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UNITED STATES

DEPARTMENT OF THE INTERIOR

OFFICE OF THE SECRETARY

File No. 9 12 17

DIVISION OF TERRITORIES AND ISLAND POSSESSIONS

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EQUATORIAL ISLANDS

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REPORTS
FIELD REPRESENTATIVE
(17th Expedition)

IMPORTANT

This file constitutes a part of the official records of the Department and should not be separated or papers withdrawn without express authority of the Secretary.

All files should be returned promptly to the File Room.

Officials and employees will be held responsible for failure to observe these rules, which are necessary to protect the integrity of official records.

Harold L. Ickes

Secretary.

Cruise from
Oct. 2, 1939
to
Oct. 21, 1939

U. S. GOVERNMENT PRINTING OFFICE 6—7385

UNITED STATES
DEPARTMENT OF THE INTERIOR
OFFICE OF THE SECRETARY
DIVISION OF TERRITORIES AND ISLAND POSSESSIONS
WASHINGTON

FHW/hh

December 14, 1939.

Commander Frank T. Kenner,
Acting Field Representative,
c/o Office of the Governor,
Honolulu, Hawaii.

My dear Commander Kenner:

I have your letter of November 10 enclosing a narrative report of the Seventeenth Cruise to the Equatorial Islands, and thank you for this complete and interesting report. We are glad to learn of the improved conditions on the Islands, and your plans for making further improvements there appear to be very satisfactory.

In regard to the discarded and worn out equipment now on the Islands, it is suggested that a list and brief description of this material be submitted to the Division, together with your formal recommendation that it be destroyed as entirely worn out and useless. This action will be in accordance with legal requirements, and notice to you of approval of your recommendation will complete the authority for its disposition.

Your recommendation that the next cruise to the Equatorial Islands be scheduled for the first week in March, 1940 has been noted, and so far as known in the Division it will be satisfactory to have the next trip made at that time.

Sincerely yours,

(Sgd.) RUTH HAMPTON
Ruth Hampton,
Acting Director.

UNITED STATES
DEPARTMENT OF THE INTERIOR
OFFICE OF THE SECRETARY
DIVISION OF TERRITORIES AND ISLAND POSSESSIONS
WASHINGTON

Iolani Palace
Honolulu, T. H.
November 10, 1939

Mrs. Ruth Hampton, Acting Director
Division of Territories and Island
Possessions
Department of the Interior
Washington, D. C.

My dear Mrs. Hampton:

I am forwarding herewith narrative report of the Seventeenth Cruise to the American Equatorial Islands of Jarvis, Baker, Howland, Canton and Enderbury, for your information and file.

Yours very truly

FRANK T. KENNER
Acting Field Representative

FTK:kl
Encl.-2

C R U I S E R E P O R T

17TH CRUISE

to

AMERICAN EQUATORIAL ISLANDS

by

FRANK T. KENNER
Acting Field Representative
U. S. Dept. of the Interior
(Division of Territories
and Island Possessions)

Iolani Palace
Honolulu, T. H.
November 3, 1939

SEVENTEENTH CRUISE TO THE AMERICAN EQUATORIAL ISLANDS of JARVIS, BAKER AND HOWLAND and to other islands in the South Seas

By
FRANK T. KENNER
Acting Field Representative
U. S. Dept. of the Interior
(Division of Territories
and Island Possessions)

The TANEY departed Honolulu, T. H., after loading supplies, equipment and relief personnel for the American Equatorial Islands, at 5:00 p.m., October 2nd, 1939.

Department of Interior personnel on board were: (reliefs with pay)

1. Ralph Feigenbaum, radio operator and student aerologist
2. Francis Stillman
3. Henry Kong Lee, radio operator and student aerologist

Extra personnel without pay:

1. Lawrence Ching
2. Oliver Roberts
3. David Kalama.

Mr. Lawrence Browne of the Honolulu Office of the United States Weather Bureau, was present on board at the request of the Field Representative Office, to service, check and replace all weather bureau equipment and to advise the Acting Field Representative regarding present and future needs of equipment for the American Equatorial Islands.

Mr. Ashley Browne, Extension Horticulturist, University of Hawaii, was present on board at the request of the Office of Field Representative Department of Interior, to survey the agricultural situation on the American Equatorial Islands, and advise as to proper procedure and make suitable recommendations for future projects on the American Equatorial Islands. Haphazard efforts have, to a degree, been successful, but it is deemed that the islands would have a greater value and be more habitable, by a well planned project to vegetate with suitable plants and trees, the surfaces of the islands particularly in the vicinity of the colonies. Prior to this cruise, the necessary water for such a project was sadly lacking. At present, through careful efforts, sufficient rain water has been collected and stored, to carry on a reasonable project. In view of the fact, that at Canton Island Pan American Airways is beginning preparations for a landscaping project, it was deemed advisable to purchase a small amount of prepared soil in Honolulu, start similar efforts around the American Colony so that the colony would present an

appearance pleasing to the surroundings.

Other guests on board were:

1. Lieut. Colonel I. Spalding, U. S. Army
2. Major H. W. Ulmo, U. S. Army
3. Mr. I. H. Polk, Civil Aeronautics Authority
4. Mr. John Young, Jr., guest of officers

A party of nine Pan American Airways employees came on board for transportation to Canton Island.

The course was set for Canton Island.

On 3 October at 10:00 a.m. it was found that a member of the enlisted force of the TANEY had been stricken with acute appendicitis. The vessel was headed back for Honolulu, arriving at 12:45 a.m. the 4th. After transferring casual to the waiting ambulance, fuel oil was taken on board and vessel departed Honolulu at 2:30 a.m. for Canton Island.

