

R. L. Wilbur

THE UNIVERSITY OF MICHIGAN
COMMITTEE ON A PROPOSED CENTER FOR TROPICAL STUDIES
UNIVERSITY MUSEUMS BUILDING • ANN ARBOR, MICHIGAN, U. S. A.

DUGALD E. S. BROWN
Chairman, Department of Zoology
STANLEY A. GAIN, *Chairman,*
Subcommittee on Financing
Chairman, Department of Conservation
NORMAN HARTWEG, *Chairman,*
Subcommittee on Physical Plant
Curator, Museum of Zoology

K. L. JONES
Chairman, Department of Botany
ROGERS McVAUGH, *Chairman,*
Subcommittee on Research Program
Curator, University Herbarium
L. C. STUART, *Chairman,*
Subcommittee on Instructional Program
Professor, Department of Zoology
T. H. HUBBELL, *Chairman,*
General Committee, and Chairman,
Subcommittee on Site and Lands
Director, Museum of Zoology

October 10, 1958

Dear Colleague:

This letter constitutes a progress report on the proposed Center for Tropical Studies.

After the Committee sent out its First Report (dated May 15, 1958) to you and others, two of its members were authorized to visit Mexico in order to confer with representatives of the various interested Mexican institutions, and to visit places that had been suggested as sites for the Center itself and its reserves. The results of this trip are set forth in two mimeographed documents: (1) the Report of a Conference held in Mexico City on July 17, and (2) the Report of the Subcommittee on Site and Lands, dated August 5. Copies of these reports have already been distributed in Mexico.

Some of our correspondents are of the opinion that several North American institutions should cooperate in the establishment and maintenance of the Center. The Committee is now exploring this possibility, and will welcome your opinion of its desirability and feasibility and your suggestions as to how it might be accomplished. In this connection we wish to stress again the instructional aspect of the proposed Center, which distinguishes it from all existing tropical facilities such as Barro Colorado, and has strongly influenced the choice of the proposed site. Some of those who have written to the Committee have apparently overlooked the place of the instructional program in the proposal and the requirements that it imposes.

If there are persons known to you who are interested in the project and who have not received the reports of the Committee, we shall be grateful to have their names and addresses.

Yours sincerely,

Theodore H. Hubbell

Theodore H. Hubbell
Chairman

R. L. Wilbur

(Translation)

Report of the meeting on July 17, 1958, in the City of Mexico, between Drs. T. H. Hubbell and N. Hartweg, of the University of Michigan, and a group of Mexican investigators connected with various institutions.

Because of the visit to Mexico of Drs. T. H. Hubbell and Norman Hartweg of the University of Michigan Committee on a Proposed Center for Tropical Studies, the Instituto Mexicano de Recursos Naturales invited the undersigned Mexican investigators [and administrators] to a luncheon for the purpose of exchanging impressions concerning the project with their North American colleagues. This meeting was the second held for this purpose; some months previous the I. M. R. N. R. had brought together the same Mexican group to discuss the plans for the Center with Dr. L. C. Stuart, another member of the University of Michigan Committee.

Drs. Hubbell and Hartweg explained fully the plans which their Committee is preparing, and which are contained in the First Report of the Committee previously distributed to the Mexican investigators attending.

Following this presentation, Dr. Enrique Beltrán of the I. M. R. N. R. informed the group that he had arranged an interview between Drs. Hubbell and Hartweg and Dr. Efraín C. del Pozo, General Secretary of the Universidad Nacional Autónoma de México, who had been authorized by the Rector of the University, Dr. Nabor Carillo, to handle for the University all matters connected with the proposed Center. At this interview Dr. del Pozo declared that his institution looked with sympathy upon the project, and was disposed to cooperate in attempting to establish the Center, upon the condition that its construction, direction and operation would be handled by the University of Michigan, and that arrangements be made so that the facilities of the Center, both for instruction and research, may be utilized by the University of México and other Mexican institutions. He added that the National University would gladly undertake to make the necessary representations to the Federal Government of México or to the governments of the States concerned to obtain the land upon which the Center is to be established, and to have them establish as national parks or as enclosed preserves the adjacent areas necessary for the studies to be undertaken.

Dr. Hubbell, in the name of the Committee of which he is Chairman, stated at this time his acceptance of the offer of the University of Mexico under the conditions stated by Dr. del Pozo--an offer which will be placed in writing and sent to the authorities of the University of Michigan. He also said that he and Dr. Hartweg would soon leave on a trip of inspection to visit the various sites in southern Mexico which have been suggested for the Center, and that they would like very much to be accompanied by Dr. Faustino Miranda of the University's Instituto de Biología to which Dr. del Pozo gave his assent.

The Mexican representatives attending the luncheon then expressed their views and opinions were exchanged and particular issues were clarified to the satisfaction of all those present. The following statements were agreed upon:

I. The undersigned persons look with sympathy upon the project to establish a Center for Tropical Studies in southern Mexico, and are prepared to cooperate with the institutions which represent the best means of establishing mutually useful relations with the Center.

II. The undersigned persons agree to stand behind the plans and policies discussed at this second luncheon meeting called by the Instituto Mexicano de Recursos Naturales Renovables, as presented in this document.

Report of meeting, July 17, 1958, Mexico, D.F., on Center for Tropical Studies - 2

Having approved the foregoing statements, Dr. Hubbell expressed in the name of his Committee his gratitude for the cooperation received.

He informed the group that, accompanied by Dr. Hartweg, Dr. Miranda, and Ing. Hernández X. of the Escuela Nacional de Agricultura, he would leave for southern Mexico, and that upon the return of this group (a subcommittee of the Committee on a proposed Center for Tropical Studies), the next steps to be undertaken would be decided in conference with Dr. Enrique Beltrán. The Mexican investigators who have shown an interest in this project will be kept informed of these steps and of progress made through the Instituto Mexicano de Recursos Naturales Renovables.

México, D.F. 17 July 1958

(Signed)

T. H. Hubbell, Director,
Museum of Zoology; Chairman,
Committee on a Proposed Center
for Tropical Studies, University
of Michigan

José R. Alcaraz, Oficina de In-
vestigaciones Industriales, Banco
de México

Enrique Beltrán, Director del In-
stituto Mexicano de Recursos Natur-
ales Renovables; Secretario Perpet-
uo de la Sociedad Mexicana de
Historia Natural

Jorge Gonzales Quintana, Director
de la Escuela Nacional de Ciencias
Biológicas del Instituto Politéc-
nico Nacional

Faustino Miranda, Investigador en
el Instituto de Biología de la
Universidad Nacional Autónoma;
Profesor en la Facultad de Ciencias

Rigoberto Vazquez de la Parra,
Director del Instituto de Investi-
gaciones Forestales

Norman Hartweg, Curator of Reptiles
and Amphibians, Museum of Zoology;
Representative, Committee on a Pro-
posed Center for Tropical Studies,
University of Michigan

Gabriel Baldovinos, Vocal Técnico de
la Comisión del Maíz, Profesor en la
Escuela Nacional de Agricultura

Gonzalo Blanco Macias, Presidente de
la Central de Amigos de la Tierra

Efraím Hernández X., Vicepresidente
de la Sociedad Botanica de México;
Profesor en la Escuela Nacional de
Agricultura

Julio Riquelme Inda, Presidente Honor-
ario de la Sociedad Forestal Mexicana

Roberto Villaseñor, Asesor Forestal
del Banco de México; Profesor en la
Escuela Nacional de Agricultura

(Note): Dr. Enrique Rioja, Presidente de la Sociedad Mexicana de Historia Natural and Profesor en la Facultad de Ciencias, and Dra. Amelia Sámano, Investigador en el Instituto de Biología de la Universidad Nacional Autónoma de México, Jefe del Departamento de Biología de la Facultad de Ciencias, were unfortunately unable to attend the luncheon, but expressed their interest in the project and their desire to cooperate in its realization.

The University of Michigan

COMMITTEE ON A PROPOSED CENTER FOR TROPICAL STUDIES

Robert L. Wilbur

REPORT OF THE SUBCOMMITTEE ON SITE AND LANDS

Dr. Faustino Miranda
Instituto de Biología, Universidad
Nacional Autónoma de México

Dr. Norman Hartweg
Museum of Zoology
University of Michigan

Ing. Efraím Hernández X.
Escuela Nacional de Agricultura
de México

Dr. T. H. Hubbell
Museum of Zoology
University of Michigan

The above-named subcommittee was appointed by the chairman of the Committee on a Proposed Center for Tropical Studies to visit the areas in southern México that have been proposed as possible locations for the Center, and to make recommendations concerning site and lands based on the results of its investigations. In addition to the many suggestions made by scientists in the United States and Latin America, the subcommittee had as a basis for its study the detailed report of Dr. L. C. Stuart, a member of the parent Committee who spent five weeks in March and April of this year surveying possible sites and obtaining data on the requirements of the physical plant and on construction costs. All members of the subcommittee have had considerable field experience in México, and one of them (Dr. Miranda) possesses intimate and detailed knowledge of the regions under consideration.

The four members of the subcommittee, travelling by carryall, left México, D.F., on July 21 and returned on August 2, after having visited Chiapas, the Isthmian strip, and the Valle Nacional area. Most of the time was spent in Chiapas, inspecting areas in the vicinity of Tuxtla Gutiérrez and making trips to San Cristóbal de las Casas and to a primeval tropical rain forest region known as El Ocote.

The work of the subcommittee was greatly assisted by the cooperation of several institutions and a number of individuals. Special thanks are owing to the Universidad Nacional Autónoma de México and the Escuela Nacional de Agricultura de México respectively for granting leave to Dr. Miranda and Ing. Hernández X. to accompany Drs. Hartweg and Hubbell on the subcommittee's tour of investigation. We are deeply indebted to Dr. Enrique Beltrán, Director of the Instituto Mexicano de Recursos Naturales Renovables, for his invaluable advice and his great efficiency in arranging interviews and conferences in his capacity as Coordinator for the interested Mexican institutions and the University of Michigan Committee. We also wish to thank Prof. Miguel Alvarez del Toro, Director of the Institute of Natural History at Tuxtla Gutiérrez, who placed his detailed knowledge of local conditions at our disposal and did everything in his power to facilitate the work of the subcommittee in Chiapas. Several other persons, both in Mexico City and in Chiapas, aided us in various ways. Although it is impossible to list them all by name and define the ways in which they helped us, we wish to thank especially the Honorable Dr. Samuel León Brindis, Governor-elect of Chiapas.

