NOTES

Facilities for Research in the Natural Sciences in the Hawaiian Islands

MORE THAN TWENTY AGENCIES or institutions, both governmental and private, possess facilities for research in the natural sciences in the Hawaiian Islands. The following inventory of these facilities has been prepared from responses by the heads of the various organizations. It is believed that this alphabetic listing will be valuable not only to scientists visiting Hawaii or corresponding with agencies in this region, but also to residents of these islands who have not previously been able to examine a complete list of local research facilities and opportunities. Similar inventories of research facilities in the natural sciences in other areas of the Pacific region are planned for future issues of PACIFIC SCIENCE.

BERNICE P. BISHOP MUSEUM

ADDRESS: Bernice P. Bishop Museum, Honolulu 35, Hawaii. Director: Dr. Peter H. Buck.

PURPOSE: Collection, preservation, and study of Hawaiian and kindred Pacific material in ethnology and the natural sciences; publication of results of study. (Only the natural sciences will be covered in the present listing.) The Museum is affiliated with Yale University, and the Director is a professor on the Yale faculty.

SUBDIVISIONS: Departments of Botany, Malacology (terrestrial and marine), Entomology, and Marine Zoology; also large collections in ichthyology, ornithology, and geology.

PERSONS ENGAGED IN RESEARCH: (botany) Dr. Harold St. John, Marie Neal, Edward Y. Hosaka, Dr. F. B. H. Brown (unofficially attached); (malacology) Dr. C. Montague Cooke, Jr., Yoshio Kondo, Wray Harris (marine); (entomology) E. C. Zimmerman; (marine zoology) Dr. C. H. Edmondson; (ornithology) Paul H. Baldwin (absent on leave). The Museum also has on its staff four honorary consultants and 11 honorary associates in the natural sciences.

OPPORTUNITIES FOR FIELD RESEARCH: The Museum budget includes appropriations for field expenses. Trips among the Hawaiian Islands and special expeditions to other parts of the Pacific area are carried out from time to time.

LIBRARY: The Library has an estimated 25,015 books and 11,580 pamphlets. These are chiefly on Pacific ethnology and natural history, with emphasis on Polynesia. No important report of an early voyage into the Pacific is lacking. There are complete files of many scientific publications from American institutions, as well as excellent files from institutions in all other parts of the world having interest in the Pacific. New books on pertinent subjects are acquired as they appear, and the Library attempts to fill the needs of the members of the staff.

COLLECTIONS: The Museum is designated by territorial law as the depository for natural history collections of the University of Hawaii and other territorial departments, bureaus, and boards. In addition to a large area devoted to ethnology (the Museum has the largest collection of Hawaiian artifacts in the world), the following collections are available in the natural sciences: (1) *Botany:* Herbarium contains what is probably the largest collection of Polynesian plants; the total number for the Pacific area is 150,000 specimens. (2) *Malacology:* Synoptic collection of land and marine shells on exhibition; land shell collection is well over 2,000,000 specimens and marine shell collection over 50,000 (3) *Entomology:* Collection numbers over 400,000 specimens. (4) *Ornithology:* Contains many specimens of extinct Hawaiian birds. (5) *Ichthyology:* Large collection of fish; also fine set of colored casts on exhibition.

PUBLICATIONS: Four series are published by the Museum. (1) *Memoirs* (quarto); 12 volumes containing 39 papers published to date. (2) *Bulletins* (royal octavo, over 50 printed pages); 188 published to date. (3) *Occasional Papers* (octavo, under 50 printed pages); 18 volumes, totaling 274 papers, published to date. (4) *Special Publications;* 37 published to date. List of publications may be obtained from the Director.

RESEARCH FELLOWSHIPS: Two Yale University–Bishop Museum Fellowships of $2,000 were offered annually by Yale University and Bishop Museum for research work on ethnology and the natural sciences of the Pacific area. They were discontinued during the war but will be resumed in the near future.

RESEARCH OPPORTUNITIES: Other opportunities are offered by the Museum from time to time as the need arises and the funds permit. Materials in botany, entomology, and marine zoology are sent out to specialists in America and Europe for identification, and the reports are published by the Museum.

RESEARCH POLICY: The Museum offers research facilities to visiting scientists to study its collections. Office space is provided. The Museum recently provided desk accommodation for 10 scientists and 20 typists who worked on the reports of the United States Commercial Company's economic survey of Micronesia. During the proposed Pacific Science Survey, the Museum is prepared to give office accommodation to research workers in ethnology and the natural sciences, as well as free access to its collections.

California Packing Corporation

ADDRESS: California Packing Corporation, P. O. Box 149, Honolulu 10, Hawaii.