During the short stay in Honolulu, Ralph Feigenbaum, Department of Interior employee, decided against taking a position on one of the Equatorial Islands. His service was terminated without any pay accruing. This was a serious loss as he was a relief radio operator. Realizing that suitable plans could be made, no delay of the sailing was requested as an indefinite time would be needed to secure another operator.

The passage to Canton was uneventful.

At 6:40 a.m., 9 October, the TANEY arrived at Canton Island. Among the first persons ashore was Mr. Lawrence Browne of the Weather Bureau who immediately commenced checking and servicing the weather bureau equipment, and Mr. Ashley Browne, who made a survey of the agricultural and landscaping possibilities on that island. All Pan American Airways personnel and freight were landed by barges. Through the courtesy of that company all Department of Interior supplies and equipment were landed by barge.

Calls were made on the British Deputy Administrator, Mr. Fleming, and the Airport Manager of Pan American Airways, Mr. Frank MacKenzie. Amiable discussions were conducted with both parties concerning conditions, operations and future problems on Canton Island. Exceedingly pleasant relations between all parties exist. Cooperation between the American Colony and Pan American Airways is producing mutual benefits contributing to a successful future of that island and its life.

Considering the construction projects adjacent to the American Colony, its general condition was very good. A complete estimate of the operations of the American Colony indicated that for the next four months two men could perform all necessary upkeep of the camp, maintain all weather and radio schedules. It was decided to place two radio operators on this island during the coming period between relief cruises. All personnel on the island were in good health. Fred Lee needed dental

treatment, was indicated for return to Honolulu. Sam Kahalewai and Fred Wilhelm were transferred to the TANEY. Henry Kong Lee was placed on Canton as one of the radio operators. All Department of Interior men remained at Canton to perform necessary work in storing stores and equipment, installing door on lighthouse, placing colony in condition for sojourn of two colonists for next period.

At 6:00 p.m. the operations of the colony being completed for that day, all hands returned to the TANEY, and the vessel drifted off the island for the evening, later proceeding to Enderbury.

At 8:00 a.m. the 10th of October the TANEY arrived at Enderbury Island. All supplies and equipment were landed. This colony was in excellent condition. There was every indication of an energetic program being carried out in both upkeep and improvement on this island. The lighthouse had been completed, with the exception of the cap. There will be no light mechanism placed on this tower but will be indicated as a daymark.

A new radio transmitter was installed on this island. The departing radio operator assisted by radio men from the TANEY, rearranged the entire radio apparatus, making necessary changes for phone operation. The leader, Harold Kim, having previous knowledge of radiophone operation was further instructed in the use of this radio set. The apparatus was retuned and dial settings recorded for his guidance. All sets were thoroughly checked and tested.

It was decided to leave only three colonists on this island. In view of the character and temperament of the colonists assigned to that island; it was considered safe to leave only three. Isaac Harbottle was found to be suffering from infected throat due to bad tonsils, and was transferred to the TANEY for return to Honolulu for treatment. Fred Wilhelm was assigned to that island. Maurice Paquette was sent on board TANEY for further transfer to Canton. Colonists on Enderbury for the coming period are Harold Kim, leader, Bernard Kahe, and Fred Wilhelm. The TANEY departed at 12:40 p.m. for Canton.

The TANEY returned to Canton at 3:40 p.m. the 10th, and departed at 6:00 p.m. During the stay, all business was cleared, final instructions for the future given. Maurice Paquette relieved Rupert Beatty as leader and senior radio operator. The colony was left in excellent condition. Rupert Beatty and Fred Lee boarded TANEY for transportation to Honolulu. Several P.A.A. personnel came on board for transportation to Honolulu.

At 6:40 a.m. 12 October, Baker was reached. Ideal weather conditions facilitated landing of stores and equipment. Condition of colony was excellent as was the health of all personnel. The leader, Louis Suares, maintained an excellent colony with the utmost harmony and energy on the part of the colonists. No replacements were made at this island. An energetic attentiveness on the part of the personnel showed a good beginning with plantings of hardy vegetation and coconut trees around the buildings. Upon completion of the servicing of this island, the TANEY departed at 10:10 a.m. for Howland. Personnel on

Baker: Louis Suares, Charles Au, Hans Jensen, Charles Stein.

At 12:32 p.m. the TANEY arrived at Howland. Due to low tide, landing of supplies and equipment was delayed until mid afternoon. The condition of this colony was excellent. The leader, Mike McCorriston, had made many improvements and had cleaned and cleared wide areas around the colony. In accord with plans, the pilot balloon station was reestablished on this island, and the personnel instructed in the operation of the same. All personnel were in excellent health. Instructions were given for further improvement of colony. Francis Stillman relieved Mike McCorriston as leader. The personnel of Howland Island are Francis Stillman, leader, William Pea, Alexander Robinson and Thomas Bederman. At 4:55 p.m., the TANEY departed enroute Jarvis Island.

At 12:52 p.m. 15 October, the Taney arrived at Jarvis Island. All supplies and equipment were landed without incident. The colony was in excellent condition. Medical examination revealed Woodrow Phillips suffering with stomach disorders and indicated for return to Honolulu. The Commanding Officer decided to remain at this island over night. All colonists were brought to the TANEY for movies and returned to the island on the morning of the 16th. David Kalama and Lawrence Ching replaced Melvin Paoa and Woodrow Phillips. Colonists on Jarvis are: James Kinney, leader, Ian A. MacKellar, David Kalama and Lawrence Ching. At 1023 on the 16th the TANEY departed Jarvis for Palmyra.

The TANEY arrived at Palmyra at 17th October and departed at noon 18th October. This stop was made for recreational purposes and inspection of the island group.

