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# **AN ANNOTATED BIBLIOGRAPHY OF KANEOHE BAY**

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**HONOLULU, HAWAII**

**TECHNICAL REPORT NO. 20**

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## INTRODUCTION

The Hawaii Marine Laboratory, now known as the Hawaii Institute of Marine Biology, established a field station on Coconut Island in Kaneohe Bay in 1949. The Laboratory is unique among marine laboratories of the world in that it is situated adjacent to a coral reef and in close proximity to a variety of marine biotypes ranging from mangrove swamps and sandy shores to patch coral reefs and deep oceanic waters, and yet it is only a few miles from one of America's major university campuses.

Research interests over the past twenty years have grown from descriptive natural history to computerized behavioral analysis programs and intricate electrophysiological studies.

A major obstacle to investigators working at the marine laboratory in the past has been the lack of a comprehensive survey of the background material on the bay environs and its biota. Pertinent information was scattered in a variety of places; in libraries, museums, State and Federal offices, and in private files. This meant a time-consuming literature search for each investigator interested in a particular aspect of past marine research conducted in Kaneohe Bay.

In recognition of the need for a compilation of the available information on the Kaneohe Bay region, a program to collect material and to annotate and catalogue it was initiated.

Rather than confine the survey just to the previous studies done at the marine station, a much broader goal was envisioned - to collect all pertinent material relating to the marine environment of Kaneohe Bay. This involved a variety of factors related directly and indirectly to waters and biota of the Kaneohe Bay area. These included the meteorology, geology, demography,

waste disposal, etc. of the Kaneohe Bay watershed. It was recognized that it would never be possible to compile all the available information in a single publication, both from a standpoint of our inability to locate all existing references, and the realization that new information was being continuously generated.

We are quite surprised to find the quantity of valuable material that was available, particularly in the form of unpublished reports and notes. A sizable body of data was contained in such things as student reports for courses in marine ecology; much of this was filed away by the professors involved and in most cases was generally unavailable to other research workers. There was also a good deal of material in the form of historical papers, descriptions from early journals as well as in the maps, charts, and early photographs found in the files of the archives, local engineering firms and in the City and County and State government offices.

Such a compilation as this could not be possible without the cooperation of a large number of people and institutions. We were extremely gratified at the willingness of these institutions to aid us in this important project. It would be impossible to recognize all of those who directed their efforts towards this project, however we would like to acknowledge the principal agencies and persons involved and thank them for their assistance:

Vernon Brock	Director, Hawaii Institute of Marine Biology, Univ. of Hawaii
Albert H. Banner	Dept. of Zoology, Univ. of Hawaii
Doak C. Cox	Water Resources Research Center, Univ. of Hawaii
Keith E. Chave	Dept. of Oceanography, Univ. of Hawaii
Robert I. Clutter	Dept. of Oceanography, Univ. of Hawaii
Maxwell S. Doty	Dept. of Botany, Univ. of Hawaii

Thomas Ebert	Dept. of Zoology, Univ. of Hawaii
William A. Gosline	Dept. of Zoology, Univ. of Hawaii
E. Alison Kay	Dept. of General Sciences, Univ. of Hawaii
Ralph Moberly Jr.	Dept. of Geology, Univ. of Hawaii
Garth I. Murphy	Dept. of Oceanography, Univ. of Hawaii
Ernst S. Reese	Dept. of Zoology, Univ. of Hawaii
Kenneth J. Roy	Dept. of Oceanography, Univ. of Hawaii
Stephen V. Smith	Dept. of Oceanography, Univ. of Hawaii
Albert L. Tester	Dept. of Zoology, Univ. of Hawaii
Sidney J. Townsley	Dept. of Zoology, Univ. of Hawaii
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Gerald S. Key	Dept. of Zoology, Univ. of Hawaii
James E. Maragos	Dept. of Oceanography, Univ. of Hawaii
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Aprilany Soegiarto	Dept. of Botany, Univ. of Hawaii
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Willima P. Enriques	Planning Dept., City and County of Honolulu
Evan Evans	U.S. Naval Undersea Research and Development Center, Kaneohe MCAS

Joan Hirai	Hawaiian Division, U.S. Geological Survey, Honolulu
Karl Keller	Chief, Coastal Engineering Section, U.S. Army Engineers, Fort Armstrong
Richard Lum	Board of Water Supply, City and County of Honolulu
James Marsh	Dept. of Environmental Sciences and Engineering, Univ. of North Carolina
Robert C. Munson	Environmental Sciences Services Administration, Honolulu
Saul Price	Weather Bureau Regional Office, U.S. Dept. of Commerce
Walter Quisenberry	Dept. of Health, State of Hawaii
Henry Sakuda	Division of Fish and Game, Dept. of Land and Natural Resources, Honolulu
Gordon Senner	Belt-Collins Associates, Honolulu
M. Tagomori	State Division of Water and Land Development, Honolulu
Michio Takata	Division of Fish and Game, Dept. of Land and Natural Resources, Honolulu
Margaret Titcomb	Librarian, Bernice P. Bishop Museum, Honolulu
Richard Towill	R. W. Towill Corporation, Honolulu
Robert R. Way	Planning Dept. City and County of Honolulu
E. C. Wilder Jr.	State Survey Office, Honolulu

Bernice P. Bishop Museum Library, Honolulu

Gregg M. Sinclair Library, Univ. of Hawaii

Hamilton Library, Univ. of Hawaii

Hawaii Historical Society Library, Honolulu

Hawaii Institute of Geophysics Library, Univ. of Hawaii

Hawaii State Library, Honolulu

Hawaiian Mission Children's Society Library, Honolulu

Municipal Reference Library, City Hall, Honolulu

This compilation of references is arranged according to subject and to author. A companion volume to this (H.I.M.B. Technical Report No. 21) is a catalog of species recorded in Kaneohe Bay to be used in cross-reference with this volume.

It is hoped that this compilation will be recognized as an incomplete document and that it will stimulate those who have pertinent information to direct it to us so that a revised version may be published in the future. It is also our desire to maintain a complete file of documents listed herein in our library at H.I.M.B. on Coconut Island for the use of interested individuals.

A project such as this has taken on added importance in recent years with the apparent degradation of the quality of our environment. Kaneohe Bay is one of the prime beauty spots in the Hawaiian Islands and its esthetic, recreation and scientific values have long been recognized. With these values being threatened, a great deal of attention is now being directed towards preservation of the bay. This coupled with the general increase in interest in the local marine environment by students, scientists, and laymen has given this work added importance.

It is hoped that this publication will be considered as an interim report in a continuing program, and that persons possessing information not included herein will contribute it to a future revision.



## SOURCE OF MATERIAL-ABBREVIATIONS

BCA	Belt-Collins Associates 1402 Kapiolani Bl., Honolulu
BPBM	Bernice P. Bishop Museum 1355 Kalihi Street, Honolulu
BWS	Board of Water Supply City and County of Honolulu 630 S. Bertania Street, Honolulu
DPH	Department of Public Health State of Hawaii 1250 Punchbowl Street, Honolulu
DWLD	Department of Land and Natural Resources Water and Land Development Division 465 S. King Street, Honolulu
ESSA	Environmental Science Services Administration 1149 Bethel St., Honolulu
HHS	Hawaii Historical Society 553 S. King Street, Honolulu
HIG	Hawaii Institute of Geophysics University of Hawaii 2525 Correa Road, Honolulu
HIMB	Hawaii Institute of Marine Biology University of Hawaii Coconut Island, Kaneohe
HMCS	Hawaii Mission Children's Society 553 S. King Street, Honolulu
L	Library
MRL	Municipal Reference Library City Hall, Honolulu
USC&GS	United States Coast & Geodetic Survey 1149 Bethel Street, Honolulu
USGS	United States Geological Survey 1100 Ward Ave., Honolulu
WRRC	Water Resources Research Center University of Hawaii 2610 Pope Road, Honolulu
Zool. D., Zool. Dept., or Zoology Dept.	Chairman's Office, Zoology Department University of Hawaii 2538 The Mall, Honolulu

ARCHAEOLOGY

ALEXANDER, W. D. 1903

Hawaiian Geographic Names

Treasury Dept. - U. S. Coast & Geodetic Survey, Appendix No. 7 - Report for 1902

publ.

Sinclair L.

A collection of the geographic names of the eight major Hawaiian Islands for the districts, the channels, the bays, and harbors, the capes and points, the rivers and streams, the ponds, the elevations, the lands and towns, villages and hamlets. The author has also made an attempt to translate the Hawaiian names into English. "Kaneohe" is translated to mean "bamboo cane".

BRYAN, E. H.

Personal notes on Mokolii Island, Oahu

Mimeography copy

unpubl.

Bryan

A one-page resume of notes on Mokolii Island, situated 470 yards east of Kualoa Point in Kaneohe Bay. The island's morphology, geology ('a typical stack'), flora and archaeological significance are discussed. According to the author, the most detailed map of the island is in the Waikane quadrangle of the U. S. Army Engineers Terrain map (1:20,000) for "official use only".

BUCK, P. H. 1957

Arts and Crafts of Hawaii

Bishop Museum Special Publ. No. 45: 606 pp.

publ.

BPBM

An extensive work by the late director of the Bishop Museum, compiling information on the arts and crafts of Hawaii in such areas as food, houses, plaiting, twined baskets, clothing, canoes, fishing, games and recreation,

musical instruments, war and weapons, and religion. On pages 570 and 571, mention is made of the burial sites on the Mokapu Peninsula.

McALLISTER, J. G. 1933  
Archaeology of Oahu  
B. P. Bishop Museum Bulletin 104  
publ.  
BPBM

An archaeological survey of Oahu conducted during nine months of 1930.

Sites have been located, mapped and described and legendary references from informants and literary sources have been included for some of the sites.

Archaeological sites in Kaneohe Bay - Kailua area are sites 321-371. The fish ponds are as follows:

Site 351 - three adjacent fish ponds located off the lands of Mikiola and Mahinui in Kaneohe. The author suggests that the two end ponds were built first and the middle pond was added later to take advantage of the walls of the other two ponds. Mikiola (western pond) and Kaluoa (middle pond) are filled, while Mahinui (eastern pond) is partially filled at present. The Mahinui Stream which fed these ponds is under the present road and has been capped for many years.

Site 349 - Waikalua Fish Pond adjacent to Waikalua. The author notes that the rebuilding of this pond has been completed. The wall was 1420 feet long of water-worn basalt and 3 to 4 feet high but somewhat wider and covered an area of 11 acres.

Site 361 - Keaalau Fish Pond adjacent to Keaalau, Kaneohe. This pond covered an area of 3 acres.

Site 362 - Hanalua Fish Pond takes its name from the adjacent land. It is a small pond covering a few acres and marks off an inlet.

Site 363 - Papaa Fish Pond, named for the adjacent land. This was a small pond.

Site 364c- Hakekou Pond . a pond of 92 acres separated from Kaneohe Bay by a long wall.

Site 364b- Nuupia Pond . a pond covering 215 acres separated from Kaneohe Bay by a long wall.

STERLING, E. P. and C. C. SUMMERS 1962  
 Sites of Oahu  
 Book V, Volumes 1 and 2 - District of Koolaupoko  
 unpubl.  
 B.P.B.M.

A compilation of the pre-European information available on the archaeological sites on the island of Oahu. In addition to locating the sites, the material also contains history, tradition, legends, place names and land descriptions of the sites. These notes were gathered from published and unpublished sources as well as from informants. The Koolaupoko district includes the area from the point of Ka'o-io to Kanau - Kualoa, Hakipuu, Waikane, Waiahole, Kaalaea, Waihee, Kahaluu, Heeia, Kaneohe, Kailua and Waimanalo. There are 233 sites between Kualoa and Kailua, in the Kaneohe Bay watershed area.

SUMMERS, C. C. 1964  
 Hawaiian Fish Ponds  
 B. P. Bishop Museum Special Publication No. 52, 26 pp.  
 publ.  
 B.P.B.M.

A study concerned with the construction and operation of fish ponds in the Hawaiian Islands as they existed before the introduction of foreign materials to the Hawaiian culture. Research is concentrated on Oahu and Molokai where the majority of ponds were located. Several shore ponds were built on the shores of Kaneohe Bay and some are still in use today.

BIBLIOGRAPHIES

DEPT. LAND AND NATURAL RESOURCES 1969  
 List of Publications  
 State of Hawaii  
 publ.  
 HIMB

A complete list of publications up to May 1969 published by the Hawaii Division of Hydrography, the Hawaii Irrigation Authority, the Hawaii Water Authority and finally their successor, the Division of Water and Land Development in the State Department of Land and Natural Resources. The listing includes sixteen Bulletins, thirty-two Reports, and fifty-four Circulars.

DEPT. PLANNING AND ECONOMIC RESOURCES 1959  
 Directory of Hawaii's Educational Resources  
 State of Hawaii  
 publ.  
 HIMB

A booklet prepared under the joint auspices of the State Dept. Education, the State Dept. Planning and Economic Development and the University which summarizes some of the available information on education in the State of Hawaii. Information on attendance records and curriculums is gathered from private and public high schools, community colleges and the University and other colleges in the State of Hawaii. Schools in Kaneohe area included in this report are Castle High and Intermediate School, St. Ann's High School and St. Stephens Seminary.

DEPT. PLANNING AND ECONOMIC DEVELOPMENT 1967  
 Hawaii State Research Inventory, 1961-1966  
 State of Hawaii  
 publ.  
 HIMB

A bibliographic list of all research projects completed and/or published by or for the State of Hawaii between July 1, 1961 and December 31, 1966, or in

progress as of January 1, 1967. The report was prepared in response to House Resolution 147 of the 1965 Legislature and adopted on April 9, 1965. Publications were submitted by the Dept. Accounting and General Services; Dept. Agriculture; Dept. Budget and Finance; Dept. Defense; Dept. Education; Dept. Hawaiian Home Lands; Dept. Health; Dept. Labor and Industrial Relations; Dept. Land and Natural Resources; Dept. Personnel Services; Dept. Planning and Economic Development; Dept. Regulatory Agencies; Dept. Social Services; Dept. Taxation; Dept. Transportation and the University of Hawaii.

DEPT. PLANNING AND ECONOMIC DEVELOPMENT 1968  
Hawaii State Research Inventory, 1967  
State of Hawaii  
publ.  
HIMB

A bibliographic list of all research reports completed and/or published by or for the State of Hawaii between January 1, 1967 and December 31, 1967 or in progress as of January 1, 1968. The report was prepared in response to House Resolution 147 of the 1965 Legislature adopted on April 9, 1965. Publications were submitted by the Dept. Agriculture; Dept. Attorney General; Dept. Budget and Finance; Dept. Defense; Dept. Education; Dept. Hawaiian Home Lands; Dept. Health; Dept. Labor and Industrial Relations; Office of the Lieutenant Governor; Dept. Personnel Services; Dept. Planning and Economic Development; Dept. Regulatory Agencies; Dept. Social Services; Dept. Taxation; Dept. Transportation; and the University of Hawaii.

HASKELL, D. C. 1942  
The United States Exploring Expedition, 1838-1842, and its publications, 1844-1874  
publ. New York Public Library, New York, 1942, 188 pp.  
publ.  
Sinclair L.

A bibliography of the U. S. Exploring Expedition under the commandship of Charles Wilkes compiled by D. C. Haskell, bibliographer of the New York

Public Library with an introductory note by H. M. Lydemberg, former Director of the Library. The sole reference to Kaneohe Bay is to the chart of Kaneohe Harbor charted by Wilkes. The chart is in the second volume of the Atlas of Charts in the twenty-third volume (Hydrography) of the Expedition Publications.

HAWAII STATE LIBRARY  
Hawaii Documents  
Department of Education, State of Hawaii  
publ.  
HIMB

A bi-month publication of the Hawaii State Library compiling all publications from all state offices, including the University. Volume one was printed in 1967. Each year ends with an annual compilation of titles. The documents are available for reference use at the county library depositories at the Hawaii State Library, Honolulu; Hawaii Public Library, Hilo; Kahului Library, Maui; and Kauai Public Library, Lihue. Inter-library loans are handled by the Hawaii State publications distribution center, Hawaii State Library, 478 King Street, Honolulu, Hawaii 96813. HIMB is on the mailing list for this publication.

LAND STUDY BUREAU 1969  
Annotated Bibliography of Reports and Other Land Fact Data  
State of Hawaii, University of Hawaii  
publ.  
HIMB

A complete listing of the publications of the Land Study Bureau including their circulars, special reports, miscellaneous reports, technical papers and bulletins of land facts maps.

MURDOCH, C. G. and M. GOTANDA  
 Basic Hawaiiana  
 State of Hawaii, Hawaii State Library  
 publ.  
 HIMB

An annotated bibliography of some 400 titles representing the core of the most important printed materials on Hawaii. The selection was made from the holdings of the Hawaii State Library's Hawaii and Pacific Collection. The list contains a number of out of print titles which are still available occasionally from dealers and private collectors. Due to current interest in Hawaiiana, some of these titles are being reprinted and these are noted here.

RICHARDS, H. G. and R. W. FAIRBRIDGE 1965  
 Annotated Bibliography of Quaternary Shorelines (1945-1964)  
 Acad. Nat. Sci. Special Publ. No. 6, Phil., Penn.  
 publ.  
 Chave

A bibliographic list of some 2400 articles intending to cover the work on quaternary shorelines published in the twenty-five year period from 1945 to 1964. Numerous articles prepared for publishing in 1964 were omitted as they were not available by the time this volume went to press. Work concerning Kaneohe Bay done by Stearns, Emery and Cox is listed on pp. 238-247.

STEARNS, N. D. 1935  
 Annotated Bibliography and Index of Geology and Water Supply of the Island of Oahu, Hawaii  
 publ.  
 Bryan

A bibliography of 436 titles relating to the geomorphology, geology and water resources of Oahu to the date of compilation. In addition, there are included pertinent annotations of certain phases of botany, climate, soil and geography. Some of the titles refer either directly or indirectly to Kaneohe Bay.



TSUDA, R. T. 1966  
 Preliminary Bibliography on the Marine Benthic Algae in the Central Pacific,  
 Polynesia and Micronesia  
 Hawaii Institute of Marine Biology, Technical Report No. 10  
 publ.  
 HIMB

Bibliography of marine benthic algae from various islands in the Central Pacific, including the Hawaiian Islands. Some of the titles refer indirectly to work done in Kaneohe Bay.

UNIVERSITY EXTENSION DIVISION  
 Bibliography of Hawaii Geology  
 State of Hawaii, University of Hawaii  
 mimeograph copy  
 HIMB

A bibliography of thirty-nine titles which is far from complete but includes only those publications which are readily available and which are not too specialized in interest.

UNIVERSITY OF HAWAII  
 Current Hawaiiana, Janet Bell, Editor  
 State of Hawaii  
 publ.  
 HIMB

A bibliographic listing of some 500 titles concerning current Hawaiiana compiled by the Hawaiian and Pacific Collection of the Gregg M. Sinclair Library, University of Hawaii in cooperation with the Hawaii Library Association. The list has been compiled from many sources and contains only what has been actually published--it does not include newspapers. When known, prices and distributing offices (if other than publishers) are included. The Library at HIMB is currently receiving this publication.

BIOLOGY

AGASSIZ, A. 1889

The Coral Reefs of the Hawaiian Islands

Bull. Mus. Comp. Zool., Harvard College 17(3): 121-170

publ.

BPBM

A recapitulation of the older theories of coral reef formation along with the author's own observations of the living and ancient Hawaiian coral reefs made during the winter of 1885. Discussion on the elevated reefs and sand beaches as well as the living coral reefs suggests that the Hawaiian Islands have not been uplifted more than 20-25 feet. The Kaneohe Bay reef is described along with the other fringing reefs of Oahu. The author mentions seeing "a few Gorgoniae" in Kaneohe Bay as well as some corals. British Admiralty Charts are included to show the position of the coral reefs on Oahu, including one bathymetric chart of Kaneohe Bay.

ALENDER, C. B. 1964

The Venom from the Heads of the Globiferous Pedicellariae of the Sea Urchin,

Tripneustes gratilla (Linnaeus)

Ph.D. Thesis - University of Hawaii

unpubl.

Sinclair L.

A study of the biochemical nature of the venom in the pedicellariae heads of the sea urchin, T. gratilla (Linnaeus), its extraction, partial purification, general chemical nature and physical properties. To determine the mode of action, techniques of physiology and pharmacology were applied from the standpoint of biological assay and pharmacodynamics. Venom from other sea urchin species was collected and compared with T. gratilla. The sea urchins were collected on the reef flats and slopes on the leeward side of Kapapa Island, Kaneohe Bay.

ALENDER, C. B., G. A. FEIGEN, and J. T. TOMITA 1965  
Isolation and Characterization of Sea Urchin Toxin  
Toxicon 3: 9-17  
HIMB Contribution No. 228  
publ.  
HIMB

An investigation isolating and characterizing the active material obtained from the globiferous pedicellariae of Tripneustes gratilla (Linnaeus) which were collected from the reef in Kaneohe Bay. The active sea urchin toxin is a non-dialyzable, thermolabile protein. It is pH-stable, almost completely soluble in distilled water and can be precipitated at relatively high potency in the presence of 2/3 saturated ammonium sulfate in a yield amounting to 26% of the dry weight of the starting material. The potency tends to decline slowly at -20°C with a half-life of approximately 3 years. Absorption peaks at 278 m $\mu$  and 323 m $\mu$  are reduced by maneuvers which remove inert materials. On the basis of ultra-centrifugation, the most active fraction which has about 60% of the lethal toxicity of the parent material, appears to be a single molecular species having a sedimentation coefficient of 2.6 Svedberg units at 20°C.

ARMY CORPS OF ENGINEERS  
U. S. Army - Fort Armstrong, Honolulu  
unpubl.  
HIMB

A compilation of all the permits issued by the Honolulu Division of the U. S. Army Corps of Engineers for dredging and construction in Kaneohe Bay. Data are given on the amount of material dredged and in most cases, where the material was dumped.

## ARMY CORPS OF ENGINEERS

U. S. Army - Fort Armstrong, Honolulu 1970

unpubl.

HIMB

A copy of the report on the Survey of Explosive Anchorages on Coastal Waters in the State of Hawaii constructed by the Honolulu Division of the U. S. Army Corps of Engineers.

## ARMY CORPS OF ENGINEERS

U. S. Army - Fort Armstrong, Honolulu 1970

unpubl.

HIMB

A copy of the data on the Federally authorized small boat harbor project at Heeia Kea conducted by the Honolulu Division of the U. S. Army Corps of Engineers.

AVERY, D. E., D. C. COX and T. LAEVASTU 1963

Currents Around the Hawaiian Islands (A Study of the Coastal Currents in Respect to Sewage Disposal)

H.I.G. Report No. 26: 22 pp.

publ.

HIG L.

A study investigating the factors affecting the dispersal and transport of waste in coastal areas around the Hawaiian Islands. Description of currents, especially around Oahu are given with a co-tidal chart for high tide. The study was also aimed at investigating the factors which determined the selection of disposal sites and which determined the periodicity and manner of disposal. Pollution of coastal marine life was also considered. A great deal of the work was done in Kaneohe Bay--the current patterns and chemical data for the Bay are included in the report.

BACHMAN, R. 1963

Fluctuations and Trends in the Abundance of Nehu (Stolephorus purpureus Fowler) as Determined from Catch Statistics

MSC Thesis - University of Hawaii, 100 pp.

unpubl.

Sinclair L.

The catch reports from 1948 to 1960 for the tuna fleet fishing in Kaneohe Bay and Maalaea Bay were used to compile the statistics for this study. An estimate of the relative abundance within each area was derived from the "link-chain-relative" method which was considered to be a better measure of centralized tendencies than the arithmetic mean based on catch per unit effort. The relationship between nehu and tuna abundance and that between effort expended to catch nehu and tuna were examined to determine whether either fishery had an effect on the other.

BALDWIN, W. J. 1967

Tentative List of Fishes of Kaneohe Bay and Tributaries

Field Notes and Work List

unpubl.

Baldwin

A list of 71 families and 211 species found in the waters of Kaneohe Bay and its tributaries from October 5, 1967 to the summer of 1970. A continuing study.

BALL, G. H. 1963

Cephaloidophora carpilodei n. sp. and C. pinguis n. sp., Gregarines of a Xanthid Crab in Hawaii

J. Protozoology 10(3): 321-327

HIMB Contribution No. 182

publ.

HIMB

A descriptive study of two new species of gregarines collected from a xanthid crab, Carpilodes rugatus, found on Coconut Island, Kaneohe Bay. The hosts were examined live and the infected portions of gut were fixed in Bouin-Duboscq fluid while the contents of the gut were smeared on cover slips and

fixed with Schaudinns fluid at 50-60°C. Sections of the digestive tract were 7  $\mu$  thick and stained in Delafield's haematoxylin and eosin.

BANNER, A. H. 1940  
The Hawaiian Crustacea of the Family Crangonidae  
MSc. Thesis, University of Hawaii, 147 pp., 21 Pls.  
unpubl.  
Sinclair L.

A study of the family Crangonidae found in the Hawaiian Islands. Of the eighteen genera in the family, only 4 are found in Hawaii: Crangon having 21 species; Synalpheus having 5 species; Alpheopsis having 1; and Jouseaumea having 2 species. The author reviews the systematics of each of the Hawaiian species.

BANNER, A. H. 1953  
The Crangonidea or Snapping Shrimp of Hawaii  
Pacific Science 7(1): 3-144  
publ.  
HIMB

A study of the crangonid fauna of the Hawaiian Islands. Nine species are listed from Kaneohe Bay. See species list, HIMB Technical Report No. 21.

BANNER, A. H. 1959  
Contributions to the Knowledge of the Alpheid Shrimp of the Pacific Ocean  
Part IV. Various Small Collections from the Central Pacific Area Including  
Supplementary Notes on Alpheids from Hawaii  
Pacific Science 13: 130-155  
HIMB Contribution No. 111  
publ.  
HIMB

Descriptions of specimens from various collections, those specimens reported from Kaneohe Bay include:

Alpheus lanceleti Coutière-Ahoolaka (Sand Island), Kaneohe Bay.

Collected from silty sand flats at tide level by A. H. Banner, max. length 20 mm.

Alpheus rapax Fabricus-Kaneohe Bay in shallow burrows on inshore mud flats in the intertidal zone. Also found in the intertidal zone on Ahoolaka (Sand Island) in Kaneohe Bay by A. H. Banner, 1955, 1956.

Alpheus platyunguiculatus (Banner) - collected from silt-buried coral heads in intertidal mud flats behind the shoreward reefs of Kaneohe Bay by A. H. Banner, max. length 34 mm.

BANNER, A. H. 1959  
A Dermatitus-Producing Alga in Hawaii  
Hawaii Medical Journal 19: 35-36  
HIMB Contribution No. 118  
publ.  
HIMB

A study of the distribution and toxicity of the blue-green alga, Lyngbya majuscula Gomont conducted at the Hawaii Marine Laboratory, Kaneohe Bay. This alga is found on many beaches in Oahu, Molokai and Kauai although it is not toxic in all areas--Kaneohe Bay and Hanauma Bay have non-toxic strains of L. majuscula.

