may participate in the on-going research of one of the visiting scientists.

Directed Research and Independent Study

Other new courses in various stages of planning include the following:
Tropical Forests, Human Ecology in the Tropics (a possible joint offering by OTS and the International Center for Medical Research and Training, located in San Jose), Tropical Limnology, and Tropical Marine Biology (to be given at some existing marine station outside of Costa Rica). Others are under consideration. Interest also has been expressed in teaching the use of aerial photography and other remote sensing devices for natural resource inventory and analysis of land use patterns, either as a course in itself or as a part of courses on tropical ecology, geography, or other subjects.

Example, will be given for the first time in the summer of 1967.
The resulting course, Tropical Lands and their Utilization: The Costa Rican Exploration of the country and consultation with the Executive Director, at the expense of the Michigan Committee on Tropical Studies, for Rica, at the expense of the Michigan Committee sending him twice to Costa Rica undertook to prepare it. This necessitated sending him twice to Costa and Dr. Ross N. Pearson of the University Department of Geography and Dr. recomended that OTS offer an introductory graduate course in that field, already been held (in 1966 at the University of Kansas). The conference such conferences are planned, and the first, on tropical geography, has a conference of specialists from member and non-member institutions. Several other than tropical biology. The needs of each field will be considered at a rapidity as possible the teaching program will be expanded into fields

Other Courses in Preparation

The most successful courses at this level have been those with a broad ecological orientation and much theoretical interest, and these fit in best with the general objectives of OTS. Courses on the systematics and ecology of particular groups of animals or plants will also be given when this seems justified, since taxonomic specialists who know tropical organizations seem just fitted, since taxonomic specialists who know tropical environments seem to the conduct of research on tropical environments.

The advanced biological courses which have been given thus far (through August, 1966) are as follows: Tropical Forest Ecology, Biology and Evolution of Tropical Insects, Morphology and Biology of Tropical Vertebrates, and Biology of Tropical Grasses. Another, Insect Ecology in the Tropics, is scheduled for the winter session of 1967.

Other conferences will be essentially work sessions at which a group of specialists will consider the needs of a particular discipline for OTS and will outline research activities for OTS consideration, and will propose courses and curricula for OTS consideration. The informal conference on tropical geography, previously mentioned, was of this nature. Attended by leading geographers from member and non-member universities, it met only last Friday of the Geography in the OTS program, but also led to the formulation of a standing committee on Geography, of which Dr. Robert E. Nutley of the University of Kansas became the first chairman. Similar conferences to deal with other fields of science are planned, and it is anticipated that other disciplines or projects will be established eventually to meet the needs of various environmental types as they now are, of the ways in which they have developed, and of the interpretations in some detail. The organization is well fitted to coordinate studies that involve cooperation of specialists in various sciences, because it can call upon the services of representatives of a large number of disciplines from the staffs of its member institutions. It can also furnish investigators with logsistic help and the use of its facilities.

VI. THE OTS RESEARCH PROGRAM

add breadth and depth to the educational program. Some of these assemblies would take the form of seminars or symposia on selected tropical problems. They might be held in Costa Rica at the beginning or end of a teaching session, or at a member institution or a professional society meeting in the United States, or at some appropriate foreign institution. As examples of what OTS might undertake, in various fields besides biology, there may be cited the conferences held under other auspices, on Tropical Botany at Miami (1960) and in Trinidad (1962), on Tropical Biology at San José (1962), and on the Biota of the Amazon Basin at Belém (1966).

A. THE OIS RESEARCH PROGRAM

Other conferences will be essentially work sessions at which a group of specialists will consider the needs of a particular discipline for typical studies, will propose courses and curricula for OTS consideration, and will outline research activities which OTS might sponsor or carry out. The informal conference on tropical geography, previously mentioned, was of this nature. Attended by leading geographers from member and non-member universities, it not only laid the basis for inclusion of geography in the OTS program, but also led to the formation of a standing OTS Committee on Geography, of which Dr. Robert E. Neely of the University of Kansas became the first chairman. Similar conferences to deal with other fields of science are planned, and it is anticipated that other disciplines or project- ence will be created to furnish guidance to the Organization.

1. Composition, Structure and Organization of Tropical Biological Communities.

The research program which OTS proposes to conduct is described below under the three headings listed in the introduction.