The TANEY arrived Honolulu 8:15 a.m. 21 October, so terminating the Seventeenth Cruise.

The receipt of spare and replacement radio parts ordered through Procurement Office of the Department of Interior, placed Jarvis and Canton in a position of dependable operation, barring a major casualty. A new small transmitting unit was purchased and placed on Enderbury Island to serve as the main unit, until a regular set acquired through Washington Offices can be installed. This set is of low price and not expected to be a permanent installation. Later it can be used as an auxiliary at a main station. Other than low cost spares and replacement parts, no expenditure was made for extensive radio facilities on Baker and Howland pending advice from Interior, Washington, as to status of new, more dependable equipment for those islands.

Thorough medical examinations were given all personnel remaining on all islands by Acting Assistant Surgeon J. M. Wolfe of the U. S. Public Health Service.

In view of the importance of Canton, it was decided to maintain two radio operators on Canton Island. Prior to the beginning of this cruise, this plan was conceived and personnel employed accordingly. The sudden decision of one radio operator to remain in Honolulu instead of continuing employment with the Department of Interior jeopardized

this plan. After serious consideration it was decided to adhere to this plan, and not put an operator on Enderbury. This island is only thirty-six miles from Canton and does not contribute any information of value to the general weather of the Pacific area. The group of colonists now occupying the island are of such type that the decision as made is a safe one, and with the phone set as installed have reasonable assurance of communication with Canton Island. To date they have not missed a schedule as instructed. The Government call KVZE was assigned, to comply with Federal Communications Commission regulations.

On all islands, all buildings were repaired and repainted. Window screens and screen doors were taken to the islands for installation on the living quarters. During certain seasons of the year flies are numerous, and troublesome. This sanitary measure was deemed necessary. The U. S. Coast Guard sent doors and frames to all islands for the lighthouses, this as a safety precaution. They will be built in immediately.

All the colonies were in excellent condition, in fact, they were better in appearance than when seen during the early spring cruises. The personnel have made great efforts in keeping their colonies clean and well ordered. The repainting and repairing weathered materials gave a new appearance to the surroundings. All personnel were complimented on their efforts and industry.

Mr. Lawrence Browne of the U. S. Weather Bureau, completely checked and serviced all weather bureau equipment on all islands. He performed a thorough and satisfactory service in a most willing and cheerful manner. His advice as to maintenance and helpful suggestions as to improvement will be heeded and placed in effect. His report will be appended. The Acting Field Representative concurs in his recommendations. Referring to the paragraph concerning Enderbury and Baker Islands it is not deemed advisable or of value to increase the equipment now on these two islands. The instrument shelter and support as recommended for Baker Island will be obtained and set up on that island the next cruise.

On Canton, Howland and Jarvis Islands the construction of small store houses for the storage of hydrogen tanks will be ordered by this office. Construction of these houses should not present any problem and it is believed to be an advisable safety precaution. As to the training of new men for the islands this plan will be considered and if the appropriation will allow the payment of the expenditures for pay covering an additional training period prior to the sailing of the relief vessel for the islands it will be instituted prior to the next cruise. It is believed that suitable arrangements can be made with the Weather Bureau, Honolulu, and the base weather station of Wheeler Field, Oahu, T. H. The comments of the representative of the U. S. Weather Bureau are quite complimentary and encouraging. His services were truly appreciated.

The report of Mr. Ahsley Browne, Extension Hortiuclturist, University of Hawaii, will be appended with suitable remarks and recommendations, and recommendations are as follows:

The Acting Field Representative concurs in general with the excellent report submitted. Observations and experience dictate that a planned program of planting for two purposes, namely windbreak and shade, is most desirable. This should only be conducted on a scale that will insure success, and no attempt should or will be made to provide plant coverage on any of the islands. Canton Island may be an exception. At a future date until such time as the personnel on the islands are more or less permanent the development of sand culture units should be postponed, as this involves skill and judgment attained only through study and education which at present is not practicable. Certain recommendations contained in this report are already being instituted on the islands as the start of this project. Limited funds prevent the purchase of seed plantings at present, but small amounts can be obtained from various Territorial and Federal departments in the Hawaiian Islands, free of charge, sufficient to get the project underway. Prepared soil for starting many of the plants will have to be purchased in Honolulu and transported to the islands. The amount that can be taken down will be governed by the funds available that can be applied to this project. It is hoped that at a future date a decision will be made, whereby this office will be advised of the permanency of the colonies now in the American Equatorial Islands. It is not deemed advisable to begin any lengthy project until such information is available.

All worn out and broken equipment was inspected on all the islands. None of this discarded equipment can ever be used; the work required to crate or box for return to Honolulu would be a useless effort with no gain whatever. Its value as junk is nil. Therefore recommend that authority be granted to destroy and dispose of the same at the individual islands. All burned out radio tubes can be destroyed and dumped at sea. No value can be attached to any of the discarded equipment; at present it is just taking up space that could be cleared for the sake of order and neatness. Request advice in this matter.

It is recommended that the next cruise to the American Equatorial Islands be scheduled for the first week of March, 1940.

FRANK T. KENNER
Acting Field Representative

UNITED STATES DEPARTMENT OF AGRICULTURE

WEATHER BUREAU
Honolulu, Hawaii

October 30, 1939.

Lieut. Commander Frank T. Kenner,
Acting Field Representative,
Department of Interior,
Iolani Palace, Honolulu, T. H.

Dear Sir:

A report on the equipment located at the American Equatorial Islands which is charged to the U. S. Weather Bureau follows herewith:

Meteorological instruments were found, in general, to be well cared for and in excellent condition. Such changes as were necessary in the proper exposure and reading of instruments were of a minor character, and readily made by means of oral instructions.