As the result of our investigations, we have reached the conclusions and make the recommendations presented below.

I. THE CENTER SHOULD BE LOCATED IN CHIAPAS NEAR TUXTLA GUTIERREZ. After inspection of the three general areas considered as possible locations for the Center in the first report of the parent Committee, the subcommittee is unanimous in concluding that central Chiapas has numerous advantages over both the Isthmus of Tehuantepec region and the Oaxaca-Valle Nacional region. The factors which have led

us to this decision are as follows:

(1) Maximum variety of accessible environments. From Tuxtla Gutiérrez as a center, one has access to a greater variety of natural and modified environments than in either of the other proposed areas. Topographically central Chiapas includes low plains, broad valleys enclosed by mountains, rolling piedmont slopes, young and mature solution terrain with many limestone caverns and much fantastically jagged karst topography, isolated mesas and peaks, and the extensive and high central plateau. Owing to differences in elevation, slope exposure and wind channeling in relation to the prevailing winds at different seasons, the climate varies greatly from one area to another--from dry to very wet, and from very hot to cool.

Among the more important environments within easy access from Tuxtla Gutiérrez are the following: savannas and scrubby forests in the semi-arid zone of the valley floors and lower surrounding slopes; dense ravine forests on the mountain sides; tall evergreen cloud forest with abundant tree-ferns and epiphytes within 16 miles of the city and accessible by road; a great expanse of virgin tropical rain forest in the area enclosed by the bend in the canyon of Río La Venta; forests of pine, oak and sweet gum on the central plateau less than 20 miles distant by road; high altitude cloud forests reaching elevations up to 8,500 feet within 60 miles, mostly by road; and about 120 miles away in the Isthmus of Tehuantepec an arid, semi-desert zone with many cacti and other xerophytes.

The relatively dry Pacific slopes and coastal plain can be reached in a two-hour drive from Tuxtla Gutiérrez. The Atlantic slopes and coastal plain of northern Chiapas and Tabasco form an extreme contrast, with their heavy precipitation and dense forests. The hot, moist lowlands of the north recall those of the lower Amazon basin, with their winding rivers, extensive marshes, and tall rain forests. These northern regions will soon be accessible from Tuxtla Gutiérrez by the road to Pichucalco and Teapa, scheduled for completion within two years. Finally, to the east of Comitán lie the beautiful blue lakes of Monte Bello, surrounded by nearly virgin forests and at present linked to the Pan-American Highway only by a dry weather road.

(2) Accessibility and Central Location. Tuxtla Gutiérrez is four days' drive from Laredo or Brownsville, Texas, via Mexico City, the whole distance on paved roads. From Mexico City the time is two days, either via Caxaca (the more direct route) or by way of Veracruz and the Trans-Isthmian Highway. Bus service from the Mexican border to Tuxtla Gutiérrez is excellent, and by plane (two flights daily in each direction) it is four hours to Mexico City. Situated on the Pan-American Highway about 150 miles from the Guatemala border, Tuxtla Gutiérrez is the hub of radiating roads that give access to the varied environments mentioned above. No other location, either in Chiapas or in the other two areas considered, is so favorably located in this respect.

(3) Climate. Chiapas, the southernmost state of Mexico, lies well within the tropics. The lowlands are hot except during the occasional "northers," and so also are the floors of the valleys that lie between the Sierra Madre and the central plateau, in one of which Tuxtla Gutiérrez is located. The highlands have temperate or even cool climates, and during the wet season and the "northers" the north-facing slopes and highlands are shrouded in mist and rain much of the time, while the south-facing slopes and adjacent valleys are bathed in sunshine.

Tuxtla Gutiérrez, situated in the Grijalva valley at an elevation of 1,750 feet, lies in the rain shadow of the central plateau. Its climate, although hot (average annual temperature about 75°F.) is relatively supportable because dry (annual precipitation 35 to 40 inches). The site recommended below for the location of the Center, 500 feet higher on the north face of the Mesa de Copoya, is not only cooler and more breezy than the valley floor but well shaded by tall trees.

(4) Advantages of proximity to Tuxtla Gutiérrez. This town of 30,000 inhabitants offers all the facilities to be expected in a modern city of this size, without the great disturbance of the surrounding environments characteristic of cities of much greater size. There are good hotels and motels, stores in wide variety, well-equipped garages and repair shops, restaurants, etc. The opportunities for social contacts and amusement it affords constitute an advantage which will be appreciated by anyone who has been confined to the intimate association of a small isolated group for a considerable time. Construction and maintenance costs will be considerably lower in the vicinity of Tuxtla Gutiérrez than if the Center were to be placed in a more distant and isolated situation, as was determined by consultation with local architects and construction firms. The variety and quality of food available in local markets and stores could not be matched in the other places considered as possible sites for the Center. The distance supplies will have to be transported is only 2.5 miles, with resultant savings in time and costs.

From an entirely different standpoint there are considerable advantages in a location near Tuxtla Gutiérrez. The state of Chiapas has a well-defined cultural tradition which centers in this city. The state government in 1941 created and has since maintained an Institute of Natural History on the outskirts of the city, with a Zoological Park and Museum, to which were added in 1949 a Botanical Garden and Museum. These surpass anything of the kind to be found elsewhere in México, and will be of much value for the instructional program of the Center. The state government has also published in recent years a number of scientific books relating to Chiapas, including works on the zoology (by Professor Miguel Alvarez del Toro, Director of the Institute of Natural History), vegetation (a two-volume work by Dr. Faustino Miranda), geology (by the late K. G. A. Muellerried), and archeology (by Dr. Frans Blom). There is every indication that the government will continue to maintain its interest in the scientific exploration of Chiapas.

(5) Assured cooperation of the Chiapas government with the Center. In an interview with the Honorable Dr. Samuel León Brindis, newly elected to a six-year term as Governor of Chiapas, he stated to the members of the subcommittee and others present that establishment of the Center in Chiapas would greatly benefit the state by the results of studies carried on there, and that his government would regard the project with much favor. He pledged the cooperation and help of the state government, and said that this would represent only a continuation of the interest already manifested by Chiapas over the years in the scientific exploration of many kinds of regional problems. The importance of such an attitude toward the work of the Center on the part of the state government is evident. We wish to express our appreciation of the arrangements made by Governor-elect León Brindis to furnish horses, pack animals, and guides for the trip to the region of El Ocote.

(6) Availability of Lands for the Use of the Center. For reasons mentioned below it appears that the site at El Zapotal recommended herein for the location of the Center can be secured for this purpose with little difficulty. The subcommittee has also been told that government action to establish protected study areas and national parks, as herein recommended, will encounter few obstacles of private ownership or prior occupancy. There is reason to believe that the difficulties would be considerably greater in the two other areas originally considered, where land would have to be acquired adjacent to the single road giving access to them.

(8) Additional Considerations Favorable to the Choice of Chiapas. People of diverse races, languages and cultures inhabit the state of Chiapas and bordering regions, affording unusual opportunities for anthropological, sociological and linguistic studies. There are also abundant archeological remains left by former inhabitants, including the world-renowned ruins of Palenque, Yashilán and Bonampak and innumerable lesser sites. These conditions make this region extraordinarily favorable for the study of the cultural evolution of man in the tropical environment.

From the standpoint of the earth sciences, also, Chiapas presents many interesting phenomena and a host of problems in structural geology, stratigraphy, paleontology and physiography. The close association in so small a region of batholithic, metamorphic, and Mesozoic and Cenozoic sedimentary rocks, the latter including coarse grits and fine shales and immense expanses of limestone, affords an opportunity to study tropical erosional and soil-forming processes acting upon various parent materials under climates ranging from extremely wet to semi-arid and very hot to cool.

Under this heading may also be included proximity to San Cristóbal de Las Casas. This city, about two hours drive to the east from Tuxtla Gutiérrez along the Pan-American Highway, is situated at an elevation of over 7,000 feet on the central plateau. Las Casas has long served as a base for investigations in linguistics, anthropology, geography and related fields. The Mexican Instituto Nacional Indigenista has headquarters there, and the library and other facilities of "Na-Bolom", the institute so painstakingly built up by Dr. Frans Blom, are available to visiting investigators. Every effort should be made to cooperate with those institutions, especially with regard to the research functions of the Center and its program of investigations.

II. CHOICE OF A SITE FOR THE CENTER. Of the various possible sites available in the vicinity of Tuxtla Gutiérrez, that here described best meets the requirements

El Zapotal is an area on the upper slopes of the Mesa de Copoya, looking north over Tuxtla Gutiérrez and the Grijalva valley toward the edge of the central plateau and the entrance to the awe-inspiring 2,000 foot gorge known as El Sumidero. It has an elevation of about 2,200 feet, some 500 feet higher than the city. From Tuxtla Gutiérrez it is reached by a 2.5 mile gravel road, which climbs through pastures and cultivated land to the forest which clothes the upper slopes below the mesa rim-rock. This forest is composed of tall trees of many species, growing on well-watered soil kept moist by the many springs at the base of the rim-rock cliffs. Several of these springs are of considerable size, feeding clear calcareous perennial streams and formerly constituting the water supply of Tuxtla Gutiérrez. They would afford abundant and uncontaminated water for the Center, and their presence was a decisive factor in the choice of this site.

The lower margins of the forest have been cleared of undergrowth and partly developed as a small municipal park with picnic grounds and, at some distance, a swimming pool. The park is evidently little used by the public. Adjacent to the park grounds are some moderately large corn fields, but the forest above the park and fields is relatively undisturbed. There are good buildingsites on the slopes above the park grounds, and the forest stretches away on either hand to an undetermined distance. Not far away a ravine cuts into the side of the mesa, and near its mouth is the entrance to a large bat-inhabited cave. At least a part of El Zapotal is municipally owned, and the subcommittee was informed that the site could be made available for the Center, but how much of it and under what conditions we did not learn.