BANNER, A. H. 1968  
A Fresh Water 'Kill' on the Coral Reefs of Hawaii  
University of Hawaii - Institute of Marine Biology Technical Report  
No. 15: 29 p.  
publ.  
HIMB

A study of the effects of a fresh water kill of organisms on the reefs and shorelines of Kaneohe Bay caused by the heavy rainfall on May 2-8, 1965. The author describes the hydrography of the bay and includes a description of the storm by G. P. Ingwersen, Lt. Col., Corps of Engineers. Biological observations of the animals before and after the rainfall were made by the author and numerous people working at the Hawaii Marine Laboratory on Coconut Island.

BARNARD, J. L. 1955

Gammaridean Amphipoda (Crustacea) in the Collections of the Bishop Museum  
B. P. Bishop Museum Bull, 215: 46 pp.

publ.

B.P.B.M.

Sinclair L.

A taxonomic study of the gammaridean amphipod collection in the Bishop Museum.

Kaneohe Bay is the type locality for one species, Photia hawaiiensis nov. sp.

BARRY, C. K. 1965

Ecological Study of the Decapod Crustaceans Commensal with the Branching  
Coral, Pocillopora meandrina var, nobilis

MSc Thesis, University of Hawaii

unpubl.

Zool. D.

A study in which an attempt was made to determine the factors imposed by the host limiting its decapod crustacean community. The host coral was viewed as a microhabitat which is both a biotic and a physical component of the symbiont's environment, thus both the physical and biotic roles of the coral were considered. Intra and inter-specific interactions of the symbionts were also considered. The coral head communities were studied on five patch reefs on the north side of the Sampan Channel in Kaneohe Bay.

Results showed that the differences among coral heads are mainly quantitative and that the coral head microhabitat is qualitatively uniform. The species composition of the community in P. meandrina is relatively constant-- a total of 11 obligate decapod crustacean commensals are found with 4 ubiquitous species. The biomass, numerical composition and species diversity of the community varies with the size of the coral head. Food is supplied by the coral head to its commensals. The decapod community is probably limited by the amount of subsurface area available in the coral head. The exact composition of the community is most likely dependent on intra and inter-specific interactions of the symbionts.



BAXTER, J. W. 1963

The Effect of Current and Depth on Growth Form of Montipora verrucosa at Coconut Island and Hanauma Bay  
Student Report, Marine Ecology 620  
unpubl.  
Reese

A study of the effects of current and depth on the growth form of Montipora verrucosa. Coconut Island was chosen as an area of slight and variable currents and of sufficient depth while Hanauma Bay was chosen because of its relatively fast currents, considerable depth and wave action.

Results showed a progressive branching and enlargement of coral masses as the depth increased.

BELDIA, M. 1964

The Effect of Temperature Changes on the Rate of Water Propulsion in an Ascidian, Ascidia interrupta Heller  
Student Report, Marine Ecology 620  
unpubl.  
Reese

A series of experiments on the rate of water propulsion in Ascidia interrupta Heller and the effects of temperature changes on this rate. The ascidians were collected in February-March, 1964 in Kaneohe Bay.

Results showed that the rate of water propulsion remained normal with an optimum range of temperature but increases or decreases significantly at extreme limits to which the animals are not physiologically adapted.

BELMONT, J. 1964

The Salinity Tolerances of Two Shrimps, the Atyidae and the Palaemonidae  
Student Report, Marine Ecology 620  
unpubl.  
Reese

A study done in partnership with J. Hiatt on the salinity tolerances of two species of shrimps and to relate the findings to their environment. For more information see Hiatt, J., 1964.

BERGQUIST, P. R. 1967  
 Additions to the Sponge Fauna of the Hawaiian Islands  
 Micronesica, J. College of Guam 3(2): 159-174  
 publ.  
 Sinclair L.

A study dealing with descriptions of fifteen sponges from the Hawaiian Islands, two of which were previously recorded, the remainder are new. Two sponges, Psammophysilla purpurea (Carter) and Clatharia procerata (Ridley) have only been found in Kaneohe Bay and no where else in the Hawaiian Islands.

BERN, H. A. and N. TAKASUGI 1962  
 The Caudal Neurosecretory System of Fishes  
 Gen. and Comp. Endocrinology 2: 96-110  
 HIMB Contribution No. 160  
 publ.  
 HIMB

A histochemical study of the caudal neurosecretory system of the fish, Tilapia mossambica. Collection of the material and preliminary work were conducted at the Hawaii Marine Laboratory, Kaneohe Bay.

BERRILL, M. 1964  
 A Comparison of the Habituation Capabilities of the Nudibranch, Placchobranthus and the Tectibranch, Aplysia  
 Student Report, Zoology 606  
 unpubl.  
 Reese

A study of the habituation capabilities of two species, Placchobranthus and Aplysia, to mechanical stimuli and a possible explanation of the differences in their capabilities based on their behavior and ecology. The animals were collected from the north end of Coconut Island.

Both animals showed habituation to mechanical stimuli. The memory spans differed, Aplysia 'forgot' previous stimulation in a minute while Placobranthus 'forgot' in 5 minutes.

BERRILL, M. 1965  
 Rhythms in Opheodesoma spectabilis  
 Student Report, Zoology 606  
 unpubl.  
 Reese

A study of the daily activity rhythms of the holothurian, O. spectabilis.  
 The animals were studied in their natural habitat on the reefs surrounding  
 Coconut Island, Kaneohe Bay. The rhythms observed were the body wall  
 peristalsis, the tentacle feeding, the body contractions and extensions as  
 well as the general activity. The author also discusses the association of  
 this holothurian with the brown alga, Sargassum echinocarpum.

BERRILL, M. 1965  
 The Ethology of the Synaptid Holothurian, Opheodesoma spectabilis Fisher  
 MSc.Thesis, University of Hawaii  
 unpubl.  
 Helfrich

A study investigating the activities and reactions of the holothurian,  
O. spectabilis, in both the laboratory and in its endemic natural habitat of  
 Kaneohe Bay. The author discusses the habitat, distribution and anatomy of  
 the holothurian and then presents an analysis of the animal's behavior with  
 emphasis on orientation, activities and the diurnal rhythm of some behaviors  
 as well as their affinity to the brown alga Sargassum echinocarpum.

BERRILL, M. 1966  
 The Ethology of the Synaptid Holothurian, Opheodesoma spectabilis  
 Can. J. Zoology 44: 457-482  
 HIMB Contribution 240  
 publ.  
 HIMB

A study of the activities and the orientation of O. spectabilis to various  
 stimuli conducted both in the laboratory and in their natural habitat of  
 Coconut Island, Kaneohe Bay,

BOHM, A. 1931  
 Distribution and Variability of Ceratium in the Northern and Western  
 Pacific  
 B. P. Bishop Museum Bull. 87; 1-46  
 publ.  
 HIMB

A paper presenting the results of a plankton study collected by Dr. V. Pietschmann (1927-1928) during the course of a journey from Honolulu to Yokohama, Moji, Shanghai, Hong Kong and Singapore. The material was obtained by using the ship's pump for two or more hours at a time and then it was filtered through nets. The distribution of Ceratium sp. was studied and the variation was studied by observing those characters which showed themselves to be relatively constant, i.e., transdiameter, total length and expanse of horns. A sample from Nuupia fish pond, Kaneohe Bay, contained only two specimens of Ceratium furca and two of Ceratium fuscus (p. 7).

BOROUGHES, H., S. J. TOWNSLEY and R. W. HIATT 1956  
 The Metabolism of Radionuclides by Marine Organisms  
 I. The Uptake, Accumulation and Loss of Strontium by Fishes  
 Biol. Bull. III(3): 336-351  
 HIMB Contribution No. 82  
 publ.  
 HIMB

A study conducted at the Hawaii Marine Laboratory, Kaneohe Bay, measuring the uptake, accumulation and loss of radiostrontium by the various tissues and organs of fish from three trophic levels:

Fourth Trophic Level - Euthynnus yiato, black skipjack  
Neothunnus macropterus, yellowfin tuna  
Coryphaena hippurus, dolphin

Third Trophic Level - Carangoides ajax, papio caught in Kaneohe Bay  
Kuhlia sandvicensis, aholehole caught in Kaneohe Bay

Second Trophic Level - Tilapia mossambica

The inter-relationships of these trophic levels to the passage of the isotope by way of the food chain was also discussed. Pelagic fishes were

shown to excrete the ingested isotope within a few hours, although various tissues retained varying amounts of residual isotope. Tilapia mossambica excreted the isotope much more slowly and most of the radioactivity was found in the structural tissues. The retention of radioactivity in various organs and tissues of the different fishes is discussed in relation to their habitat.

BOROUGHES, H., S. J. TOWNSLEY and R. W. HIATT 1956  
 The Metabolism of Radionuclides by Marine Organisms  
 II. The Uptake, Accumulation and Loss of yttrium by Marine Fish and the  
 Importance of Short-Lived Radionuclides in the Sea  
 Biol. Bull. III(3): 352-357  
 HIMB Contribution 83  
 publ.  
 HIMB

A study conducted at the Hawaii Marine Laboratory, Kaneohe Bay, to determine the metabolism of yttrium by the fish, Tilapia. Although yttrium is closely related to strontium, only 2% of the ingested dose of yttrium remains after 2 days which is very much less than a similar dose of strontium. The distribution of the remaining ingested isotopes also differs widely.

BOROUGHES, H., S. J. TOWNSLEY and R. W. HIATT 1957  
 The Metabolism of Radionuclides by Marine Organisms  
 III. The Uptake of Calcium<sup>45</sup> in Solution by Marine Fish  
 Limnology and Oceanography II(1): 28-32  
 HIMB Contribution 84  
 publ.  
 HIMB

A study conducted at the Hawaii Marine Laboratory, Kaneohe Bay, using Tilapia mossambica to determine whether marine fish required calcium in their diets or whether they could take up an adequate amount of calcium from the seawater.

This study showed that marine fishes can take up calcium directly from seawater, and do not need a dietary source for this element. In comparison with a similar experiment using radiostrontium, it was found that marine fishes discriminate against strontium in favor of calcium.

BOROUGHES, H., S. J. TOWNSELY and W. EGO 1958  
 The Accumulation of  $Y^{90}$  from an Equilibrium of  $Sr^{90}-Y^{90}$  by Artemia salina  
 (L.)  
 Limnology and Oceanography 3(4): 413-417  
 HIMB Contribution 102  
 publ.  
 HIMB

A study conducted at the Hawaii Marine Laboratory, Kaneohe Bay, using Artemia salina as a representative from the second trophic level, to determine the process of transfer of radionuclides through a marine food chain.

Results showed that Artemia discriminated against the long-lived  $Sr^{90}$  in preference for the short-lived  $Y^{90}$ . It is possible that through such fractionation the more hazardous  $Sr^{90}$  may be lost by the time higher trophic levels are reached, although some organisms may concentrate strontium almost exclusively from an equilibrium mixture.

BOROUGHES, H. and D. F. REID 1958  
 The Role of the Blood in the Transportation of Strontium<sup>90</sup>-yttrium<sup>90</sup> in  
 the Teleost Fish  
 Biol. Bull. 115(1): 64-73  
 HIMB Contribution No. 108  
 publ.  
 HIMB

A study conducted at Coconut Island, Kaneohe Bay, on certain aspects of the transportation of the radioactive isotope, strontium<sup>90</sup>-yttrium<sup>90</sup>, in the blood of the teleost fish, Tilapia mossambica. The  $Sr^{90}-Y^{90}$  dose was injected into the ventricle of the heart and at a series of predetermined times, as much blood as possible was withdrawn through the kidney sinus. Radioactivity of the plasma and the cells was monitored. Separate organs and tissues were ashed and their radioactivity was also monitored.

Results showed that the  $Sr^{90}-Y^{90}$  disappeared rapidly from the blood. This disappearance depended on more than one process. Almost all of the  $Sr^{90}$

in whole blood was carried by the plasma; very little was found in either the cells or the cell walls. Yttrium<sup>90</sup> was present in the stroma. Vascularized tissues were shown to have a greater avidity for Y<sup>90</sup> than for Sr<sup>90</sup>.

BOSCH, H. F. 1965  
 A Gastropod Parasitic on Solitary Corals in Hawaii  
 Pacific Science 19(2): 267-268  
 H.M.L. Contribution No. 221  
 publ.  
 Sinclair L.

A study of the relationship between the wendletrap gastropod, Epitonium ulu Pilsbry and the solitary coral, Fungia scutaria Lamarck collected in Kaneohe Bay. The author feels that this relationship might be correlated with the breeding cycle of the snails and is probably only intermittent or temporary.

BORCH, H. F. 1967  
 Growth Rate of Fungia scutaria in Kaneohe Bay, Oahu  
 MSc. Thesis, University of Hawaii  
 unpubl.  
 Sinclair L.

A study on the annual growth rate of the solitary coral, F. scutaria, by observing increases in skeletal length and width during a period 1963-1964. Measurements were made in situ in Kaneohe Bay. Estimates of growth, made on the basis of large sampling, were used to assess the effects of the environment upon variations in growth rate. The environmental effects were substratum, waves and currents, siltation, other physical and chemical factors, biotic factors, population density and local distribution patterns.

BOYLAN, D. B. 1966

The Chemical Nature of the Toxic Secretions of the Boxfish (Ostracion lentiginosus Schneider)

Ph.D. Degree, University of Hawaii

publ.

Sinclair L.

A chemical investigation of the pure toxic component isolated from the crude secretions of the boxfish, O. lentiginosus. The synthesis of the toxic principle was attempted in an effort to elucidate the mechanism of biological action. The boxfish were caught off Waikiki and Kaneohe Bay reefs.

BOWERS, R. L. 1965

Observations on the Orientation and Feeding Behavior of Barnacles Associated with Lobsters

MSc.Thesis Plan B. Zoology, University of Hawaii

unpubl.

Zool. D.

A two part study: 1) A study in which the orientation of Balanus trigonus on a single specimen of Panulirus japonicus was measured using a previously published method. Barnacles on various areas of the lobster's carapace were measured and an attempt was made to correlate the results with the results of previous workers and the general habitat of the lobster.

The lobster was collected at Coconut Island, Kaneohe Bay, with the adhering organisms: Balanus trigonus, Chelonibia patula, Sagartia longa, and Hydroides norvegica. 2) A study of the orientation of the barnacle, Trilasmis (Temnaspis) fissum hawaiense (Pilsbry) epizoic on the lobsters, Panulirus japonicus (DeSiebold) and Panulirus penicillatus (Oliver) involving orientation to jets of seawater and to jets of seawater and lobster meat juice. Observations were also made on the feeding behavior of the barnacle. Species epizoic on the lobsters: Balanus trigonus (Darwin), Chelonibia patula (Ranzani), Trilasmis (Temnaspis) fissum hawaiense (Pilsbry), Octolasmis (Octolasmis) lavei (Darwin), and Paralepas palinuri urae (Newman).



BOWERS, R. and K. BRIDGES 1963  
The Distribution of Fungia scutaria from Four Reef Areas of Different  
Degrees of Exposure at Coconut Island  
Student Report, Zoology 620  
unpubl.  
Reese

A study determining the distribution of F. scutaria in reef areas of different degrees of exposure at Coconut Island. Transects were made over the reef in four areas around the island and the corals were counted in such a way as to give a quantitative distribution relating to distance over the reef. It was found that the most probable limiting factor in the distribution of Fungia is silting, but the amount of wave action and substrate preference of the attached forms may also be of importance.

BRIDGES, K. W. 1967  
Aspects of the Feeding Dynamics of the Aholehole (Kuhlia sandvicensis)  
MSc. Thesis, University of Hawaii  
unpubl.  
Sinclair L.

A study investigating two aspects of the feeding dynamics of the aholehole: the relationship between the food, growth and metabolic requirements of the fish and the provision of a quantitative expression of the relationship between the food growth and metabolic requirements. The fish were caught by angling with live shrimp along the breakwater at the entrance to the Anchorage, Coconut Island, Kaneohe Bay.

The use of regression analysis on the data was shown to be the most complete description of the food and growth relationship. It was found that an increased level of swimming did increase the maintenance requirement of the fish but not the net efficiency. The maintenance requirement for a 63 gm aholehole was estimated to be .534 gm/day at zero activity and the cost of swimming at 4.5 in/sec was 41% of the total maintenance requirement.

Rate of weight loss of starving fish was shown to be related to the weight of the fish and this provided an estimate of the rate of metabolism. Weight loss values recorded during periods of activity compared favorably with oxygen consumption studies for the same levels of activity.

BROCK, R. E. and B. MACHADO 1967  
A Study of the Resistance to Desiccation in Relation to Habitat Among  
Three Hawaiian Crabs  
Student Report, Marine Ecology 620  
unpubl.  
Reese

A series of experiments designed to determine the ability of three species of crabs from three diverse habitats to withstand varying amounts of desiccation. Ocypode ceratophthalmus was collected from Sandy Beach, Grapsus grapsus was collected from the Blowhole and Thalamita integra was collected from Kaneohe Bay. Representatives of the three species were isolated under three conditions - 100% seawater, a 99% humidity atmosphere and a completely dry atmosphere, and the tolerances of the three species were compared.

It was concluded that none of the three species could be drowned; O. ceratophthalmus is the most land-adapted of the three; T. integra has more resistance to desiccation than G. grapsus despite the habitat and larger gill ratio; in extreme desiccation tests, there is a true correlation between specimen size and its ability to withstand desiccation; and that the habitat alone of the three crabs does not directly correlate with their ability to withstand desiccation.

BROCK, V. E. 1962

The Experimental Introduction of Certain Marine Fishes from the Society Islands to the Hawaiian Islands

Final Report, Economic Planning and Coordination Authority Grant No. 12 publ.

Helfrich

A final report of a study to selectively introduce some species of fish from the Society Islands into the Hawaiian Islands. This report deals with the preliminary studies of fish selection, transportation to the Hawaiian Islands, their release and finally cases of their recapture.

Records concerning Kaneohe Bay:

October 10, 1956. (Tarao) Epinephelus merra - 469 released from Coconut Island

October 10, 1956. (Toau) Lutrianus vaigiensis - 239 released from Tide House, Coconut Island

October 10, 1956. (Aaravi) Lethrinus meriatus - 3 released from Tide House, Coconut Island

BROWNSCOMBE, K. 1964

A Study of Sandy Intertidal Communities of Hawaii

Student Report, Marine Ecology

unpubl.

Reese

A study done in conjunction with R. Snider to study the communities and zonation of three relatively exposed sandy beaches on the Island of Oahu-- Coconut Island, Ala Moana, and Sandy Beach.

Shorelines were surveyed noting the height of the beach, samples were taken at 0-6", 6-12" and 12-18" deep, sieved and counted. Each beach was carefully described.

BROWNSCOMBE, A. K. 1966  
 An Ethological Study of the Shore Crab, Metapograpus messor (Forsk.)  
 in Oahu, Hawaiian Islands  
 MSc. Thesis, University of Hawaii  
 unpubl.  
 Sinclair L.

The behavior of the crab, M. messor, was studied from an ethological viewpoint, both in the laboratory and in the field. Cyclic effects of the environment on the crab behavior were investigated. Various areas around Oahu were studied, but the area of the concentrated population study was at Coconut Island in Kaneohe Bay where the population reaches its greatest density found on Oahu.

The behavioral repertoire of the crab appeared to consist of 28 discrete behavioral units--the feeding and locomotion behaviors are remarkably complex considering the simplicity of the central nervous system. Dominance hierarchies were not apparent in the field, but dominance according to sex and size was established in the laboratory under enforced crowding conditions. Cyclic fluctuations in environmental light intensity, tides, and temperature have a profound effect on producing periodic behavioral patterns in the crab. A diurnal rhythm was revealed from population numbers, feeding rate, number and percentage of animals feeding at hourly intervals and the distribution of activities. Melanophore expansion had a rhythm corresponding to the diurnal activity rhythm. Territorial behavior was not present, and there was no tendency toward social cooperation.

BRYAN, E. H., R. 1935  
 Hawaiian Nature Notes  
 Publ. Honolulu Star-Bulletin Ltd., Honolulu  
 publ.  
 Sinclair L.

A collection of fifty weekly articles in the Sunday editions of the Honolulu Advertiser from April, 1932 to April, 1933 with a wide range of interesting

topics. The author mentions a reddish-brown sea cucumber and the 'sea beaver', a heart-shaped sea urchin as being common in the sandy areas of Kaneohe Bay.

BRYAN, W. A. 1915  
 Natural History of Hawaii  
 Publ. Hawaiian Gazette Co. Ltd., Honolulu, 596 pp.  
 publ.  
 Sinclair L.

A general history of the Hawaiian people, the geology and geography of the islands, the native and introduced plants and the animals of the islands. There are two chapters on the flora and fauna of coral reefs in which is mentioned finding Dendrophyllia manni growing on the edge of a small coral island in Kaneohe Bay. Opheodesoma spectabilis was found to be common in Pearl Harbor and Kaneohe Bay. The work contains many photographs, not only of marine life, but also views around the islands taken on the author's travels.

BURDICK, J. E. 1969  
 The feeding habits of the nehu (Hawaiian anchovy) larvae  
 MSc. Thesis, University of Hawaii  
 unpubl.  
 G. Murphy

An investigation on the feeding habits of the nehu larvae from Kaneohe Bay. The principal aims of the study were to describe the diet and to determine the food size, diurnal feeding patterns, food selection and incidence of feeding of different sized nehu larvae. Using a plankton purse seine, the hypothesis that many of the larvae clupeoids collected by conventional methods during the day are dead or unhealthy and that day-caught larvae are a measure of larval mortality was tested. Samples were collected in S. E. Kaneohe Bay from November 1966 to August 1967.

BYRNE, J. E. 1962  
 Observations on the behavior of parrotfishes with particular attention  
 to the mucous envelope  
 MSc. Zoology, University of Hawaii  
 unpubl.  
 Zoology Dept.

A study summarizing the literature published on the mucous envelope formation in the parrotfish and giving observations on the fish in Kaneohe Bay. Observations included the effect of light, day/night cycles, and natural over unnatural (lab) environments on the mucous envelope formation. Studies were also done on the predator-prey relationship of the parrotfish to:

Mulloidichthyes samoiensis

Parupenus porphyreus

Acanthurus sandvicensis

Parupenus multifasciatus

Chaetodon miliaris

Kuhlia sandvicensis

Species of parrotfish used: Scarus dubius, Scarus perspicillatus.

BYRNE, J. 1963  
 The effect of salinity on the rate of  $Ca^{45}$  deposition by the coral,  
Fungia scutaria  
 Student report, Marine Ecology 620  
 unpubl.  
 Reese

A study done in partnership with K. Yamazato on the effects of salinity on calcium deposition in F. scutaria using radioactive calcium. For more details, see Yamazato, K. 1963.

BYRNE, J. E. ?  
 Animal communities in association with live coral heads of Porites compressa  
 Student report, Zoology 620  
 unpubl.  
 Reese

A study of the animals associated with coral heads of P. compressa on three areas of the windward reef at Coconut Island. The size of the coral head

and the location of the coral head were considered relative to community composition. The results lead the authors to feel that the location, not the size of the coral head determined the number of species and individuals found in association with it.

CAMPBELL, W. 1963  
 Fish mating behaviour in the maomao, Abudefduf abdominalis  
 Student report, Zoology 606  
 unpubl.  
 Reese

A study of the reproductive behaviour of the maomao with emphasis on the looping, zigzag swimming, vertical stance and tail-on-tail chasing motions of their behaviour. The fish were observed in their natural habitat from a concrete wall around the southwest point of Coconut Island, Kaneohe Bay.

CANU, F. and R. S. BASSLER 1927  
 Bryozaires des Iles Hawai  
 Bull. Soc. des Sci. Nat. de Siene et Oise ser. 2. Fasc. 8 (suppl):56 pp.  
 publ.  
 BPBM

A systematic study of the bryozoans collected by the Albatross expedition from the region of the Hawaiian Islands. The articles are written in French with no English summary.

Species collected in the Kaneohe Bay area include:

f. Escharellidae Schizoporella crassomuralis nov. sp. Albatross Stn.

4158-36-55 m. Moku Manu

f. Reteporidae - Rhynchozoan nudum nov. sp. Albatross stn. 4168-36-38 m.

Moku Manu

CARAYANNIS, G. P. 1967

The barium content in the calcareous skeletal materials  
of some recent and fossil corals of the Hawaiian Islands

MSc Thesis, University of Hawaii

unpubl.

Sinclair L.

A study involving ion concentrations of the skeletal materials of some corals. Aragonite-calcite ratios of living and fossil corals (Madreporaria) were determined with a Temp-Pres D-1, X-ray diffraction unit. Barium content was measured with a Perkin Elmer 303 atomic absorption spectrophotometer. Calcium determinations were made with a Beckman DU flame photometer. The corals were collected from the western side of Coconut Island, Kaneohe Bay.

CASS, P. H. 1967

Some aspects of the biology of the gastropod genus Hipponix on  
Oahu, Hawaii

MSc Thesis, University of Hawaii, 62 pp.

unpubl.

Sinclair L.

A study examining the differences among the three subtidal, rock dwelling species of Hipponix occurring on Oahu, using taxonomic as well as biochemical means. Their modes of feeding and reproduction are compared with other closely related genera. Analysis of amino acids by paper chromatography suggested that the three species are distinct. The other methods used by the author came to this same conclusion. The specimens were collected in Kaneohe Bay as well as in other areas of Oahu.

CASTRO, P. 1966

Checklist of the commensal decapod crustacea of the Hawaiian Islands

MSc. Thesis, University of Hawaii, 64 pp.

unpubl.

HIMB

A complete review of the commensal decapods of the Hawaiian Islands. In addition to the material collected in the field, those commensal associations



in decapods which have been reported in the literature are also included. A total of 31 commensal is listed: 17 natantian decapods and 14 brachyurans. The commensal nature of some of these forms is in question. Madreporian corals serve as hosts for the largest number of species. Other hosts are Echinoidea, Porifera, Asteroidea, Pelecypoda, Antipatharia, Polycheta, Holothuroidea and Gastropoda.

CHRISTOFFERSON, J. 1963  
Lethal temperatures of the damselfish, Dascyllus albisella  
Student report, Marine Ecology 620  
unpubl.  
Reese

A study done in partnership with E. Murchison on the temperature tolerances of D. albisella. For more details, see Murchison, E. 1963.

CHRISTOFFERSON, J. P. 1966  
Histology of selected sense organs of the holothurian, Opheodesoma spectabilis  
Student report, Zoology 699  
unpubl.  
Zoology Dept.

A study undertaken primarily to learn techniques for the anatomical study of the nervous system in invertebrates and applying some of these techniques to the eye-spots and equilibrium organs in O. spectabilis. Specimens were collected from Coconut Island, Kaneohe Bay.

CHU, G. W. T. C. 1952  
First report of the presence of a dermatitis-producing marine larval schistosome in Hawaii  
Science 115(2980):151-153.  
H.M.L. Contribution No. 13  
publ.  
Sinclair L.

A description of a larval schistosome tentatively identified as Cercaria littorinalinae from marine snails, Littorina pintado Wood collected from Moku Manu (Bird Island) near Kaneohe, Oahu.