The personnel charged with the taking and recording of observations, and with the care and maintainance of instruments, were found to be able, willing, conscientious, and of a high order of intelligence. In addition, when one considers the solitude of their life, and the comparatively long period of time that elapses between their contacts with the outside world, their morale was excellent. Considering the multiplicity of their activities in conjunction with the strain that such a solitary life is supposed to produce, the conviction is inescapable that the boys have done a magnificient piece of work.

Considering the rather sketchy training the boys have had in Weather Bureau work and methods, I feel justified in saying, as a representative of the U. S. Weather Bureau, that the meteorological phase of the work is being well done.

The following recommendations are made as to the changes and additions in Weather Bureau work and equipment.

That, since Enderbury and Baker Islands are so close to Canton and Howland Islands, respectively, no addition be made in the equipment at those islands, with the exception of furnishing an instrument shelter and instrument shelter support to Baker Island for the purpose of providing a standard exposure for the maximum and minimum thermometers at that island.

✓ cpy on 9-12-22

That small stone houses, capable of housing between fifteen and twenty tanks of hydrogen, be built at Canton, Howland, and Jarvis Islands. The present practice of sheltering the hydrogen tanks in, under, or near the balloon house, which is the house in which the balloons are filled and the upper air data are plotted, is, at best, risky.

Finally, it is recommended that, when new men are to be sent to any one of the Islands, they be required to put in from one to two weeks preliminary training in Weather Bureau work and methods. If they are to be sent to Enderbury or Baker Islands, one week's work at the Weather Bureau Office in Honolulu should be sufficient to give them an adequate grounding in the work incidental to surface observations, such as the reading of barometers, thermometers, and anemometers, the estimation of cloud types and amounts, the measuring of precipitation, etc. If they are to be sent to Canton, Howland, or Jarvis Islands, they should have, in addition to a week at the Weather Bureau Office in Honolulu, at least one week, and preferably two weeks, at either the Naval Air Base Weather Station, or the Base Weather Station at Wheeler Field, for the purpose of attaining a thorough grounding in the details of making Pilot Balloon Observations. It is understood by the writer that the pay of the colonists does not start until the day the U. S. C. G. C. Taney sails. It is suggested, however, that their appointment might be made contingent on their reporting at the necessary places for this preliminary training.

In closing, may I extend my thanks and appreciation for the unfailing courtesy of the enlisted and commissioned personnel of the Taney, and especially for their patience and consideration in aiding me in the prosecution of the Weather Bureau work.

Respectfully,

Laurence W. Browne,
Junior Meteorologist,
U. S. Weather Bureau,
Honolulu, T. H.

(Through Official in Charge,
Weather Bureau Office,
Honolulu, T. H.)

Copy to Chief, U. S. Weather Bureau,
Washington, D. C.

REPORT ON THE PLANTING PROGRAM FOR THE EQUATORIAL ISLANDS

As a result of observations made on a trip to the Equatorial Islands between October 2 and October 23, 1939, the following general observations and suggestions are offered on the subject of a planting program for the islands:

A. Object. It seems highly desirable and necessary to undertake a planned program of planting around the buildings on Canton, Baker, Howland, Enderbury and Jarvis islands for the two purposes of creating (a) windbreak and (b) shade. Two other phases of the planting program should be pointed out at this time:

1. It would seem undesirable to attempt cover plantings in locations other than around buildings except insofar as this might be done in an experimental way to replace certain species of hard wooded plants which now seem to be disappearing.

2. Development of sand culture units at each of the stations for the purpose of producing some fresh vegetables. This program is highly desirable, but somewhat complicated and if it is to succeed, we must presuppose a certain period of training and instruction in Honolulu before those who are to operate it on the islands can be expected to produce satisfactory crops. The establishment of sand culture units on off islands is a matter which involves some financial expenditure and will probably have to be carried to completion over a period of years. It must be borne in mind, however, that the production of vegetables by the sand culture method is, in its final analysis, a highly technical process involving skill and judgment equal to and perhaps greater than that required to produce the same vegetables under normal growing conditions. Because of these facts it seems advisable to suggest for the present that major emphasis be placed on the creation of shade and the establishment of windbreaks.

B. Program. The attainment of the objectives indicated above is highly doubtful unless a sound, simple, long time program is consistently and conscientiously followed. Experience in the past has shown the fallacy of attempting extensive plantings on arid or semi-arid islands. It seems more reasonable to expect success where a limited number of plant units are set at any one time which receive the full programmed attention of the colonists. It is therefore recommended that introduction of extensive lists of planting material be discontinued unless facilities are definitely available for their proper care and maintenance. A reasonable program should anticipate the quarterly increase in plantings only in proportion to the amount of fresh water available to maintain the plants after setting out and until they have passed through the critical period during which they should become established.

C. Development. The rate of development of this program will probably be in proportion to the intelligence, industry, and interest of the colonists as well as the environment, material used and the amount of fresh water available. It is suggested that planting of growing material transported from Honolulu first be concentrated in the development of windbreaks and shade around dwellings.

1. It would seem far more desirable to concentrate upon successfully establishing a few (perhaps 20 to 25) adapted

plants per quarter than to undertake extensive plantings when the possibility of proper maintenance would be proportionately lessened.