III. RESERVES AND STUDY AREAS. Most of the various natural and culturally modified environments of this region are so extensively represented that there is no present need to set aside examples for preservation. This is not true, however, of the various types of humid forest. In the more inaccessible parts of Chiapas there remain thousands of square miles of virgin or almost virgin forest; but where roads or navigable streams give access to them they are rapidly cleared for agriculture or altered by the removal of the more valuable timber trees. The tall evergreen forests of the humid areas are the soonest destroyed, but the same fate awaits the temperate forests of pine, oak and sweetgum of the uplands. Fortunately for the choice of the region of Tuxtla Gutiérrez as a location for the Center, there remains a tract of relatively unaltered tall evergreen humid forest within a short distance by road, and at a somewhat greater distance one can reach the edge of a tremendous

expanse of magnificent virgin rain forest. Tracts of little altered humid upland temperate forests also remain accessible within a reasonable distance from the proposed site of the Center. The forest areas visited by the subcommittee or of which we were reliably informed will, if preserved in part (or as a whole in the instance of El Suspiro) insure the opportunity for long-term research programs in these environments. Without such assurance some other location for the Center would have to be sought. The principal areas recommended below for preservation are the following:

(1) El Suspiro. Ten miles west of Tuxtla Gutiérrez on the Pan-American Highway is the small town of Berriozábal. Here a jeep road extends to the north, winding up a distance of about 6 miles through cultivated fields, pastureland and savanna dotted with low nanche and espino trees, to an old ranch house on the shoulder of a hill at an elevation of about 3,000 feet. Following the road around the shoulder to the north at face one comes suddenly upon the margin of a tall, luxuriant humid evergreen forest, the trees loaded with epiphytes and tree-ferns conspicuous in the understory. This forest, about 250 hectares in extent, is in relatively unaltered condition, and can be reached from the proposed site of the Center in less than an hour's drive. The forest is not so tall as that at El Ocote, and of different composition. It should be preserved and made available to the Center for teaching and research use.

(2) El Ocote. Twenty-two miles west of Tuxtla Gutiérrez on the Pan-American Highway is the town of Ocozocuahtla (called Coita by its inhabitants for short). A short distance beyond the town a jeep road runs northwest, arriving in a few miles at a cattle ranch, San José Piedra Parada, situated not far from some striking sandstone cliffs. From this point a horse trail extends 20 miles northwest over the rolling nanche savannas that lie between the mountain wall on the right and the deep gorge of Río La Venta on the left. The trail winds among the rocks that strew the surface, descending from time to time into wooded ravines, and ends at the ranchito called El Ocote (from a solitary pine that grew there long ago). After an overnight stay, the members of the party proceeded on foot some five miles into the tall evergreen rain forest that begins just beyond El Ocote, spending the night at a small camp known as Hato del Tigre, beside a forest pool where the undergrowth had been cleared and a little coffee planted. The party returned to El Ocote by a different trail, and the next day followed the trail back to San José Piedra Parada.

Except for a few small cafetales like the one in which we camped, the forest of El Ocote is virgin. Enclosed by the great loop of the Río La Venta canyon on two sides and an almost insurmountable karst mountain on a third, it has been protected by its isolation. The forest crown probably averages well over 100 feet in height, and giant mahoganies and other immense trees tower above the rest of the forest. The whole region is one of limestone soils and solution topography, the part we traversed having an average relief of 50 to 100 feet with a succession of low ridges, shallow valleys, and sink basins. The number of species of trees in this forest probably approaches 200, and in height and density it is the equal of all but the very tallest rain forest in the inaccessible Lacandón region. It occupies the northwestern half of the loop formed by Río La Venta and Río Grijalva, and thence, interrupted only by the deep narrow gorge of the former river, stretches west over some 1,200 square miles of unexplored and almost impassable, deeply dissected karst lands to the edge of the cleared lands bordering the Trans-Isthmian Highway.

(3) Humid temperate upland forest. The subcommittee was unfortunately unable to select a representative tract of pine-oak-sweetgum upland forest on the central plateau to recommend for preservation, but the environment is of much interest, and an outstanding example should be set aside as national reserve.

(4) Lagos de Monte Bello. These deep, isolated, clear upland lakes are unique in southern México, and the area containing them should be designated a national

park so that its beauties may be kept unspoiled for the enjoyment of future generations. Although the area is somewhat more distant from the proposed location of the Center than would be desirable for maximum scientific use to be made of it, the environments provided by the lakes and their surroundings are not duplicated elsewhere in southern México, and limnological and other investigations at Monte Bello should form a part of the ultimate program of the Center.

RECOMMENDATIONS

The Universidad Nacional Autónoma de México has expressed its willingness to cooperate with the University of Michigan in attempting to secure the establishment of a Center for Tropical Studies in México. It has also been agreed by representatives of those Mexican scientific and educational institutions interested in the project that the National University is the institution which should logically undertake this responsibility. It is further understood that the prime contribution of the National University of México to the cooperative project should be to secure the necessary lands for construction of the Center and establishment of the study areas and reserves necessary for the protection of the long-term research programs in biology, ecology and conservation which will give continuity to the activities of the Center.

Since the project is contingent upon formal agreements to be reached by the authorities of the two institutions, and further contingent upon the obtaining of considerable funds from outside sources, the following recommendations are accompanied by suggestions as to the steps which may be undertaken now, and those which should be postponed until a later stage of the undertaking.

1. Building Site. It is recommended that a tract of land, preferably not less than 50 hectares in area, be obtained in the area known as El Zapotal for erection of the buildings of the Center (about 10 hectares) and for purposes of instruction and research (the remainder). This tract should include the slopes above the area now used as a municipal park by the city of Tuxtla Gutiérrez, and the large springs that issue from the base of the rim-rock cliffs and which would constitute the water supply of the Center. It might, if the city made no objection, include a part of the area now used as a park. It should be so positioned as to include suitable building sites, and a considerable extent of the forest on the upper slopes below the cliff.

It is suggested that steps be taken to investigate the availability of this site and the terms under which it might be obtained. The subcommittee was informed that it is owned, in part or wholly, by the city of Tuxtla Gutiérrez, and that there would consequently be little difficulty in arranging for its use as a site for the Center.

2. El Suspiro. It is recommended that the tract of humid evergreen tall forest at El Suspiro be obtained as a research and teaching area for the use of the Center. According to information supplied to the subcommittee the present owners of the hacienda have expressed their willingness to have it made a nature reserve allocated to scientific uses if the Center is established near Tuxtla Gutiérrez.

It is suggested that inquiries be made as to the terms under which such an arrangement could be set up. Final action need not be taken until the establishment of the Center is assured.

3. El Ocote. It is recommended that a tract of land approximately eight by six kilometers in extent in the tall evergreen rain forest region known as El Ocote be designated by the national government of México as a wilderness reserve, accessible for scientific study but protected against alteration by human activities. This area should be so located as to take in the ranchito El Ocote and a small part

of the adjacent savanna, and also the camp site and forest pool at Hato del Tigre. It is urgent that action be taken on this matter soon, while the forest is still in its present virgin state. It is important for the research and teaching program of the Center that this area be preserved, but it is also something that should be done because it would be in the long-time national interest. Some years ago certain Mexican scientists tried to have El Ocote made a national reserve. The data which they assembled would serve as a basis for a renewed attempt, and doubtless can be found in the files of some government office.

It is suggested that interested Mexican institutions, with the support of as many leading scientists and public men as possible, try to initiate as soon as possible the legislation necessary to make a national wilderness reserve at El Ocote.

3. Lagos de Monte Bello. It is recommended that the area near the Guatemalan border that includes the Lagos de Monte Bello be made a national park, and that its accessibility be improved by making the road from Comitán an all-weather jeep road. This action, like that recommended for El Ocote, would be in the long-time national interest. It will be easier to accomplish now than after private interests become firmly established. If the attempt succeeds, and provision is made for the use and enjoyment of the park by the general public, the Center might later request that selected areas in the park be set aside for scientific purposes, including one or more shore sites where a modest limnological laboratory and boathouse might be erected.

It is suggested that all interested institutions and individuals take steps to promote the necessary legislation to make the Lagos de Monte Bello region a national park.

4. Humid highland forest reserve. It is recommended that a committee of qualified persons be appointed by the Rector of the National University to choose a tract some 48 square kilometers in extent, representative of the best accessible example of pine-oak-sweetgum upland forest. This should be sought on the central plateau, and if possible be situated along the Tuxtla Gutiérrez-Pichucalco road for easy access and maximum usefulness in the program of the Center.

It is suggested that following the report of the committee on the area selected, steps be taken to have it set aside as a national reserve dedicated to scientific studies and accessible to the Center for research and teaching. It is less urgent that this be done soon than in the instances of El Ocote and Lagos de Monte Bello, but the existence of such a reserve would be of great importance to the Center.

5. Other small areas. Most of the drier types of environment in Chiapas are represented by extensive and often monotonously uniform expanses, such as are seen in the savannas and regions covered with scrubby forest. There is no immediate need to establish study areas in such situations. When the Center is in operation a number of small exclosures of a few hectares each will be needed, in order to exclude livestock and make possible the comparison of grazed with ungrazed land. The agricultural plots mentioned in the first report of the parent Committee can perhaps be found within the limits of the El Zapotal site, or can be obtained after the Center is established and its needs more clearly determined.

Dr. Faustino Miranda

Dr. Norman Hartweg

Ing. Efraím Hernández X.