CLARK, A. H. 1908

Descriptions of new species of crinoids, chiefly from the collections made by the U. S. Fisheries steamer Albatross at the Hawaiian Islands in 1902; with remarks on the classification of the Comatulida  
 publ. Government Printing Office, Washington, no. 1608.  
 from Proc. U. S. Nat. Mus. vol. 34:209-239. 1908.  
 Sinclair L.

A taxonomic description of the crinoids collected by the Bureau of Fisheries vessel, Albatross, from the Hawaiian Islands in 1902 and of new species collected by the same vessel on other cruises. The author also discusses the classification of the free crinoids. A key to the crinoids of the Hawaiian Islands is included in the introduction.

CLARK, A. H. 1949

Ophiuroidea of the Hawaiian Islands  
 B. P. Bishop Museum Bull. 195: 133 pp.  
 publ.  
 Sinclair L.

A taxonomic study of the ophiuroids from the Hawaiian Islands based primarily upon the collections by the Albatross in 1902.

Records of collections from Kaneohe Bay (with date of collection):

Ophiactis savignyi (Muller and Troschel) (1933 and 1942)

Ophiactis modesta Brock (1933)

The author includes a list of species taken in shore collecting but rather than listing the species from the various localities, they are all presented as the Hawaiian collection.

CLARK, H. L. 1925

Echinoderms other than sea stars  
 B. P. Bishop Museum Bull. 27:89-111.  
 publ.  
 BPBM

A report on the echinoderms other than sea stars collected by the Tanager Expedition. The collection is now housed in the Bishop Museum.

COBB, J. N. 1902  
 Commercial fisheries of the Hawaiian Islands  
 U. S. Fish Com. Report for 1901: 381-499, pl. 21-27  
 publ.  
 BPBM

A report on the present condition of the commercial fisheries of the Islands with a review of their past history and "the changes in the methods, extent and character of the fisheries in historic times, as shown by records or traditions, particularly since the coming of the Americans, Europeans and Asiatics". The history of fishery legislation and the possibility of improving the present laws are also considered. p. 429. a list of the fish ponds still in existence together with their area and a statement of their condition at that time. Koolau Bay (now Kaneohe Bay) was noted to have 20 fishponds.

COLLIER, M. and B. SANDERS ?  
 Microatoll community  
 Student report, Zoology 620  
 unpubl.  
 Reese

A study of the microatoll communities of three atoll reefs which were removed from the water, broken into gravel sized fragments and observed for species diversity and quantity of animals present. These atolls were off the windward side of Coconut Island. There was no species list as such included in the report. Tube-forming polychaetes were found to be the dominant species of approximately 21 different genera found in the atolls.

CORN, C. 1967  
 Interim report (as of 31 January 1967) on the distribution and ecology of the family Ostridae in Kaneohe Bay  
 Report to Dr. G. Murphy, Chairman, Oceanography Dept. U. H.  
 unpubl.  
 HIMB

A study initiated in September 1966 to obtain data on the species which are present in Kaneohe Bay and their distributional pattern in the bay. It was

found that each oyster species has its own distributional pattern with its own tolerance level. Ostrea sandvichensis occurs below low tide on coral rubble, living on dead coral heads, pilings, and metal fencing.

O. thaanumi occurs intertidally throughout the bay along walls, on rocks, pilings, tires and debris. Crassostrea virginica is found occasionally in the intertidal region. It parallels C. gigas in distribution. C. gigas grows intertidally to depths of 15 feet below low tide. It is most numerous in the southern end of the bay adjacent to the dredged channels. Approximately seventeen factors are interacting to cause these distributional patterns. It is suggested that tests should be devised to ascertain upper and lower tolerance levels for the various species.

Results of the study showed that spats set from 12 October to 6 January; oyster larvae will settle at depths of 13 feet; there appears to be no difference between rough and smooth surfaces in settling preferences; spats do not survive 0-12" off a silt bottom; growth was fastest in the first 12 weeks after settling on the northern vertical and lower horizontal surfaces away from the sun; few spats settle and mature on the exposed southern surfaces; oyster speciation can be regulated by the angle of exposure; a steady rate of growth in shallower water may cause the shallower spats to grow larger per time period than those in deeper water which grow fast initially and then slow down after the twelfth week.

CORN, C. A. 1969  
Oyster progress report no. 3  
Report to Dr. G. Murphy, Chairman, Oceanography Dept. U. H.  
unpubl.  
HIMB

A report reviewing why Crassostrea gigas does not extend below extreme low tide level in all but a couple of locations throughout Kaneohe Bay. This

has involved further investigations into the biological interactions of the intertidal and subtidal oyster communities. Possible mechanisms for this occurrence were studied - food availability, adult oyster predators, larval spat predators, organisms influencing the distribution of oyster spat settlement, number and species of oysters present at given depths, periodicity of spat settlement and a cause for shell variation at different parts of the Bay.

CORREA, L. H. 1967  
 Factors affecting the distribution of tunicates and anemones  
 in Kaneohe Bay  
 Student report, Marine Ecology 620  
 unpubl.  
 Reese

A study done in conjunction with D. D. Thomas on the distribution of the tunicate, Ascidia interrupta Heller, in relation to other filter feeders on the reefs of Coconut Island. For more information see Thomas, D. D. 1967.

DALL, W. H., BARSCH, P. and H. A. REHDER 1938  
 A manual of the recent and fossil marine pelecypod mollusks of  
 the Hawaiian Islands  
 B. P. Bishop Museum Bull. 153  
 publ.  
 BPBM

A study of recent and fossil marine pelecypods including a taxonomic discussion and a discussion of the two theories of organism establishment on the Hawaiian Islands: the drift theory versus the larval swimming theory.

DANFORTH, CHARLES G. 1970  
 Epicaridea (Isopoda) of Hawaii  
 Bulletin of the Southern Calif. Acad. of Sci. 69(1):27-31  
 publ.  
 HIMB

A description of a new form of the Bopyrid Isopoda, I. murchisoni n. sp.  
 This is the sixth species of parasitic isopod in the Epicaridea suborder to

be reported from the State of Hawaii and is the first of this genus to be found outside of Chile. The isopod was found in Kaneohe Bay on Sand Island in the right gill chamber of the host shrimp, Callinassa sp.

DANIELS, C. I. JR. 1966  
Obstacle orientation in Myripristus argyromus and Acanthurus nigroris  
Student report, Zoology 606  
unpubl.  
Reese

A study to obtain comparative data between species in controlled stimulus situations and to develop a method of measuring the information derived from the various sensory modalities, comparing them and relating them to functional states of the animal. The work was conducted at the Hawaii Marine Laboratory on Coconut Island.

DAVIS, L. V. 1967  
The suppression of autotomy in Linckia multiflora (Lamarck) by  
a parasitic gastropod, Stylifer linckiae Sarasin  
Veliger 9(3): 343-346  
HIMB Contribution No. 255  
publ.  
HIMB

A study conducted at the Hawaii Marine Laboratory, Kaneohe Bay, with specimens collected in Kaneohe Bay, investigating the host-parasite relationship of L. multiflora and S. linckiae. In this relationship, the gastropod reduces the high rate of spontaneous autotomy of the arms of the starfish.

DeAUSEN, T. T. 1966  
Coastline ecosystems in Oahu, Hawaii  
MSc Thesis, University of Hawaii  
unpubl.  
Sinclair L.

A study describing the coastline ecosystems on Oahu as to vegetative composition and structure and environmental features such as climate, physiography, exposure, substratum and ground water and to relate vegetation

patterns to these features. Twenty-two study areas were selected. Abundance-dominance, sociability and vigor ratings were given to species in quadrats and transects. Field work also included determination of physiographic position, rating of exposure intensity, collection of soil samples and determination of soil texture and structure. Laboratory work included construction of climate diagrams and determination of soil color, consistence, pH, salt concentration, organic C, moisture equivalent, 15 atmosphere and available moisture.

Three stations were made in the Kaneohe Bay area, numbers 09, 21 and 20.

STATE OF HAWAII, DEPT. LAND AND NATURAL RESOURCES      1963  
 Survey of the oyster potential of Hawaii  
 Div. Fish and Game Publ. by A. K. Sparks: 44 pp.  
 publ.  
 HIMB

An investigation of Pearl Harbor and Kaneohe Bay including a survey of the extent and status of the oyster beds, analysis of the size and age composition of the oysters on the bed, box counts, examination of boxes for evidence of predation, a study of associated fauna, study of the condition index of marketability, species composition and consideration of problems associated with fecal contamination.

A secondary phase of the investigation was to consist of a cursory survey of selected shore areas around the islands of Oahu, Kauai, Hawaii, Maui and Molokai to determine the suitability of these areas for the stocking of oysters and/or other shellfish such as clams.

Plantings of Crassostrea virginica were made in Kaneohe Bay in 1923, 1924 and 1940 (p. 2.) Apparently none of these ventures were successful. The Japanese C. gigas was imported in 1939 to Coconut Island and Mokapu ( p. 3) and they are still found in Kaneohe Bay. The Australian C. commercialis

was introduced into Kaneohe Bay in 1929 but the stock died within 6 months of planting (p. 3). C. amasa from Australia was introduced into Coconut Island in 1956. Present studies indicate that the original population has died out. (p. 3).

Preliminary examination of Kaneohe Bay on March 13, 1963 from the Yacht Club Basin to Coconut Island to Matson's Point and back along Heeia fish-pond showed a heavy set of C. gigas in the eastern portion of the bay and scattered individuals elsewhere. No C. amasa were seen. The study recommended that C. virginica could grow in Kaneohe Bay. Trans-plantings were made from beds in West Loch to hard bottom areas in the western side of Kaneohe Bay so that their survival, rate of bacterial loss and condition could be determined. Results were not included in this report.

DEPT. LAND AND NATURAL RESOURCES-DIV. FISH AND GAME  
Annual Report, 1964-66  
State of Hawaii  
publ.  
HIMB

The annual reports of the Department of Land and Natural Resources. The Division of Fish and Game has several projects in Kaneohe Bay, the results of which were reported. An extensive population of clams, Venerupis philippinarium was discovered in the SE section of Kaneohe Bay. This provided recreation for 10,000 clam diggers during the 1965 season. To extend the distribution of the clam, approximately 1,500,000 seed clams were transferred from the original bed to other areas in the Bay, to Pearl Harbor, Keehi Lagoon and Maunalua Bay.



DEPT. LAND AND NATURAL RESOURCES 1968  
 Report to the Governor, 1967-1968. by S. Kido  
 State of Hawaii  
 publ.  
 HIMB

The report of the Department of Land and Natural Resources for the year 1967-68. The report includes reports from all the divisions of this department - Conveyance, Fish and Game, Forestry, Land Management, State Parks, Water and Land Development and the Hawaii Job Corps. This booklet provides an excellent source of knowledge about the various divisions of the department and of their personnel. The report of the Hawaii Job Corps includes mention and a photograph of seeding clams in Kaneohe Bay (p. 39).

DEPT. LAND AND NATURAL RESOURCES  
 Annual Report, 1967-68  
 State of Hawaii  
 publ.  
 HIMB

The annual report of the Department of Land and Natural Resources of which the Division of Fish and Game is a member.

In this year's report it was reported that an estimated 41,000 persons participated in the clam season and harvested about 10,700 gallons of Manila clams (Venerupis philippinarium) from the southeastern section of Kaneohe Bay. After the close of the season, about 253,000 seed clams were collected and transferred to waters off Wailupe, Oahu.

Two large specimens of the Quahog clam, Mercenaria mercenaria from the eastern U. S. were discovered in Kaneohe Bay. These clams were traced to an unrecorded introduction into the Bay during the 1930's by a private citizen. A total of 985 Quahog clams were imported from Connecticut and planted in Kaneohe Bay and in the Nomilo fishpond on Kauai.

DEPT. LAND AND NATURAL RESOURCES  
Annual Report, 1968-69  
State of Hawaii  
publ.  
HIMB

The annual report of the Department of Land and Natural Resources for 1968-69. The Division of Fish and Game reports that the topshell, Trochus niloticus, was introduced from Guam into the vicinity of Pyramid Rock in Kaneohe Bay. Later monitorings made at the site of release gave counts of 72 and 44 live Trochus respectively. As yet, evidence of Trochus reproduction had not been uncovered.

After a year in Hawaiian waters the quahog clams introduced from Connecticut into Kaneohe Bay have grown from an average size of 1/14 " - 1/34 " in length. The clams have adjusted well with a survival rate of 80%.

An experimental introduction of abalone into Kaneohe Bay was carried out by HIMB on Coconut Island. Two species, the Green Abalone (Haliotis fulgens) and the Pink Abalone (H. corrugata) were shipped periodically from the California Fish and Game Department.

DEVANEY, D. M. 1963  
Surface zooplankton density in Kaneohe Bay, Oahu 1963  
Student report, Marine Ecology 620  
unpubl.  
Reese

A study done in conjunction with L. Taylor on the zooplankton population densities in samples taken on a transect in Kaneohe Bay. The density was correlated with environmental factors and it was found that salinity and transparency might be responsible for the differences in absolute and specific densities of the zooplankton populations.

DEVANEY, D. M. 1968

The systematics and post-larval growth changes in ophiocomid brittlestars  
PhD. Thesis, University of Hawaii, 292 pp.  
unpubl.  
Sinclair L.

A comprehensive review of the subfamily Ophiocominae in terms of its systematic structure. This study involved: (a) determining the extent and the limitations of genera and species concept and (b) analyzing the phylogenetic relationships more thoroughly. These two points are realized through new interpretation of taxonomic criteria, some presented for the first time, according to the author. Numerous collections were made on Oahu - Ophiocoma pica Muller and Troschel was found in Kaneohe Bay. A representative series of specimens were given by the author to the Hawaii Institute of Marine Biology, Coconut Island.

DISALVO, L. H. 1969

Some aspects of the regenerative function and microbial ecology  
of coral reefs  
Preliminary report of paper, Dept. Zoology, University of North Carolina  
Chapel Hill, 27514  
unpubl.  
Helfrich

A report dealing with the microbial populations occurring in the finely divided aerobic sediments adherent to internal spaces of coral skeletons, "the coral reef regenerative sediment" in the fringing reefs of Kaneohe Bay and of the atoll reefs of Eniwetok and the Marshall Islands. Coral heads were collected and returned to the lab where the organic matter was determined by ashing; total sediment nitrogen was determined by the Kjeldhal method; total counts of  $10^8$  to  $10^9$  viable bacteria per gram dry sediment were obtained by plate count techniques; recovery of radioactively labelled  $S^{35}$  in detritus, suspension feeding in fauna, living coral tissue and algal-covered surfaces were determined after seawater containing  $S^{35}$  bacteria was

circulated over a model reef in the laboratory. Some terrestrial influences on the regenerative reef structures and sediments were noted in Kaneohe Bay.

DiSALVO, L. H. 1969  
On the existence of a coral reef regenerative sediment  
Pacific Science 23(1):129  
publ.  
Sinclair L.

A note on the occurrence and possible formation of the calcareous detrital material found on non-living coral formations of several reef areas - Kaneohe Bay reef being one area and Eniwetok Atoll, the other area studied.

DOTY, M. S. 1961  
Acanthophora, a possible invader of the marine flora of Hawaii  
Pacific Science 15(4):547-552  
publ.  
Sinclair L.

A paper dealing with the genus Acanthophora, its discovery in Hawaii and a subsequent literature and herbaria search to find previous Pacific records of this genus. The author mentions Kohn (1959) recording Acanthophora in Kaneohe Bay found on the egg cases of Conus quercinus.

DOTY, M. S., R. R. GUILLARD and E. C. JONES 1954-1955  
The productivity of the inshore waters of Hawaii  
Proc. Hawaii Acad. Sci. (abstracts), University of Hawaii:15  
publ.  
Sinclair L.

The abstract of a paper describing the measurement of plankton photosynthesis at different distances from the shores of Oahu. Photosynthesis was measured by following the uptake of radioactive carbon by planktonic algae. The water samples came from four areas - one within Kaneohe Bay, one just outside the Bay and two others offshore at 5 and 10 miles respectively.

DOTY, M. S. and M. OGURI 1956  
 The island mass effect  
 Extrait du J. du Conseil Int. pour L'exploration de la Mer 22(1):33-37  
 publ.  
 HIG L.

The hypothesis that as oceanic island shores are approached, there is an increase in phytoplankton productivity was tested by determining productivity magnitude with light and dark bottles and carbon fourteen studies. The study was extended over a fourteen month period with sampling stations on a line measured 20 miles offshore from Kaneohe Bay.

DOTY, M. S. and B. C. STONE 1966  
 Two new species of Halophila (Hydrocharitaceae)  
 Brittonia 18:303-306  
 publ.  
 Chave

A taxonomic paper describing two new species in the genus Halophila, one from the Hawaiian Islands, Halophila hawaiiiana Doty and Stone sp. nov., and the other from Australia, Halophila australis Doty and Stone sp. nov..

H. hawaiiiana was found in four areas in Kaneohe Bay: in the salty mud at minus 2 feet below MSL off the NW corner of Moku O Loe Island, 3 Oct. 1950 Doty 8110; in a colony in about 15 feet water on bottom of channel dug in 1943, east of U. H. Marine Laboratory, 28 March, 1952, Doty 9980; in sand on shoal, submerged 2 feet, about 1 mile NW of Kapapa, 17 January 1948, Webster 1189 (US;BISH) and near Mokuawa, off Makaekahana, 19 August 1915 (BISH).

DROULET, E. 1969  
 K. Bay pollution dangers rising rapidly: home values threatened  
 Pali Press 12(15):1  
 publ.  
 HIMB

One of two articles on the pollution problem in Kaneohe Bay. This article reports on a talk given by Dr. P. Helfrich on April 2, 1969 to the Kaneohe

Community Council meeting. Mention is made in the article of House bills 141 and 207 which are an attempt to improve the pollution situation in the bay.

DROULET, E. 1969  
 Pollution study races the clock  
 Pali Press 12(7):2  
 publ.  
 HIMB

One of two articles on the pollution problem in Kaneohe Bay. The article outlines the prospective Water Quality Program for Oahu with emphasis on waste discharge. The article also emphasizes the urgency of such a program.

DYKSTRA, W. 1967  
 Oxygen consumption in Metopograpsus messor at lowered temperatures  
 Student report, Marine Ecology 620  
 unpubl.  
 Reese

A study done in partnership with J. Wertzberger on the determination of oxygen consumption by the crab, M. messor at 10°C and 23°C respectively. For more information see Wertzberger, J. 1967.

EDDINGER, R. 1966  
 The composition and density of fouling organisms in relation to substratum  
 Student report, Marine Ecology 620  
 unpubl.  
 Reese

A study done in conjunction with R. T. Ramakrishna on the composition and relative abundance of major fouling organisms in the lagoon of Coconut Island and to study the density of fouling animals in relation to the substratum. For further details see Ramakrishna, R. T. 1966.

EDMONDSON, C. H. 1921  
Stomatopoda in the Bernice P. Bishop Museum  
B. P. Bishop Museum Occ. Papers 7(13):279-302  
publ.  
BPBM/Sinclair L.

A taxonomic study of the Stomatopod collection in the B. P. Bishop Museum. The collection comprises 53 specimens grouped under six genera and nine species, one of which is new. Of the 53 specimens, 10 are recorded from Guam, 4 from Tahiti and 2 from the Marquesas, the other 37 are from Hawaii.

EDMONDSON, C. H. 1928  
The ecology of an Hawaiian coral reef  
B. P. Bishop Museum Bull. 45, 64 pp.  
publ.  
BPBM/Sinclair L.

An intensive ecological study of Hawaiian corals in a section of the Waikiki reef on the south shore of Oahu. Response of the corals to the following parameters was noted: temperature, salinity, silt, direct sunlight, air and absence of sunlight. The author mentions that Kaneohe Bay is recognized as one of the most favorable localities for the development of shallow water corals. Nearly all the reef-forming genera known in the Hawaiian Islands are represented and grow luxuriantly in the Bay.

EDMONDSON, C. H. 1929  
Growth of Hawaiian corals  
B. P. Bishop Museum Bull. 58, 38 pp.  
publ.  
BPBM/Sinclair L.

A paper dealing with generalized descriptions of Hawaiian reefs, including references to the Kaneohe Bay reef. Morphology and behavior of planulae larvae are reviewed and a comparison of previous records of coral growth in the Indian, Pacific and Atlantic Oceans with those of the Hawaiian Islands is drawn.

EDMONDSON, C. H. 1930  
 New Hawaiian Medusae  
 B. P. Bishop Museum Occ. Papers 9(6):1-16  
 publ.  
 BPBM/Sinclair L.

A taxonomic description of several forms of creeping and sessile medusae previously unrecorded from the Hawaiian Islands. The type specimen of the Stauromedusae, Kishinouyea hawaiiensis n. sp., was found in Kahana Bay on seaweed in shallow water; type specimen is now in Bishop Museum.

EDMONDSON, C. H. 1930  
 New Hawaiian Crustacea  
 B. P. Bishop Museum Occ. Papers 9(10):1-18  
 publ.  
 BPBM/Sinclair L.

A taxonomic description of new species of the genera Processa, Jousseaumea, Axiopsis, and Palicus and of the family Portunidae. Kaneohe Bay is the type locality of a new species, Processa paucirostis n. sp..

EDMONDSON, C. H. 1933  
 Reef and shore fauna of Hawaii  
 B. P. Bishop Museum special publ. no. 22, 295 pp., 1st edition  
 publ.  
 BPBM/Sinclair L.

A general descriptive study of the fauna found in the reefs and shores of the Hawaiian Islands.

EDMONDSON, C. H. 1933  
Cryptochirus of the Central Pacific  
 B. P. Bishop Museum Occ. Papers 10(5):1-23  
 publ.  
 BPBM/Sinclair L.

A taxonomic study of the members of the genus Cryptochirus (Crustacea) collected in the Central Pacific. This genus includes the crabs which as larvae settle in the calcites of coral causing the death of the polyp. The crabs remain there passively as the coral continues to grow around it.



Cryptochirus minutus n. sp. is less plentiful in Kaneohe Bay than at other localities on Oahu. It may be found in species of Cyphastrea ocellina and Lepastrea purpurea.

EDMONDSON, C. H. 1933  
Quantitative studies of copepods about the shores of Oahu  
Fifth Pacific Science Congress 1933, vol. 3: 1997-2001  
publ.  
Hamilton L.

A study in which the copepods around Oahu were sampled quantitatively to determine the amount of food available to other organisms in the shoal areas. It was hoped that this abundance or paucity of such a potential food source might be correlated with the relative growth of other organisms. Kaneohe Bay was the center for sampling on the windward shore of Oahu. Sampling was carried over a period of one year (September 22, 1931 to September 21, 1932).

EDMONDSON, C. H. 1935  
New and rare Polynesian Crustacea  
B. P. Bishop Museum Occ. Papers 10(24):1-40  
publ.  
BPBM/Sinclair L.

A taxonomic account of the new and rarely observed decapod crustaceans collected by various field workers in widely separated parts of Polynesia ranging from Hawaii through the equatorial islands to Fiji, including the Lau Archipelago and Tongatabu.

A new species of Periclimenes was found living on Linckia multiflora in Kaneohe Bay called Periclimenes bicolor n. sp.. Kaneohe Bay is listed as the type locality for this species (Bishop Museum Collection no. 3756). Another species, Hymenocera elegans Heller was first collected in Hawaii in 1934 from a Porites coral head in Kaneohe Bay.

A hydroid apparently identical with Pennaria tiarella McCrady, from the Atlantic coast flourishes in Kaneohe Bay - a possible introduction.

EDMONDSON, C. H. 1935-1936  
Autotomy and regeneration in Hawaiian starfishes  
B. P. Bishop Museum Occ. Papers 11(8):1-20  
publ.  
BPBM/Sinclair L.

An investigation to determine the extent of the phenomenon of autotomy among Hawaiian starfishes and to follow the processes involved in the regeneration after natural or artificial injury. This investigation covered a period of approximately three years and was conducted on Linckia multiflora, Linckia diplax and Coscinasterias acutispina from Kaneohe Bay as well as Pentaceros hawaiiensis Fisher from Maile Point and Dactyloaster cylindricus pacificus Fisher and Nepanthia sp. from Black Point.

EDMONDSON, C. H. 1937  
Quantitative studies of copepods in Hawaii with brief surveys  
in Fiji and Tahiti  
B. P. Bishop Museum Occ. Papers 13(12):131-146  
publ.  
BPBM/Sinclair L.

A one-year investigation (Sept. 22, 1931 - Sept. 21, 1932) on the determination of the amount of potential food available at certain localities in the shoal waters about Oahu as expressed in the numerical quantity of marine free swimming copepods. The correlation of the amount of growth of the invertebrates and the amount of the copepods was also considered. Kaneohe Bay was the center for all investigations, stations also being run at Waikiki, Pearl Harbor and other areas of Oahu.

EDMONDSON, C. H. 1939

The relation of the marine fauna of Hawaii to that of other sections of the Pacific area  
Sixth Pacific Science Congress, Oceanography and Marine Biology  
593-598

publ.

HIMB

A discussion of some considerations concerning the position which Hawaii holds with respect to certain groups of marine fauna. The author believes that there are 3 main streams of dispersal of the invertebrate fauna in the Pacific Ocean (with some fusion and mergence in some areas): from the East Indian area the near shore fauna seems to have spread in one stream to the northeast, reaching the shores of China and Japan. Another current of migration appears to have spread northeastward through the western Pacific, reaching the Caroline and Marshall Islands, Wake and possibly the leeward chain of the Hawaiian Archipelago. A third migration was thought to have swept through southern Polynesia to the east, some elements of this current probably reaching tropical America. This paper makes no direct reference to Kaneohe Bay, but it is included here for its biological and philosophical value.

EDMONDSON, C. H. 1940

A recent shipworm survey in Hawaii  
Proc. 6th Pacific Science Congress 3: 245-250

publ.

Hamilton L.

A continuation of previous work on shipworms in Hawaii with emphasis on wood borers of the genera Teredo and Bankia. The history of shipworms on the island is reviewed and this paper presents the results of a re-survey of shipworms which might reveal additions to or shifts in the previously known population of shipworms on the island. Two of the survey areas were in Kaneohe Bay. Test blocks of various woods were submerged and lifted at

intervals to determine species present, their distribution, rate of growth, periods of spawning, seasonal variation in behavior, larval and postlarval development, their behavior under normal and abnormal conditions, their preference for certain woods and other information.

EDMONDSON, C. H. 1941  
Viability of coconut seeds after floating in the sea  
B. P. Bishop Museum Occ. Papers 16(12):291-304  
publ.  
BPBM/Sinclair L.

A report concerning the viability of the coconut seed, Cocos nucifera Lin., after floating in the ocean for various periods up to four months. The author feels that controlled experiments to determine the duration of drifting and its effect upon germination of the seed might be the initial step in answering the mooted question of coconut dispersal. Kaneohe Bay was one of the areas in which the coconuts were floated. Coconuts were found capable of developing after having floated in the sea for periods up to 110 days, possibly 3000 miles in the right current. These nuts required 3 months to a year to exhibit visible development. There seemed to be little correlation between floating time and subsequent time required for sprouting. Water absorbed during floating and improper oxygenation of the skin do not inhibit development although excessive dryness will completely inhibit development once germination has begun.