PURPOSE: Since the corporation is primarily a production organization, research facilities are confined to those necessary to growing and canning fruits and vegetables. Research in agriculture is carried on by Maxwell O. Johnson. The corporation is also served by its main office in San Francisco and by the Pineapple Research Institute.

FACILITIES: Laboratory facilities in Honolulu are limited to those required for simple analysis and control of canning operations.

Hawaii National Park

ADDRESS: U. S. Department of the Interior, National Park Service, Hawaii National Park, Hawaii. Superintendent: Frank R. Oberhansley.

PURPOSE: The Park Service is primarily an operating organization; research by the field staff is encouraged when time permits.

SPECIAL SUBDIVISIONS: Naturalist Department; Hawaiian Volcano Observatory (for description of this Observatory see listing below under "Hawaiian Volcano Observatory").

PERSONS ENGAGED IN RESEARCH: G. O. Fagerlund, botany; Clifton J. Davis, entomology.

FACILITIES: Offices, laboratories, and photographic darkroom.

OPPORTUNITIES FOR FIELD RESEARCH: Year-round access to area of contrasted physiographic, climatic, and ecological conditions.

LIBRARY: A few hundred volumes on biology.

COLLECTIONS: Fairly complete classified collection of plants, birds, and insects of the Park area.

PUBLICATION SERIES: Mimeographed *Natural History Bulletins* interpreting natural conditions, published occasionally.

RESEARCH POLICY: The Service co-operates in every way within its means to encourage institutions and individuals to conduct research in its areas.

Hawaiian Pineapple Company

ADDRESS: (Dole) Hawaiian Pineapple Company, Ltd., Honolulu 1, Hawaii.

PURPOSE: Research pertaining to the growing and processing of pineapples and other subtropical crops.

STAFF: Technically trained persons engaged in research number 25. Staff includes Dr. F. P. Mehrlich, Assistant Vice President in Charge of Research; Dr. George E. Felton, Chemist; Dr. R. O. Belkengren, Food Biochemist; Dr. Dillon S. Brown, Horticulturist; Dr. Melvin Levine, Bacteriologist; Kenneth Kopf, Geneticist.

FACILITIES: Laboratories in Honolulu for chemical research, frozen food research, food technology, bacteriology, and plant physiology. Laboratory at Wahiawa for horticultural, genetic, agronomic, and plant physiology research. A similar laboratory on Lanai. Pilot plants and special processing lines of commercial equipment are available in the Honolulu factory.

OPPORTUNITIES FOR FIELD RESEARCH: Comprehensive field research is carried on relative to agronomy, horticulture, genetics, and plant physiology.

LIBRARY: The library contains about 500 volumes.

Hawaiian Sugar Planters' Association

ADDRESS: Experiment Station, Hawaiian Sugar Planters' Association, 1527 Keeaumoku Street, Honolulu 4, Hawaii. Director: Dr. Harold L. Lyon.

PURPOSE: To investigate and solve the field and factory problems of the Hawaiian sugar industry.

SUBDIVISIONS: Departments of Agriculture, Botany and Forestry, Chemistry, Climatology, Entomology, Genetics, Geology, Pathology, Physiology and Biochemistry, and Sugar Technology. Each department is headed by an outstanding scientist.

PERSONS ENGAGED IN RESEARCH: About 65 research workers.

FACILITIES: Each department has at its disposal all the facilities and equipment necessary for research in its special field.

LIBRARY: The library contains 25,860 volumes and thousands of separates, bulletins, and pamphlets, all properly classified.

COLLECTIONS: A very extensive collection of insects of the Pacific ocean area; museums of sugar canes and cane diseases.

PUBLICATIONS: *The Hawaiian Planters' Record,* a magazine now in its fiftieth volume. Members of the organization are encouraged to publish results of research in various scientific journals.

RESEARCH FELLOWSHIPS: None offered at present.

RESEARCH POLICY: The Station always welcomes visiting scientists and strives to assist them in every way possible. During the year 1946, the Station gave assistance in the field, laboratory, and library to sugar cane experts from Australia, China, Cuba, Mauritius, and Tanganyika.

Hawaiian Tuna Packers

ADDRESS: Hawaiian Tuna Packers, Ltd., P. O. Box 238, Honolulu, Hawaii.

FACILITIES: At the present time the company does not have facilities for scientific research, as this organization, primarily engaged in processing, is only slowly getting its activities back to a prewar basis of operation, and hopes to reach normal production by the latter part of 1947.

Hawaiian Volcano Observatory

(Branch of Hawaii National Park collaborating with Hawaiian Volcano Research Association and the University of Hawaii)

ADDRESS: Hawaiian Volcano Observatory, Hawaii National Park, Hawaii. Volcanologist in charge: R. H. Finch.