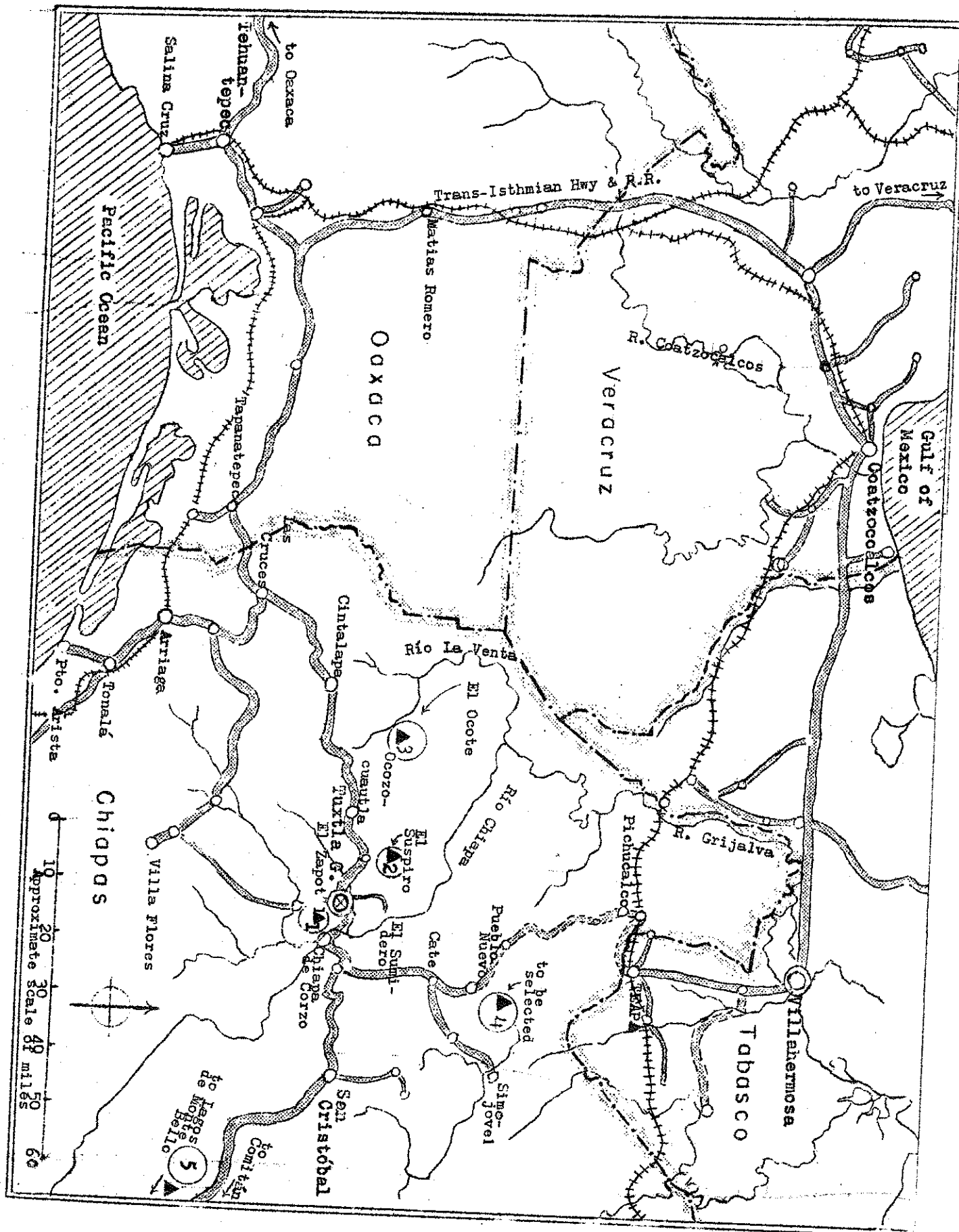
Dr. T. H. Hubbell

México, D. F.
5 August 1958

CHIAPAS AND THE ISTHMUS OF Tehuantepec

Triangles show sites recommended for Center and its Reserves

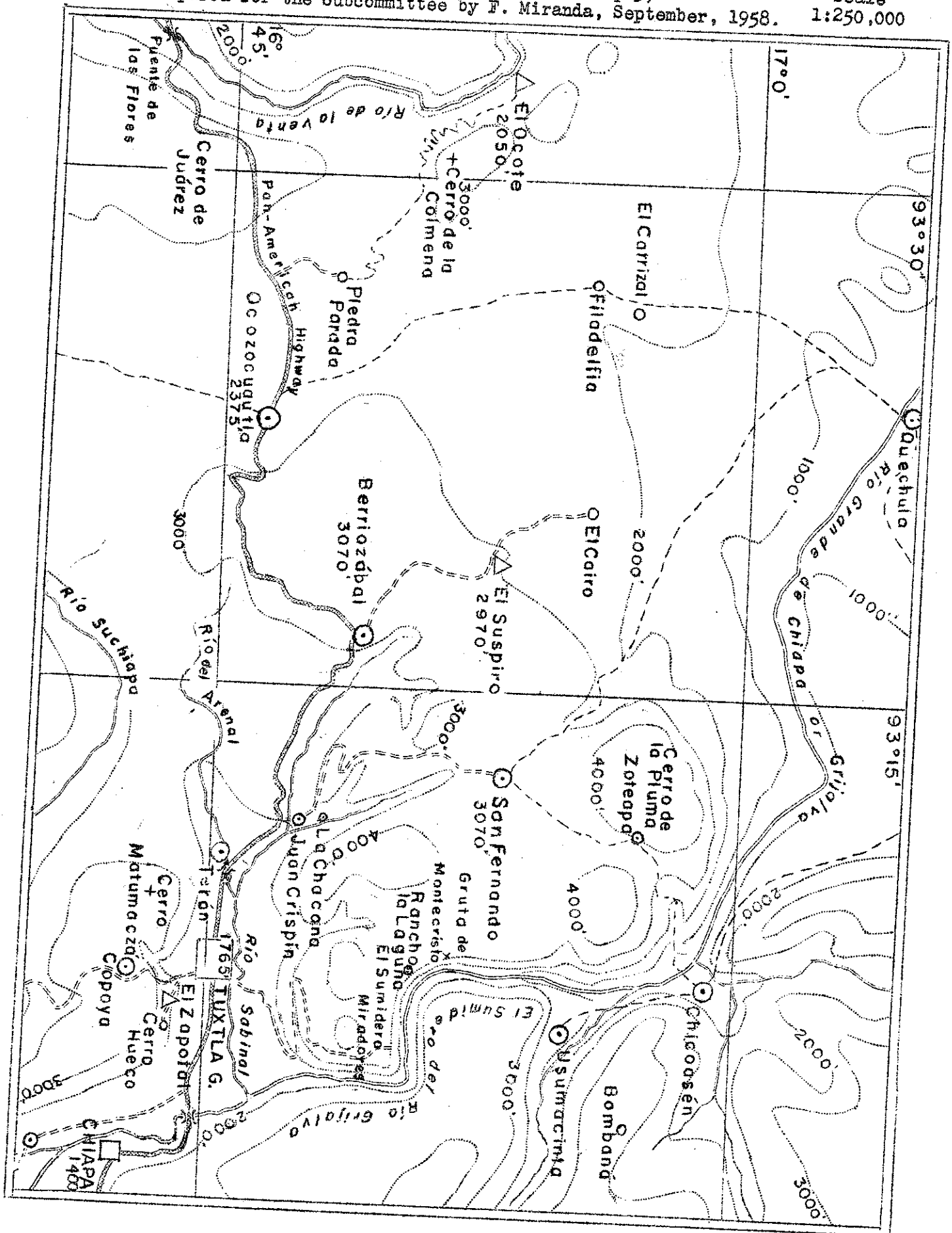
Map 1



Map 2 :

Scale
:250,000

Prepared for the Subcommittee by F. Miranda, September, 1958.



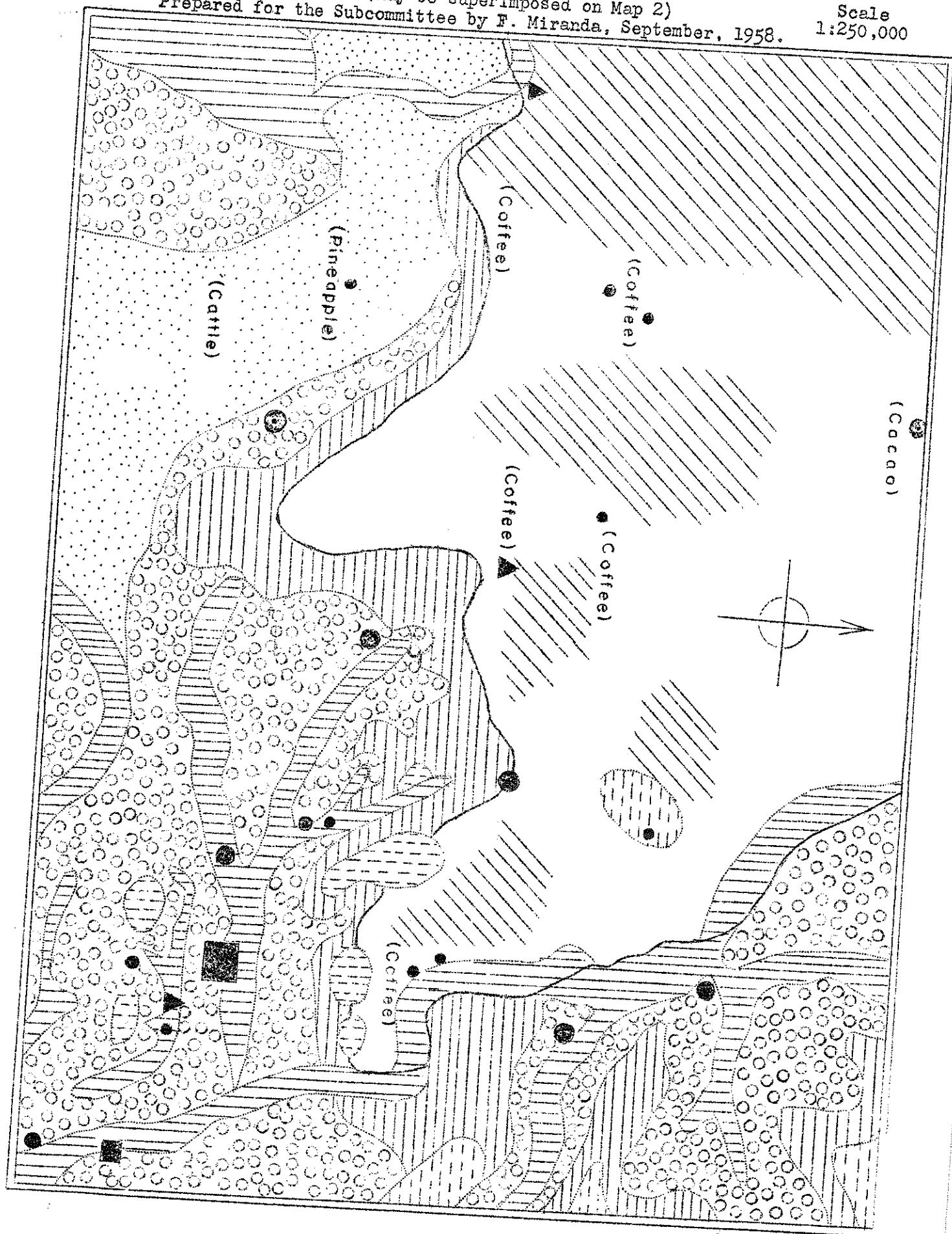
SKETCH MAP OF THE TUXTLA GUTIERREZ REGION IN CHIAPAS
Showing the Principal Vegetation Types

Map 3

(May be superimposed on Map 2)

Prepared for the Subcommittee by F. Miranda, September, 1958.