2. Planted windbreaks seem feasible and are highly desirable at each station. These windbreaks should be planted in a line perhaps 300 to 400 feet long, lying parallel to the beach crest and at a distance of approximately 150 feet to windward behind the buildings. The windbreak itself should consist of at least two and if possible three rows of major plants or trees set at intervals of approximately 15 feet from each other. Plants within the rows should be set in such a manner that they alternate with those in the rows adjacent. These 15 foot intervals should be occupied by plants which will in time reach considerable size and density. For this purpose it is suggested that the row closest to the building, which can be called row one, be planted with cocoanuts. The next row to windward, which can be called row two, should be planted with ironwood, using the beach type as this is more adapted to island conditions than the mountain type. Row three, or the row farthest to the windward, should likewise be planted with ironwood. These major plants are designed in such a manner as to give the maximum protection against wind and at the same time to build up the windbreak in such a way that each line protects the line in its lee. Interplantings in row two and three between the ironwoods would seem desirable and it is suggested that for this purpose tournefortia be planted between the ironwoods in row two. This dense growing tree would therefore provide direct protection to the palm lying beyond it. Interplants in row three should consist of either tournefortia or possibly Sea Grape if plants can be secured. Vitex planted at Jarvis island was found to be in a highly thrifty condition with indications of its having adapted itself with little difficulty. The ease with which this plant can be propagated and its ability to withstand adverse conditions suggest its desirability as a factor in interplanting for windbreak purposes. Tamarisk is likewise adapted to this type of use. If stock can be secured it might be used for the interplants in row three. Kamani and milo could either one or both be used with advantage in interplanting in row two as substitutes for tournefortia if these two species can be secured. In case they are used in row two, row three should consist primarily of tournefortia because of its low growth, dense habit and adaptability under continually windy conditions.

Development of shade around dwellings will be made easier when the windbreaks have become established, but it is desirable that some efforts be directed toward this during the development of the windbreak. For shade purposes around dwellings, Kamani, hau, cocoanuts and milo are suggested. Due to its low stature little or no shade can be developed from the planting of beach heliotrope or tournefortia when grown adjacent to buildings. Under these circumstances it can only be considered as an ornamental.

For trial purposes a small quantity of seed of spineless

kiawe was left at Canton Island. While kiawe is able to adapt itself to adverse conditions, it does not seem advisable to advocate its extensive planting on other islands at this time since the tender growth is exceedingly susceptible to injury from salt sprays. Certain biological reasons also underlie the hesitancy in recommending its extensive use at present.

3. Other plantings. Plantings other than around buildings or for windbreak purposes have been suggested as possible means of reducing surface temperature and radiation on the islands. The possibility of succeeding in such a program seems highly doubtful and is not recommended for consideration at this time. The geographic position of the islands in relation to natural rain belt, the extent of the undertaking, the limited personnel available, the difficulty in securing sufficient materials as well as the possibility of seriously upsetting the biological balance of the islands make it seem unwise to advocate this type of program at present.

4. Cultures. The production of a limited amount of fresh produce through the use of the sand culture method offers a possibility of improving health and providing some relief to the diet of the colonists. As indicated above, however, this type of work will only succeed at those places and during those times when colonists, interested in the work and trained in its special technique, are present. The production of vegetables by the sand culture method is not feasible when undertaken by untrained personnel and even under these circumstances the technique is one requiring considerable skill and intuitive understanding. It is believed that with further experience and training to be gained from the continued operation of the facilities now available on Canton Island the Department can secure sufficient information to justify its application elsewhere.

D. The methods recommended for the achievement of the objectives outlined above are as follows:

1. The continued transport of both soil and plants from Honolulu for distribution on the islands.

2. The selection in Honolulu of only those species which can be fitted into the program or which offer superior advantages not mentioned above.

3. These plants should be well established, preferably in gallon cans and before shipment, and should be thoroughly inspected for the possible presence of diseases or injurious insects. If either insects or diseases are found, the plants should be thoroughly treated with appropriate fungicides or insecticides. Whenever possible it is recommended that insect control, if necessary, shall consist of vacumn fumigation, using the standard methyl bromide treatment.

4. Seeds. As a general practice, it would seem inadvisable to recommend the use of seeds since the chances of their survival

are considerably less than those of previously rooted plants and the care and attention necessary to their satisfactory growth is considerably greater. The problem of maintaining optimum moisture condition for germination, for wind protection during the seedling stage and the exclusion of natural enemies such as birds, crabs, rats, etc. combine to make the use of seeds both impractical and undesirable.

5. Cuttings of most species of plants are not recommended. The one exception to this however is tamarisk. This plant is best reproduced by cuttings which should be wrapped in moist moss and wax paper for purposes of transport. Such bundles of cuttings can be expected to carry well if kept cool, but upon arrival they should be promptly planted and given protection from the full sun until they have become established. Once started, tamarisk may be expected to care for itself and to withstand the constant prevailing winds. Rooted cuttings if used should have been placed in cans and established at least one month, if possible, before shipment to the Line Islands.

6. Established plants growing in cans can be set out in either of three ways. First, the sides and bottom of the tin can be cut in such a way as to release the roots and permit the rapid disintegration of the container without the removal of the plant. In this case the can and plant are simply set into a hole and the earth or native material gathered around to provide stability. In this case water would be definitely confined to the can itself. Some shade may be necessary and protection from wind and other destructive agencies will probably have to be provided. A second method is the removal of the plant from the can and the setting of the ball into a hole to which transported soil has been added. In this case it is absolutely necessary that the roots be as little disturbed as possible during the removal from the tin. The can should be cut from top to bottom on opposite sides and the two halves folded back, releasing the undisturbed block of roots and soil. Planting depth should be at the same level as that of the plant when it stood in the unopened can. Maintenance in this case will be the same as above. The third and perhaps the least desirable method is that wherein the same procedure is followed as above except that the ball of roots and soil is set directly into the opening in the native soil without the addition of transported earth. There probably will be more difficulty in establishing plants by this method than by using the method preceding.