PURPOSE: To maintain measurements and observations on the active volcanoes Kilauea and Mauna Loa and to conduct research on the physics and chemistry of volcanoes by seismic, magnetic, or other available methods and to devise and test new methods.

PERSONS ENGAGED IN RESEARCH: R. H. Finch, Volcanologist; Dr. H. A. Powers, Seismologist; B. J. Loucks, Instrument Maker; occasional visiting specialists.

FACILITIES: (1) Hawaii National Park Naturalist-Observatory Building (laboratories, seismograph vaults, instrument shop, darkroom). (2) University of Hawaii Kilauea Laboratory (separate laboratory and office buildings, miscellaneous instruments, collections, records, etc.). (3) Seismograph stations at other points on the island of Hawaii.

OPPORTUNITIES FOR FIELD RESEARCH: Proximity to Kilauea Crater and accessibility of Mauna Loa. Opportunity for studies in petrology, areal geology, volcanic processes, and varied geophysical measurements.

LIBRARY: Specialized collection of books, journals, and reprints in volcanology and related subjects. (See also below, "Hawaiian Volcano Research Association, Library.")

PUBLICATION SERIES: *Hawaiian Volcano Observatory Bulletin,* 1912–1929, and *Special Reports* (both in collaboration with Hawaiian Volcano Research Association); *Volcano Letter,* 1925 to date (in collaboration with Hawaiian Volcano Research Association and University of Hawaii). A number of publications by staff members have appeared in various scientific journals.

RESEARCH FELLOWSHIPS: See "Hawaiian Volcano Research Association, Research Fellowships."

RESEARCH POLICY: Cordial collaboration; desk space and laboratory facilities afforded to visiting scientists.

Hawaiian Volcano Research Association

ADDRESS: Hawaiian Volcano Research Association. President: L. P. Thurston; Secretary: L. W. de Vis-Norton, 320 James Campbell Building, Honolulu, Hawaii; Scientific Director: Dr. T. A. Jaggar, University of Hawaii, Honolulu 10, Hawaii.

PURPOSE: To sponsor research in physical processes of Hawaiian volcanoes. The Association co-operates in research with the Hawaiian Volcano Observatory.

PERSONS ENGAGED IN RESEARCH: (At University of Hawaii) Dr. T. A. Jaggar, Research Associate in Volcanology, and R. A. Okuda, Junior Researcher; (at Hawaii National Park) staff of Hawaiian Volcano Observatory.

FACILITIES: (1) Kilauea Laboratory of the University of Hawaii (instrument shop, collections, files, instruments, maps, records, etc.); (2) Hawaiian Volcano Observatory at Hawaii National Park (see "Hawaiian Volcano Observatory"); (3) Volcanology Laboratory, Room 2, Home Economics Building, University campus.

LIBRARY: (At Hawaiian Volcano Observatory, Hawaii National Park) Many volumes, record books, reprints, journals, maps, instrument designs, and seismograms.

EXHIBITS: (At Hawaii National Park) Volcanic specimens, photographs, models, and exhibition seismograph.

PUBLICATION SERIES: See "Hawaiian Volcano Observatory."

RESEARCH FELLOWSHIPS: The Directors will receive applications at any time from research investigators holding doctorate degrees who desire to pursue specialized Hawaii studies in seismology, volcanology, and volcanological oceanography. Persons of advanced grade holding fellowships from mainland colleges may be assisted in travel expense and provided with apparatus or use of facilities. Address inquiries to: Dr. T. A. Jaggar, Scientific Director, University of Hawaii, Honolulu 10, Hawaii.

RESEARCH POLICY: To encourage highly skilled, specialized research on Hawaiian volcanology, seismology, and related phenomena. Desk space and laboratory facilities are offered to visiting scientists.

Honolulu Board of Water Supply

ADDRESS: Honolulu Board of Water Supply, P. O. Box 3410, Honolulu 1, Hawaii.

PURPOSE: To maintain, expand, and improve the Honolulu water supply.

SUBDIVISIONS (engaged in other than service activities): Division of Geology (Dr. C. K. Wentworth and two others); Division of Chemistry (L. T. Bryson and one other); Division of Bacteriology (J. M. Downer and four others).

FACILITIES: Separate laboratories for the three divisions, with supplementary darkroom, microscope room, and storage and office space.

Equipment for general studies in areal geology and petrography, chemical analyses of water and other materials, special studies of corrosion and other impairment, bacteriology of water, and the like.