Since the primary objective of OTS is to increase knowledge and understanding of tropical environments, the Organization will give priority to research on aspects of science which bear directly on tropical problems and which cannot be equally well studied outside of the tropical zone. Such research will include analysis for thorough analysis of the various environmental types as they now are, of the ways in which they have developed, and of the interplay between man and the tropic environment in the past and today. The various ways in which OTS can facilitate organization is well fitted to coordinate studies that involve cooperation of specialists in various sciences, because it can call upon the services of representatives of a large number of disciplines from the staffs of its member institutions. It can also furnish investigators with logistic help and the use of its facilities.

Budget - The abundance of sunshine in the tropiccal zone is its high total energy budget - related to this in ways not well understood are the following characteristics of terrestrial environments in the tropics: (1) high species diversity, (2) greatest total biomass, (3) multiplicity of biogeoclimatic niches, (4) multiple, crypotic and arid semi-arid habitats, (5) maximum frequency of mutualists.

- These are the biotic features that make the tropical landscape distinctive. They involve no special "principles" applicable only to tropical biology, but they are all somehow causally related, and may be merely the outcome of a general intensification of many biological processes and interactions in this region of abundant available energy. In the aggregate, they account for the single most striking aspect of the tropical organization, which is achieved whenever the water budget is ample enough and stable enough to sustain massive photosynthesists throughout the year. Comparable though perhaps less striking phenomena characterize the marine and freshwater environments of the tropics.
- It is essential both for the advancement of biological science and to provide background for intelligent use of tropical resources, that the organization of this system and its reverse communities be understood. Any proposed study that can contribute toward such an understanding will be considerably aided by OTS for support. Biological inventory is of course necessary, but it alone does not take us very far. The critical analyses can proceed in two ways: by intensive attention to specific life cycles (autecology), and by analysis of segments of the total system, such as soil relations, food chains, nutrient cycles, microclimates, zonation, stratification, or mutualistic relationships (synecology).
- Work at these levels must rest on adequate knowledge of the physical aspects of the tropical environments, about which much remains to be learned. OTS will support studies of geology, land forms, climatology, meteorology, hydrology and other phases of the earth sciences in the tropics which are pertinent to its overall objectives.
- The role of time in modifying tropical communities will be studied from various standpoints, as follows:
2. Changes in Tropical Landscape through Time.
- a) Periodic changes. Daily and seasonal rhythms. Time cycles as an organizing factor.
- b) Succession. Regeneration of the organized biotic community after disturbance. Natural causes of disturbance. The role of animals in plant succession.
- c) Biogeographic background for community recruitment. The interplay of biogeography and ecology in the establishment and maintenance of tropical communities. Migration of species between tropical continental areas and to islands and island groups.
- d) Modification of tropical landscapes by recent climatic and geological changes and the influence of prehistoric man, as revealed by stratigraphic and fossil pollen studies and examination of archeological sites.
3. Man's Relations to the Tropical Environment, Past, Present and Future.

a) See 2-D above.

A grant-supported, OTS-administered research program would have several advantages. The Organization is well qualified to evaluate proposals for tropical studies, because so many of the scientists of this country who are already working in the tropics are on the staffs of its member institutions, and independent studies to work effectively for pilot projects and research undertakings of modest scope.

The Organization is seeking funds which it can provide limited grants-in-aid to individuals and groups for studies which will contribute to its research goals, and can furnish the services needed to enable visiting scientists to work effectively for both research proposals of independent origin and, on occasion, solicit pilot proposals for urgently needed studies. Funds would be allocated primarily for pilot projects and research undertakings of modest scope.

2. A Grant-supported OTS Research Program.

b) The grant may be handled through OTS as the sponsoring institution, and will include in its budget a negotiated item for overhead.

a) The grant may be handled through the investigator's own institution, and will include in its budget the costs of services to be furnished by OTS; or

and, if they receive their own support, can be given use of OTS facilities and logistic help, under either of the following arrangements: comparable with the objectives of OTS may be sponsored by the Organization and individual or group projects adjudged to be contributory to or at least

1. Independent Studies.

The Organization for Tropical Studies has no funds of its own with which to support research. All studies made under its sponsorship will have to be financed, in one way or another, by public or private grants-in-aid. As now envisioned, there are at least three ways in which research can be accomplished through OTS.

Funding and Operation of the Research Program

A detailed analysis of the dynamics of tropical environments and their interrelations with man will provide a basis for more rational use, management and conservation of these highly productive systems.

e) Application of findings. Development of ecological and economic models for maximum sustained utilization of the varied tropical environments.

d) Interactions with environment. Correlation of medical, nutritional and cultural factors with tropical environments.

c) Land utilization. Analysis and evaluation of systems of use.

b) The historical record. The history of successful and unsuccessful attempts at exploitation.