Scale
1:250,000








EXPLANATION OF MAPS 2 AND 3 OF THE TUXTLA GUTIERREZ REGION
Prepared for the Subcommittee by F. Miranda, September, 1958

MAP 2 - TOPOGRAPHY AND CULTURE

Symbols





-  City, more than 15,000 pop.
-  Town, less than 15,000 pop.
-  Small village, rancho, or uninhabited place
-  Places recommended as sites for Center and its reserves
-  Mountain summit

Symbols






-  Paved highway
-  Dirt road or cart road
-  Horse trail
-  River
-  Contour lines (1000 ft. interval)

MAP 3 - VEGETATION

Symbols

-  Boundary between humid zone and subhumid and semiarid zones
-  Humid tropical evergreen forest, tall (over 100') or of medium height (50-100'); the obliquely ruled areas have been little altered
-  Transitional subdeciduous forest, tall or of medium height. Savannas of nanche or espino are frequent in this zone
-  Tall subdeciduous forests of river valleys, ravines, or escarpments with reduced insolation

Symbols

-  Boundary between vegetation types
-  Low deciduous forest (12-50')
-  Oak forest
-  Oak forest with pines or junipers ("cipreses"), or pine forests
-  Extensive savannas of nanche (*Byrsonima crassifolia*) or espino (*Acacia pennatula*), or forest-savanna with those species frequent

Other symbols as in Map 2

Descriptions of the vegetation types mentioned will be found in: F. Miranda, *La Vegetación de Chiapas*, Primera Parte, Ediciones del Gobierno del Estado, Tuxtla Gutiérrez, Chiapas, 1952. See especially the following:

- | | |
|-------------------------------------------------------|-----------------------------------------------------|
| p. 63 - caobal (mahogany forest) | p. 98 - forests of canelo (<i>Calycophyllum</i>) |
| 65 - zapotal (<i>Vochysia</i> , zapote forest) | 99 - forests of <i>Platymiscium</i> & <i>Ptero-</i> |
| 66 - forests of <i>Bernoullia</i> & <i>Zinowiewia</i> | 103 - low deciduous forests <i>carpus</i> |
| 68 - forests of <i>Pseudolmedia</i> | 116 - savannas |
| 69 - forests of <i>Brosimum</i> & <i>Quararibea</i> | 122 - quebrachales (<i>Acacia milleriana</i>) |
| 70 - forests of <i>Licaria</i> & <i>Vatairea</i> | 130 - low evergreen forests of <i>Oreo-</i> |
| 88 - forests of cajpoquí (<i>Bumelia</i>) | <i>panax</i> , <i>Topobea</i> and <i>Persea</i> |
| 91 - forests of guanacaste & totoposte | 133 - cacatales (<i>Oecopetalum mexicanum</i>) |
| 97 - mujual (<i>Brosimum alicastrum</i> forest) | 147 - encinar (oak forests) |
| | 156 - pinar (pine forests) |

All of the above-named plant associations occur in the region included by Maps 2 and 3. Others that occur on the coastal plain and on the higher parts of the Mesa Central can be reached by road in a few hours from Tuxtla Gutierrez.

Robert L. Wilbur

University of Michigan
COMMITTEE ON A PROPOSED CENTER FOR TROPICAL STUDIES

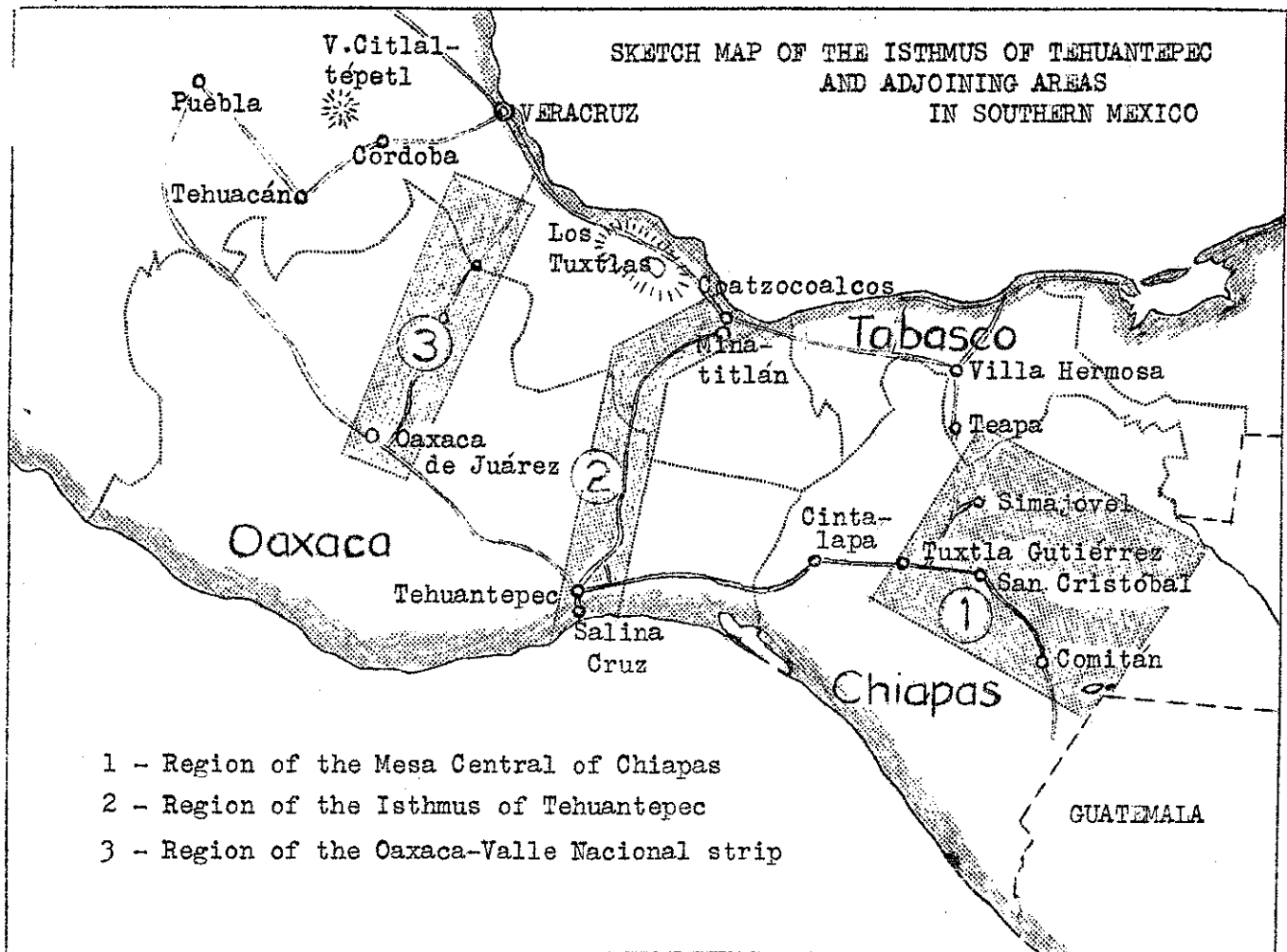
Dear Sir:

In appreciation of your interest and help, the Committee takes pleasure in sending you the enclosed copy of its first report on the project of establishing a Center for Tropical Studies. This report has been placed in the hands of authorities of the University of Michigan, and the Committee has been authorized to distribute it to interested parties. It should not, however, be publicized generally, since many steps remain to be taken before the project can be officially sponsored and outside support can be sought for it.

Present plans call for members of the Committee to visit Mexico this summer to confer with representatives of Mexican institutions. As a result of these talks, it is hoped that during the autumn the project can proceed to stage (4) as outlined on pages 16 and 17 of the report.

Since it will not be possible to send a copy of this report to everyone who replied to our preliminary inquiry, we hope that you will circulate it within your department or institution to insure that it will be seen by all who may be interested.

The sketch map below shows the approximate location of the regions and cities or towns discussed in the report.



T. H. Hubbell
Chairman

University of Michigan
COMMITTEE ON A PROPOSED CENTER FOR TROPICAL STUDIES

First Report

OUTLINE OF A PLAN FOR THE ESTABLISHMENT
IN TROPICAL MEXICO OF A
CENTER FOR TEACHING AND RESEARCH

It is recommended by the undersigned Committee that the University of Michigan and one of the several institutions of higher learning in Mexico cooperate to establish a Center for Tropical Studies in southern Mexico. The grounds for this proposal and a plan for accomplishing it are presented below. Selection of southern Mexico as the preferred location of the Center was made in consideration of proximity and accessibility, diversity of environment and research opportunity, political stability and, equally important, the enthusiastic welcome accorded the project by many leading Mexican scientists. This choice also meets with the approval of the largest number of North American scientists who have expressed their views to the Committee.

With the submission of this report and recommendation, the Committee enters the second phase of its exploratory assignment. Its preliminary inquiries were necessarily general in nature. More than two hundred and fifty North American and Latin American scientists responded. Their replies show that the need for such a Center exists and that prospects for its establishment are favorable. The time has arrived for presentation of more specific proposals. The plan here suggested is intended to serve as a basis for discussion, negotiation, and eventual agreement between the University of Michigan and a designated Mexican institution. When agreement is reached, work can begin on a detailed prospectus. Such a prospectus will be needed by the governing boards of the sponsoring institutions, and will be the basis for requests for financial support from the major foundations.

NEED FOR THE CENTER. On account of the rapid growth of human populations and dwindling natural resources, the tropics are increasingly important to mankind. There is urgent need for planned, systematic studies in tropical regions--studies of physical and biotic conditions, resources, and of the many aspects of human life and culture, past and present. The necessary basic research must be accomplished by trained investigators and by students working under their supervision. In order that there may be an adequate supply of competent investigators, it is imperative that there be an instructional program in which students can get first-hand experience in a variety of tropical environments and in diverse fields of science.

The above premises were taken as basic in the Committee's planning. They are also evidently so regarded by the great majority of the scientists who have thus far commented on the proposal. Extensive sampling

of informed opinion has demonstrated substantial agreement that (1) there is need for the proposed Center, (2) no existing research facility can fill this need, and (3) establishment of the Center in southern Mexico would be welcomed by Mexican scientists and institutions.