OPPORTUNITIES FOR FIELD RESEARCH: (1) Work in geology includes field mapping of structures and ground-water features, laboratory and field experiments in hydrology, and collection of data and mathematical studies in meteorology and hydrology (the latter in collaboration with the Division of Water Resources of the Board of Water Supply). (2) Work in chemistry includes analysis of daily samples, annual complete analyses of water from various sources, and required special analyses, as well as tests of fuel oil, metals, and construction materials; studies of corrosion or other failure as needed. (3) Work in bacteriology includes daily sampling at sources and at points in the distribution system, with special test programs to maintain required and recognized standards for potable water.

LIBRARY: About 100 feet of shelves containing technical books and journals on engineering, water supply, and related technical subjects.

COLLECTIONS AND EXHIBITS: Working collections of rocks and drill cores; photograph files; occasional charts and technical exhibits.

PUBLICATIONS: Biennial reports containing records of quantities and costs, analyses, and other pertinent data, with occasional technical appendixes. A few supplementary reports have also been published on geology, ground water, water law, and similar subjects.

RESEARCH POLICY: Cordial informal relations with visiting engineers and scientists.

Libby, McNeill and Libby

ADDRESS: Libby, McNeill and Libby, Pineapple Division, P. O. Box 1140, Honolulu 7, Hawaii. Manager of Research: Dr. O. C. Magistad.

PURPOSE: This company conducts research both on pineapple production and on processing.

STAFF: About 10 men devote full time to research problems under supervisory staff of university graduates in chemistry or agriculture.

FACILITIES: In addition to main laboratory in the Libby Cannery, field laboratories have been provided on the islands of Oahu, Molokai, and Maui.

Pacific Chemical and Fertilizer Company

ADDRESS: Research Division, Pacific Chemical and Fertilizer Company, P. O. Box 48, Honolulu 10, Hawaii.

PURPOSE: (1) To conduct investigations in the chemical and agricultural fields related to the company's business. (2) To co-operate with local research organizations such as the Experiment Station of the Hawaiian Sugar Planters' Association, the Pineapple Research Institute, and the University of Hawaii Agricultural Experiment Station on research problems of mutual interest. (3) To conduct or direct research for clients on a contractual basis. (4) To act as consultants in chemistry and agriculture.

STAFF: Four chemists, one chemical engineer, one agricultural technologist, and five additional employees. The division is under the direction of Dr. John H. Payne.

FACILITIES: Laboratory area of 5,000 square feet.

LIBRARY: Technical library of some 1,500 volumes.

PUBLICATIONS: Papers are published (most commonly in chemical periodicals) by staff members from time to time.

RESEARCH OPPORTUNITIES: The company offers no research fellowship at present. Facilities are available to visiting scientists.

Pineapple Research Institute of Hawaii

ADDRESS: Pineapple Research Institute of Hawaii, P. O. Box 3166, Honolulu 2, Hawaii. President and Director: Dr. Eugene C. Auchter.

PURPOSE: The Institute, which had its beginnings about 1912, is supported by the pineapple industry of Hawaii. It is located on land adjoining the University of Hawaii and co-operation with the University is arranged in the study of problems of mutual interest. The purpose of the Institute is to conduct research on all problems encountered in the production of pineapple plants and fruit.

SUBDIVISIONS: Departments of Entomology, Plant Pathology, Plant Physiology, Genetics, Chemistry, Agricultural Engineering, Meteorology, and Publications.

STAFF: About 40 scientists are engaged in research. Additional employees include business organization, secretarial staffs, and farm labor. Department heads include Dr. E. G. McKibben, agricultural engineering; Dr. M. B. Linford, pathology; Dr. J. L. Collins, genetics; Dr. Walter Carter, entomology; Dr. G. T. Nightingale, plant physiology; Dr. Harold E. Clark, chemistry; L. B. Leopold, meteorology; and Joyce Roberts, publications. Many of the associates hold doctorate degrees.

FACILITIES: Well-equipped laboratories are available in all departments.

OPPORTUNITIES FOR FIELD RESEARCH: Greenhouses, shade houses, and an experiment station of 100 acres (located at Wahiawa, Oahu) are available. Research may also be carried on in the pineapple fields of member companies.

LIBRARY: The library contains 4,352 bound and unbound volumes and several hundred special pamphlets; 101 research journals and technical publications are received regularly.

EXHIBITS: Permanent exhibits in several branches of research have been set up. An excellent living collection of the various pineapple spe-

cies, hybrids, and clones is established on the grounds of the experiment station at Wahiawa.

PUBLICATIONS: *Pineapple News,* 1927–1936; *Pineapple Quarterly,* 1931–1936. Recent policy has been to issue reports of research to the pineapple industry, and to publish papers giving the results of technical investigations in various American and foreign scientific journals.