Support should be available both to U.S. citizens and others, because research on tropical problems concerns the whole world. It should have no national boundaries, and much is to be gained by having scientists of various nations work together. An OTS-administered research program would contribute both information and some of the trained personnel needed for the planning and staffing of such larger scale undertakings as are discussed in the next section.

OTS could relieve the large granting agencies of the task of reviewing many small grant proposals for tropical research, and probably do it better. It could keep track of what is being done, coordinate activities and prevent duplication, and certainly could more effectively supervise the field work than can the foundations.

Support should be available to serve on ad hoc review panels. Given this role, and would be available to both to U.S. citizens and others, because research on tropical problems concerns the whole world. It should have no national boundaries, and much is to be gained by having scientists of various nations work together. An OTS-administered research program would contribute both information and some of the trained personnel needed for the planning and staffing of such larger scale undertakings as are discussed in the next section.

Any project of large scope developed under OTS sponsorship would seek support from appropriate grants-in-aid of its own merits. Furthermore, almost any such project is almost sure to be of interest to other scientific or governmental agencies. That described below is an example.

There is urgent need for what might be called "Studies of the Biology of Effects of Constructing an Isthmian Sea-Level Canal" in Panama or elsewhere. Such a canal is almost certain to be built, whether by atomic explosions or other means, within the next decade or two. At present the feasibility of the project is being considered solely in terms of engineering, economics, and international politics; no thought is being given to its long-term effects on the marine and terrestrial ecosystems of the region.

It is undoubtedly too late for us to learn all that should have been by the canal, as a basis for follow-up studies after it has been built. We should already be making detailed studies of the environments and biotas on both coasts of the Isthmus and along the region to be traversed recorded about pre-canal conditions, but this makes it even more urgent to salvage what we can in the time that is left. One of the most important things to be done is to make an intensive study of the marine biotas on

Both OTS and subcommitteees of the International Biological Program recognize the urgency and importance of research in the isthmian region both before and after the canal is built, and are attempting to do something about it. It is likely that in the near future proposals will be submitted to one or more government agencies for projects dealing with certain phases of the work.

The two coasts. This will enable us to follow the large-scale ecological and evolutionary experiment that is being set up, wherein biotas that have been separated for some millions of years (since mid-Pliocene times) will be brought into contact.

Among several other undertakings of considerable magnitude which OTS might sponsor and help to organize, only two have reached a stage in planning which merits their mention. The first is a comparative study of tropical lowland forests on the Atlantic slope (wet), on the Pacific side of Dosa Peninsula (wet), and in the Guanacaste area (dry). Included in these ecosystems are subtropical evergreen forests, subtropical seasonal activity and seasonal fluctuations of populations, patterns of daily and seasonal activity and present, habitat preferences, patterns of daily and seasonal activity and groups of animals would be considered from the forest layers, and qualitative and quantitative inventories of plants in the cycling of nutrients, and qualitative and quantitative features, of energy flow and the cycling of climatic

The second project which has reached the planning stage is a broad study of the Amazon and Mopane of Tropical Woods. At the Tri-national Conference on Tropical Botany (1962), Dr. W. L. Stern of The Smithsonian Institution called attention to the fact that since the death of Dr. S. J. Bertrand of Yale University very little significant research has been done on this subject. Several of the scientists on faculties of OTS universities are specialists on wood anatomy and morphology, but most of their work has been done on wood anatomy and morphology, but most of their work in this field of knowledge.

Plans now being formulated for the two projects just described will result in proposals for grant support under OTS sponsorship, and others which they and their graduate students can help to fill the existing gap in a research program on tropical woods on a world-wide basis, through a research zone some species. They are interested in developing a research program on temperate zone species. They are most of their work on this subject. Several of the scientists on faculties of OTS universities are specialists on wood anatomy and morphology, but most of their work has been done on wood anatomy and morphology, but most of their work in this field of knowledge.

The Organization for Tropical Studies is very young. Its potentialities for the promotion of science and human welfare are great. Its current graduate training program shows every sign of success, and expansion of this aspect of its activities is now under way. The Organization must now proceed to put into effect the research program outlined above, which will depend for its success on three conditions: (1) that scientists and granting agencies recognize the urgency and importance of tropical studies, (2) that OTS is accepted by the scientific community of this country as its principal agency for the conduct of research in the tropics, and (3) that the Organization receive adequate financial support. OTS hopes and believes that these conditions will be met, and that it will be enabled to achieve the balance of activities through which its objectives can be accomplished.