EDMONDSON, C. H. 1944  
Teredinidae of Hawaii  
B. P. Bishop Museum Occ. Papers 17(10):97-150  
publ.  
BPBM/Sinclair L.

A report dealing with a record of studies and observations of shipworms on the island of Oahu. Shipworms from 14 stations on Oahu were collected and systematically described. The material received from Canton Island

and Western Samoa is discussed. Collections in Kaneohe Bay included:

Station J. pier of Territorial Fish and Game Farm Teredo parksi

T. bartschi

T. diagensis

Station K. near the middle of Kaneohe Bay on the reef

T. parksi

T. bartschi

T. millen

T. gregoryi

Station L. shore of Mokuapu Peninsula

T. millen

T. medilobata

EDMONDSON, C. H. 1946

Reef and Shore Fauna of Hawaii

B. P. Bishop Museum Special Publication No. 22, 381 pp.

publ.

BPBM

A revised edition of the earlier 1933 edition. More complete data, new figures and keys have been added to several sections and the nomenclature has been brought up to date to conform with intervening investigations.

EDMONDSON, C. H. 1946

Behaviour of coral planulae under altered saline and thermal conditions

Bishop Museum Occ. Papers 18(19):283-304

publ.

BPBM

A paper dealing with the responses and behavior of planulae of three Hawaiian shoal water corals when subjected to controlled variations of salinity and temperature. The corals studied were Pocillopora damicornis, Cyphastrea ocellina and Dendrophyllia manni, all of which grow in Kaneohe Bay. Results showed that the Cyphastrea larvae had greater resistance than the other two species to certain dilutions of seawater - all species seemed unaffected by 1:1 mixtures of seawater and freshwater. Cyphastrea larvae

were also less affected by brief exposures to high temperatures. Dendrophyllia planulae were most sensitive to rising temperatures. It was observed that all planulae could endure temperatures ranging from 32°C to 33°C for several days. Dendrophyllia planulae are the most sensitive to falling temperatures; Cyphastrea and Pocillopora planulae seemed unaffected by contact with 0.5°C for 5 minutes. All planulae appeared likely to survive indefinitely at temperatures ranging from 16°C to 14°C. Affixation of planulae may take place under conditions varying from normal-Cyphastrea and Dendrophyllia may become affixed in total darkness; Pocillopora may become affixed at temperatures ranging from 31.5 to 32.0°C; all species have affixed at pH 7. There was a tendency for the planulae of Dendrophyllia and Cyphastrea to settle and affix in aggregations. This frequently occurs under crowded conditions. This phenomenon was not noted among Pocillopora planulae.

EDMONDSON, C. H. 1949  
Seashore Treasures  
Publ. Pacific Books, Palo Alto, California, 144 pp.  
publ.  
Sinclair L.

A general description of coral reefs and the animals and plants which are found on the reefs of Hawaii. There is one interesting picture of the Kaneohe Bay reef taken at a very low tide when most of the reef was exposed.

EDMONDSON, C. H. 1953  
Response of marine borers to chemically treated woods and other products  
B. P. Bishop Museum Occ. Papers 21(7):87-133  
publ.  
BPBM/Sinclair L.

A study recording the response of marine borers to certain chemically treated woods and other products, some of which show remarkable resistance to termites but have not, until now, been examined for their reaction to

marine borers. Panels of woods, plastics and metals (copper and zinc) treated in a number of ways were placed in Kaneohe Bay and other sites on Oahu.

EDMONDSON, C. H. 1954  
Hawaiian Portunidae  
B. P. Bishop Museum Occ. Papers 21(2):217-274  
publ.  
BPBM/Sinclair L.

A critical study of the portunid crabs in the Bishop Museum collection and in other collections including descriptions of new forms. Keys and illustrations are included.

EDMONDSON, C. H. 1955  
Resistance of woods to marine borers in Hawaiian waters  
B. P. Bishop Museum Bull. 217, 91 pp.  
publ.  
BPBM/Sinclair L.

A general discussion on the geographically wide-spread nature of marine borers, efforts to reduce their occurrence and a report of a series of anti-fouling experiments done by the author over a period of 16 years in the waters of Hawaii. Test panels were set in Pearl Harbor, Honolulu Harbor, Waikiki, Hanauma Bay, Waimanalo and Kaneohe Bay. Representatives of 69 families of woods were set out in these locations and the author reports on their infestation:

Data for Kaneohe Bay-

Bignoniaceae Cybistax donnell-smithii (Rose) - no infestation  
after 8 months

Dipterocarpaceae Hopea sp. - riddled by teredos within 5 months

Hammamelidaceae Liquidambar straciflua Linn. - infested with teredos  
in 3-6 months

Myrtaceae Psidium guajava Linn. - infested with teredos in 184 days  
with a maximum penetration of 143 mm.

Rhamnaceae Colubrina oppositipolia Brongn - moderately infested with teredos after 7 months

EDMONDSON, C. H. 1962  
 Teredinidae, Ocean travelers  
 B. P. Bishop Museum Occ. Papers 23(3):45-59  
 publ.  
 BPBM/Sinclair L.

Observations on marine wood borers recovered from flotsam in bays and harbors of some Pacific Islands and on open reefs offshore including a summary of previous work of recovery of shipworm larvae on fouling panels. The author was interested in whether the various shipworm larvae had a preference for a pelagic existence in the open ocean or a comparative immobility in a harbor piling. Juveniles of Teredo gregoryi were trapped on test panels in Kaneohe Bay.

EDMONDSON, C. H. 1962  
 Hawaiian Crustacea: Goneplacidae, Pinnotheridae, Cymopoliidae,  
 Ocypodidae and Gecarcinidae  
 B. P. Bishop Museum Occ. Papers 23(1):1-27  
 publ.  
 BPBM/Sinclair L.

The fourth and the last in a series of revised records of brachyuran crabs recorded in Hawaiian waters. This report deals with five families, lists only sixteen species, four of which were thought not to exist in the Hawaiian fauna at the time of publication.

EDMONDSON, C. H., W. K. FISHER, H. L. CLARK, A. L. TREADWELL and  
 J. A. CUSHMAN 1925  
 Marine Zoology of Tropical Central Pacific  
 B. P. Bishop Museum Bull. 27, 148 pp.  
 Tanager Expedition Publ. No. 1  
 publ.  
 BPBM/Sinclair L.

The collective reports of the Tanager expedition 1923-24, including reports on Crustacea, sea stars, echinoderms other than sea stars, polychaetous



annelids and foraminifera.

Reference is made to Kaneohe Bay in the paper by Clark and many specimens are mentioned as being very common about the reefs of Hawaii.

EDMONDSON, C. H. and W. M. INGRAM 1939  
Fouling organisms in Hawaii  
B. P. Bishop Museum Occ. Paper 14(14)  
publ.  
BPBM/Sinclair L.

A report on the fouling organisms found in Kaneohe Bay and in Pearl Harbor over a period of years, 1935-1939. Attention was given to species, their seasonal succession and ecology. Early developmental stages in some cases are described and the rate of growth under varied conditions is recorded. Consideration was also given to surface type of attachment. The majority of experiments were done with larval and adult barnacles.

EDMONDSON, C. H. and I. H. WILSON 1940  
The shellfish resources of Hawaii  
Proc. 6th Pacific Science Congress 3:241-243  
publ.  
Hamilton L.

A review of the shellfish industry in Hawaii including the number of species occurring in the islands, species of commercial value and the successes and failures of various transplanting operations. In 1920, Paphia philipinarum from Japan, were planted in Kalihi Basin, Pearl Harbor and Kaneohe Bay. They grew and reproduced in all areas except Kaneohe Bay. In February 1939, a shipment of 20,000 young specimens of Cytherea were received from Japan and planted in Kaneohe Bay where rapid growth has taken place (to date in 1940). In 1927, a small shipment of abalones were planted in Kaneohe Bay where they seemed to do well and then disappeared. Quantities of the American oyster, Ostrea cucullata have been planted in Kaneohe Bay (no date given). They died within 6 months. During March 1939, more than

one million spat of the Japanese oyster, Ostrea gigas were planted in Kaneohe Bay. Exceptional growth took place and it is hoped that this species may become permanently established in Hawaii. Pteria nebulosa is a small native oyster growing luxuriantly in Kaneohe Bay. The commercial value of the Hawaiian invertebrates such as squid, gastropods, crabs and shrimps are discussed but with no reference to Kaneohe Bay.

EDMONDSON, C. H. and G. S. MANSFIELD 1948  
 Hawaiian Caprellidae  
 B. P. Bishop Museum Occ. Papers 19(10):201-218  
 publ.  
 BPBM/Sinclair

A taxonomic report dealing with a small collection of caprellids at the Bishop Museum. Specimens of Caprella acutifrons Latreille are reported to be very abundant in Kaneohe Bay.

EGER, W. H. 1963  
 An exotoxin produced by the puffer, Arothron hispidus, with notes on the toxicity of other plectognath fishes  
 MSc. Thesis, University of Hawaii, 88 pp.  
 unpubl.  
 Sinclair L.

A study of Arothron hispidus to confirm the presence of a toxic substance in the skin secretions and to establish the site of its production. The author also investigated the character of this exotoxin and compared it with the endotoxin of the internal organs on a biological, physical and chemical basis. All of the specimens used in this study were caught either with traps or with a hook and line in Kaneohe Bay.

It was found that the exotoxin was being secreted by specialized serous glands associated with the integumentary spines. It is essentially similar to the endotoxin on a biological, chemical, physical and pharmacological basis.

ELDREDGE, L. G. III. 1965  
 The taxonomy of the Diademidae (Ascidiacea) of the Central Pacific  
 including Indo-Pacific records  
 PhD. Thesis, University of Hawaii  
 unpubl.  
 Sinclair L.

A descriptive, taxonomic study of the twenty-three diademid ascidian species  
 in the Central Pacific waters.

Data for Kaneohe Bay:

Diplosoma (Lissoclinum) fragile (Van Name) 6 colonies; 21-XI-63;  
 Coconut Is.

Diplosoma (Diplosoma) macdonaldi Herdman 100 colonies; 1961-1964;  
 Coconut Is.

Diplosoma (Diplosoma) virens (Hartmeyer) 10 colonies; 1961, 1964;  
 Checker reef

Didemnum candidum Savigny 60 colonies; 1961, 1963; Coconut Is.

Didemnum moseleyi (Herdman) 6 colonies; 1961; Coconut Is.

Didemnum n. sp. 4. 50 colonies; 1961, 1963; Coconut Is.  
 7 colonies; 1961; Buoy No. 8  
 1 colony; 1961; Sand Is.

Didemnum n. sp. 1. 1 colony; 1962; Coconut Is. type locality on  
 floating wood dock

Trididemnum savignii (Herdman) 20 colonies; 1961, 1963; Coconut Is.

Trididemnum profundum (Sluiter) 1 colony; 1963; Sand Is.  
 2 colonies; 1964; Coconut Is.

ELDREDGE, L. G. 1966  
 A taxonomic review of the Indo-Pacific didemnid ascidians and  
 descriptions of twenty-three Central Pacific species  
 Micronesica vol 2: 161-261  
 HIMB Contribution No. 254  
 publ.  
 HIMB

A systematic description of twenty-three didemnid ascidians species, eight  
 of them new, from the Central Pacific waters. The taxonomic position of  
 each is considered with reference to other related Indo-Pacific species

and the basis for generic and specific determinations are reviewed and evaluated. The author provides an appendix with information concerning the distribution of identified species and a summary of pertinent Indo-Pacific records. A key to the didemnid ascidian species of Oahu is also included. Kaneohe Bay and Moku Manu were among 16 collection sites on Oahu.

Data for Kaneohe Bay:

Trididemnum profundum (Sluiter) leeward Sand Island; 1-8-63; 1 colony  
Coconut Island; 30-7-64; 2 colonies in coral and calcareous algae

Trididemnum savignii (Herdman) Coconut Island; 2-8-61, 29-11-61,  
13-12-61, 21-9-62, 1-8-63; 20 colonies on wood, glass, sabellid  
worm tubes, barnacles and solitary ascidians

Didemnum elikapekae n. sp. Coconut Island; 21-11-62; 1 colony on wood

Didemnum edmondsoni n. sp. Coconut Island; 21-6-61, 9-8-61, 29-11-61,  
13-12-63, 1-8-63, 16-11-63; 50 colonies Buoy No. 8; 29-11-61; 7 co-  
lonies Sand Island; 1-8-63; 1 colony on wood, glass, serpulid worm  
tubes, solitary ascidians, molluscs, sponges and calcareous algae

Didemnum moseleyi (Herdman) Coconut Island; 14-10-61, 13-12-61;  
6 colonies

Didemnum candidum Savigny Coconut Island; 41-10-61, 15-11-61, 29-11-61,  
13-12-61, 11-5-63, 1-8-63, 26-10-63, 16-11-63; 60 colonies on wood,  
sabellid and serpulid worm tubes, barnacles, solitary ascidians,  
bivalve molluscs, sponges, cal. algae

Leptoclinides rufus (Sluiter) Moku Manu; ?-11-62; 2 colonies collected  
45 m. on coral and black coral

Diplosoma (Diplosoma) virens (Hartmeyer) Checker Reef; 10-11-61,  
30-7-64; in colonies on coral and calcareous algae

Diplosoma (Diplosoma) macdonaldi Herdman (nomen conservandum) Coconut  
Island; 9-8-61, 4-10-61, 11-10-61, 11-9-61, 29-11-61, 21-11-62,  
11-5-63, 1-7-63, 30-7-64; 100 colonies on wood, sabellid and serpulid  
worm tubes, barnacle, coral, mollusks, sponges, green algae, cal-  
careous algae, solitary ascidians

Diplosoma (Lissoclinum) fragile (Van Name) Coconut Island; 21-11-62,  
26-10-63; 6 colonies on wood, coral and calcareous algae

ELEY, M. A. 1960  
 Some visual aspects of behavior in Gonodactylus glabrous Brooks  
 (Crustacea: Stomatopoda)  
 MSc. Thesis, University of Hawaii, 62 pp.  
 unpubl.  
 Sinclair L.

A study of Gonodactylus glabrous to determine whether this species has form vision and if so, to discover some of the kinds of forms that it can distinguish and to consider the significance of this ability on the animals' behavior in nature. All of the animals examined were taken from the north shore of Coconut Island in Kaneohe Bay. Results showed that the animals displayed a spontaneous preference for certain form patterns. Sexual differences were noted in some of the form patterns. The author discusses the possible importance of this ability of visual discrimination.

ELY, C. A. 1942  
 Shallow water Asteroidea and Ophiuroidea of Hawaii  
 B. P. Bishop Museum Bull. 176, 63 pp.  
 publ.  
 BPBM/Sinclair L.

A systematic paper dealing with 40 species of Asteroids, 25 of which are starfishes and 15 are brittle stars. Among the brittle stars, 3 species were new to science at the time of publication and one of these was the type of a new genus. Linckia multiflora (Lamarck) is found only in Kaneohe Bay on Oahu.

FEE, J. H. 1967  
 Studies of the direction-finding behavior of the beach hopper,  
Orchestia platensis (Kroyer) (Crustacea-Amphipoda)  
 MSc. Thesis, plan B, Zoology, University of Hawaii  
 unpubl.  
 Zoology Dept.

A report on the direction-finding behavior of the Oahu population of Orchestia platensis, a Talitridae amphipod. The behavior of this Hawaiian

beach hopper is compared with that of other species. The effect of the northward position of the sun in the late spring and early summer in the Hawaiian Islands on the direction-finding behavior is also investigated. Kaneohe Bay was one of the collecting areas on a beach near the middle of the bay shore.

The amphipod appeared to move vertically up and down the beach as the tide ebbed and flowed. The amphipods examined in Kaneohe Bay demonstrated rhythmic behavior, the change of the angle of orientation with respect to a stationary light source correlated with the daily motion of the sun.

These amphipods were noted to be physically different from O. platensis and so they may be another species; the author was not sure.

FELLOWS, D. P. 1966

Zonation and burrowing behavior of the ghost crabs Ocypode ceratophthalmus (Pallas) and Ocypode laevis Dana in Hawaii

MSc. Thesis, University of Hawaii, 78 pp.

unpubl.

Sinclair L.

A study representing the first behavioral study of Ocypode ceratophthalmus in the eastern portion of its distributional range as well as the first such study for Ocypode laevis. The primary objective was to determine whether the disparity among the previous reports on the digging behavior of O. ceratophthalmus is related merely to habitat diversity, or is, in fact, the result of behavioral differences among isolated populations of this species. O. laevis was found to inhabit only one type of burrow. In contrast, O. ceratophthalmus was found to dig 4 types of burrows, the structure being dependent upon the age and sex of the crab. No differences in digging behavior were noticed between the two species. Sand Island, Kaneohe Bay, was one area of collection.

FISHER, W. K. 1906

The starfishes of the Hawaiian Islands

publ. Government Printing Office, Washington, 1906

extracted from U. S. Fish Commission Bull. for 1903, part 3: 987-1130,  
plates I-XLIX

publ.

Sinclair L.

A taxonomic description of specimens collected by the U. S. Fisheries steamer Albatross from the Hawaiian Islands during the spring and summer of 1902. Included also is a small collection taken by the Albatross in 1891 off the south coast of Oahu. Specimens were taken from the shoreline to the thousand fathom line. A list of station positions and keys to the families plus a directory of technical terms is presented in the introduction.

FISHER, W. K. 1907

The holothurians of the Hawaiian Islands

publ. Government Printing Office, Washington no. 1555

from the Proc. U. S. Nat. Mus. 32: 637-744, plates LXVI-LXXXII

publ.

BPBM

A taxonomic description of the holothurians found in and around the Hawaiian Islands. The material for this study comes from the dredging stations of the Albatross expedition in 1902 and observations of reef and shallow water areas near land by the author.

Data for the Kaneohe Bay areas:

Scotodeima vitreum n. sp. station 3979, vicinity of Bird Island in  
222-387 f. on fine white sand, foraminifera, rocks. bottom tem-  
perature 54°.

FOWLER, H. W. 1928

The Fishes of Oceania

Mem. Bernice P. Bishop Museum vol. 10

publ.

BPBM/Sinclair L.

A description of the fishes stored in the Bernice P. Bishop Museum embracing some 14,000 specimens. These include the large Hawaiian collections

(the local accessions of the museum since its inception); the collections made by Mr. Alvin Seale in the South Pacific (1900-1903) and in Guam (1900); those made by Hans G. Hernbostel in Guam (1923); by the Tanager Expedition (1923); and by the Whippoorwill Expedition in 1924. Reference to the Kaneohe Bay area:

Echidnidae - Gymnothorax laysanus Jenkins - from Coconut Island by Jordan and Evermann, U. S. Fish Comm. Bull. v. 23, p. 93. 1903. (Synonymus with Lycodontis melaegris (Shaw and Nodder)).

Atherinidae - Hepsetia insularum (Jordan and Evermann) - from Koolau Bay, Nov. 1922.

Kyphosidae - Sectator azureus Jordan and Evermann - type loc. is Heeia, Oahu. Synonymus with Sectator azureus Jordan and Evermann, U. S. Fish Comm. Bull. 22, only one specimen from Heeia known in the museum.

Gobiidae - Sicyopterus stimpsoni (Gill) - synonymus with Sicydium stimpsoni Jordan and Evermann, U. S. Fish Comm. Bull. 23 pt. 1, from Hiol, Heeia and Kailua.

FREEMAN, P. J. 1966

Observations on osmotic relationships in the holothurian, Opheodesoma spectabilis

Pacific Science 20(1): 60-69

HIMB Contribution No. 237

publ.

HIMB

A study conducted at the Hawaii Marine Laboratory, Kaneohe Bay, with specimens collected from the Coconut Island reef, to establish by what means the holothurians were able to function in such an environment where the seawater underwent marked fluctuations in dilution. The easy tolerance of Opheodesoma to dilute seawater remains puzzling, there are no particular structures devoted to osmoregulation; there appears to be no adaptive significance in tolerance extending Opheodesoma's environmental range. It is suggested that tolerance to fresh waters is incidental and is derived from the slow "turnover" of the comparatively large volume of coelomic



fluid with environmental water and to the habit of steadily ingesting variable quantities of organic material which results in oscillating levels of digestive end-products in the coelomic fluid.

FUCHS, R. J., N. C. BURBANK JR., K. R. GUNDERSEN, K. E. CHAVE, R. CLUTTER,  
R. M. MOBERLEY, P. C. FAN, L. S. LAU, J. R. DAVIDSON, V. E. BROCK, and  
D. C. COX 1967

Estaurine pollution in the State of Hawaii  
Technical memorandum report no. 15  
Water Resources Research Center  
publ.  
WRRC

A report summarizing the first half of a one-year study of pollution of the estuaries in the State of Hawaii undertaken by the University of Hawaii for the Federal Water Pollution Control Administration. The study includes an extensive survey of problems of pollution of estuaries throughout the state, an intensive study of the ecology, the sources and the extent of pollution and the economic implications of pollution control standards in Kaneohe Bay. Five estuaries were studied: Kahului Harbor, Maui; Hilo Bay, Hawaii; Nawiliwili Bay, Kauai; Pearl Harbor, Oahu; Kaneohe Bay, Oahu.

FUJIMURA, T. 1957-58  
Introduction of marine game fishes from areas in the Pacific  
Job completion report - project no. F-5-R, job no. 9  
publ.  
Helfrich

A report dealing with the release of lutjanids and serranids from the Marquesas Islands to Oahu. The groupers were released from Brown's Camp, Oahu, and the snappers were released off Coconut Island, Kaneohe Bay. Underwater surveys were made to determine the distribution of the released fish.

FUJIMURA, T. 1960  
 Underwater survey of fishing areas  
 Job completion report - project no. F-5-R, job no. 2(1)  
 publ.  
 Helfrich

A study investigating the possible physical and biological factors for producing significant differences in standing fish crops among four stations on Oahu, one of them being Pyramid Rock in Kaneohe Bay.

GALTSOFF, P. 1933  
 Pearl and Hermes Reef, Hawaii; hydrological and biological observations  
 B. P. Bishop Museum Bull. 107: 1-49  
 publ.  
 BPBM

An account of the discovery in 1927 of a large pearl oyster bed in the Pearl and Hermes Reef and the resultant hydrological and biological survey of the area, legislation to regulate exploitation and development of the resource and the possible introduction of the oysters into the waters near Honolulu. To test the possibility of propagating the oysters on a commercial scale in waters close to Honolulu, 320 oysters were transported into the area west and south of the southern end of Mokoloe Island in Kaneohe Bay. The oysters were examined at yearly intervals afterward and in 1931, 150 oysters remained which indicated that the project was successful.

GILBERT, W. J. 1962  
 Contribution to the marine Chlorophyta of Hawaii I  
 Pacific Science 16(1):135-144  
 publ.  
 HIMB

An annotated list of new and previously recorded green algae of the Hawaiian Islands. Kaneohe Bay collection: Caulerpa ambigua Okamura Gilbert collection No. 9797 found on Coconut Island and Doty collection Nos. 8117 and 10100 both found on Coconut Island. This algae appears only among the Kaneohe Bay collection from the Hawaiian Islands.

GILBERT, W. J. 1965  
 Contribution to the marine Chlorophyta of Hawaii II.  
 Additional records  
 Pacific Science 19(4):482-492  
 publ.  
 Sinclair L.

An annotated list of new or previously recorded marine green algae from the Hawaiian Islands. Monostroma oxyspermum (Kutzing): Doty, 1947 - Gilbert collection no. 9785, was found on Coconut Island in 1959.

GONZALES, P. C. 1964  
 Habituation in the sea anemone of the genus Aiptasia  
 Student report, Zoology 606  
 unpubl.  
 Reese

A study to determine whether the sea anemones of the genus Aiptasia were capable of habituation using feeding experiments. The anemones were collected from the lagoon in Coconut Island, Kaneohe Bay. Results indicated that the anemones showed habituation in the feeding experiments.

GORDON, M. S. and H. M. KELLY 1962  
 Primary productivity of an Hawaiian coral reef: a critique of flow respirometry in turbulent waters  
 Ecology 43(3):473-480  
 HIMB Contribution No. 165  
 publ.  
 HIMB

A means of studying the productivity of a coral reef by the changes in oxygen content in the water flowing over the reef. The reef studied was located just outside the entrance to the Hawaii Marine Laboratory, Kaneohe Bay.

Flow respirometry was carried out using 2 methods - a simplified method used by some previous workers and a statistically more rigorous method taking turbulence changes partly into account. The reef was shown to be non-autotrophic, this was shown to be true throughout the year. This may

indicate a metabolic differentiation between open ocean reefs and those associated with large land masses. Technical improvements were suggested to give better estimates of benthic communities covered by turbulent waters.

GOSLINE, W. A. 1953

Hawaiian shallow-water fishes of the family Brotulidae with a description of a new genus and notes on Brotulid anatomy

Copeia no. 4: 215-225

HML Contribution No. 39

publ.

HIMB

A review of the shallow-water brotulids known from the Hawaiian Islands with notes on their anatomy. Microbrotula rubra sp. nov. Holotype: U. S. N. M. No. 162710, a male, 38.3 mm in standard length, taken in a rotenone station in about three feet of water over an area of mixed coral and sand in Kaneohe Bay on the north coast of Oahu, October 2, 1948 by Gosline and class.

GOSLINE, W. A. 1965

Vertical zonation of inshore fishes in the upper water layers of the Hawaiian Islands

Ecology 46(6):823-831

HIMB Contribution No. 230

publ.

HIMB

A summary of information regarding the vertical distribution of fishes in Hawaiian waters making reference to the reef in Kaneohe Bay. The pools in the splash zone contain very few but well differentiated species of fish. On exposed rocky shores just above sea level, the herbivorous blenny is the only fish found among the seaweed. Six meters below sea level are found the herbivores grazing on the short algal stubble. In the quiet water offshore in the coral zone, there is a greater diversity of species. Data on the zonation of the fishes below this point is scarce. Preliminary information suggests that the differentiation of the species at deeper

levels is far more gradual and that there is still a considerable number of species found to at least half a mile in depth.

GOSLINE, W. A. 1968  
Considerations regarding the evolution of Hawaiian animals  
Pacific Science 22(2): 267-273  
publ.  
Sinclair L.

A discussion of some aspects of the evolution of oceanic animals. The author explains the occurrence of insular evolution on oceanic islands and the possibility that this might be a small-scale model of what has happened on the continents. The details of insular evolution are somewhat unclear and so the author attempts to explain some of them. With the rapid decimation of many native insular habitats, soon many of them will be impossible to study. Reference is made to the introduction of the Marquesan sardine into the waters of Kaneohe Bay.

GOSLINE, W. A. and V. E. BROCK 1960  
Handbook of Hawaiian Fishes  
University of Hawaii Press, Honolulu  
publ.  
Sinclair L.