RESEARCH FELLOWSHIPS: Through an arrangement with the University of Hawaii it is possible for graduate students to prepare their theses under the direction of members of the research staff and to work in the laboratories or at the experiment station. Occasionally research fellowships or research assistantships are offered.

RESEARCH OPPORTUNITIES: Outstanding scientists from the Mainland and elsewhere are often invited to come to the Institute to work on problems of common interest. To such scientists all the facilities of the Institute are made available.

RESEARCH POLICY: The Institute arranges cooperative studies with various scientific agencies both in the Hawaiian Islands and on the Mainland on problems of mutual interest.

Territorial Board of Agriculture and Forestry

ADDRESS: Territory of Hawaii, Board of Commissioners of Agriculture and Forestry, King and Keeaumoku Streets, P. O. Box 3319, Honolulu 1, Hawaii. President: Colin G. Lennox.

PURPOSE: The Board is primarily concerned with law enforcement, but does carry on some research.

SUBDIVISIONS: Division of Fish and Game, which is conducting biological research in fisheries and wild life; Division of Animal Industry, which carries on bacteriological and pathological research on animal diseases; Division of Entomology, which carries on biological research in entomology primarily as it concerns the introduction of insect parasites. Foresters carry on field research from time to time.

PERSONS ENGAGED IN RESEARCH: About nine.

FACILITIES: Laboratories well equipped for all necessary investigations. Laboratory facilities for fisheries and wild life research are available at present through the Department of Zoology, University of Hawaii.

LIBRARY: The Division of Entomology Library consists of about 1,000 volumes, including the principal sets of entomological publications.

COLLECTIONS: Division of Entomology has special collections which include fruit flies of the world, parasitic insects, and general collections made in Africa, Asia, Australia, Mexico, Panama, and Brazil. A permanent exhibit of economically important insects is presented in display cases.

PUBLICATIONS: *Biennial Report; Division of Forestry, Botanical Bulletins* 1–6 (1911–1919); *Hawaiian Forester and Agriculturist,* 1904–1933. Staff members have prepared special reports, bulletins, and articles.

RESEARCH POLICY: No standing offer of research facilities is made, but these have been used on several occasions by visiting scientists with the Board's permission. Inquiries should be addressed to the president of the Board.

Territorial Board of Health

ADDRESS: Territory of Hawaii, Board of Health, Kapuaiwa Building, Honolulu, Hawaii. President: Dr. C. L. Wilbar, Jr.

PURPOSE: General charge, supervision, and care of the health and lives of the people of the Territory.

SUBDIVISIONS: Preventive Medicine; Local Health Services; Medical Services; Central Administration; and Sanitation (including industrial hygiene, food and drugs, rodent and mosquito control, housing). An active research program is carried on by Dr. David S. Bonnet, Medical Entomologist, for the control and prevention of diseases carried by rodents and mosquitoes.

FACILITIES: Adequate laboratories are available in the health department offices on the various islands.

OPPORTUNITIES FOR FIELD RESEARCH: Professional and administrative personnel are busy with ordinary routine duties, but existing programs offer material for much research.

PUBLICATIONS: *Annual Report.*

RESEARCH FELLOWSHIPS: From time to time fellowships are offered to members of the Board's medical, nursing, sanitation, laboratory, and other staffs.

U. S. Bureau of Animal Industry

ADDRESS: U. S. Department of Agriculture, Bureau of Animal Industry, 219 Federal Office Building, Honolulu 2, Hawaii. Inspector, in Charge: Dr. A. H. Julien.

RESEARCH POLICY: This bureau is primarily a routine inspection agency, and no research program is carried on at present.

U. S. Bureau of Entomology and Plant Quarantine

ADDRESS: U. S. Department of Agriculture, Agricultural Research Administration, Bureau of Entomology and Plant Quarantine, Division of Foreign Plant Quarantine, P. O. Box 340, Honolulu 9, Hawaii.

RESEARCH POLICY: This division is primarily an inspection agency, and no research program is carried on at present. (See listing on Fruitfly Investigations division below.)

U. S. Bureau of Entomology and Plant Quarantine (Fruitfly Investigations)

ADDRESS: U. S. Department of Agriculture, Agricultural Research Administration, Bureau of Entomology and Plant Quarantine, Fruitfly Investigations, University of Hawaii Campus, P. O. Box 340, Honolulu 9, Hawaii. Entomologist in Charge: J. W. Balock.

PURPOSE: Research on the biology, ecology, and chemical control of fruit flies; development of methods of fruit treatment to eliminate risk that living insects of economic importance will be transported through channels of commerce.

STAFF: Normally, three professional workers, one sub-professional worker, and one administrative clerk.