IN CONCLUSION

professors from universities and other institutions throughout the Americas. OTS does not have a permanent faculty. Instruction is provided by visiting

professors among applicants for other courses.

To TROPICAL BIOLOGY - An ECOLOGICAL APPROACH, and graduate students will have priority among applicants for other courses.

beers will not, except under unusual circumstances, be admitted as participants in demand for them by graduate students, post-doctoral students and faculty members.

its parent institution, from which a transcript of his record will be sent to a member of the University of Costa Rica, to which he is admitted. He will be enrolled in the University of Costa Rica, to which it is accepted to elect for graduate credit the OTS course.

Each student accepted is excepted for a graduate program in a college or university in or have been accepted for consideration, an applicant normally must be enrolled in or have been accepted for a graduate program in a college or university.

To be eligible for consideration provided by the application material.

Enrollment is competitive, based on information provided by the application materials.

Enrollment in these courses is limited, and selection of students for admission is competitive, created by a consortium of universities.

The Organization for Tropical Studies, will provide part-time living expenses and round-trip transportation between Costa Rica and the place of residence.

finanical support from the National Science Foundation, AID, and its member institutions, will provide part-time living expenses and round-trip transportation, between Costa Rica and the Americas. There is no tuition, and OTS, with colleges and universities in the Americas. The courses are open to graduate students from all courses as indicated below.

use by man, will offer courses in tropical biology and geography in its several teaching session in Costa Rica. Instruction will be in English, except for one course to promote understanding of tropical environments and their interaction with nature to promote understanding of tropical environments and their interaction with nature.

July 1 - August 30, 1967
Costa Rica, Central America
to be given in

A GRADUATE PROGRAM IN TROPICAL STUDIES

Announces

Member Institutions: Costa Rica California Connecticut Florida Georgia
Harvard Hawaii Indiana Kansas Louisiana State Miami
Michigan Southern California Smithsonian Institution
Texas A & M Texas Tech Washington
Appartado 16
Cuidad Universitaria
Costa Rica, C. A.
North American Office:
School of Natural Resources
The University of Michigan
Ann Arbor, Michigan

The course deals with biological concepts that can be treated effectively

At each field site, one or two days are spent in orientation of the area and its biota. Two to four days are devoted to group study of field problems and their solutions. One or two days are spent in the early stages of graduate work, giving an introduction in depth to the principles of ecology as they operate in the tropics. After three days of introductory lectures and laboratory work in the class will be almost continuously in the field, spending four days to two weeks in each of four or five contrasting tropical environments. Data are collected, analyzed, and reported on by small working groups of students. The remaining time, amounting to about one-fourth of the days spent in the field, is occupied by individual research on problems selected by the students. The final four days of the course are assigned to completion of individual research reports, summary seminars, and the final examination.

This course, designed for students in the early stages of graduate work, gives an introduction in depth to the principles of ecology as they operate in the tropics. After three days of introductory lectures and laboratory work in the class will be almost continuously in the field, spending four days to two weeks in each of four or five contrasting tropical environments. Data are collected, analyzed, and reported on by small working groups of students. The final four days of the course are assigned to completion of individual research reports, summary seminars, and the final examination.

One additional full-term faculty member and four visiting scientists to be announced.

The University of Southern California
Assistant Professor: Mr. Roy McDermid, Department of Zoology,
Associate Professor: Dr. Thomas E. Bimmel, Department of Biological Sciences, Stanford University

Faculty: Graduate Coordinator: Dr. Thomas E. Bimmel, Department of Biological Sciences, Stanford University
Credit: 8 Semester Hours Limit: 20 Participants
Prerequisite: Graduate standing, with a minimum of four graduate or undergraduate courses in biology, including at least one in general ecology
at courses in biology, including at least one in general ecology
Credit: 8 Semester Hours Limit: 20 Participants

(Instruction in English)

Tropical Biology—An Ecological Approach Section I

THE COURSES

For adequate coverage of the subject matter, with depth in selected areas, the faculty for each course includes two or more full-term instructors, several short-term visiting scientists who are with the classes for two or more weeks each, and local lecturers. The courses are field-oriented; approximately seven of the eight weeks of the session are spent at selected field sites representing the principal kinds of tropical environments occurring in Costa Rica. Each phase is placed on those subjects of the subjects that can be studied only in a tropical region.