The Center would be open to all qualified persons, without regard to nationality or institutional affiliation. Its objectives would be teaching and research, as coequal activities. It would provide instruction and training of students at the graduate and advanced undergraduate levels, and promote research by members of the staff, visiting investigators and students.

RELATIONS TO EXISTING CENTERS. The numerous field stations which exist in the United States for work in pure and applied natural science are all located in the temperate zone, and cannot serve the purposes of the proposed Center. The latter would not compete with these northern stations, nor they with it.

The feasibility of using one of the already established facilities in the American tropics has been carefully considered. The Committee feels that the existing institutions, though adapted to their specific purposes, do not meet the criteria of the proposed Center. The feature which especially distinguishes the latter from any of them is its strong emphasis on class instruction in a variety of subjects necessary for an understanding of the tropics.

If North American students are to attend the Center a number of requirements must be met. The Center should be easy and inexpensive of access; it should be located where there is a maximum of environmental diversity in small compass; it should be near undisturbed biotic communities of various sorts that are preserved from exploitation; opportunities for geographical and anthropological studies would be highly desirable; and finally, it should be located in a healthful and comfortable environment, preferably fairly near a town or small city. The Center will also have to provide living quarters and laboratory facilities on a scale not available in any of the existing research centers.

Venezuela, with its proposed station on Lake Valencia and the buildings at Rancho Grande, offers many advantages. Unfortunately, distance and cost of transportation are alone enough to eliminate any possibility of taking large numbers of North American students there.

Barro Colorado in Gatun Lake, Canal Zone, has its proponents. It suffers from the same handicap of distance and cost as does Venezuela, and the additional one that only a single major tropical environment (the rain forest) is represented. The area is also of little interest to anthropologists and geographers.

Turrialba in Costa Rica has a program which in some respects resembles that here described. To set up the Center alongside of the existing institute would create a truly outstanding concentration of staff, facil-

ities, and library. The emphasis at Turrialba is on agriculture and applied biology; addition of the Center would round out the program by adding biology and conservation. The major objections are limited and expensive means of access.

San Salvador has an active research institute, and in Honduras the Escuela Agricola Panamericana at Zamorano offers general education and practical training in agriculture to Latin American students. Neither of these is adapted to serve the purposes here outlined, and neither is readily or inexpensively accessible to North American students.

SPONSORING INSTITUTIONS. This Committee and a majority of Mexican and North American scientists who have been consulted believe that for various reasons the Center should be established under the sponsorship of two institutions--one North American, one Mexican.

The North American institution should be the University of Michigan. It is no accident that the Committee making this proposal was set up here. There is at this university a long history of interest in the American tropics, going back well into the last century. Beginning with the early explorations of J. B. Steere, and carried on through the activity of A. G. Ruthven, F. M. Gaige, H. H. Bartlett and others, the interest of Michigan botanists, zoologists, anthropologists and geologists in tropical studies has continued to grow. The University of Michigan now has very large commitments in tropical America in terms of faculty interest, museum collections, library holdings, and published research. It helped to establish and for many years contributed to the support of the biological research laboratory at Barro Colorado, and cooperated with the Carnegie Institution of Washington in biological and anthropological studies on Guatemala and the Yucatan Peninsula. A great deal of work has also been done in Mexico. A survey of the kind and amount of such research done by members of the university faculty was made some years ago. It showed, first, that future work in Mexico would be greatly facilitated by the establishment of a central clearing-house, and second, that a cooperative rather than an individual approach would often resolve or bring to a common focus diverse and apparently isolated problems. And as final evidence of the strength, persistence, and urgency of the felt need at this institution for teaching and research facilities in the tropics, we have the existence of this Committee and this report.

In Mexico there are a number of institutions which have important stakes in any such undertaking as that here proposed. All of these institutions should participate in deciding which should be the primary sponsor of the Center in Mexico, and how they may cooperate in its use and support. The Committee is especially indebted to the Instituto Mexicano de Recursos Naturales Renovables for help received; that institute has been and is willing to continue as the principal agency for the interchange of ideas between representatives of the University of Michigan and various Mexican institutions.

ORGANIZATION AND ADMINISTRATION. With the advice and concurrence of a majority of the Mexican and North American scientists consulted on these matters, the Committee recommends that the Center be administered and operated by the University of Michigan, according to the following plan. (This and the succeeding sections of this report are based on the assumption of continuous operation of the Center and the presence there of approximately 100 persons during its periods of maximum use).

Administration of the Center would be through the agency of a Director, a Deputy Director, and an Advisory Board, having responsibilities and duties as follows:

Director. A member of the faculty of the University of Michigan, responsible to the Regents of that institution. (The exact relation of the Center to the Colleges of the University, and hence the mode of appointment of the Director, remain to be determined, but in any event the Advisory Board of the Center and the chairmen of the interested departments of the University should have a voice in his selection). The Director should be appointed for three to five years, the longer period preferable after the Center is in operation. The appointment should automatically be reviewed at the end of this period, and at any other time at the request of the Director or the Advisory Board.

Duties: To administer and coordinate the activities of the Center, prepare a budget, arrange for the employment of professional and service personnel, administer the instructional programs offered at the Center, facilitate the work of visiting investigators, and in general do all that is needed for the successful management and operation of the Center. He would be the University's principal liaison agent in relations with Mexican and North American institutions. During a part of each year he would be in Ann Arbor and engage in instructional and other activities on the University campus. His salary, paid by the University, should be commensurate with his academic rank and administrative responsibilities. The Director should be provided with funds for travel and subsistence while enroute to and from the Center, and while away on University business for the Center.

Deputy Director. Employed by the University of Michigan; responsible to the Director, and through him to the Regents of the University of Michigan. He should reside at the Center, and be capable of conducting its affairs in the absence of the Director. He should be a scientist of ability and preferably a Mexican citizen. He should be appointed upon the recommendation of the Director and the Advisory Board, through channels to be established. His appointment should be for a term the same as that of the Director and should be similarly subject to review.

Duties: To serve with the Director in administration of the Center, and as his Deputy during the Director's absence. He would have particular responsibility for service staff, relations with

local inhabitants and authorities, maintenance of physical plant, and knowledge of the local environment. He would advise the Director in his relations with Mexican authorities, institutions and students. His salary should be commensurate with his abilities and responsibilities.

Advisory Board. To consist of approximately equal numbers of Mexican and North American scientists, selected to represent the principal fields of study emphasized at the Center. The size of the Board and the mode of its creation remain to be determined. (Among the suggestions that have been made are these: there might, to begin with, be three Mexican and three North American members, representing among themselves the fields of botany, zoology, conservation, anthropology, geography, and geology; by agreement, three of them might be appointed by the head of each of the sponsoring institutions; once set up, the six-man Advisory Board might by mutual agreement increase its own membership to some predetermined limit). The members of this Advisory Board should serve without pay, but should receive expenses and a per diem allowance during attendance at meetings of the Board or on official visits to the Center.

Duties: To make recommendations to the Regents (through channels to be established) concerning selection of the Director and Deputy Director; to recommend policies and procedures for the effective use of the Center; and to serve as a board of review in matters of concern to the sponsoring institutions.

In addition to the Director, Deputy Director, and Advisory Board, the Center would require the services of a small service staff throughout the year. Each sponsoring institution would employ its own teaching faculty for specified periods, and would provide the additional professional and service staff needed to handle the increased attendance at the Center during those periods.

INSTRUCTIONAL PROGRAM

The cooperating institutions should have complete and equal freedom to use the facilities of the Center and to develop their own instructional programs, with suitable provision for adjustment of scheduling to avoid interference. Qualified students from any institution should be entitled to enroll in either program.

The University of Michigan teaching program. Courses offered by this university would for the most part be scheduled between late June and early September, since that is the period in which most North American students could attend. If there were sufficient demand special courses could occasionally be given at other times of the year. Work would be offered in botany, zoology, ecology, conservation, and field anthropology. None of the courses would be of the general introductory type. They would be designed for advanced students, would be definitely

related to local conditions, and would for the most part be field courses. The strictly biological ones, for example, would deal with plants and animals of the region, especially in terms of their existence and interactions in the tropical environment, both in undisturbed and in culturally altered situations.

The actual course program should not be so rigid as to be unadaptable to changing demands. On the other hand, it should include a core of basic offerings available every year. Among those which should certainly be included are (1) fundamentals of tropical ecology, (2) natural history of the local flora, (3) natural history of the local fauna, and (4) fundamentals of tropical conservation. Others could be added as experience showed a need for them. Each member of the teaching staff should have the opportunity to give courses in his specialty (e.g., ornithology, bryology, land use, etc.) at intervals or upon evidence of sufficient demand.

Success of the teaching programs at the Center will depend quite largely upon their receiving adequate and properly timed publicity. The announcements should so far as possible include not merely the current year's offerings, but also the special courses to be offered the succeeding season, so that the prospective student might choose the most advantageous time to enroll. Subsidization of students to reduce the cost of attendance will undoubtedly be necessary; this is discussed below under the heading of Outside Support.

Success of the instructional program will be assured if the courses given are from the first of very high quality. Careful selection of the teaching staff is one obvious way to insure this. However, no one, regardless of his competence as a scientist or teacher, can give a first rate field course in an area strange to him. This leads to two suggestions. The first is that, upon occasion, the University of Michigan secure the services of Mexican scientists qualified by their special knowledge and their command of the English language to teach North American students. The second is that, so far as possible, prospective teachers be given an opportunity to become familiar with the local environments and their inhabitants before they undertake to offer courses. A preliminary year of research by the Directors and the initial teaching staff of the Center should precede the beginning of the University of Michigan instructional program, largely in order to prepare for the latter. So far as possible, also, men added to the instructional staff or replacing others should have had at least a preliminary period of research to prepare them for more effective teaching. This second suggestion is again mentioned in connection with the research program, and in the section dealing with Outside Support.

RESEARCH PROGRAM.

The Committee feels strongly that research at the Center should be basic, not applied, although these terms will have to be rather broadly and flexibly interpreted. Medicine and agriculture as such are excluded; but studies on the genetics of crop plants or on the life histories of disease vectors, for example, would be suitable undertakings. In the field of conservation the research of the Center should be directed toward

acquisition of the data and understandings upon which intelligent practical measures can be based.