A complete guide to the native inshore fishes found in the waters of the Hawaiian Islands (with a literature reference in Appendix B). Keys are provided for all Hawaiian fish families and for all inshore species. Illustrations are given only as aids to identification, there are no colour plates. To reduce confusion with the variety of common names, the authors have given both the scientific and the preferred common name for each fish.

GRIGG, R. W. 1964

A contribution to the biology and ecology of the black coral,

Antipathes grandis in Hawaii

MSc. Thesis, University of Hawaii

unpubl.

Sinclair L.

An investigation of the ecological factors which limit the distribution of the black coral, Antipathes grandis Verrill, into deeper waters. Studies were also made of the benthic habitat below 30 meters in an effort to understand the vertical zonation of this and other forms of life. A series of 15 stations were selected on Maui and Oahu into which branches of the black coral were transplanted over a period of six months. Hydrographic data of the areas were collected: light penetration, current, turbidity, surge, oxygen concentration, salinity, temperature and depth. The texture and type of substrate were recorded and population counts were made. With this data, a comparison between the stations could be drawn and the factors limiting the distribution could be delineated. Three stations were set up in Kaneohe Bay: 1a. Moku Manu, 500 yd. off headland; 1b. Moku Manu, 50 yd. off headland; and 15. Coconut Island on the reef slope. Results showed that adult colonies could withstand light intensities up to 60% of the surface incident light, depths from 1-146 meters and are limited by the abrasive effects of surge. Oxygen concentration and temperature do not appear to limit distribution. It is postulated that the larvae are photonegative in strong light intensities hence settlement occurs below 40 meters. It appeared that calcium carbonate was a more preferable substrate than basalt and that the most favorable range of current for growth was between 0.5 to 2 knots. Rough estimates of growth average 1.2 cm annually. Reproduction is sexual and asexual.

GRIGG, R. W. 1965  
Ecological studies of the black coral in Hawaii  
Pacific Science 19(2): 244-260  
publ.  
Sinclair L.

A study to determine the ecological factors which limit the distribution of this species into deeper water. Kaneohe Bay was one of the areas to which the coral was transported from Lahaina, Maui. Because of the extreme turbidity in Kaneohe Bay, there are no excessive fluctuations in salinity, oxygen concentration and temperature, so that other environmental controlling factors could be studied.

Results showed that adult colonies can withstand intensities up to 60% of the surface incident light. Adult are found from 1-146 meters indicating that pressure is not a limiting factor. Oxygen concentration, salinity and temperature are relatively stable in the natural environment. Adult colonies are limited by the abrasive action of the surge. The larvae are postulated to be photonegative as most colonies are found below 35 meters. Evidently, the larvae will not settle unless the light penetration is less than 25% of the surface light. Some evidence shows that a  $\text{CaCO}_3$  substrate is more favorable than a basaltic substrate. The most favorable current for growth ranges between 0.5 and 2 knots.

GROSVENOR, G. 1924  
The Hawaiian Islands: America's strongest outpost of defense,  
the volcanic and floral wonderland of the world  
National Geographic XLV(2): 115-238  
publ.  
Bryan

A complete issue of the National Geographic on the Hawaiian Islands depicting their history, geology, culture and natural history. The article contains many interesting photographs in both black and white and in color tints - two of which are the royal fish pond at Kaneohe and the pond at Heeia.

GRUNWALD, R. 1967  
 The distribution of zirconium in Hawaiian sediments  
 MSc. Thesis, University of Hawaii, 85 pp.  
 unpubl.  
 Sinclair L.

A study of Hawaiian sediment samples from 57 locations analyzed for zirconium. Chelation by EDTA was used to dissolve authigenic ferromanganese oxides and absorbed fractions. Soluble zirconium was employed as a measure of total authigenic zirconium. Results showed that there was no correlation between zirconium concentration in a carbonate free base and distance from nearest land, but zirconium concentration increased with increasing latitudes. Also the percentage acid soluble zirconium decreased with increasing latitudes and was not related to distance from shore. Due possibly to dilution of subaerially weathered detritus by pelagic sediments since the most heavily weathered Hawaiian Islands, Kauai and Oahu, lie in the same latitudes. Another possible cause is the decrease of continental derived aeolian debris toward the equator in this latitude. There were 2 stations taken off Kaneohe Bay, number 2 was an 86 cm core of silty fine calcareous sand and number 4 was a core of calcareous silt.

GUINThER, E. 1968  
 Biology of some Hawaiian Epitoniidae  
 Abstract. Biology of Molluscs. Graduate Training Program, U. H.  
 HIMB Technical Report No. 18  
 publ.  
 HIMB

A study of four species of Epitonium in Kaneohe Bay and their associated coelenterates: E. fucatum Pease (with Marcanthea cookei); E. hyalina-mokulensis Pilsbry (with Boloceriodes lilae); E. ulu Pilsbry (with Fungia scutaria); and a species resembling E. costalum Sowerby (also with F. scutaria). E. fucatum maintains one large population in Kaneohe Bay associated with the anemone on which they feed. Individuals collected in



Kealakekua Bay were not in association with any anemone although they will eat M. cookei. E. hyalina is rare in Kaneohe Bay although its associated anemone is quite abundant. E. ulu is the most common species of this genus in the bay. Only three individuals of E. costulatum were found during the study.

GUNDERSON, K. R. and D. B. STROUPE 1967  
 Bacterial pollution of Kaneohe Bay, Oahu  
 Water Resources Research Center, U. H. Technical Report No. 12  
 publ.  
 WRRRC

Six regularly monitored stations and several supplementary stations were established in the middle and southern sections of Kaneohe Bay at which the presence and numbers of coliform bacteria, fecal streptococci (enterococci) and bacteria capable of growing on peptone-seawater agar at 28° were studied in a period of June to August, 1967. The bacterial concentrations in various parts of the bay were compared with Public Health water standards.

GUPTA, K. C. 1967  
 Marine Sterols  
 PhD. Thesis, University of Hawaii, 185 pp.  
 unpubl.  
 Sinclair L.

A systematic investigation of the sterols of marine invertebrates, chiefly the sterols of members of the family Zoanthidae, phylum Coelenterata, and those of members of the phylum Echinodermata, with a two-fold purpose: to replace the existing fragmentary data with comprehensive and accurate information and to explore a possible relationship between sterol composition and taxonomic classification. An improved method for the separation of mixtures closely related to sterols was devised to insure pure solutions of the sterols. Physical data of pure sterols other than melting point and rotation was recorded in an effort to clarify the confusion existing

in sterol literature.

Zoanths for the study were collected during 1964-1967 from various locations including the islands of Oahu (Coconut Island), Tahiti, Maui, Eniwetok Atoll and the Marshall Islands.

HANDY, E. S. C. 1940  
The Hawaiian Planter vol. 1. His plants, methods and areas  
of cultivation  
B. P. Bishop Museum Bull. 161: 1-226  
publ.  
BPBM/Sinclair L.

An ethnologist's study of the cultivated plants introduced by the Hawaiians before the discovery of the islands by Europeans, of the Hawaiian horticultural methods and of the extent to which they utilized their resources of soil and water. A geographical description of the Kaneohe Bay watershed area is given. Evidence is given of the important role of the fishing trade in the area in the form of a large number of large stone dams on the beach area below the town.

HARAMOTO, F. H. 1966  
Biology and control of Brevipalus phoenicis (Geijskes)  
(Acarina: Tenuipalpidae)  
PhD. Thesis, University of Hawaii  
unpubl.  
Sinclair L.

A detailed biological study of the red and black flat mite, B. phoenicis (Geijskes). The origin of this pest is obscure although it is believed to be tropical. It is dangerous to papaya crops. Part of this study was conducted in Kaneohe from January 1962 to December 1963 on the papaya fields.

HARTMAN, O. 1966  
 Polychaetous annelids of the Hawaiian Islands  
 B. P. Bishop Museum Occ. Papers 23(11): 163-252  
 publ.  
 BPBM/Sinclair L.

A report assembling all published records of polychaetous annelids named from the Hawaiian Islands. Some unpublished records are included, based on collections from littoral regions. Descriptions are given of two new species and one new genus.

HATCH, G. 1958  
 Honolulu Christmas Count, December 21, 1958  
 Elepaio 19(8): 47-50  
 publ.  
 BPBM

The 17th annual Christmas bird count done by the Hawaii Audubon Society. This year was the first time that the blue-faced booby has been reported to be on Oahu at Christmas. It was seen on Moku Manu.

Moku Manu - blue faced booby (1), red footed booby (460), great frigate bird (725).

Ulupau Head - brown booby (20), red footed booby (1100), black (night) heron (1), American golden plover (78), ruddy turnstone (31), wandering tattler (3), Hawaiian stilt (27), spotted dove (7), barred dove (60), mynah (17), white eye (3), rice bird (150), house sparrow (51), cardinal (N. A.) (12), Brazilian cardinal (4), house finch (7).

HELFRICH, P. H. 1958

The early life history and reproductive behavior of the maomao,

Abudefduf abdominalis (Quoy and Gaimard)

PhD. Thesis, University of Hawaii

unpubl.

Sinclair L.

A study of the embryonic, larval and adult stages of the maomao with respect to various elements in the environment which may affect the survival of each stage. Factors controlling the spawning cycle, fluctuations in abundance and fecundity are also reviewed to determine how they might influence the reproductive potential of this species. The reproductive activities of the maomao were observed in Southwest Point and Tuna Road, two shallow water spawning areas on Coconut Island, Kaneohe Bay. Results showed the habitat of the maomao to be varied, extending over a considerable range of depth and substrate type with the exclusion of extensive muddy and sandy areas. The maomao is broadly omnivorous. Coloration includes two categories - normal adaptive coloration and nuptial coloration. The structure of the reproductive system is similar to other teleosts with external fertilization. The sex ratio noted in this study was 68.16% male and 31.4% female but there is evidence of selective sampling. The fecundity of female maomao was not determined although a single female was estimated to spawn an average of 21,400 eggs at one time. The spawning cycle continued throughout the year with increased spawning from mid-December to September and a peak in May or June. Eggs are described, mortality, development, rearing and adult rearing behavior as well as mating behavior were studied and described.

HELFRICH, P. 1963  
 Fish poisoning in Hawaii  
 Hawaii Medical Journal 22:361-372  
 HIMB Contribution No. 186  
 publ.  
 HIMB

A review of the categories of fish poisoning, their symptomology, treatment and other information of value to the public and to physicians. The review makes reference to investigations on the causes of Ciguatera being carried out at the Hawaii Marine Lab, Kaneohe Bay, and to investigations on tetraodon poisoning using female specimens of Arothron hispidus collected in Kaneohe Bay.

HELFRICH, P. and A. H. BANNER 1960  
 Hallucinatory mullet poisoning - a preliminary report  
 J. Tropical Medicine and Hygiene, April 1960: 1-4  
 HIMB Contribution No. 126  
 publ.  
 HIMB

Two species of mullet, Mugil cephalus L. and Neomyxus chaptalli (Eydoux and Souleyet) and two species of goatfish, Mulloidichthys samoensis (Gunter) and Upeneus arge (Jordan and Evermann) have been reported in Hawaii to cause a type of intoxication termed 'hallucinatory mullet poisoning' by the authors.

Afflictions are sporadic rather than general which has led people to believe that quantities of the blue-green algae, Lyngbya majuscula, eaten by the fish causes poisoning. However, Lyngbya is found abundantly in areas where there has been no toxic reports, such as Kaneohe Bay.

HELFRICH, P. and S. J. TOWNSLEY 1961  
 The influence of the sea  
 Tenth Pacific Science Congress of the Pacific Science Assoc.  
 HIMB Contribution No. 168  
 publ.  
 HIMB

A general description of island ecosystems with reference to work at Coconut Island by Gordon and Kelly, 1962.

HELFRICH, P. H. and S. J. TOWNSLEY 1964-1968  
 Biology of Palythoa and related forms  
 Contract of U.S. Army, Edgewood Arsenal Laboratories  
 contract no. DA18-035-AMC-316(A)  
 publ.  
 Helfrich

A study involving three annual reports, nine quarterly reports, and twenty-four monthly reports on the biology of the Palythoa and related forms.

Numerous references to collections of zooanthids from Kaneohe Bay are made including a draft of a taxonomic revision of the family Zoanthidae from Hawaii.

Data for Kaneohe Bay:

<u>Zoanthus nitidus</u>	Goat Island
<u>Zoanthus confertus</u>	Coconut Island on the reef flat, boat channel, lagoon and edge of reef
<u>Palythoa vestitus</u>	Coconut Island on reef edge, lagoon and sand flat
<u>Palythoa tuberculosa</u>	Coconut Island in the lagoon
<u>Edwardsia</u> sp.	Coconut Island in the lagoon
<u>Epizoanthus</u> ?	Coconut Island on the reef flat
<u>Zoanthus</u> ?	Coconut Island on the reef flat
<u>Palythoa</u> ?	Turtle Island
<u>Palythoa</u> ?	Chinaman's Hat

Data includes toxin content in mg/kg.

HERNANDEZ, J. V. 1964  
 A study of the concentration and size of the barnacle, Balanus amphitrite as a factor of wave action and splash zone  
 Student report, Marine Ecology 620  
 unpubl.  
 Reese

A report of a study made on the Hawaiian species of Balanus amphitrite to determine whether the concentration and size of the individuals is affected by the amount of wave action and the splash zone. The area of intensive study was at the Kaneohe Bay Anchorage. The greatest number of barnacles was found in the highest splash zone and better wave action.

HIATT, J. 1964

A comparison of salinity tolerance in two families of shrimps:  
the Atyidae and the Palaemonidae  
Student report, Marine Ecology 620  
unpubl.  
Reese

A report of an experiment designed to test the salinity tolerances of the two families of shrimps, while keeping other variables, such as temperature, constant. The Atyidae were collected from Manoa Stream while the palaemonids were collected from the Anchorage in Kaneohe Bay.

Results showed that the Atyidae have good tolerance to 33, 50 and 100% seawater and that the Palaemonidae have good tolerance to 33, 50% solutions. Thus the latter species can withstand brackish water more than the former. Results are discussed in relation to their environments.

HIATT, R. W. 1948

Records of rare Hawaiian Decapod Crustacea  
Pacific Science 2(2): 78-80  
publ.  
Sinclair L.

A taxonomic study of some rare or previously unknown decapod crustacea from Hawaii. Hymenocera elegans Heller was found in a Porites coral head in Kaneohe Bay. The collection is now housed at the Hawaii Marine Laboratory, Coconut Island.

HIATT, R. W. 1951

Food and feeding habits of the nehu, Stolephorus purpureus Fowler  
Pacific Science 5(4): 347-358  
HML Contribution No. 9  
publ.  
HIMB

A study of the food and feeding habits of the nehu in an attempt to learn more of this important baitfish. Kaneohe Bay, where the studies were done, provides more than 60% of the total commercial catch according to statistics of the Territorial Division of Fish and Game.

Results showed that copepods, barnacle nauplii and mysis larvae of shrimps were most important in the diet of the nehu taken in Kaneohe Bay, while other animals were more important to nehu in other areas. The nehu are selective feeders in that they feed only on the crustacean elements in the plankton. The author concludes that further study on the relation of vigor to size and of size to food available may indicate the principles underlying the apparent differences in size and vigor of nehu in the various baiting grounds.

HIATT, R. W. 1951  
The food and feeding habits of nehu  
HML News Circular No. 11  
publ.  
HIMB

A study of the food and the feeding habits of the nehu which is part of a greater study on nehu spawning, growth, habits and preferences for certain kinds of water in an effort to understand why nehu are more abundant in some areas than in others during different times of the year as well as other problems with the nehu populations. Nehu were studied in Kaneohe Bay, Ala Wai Canal, Honolulu Harbor, Pearl Harbor and Hilo Bay.

Results indicated that the abundance of nehu was dependent on the availability of food but that factors other than food are probably more important in causing seasonal changes in the nehu population. The size of the nehu appears to be directly related to the presence or absence of the larger food animals. Small nehu seem to have less vigor and strength than the larger fish. The decrease in the nehu population in Hilo Bay is due to the decrease in the kinds and amount of food available. The latter is due probably to the erection of the breakwater across the bay or to the discharge of bagasse and silt from the sugar factories.



HIATT, R. W. 1954  
 Hawaiian marine invertebrates - A guide to their identification  
 An Invertebrate Course Manual, U. H., 140 pp.  
 unpubl.  
 HIMB

The laboratory manual of Zoology 281, Taxonomy of Marine Invertebrates.  
 Included are keys to all the major classes of invertebrates, descriptions  
 of all phyla and a glossary to the descriptive terms used. General re-  
 ferences are made to Kaneohe Bay: the black columnar sponges are common  
 in the coral colonies and the hydroid, Pennaria tiarella McCrady is also  
 common in the bay.

HIATT, R. W. and A. L. TESTER 1949  
 Parasites of the nehu  
 HML News Circular No. 3  
 publ.  
 HIMB

A short article on the occurrence of parasites in the nehu baitfish.  
 Apparently, parasites are only found in the nehu population in Kaneohe  
 Bay--other populations in the Ala Wai Canal, Pearl Harbor, Kihei and Hilo  
 are reported to have no parasites. The nehu in Kaneohe Bay were examined  
 the year round and the authors give the number of fish with tapeworm lar-  
 vae and with roundworms for each month. The effect of such infestation  
 was unknown.

HIATT, R. W. and A. L. TESTER 1949  
 Nehu populations  
 HML News Circular No. 4  
 publ.  
 HIMB

An article on the possible differences in the populations of nehu in the  
 important baitfish fishing areas - Kaneohe Bay, Ala Wai Canal, Pearl Har-  
 bor, Kihei and Hilo. The fish were weighed and measured, bleached in  
 hydrogen peroxide, stained in alizarin (red dye) and mounted in glycerin.

This method made the fish transparent and stained the backbone so that vertebral counts could be made. The average number of vertebrae between the areas was found to differ significantly which suggested localized populations.

HIATT, R. W. and A. L. TESTER 1950  
 Nehu Catch Statistics  
 HML News Circular No. 5  
 publ.  
 HIMB

A discussion of the problems of the catch statistics which the fishermen are required to submit to the Division of Fish and Game. The ten most important nehu fishing areas in the state (with the percentage of total nehu catch in the previous 3 years) are: Kaneohe Bay, Oahu (57.3%); Kihei, Maui (22.5%); Hilo, Hawaii (4.4%); Ala Wai Canal, Oahu (4.2%); Kawaihee, Hawaii (2.5%); Pearl Harbor, Oahu (2.3%); Kahului-Paia, Maui (2.0%); Honolulu Harbor, Oahu (1.4%); Hanalei, Kauai (0.6%); and Kaunakakai, Molokai (0.6%).

HIATT, R. W. and A. L. TESTER 1950  
 The supply of nehu  
 HML News Circular No. 6  
 publ.  
 HIMB

A discussion centered around the question, 'How is the supply of nehu holding up?', a question which is important to the aku fishermen who depend on the nehu for livebait. Total catch statistics for the previous 5 years were examined as well as catch statistics per boat per month for the previous 5 years. The results showed that heavily fished areas such as Kaneohe Bay have been nearly fished to capacity due to the number of boats fishing in the bay. Precautions to prevent overfishing are suggested.

HIGA, G. 1967

A quantitative study of the fixed motor patterns of the shrimp, Stenopus hispidus, particularly those movements associated with self-grooming  
MSc. Thesis, Plan B-Zoology, University of Hawaii  
unpubl.  
Zoology Dept.

A literature review of shrimp cleaning symbiosis and a quantitative analysis of the fixed motor patterns in the self-grooming behavior of Stenopus hispidus. To study the latter problem, the grooming behavior of S. hispidus was compared to that of Hippolytina grabhami to determine the fixed motor patterns of this behavior in each shrimp. Along with these studies, observations were made on S. hispidus when one member of the major pair of pereopods had been amputated.

The research was conducted on Coconut Island with shrimp from Kewalo Basin and Kaneohe Bay. Mention is made of finding six possible new species of shrimp but no descriptions are given.

HIGGINS, J.

A study of the population density of a clam, Ruditapes philippinarum in conjunction with pollution in the northeastern section of Kaneohe Bay  
Student report, Marine Ecology 620  
unpubl.  
Helfrich

A project studying the population density of Ruditapes philippinarum in conjunction with the flow of sewage from the Kaneohe Marine Corps Air Station over the northeastern part of the Kaneohe Bay reef. The number, length, body weight, and shell weight of the clams are recorded.

HIGGENS, J. H. 1969  
Some aspects of the ecology of a bivalve mollusk in Kaneohe Bay,  
Oahu, Hawaii  
MSc. Thesis, University of Hawaii  
unpubl.  
HIMB/Sinclair L.

A study of some aspects of the ecology of the clam, Tapes philippinarum Adams and Reeve, 1867. The author collected relevant ecological data with emphasis on the distribution and growth of clams in various parts of the bay in order to determine what limits distribution and the effects (if any) which pollution may have on the clam beds. The author also determined the interaction of Tapes with other species, particularly predators and L. reevi, a co-occurring filterfeeder and he studied the effects of harvesting on abundance and population structure. The study was conducted in the southeastern section of Kaneohe Bay. Clam distribution was shown to be possibly related to substratum, circulation, depth and salinity. The larvae settle in the spring, the peak time being between April and May. The growth rate of the clams varied with location in the bay which may be due to possible nutritional differences in various parts of the bay. The effects of clambers on the clam population showed the biggest clams on the periphery of the beds were taken, leaving the smaller clams in the centralized crowded areas. The average weight of the clams dropped 35% (1.7 - 1.1 gms) as virtually all the clams above the legal size limit (25 mm) were taken. Approximately 50% of the total clam population was reduced by clambers, 15% of this were clams above the legal size limit, indicating that smaller clams were being illegally harvested. Several regulations are suggested by the author to insure the continued harvest of clams.

HILTON, W. A. 1942  
 Pycnogonids from Hawaii  
 B. P. Bishop Museum Occ. Papers 17(3): 43-55  
 publ.  
 BPBM/Sinclair L.

A taxonomic description of the pycnogonids collected mainly by C. H. Edmondson. A number of new species and one new genus are described. All the specimens are presently in the Bishop Museum. Those species collected from Kaneohe Bay include:

Endeis (Phoxichillus) nodosa n. sp. - collected 1924-1927 from hydroids by V. Pietschmann

HINEGARDNER, R. T. 1961  
 Studies on the sea urchin egg nucleus: its isolation, structure, physical properties and DNA content  
 PhD. Thesis, University of Hawaii  
 unpubl.  
 Sinclair L.

A study on the determination of DNA in the sea urchin egg nucleus - this involved development of a method for measuring the DNA content of the nucleus alone. This problem involved a number of other minor problems as well: the distribution of the local sea urchin and their spawning seasons and the isolation of the egg nucleus. Most of the collecting and experimental work was conducted at the Hawaii Marine Laboratory, Coconut Island, Kaneohe Bay.

HOBSON, E. S. 1963  
 Feeding behavior in three species of sharks  
 Pacific Science 17(2): 171-194  
 HIMB Contribution No. 180  
 publ.  
 HIMB

A study conducted in part at the Hawaii Marine Laboratory, Kaneohe Bay, in comparing the feeding behavior of three species of sharks. Their behavior was related to habitat and crowding within the experimental areas as well as to the sensory modalities involved.

HOLLENBERG, G. J. 1968  
An account of the species of Polysiphonia of the Central and Western  
tropical Pacific Ocean 1. Oligosiphonia  
Pacific Science 22(1): 56-98  
publ.  
Sinclair L.

A taxonomic account of the Oligosiphonia algae collected by Dr. M. S. Doty  
(1962) and by the author in 1948 of the Marshall Islands and in 1964-1965  
by Doty of widely scattered central and western tropical islands in the  
Pacific Ocean.

HOLLENBERG, G. J. 1968  
An account of the species of red alga, Polysiphonia, of the central  
and western tropical Pacific Ocean  
Pacific Science 22(2): 198  
publ.  
Sinclair L.

A taxonomic description of seven polysiphonous species - three of which  
are new. Three previously known species, P. homoia Setchell and Gardner  
1950, P. howei Hollenberg and P. tepdia Hollenberg were collected in  
Kaneohe Bay.

HOLLENBERG, G. J. 1968  
An account of the species of the red alga Herposiphonia occurring in  
the Central and Western Pacific Ocean  
Pacific Science 22(4): 536-560  
publ.  
Sinclair L.

A taxonomic study of fourteen species in the genus Herposiphonia collected  
in the Central and Western tropical Pacific Ocean. The nature and arrange-  
ment of trichoblasts and of the sexual reproductive structures as features  
of taxonomic importance were emphasized. Specimens of H. parca Setchell  
were collected in Kaneohe Bay.

HOLLOWELL, C. A. 1966

The effects of sewage from Kaneohe Marine Station on the population of the clam, Ruditapes philippinarum  
Student report, Zoology 620  
unpubl.  
Reese

A study of the clam population across the sewer flow and on either side of the flow to determine whether or not the clam population was influenced by the sewage outlet. The area studied was the sewer outlet of the Kaneohe Marine Station.

The author concludes that her results indicate that the clam population is being affected by the presence of sewage from the Marine Station sewer outlet. The population is favored by moderate amounts of sewage and will probably increase as long as conditions remain as they are.

HOLLY, M. 1935

Polychaeta from Hawaii  
B. P. Bishop Museum Bulletin 129  
publ.  
BPBM/Sinclair L.

A taxonomic study of the polychaeta collection which was part of a zoological collection made by Dr. Victor Pietschmann in Hawaii in 1928. Kaneohe Bay was one of the collecting sites. Most of the species described are the pelagic forms of nereids which were captured on the sea surface especially at night.

HOSKIN, G. P. 1968

The comparative biology and morphology of the parasitic prosobranchs Mucronalia nitidula Pease, 1860 and Mucronalia n. sp.  
MSc. Thesis, University of Hawaii, 117 pp.  
unpubl.  
Sinclair L.

A microanatomical study of two species of Mucronalia in an attempt to derive a more satisfactory description of these molluscs at the familial and subordinal level. Various aspects of the ecology, zoogeography, behavior

and physiology as related to nutrient uptake of these two species are also studied and compared. M. nitidula and its host, Holothuria atra, are common in Kaneohe Bay where some specimens for this study were collected. Other collection sites included Queens Surf, Oahu and the southern coast of Kauai.

HOUBRICK, J. R. and V. FRETTER 1969  
Some aspects of the functional anatomy and biology of Cymatium  
and Bursa  
Proc. Malac. Soc. Lond. 38: 415-429  
HIMB Contribution No. 333  
publ.  
HIMB

A description of the external anatomy and alimentary canal of two species from the Mesogastropod superfamily Tonnacea, Cymatium and Bursa, with consideration of their food and feeding habits. The reproductive system of both species is described and their reproductive activity is discussed. An egg mass with a structure similar to that of Cymatium nicobaricum and containing 400 eggs was dredged from a hard substratum in Kaneohe Bay. Three species found in Kaneohe Bay were studied: Bursa granularis (Roding, 1789), Cymatium nicobaricum (Roding, 1789) and Cymatium pileare (Linnaeus, 1758).

HOWE, M. A. 1934  
Hawaiian algae collected by Dr. Paul Galtsoff  
Wash. Acad. Sci. 24(1): 32-42  
publ.  
Hamilton L.