E. Responsibility. It is almost futile to anticipate any success from a program of planting which does not allocate definite responsibilities to the colonists and which fails to prescribe a maintenance program which can be reasonably carried out. The colonist in charge or leader should understand that the maintenance of the plants growing at the time of his arrival is as much his responsibility as any other assigned duty. In addition he should have had preliminary instructions and be provided with written directions and diagrams to guide him in his work.

F. Maintenance. The maintenance program should precede the development program, thus the emphasis should be placed upon caring for plants previously established, and secondly, upon the setting out and establishment of a small number of new plants during any quarterly period. After becoming finally established, the amount of water needed per plant will probably decrease. Major water requirements will be greatest on the newly set transplants. Every possible source should be utilized for saving any rain water that may fall. This, supplemented by such supplies as have been brought previously from Honolulu and remain unconsumed at the end of the quarterly period, could be considered as available for planting and maintenance purposes. Shade trees, if set in shallow basins perhaps 3 feet across and 6 inches in depth, would be able to hold a maximum amount of rainfall. These shallow basins should also be mulched with 4 to 6 inches of dry weeds and grass which could be gathered locally. These mulch blankets can, if necessary, be held in place by loose stones. The mulch should be continually renewed as it decomposes.

Protection from the wind, which is essential to newly set transplants, can be afforded by setting 3 or 4 empty steel drums in a semi-circle or crescent around the margin of the planting basin. These drums should be so placed that there is an interval of 6 to 8 inches between adjacent drums. Where it is inconvenient to use the drums, simple rock shelters can be laid up in a crescent shape with the back sloped off to the ground level at an angle of perhaps 45 degrees. These crescents or stone windbreaks should be about 30 to 36 inches high, $2\frac{1}{2}$ to 3 feet back from the plants and about 5 to 6 feet between points, reaching their maximum height at a point approximately in line with the prevailing wind. The two outward points should extend far enough to either side to give the maximum shelter. The entire area between the outward points should be shaped into a shallow basin of 6 to 8 inches depth and heavily mulched with dry weeds.

During the visits to the separate islands, it was noted in every case from 15 to 25 drums of rain water had been secured and were on hand in storage. Since the carrying of water, bucket by bucket, from the storehouse where the drums are usually kept, is a slow and tedious process, it is easy to see that the systematic attention needed during the early stages of growth might readily be overlooked by a colonist whose interest was not particularly keen in the maintenance or development of the windbreak and shelter plantings. In order to overcome any possible tendency to slight this phase of the work it is suggested that one or two filled water drums be kept constantly on hand near the windbreak plantings in order to reduce the amount of work necessary in routine maintenance. Sufficient lumber is on hand and valves are available so that these drums could be mounted on trestles for the easy withdrawal of water.

Water requirements will vary with the size of the plant and its age, thus recently set transplants may for a time require one to two quarts of water every second or third day but after becoming established it may be possible to water somewhat less frequently. The maintenance of mulches, as indicated above, is a matter of major importance and should under no circumstances be overlooked since it provides a direct and effective means of conserving water and of stimulating growth. In this connection it is extremely important that mulch material shall under no circumstances be gathered from around the camps as no object is to be gained by taking up plants of one kind in order to provide mulch material for another kind. Mulch material should be gathered from some distance beyond the houses where

its removal will not affect the appearance nor cause an increase in the expanse of bare uncovered ground.

G. The following plant lists are submitted for consideration:

1. Those recommended for planting

Ironwood
Coconut
Hau
Kamani
Tournefortia
Pandanus
Scaevalae
Beabh Morning Glory
Vigna sp. (vine)
Beach Manini
Lipturus (running beach grass)
Milo
Tamarisk
Sea Grape

2. Plants of doubtful value

Kiawe (thornless)
Papaya
Groton
Ornamental leaf plants
Panax
Mao (wild red cotton)
Ekoa
Paperbark
Pisonia (tree found on Palmyra)

3. Plants not recommended

Mango
Avocado
Macadamia
Monkey pod
Shower trees
Banyan
Poinciana
Ornamental palms
Guava
Lantana
Cotton
Sisal
Banana

H. On the cruise under discussion the following lists of plants and trees were taken aboard at Honolulu. Distribution of these plants is indicated in the last column to the right. (see next page). It will be noted in the accompanying table that with the exception of one flat of ironwood, all the material was turned over to the Pan American Airways at Canton Island. In discussing the planting program with Mr. Frank McKenzie, representative of the Pan American Airways at Canton, it was Mr. Kenner's and

my understanding that in return for the material listed, the Pan American people would plant the Canton camp in conjunction with their own program of landscaping when this work is undertaken at their now incompleted air base. This will be to the decided advantage of the Department because of the fact that the personnel at Canton has now been reduced to two men whose very full program will not permit their giving the necessary time and attention to the development of shade or shelter. It is my feeling that this cooperative agreement is to the decided advantage of all concerned and it is recommended that if possible it shall be fostered and continued in the future.

Conclusions. Inspection of the dwelling sites on the American Equatorial Islands leads me to believe that a limited program intended to provide shade and windbreaks can be successfully carried out, and that water and early care and attention will prove to be the limiting factors. With regular shipments of both plants and soil from Honolulu, colonists can be instructed to maintain and extend the plantings. Sand culture methods can be adopted where colonists have been previously trained in the technique prior to their departure from Honolulu. The success of the planting and culture programs will probably be in proportion to the intelligence, industry, interest and enthusiasm which the local leader is able to instill into his fellow colonists.