Credit: 8 Semester Hours
Limit: 10 Participants

Prerequisite: One year of graduate study in botany, including one course in morphology

The Biology of Tropical Pteridophytes

This section, similar to Section I described above in both materials covered and methods of presentation, will be taught in Spanish and will admit six biology faculty members from Central American universities and ten North American participants. For North American participants who have adequate knowledge of Spanish to communicate verbally, it will provide a unique opportunity for association with Latin American scientists in addition to those who fits in inherent to the course. It should be particularly valuable for those who plan extensive future work in the American tropics.

Mr. William Ramirez, Department of Entomology, The University of Kansas

Dr. Richard Casbeer, AID-ROCAP, Costa Rica

Dr. Jay Savage, Department of Zoology, The University of Southern California

Assistant Professors: Dr. Jay Savage, Department of Zoology, The University of California, Davis

Associate Professor: Dr. Robert Budd, The University of Los Angeles

Course Coordinator and Major Professor: Dr. Mildred Mathias, Department of Botany, University of California, Los Angeles

Faculty:

Credit: 8 Semester Hours
Limit: 16 Participants

Prerequisite: Faculty or graduate standing with a minimum of four graduate or undergraduate courses in botany or zoology, including one in general ecology and proficiency in spoken Spanish

(Instruction in Spanish)

Tropical Biology-An Ecological Approach Section II

Only by intensive field study, and so integrates botanical and zoological aspects of tropical environments that it is of equal value to students specializing in either botany or zoology.

This course is designed for graduate students who plan specialization in the Latin American tropics. It will be taught largely in the field. After several days of introductory lectures at the University of Costa Rica and short trips in the near vicinity, the class will spend four or five days in each of five or six different environments. At each field location, approximately one day will be spent in orientation to the area and family orientation with its environmental features and major land uses. Following this, several days will be devoted to group field problems of limited scope which yield detailed information on aspects of Latin American tropics.

Scholar-Term Faculty: Two visiting scientists

ASSOCIATE PROFESSOR: DR. PIERRE A. C. STOURE, DEPARTMENT OF GEOGRAPHY, THE UNIVERSITY OF KANSAS

Courses Coordinator and Professor: Dr. Ross N. Pearson, Department of Geography, The University of Michigan

Credits: 8 Semester Hours Limit: 15 Participants

One year of graduate study in Geography, a course in Field methods, and adequate proficiency in Spanish to work effectively in a Latin American field situation

Tropical Lands and Their Utilization: The Costa Rican Example

Described for advanced graduate students in botany with special interest in pteridophytes, this course will cover Lycopods, arctocaulates, ferns, and other pteridophytes. After an introductory period of lectures, life cycles, and evolution. After an introductory period of lectures, laboratories, and evolution. Pteridophytes studied from the standpoint of ecology, life cycles, and other topics in San Jose during which time familiality will be gained with the pteridophytes of Costa Rica, the tropical environment represented there, and the pteridophytic flora, the field instruction will be conducted from field locations in several environments. Field instruction will include lectures and seminars, group projects and individual research.

Mr. Murray Evans, The University of Tennessee

Visiting Scientists: Dr. David Lellinger, The Smithsonian Institution

Associate Professor: Dr. Elias Ramon de La Sota, La Plata University

Faculty: Warren H. Wagner, The University of Michigan
Course Director: Dr. Warren H. Wagner, The University of Michigan
Course Coordinator and Professor: Dr. John Mieke, Iowa State University

Applications must be received by the OTS North American Office by February 6. Applications will be notified concerning acceptance by February 27, 1967.

Members of the OTS Board of Directors and Advisory Council, and chairmen of the Local Committees on Tropical Studies, all member universities.

OTS Costa Rican Office OTS North American Office School of Natural Resources The University of Michigan Ann Arbor, Michigan 48104	Ciudad Universitaria Costa Rica, C. A. The University of Michigan Ann Arbor, Michigan 48104
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Application forms are available from any of the following sources:

APPLICATIONS

Each student will be expected to complete an individual research problem under faculty guidance and supervision. Insofar as practical, this problem should be selected prior to leaving for Costa Rica with the assistance of a faculty member from the participant's home university. Several days will be devoted to independent work on individual research, and each student will report his findings to the group during the final week of the course.

Such information will be collected, mapped, analyzed, and reported by small working groups of participants. Such problems will be man-and-land relationships and illustrate methods useful in the investigation of tropical problems. Such information will be collected, mapped, analyzed,