The taxonomic report of algae collected by Dr. P. Galtsoff during the summer of 1930 from Kaneohe Bay, Oahu and from Pearl and Hermes Reef, 1200 miles northwest of Oahu.



HSIAO, S. C. 1952  
 Reactions of tuna and other fish to stimuli  
 Part III. Observations on the reaction of tuna to artificial light  
 U. S. Dept. Interior - Fish and Wildlife Service  
 Special Scientific Report, Fisheries No. 91  
 HIMB Contribution No. 24  
 publ.  
 HIMB

A study of the reaction pattern of tuna, established in captivity, to different quantities and qualities of light stimuli noting their response to intensity and duration of light stimulation and to different frequencies of light.

Noethunnus macropterus and Euthynnus yaito were maintained in concrete tanks on Coconut Island, Kaneohe Bay.

HSIAO, S. C. and A. L. TESTER 1955  
 Response of tuna to visual and visual-chemical stimuli  
 U. S. Dept. Interior - Fish and Wildlife Service  
 Special Scientific Report, Fisheries No. 130, part 2  
 HIMB Contribution No. 48  
 publ.  
 HIMB

Behavioural study of twelve little tunny (Euthynnus yaito) maintained in concrete tanks on Coconut Island to determine whether visual lures would promote a tropistic response and whether this response was affected by chemical stimuli, extract of tuna flesh or by lure colour.

IKEHARA, I. I. 1961  
 Billy Weaver shark research and control program. Final Report  
 Division of Fish and Game - Dept. Agriculture and Conservation  
 publ.  
 HIMB

The final report of the Billy Weaver shark program (April 1959 - March 1960) which was designed to reduce the shark population within a relatively short period of time and also to permit the compilation of scientific data such as stomach contents and reproductive activity for future

use in controlling shark abundance. The fish were caught using hooked lines of half mile in length which were set parallel to the shore in the afternoon and retrieved at dawn or early the next morning.

Total 24 caught in outer waters and 27 in inner waters. A checklist of food items found in 166 sand sharks, 65 tigers and 43 small black tips sharks is given.

INGRAM, W. M. 1937  
Fouling organisms in Kaneohe Bay and Pearl Harbor  
MSc. Thesis, University of Hawaii  
unpubl.  
Sinclair L.

A study concerned with the biological phases of the various organisms which habitually attach themselves to submerged structures, to note their rate of growth, their relative abundance and seasonal succession. Because of the economic concern in fouling organisms attention was given to various experimental and artificial means of preventing or at least discouraging the attachment of these organisms. The study was centered in Kaneohe Bay and in Pearl Harbor for 18 and 12 months respectively starting in September 1935 and October 1935 respectively. The author notes no important difference in the species between the two areas. The total species list for each area is given.

INGRAM, W. M. 1939  
Endemic Hawaiian cowries  
B. P. Bishop Museum Occ. Papers 14(19): 327-333  
publ.  
BPBM/Sinclair L.

A paper dealing with individual variations in size and relative abundance of the five endemic Hawaiian cowries. Data concerning the possible evolution of these endemic species are also discussed and detailed systematic

descriptions of the individuals are given. Living specimens of Cyprae semiplota Mighels and C. sulcidentata Gray are found in Kaneohe Bay.

INGRAM, W. M. 1947  
Hawaiian Cypraeidae  
B. P. Bishop Museum Occ. Papers 19(1): 1-23  
publ.  
BPBM/Sinclair L.

A paper 'filling in the gaps in our knowledge' of the twenty-nine species of Hawaiian cowries. An effort is made to summarize the available published information. Five species of Cyprae are found in Kaneohe Bay.

ISHIMOTO, J. N. 1964  
Observations of the bottom contour and the surface currents at  
the Coconut Island lagoon  
Student report, Zoology 699  
unpubl.  
Helfrich

A study (July 13-31, 1964) of the variations in the currents and temperature in the Coconut Island lagoon to determine whether the porpoise pen in the lagoon has brought about any physical changes in the water and whether the water is suitable for laboratory animals kept in cages in the lagoon.

IWAMOTO, R. T. 1952  
An investigation of organic matter in Hawaiian ocean water  
and sediment  
MSc. Thesis, University of Hawaii  
unpubl.  
Sinclair L.

A study investigating the nature of organic matter in sea water, and in near shore ocean sediment. The organic matter was concentrated by Soxhlet extraction using ether, chloroform, ethyl acetate, toluene and petroleum ether as solvents. The amount of organic matter extracted was determined by Allison's modification of Schollenberger's method for determining

organic soil carbon by chromic acid oxidation. Organic analytical tests were applied to the extraction residues to determine their composition. Preliminary work was done in Kaneohe Bay, but the majority of sampling was carried out near Koko Head, Oahu.

JANDER, R., K. DAUMER and T. H. WATERMAN 1963  
Polarized light orientation by two Hawaiian decapod cephalopods  
Zeitschrift fur vergleichende Physiologie 46: 383-394  
publ.  
HIMB

A study investigating the orientation behaviour of two small decapods Euprymna morsei and Sepioteuthis lessoniana, which were caught by night light fishing from the shore of Coconut Island, Kaneohe Bay, to determine whether the rhabdom-like structures of the photoreceptors are orientated to perceive polarized light.

In a vertical beam of linearly polarized light and in horizontal light intensity patterns, the cephalopods showed 4 preferential swimming directions relative to the e-vector ( $0^\circ$ ,  $90^\circ$  and  $\pm 45^\circ$ ). The horizontal intensity patterns induced only positive or positive and negative phototactic orientation. When polarized light and intensity patterns were presented together, the polarized light response predominates. Polarized light vision in these decapod mollusks is a distinct perceptual process showing a remarkable convergence with this function in arthropods.

JOHANNES, R. E. 1963  
Uptake and release of phosphorus by representatives of a coastal marine ecosystem  
PhD. Thesis, University of Hawaii no. 42  
unpubl.  
Sinclair L.

An examination of some of the aspects of phosphorus uptake and release in the ecological cycle in the marine environment. The study also examines

the ecological significance of the phosphorus in both the living and non-living particles in the sea. The work was done in part at the marine lab on Coconut Island. The production and utilization of dissolved inorganic phosphate, soluble organic phosphorus and detrital phosphorus by representatives of three major trophic levels was studied - using diatoms (producer), amphipod (consumer) and bacteria (transformer). Chemical analyses replaced radiometric analyses where possible, using P32 in an effort to detect small quantities of phosphorus.

JOHANNES, R. E. 1964

Uptake and release of dissolved organic phosphorus by representatives of a coastal marine ecosystem

Limnology and Oceanography 9(2): 224-234

HIMB Contribution No. 199

publ.

HIMB

A study conducted at Coconut Island, Kaneohe Bay, concerning the production and utilization of dissolved organic phosphorus (DOP) by a diatom, an amphipod and mixed species of marine bacteria.

The amphipod, Lembos intermedius Schellberg was collected from seaweed growing at the Hawaii Marine Laboratory, Kaneohe Bay. The diatom, Achnanthes subhyalina n. sp. (Dr. P. S. Conger) was found in a coarse sand sample of mixed bacteria collected from a subsurface sample, 100 meters east of Coconut Island, Kaneohe Bay.

Results showed that over one-third of the soluble phosphorus released by the amphipod was in organic form (0.79  $\mu\text{g-at DOP/g}$  of animal/hr). Marine bacteria utilized 80% of this DOP; 30% was hydrolyzed in sterile media, possibly by alkaline phosphatase released by the amphipods. Bacteria-free diatoms released little DOP during growth, but released 20% of their total phosphorus as DOP after growth has ceased. Growing diatoms reabsorbed 40%

of this DOP; marine bacteria, 92%. No regeneration of dissolved inorganic phosphate from DOP in the presence of bacteria was noted. Marine bacteria, living or dead, released very little DOP.

JOHNSON, F. H. 1959  
 Kinetics of luminescence in Chaetopterus slime and the influence  
 of certain factors thereon  
 J. cell. and comp. physiol. 53(2): 259-278  
 HIMB Contribution No. 114  
 publ.  
 HIMB

An investigation carried out at Coconut Island on Chaetopterus variopedatus collected from coral in Kaneohe Bay, to determine the nature and the kinetical properties of the light emitting system, particularly in the free slime.

The initial rate of decay was nearly exponential, but decreased progressively, ending in a dim, long-lasting glow of luminescence. This decay rate was not altered by aeration, addition of seawater, FMN, DPNH or by ATP addition. The decay rate was increased by adding small amounts of decaldehyde to 8 volumes of distilled water. Attempts by various methods to obtain from the luminescent slime, components active in light emission led to negative or equivocal results.

JOHNSON, F. H. and M. M. JOHNSON 1959  
 The luminescent flash of Polycirrus  
 J. cell. and comp. physiol. 53(2): 179-186  
 HIMB Contribution No. 115  
 publ.  
 HIMB

A study conducted at Coconut Island with specimens of Polycirrus sp. collected in shallow water from coral in Kaneohe Bay, to investigate the response of the animal to electrical stimulation.

Repeated inductorium shocks produced a luminescent response consisting of

short flashes on the order of a tenth of a second in duration, with times of slightly over 10 milliseconds to reach half maximum intensity, and 20 to 24 milliseconds for one half decay at 24-26°C. The rate of decay from maximum intensity was exponential.

JOHNSON, G. E. 1965  
Behavioral observations on the rock crab, Grapsus grapsus at  
Coconut Island, Kaneohe Bay, Oahu, Hawaii  
MSc. Thesis, plan B-Zoology, University of Hawaii  
unpubl.  
Zoology Dept.

A study observing and describing the behavioral elements of the crab, G. grapsus from January to May, 1965. Individuals of all ages and communities were studied and from this an ethogram was developed with 23 fixed motor patterns and associated activities. The majority of observations were carried out on the outer regions of the artificial breakwater protecting the eastern lagoon of Coconut Island.

JOHNSON, V. R. Jr. 1966  
A mathematical analysis of the natural distribution pattern  
of the sea anemone, Marcanthea cookei  
Student report, Zoology 620  
unpubl.  
Reese

A description of the mathematical analysis used in studying the distribution of M. cookei in a natural population on a sandy reef flat near Coconut Island. The mathematical formula used was from Hazen (1964) 'Readings in Population and Community Ecology' based on measuring the distance between each individual and the nearest neighbour.

JOHNSON, V. R. Jr. 1969  
Behavior associated with pair formation in the banded shrimp,  
Stenopus hispidus (Olivier)  
Pacific Science 23(1): 40-50  
HIMB Contribution No. 316  
publ.  
HIMB

A study investigating intraspecific sex recognition and pair formation in Stenopus. Some aspects of this behavior studied were the quickness with which the shrimps form pairs, whether the pair in the field is always male and female and how intraspecific sex recognition is accomplished. Shrimps were caught in the Ala Wai Yacht Harbor, the Diamond Head and Ala Moana reefs and one third of the specimens were taken from the Kaneohe Bay reef. These animals were taken to the laboratory on Coconut Island and put into aquaria for behavioral experiments.

JONES, R. S. 1964  
Some observations on the phenomenon of habituation in the  
African land snail, Achatina fulica  
Student report, Zoology 606  
unpubl.  
Reese

A study of the range of stimuli which will elicit habituation in the snail, A. fulica. Other aspects of the study include: a determination of whether a significant sample of the population habituated approximately the same point in the scale of stimulation and to see if time, the number of stimuli or the strength of stimuli played equal roles in habituation. The specimens were collected on Coconut Island, Kaneohe Bay.  
The animals often showed an erratic approach to habituation. As the time interval between the stimuli decreased, a smaller number of stimuli were needed to habituate the animal. With an increase in stimulus strength, a larger number of stimuli were necessary to habituate. The larger snails were noted to react more violently.



JONES, R. S. 1967

Ecological relationships in Hawaiian and Johnston Island Acanthuridae  
(surgeonfishes) with emphasis on food and feeding habits  
PhD. Thesis, University of Hawaii, 245 pp.  
unpubl.  
Sinclair L.

An investigation of the ecological relationships of the surgeonfishes of the Hawaiian Islands and Johnston Island with emphasis on the ecological separation by habitat, foraging methods and food eaten. In addition, comparative studies of the gross morphology of the alimentary canals of the species were undertaken in an effort to elucidate possible 'adaptations' in the feeding mechanisms of the species. The author had four stations in the Kaneohe Bay area: Moku Manu (no. 9), Kaneohe Outer reef (10), Kaneohe Bay (11), and Kuloa Point (12). Most of the experimental work was done in La Perouse Bay, Maui, in Kealekekua Bay, Hawaii, and on Johnston Island.

JORDAN, D. S. and B. W. EVERMANN 1902

The fishes and fisheries of the Hawaiian Islands: A preliminary report  
U. S. Fish Com. Report for 1901: 353-380  
publ.  
BPBM

A comprehensive report on the fishes and fisheries of the Hawaiian Islands including a qualitative and quantitative study of the commercial and shore fishes, molluscs, crustaceans and other aquatic animals and plants. The methods, extent and history of the fisheries and the fishery laws are also reviewed and the possibilities of improving methods of fishing, handling and marketing are discussed. When discussing the fishery laws, the shoal areas around Kapapa Island in Kaneohe Bay are noted for their abundance of fish (p. 364). This area was put under the protective taboo of the tax officers for the king at certain seasons of the year.

JORDAN, D. S. and B. W. EVERMANN 1905  
 The shore fishes of the Hawaiian Islands, with a general  
 account of the fish fauna  
 Bull. U. S. Fish Comm. vol. 23 for 1903, part 1: 574 pp.  
 publ.  
 Sinclair L.

A brief summary of ichthyological work on the Hawaiian fauna previous to 1901 and a descriptive report of the shore fishes found by the U. S. Fish Commission's studies in 1901 and 1902. Field investigations in 1901 were devoted to shore fishes (of which this is the final report) and in 1902 the studies were primarily on deeper fauna (in which there was no mention of fish caught in Kaneohe Bay area - Bull. U. S. Fish Comm. for 1903, part 2: 765 pp.). Most of the collecting was done in Honolulu, although visits were made to Hilo, Lahaina (Maui), Kailua and Molokai and other places. The Honolulu market was the largest collecting area, while great numbers of specimens were obtained in shallow water and on coral reefs about Honolulu, Waikiki, Moana Lua, Waianae, Wailua, Waimea and Heeia. On p. 248 the authors report finding Sectator azureus Jordan and Evermann in Heeia, Oahu (family Kyphosidae). The authors commented that "this species must be very rare being unknown to the fisherman and only a single specimen having been obtained by us". Type no. 50664, U. S. N. M. (field No. 03363), 15.25" long being taken off the shore near Heeia, Oahu.

JOSEPHSON, R. K. and S. C. MARCH 1966  
 The swimming performance of the sea-anemone, Bolocerooides  
 J. Exp. Biol. 44: 493-506  
 HIMB Contribution No. 222  
 publ.  
 HIMB

A study of the swimming ability of Bolocerooides and the ways in which the usual anemone organization has been modified for swimming. The animals were collected in the vicinity of Coconut Island. Results showed that the

anemones swim by a repeated aboral-oral inflection of the tentacles which make up over 90% of the weight of the anemone. The tentacles at different distances from the mouth, were shown to beat slightly out of phase with each other. The swimming velocity was about 1.9 cm/second. In tethered swimming experiments, it was shown that the maximum forward force developed during a stroke increases with animal size approximately as the square of the diameter of the tentacle crown. The average forward force of the flexion cycle is about 5% of the maximum force due to the rearward recovery portion of the cycle.

KAMI, H. 1962

Introduction of marine game fishes from areas in the Pacific Reef and Inshore Game Fish Management Research Project

F-5-R-10, Job No. 9

publ.

Helfrich

A study in which 7,200 snappers and groupers consisting of 4 species each, were collected at Moorea, French Oceania and live-shipped to Oahu where the entire shipment was released at an artificial shoal site at Maunalua Bay. Live specimens were occasionally recovered by local commercial fishermen, measured, weighed and tagged and then released for growth rate and migration data.

Reference to Kaneohe Bay:

40 specimens of Lutjanus gibbus were released into Kaneohe Bay from Marquesas Islands in 1958 - no recoveries

Epinephelus merra were released into Kaneohe Bay in 1956 - no recoveries

KAMI, H. 1961

Introduction of marine game fishes from areas in the Pacific Reef and Inshore Game Fish Management Research Project

No. F-5-R-9, Job No. 9

unpubl.

Helfrich

A study involving the biology of certain Pacific game fish in their native habitat, their transportation to new habitats and their recovery. Snappers, L. vaigiensis, were caught in commercially operated mullet ponds on three occasions in Kaneohe Bay. Each was tagged and released for later compilation of growth data.

KAWAMOTO, P. and W. MOTOOKA 1964

Habituation in fishes

Student report, Zoology 606

unpubl.

HIMB

A study to determine habituation in fishes by examining three species of fresh water fishes, Betta splendens, the siamese fighting fish, Xiphophorus maculatus, the moon fishes and Lebistes reticulatus, the guppy.

The guppies were collected in a stream in Kaneohe. The method of determining habituation differed in each case - the siamese fighting fish were presented with a mirror image and the time taken for the fish to stop displaying the fighting behavior was noted; the guppies and moonfishes were both tested using sound-vibration experiments. The siamese fighting fish took approximately  $2\frac{1}{2}$  hours to completely habituate to the mirror image. The moonfishes showed a true limit to habituation to sound vibration while the guppies showed no response in the relearning trials. The complications of determining habituation are discussed relative to these cases.

KAY, E. ALISON 1970  
The Biology of Molluscs - A Collection of Abstracts  
HIMB Technical Report No. 18  
publ.  
HIMB

A collection of 26 abstracts of projects completed during the NSF sponsored Graduate Training Program on The Biology of Molluscs, held at the Hawaii Institute of Marine Biology during the summer of 1968 - 17 June to 6 September.

KAY, E. A. 1970  
Some common vermetid gastropods of Kaneohe Bay, Oahu  
and their methods of feeding  
Abstract. Biology of Molluscs. Graduate Training Program, U. H.  
1968  
HIMB Technical Report No. 18  
publ.  
HIMB

A description of the feeding methods of six commonly occurring vermetids (Mesogastropods: Vermetidae) in Kaneohe Bay, Oahu. Only one, Dendropoma platypus Morch has been previously recorded in Hawaiian waters; the others, 2 species of Dendropoma, one species of Serpulorbis and two species of Vermetus appear to be undescribed. All are solitary forms, occurring on coral, sea walls, etc.

KAY, E. ALISON  
Marine mollusca of the Hawaiian Islands  
Unpublished manuscript  
unpubl.  
HIMB

A taxonomic description of the marine mollusca of the Hawaiian Islands with keys to the major families. Many species are recorded from Oahu, but no specific localities are given. Although it makes no reference to Kaneohe Bay, the work is invaluable to the malacologist desiring descriptions or systematic information.

KEY, G. S. 1969a

A study of biomass, productivity and species diversity in Kaneohe Bay, Oahu, Hawaii  
Student report, Marine Ecology  
unpubl.  
Ebert

A study of the diatom community in Kaneohe Bay with respect to productivity, biomass, standing crop and species diversity. Diatom communities in polluted areas of the Bay were also studied to discern the effects of pollution on the community structure and function.

KEY, G. S. 1969b

A study of density - dependent growth and mortality in Littorina scabra  
Student report, Marine Ecology  
unpubl.  
Ebert

A study attempting to show the density dependence in a field population of the marine snails, Littorina scabra, on the Lilipuna dock and adjacent sea walls at the southwest end of Kaneohe Bay, Oahu. Snails were removed from the dock pilings, sized and sexed. Each snail was tagged according to its size class and put into one of five arbitrary densities which were then assigned to each piling by the use of a table of random numbers. The snails were returned to the pilings and at irregular intervals, the snails were counted. Statistics were used to determine growth and mortality of the population(s).

KHEMKA, K. C. ?

A study of discrimination learning in the crab, Metapograpsus messor  
Student report, Zoology 606  
unpubl.  
Reese

A study of the discrimination patterns in the crab, M. messor. The author was interested to see whether the crab would learn to choose a black object in a lesser number of trials, taking less mean time, than it would

take to learn to choose a white object in a two-choice discrimination situation. The animals were collected near the Hawaii Marine Laboratory, Kaneohe Bay.

Results showed that a comparatively small number of trials were needed to learn to choose a black target over a white target.

KINZIE, R. 1966  
Stomatopod collection notes  
Manuscript notes  
unpubl.  
HIMB

Some xeroxed notes on stomatopod collections made at various sites around Oahu, including some made in Kaneohe Bay. In Kaneohe Bay, three areas close to Coconut Island, were repeatedly sampled using plankton tows from October 1, 1964 to October 14, 1965. The author noted the species collected, weather conditions and in the case of the plankton sample the amount of water filtered, the volume and the weight of the sample. No species list for the plankton samples taken in Kaneohe Bay was given.

KINZIE, R. A. III. 1968  
The ecology of the replacement of Pseudosquilla ciliata by Gonodactylus falcatus (Crustacea: Stomatopoda) recently introduced into the Hawaiian Islands  
Pacific Science 22(4): 465-475  
HIMB Contribution No. 312  
publ.  
Sinclair L.

A study investigating the hypothesis that the coral head habitat, once almost exclusively occupied by Pseudosquilla ciliata, has been taken over completely by Gonodactylus falcatus in about the last nine years. The origins, possible mode of introduction and mechanism of replacement of this takeover were also investigated. The paper includes the distribution and notes on the new Hawaiian species, G. falcatus (Forsk.) which was found in Kaneohe Bay and on G. hendersoni Manning which was not taken in Kaneohe Bay.

KLIM, D. G. 1969  
Interactions between sea water and coral reefs in Kaneohe  
Bay, Oahu, Hawaii  
HIMB Technical Report No. 16, 56 pp.  
unpubl.  
HIMB

A study covering an 8-month period, to determine if measurable changes in characteristics occur in sea water passing over a shallow coral reef. The parameters studied included salinity, temperature, current velocities, dissolved oxygen, pH, dissolved organic carbon and particulate carbon and suspended inorganic carbon. Staining and microscope observations were made to supplement the other data. The results showed noticeable increases in oxygen, pH, particulate organic and inorganic carbon abundance in the central portion of the reef, which were attributed to the influence of extensive growths of benthic algae found on the seaward edge. Dissolved organic carbon concentration increased gradually across the reef and there is evidence that inorganic carbonate is being accumulated on the leeward edge of the reef.

KOHN, A. J. 1959  
The ecology of Conus in Hawaii  
Ecological Monographs 29(1): 47-90  
publ.  
Hamilton L.

A study based on the ecological observations of natural populations of Conus in different areas with emphasis on the Indo-West Pacific region. Twenty-one species of Conus inhabit the coral reefs and marine benches fringing the Hawaiian Islands. The objectives of the study were to describe the ecological niches of these species, to determine the extent of isolation between ecologically similar species and then to elucidate the mechanisms that permit a large number of closely related species to survive and to retain their identity in a narrow environment.



KOHN, A. J. 1961  
 Studies on spawning behavior, egg masses and larval development  
 in the gastropod genus Conus. Part I. Observations on nine  
 species in Hawaii  
 Pacific Science 15(2): 163-179  
 HIMB Contribution No. 148  
 publ.  
 HIMB

Observations were conducted on three specimens of Conus found in Kaneohe  
 Bay:

Conus leopardus collected 25/4/56 - 19 capsules/cluster - 49-  
 58x34-37 mm

Conus quercinus collected 9/2/56 - 40 capsules/cluster - 19-  
 26x17-22 mm

C. quercinus collected 9/2/56 - 3 capsules/cluster - 17-19x18-20 mm  
 including the number of egg capsules/cluster and the maximum height times  
 the maximum breadth of the capsules.

The complete course of larval development within the egg capsule from  
 spawning to hatching is described for 4 species. Early cleavage stages  
 occur 1-3 days after spawning, spueressed trochophore stage at 2-6 days  
 and veliger stage at 6-10 days. Freely swimming veligers hatched from  
 egg capsules of 3 species 14-15 days after oviposition. All species have  
 pelagic larvae produced in large numbers.

Hatching in C. pennaceus occurred 16-26 days after oviposition at the  
 advanced veliger or veliconcha stage. After swimming one day, they settle  
 to the bottom and metamorphose.

KOJIMA, E. S. 1965  
 Bacteriological studies on leukodermic lesions on the giant  
 African snail  
 MSc. Thesis, University of Hawaii  
 unpubl.  
 Sinclair L.

A study of Mead's Syndrome, a disease of the giant African land snail,  
Achatina fulica Bauditch, characterized by leukodermic lesions, using

methods of determinative bacteriology and techniques of immunochemistry, serology and fluorescent antibody-staining. Diseased snails were collected from Mahinui Street in Kaneohe, Oahu.

KRUSCHWITZ, L. G. 1966  
A population study of the clam, Ruditapes philippinarum, in Kaneohe Bay  
Student report, Zoology 620  
unpubl.  
Reese

A study on the relationship between an increase in the volume of sewage into an area and the resulting change in the fauna. The areas studied were the reef flats in front of the sewer outlets near Kaneohe Marine Station and the Kaneohe Stream. The population differences and core samples were compared for each area.

Investigation shows the population of R. philippinarum to be rapidly increasing in the southeast portion of Kaneohe Bay. Population density is greatest near the sewage outlets which suggests that enrichment of water from sewage is enhancing growth. It is cautioned that before equating this faunal change with pollution, it must be determined whether other factors, such as an increase in the amount of fresh water, are not causing this increase in Ruditapes growth.

KRUSCHWITZ, L. 1966  
A substratum analysis for the brachiopod, Lingula reevi  
Student report, Marine Ecology 620  
unpubl.  
Reese

A project analyzing sediment particle size and other environmental factors which might be related to the distribution of the brachiopod, L. reevi. Morgan's (1956) method was used for analyzing shallow water substrata and the author used Wentworth's (1927) classification of particle size. The

major part of the work was done on the sand bar in Kaneohe Bay with smaller studies on the lee side of the Kaneohe Marine Station and on the reef flat off Hickam Harbor.

Particle size may be important in the habitat because the composition of the sand is consistent in each sample. Fine or very fine sand is consistently present and it is probably necessary in the habitat. A base of coral rock or coral pebbles appears to be preferable.

KRUSCHWITZ, L. G. 1967  
Some aspects of the ecology and ethology of the shrimp,  
Saron marmoratus  
MSc. Thesis, University of Hawaii  
unpubl.  
Zoology Dept.

An ecological and ethological study of the shrimp, S. marmoratus. The shrimp were observed and collected in several areas around Oahu, including a patch reef in Kaneohe Bay and Coconut Island. The habitat, aggregations, social behavior, activity patterns and feeding were studied in the field. These studies provided a basis for the morphological and behavioral studies in the laboratory.