FACILITIES: Well-equipped laboratory for entomological research (refrigeration facilities, vapor-heat room and equipment, constant temperature cabinets, micro-balance, etc.).

OPPORTUNITIES FOR FIELD RESEARCH: Field research conducted in co-operation with individual farmers or on Bureau's own research plots.

LIBRARY: Limited library on general entomology.

PUBLICATIONS: Research results appear in scientific journals and U. S. Department of Agriculture publications.

RESEARCH POLICY: Facilities and laboratory space are willingly made available to visiting scientists interested in these problems. Such facilities have also been made available to local scientists when practicable.

U. S. Coast and Geodetic Survey

ADDRESS: U. S. Department of Commerce, U. S. Coast and Geodetic Survey, Pacific District Headquarters, 244 Federal Office Building, Honolulu, Hawaii. Supervisor, Pacific District: Lt. Comdr. L. C. Wilder.

PURPOSE: The principal functions of the Coast and Geodetic Survey are the surveying of all coastal waters under the jurisdiction of the United States and the production of the nautical charts and coast pilot publications required for the navigation of those waters; the compilation of aeronautical charts for air navigation; and the accomplishment, throughout our country and its possessions, of geodetic control surveys which provide essential basic data for nautical charting and topographic mapping (see U. S. Coast and Geodetic Survey *Special Publication* 216, "The United States Coast and Geodetic Survey," Washington, 1938). Research is carried on principally in the office in Washington, D.C., from field data assembled there; work is principally in seismology, magnetism, tides, currents, and sea water salinities and temperature, and in the development of necessary instruments and equipment for carrying on field work. The principal work in the area directed from Pacific Headquarters is to obtain and make available nautical information, charts, and tide and current tables to the seafaring profession and allied interests.

FACILITIES: At Barbers Point, Oahu, is located the Coast and Geodetic Magnetic and Seismological Observatory, in charge of R. F. White, Geophysicist. It is likely that this observatory will be expanded to handle the correlating of various earthquake reports and possibly of those on seismic sea waves. The Pacific District will soon set up, in co-operation with other agencies, a comprehensive series of tide gages which will also record water salinities and temperatures.

LIBRARY: Limited file of publications upon tides, currents, seismology, magnetism, chart and map making, surveying, and astronomy.

U. S. Geological Survey, Division of Surface Waters

ADDRESS: U. S. Department of the Interior, Geological Survey, Water Resources Branch, Division of Surface Waters, 225 Federal Office Building, Honolulu 2, Hawaii. District Engineer: Max H. Carson. (The Geological Survey is associated with the Territorial Division of Hydrography, of which Mr. Carson is Chief Hydrographer.)

PURPOSE: Collection of reliable records of flow of the principal streams and ditches in the Territory and their interpretation. The organization also collects data on the artesian wells in the Territory and administers the laws relating to the conservation of artesian waters. (See also Ground Water Division, below.)

PERSONS ENGAGED IN RESEARCH: The Geological Survey co-operates with the Division of Hydrography of the Territory, the two organizations functioning as a unit. The staff includes several hydraulic engineers, two engineering aides, and one engineering draftsman in Federal pay; and one hydraulic engineer, two engineering aides, and two clerical employees in Territorial pay.

FACILITIES: A small hydraulics laboratory is situated just below Nuuanu Reservoir No. 3 in Nuuanu Valley. Here, previous to the war, several models of streams were built and tested. At present no laboratory work is being done, but plans call for one engineer to spend full time in laboratory research.

LIBRARY: Consists of U. S. Geological Survey *Water-Supply Papers* 1–1014, *Professional Papers* 42–207, *Bulletins* 600–930, *Annual Reports* 17–25, *Miscellaneous Mineral Reports,* various monographs, and more than 500 state and miscellaneous reports and textbooks.

PUBLICATION SERIES: Publications of the Survey on Hawaii are a part of the series of U. S. Geological Survey *Water-Supply Papers.* Num-

bers of the series pertaining to Hawaii are 77, 318, 336, 373, 430, 445, 465, 485, 515, 516, 535, 555, 575, 595, 615, 635, 655, 675, 695, 710, 725, 740, 755, 770, 795, 815, 835, 865, 885, 905, 935, 965, 985.

RESEARCH POLICY: No special facilities are offered to visiting scientists.

U. S. Geological Survey, Ground Water Division

ADDRESS: U. S. Department of the Interior, Geological Survey, Ground Water Division, 333 Federal Office Building, Honolulu 2, Hawaii. District Geologist: Dr. Gordon A. Macdonald. (See also Surface Water Division, above.)

PURPOSE: Investigation of the geology and groundwater resources of the Hawaiian Islands.