The Center should develop and promote a coordinated, continuing, ecologically oriented program of research on a regional basis, into which much of the work of its staff, visiting investigators, and graduate students could be channeled. This should apply particularly to long-term projects. Various short-term investigations should be encouraged, some of which might not fit into the major lines of research stressed at the Center, but all of which should be compatible with the Center's objectives. All competent workers who can contribute toward a solution of any of the many tropical problems should be welcomed.

Researches carried on at the Center should be closely linked with the instructional programs. As was mentioned above, preliminary research will be necessary for many members of the staff teaching the University of Michigan courses for two reasons: (1) to familiarize themselves with the various situations and examples to be used in the courses, and (2) to assay the potentialities of the area in terms of future research in their fields.

Provision should be made for research by advanced students under proper guidance. Some of the studies undertaken by students might require the student to be at the Center throughout a year or in parts of successive years. Student projects of some magnitude would often result in graduate theses for advanced degrees.

LOCATION OF THE CENTER.

In seeking a suitable location for the Center in southern Mexico, the following requisites must be considered:

- A. Accessibility to the Center by ordinary means of communication, especially by road.
 - B. Environmental and cultural diversity within a reasonable distance from the Center, and ready access to these varied conditions.
 - C. Living conditions suitable for students and investigators not acclimated to the tropics.
-

On the basis of these requisites three general regions merit serious consideration. These are:

- 1.-The Mesa Central in Chiapas.
- 2.-The Isthmus of Tehuantepec, including the strip along the Trans-Isthmian Highway together with the immediately adjacent highlands.

3.-The Oaxaca-Valle Nacional region, comprising a strip along the almost completed Oaxaca-Valle Nacional Highway.

Our evaluations of these three regions are based primarily upon the report of five weeks' exploration by a member of the Committee, supplemented by information supplied by persons well-acquainted with some of the areas.

The Mesa Central of Chiapas. This region is accessible by car, bus and plane from the United States. From Laredo it is about 1500 miles (4 driving days) over good to excellent roads. The region is one of tremendous environmental diversity. Biotic communities ranging from near-desert to tropical rain forest are accessible on the slopes and summit of the Mesa Central, at elevations from near sea-level to about 3000 meters. Culturally the region is sufficiently diverse to have attracted a team of investigators from the University of Chicago and another group supported by the New World Archeological Foundation. Excellent living conditions may be encountered in this area. Although spottily distributed, water is no problem, and--an item of no little importance--fruits, vegetables and meats of good quality are produced in abundance and variety.

An adequate biological museum with both zoological and botanical gardens exists in Tuxtla Gutiérrez, and at San Cristóbal las Casas an excellent library on Chiapas has been assembled by Dr. Franz Blom at his personally financed research center. In Las Casas, also, there is a station of the government-supported Instituto Nacional Indigenista. The nationally owned lakes east of Comitán are an important asset of this region.

The Isthmus of Tehuantepec. Like the preceding, this region is accessible by car, bus, and plane. From Laredo it is 3 to 4 days by car over excellent roads. Within a radius of 50 miles from its center at Jesús Carranza great environmental and cultural diversity exists, and within a radius of 75 miles both the Pacific and Gulf of Mexico coasts may be reached. On the basis of existing roads the Center could be located only in the hot lowlands, although it could be placed either in humid or xeric situations. Water, especially in the dry south, might place further restrictions on available sites. Variety of foods would be less than on the Mesa Central. There are at present no cultural centers in the isthmian region such as exist at Tuxtla Gutiérrez and Las Casas.

The Oaxaca-Valle Nacional strip. This region, along a new road which is scheduled for completion in June, 1958, is, like the other two areas, accessible by car, bus, and plane. It is located 3 driving days from Laredo over excellent roads. The Committee has little information on this strip and such as it does possess was gained from road engineers. Both ends of the strip have been inspected, however, and there is little doubt that considerable environmental diversity exists along it. The Oaxaca region is, of course, one of particular cultural interest. In the city of Oaxaca de Juárez living conditions excel those in the two preceding regions. On the Valle Nacional side it would probably be necessary to locate the Center in the hot, humid lowlands. Water, food, and other vital conditions would present no problem in that portal area.

Oaxaca de Juárez has served as a major center in Mexico for both archeological (Monte Albán and Mitla) and anthropological investigations. A regional museum is already well established in the city. In the Valle Nacional region, on the other hand, no such advantages are present.

Potentially each of the three general regions possesses all the basic requisites for the Center. In final analysis, selection of a site depends upon ready accessibility to diverse environment and culture types. This, in turn, means that there should be a number of tributary roads extending out from major routes or centers. At present the Oaxaca-Valle Nacional strip lacks such tributary lines of communication, and the almost completed highway between the two towns is a tortuous mountain road, with some grades exceeding 15 percent. Similarly, the Trans-Isthmian Highway is without tributary roads leading to the diverse environments that lie to the east and west of the highway. Thus instruction and investigation in either of these two areas would be restricted to the vicinity of the major highways.

The Mesa Central of Chiapas, by contrast, has a major east-west highway (a part of the Pan-American Highway that will eventually lead into Guatemala) and a number of satisfactory (if not always first class) accessory roads. As yet the highway designed to link the dry valley of the Río Grijalva with the humid lowlands of Tabasco has not been completed, but work is progressing on it. Mexico is at present pushing forward an extensive highway-building program, and all indications point to its continuance. It may well be that 5 years from now various excellent sites will have become available that cannot now even be considered. The Committee considers establishment of the Center too urgent to be postponed for such a consideration, and on the basis of present information strongly recommends that it be placed somewhere in, or on the flanks of, the Mesa Central of Chiapas. Choice of the exact site must await detailed exploration and careful weighing of advantages and disadvantages of particular locations.

PHYSICAL PLANT

The physical plant here suggested is based on the assumption of a maximum population at the Center of about 100 persons (e.g., about 50 students and 50 other individuals comprising staff, investigators, service personnel, and families). The plant may be considered in terms of its three basic divisions:

First Report -- 10

1.-Buildings, including such basic installations as water, electricity and waste disposal.

2.-Service equipment, i.e. motor vehicles, power and water plants, interior furnishings, commissary equipment, etc.

3.-Laboratory equipment exclusive of general laboratory furnishings.

Buildings. Inspection by the Committee of a variety of structures in southern Mexico has convinced us that, with the exception of certain specialty items (aluminum windows) and minor structural modifications, all buildings within the Center can be constructed by local workmen utilizing native materials. It seems advisable that the Center be planned on the basis of one-story structures, use of modular design, uniformity of such features as doors and windows, and grouping of certain installations such as bath units and laundry. As now foreseen, the following buildings are indicated:

1.-Housing

- a. Serial double units for unmarried students and investigators.
- b. Serial units for married students and investigators.
- c. Bath unit for all students and investigators with laundry in conjunction.
- d. Double or serial units with bath for faculty.
- e. Single units with bath for two administrators.
- f. Serial units for service personnel.
- g. Bath unit for service personnel.

2.-Instruction and research

- a. Classroom units.
- b. Laboratory units.
- c. Research units.

3.-Service units

- a. Commissary and dining room.
- b. Library, museum for study collections, photographic room.
- c. Machine shop and garage.
- d. Power and water plant.

4.-Miscellaneous

- a. Animal house and aquarium.
- b. Greenhouse.
- c. General service units for first aid dispensary, equipment dispensary, storage, etc.

It is estimated that for proper spacing of structures and to provide for possible future expansion a ten-acre, fenced compound would be required to contain the physical plant.

Service Equipment and Furnishings. Heavy service equipment such as power and water plants, motor vehicles, refrigeration units, etc., would have to be imported. Lighter installations including bath and commissary equipment, electric appliances, beds, and the like of high quality are manufactured in Mexico. Other items such as chairs, cabinets, tables and laboratory benches can be constructed by local artisans. Basic equipment and furnishings would include:

1.--Housing equipment. Furniture, electrical appliances, bath installations need not be itemized at this time. In consideration of the assumed population of the Center the quantity of these items seems fairly obvious.

2.--Service equipment.

- a. Two power plants are mandatory.
- b. Water plant including a heating unit. It is not improbable that a water storage basin of some type will be required to insure water supply during the dry season.
- c. Waste and sewage disposal unit. Depending on the presence or absence of a suitable dilution stream and upon local drainage field conditions this unit could be either relatively simple or quite an expensive installation.
- d. Laundry unit.
- e. Commissary unit including walk-in cold room and deep-freeze unit.
- f. Machine, carpentry and instrument shop equipment.
- g. Motor vehicles.

3.--Laboratory equipment. Aside from such items as sinks, laboratory benches, stools and storage cases, all laboratory equipment will have to be imported. Such imports enter Mexico duty-free. Estimates of quantity and quality of this type of equipment must await more complete plans.

Design of this entire installation should be placed in the hands of a Mexican architect who would be expected to work in conjunction with a committee of Mexican and North American scientists. Members of the CAPFCE (Comité Administrador del Programa Federal de Construcción de Escuelas) are especially skilled in school design and are well acquainted with local problems of construction. Inasmuch as the Center would be administered by the University of Michigan, the authorities of that institution would naturally expect to oversee its construction.

COST OF INSTALLATION

At this time any estimate of the cost of installing such a Center as is envisioned by the Committee can be little more than approximate. Figures on the cost of building construction, for example, quoted to the Committee by informed Mexicans, vary from \$40 to \$125 per square meter

Cost of Installation, continued.

of floor space. In other instances more exact figures have been obtained.

1. <u>Buildings</u> --including electrical, water and waste installations exclusive of appliances. Based on total floor space of 3,160 square meters at a cost of \$75 per square meter....	\$237,000
2. <u>Furnishings</u> --for housing of personnel, including furniture, electrical appliances, etc.	25,000
3. <u>Service Equipment</u> --including power, water and sewage disposal installations, commissary unit, laundry, motor vehicles, etc.	238,000
4. <u>Teaching and Research Equipment</u> --including library, photographic room, greenhouse, animal house, aquarium, museum equipment, instruments, tables, chairs, etc.	70,000
Estimated total cost	\$570,000

In the above estimate the cost of building construction amounts to about 40 percent of the total. Since this item is that upon which the Committee has the least information, the estimated total cost may be as much as \$100,000 above or below the figure given above.