KUMAGAI, J. 1966  
Report on the phosphate determinations of Kaneohe Bay  
samples of July 19, 1966  
Water Resources Research Center, preliminary report  
unpubl.  
HIMB

The preliminary report of J. Kumagai to the Water Resources Research Center on the phosphate determinations done in Kaneohe Bay. This report is included in the WRRRC Memorandum report No. 6 on the phosphate determinations of the Kaneohe Bay samples and the Waimanalo samples which was published in the same year, 1966. Samples were taken by the State Health Department on July 19, delivered to the WRRRC lab where phosphate analysis was done

according to the method of Strickland and Parsons (1960, FRB, Canada, Bulletin 125). Results showed that the orthophosphate level in the four stations was above or below the critical phosphate level reported for algal growth. These four stations were at the entrance to the bay near the Marine Base; between the Marine Base outfall and the Kaneohe STP outfall; over the Kaneohe STP outfall and in the channel between Coconut Island and Oahu.

KUMAGAI, J. S. 1967  
Infiltration and percolation studies of sulfides and sewage  
carbonaceous matter  
Technical report No. 7, 58 pp.  
Final report for Pollution Effects of Groundwater Recharge in Hawaii  
publ.  
HIMB

A report of a laboratory study of the infiltration and percolation of sulfides and sewage carbonaceous matter which was conducted in 2 phases. Phase one utilized simulated cesspool lysimeters and phase two considered the generation of sulfides and the infiltration and percolation of sulfides through soil and sand columns. Phase one resulted in the need for further study as certain odorous compounds were percolated and COD removals were obtained under anaerobic conditions, contrary to previous literature. Phase two found that the soil column was more effective in sulfide removal than the sand column.

KUNISHI, H. M. 1956  
Mineral analysis of Hawaiian surface and seepage waters  
MSc. Thesis, University of Hawaii  
unpubl.  
Sinclair L.

A study of the analysis of surface and seepage waters of the Hawaiian Islands - Oahu, Maui, Kauai and Hawaii, to determine the amount and the type of substrates being carried in solution. From these analyses, relative

rates of removal of soluble substances were determined and attempts were made to determine the soil forming processes being favored by such movement. Work was done in Halawa Stream in the Kaneohe Bay watershed area.

LAEVASTU, T., D. E. AVERY and D. C. COX 1964  
Coastal currents and sewage disposal in the Hawaiian Islands  
Final Report - Hawaii State Dept. Planning and Research, 105 pp.  
HIG Report No. 64-1  
publ.  
HIG L.

A study of the means of disposal of sewage in the Hawaiian Islands, past, present and with recommendations from the findings of this report to avoid pollution in the future. Information applicable to problems of coastal currents, mixing and remineralization of sewage in Hawaii and similar areas is given as well as information on currents and mixing conditions in specific areas where sewage outfalls are contemplated. Seasonal changes in oceanographic and meteorological conditions for each of these proposed areas was studied. In the event of establishing new outlets, the information for the existing areas is generalized and made adaptable to a variety of locations. Kaneohe Bay was one of the areas studied on Oahu.

LAUBENFELS, M. W. de 1950  
The sponges of Kaneohe Bay, Oahu  
Pacific Science 4(1): 3-26  
HML Contribution No. 1  
publ.  
Sinclair L.

A taxonomic study of the sponges in Kaneohe Bay especially in the vicinity of Coconut Island. About a dozen species were common, another dozen were rare. A key to the genera is included.

LAUBENFELS, M. W. de 1957  
 New species and records of Hawaiian sponges  
 Pacific Science 11(2): 236  
 publ.  
 Sinclair L.

A paper based on three years of taxonomic study of the Hawaiian sponges.  
Myxilla rosacea (Lieberkuhn) Schmidt found in Kaneohe Bay was previously described in de Laubenfels, 1950.

LEE, R. S. K. 1963  
 The structure and reproduction of Dudresnaya hawaiiensis  
 sp. nov. (Rhodophyta)  
 Amer. Journ. Bot. 50: 315-319  
 publ.  
 Hamilton L.

A taxonomic description of Dudresnaya hawaiiensis sp. nov., the first time that this genus has been reported from the Hawaiian Islands. The gross vegetative structure of this new species is unique and the basal structures involved in post-fertilization which are typical of the genus are described. The typical locus for this species in Hawaii is in Kaneohe Bay. Specimens were collected in May, 1959 (Doty no. 19041) and in March, 1961 (Soegiarto no. 137).

LEE, R. and W. KNOWLTON 1962  
 Moku Manu  
 Paradise of the Pacific 74(7): 28-32  
 publ.  
 Sinclair L.

A short article on Moku Manu with several black and white photographs of brown boobies (and chicks), masked boobies, sooty terns, frigate birds, wedge-tailed shearwaters, red-footed boobies and noddy terns.

LEGGETT, J. D. 1964  
 Habituation of the shadow response in the sea urchin,  
Echinothrix diadema  
 Student report, Zoology 606  
 unpubl.  
 Reese

A study to determine if the shadow reaction can be clearly demonstrated to be habituated in the sea urchin, Echinothrix diadema. Specimens were gathered near Buoy 8 in Kaneohe Bay and brought back to the holding tanks in the laboratory on Coconut Island for experimentation.

The animals showed a waning in response to a consistent stimulus without reinforcement. In each case, the waning eventually reached the point where there was no response to the stimulus and this was relatively permanent - hence the animals exhibited habituation.

LEWIS, A. G. 1963  
 Life History of the caligid copepod Lepeophtheirus dissimulatus  
 Wilson, 1905 (Crustacea: Calogoida)  
 Pacific Science 17(2): 195-242  
 HIMB Contribution No. 181  
 publ.  
 HIMB

A descriptive histological study of the life history of Lepeophtheirus dissimulatus which were collected from host material, the Hawaiian acanthurid (surgeon) fishes, in Kaneohe Bay.

LLOYD, M. 1970  
 Distribution and abundance of the common vermetids of Checker  
 Reef, Kaneohe Bay, Oahu, Hawaii  
 Abstract. Biology of Molluscs. Graduate Training Program. U. H.  
 1968  
 HIMB Technical Report No. 18  
 publ.  
 HIMB

A description of the distribution and abundance of vermetid gastropods (Mesogastropoda: Vermetidae) which form the dominant component of the molluscan fauna of Checker Reef, Kaneohe Bay. They commonly occur on hard,

silt-free substrate from the water surface to a depth of six meters. Relative abundances of the vermetid species differed considerably on the Porolithon ridge, dead coral heads and on Porites heads.

LUM, A. 1969  
Analysis of diatom communities in Kaneohe Bay, Oahu  
Student report, Marine Ecology  
unpubl.  
Ebert

A study analyzing the structure of the diatom communities in two areas of Kaneohe Bay, Oahu, using data collected from growth and settling of organisms on glass slides of a Catherwall diatometer.

MacCAUGHEY, V. 1918  
A survey of the Hawaiian coral reefs  
American Naturalist 52: 409-438  
publ.  
Hamilton L.

A paper on the natural history of the Hawaiian coral reefs. The author combines a mass of scattered literature which was until this time, unavailable to the general reader. Kaneohe Bay is described as essentially a drowned valley region. In addition to the geology of the region, the author describes the flora and fauna of the bay.

MacDOUGALL, B. E. 1963  
Responses and salinity tolerance limits of the sea cucumber  
Opheodesoma spectabilis in sea water of abnormal salinities  
Student report, Marine Ecology 620  
unpubl.  
Reese

A series of experiments observing the responses of sea cucumbers, Opheodesoma spectabilis in sea water of varying salinities and to investigate the extent of the animals' tolerance to these salinities. The specimens were collected from the waters surrounding the Hawaii Marine Laboratory at Coconut Island.



Results showed tolerance to salinities as low as 27‰ and possibly lower.

An upper tolerance level was not ascertained.

MacKAYE, D. C. G. 1945  
Notes on the aggregating marine animals of Hawaii  
Ecology 26: 205-207  
publ.  
Hamilton L.

Notes on the aggregations of certain marine invertebrates on Oahu as observed by the author during 1941-42 - sedentary animals such as colonial Protozoans, hydroids, bryozoans, teredos, tunicates and syrpulid worms have been purposely left out as have aggregating fishes. The purposes of such behavior cannot be guessed at and the author ventures no guesses but refers the reader to Allee (1931). MacKay notes that the brittle star, Ophiactis savignyi (Muller and Troschel) is a tropicopolitan species which lives in the canals of sponges, crevices in dead coral or in tangled masses of seaweed and is common in Kaneohe Bay.

MacKAYE, A. L. 1915  
Corals of Kaneohe Bay  
Hawaiian Almanac and Annual for 1916: 135-139  
publ.  
BPBM

A description of coral life in Kaneohe Bay. The author describes the bay as originally being "a deep pit of an immense crater" which had one side blown to the sea and the coral animaculae of the waters have built up the reefs within the crater. Over a hundred varieties of corals are known to exist in Kaneohe Bay being coloured yellow, red, green, brown, and lavender.

MacNAMEE, C. G. 1961  
 Life history, morphology, habits and taxonomy of Haplocarcinus marsupialis Stimpson (Arthropoda, Crustacea, Decapoda)  
 MSc. Thesis, University of Hawaii, 64 pp.  
 unpubl.  
 Sinclair L.

A study of Haplocarcinus marsupialis examining the complete external morphology of the female and male noting the variations other than size between the juvenile and mature females; and the life history giving the developmental and larval stages. A correlation is made between the morphological features of the species and their ecological requirements and behavior. Specimens were collected from the reefs in Kaneohe Bay, particularly on the windward reef of Moku O Loe Island, Checker Reef and the Channel Island Reef.

MAGINNISS, L. A. 1969  
 The growth and mortality of Littorina scabra at Lilipuna dock  
 Student report, Marine Ecology  
 unpubl.  
 Ebert

A study on the growth and mortality of the population of Littorina scabra on the Lilipuna dock in Kaneohe Bay. Tag and recapture data (see Key, 1969b) were fitted into models of Walford and von Bertalanffy; growth was examined in regard to density; and the relationships between mortality and the snail's size, structure and density were also considered.

MAINLAND, G. B. 1939  
 Gobioidae and freshwater fish on the island of Oahu  
 MA. Thesis, University of Hawaii  
 unpubl.  
 Sinclair L.

A two-year study (1937-1939) of the habitats and distribution of the freshwater fish and marine gobioid fish found on Oahu. Collections were made on the mud flats of Kaneohe Bay, the streams and brackish water areas of Kaaawa and Waihee and many other areas of Oahu.

MARSH, J. A. 1968

Primary productivity of the reef-building calcareous red algae  
PhD. Thesis, University of Georgia, 84 pp.  
unpubl.

HIMB

A study of the biological role of calcareous red algae in the life of a reef. It presents a determination of their primary productivity and an evaluation of their contribution to the total reef economy. The study was done at Eniwetok Atoll, Marshall Islands and at Coconut Island, Kaneohe Bay, Oahu, Hawaii.

Primary productivity was studied using polarographic oxygen electrodes and before-and-after Winkler titrations. Gross productivity was found to be  $.048-.002 \text{ mg O}_2 \text{ cm}^{-2} \text{ hr}^{-1}$ . Photosynthesis was found to increase with increased light intensity up to approximately 100 foot-candles and was constant between 1000 and 8000 foot-candles. Water circulation increased respiration and photosynthesis by a factor of 3 over the rates in still water. Gas exchange in flowing water showed no correlation with water velocity. Estimated productivity of the zones dominated by algal growth was noted to be lower than the productivity reported in the literature for other reef zones on atolls. All in all, this study indicates that calcareous algae are less important as primary producers than expected.

MARSH, J. A. Jr. 1968

Primary productivity of the reef-building calcareous red algae  
Copy of a paper given at the AAAS Dallas meeting, December 1968  
unpubl.

Helfrich

A paper dealing with the primary productivity of the calcareous red algae (or lithothamniods) and their relative contributions to total reef production. The study was conducted at Eniwetok Atoll and at Coconut Island, Kaneohe Bay. Data are presented of the daily pattern of light intensity and

the calculated daily pattern of net photosynthesis for calcareous algae living at the surface of Kaneohe Bay.

MARTIN, W. E. 1958  
The life histories of some Hawaiian heteropyid trematodes  
J. Parasitology 44(3): 305-323  
HIMB Contribution No. 101  
publ.  
HIMB

Snails, Stenomelania newcombi Lea and Tarebia granifera Lamarck, were collected in ditches surrounding taro patches in Kaneohe, Oahu. Their life cycles were investigated at the University of Southern California during which four species of heterophyid trematodes were found which use the snails as first intermediate hosts:

Centrocestus formosanus (Nishigori, 1924)

Haplorchis taichui (Nishigori, 1924)

Haplorchis yokogawai (Katsuta, 1932)

Stellantchasmus falcatus Onji and Nishio, 1924

In this paper, the four species and their life cycles are described.

MARTIN, W. E. 1958  
Hawaiian helminths  
1. Trigoncryptus conus n. gen., n. sp. (Trematoda: Fellodistomidae)  
Pacific Science 12(3): 251-254  
HIMB Contribution No. 107  
publ.  
HIMB

A description of a new species and new genus of Trematode found in the stomach of the balloon fish, Tetraodon hispidus L., collected at the Hawaii Marine Laboratory, Kaneohe Bay.

MARSH, J. A. 1968

Primary productivity of the reef-building calcareous red algae

PhD. Thesis, University of Georgia, 84 pp.

unpubl.

HIMB

A study of the biological role of calcareous red algae in the life of a reef. It presents a determination of their primary productivity and an evaluation of their contribution to the total reef economy. The study was done at Eniwetok Atoll, Marshall Islands and at Coconut Island, Kaneohe Bay, Oahu, Hawaii.

Primary productivity was studied using polarographic oxygen electrodes and before-and-after Winkler titrations. Gross productivity was found to be  $.048-.002 \text{ mg O}_2 \text{ cm}^{-2} \text{ hr}^{-1}$ . Photosynthesis was found to increase with increased light intensity up to approximately 100 foot-candles and was constant between 1000 and 8000 foot-candles. Water circulation increased respiration and photosynthesis by a factor of 3 over the rates in still water. Gas exchange in flowing water showed no correlation with water velocity. Estimated productivity of the zones dominated by algal growth was noted to be lower than the productivity reported in the literature for other reef zones on atolls. All in all, this study indicates that calcareous algae are less important as primary producers than expected.

MARSH, J. A. Jr. 1968

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Copy of a paper given at the AAAS Dallas meeting, December 1968

unpubl.

Helfrich

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publ.  
HIMB

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MARTIN, W. E. 1960  
 Hawaiian helminths, Part III. New Opecoelid trematodes  
 Pacific Science 14(4): 411-415  
 HIMB Contribution No. 140  
 publ.  
 HIMB

Descriptions of opecoelid trematodes found in fishes caught in Kaneohe Bay, Oahu:

Coitocaecum banneri - in the gall bladder of wrasse, Thalassoma duperrey (Quoy and Gaimard)

Coitocaecum hawaiiensis - in the gall bladder of wrasse, T. duperrey (Quoy and Gaimard)

Coitocaecum norae - in the gall bladder of Ctenochaetus strigosus

Opecoelus lanceolatus - in the intestine of goatfish, Mulloidichthys samoensis (Gunther)

Pseudopecoelus tenuoides - in the intestine of Priacanthus cruentatus

MARTIN, W. E. 1960  
 Hawaiian helminths, Part IV. Paracardicola hawaiiensis n. gen., n. sp. (Trematoda: Sanguinicolidae) from the balloon fish, Tetraodon hispidus L.  
 J. Parasitology 46(5): 648-650  
 HIMB Contribution No. 127  
 publ.  
 HIMB

Description of a new species and new genera of Trematode found in the mesenteric veins of the balloon fish, Tetraodon hispidus collected in Kaneohe Bay.

MARTIN, A. W., D. M. STEWART and F. M. HARRISON 1965  
 Urine formation in a pulmonate snail, Achatina fulica  
 J. Exp. Biol. 42: 99-123  
 HIMB Contribution No. 210  
 publ.  
 HIMB

A study conducted at the Hawaii Marine Laboratory, Kaneohe Bay, on the sequential process of urine formation in a pulmonate gastropod to determine the overall mechanism of urine formation. The specimens were collected

from the Kaneohe watershed and maintained in aquaria with sod and fresh-water in the laboratory.

Identification of the site of filtration has not been completed but it seems possible that the direct arterial blood supply to the kidney provides the filtration pressure and that a specialized area of the kidney may be involved. In the process of filtration, exogenous urea is excreted; glucose is filtered and actively reabsorbed; chloride is actively reabsorbed; and phenol red and PAH are actively excreted.

MATTHEWS, D. C. 1951  
The origin, development and the nature of the spermatophoric mass of the spiny lobster, Panulirus penicillatus (Oliver)  
Pacific Science 5(4): 359-371  
HML Contribution No. 10  
publ.  
Sinclair L.

A histological study concerning the biology of P. penicillatus (Oliver) with emphasis on the origin, development and nature of the spermatophoric mass. The author presents a possible method by which the spermatozoa are liberated. Collections were made in the vicinity of Kaneohe Bay, July, 1947 - January, 1948.

MATTHEWS, D. C. 1953  
New Hawaiian Records of Folliculinids (Protozoa)  
Transactions of the American Micro. Soc. LXXII(4): 344  
HML Contribution No. 33  
publ.  
HIMB

A paper recording the occurrence of two additional species to the Hawaiian Islands: Metafolliculina andrewsi Hadzi, growing on oyster (Crassostrea virginica) valves near Coconut Island, and Lagotia simplex Dons found growing on a small alga (Chondria tenuissima) on the reef at the marine laboratory in Kaneohe Bay.



MATTHEWS, D. C. and S. J. TOWNSLEY 1964  
 Additional records of Hawaiian Platyctenea (ctenophora)  
 Pacific Science 18(3): 344-351  
 HIMB Contribution No. 208  
 publ.  
 HIMB

A previous study of Platyctenea in Hawaii revealed the finding of Coeloplana dubosequii on the alga, Hypnea nidifica in Kaneohe Bay and other platyctenids found on spines of Echinothrix diadema on Buoy no. 8 in Kaneohe Bay. In this study, three more urchins were found to be hosts for platyctenids:

- C. echinicola Tanaka on Tripneustes pileolus
- C. willeyi Abbott on Heterocentrotus mamillatus
- C. willeyi Abbott on Echinothrix diadema

MAY, R. C. 1967  
 Larval survival in the maomao, Abudefduf abdominalis (Quoy and Gaimard)  
 MSc. Thesis, University of Hawaii  
 unpubl.  
 Sinclair L.

The larvae of the maomao were studied both in laboratory and in field conditions to investigate the factors influencing the mortality of the species during the larval stage, especially during the apparent 'critical period'. The work was divided into three stages: a general description of the fish and certain aspects of its spawning behavior; laboratory rearing attempts and finally, laboratory work utilizing a rearing net designed by P. Helfrich to study the mortality of the fish under semi-natural conditions. The author includes data on the frequency of spawning of this species at Coconut Island.

MENEZ, E. G. 1962  
The ecology and taxonomy of Polysiphonia in Hawaii  
MSc. Thesis, University of Hawaii  
unpubl.  
Sinclair L.

A study to evaluate the taxonomy of Polysiphonia previously reported from the Hawaiian Islands and to determine and describe any new species. Some of the ecological factors thought to determine the distribution of Poly-siphonia were tides and light, temperature and salinity, turbulence, pH, oxygen, PO<sub>4</sub>-P, and NO<sub>3</sub>-N. Measurements were made on these parameters from October - December, 1959.

MENEZ, E. G. 1964  
The taxonomy of Polysiphonia in Hawaii  
Pacific Science 18(2): 207-222  
publ.  
Sinclair L.

A taxonomic study of the genus Polysiphonia in Hawaii. Six species of Polysiphonia have been reported in the literature from Hawaii.

MILEWSKI, J. R. 1966  
A quantitative analysis of the distribution pattern of the sea anemone Marcanthea cookei on a sandy reef flat off Coconut Island  
Student report, Zoology 620  
unpubl.  
Reese

A study of the distribution pattern and density of the sea anemone M. cookei in a natural population on the shallow reef-flat on the north shore of Coconut Island. The method of measuring the distance between nearest neighbours was used as an index to the type of spacing and degree of dispersal.

MILLER, B. 1970

Preliminary studies on the biology and ecology of

Terebra gouldii Deshayes

Abstract. Biology of Molluscs. Graduate Training Program, U. H.  
1968

HIMB Technical Report No. 18

publ.

HIMB

Preliminary studies on the distribution, abundance, migration habits, reproduction and feeding preferences of the toxoglossan gastropod, Terebra gouldii on the sand flats of Ahu O Laka, Kaneohe Bay. T. gouldii is primarily a carnivore, feeding exclusively on the enteropneust Ptychodera flava and feeding mainly at night. T. gouldii is preyed upon by the gastropod Natica macrochiensis and by the sand crab Calappa hepatica. The terebrid can crawl 1-2 m a night over the hard sand. Spawning is by means of egg capsules, there is no planktonic stage.

MILLER, M. A. 1941

The isopod crustacea of the Hawaiian Islands. II. Asellota

B. P. Bishop Museum Occ. Papers 16(13): 305-320

publ.

BPBM/Sinclair L.

A taxonomic study of the superfamily Asellota (Aselloidea) of the crustacean order Isopoda which is represented in Hawaii by four new species belonging to four genera and to three families.

MITCHELL, J. 1963

Some observations on the behaviour of Abudefduf abdominalis

Student report, Zoology 606

unpubl.

Reese

A report on brief field observations of some behavioural patterns associated with reproduction and care of the nest by the maomao, A. abdominalis. The area observed was a shallow, coral-strewn area on the south-west corner of Coconut Island.

MIYAKE, I. 1952

Reaction of tuna and other fish to stimuli - 1951  
Part IV. Observations on sound production and responses in tuna  
U. S. Dept. Interior - Fish and Wildlife Service  
Special Scientific Report, Fisheries No. 91  
HML Contribution No. 25  
publ.  
HIMB

A study to determine whether tuna produce sounds and whether tuna respond to sound stimuli. Listening devices were used to determine whether the fish actually produced sounds. To determine whether tuna were responsive to sound, observations were made on their attraction to various qualities and quantities of sounds from different boats and their avoidance to similar sounds. Such information may aid in fishing operations. Preliminary experiments were conducted in concrete tanks on Coconut Island on Neothunnus macropterus and Acanthurus sandvicensis and Euthynnus yaito.

The yellowfin in the concrete tanks showed no reaction to sound frequencies over a range of 500 cycles to 70 kilocycles per second, nor to sound with varying frequency from 100 cycles to 10 kilocycles per second. The yellowfin in the pond seemed to respond to certain sound stimuli but no definite data were available.

MORGAN, M. E. 1951

Response of tropical fish to interrupted direct current and its application to the problems of electrofishing in seawater  
MSc. Thesis, University of Hawaii  
unpubl.  
Sinclair L.

A study directed towards devising techniques and equipment on a laboratory scale which would produce a response in experimental fish to electrical stimulation, such as would lead to their capture. The work was done at Coconut Island and the Waikiki laboratory on baitfish, Pranesus insularum (Jordan) and Stolephorus purpureus (Fowler) and the aholehole, Kuhlia

sandvicensis (Steindacher) as well as many other smaller reef fish.

Interrupted current was found to be more desirable because of the increased electrostatic and electronarcotic effects on the fish and of the saving in power over uninterrupted current. Using a short pulse length, the fish can be attracted to the positive pole and immobilized without being killed or injured. The success of commercial electrofishing will depend on the ability to make still more efficient use of available power.

MORGAN, M. E. 1953

The response of a tropical fish to direct current and its application to the problems of electrofishing in sea water

Pacific Science 7: 482-492

HML Contribution No. 34

publ.

Sinclair L.

A report dealing with the successes and failures of electrofishing in several countries, in particular Germany and indicating that efficient utilization of the electricity may be more potent than merely increasing the amount of electricity. Reference is also made to pulse shape, pulse rate and electrode arrangement. The work was begun at Coconut Island and then transferred to the Waikiki laboratory. The experimental fish was Kuhlia sandvicensis (Steindacher).

Results showed that interrupted current was more desirable for electrofishing than uninterrupted current because of the increased electrostatic and electronarcotic effects on the fish. The use of the former also presents a considerable saving in power over the latter especially as the pulse length of the interrupted current can be decreased to some extent without sacrificing any effectiveness. The peak current value reached during a pulse was thought to be the important consideration in causing the response desired in electrofishing. Using an interrupted direct

current, fish can be attracted to the positive pole and immobilized without being killed or injured.

MORRIS, D. E. 1969

Some aspects of the commercial fishery and biology of two species of spiny lobsters: Panulirus japonicus (DeSiebold) and Panulirus pencillatus (Oliver) in Hawaii

MSc. Thesis, University of Hawaii, 82 pp.

unpubl.

Sinclair L.

A study of all aspects of the spiny lobster in an effort to maintain and operate a lobster fishery at optimum yield. Study exclusively in Maunalua Bay. No work done in Kaneohe Bay.

MORRIS, J. E. 1960

Some relationships of the physical environment to self- and cross-fertilization and to early development in an Hawaiian tunicate, Herdmania momus

MSc. Thesis, University of Hawaii, 50 pp.

unpubl.

Sinclair L.

A study divided into three main sections: the anatomy and physiology of the gonads and gametes with special emphasis on the fertilization membrane; the technique used in the self-sterility experiments and results of such experiments; and the anatomy of the development and the effect of temperature on development rate. Specimens were collected from various areas on Oahu but all the experimental animals were obtained from pilings and rocks on the leeward side of Coconut Island, Kaneohe Bay.

MUNRO, G. C. 1947

Notes on the islands in Kaneohe Bay

The Elepaio 8(4): 20-22

publ.

BPBM

A note on the birds found on the islands in Kaneohe Bay toward the end of 1936. There were a pair of Bulwer's petrel (Bulweria bulweri), remains of

akekeke (Arenaria interpres interpres), golden plovers (Pluvialis dominica fulva) and wedge-tailed shearwaters. On Mokulu, a colony of shearwaters were found. The author banded the birds and returned several times after that to check on possible migrations to and from the islands. The islands were devastated by the tidal wave in April 1, 1946 and exceptional high seas in January 1947 which accounts for the relative lack of flora and fauna.

MURCHISON, E. 1963  
Lethal temperatures of the damselfish, Dascyllus albisella  
Student report, Marine Ecology 620  
unpubl.  
Reese

A study of temperature as an environmental controlling factor. Several methods of measuring lethal temperatures were used and the knowledge gained was used to determine the temperature tolerance of Dascyllus albisella. Specimens were collected from the north reef flat off Coconut Island. The range of lethal temperatures for D. albisella is approximately 10° - 36°C. D. albisella normally lives in water that is nearer its upper temperature limit than its lower temperature limit.

MURPHY, G. I. 1960  
Introduction of the Marquesan sardine, Harengula vittata  
(Cuvier and Valenciennes) to Hawaiian waters  
Pacific Science 15(2): 185-187  
publ.  
Sinclair L.

A report on the introduction of the Marquesan sardine, Harengula vittata, into Hawaiian waters in the hopes of supplementing the supply of the nehu Stolephorus purpureus Fowler, used as a baitfish in the tuna industry. The report includes data on releases and recoveries during 1955 to 1958. Several recoveries were made in Kaneohe Bay although no releases were made in the Bay.