Respectfully submitted,

(signed)

Ashley C. Browne
Extension Horticulturist

PLANT MATERIAL SHIPPED ON OCTOBER, 1939 CRUISE, COAST GUARD CUTTER "R. B. TANEY"

PLANT NAMES	SOURCE	NO.	SIZE	CONTAINER	DESTINATION
Hau	Board of Agri. & Forestry	22 plants	18"-24"	#2½ cans	PAA Canton
Beach Ironwood (Casurina equisetifolia)	" " " " "	75 plants	10"-24"	3 flats	2 PAA Canton 1 Jarvis
Milo (Thespesia papul)	Shade Tree Commission	6 plants	7-8'	5 gal. cans	PAA Canton
Plumeria (Plumeria acutifolia)	" " "	1 "	24"	1 gal. can	" "
Sea Grape (Coccolaba uvifera)	" " "	1 "	7'	5 gal. can	" "
Geiger Tree (Cordia subestenia)	Foster Gardens	4 "	2'	#2½ cans	" "
Crown flower (Calotropis gigantea)	Shade Tree Commission	8 "	2'	2 qt. cans	" "
Beach Heliotrope (Tournefortia argentea)	Foster Gardens	12 "	6"-10"	1 gal. can	" "
Pluchea indica	Sand Island	seed		packet	" "
Spineless kiawe (Prosopis juliflora)	" "	"		"	" "
Bean seed (Ky. Wonder Rust. Res.)	Hawaii Experiment Station	"		"	" "
Watermelon (White seeded Chilean)	" " "	"		"	" "
Tomato (Break O'Day)	" " "	"		"	" "

15 tons of soil in sacks purchased by PAA Canton and U.S.Dept. of Interior

MEDICAL EXAMINATIONS

All medical examinations during the 17th Cruise were performed by Dr. James M. Wolfe, U.S.P.H.S., the medical officer of the TANEY. Results of these examinations are retained in the file of the office of the Field Representative and in the office of Dr. Wolfe aboard the TANEY.

SUPPLY LISTS - 17th CRUISE

Items listed were duly landed on Howland, Baker, Canton, Enderbury and Jarvis as noted in narrative.

CASES OR PACKAGES TO MARKED IN PAINT OR CRAYON "J", B", "H", "C", OR "E"

EQUIPMENT - 17TH CRUISE

	Item	"C"	"E"	"B"	"H"	"J"	TOTAL
1.	Kerosene, 5 gal cans	60	50	50	10	10	180
2.	Gasoline, 35 gal drum, white	10	3	3	4	20	40
3.	Hydrogen (see Navy letter Oct. 5 re cylinders)	10			6	10	26
4.	Matches, Gold Medal 10's	18	0	36	36	36	126
5.	Record books	3	3	3	3	3	15
6.	Dry cells, #6 1½ v., cartons of 25	1	1	1	1	1	5
7.	Dish towels, Navy Standard, dozens	1	1	1	1	1	5
8.	Dish cloths, Navy Standard, dozens	1	1	1	1	1	5
9.	Pencils, 2 H, boxes of 1 dozen	1	1	1	1	1	5
10.	Cement, Portland, bags	0	8	1	12	10	31 bags
11.	Pillow cases, Navy Standard, dozens	½	½	½	½	½	2½
12.	Aluminum Powder, 1 lb cans			2			2
13.	Bulbs, flashlight, dozens				1		1
14.	Paper, roofing, rolls					6	6
15.	Varnish, gals			2			2
16.	Paint, dark gray, gals				2		2
17.	Paint, light gray, gals				2		2
18.	Paint, inside, white, gals					2	2
19.	Lime, bags	1	1	1	1	1	5
20.	Stain, gray, gals					2	2
21.	Lead, red, mixed, gals					2	2
22.	Brooms			1			1
23.	Batteries, flashlight	2		2	2	2	8
24.	Flashlights		1	2	2	2	7
25.	Sandpaper, medium, dozens	½	½	½	½	½	2½
26.	Sandpaper, fine, dozens	½	½	½	½	½	2½

EQUIPMENT - 17TH CRUISE

		"C"	"E"	"B"	"H"	"J"	TOTAL
27.	Turpentine, gals				1		1
28.	Water drums	10	10	10	10	10	50
29.	Vice, bench, 6 inch					1	1
30.	Cord, halliard, 100 ft.					1	1
31.	Tissue, toilet, case			1			1
32.	Files, 3 cornered, 6 inch, medium		1		2		3
33.	Files, flat, 8 inch coarse				1		1
34.	Files, flat, 8 inch medium				1		1
35.	Files, flat, 8 inch fine				1		1
36.	Wrench, crescent, 8 inch				1		1
37.	Wrench, crescent, 6 inch			1			1
38.	Openers, can, wall mounted	1	1	1	1	1	5
39.	Lumber, pieces, T & G 1"x6"x48 (Lengths in stock)				1		1

CASES OR PACKAGES TO MARKED IN PAINT OR CRAYON "J", "B", "H", "C" OR "E"