COSTS OF OPERATION AND MAINTENANCE

The University of Michigan would be expected to assume responsibility for the costs of operation and maintenance of the Center (but see p. 16, item (4) at top). Each of the cooperating institutions would be expected to pay for its own instructional program.

Some of the costs can be estimated with precision. Thus salaries and wages have been calculated from amounts currently paid for academic and non-academic services in the United States and in Mexico. Some of the other estimates are rough approximations, and more substantial figures must be obtained for the detailed prospectus. Nevertheless, the following amounts are believed by the Committee to represent a realistic estimate of the annual cost of operation and maintenance of the Center.

<u>Salaries and wages of permanent staff</u>	\$30,000
Including Director, Deputy Director, Secretary, travel and per diem allowance for members of Advisory Board, service personnel, labor.	
<u>Maintenance and operation (exclusive of instruction)</u>	20,000
Including gas and oil for transportation and power, maintenance of physical plant, maintenance and replacement of research equipment and supplies.	
<u>University of Michigan instructional program</u>	30,000
Including 6 professors, 6 assistants, resident physician, dietitian, additions to service personnel and labor, transportation, supplies, maintenance and replacement of field and laboratory equipment for teaching and student research.	
Estimated total cost	\$80,000

For comparison, the University of Michigan Biological Station at Douglas Lake, operated for 250 persons during two summer months, has an annual budget of \$70,000, of which \$10,000 is for expansion and improvement of physical plant.

CONTRIBUTIONS OF THE SPONSORING INSTITUTIONS

Each of the sponsoring institutions would be expected to contribute to the establishment and support of the Center in appropriate amounts and ways. As indicated above, each would pay the expenses of its own instructional program. The major contribution of the University of Michigan would be to assume the responsibilities and costs of administering and operating the Center.

Land on which to build the Center and lands set aside for its use would necessarily be a most important contribution to be made by the Mexican sponsoring institution or through its agency. Specifically, there would be needed the following:

(1) Building site. A suitably located tract, allocated to the use of the Center for a specified but long-term period. Title to the land should remain with the Mexican government or its subsidiary. In the event that the Center ceased to operate, the Committee is of the opinion that the buildings should become the property of the Mexican government or its subsidiary, the sponsoring institution.

(2) Research areas. An essential requisite for the establishment of the Center is the setting aside by the Mexican government of adequate research areas for its use. These need to be very carefully selected in terms of suitability, accessibility and availability, and must be protected against exploitation to permit their use in continuing programs of study extending over periods of years. Such reserves should be of three kinds:

(a) Natural Areas. Areas of undisturbed natural environments should be selected for protection and scientific study. Several such areas would be needed to include representation of all the major environments present within a considerable radius of the Center. Each must be of sufficient size to insure continuance in it of natural conditions even if the surroundings should be greatly altered.

(b) Management Areas. Tracts of important natural or culturally altered environments characteristic of the region, carefully selected and set aside for use in research on natural resources and their management. In the case of silviculture, for example, these tracts might advantageously adjoin or be a part of natural area reservations, provided that the latter were not endangered.

(c) Experimental Plantations. One or more small parcels containing a variety of agricultural soils should be assigned to the use of the Center for basic research in plant sciences, such as studies in plant genetics.

OUTSIDE SOURCES OF SUPPORT

Funds for constructing and equipping the Center will be sought from outside sources, chiefly the major foundations and other granting agencies. Subsidies for operation may also be sought from governmental (United States and Mexican) and international agencies. The instructional programs will undoubtedly require subsidization to reduce the cost of attendance by students, and the work of individual investigators at the Center will probably have to be supported in large part by research grants for specific projects.

In more detail, the types of support which need to be obtained from outside agencies are as follows:

(1) Capital Outlay.

It will probably be best to present to a single foundation the entire request for funds to build and equip the Center (approximately half a million dollars). This package proposal should include, first, buildings (classrooms, laboratories, storage, housekeeping, dormitories, apartments or cottages, kitchen, dining room, recreation rooms, machine shop, garage, power plant, water and sewage facilities) and operating equipment (standby water and power plants, vehicles, tractor, grader, power equipment for grounds and experimental plantations, etc.).

A second part of the proposal would cover the scientific, technical and educational equipment and supplies necessary to equip the Center for its teaching and research functions. This should include such items as library materials (books, maps, journals, etc., with special reference to the region and the tropical environment), laboratory apparatus, field equipment and instruments, and vehicles needed primarily for research and transport of students in the vicinity of the Center.

If the foundation to which this proposal is presented so desires, the cost might be shared with one or more other foundations.

(2) Support for Research.

This can come from several sources. Two types of appeal should be made: first, for general funds to be administered by the Center, and second, for support for special projects. Research at the Center should include:

(a) Continuing program of the Center. Funds should be sought for the support of research by the staff of the Center on a continuing basis for a minimum period of five years. If the results are significant, additional support could be sought.

By "staff" is meant the Directors and other scientists who, during the initial years, could devote considerable time to Center-focused investigations, and whose studies would fit into the general program.

Such studies should not be thought of as necessarily highly original, but rather as being focused on the local scene. They would be substantial, but their main value would be to enhance the quality of the educational work of the Center. Here would fall studies on local flora, fauna, communities, and ecology (including the formation of specimen collections for study and reference), and on the anthropology, geomorphology, meteorology, pedology, and other aspects of the local region. Such studies, of merit in themselves, would be needed as a base for teaching and for subsequent research elaboration.

(b) Individual projects and programs. Much of the research at the Center would be by staff members and visiting investigators on projects supported by individual research grants. The Center should encourage such use of its facilities, especially during the periods when it is not crowded with students.

(c) Team and programmed research. Two or more investigators planning to work together could seek special grants for inter-disciplinary research and studies in convergent fields. Grants are made especially for such purposes by some foundations.

(3) Support for Teaching.

It is presumed by the Committee that the teaching programs of the sponsoring institutions would be supported in part by fees paid by students. This source of income is grossly inadequate to cover the foreseen costs, and cannot be increased by requiring high fees without discouraging attendance. Indeed, most students will require some form of subsidy if they are to attend the Center. The following forms of support for the teaching program are suggested by the Committee:

(a) Period grant for subsidization of students. An excellent arrangement would be administration by the Center of a number of scholarships (perhaps \$250 to \$350 each) for students qualified to attend. The amount paid would be high enough to attract a serious student, but would still leave a significant contribution to be made by him. If twenty to twenty-five such scholarships were made available by some granting agency for a period of three to five years, they could be advertised in Mexico and the United States, or even more widely, giving the Center excellent publicity and enabling it to select qualified students.

(b) Period grant for subsidy of a teaching and research staff position. In any of the several fields of interest of the Center, financial support could be sought to bring a man to the teaching staff for three to five years' experience at the Center. Such a man, interested in teaching and research, for example, in tropical silviculture, should receive salary for eight to twelve weeks, travel, and perhaps a part of the cost of subsistence. Staff members obtained under such a plan could undertake continuing programs of research, and would make highly effective teachers.

(4) Support for Operations.

Although the Committee feels that the University of Michigan should assume the basic obligation for maintenance and operation of the Center, the likelihood of its doing so would be increased if it were to be aided during the initial years. Therefore grants for this purpose should be sought, if necessary on a matching basis.

(5) Inter-governmental Assistance.

When the Mexican and University of Michigan officials have agreed in principle, the proposed Center should be explored with the International Cooperation Administration (Point Four). This might result in a contract between the Mexican and United States governments supporting the Center in some or all of the aspects described above.

Specialized agencies of the United Nations might become interested in cooperation with the Center once its establishment is assured. For example, UNESCO has been and continues to be interested in the problems of both humid and arid tropical regions. The same is true of FAO and to a lesser degree of WHO. The Pan American Union has also been suggested as a source of support. Such international agencies could provide staff members and funds for fellowships, and subsidize specific investigations.

PROPOSED STAGES OF PROCEDURE

The Committee has been impressed by the large amount of interest aroused in the United States by the preliminary announcement of the project, and even more by the enthusiastic endorsement given it by many leading scientists in Mexico. Further developments will depend on the outcome of a series of steps which must be taken more or less in the following sequence.

(1) Presentation of this report and recommendation to the interested institutions, which include the University of Michigan and several institutions in Mexico which may be affected.

(2) Designation by the Mexican institutions of one among them to serve as principal co-sponsor of the Center.

(3) An invitation from the designated co-sponsor to the University of Michigan to send one of its superior officers, accompanied by one or more members of the present Committee as advisors, to Mexico to confer upon a cooperative agreement relative to the Center. If such an agreement can be reached in principle, the way will be opened to proceed with further planning on a detailed and practical basis.

(4) Creation by the co-sponsoring institutions of joint committees charged with (a) Making final selection of a site; (b) Working with the appropriate Mexican governmental agencies to establish the research and

teaching reserves required; (c) Preparing detailed plans of the physical plant of the Center; (d) Drawing up agreements between the co-sponsors defining their respective rights, privileges, duties and responsibilities, and their relations to the various institutions and governments involved; (e) Preparing proposals for support for presentation by the University of Michigan to various foundations and other granting agencies; (f) Setting up of a joint supervisory committee to oversee and coordinate the various phases of planning listed above; and lastly, (g) Creation by the University of Michigan of a committee charged with preparing the instructional program of that university.

(5) Approach to the foundations with requests for support of the project along the lines indicated above. If such support is gained, and only in that event, the next step will become feasible.

(6) Presentation to the Regents of the University of Michigan and to the governing body of the designated Mexican institution of a formal request for establishment of a Center for Tropical Studies in southern Mexico under the terms tentatively agreed upon. When approved by both institutions formation of the Center can proceed to

(7) Appointment of the Advisory Board, Directors, and a skeleton staff, and start of construction, establishment of land reserves, and other actions needed to bring the Center into existence.

CONCLUDING REMARKS

With the successful completion of stage three the usefulness of the present investigatory Committee will have expired. It should not be a function of the present Committee to conduct negotiations with the sponsoring Mexican institution nor to approach foundations for support. If for any reason the proposed agreements cannot be reached, the Committee is prepared to continue its search for some other way of meeting the urgent need for a Tropical Studies Center.

Signed:

Dugald E. S. Brown
Stanley A. Cain
Norman Hartweg
K. L. Jones
Rogers McVaugh
L. C. Stuart
T. H. Hubbell, Chairman

May 15, 1958