PERSONS ENGAGED IN RESEARCH: Dr. Gordon A. Macdonald, District Geologist; Dan A. Davis, Associate Geologist.

FACILITIES: Laboratory—none. Petrographic microscope.

OPPORTUNITIES FOR FIELD RESEARCH: Excellent.

LIBRARY: About 500 volumes, including U. S. Geological Survey *Professional Papers, Bulletins, Water-Supply Papers.*

COLLECTIONS: Petrologic collections from the Hawaiian Islands.

PUBLICATION SERIES: *Bulletins* of the Hawaii Division of Hydrography.

RESEARCH POLICY: All possible co-operation is offered to provide facilities for visiting scientists.

U. S. Public Health Service

ADDRESS: U. S. Public Health Service, 208 Federal Office Building, Honolulu, Hawaii.

RESEARCH POLICY: No local research program is carried on at present.

U. S. Weather Bureau Office

ADDRESS: U. S. Department of Commerce, U. S. Weather Bureau Office, Federal Office Building, Honolulu 1, Hawaii.

PURPOSE: Weather forecasting for aviation and shipping in the Pacific, as well as for local interests. Collection, summarization, and publication of Hawaii weather records.

SUBDIVISIONS: Forecast Office (John Rodgers Airport), Acting Official in Charge: Charles M. Woffinden; Climatology Office (Federal Office Building), Acting Official in Charge: W. F. Feldwisch.

FACILITIES: Original records available from approximately 300 points in the Hawaiian Islands (chiefly rainfall records). Analyzed weather maps of Northern Hemisphere on file.

LIBRARY: Approximately 100 volumes bearing on meteorology, forecasting, and climatology. Several hundred volumes and various pamphlets of published weather data, mostly from the United States, but some from various other parts of the world.

PUBLICATIONS: Monthly and annual *Meteorological Summary* for Honolulu; monthly and annual *Climatological Data* for the Hawaiian Islands.

University of Hawaii

ADDRESS: University of Hawaii, P. O. Box 18, Honolulu 10, Hawaii. President: Gregg M. Sinclair.

PURPOSE: The University, a land-grant institution of higher learning founded in 1907, offers many opportunities for research in the physical and biological sciences, both in the research programs of faculty and students and in research in co-operation with many of the governmental and other agencies in the Hawaiian Islands, such as the Bernice P. Bishop Museum, the Pineapple Research Institute, the Hawaiian Sugar Planters' Association, and the U. S. Bureau of Entomology and Plant Quarantine. (The work of the University of Hawaii Agricultural Experiment Station is separately reported below.)

SUBDIVISIONS: The University departments which carry on research in the natural sciences, with the names of departmental chairmen, include: Agriculture (Harold A. Wadsworth), Bacteriology (Dr. Floyd W. Hartmann), Botany (Dr. Harold St. John), Chemistry (Dr. Leonora N. Bilger), Geology (Dr. Harold S. Palmer), Physics (Dr. Willard H. Eller), and Zoology and Entomology (Dr. Robert W. Hiatt). Certain members of the University faculty are assigned, as part of their duties, to carry on research at the Bishop Museum.

PERSONS ENGAGED IN RESEARCH: In addition to the department chairmen mentioned above, the University faculty in the natural and physical sciences includes: (Agriculture) Louis A. Henke, Dr. William B. Storey; (Bacteriology) Dr. Oswald A. Bushnell; (Botany) Dr. Charles J. Engard, Dr. Donald P. Rogers; (Chemistry) Dr. Earl M. Bilger, Dr. Frederick G. Mann, Dr. Robert C. Brasted, Dr. Robert D. Bright, Dr. Robert A. Spurr; (Physics) Dr. E. H. Bramhall, Iwao Miyake; (Zoology and Entomology) Dr. Frederick G. Holdaway, Dr. Joseph E. Alicata, Dr. Albert H. Banner, Dr. Harvey I. Fisher, Dr. Pauline Heizer, Dr. Gordon B. Mainland, Dr. Leonard D. Tuthill.

FACILITIES: Laboratory facilities are available on the University campus, in Gartley Hall for chemistry and physics, and in Dean Hall for botany, geology, zoology, and entomology. Agricultural and nutrition laboratories are found in Gilmore Hall. Other research laboratories on the campus are those of the U. S. Bureau of Entomology and Plant Quarantine, the Pineapple Research Institute, and the University

Agricultural Experiment Station. A large laboratory will be housed in the Agricultural Engineering Institute now under construction, the gift of the Hawaiian Sugar Planters' Association. Off-campus laboratories include the Marine Biological Laboratory and Aquarium at Waikiki, the Astronomical Observatory at Kaimuki, and the Kilauea Laboratory in Hawaii National Park.