FOOD SUPPLIES - 17TH CRUISE

	Item	"C"	"E"	"B"	"H"	"J"	TOTAL
1.	Apricots, halves, 24/2's Libby's, cases	0	1	1	1	1	4 cases
2.	Beans, pork and, 24/18 oz., cases	½	1	1	1	1	4½ "
3.	Beef, corned, 12 oz., tins	24	60	60	60	60	264 tins
4.	Beef stew, 24/24 oz., tins	12		36	36	36	120 "
5.	Beets, sliced, fancy, 20 oz., tins	12	24	24	24	24	108 "
6.	Bisquick Mix, flour, 12/40 oz., pkgs	5	10	10	10	10	45 pkgs
7.	Butter, canned, case	¼	½	½		½	1¼ cases
8.	Candy bars, Oh Henry, carton	1	3	3	3	3	13 cartons
9.	Candy bars, Snickers, carton		1	1	1	1	4 cartons
10.	Catsup, 24/14 oz., bottles	3	6	6	6	6	27 bottles
11.	Chili Con Carne with Beans, 24/11 oz., case	½	1	1	1	1	4½ cases
12.	Cocoa, Breakfast, Herseys, 24/8 oz., tins	3	5	5	5	5	23 tins
13.	Coffee, Kona, 48/1 lb., pkgs	4	8	8	8	8	36 pkgs
14.	Cookies, assorted sweet, lbs	5	10	10	10	10	45 lbs
15.	Corn Beef Hash, 24/10 oz., tins	12	36	36	36	36	156 tins
16.	Corn, fancy, cream style, 34/2's, tins	12	24	24	24	24	108 "
17.	Corn Niblets, 24/12 oz., cases	½	1	1	1	1	4½ cases
18.	Cereal, Shredded Wheat, pkgs	5	10	10	10	10	45 pkgs
19.	Crackers, saloon pilot, 16 oz., lbs	20	40	40	40	40	180 lbs
20.	Extract, lemon, 2 oz., bottles	1	2	2	2	2	9 bottles
21.	Extract, vanilla, 2 oz., bottles	1	2	2	2	2	9 bottles
22.	Flour, wheat, Pillsbury's 9.8 bags	2	5	5		5	17 bags
23.	Fruit salad, fancy, 8 oz., cases	1	2	2	2	2	9 cases
24.	Garlic, lbs		2	2	2	2	8 lbs
25.	Ginger root		1	1	1	1	4 lbs
26.	Jelly, assorted, guava, pineapple, small jars	3	12	12	12	12	51 jars

FOOD SUPPLIES - 17TH CRUISI

	Item	"C"	"E"	"B"	"H"	"J"	TOTAL
27.	Juice, grape, Welch, 24 pts., case	½	½	½	½	½	2½ cases
28.	Juice, grapefruit, 12 oz., cases	1	1	1	1	1	5 cases
29.	Juice, pineapple, Dole, 24/18 oz., cases	1	2	2	2	2	9 "
30.	Macaroni, dry, Fontana, 24/8 oz., pkgs	5	10	10	10	10	45 pkgs
31.	Milk, evaporated, Carnation, 48/1's., cases	1	2	2	2	2	9 cases
32.	Milk, powdered, 5 lb cans	1	2	3	2	2	10 cans
33.	Peaches, cling, sliced, fancy 1's, 16 oz., cases	½	1	1	1	1	4½ cases
34.	Peanut butter, 24/16 oz., tins	1	2	2	2	2	9 tins
35.	Peas, tiny, sugar, 24/2, cases	½	1	1	1	1	4½ cases
36.	Pickles, mixed, sweet 24/16 oz., bottles	2	4	4	4	4	18 bottles
37.	Pineapple, fancy, sliced, Dole, 24/2's cases	½	1	1	1	1	4½ cases
38.	Poi, canned, 1 lb. 12 oz., Haw'n Royalty, tins	0	120	240	240	240	840 tins
39.	Powder, baking, Royal, 24/8 oz., cans	1	2	4	3	3	13 cans
40.	Rice, 100 lb., bags	½		1		1	2½ bags
41.	Salad oil, qts	1		3	3	3	10 qts
42.	Salad Dressing, Mayonnaise, qts	1	3	3	3	3	13 qts
43.	Salmon, 48/1's, cases	½		1		1	2½ cases
44.	Salt, table, iodized, 2 lbs, Ardens, pkgs	2	4	4	4	4	18 pkgs
45.	Sausage, Vienna, 2 lb cans, cases	½	1	1	1	1	4½ cases
46.	Soup, chicken gumbo, Campbells, 48/1's, tins	12	24	24	24	24	108 tins
47.	Soup, vegetables, Campbells, 48/1's tins	12	24	24	24	24	108 tins
48.	Soyu bean sauce, qts	1		2		2	5 qts
49.	Spaghetti, dry, Fontana, 24/8 oz., pkgs	6	12	12	12	12	54 pkgs
50.	Sugar, white, 100 lbs., bags	½		1	1	1	3½ bags
51.	Tea, black, English, 8 oz., pkgs	1		2	2	2	7 pkgs
52.	Tomato juice, 24/18, cases	1	1	1	1	1	5 cases
53.	Tomato sauce, 7½ oz. Exquisite, tins	12	36	36	36	36	156 tins

FOOD SUPPLIES - 17TH CRUISE

	Item	"C"	"E"	"B"	"H"	"J"	TOTAL
54.	Tomatoes, solid pack, tins	12	24	24	24	24	108 tins
55.	Tongue, cooked, lunch, Star 24/6, cases	½	1	1	1	1	4½ cases
56.	Vegetable for salad, 48/8 oz., tins	18	36	36	36	36	156 tins
57.	Vinegar, cider, 16 oz., bottles	1	2	2		2	7 bottles
58.	Curry powder, cans					1	1 can

TO BE PACKED FOR CHILL ROOM

59.	Ham, sweet pickled, cured	1	2	2	2	2	9 only
60.	Onions, dry, bag 100 lbs	1	2	2	2	2	9 bags
61.	Potatoes, Irish, 100 lb bags	1	2	2	2	2	9 "
62.	Potatoes, Sweet, 100 lb bags	1	1	1	1	1	5 "
63.	Sausage, Salami, dried, 3 to 4 lbs each	1	2	2	2	2	9 only
64.	Bacon, sweet pickled, cured, slabs	1		4	4	4	13 slabs
65.	Beef, jerked, lbs	5	10	10	10	10	45 lbs
66.	Cheese, processed, American, lbs	2	6	6	6	6	26 lbs
67.	Yeast, lbs	1	2	2	2	2	9 lbs