OPPORTUNITIES FOR FIELD RESEARCH: Field research trips are organized periodically, under the supervision of University faculty members. In the past these trips have covered not only the outer islands of the Hawaiian Group but also other islands of the Pacific region. As a part of the program of the University's Pacific Islands Research Committee headed by Dean Paul S. Bachman, in December, 1945, four faculty members made a reconnaissance visit to Micronesia, which was followed in the summer of 1946 by teams of scientists who made field surveys in Micronesia particularly in botany, zoology and bacteriology, and parasitology (see PACIFIC SCIENCE, January, 1946, p. 61–62).

LIBRARY: The University Library contains 163,950 bound volumes and 378,829 unbound parts and pamphlets, including the main publications in natural science. A union list of serials in the Library indicates the locations of all periodicals found in all libraries in the Territory. Standard scientific works are to be found on the Library shelves; well represented are works on the botany of the Pacific area, tropical agriculture, marine biology, and chemistry; there are also many volumes on voyages and scientific expeditions to the Pacific. The Library is an official depository for Federal and Territorial governmental publications. Scientific works printed in the Chinese and Japanese languages are included in the Oriental Collection. Visiting scientists are accorded free use of all Library facilities.

EXHIBITS: Collections or permanent exhibits, by act of the Territorial Legislature, are placed in the Bishop Museum, and a considerable part of the botanical and zoological exhibits in that museum is the work of University scientists. The herbarium there housed contains the most nearly complete collection of Hawaiian plants in existence, including some species now extinct. Certain departments of the University arrange displays on the campus from time to time. Large-scale relief maps of the major islands of the Hawaiian Group are to be found in the main lobby of Gilmore Hall. A botanical tour of the campus is described in a free illustrated booklet, *In Green Manoa Valley.*

PUBLICATION SERIES: *Research Publications* (1927 to date); *Occasional Papers* (1934 to date). In January, 1947, the University began publication of PACIFIC SCIENCE, a quarterly devoted to the biological and physical sciences of the Pacific region. *The Volcano Letter,* since 1938, has been published by the University for the Hawaiian Volcano Observatory and the Hawaiian Volcano Research Association. *Proceedings of the Hawaiian Academy of Science* has been issued jointly by the University and the Academy since 1940.

RESEARCH FELLOWSHIPS: Fellowships are offered in scientific fields, on a half-time basis, to qualified graduate students.

RESEARCH POLICY: The University, as a fully accredited institution of higher learning, is desirous of promoting scientific research in every possible way, and members of its faculty and staff are allowed time and funds to carry on such research. Co-operative research of many sorts is carried on by arrangement with various other institutions and agencies. It is the policy of the University to extend its hospitality to visiting scientists who wish to arrange for laboratory and library facilities.

UNIVERSITY OF HAWAII AGRICULTURAL EXPERIMENT STATION

ADDRESS: University of Hawaii Agricultural Experiment Station, Box 18, Honolulu 10, Hawaii. Director: Dr. John H. Beaumont.

PURPOSE: To conduct research and experiments bearing upon the establishment and maintenance of a permanent and efficient agricultural industry in the Territory.

SUBDIVISIONS: Departments of Agronomy, Horticulture, Animal Husbandry, Poultry Husbandry, Nutrition, Soils and Agricultural Chemistry, Plant Physiology, Plant Pathology, Vegetable Crops, Parasitology, Entomology, and Agricultural Engineering.

PERSONS ENGAGED IN RESEARCH: More than 40. Department heads include Dr. J. E. Alicata, Dr. H. F. Clements, Dr. W. A. Frazier, Rene Guillou, J. W. Hendrix, L. A. Henke, Dr. F. G. Holdaway, Carey D. Miller, J. C. Ripperton, Dr. G. D. Sherman, and Dr. W. B. Storey.

FACILITIES: Adequate laboratories in Soils and Agricultural Chemistry, Plant Physiology, Nutrition, Poultry Husbandry, Horticulture, and Vegetable Crops. Field experiment stations are located on the University campus at Honolulu, at Poamoho on Oahu, at Haleakala on Maui, and at Kona on Hawaii.

LIBRARY: University of Hawaii Library and Station Library.

PUBLICATION SERIES: *Annual Report, Bulletin, Circular, Technical Bulletin, Progress Notes, Technical Papers.*

RESEARCH FELLOWSHIPS: Fellowships are offered occasionally, as need arises.

RESEARCH OPPORTUNITIES: Graduate and undergraduate research is carried on in collaboration with the University of Hawaii.

RESEARCH POLICY: Facilities of the Station are freely offered to visiting scientists.