NAKAMOTO, R. 1966  
Population study of Ruditapes phillipinnarum in Kaneohe Bay  
Student report, Zoology 620  
unpubl.  
Reese

A study of the population density of R. phillipinnarum and the effect of raw sewage disposal in the area on this population. Four aspects were studied: the total body weight of the animal excluding shell weight; animal body weight to shell weight ratio; linear dimension and the number of individuals recovered per sample. The population studied was in the southeastern area of Kaneohe Bay.

Pollution is occurring in Kaneohe Bay according to the author. Results indicated a greater number of samples with a greater density of clams near or very close to the sewer outlets. Density drops off with distance from the outlets, as do the pollution effects, but changes also occur in substratum, salinity, temperature, O<sub>2</sub> debt and pH which makes interpretation difficult. High clam densities were noted occurring near the channels coursing through the reefs - water circulation supplying organic matter from the sewer system in these areas is the hypothesis of the author.

NAKAMURA, R. 1968  
An additional contribution to the biology of the wholehole,  
Kuhlia sandvicensis (Steindacher)  
Pacific Science 22(4): 493-496  
publ.  
Sinclair L.

A paper presenting information concerning the growth and age of a common inshore species, the wholehole. Data were collected from a population of individually marked fish over a period of a year in a pond on Coconut Island, Kaneohe Bay. Length and weight measurements were taken at monthly intervals along with scale samples for a study of scale growth.



NANDI, J. and H. A. BERN 1960  
 Corticosteroid production by interrenal tissue of teleost fishes  
 Endocrinology 66(2): 295-303  
 HIMB Contribution No. 123  
 publ.  
 HIMB

Investigation on the secretion of adrenocortical steroid hormone by the interrenal glands of teleost fishes and the tentative identification of these hormones by chromatographic methods. The study was conducted at the Dept. of Zoology and its Cancer Research Genetics Laboratory, University of California, Berkeley. Specimens of Mugil cephalus, caught by commercial seining in Kaneohe Bay, were supplied by the Hawaii Marine Laboratory.

NEAL, M. C. 1930  
 Hawaiian Marine Algae  
 B. P. Bishop Museum Bull. 67, 84 pp.  
 publ.  
 BPBM/Sinclair L.

A study of Hawaiian marine algae with regard to their rate of growth, periods of appearance and dominance, fruiting times, changes in population, life cycles, effect of different factors and numbers of each kind present. This study was conducted entirely on a shallow reef area slightly west of the Aquarium at Waikiki. The author did visit Ulupau Crater on Mokapu Peninsula on March 25, 1923 to examine the algae growing on the rocks in the tidal zones and tidepools.

NEEDHAM, R. L. ?  
 Ecology and ethology of the sea cucumber crab, Lissocarcinus orbicularis Dana  
 MSc. Thesis, plan B-Zoology, University of Hawaii  
 unpubl.  
 Zoology Dept.

The main purpose of this study was to elucidate some of the aspects of the formation and maintenance of the relationship between a commensal and its host. Such a study was thought to aid in the understanding of the

non-symbiotic, interspecific and intraspecific relationships.

Measurements included the number, sex and position of crabs in the holothurians anal and oral ends, the percentage of hosts infested and factors influencing this infestation, how the crab locates the host and the behavior in so doing and the larval development of the crabs.

NEEDHAM, R. L. and R. WASS 1966  
Feeding behaviour of the frogfish Antennarius molluccensis (Blecker)  
Student report, Zoology 606  
unpubl.  
Reese

A study of the feeding behaviour of the frogfish, A. molluccensis, which was caught on a shallow reef flat in Kaneohe Bay and maintained in a laboratory aquarium. The tank was stocked with twelve coral dwelling fish of the species Dascyllus albisella and Plectroglyphiododon johnstonianus and small blennies, Cirripectus sp. and sailfin mollies, Mollenicia latipinna. The behaviour of the frogfish to these other fish was observed at two-day intervals.

NEWMAN, W. A. 1961  
On certain littoral species of Octolasmis (Cirripedia, Thoracica)  
symbiotic with decapod Crustacea from Australia, Hawaii and Japan  
The Veliger 4(2): 99-107  
publ.  
Hamilton L.

A paper concerned with the reinstatement of Octolasmis neptuni (MacDonald) long held in synonymy with O. lowei (Darwin) - Australian and Japanese subspecies are designated. The paper also reports a remarkable new species of Octolasmis from Hawaii (Kaneohe Bay). Analysis of the ontogeny and adult morphology suggests a new interpretation of the origin and the phylogeny of this and other related forms.

Octolasmis (Octolasmis) indubia Newman spec. nov. Coconut Island. Numerous

specimens were found of the mouth parts of a single specimen of Scyllarides squamosus (Milne-Edwards). The gills of this specimen were infected with Octolasmis lowei (Darwin). Holotype of O. indubia, U. S. N. M. Cat. no. 107'310; paratypes, U. S. N. M. Cat. no. 107'311 and 107'312.

NIIMI, A. 1963  
Aggressive behaviour in hermit crabs  
Student report, Zoology 606  
unpubl.  
Reese

A study of the aggressive behavioural patterns of the hermit crabs with emphasis on the possibility that this behaviour might be influenced by their size, sex and differences in aggressiveness among different species. Some specimens were collected from Coconut Island, Kaneohe Bay: Calcinus laevimanus, C. elegans, C. seurati.

NIIMI, A. J. 1966  
Oxygen requirements of aholehole (Kuhlia sandvicensis) under conditions of maximum swimming  
MSc. Thesis, University of Hawaii, 49 pp.  
unpubl.  
Sinclair L.

An investigation of the oxygen requirements of the aholehole under conditions of maximum activity, where activity is measured as swimming speed. The effects of salinity and oxygen content of the water on consumption were also investigated. An attempt was made to estimate oxygen requirements at intermediate speeds and to extrapolate to a standard metabolism. Kuhlia were collected at the entrance to the Kaneohe Bay Anchorage.

NISHIMOTO, R. T. 1967  
Descriptions of seven Kaneohe Bay reef areas  
Student report  
unpubl.  
Helfrich

A series of seven reports consisting of descriptions and collections in seven areas of Kaneohe Bay.

NISHIOKA, R. S. 1959  
 A comparative histology of the male reproductive  
 system of 3 portunid crabs  
 MSc. Thesis, University of Hawaii, 70 pp.  
 unpubl.  
 Sinclair L.

A study attempting to ascertain if the manner of spermatophore elaboration bears similar relationship in 3 species of portunid crabs - Portunus sanguinolentus, Podophthalmus vigil and Lissoncarcinus orbicularis. All three species were found in Kaneohe Bay. Results showed that the morphological microscopical anatomy of the male reproductive systems of these 3 species were identical except for two very minor characteristics. These features provide the basis of a more exact method of classification than the present use of external morphological characteristics.

NUTTING, C. C. 1905  
 Hydroids of the Hawaiian Islands collected by the steamer  
 Albatross in 1902  
 Publ. Government Printing Office, Washington, 1905  
 extracted from U. S. Fish Comm. Bull. for 1903, part 3: 931-959,  
 plates I-XIII  
 publ.  
 Sinclair L.

The first major taxonomic report on hydroids from the Hawaiian Islands - 29 of the 49 species collected were new to science. The specimens were collected by the U. S. Fisheries steamer Albatross in 1902. The author includes a systematic discussion of the hydroids in the introduction.

OLLA, B. L. 1962  
 The perception of sound in small hammerhead sharks, Sphyrna lewini  
 MSc. Thesis, University of Hawaii  
 unpubl.  
 Sinclair L.

A study dealing with the response of Sphyrna lewini (Griffith) to sound. The objectives were to train young hammerhead sharks to associate sound with an unconditioned stimulus and to determine what range of frequencies

at relative intensity thresholds can be detected. The sharks were caught by hook and line in Kaneohe Bay and the experimental work was conducted at the marine laboratory on Coconut Island from June 1961 to September 1961. Results showed that small hammerhead sharks could be trained to develop an association between sounds of certain frequencies and an aversive or punishment stimulus consisting of a yank on a cord connected through the dorsal fin. Sound frequencies between 250 cps and 750 cps can be perceived, but they may be able to perceive sounds higher than 750 cps. They are most sensitive to sounds between 250 and 375 cps. The author concludes that it is likely that the range of greatest sensitivity in the hammerhead covers a lower spectrum of frequency than in the bull shark.

OLSEN, D. and D. WOODSIDE 1969  
 Hawaiian Birds, Part I. Our Vanishing Heritage  
 Pali Press 7(3)  
 publ.  
 HIMB

A series of five articles on the native birds found on Oahu with special consideration given to their status and distribution on the Windward side of the island. The authors talk about the stilt (aeo), the gallinule (alae ula), the coot (alae keo keo), the Hawaiian duck (koloa) and the owl (pueo) all of which are endemic to the Hawaiian Islands. Each article is devoted to one of the birds.

OSTERGAARD, J. M. 1928  
 Fossil marine mollusks of Oahu  
 B. P. Bishop Museum Bulletin 51  
 publ.  
 BPBM/Sinclair L.

A study comparing the fossil animals and plants with those living in the surrounding water in an attempt to throw light on the ecological conditions under which the emergent limestones of Hawaii were built up. Discussion

is restricted to the phylum Mollusca and in particular the classes Gastropoda and Pelecypoda. One of the 22 stations on Oahu was the Mokapu peninsula in Kaneohe Bay. Strombus ostergaardii Pilsbry was found in this area.

OSTERGAARD, J. M. 1950  
 Spawning and development of some Hawaiian marine gastropods  
 Pacific Science 4(2): 75-115  
 HML Contribution No. 2  
 publ.  
 Sinclair L.

A taxonomic study of the spawning habits and development of some Hawaiian marine gastropods. This is the first such study to be published in this area. Included is a key to the spawn of the gastropods described.

OSTERGAARD, J. M. 1955  
 Some opisthobranchiate Mollusca from Hawaii  
 Pacific Science 9: 110-136  
 HIMB Contribution No. 55  
 publ.  
 HIMB

Taxonomic descriptions of some opisthobranchs from Hawaii. Found in Kaneohe Bay:

Placobranchus ianthobapus Gould - found on mud flats near Coconut Island

OYAMA, S. 1964  
 The morphological and histological structure of the digestive tracts and diverticula of the brachiopod, Lingula reevi Davidson, with additional studies on their physiological activity  
 MSc. Thesis, University of Hawaii, 71 pp.  
 unpubl.  
 Sinclair L.

A study of the gross and histological anatomy of the digestive tract of the inarticulate brachiopod, Lingula reevi, and to compare it with that of Lingula unguis (Linne) described by Chuang. The roles of the various digestive organs in digestion and absorption of food materials were investigated from the standpoint of their anatomy, histology and physiology.

Using labelled C14 glucose and diatoms, attempts were made to study the rate and site of absorption within the digestive tract of L. reevi. Using specific cytological staining techniques, differences in the digestive organs cells between fed and starved animals were examined.

PAPAGNI, D. 1966

A study of fouling intensity as a function of depth

Student report, Marine Ecology 620

unpubl.

Reese

A study done in partnership with E. Preston determining the fouling intensity in the lagoon of Coconut Island and how the intensity varies with depth. For more details, see Preston, E. 1966.

PAPAGNI, D. 1967

Some aspects of the behavioral ecology of three species  
of hermit crabs from Kaneohe Bay

MSc. Thesis, plan B-Zoology, University of Hawaii

unpubl.

Zool. Dept.

A study to determine whether a social dominance hierarchy exists between sympatric species of hermit crabs, to look for social interactions which might reveal interspecific dominance and to look at some aspects of the behavioral ecology of the hermit crabs studied.

The crabs Calcinus laevimanus, C. latens and Clibanarius zebra were studied in the field and collected for lab experiments from a coral rubble reef northeast of Coconut Island. The adults were found in the shells of Trochus sandwichensis and Turbo intercostalis. The three test shells used were Tegula finebralis, Acanthina spirata and Olivella biplicata.

Results indicated a 3 rank hierarchy with C. laevi first, followed by C. latens and then C. zebra. Species membership may take precedence over other factors in determining dominance but it may become secondary to individual differences such as body weight.

PARARAS-CARAYANNIS, G. 1967  
The barium content in the calcareous skeletal materials  
of some recent and fossil corals of the Hawaiian Islands  
MSc. Thesis, University of Hawaii  
unpubl.  
Sinclair L.

A study involving ion concentrations in the skeletal materials of some corals. Aragonite-calcite ratios of living and fossil corals (Madreporaria) were determined with a Temp-Pres D-1, x-ray diffraction unit. Barium content was measured with a Perkin Elmer 303 atomic absorption spectrophotometer. Calcium determinations were made with a Beckman DU flame photometer. The corals were collected from the western side of Coconut Island, Kaneohe Bay. Separation of alkaline earth metals with ion-exchange was found possible with a resin that has the proper selectivity characteristics. Recoveries can be better than 90%. Isolation of elements found in corals in trace amounts is necessary prior to their determination by atomic absorption spectrophotometry. For high aragonite-calcite ratios, x-ray diffraction is a reliable method for quantitative determinations. For low aragonite-calcite ratios, x-ray diffraction has poor precision with a coefficient of variation as high as  $\pm 20\%$ .

The amount of aragonite decreases with depth in the fossil corals confirming the theory that age and increasing temperatures and pressures gradually convert aragonite to calcite and that at greater depths, complete recrystallization occurs.

The barium content in the skeletal materials of living corals varies considerably even in species that belong to the same family. Fossil corals do not contain detectable amounts of barium. A linear relationship between aragonite content and barium concentration was found. It is suggested that barium possibly behaves in the same manner that was shown for strontium in that it acts as an inhibitor for the aragonite-calcite conversion.



PETERSON, WILLIAM T. 1969  
Species Diversity and Community Structure of the Zooplankton  
of Kaneohe Bay, Oahu, Hawaii  
MSc. Thesis, University of Hawaii, 91 pp.  
unpubl.  
HIMB

A study considering both the micro- and the macrozooplankton communities in quantitative terms for all of Kaneohe Bay. The study involved the distribution and abundance of all component species; the description of communities in pre-defined areas in terms of various distributional statistics; the analysis of community structure in terms of community diversity and of feeding habits of the components, the food chain and the probable pathways of energy flow. Results of this study are important in the pollution aspects of the bay and in a general understanding of the dynamics of the Kaneohe Bay ecosystem.

The environmental gradient was shown to extend from the southern section of the bay, where the standing stock of macrozooplankton was  $1104/m^3$ , to the northern section, where the standing stock was  $82/m^3$ . Certain species were found abundant in certain sections of the bay, while others were ubiquitous. In terms of probable energy flow through the proposed food chain and the relative abundances of the major components, the southern section of the bay was shown to be the most simply structured area of the bay - this structure is governed by only 2 primary consumers and 2 secondary consumers species. Pollution may theoretically effect this area's flora and fauna, but no major alterations are expected.

PIETSCHMANN, V. 1930  
 Remarks on Pacific fishes  
 B. P. Bishop Museum Bull. 73  
 publ.  
 BPBM/Sinclair L.

A taxonomic study of some fishes collected at the Honolulu fish market and others collected by C. H. Edmondson from various areas of Oahu, from collections of the vessel Lanikai and by various people at the Bishop Museum.

PIETSCHMANN, V. 1938  
 Hawaiian shore fishes  
 B. P. Bishop Museum Bull. 156, 55 pp.  
 publ.  
 BPBM/Sinclair L.

A taxonomic study of Hawaiian shore fishes, 1927-1928. The author presents a uniform fish fauna for the entire islands which may be broken into smaller areas of coastline. Many new species are listed.

PILSBRY, H. A. 1917  
 Marine mollusks of Hawaii, IV-VII  
 Proc. Nat. Sci. Phil. 69: 309-333  
 publ.  
 BPBM

A continuing study of Hawaiian marine mollusks (first paper, Proc. Nat. Sci. Phil. 69: 207-230) including an important collection made by Prof. Wm. Alanson Bryan and Mrs. Bryan. Most of the shells are from Kauai, Oahu and Molokai.

PILSBRY, H. A. 1917  
 Marine Mollusks of Hawaii, VIII-XIII  
 Proc. Acad. Nat. Sci. Phil. 72: 296-328  
 publ.  
 BPBM

A taxonomic description of material submitted to the author by Mr. D. Thaanum, W. A. Bryan, J. M. Ostergaard and material collected by the

author in 1913. Included in the work also are keys to the Hawaiian Terebra and a partial key to Mitra and Vexillum.

PILSBRY, H. A. 1927  
Littoral barnacles of the Hawaiian Islands and Japan  
Proc. Acad. Nat. Sci. Phil. 79: 305-317  
publ.  
BPBM/Sinclair L.

Descriptions of the shore barnacles in the Bernice Pauahi Bishop Museum, from Hawaii and Japan collected by the Tanager Expedition.

PIYAKARNCHANA, T. 1965  
The plankton community in the southeastern part of Kaneohe Bay, Oahu, with special emphasis on the distribution, breeding season and population fluctuation of Sagitta enflata Grassi  
PhD. Thesis, University of Hawaii  
unpubl.  
Sinclair L.

A one year study (1963-1964) of the zooplankton community in Kaneohe Bay emphasizing the ecological relationships of the members of the zooplankton community and some aspects of the biology of Sagitta enflata Grassi. The bay was described in terms of temperature, salinity, water temperature, current patterns and phosphate concentration.

PRASENSO, D. 1968  
A study of phytoplankton seasonal variations in Kaneohe Bay, Oahu, Hawaii  
Student report, Botany V  
unpubl.  
Helfrich

A study of the seasonal variations of the phytoplankton in the southern part of Kaneohe Bay. Four stations were sampled weekly. The author was interested in variations in phytoplankton concentration, composition and some of the factors affecting the phytoplankton population.

PRESTON, E. 1966  
A study of fouling intensity as a function of depth  
Student report, Marine Ecology 620  
unpubl.  
Reese

A project which was designed to determine how fouling intensity varies with depth in a small 'lagoon' off Coconut Island in Kaneohe Bay. Two series of racks each containing five 6"x12" stainless steel plates with one side sand blasted to produce a rough surface were hung from a raft in the lagoon to act as a settling surface - one series of plates was hung with the rough side facing downward and the second series was hung with the rough surface facing upward to allow a comparison of settling preferences with depth. The plates were exposed for 21 days.

The barnacles and polychaete worms were the dominant species among the fouling organisms and although the results were complex, the major factors affecting settling were thought to be 1) the nature of the substratum (texture); 2) light; 3) sediment and 4) some unknown factor or factors, physical or biological which were not measured and which may have varied with depth.

PRITCHARD, A. W. 1953  
The oxygen requirements of Hawaiian tuna baitfish  
PhD. Thesis, University of Hawaii  
unpubl.  
Sinclair L.

A study analyzing the oxygen requirements of the baitfish to obtain basic information which will be of value in preventing the high mortality of baitfish in the livebait tuna industry. Oxygen consumption under various conditions was noted with special emphasis on the effects of temperature, flow rates, degrees of crowding and oxygen concentration of the water. Experiments were also conducted to determine the lethal value of oxygen

for the fish. The baitfish were caught in Kaneohe Bay and experiments were conducted on Coconut Island.

Results showed that the oxygen consumption in the iao fluctuated hour to hour even when there were no outward signs of increased or decreased activity of the fish. No rhythmic cycle of metabolic rate could be demonstrated. Oxygen consumption increased with an increase in flow rate. The critical oxygen level could not be precisely delimited but lay somewhere between 1.5 and 2.5 cc/l. Individual iao showed marked differences in resistance to oxygen deficiency. Lethal values of oxygen ranged between 0.50 to 1.58 cc/l. Oxygen consumption increased slowly at first and then more rapidly at the higher temperatures between 19° and 29°. Lethal values for oxygen showed a greater increase between 26° and 31°C.

PRITCHARD, A. 1955  
Oxygen requirements of some Hawaiian baitfish  
U. S. Dept. Interior - Fish and Wildlife Service  
Special Scientific Report, Fisheries No. 146  
HIMB Contribution No. 61  
publ.  
HIMB

A study to analyze in the laboratory, the oxygen requirements of the local tuna baitfish, the nehu Stolephorus purpureus Fowler and the iao Pranesus insularum (Jordan and Evermann) with emphasis on the effects of temperature, flow rates, degrees of crowding, oxygen concentration of the water and the lethal level of oxygen for the fish. The fish were seined in the shallow waters and maintained at the Hawaii Marine Laboratory on Coconut Island. This was a paper published from a doctoral thesis of the same title finished in 1953. Results of the work are included in Pritchard, 1953. The oxygen consumption of the iao fluctuated hourly without activity of the fish. No rhythmic cycle in metabolic rate could be demonstrated.

Oxygen consumption did increase with an increase in flow rate, this effect being more pronounced in the summer months.

The critical oxygen level could not be determined exactly, but it lay in the region of 1.5 and 2.5 cc/l. Lethal values ranged from 0.50 to 1.58 cc/l. Over the temperature interval of 19-29°, the rate of oxygen consumption increased slowly at first and then more rapidly, lethal values of oxygen measured over the same range, also showed a greater increase between 26° and 31°C.

QUAN, E. L. 1969

Some aspects of pollution in Kaneohe Bay, Oahu and its effects on selected microorganisms  
MSc. Thesis, University of Hawaii, 140 pp.  
unpubl.  
Sinclair L.

A study of surface water quality in the waters of the southeastern section of Kaneohe Bay undertaken between February and mid-April 1968 in an attempt to determine the impact of surface runoff on water quality in the Bay; the chemical and bacterial quality of wastewaters emerging from the two sewage treatment plants outfalls and whether the overall water quality standards imposed by the State were met as a result of the preceding investigations. High rainfall and surface runoff in this area of the Bay introduce high concentrations of nitrate-nitrogen and fecal streptococci in the lower areas of Kealahala and Kaneohe Streams; the water temperature is lowered by 2°C over dry weather flow and silt-turbidity is caused along the nearshore waters of the Bay. Although surface runoff does not contribute significantly to the phosphates in the Bay, the phosphate-phosphorus concentrations averaged 0.046 mg/l at the Kaneohe sewage treatment plant and 0.033 mg/l at the Kaneohe MCAS, exceeding the limit established for class A waters by 0.021 and 0.008 mg/l respectively.

Dissolved oxygen and pH adequately met the quality standards at all stations except for two low dissolved oxygen readings in Keaahala Stream.

From the mid-Bay region to the northern portion of the Bay, the overall water quality met the standards for both class AA and class A waters.

RAMAKRISHNA, R. T. 1966  
The composition and density of fouling organisms in  
relation to substratum  
Student report, Zoology 620  
unpubl.  
Reese

A study conducted at Coconut Island to determine the composition and relative abundance of the major fouling organisms and to study the density of the fouling organisms in relation to their substratum. Two frames in which the test plates of different materials, plain wood, painted wood, plastic, metal, glass and masonite, were suspended in the water as collecting plates. The plates were submerged for 22 days after which the species density on each plate was measured and compared with the other plates.

RANDALL, J. E. 1955  
A revision of the surgeon fish genera Zebrasoma and Paracanthurus  
Pacific Science 9: 396-412  
HIMB Contribution No. 70  
publ.  
HIMB

A taxonomic study of surgeon fish in the two genera, Zebrasoma and Paracanthurus in all known localities.

A 18 mm post larval specimen of Zebrasoma veliferum was collected by Joseph E. King of the Pacific Oceanic Fishery Investigations on 26/12/51 offshore from Kaneohe Bay in an oblique haul from the surface to 200 m with a 6 foot trawl.

RANDALL, J. E. 1956  
A new method of attaching Petersen disk tags with  
monofilament nylon  
California Fish and Game 42(1): 63-67  
HIMB Contribution No. 68  
publ.  
HIMB

To avoid problems of tying knots in the nylon filaments when tagging fish with the Petersen tags, a method was devised of melting each free end of the nylon into a ball. This has proved successful for short-period retentions and at the time of publication, there was not enough time to test long-period retention. This work was done in tanks on Coconut Island.

RANDALL, J. E. 1958  
A review of the labrid fish genus Labroides with descriptions  
of two new species and notes of their ecology  
Pacific Science 12(4): 327-347  
publ.  
Sinclair L.

A taxonomic study of four species of labrid fishes including underwater observations on their food habit of removing ectoparasites from other fishes.

RANDALL, J. E. 1961  
A contribution to the biology of the convict surgeonfish of  
the Hawaiian Islands, Acanthurus triostegus sandvicensis  
Pacific Science 15(2): 215-272  
HIMB Contribution No. 149  
publ.  
HIMB

A study involving aspects of habitat, environmental extremes, predators, parasites, food habits and the digestion, reproduction, growth, development and behavior of the convict surgeonfish, A. triostegus sandvicensis - conducted in part at the Hawaii Marine Laboratory, Kaneohe Bay, Oahu.



RATHBUN, M. J. 1906

The brachyura and macura of the Hawaiian Islands  
U. S. Fish Comm. Bull. for 1903, part III: 827-930. 24 plates  
publ.  
BPBM

A taxonomic description of the known brachyura and macura of the Hawaiian Islands. There are 314 known species to date, the majority of these specimens were collected by the U. S. Fish Commission explorations carried out in connection with a cable survey between California and Hawaii and the remainder of the specimens were collected by the Albatross expedition of 1902. Moku Manu is the type locality for Thalamita auauensis n. sp.

REED, M. 1906

The economic seaweeds of Hawaii and their food value  
Hawaii Agricultural Experimental Station, Annual Report: 61-88  
publ.  
Sinclair L.

A collection of notes and observations from various sources including a personal study of the markets and beaches wherever the limu gatherers were at work collecting or preparing the algae. Methods of gathering, preparing and serving seaweeds, the popular varieties, methods of cultivation, the chemical properties and the food value are all discussed. Apparently, limu pakaelaewaa or Grateloupia filicina was planted in Kaneohe Bay many years ago by a chief who brought it from Hawaii. At the time of publication the author reports it to be growing luxuriantly on the rocks near the shores of the Bay.

REESE, E. S. 1962

Shell selection behaviour of hermit crabs  
Animal Behaviour 10(3-4): 347-360  
publ.  
Reese

An analysis of the behavioural pattern of shell selection by the hermit crab in an effort to determine whether the hermit crabs were capable of

discriminating one species of shell from another and to what extent the behaviour was composed of acquired and innate components by rearing the crabs from eggs through the pelagic larval stages to the stage in their ontogeny when shells are first taken by young crabs. Calcinus laevimanus was studied in Kaneohe Bay where they were collected from the coral rubble in the intertidal regions of the Bay.

Results showed that the natural occurrence of hermit crabs in certain species of shells was explicable by at least two factors - an actual preference for certain species of shells and the relative abundance of shells of different species in different habitats. Dominance relationships may play a part in this behaviour.

The hermit crabs tested were able to distinguish between at least 3 different species of shells regardless of previous experience with these shells. The hermit crabs were able not only to distinguish between shells of the same species but also of different weights; they chose a shell of a specific weight relative to their own weight. The behaviour associated with entry into shells appears to be composed of innate components and is fully expressed in the glaucothoe stage. The ability to discriminate between shells of different weights and also between shells of different species does not appear to depend on experience with shells.

REESE, E. S. 1962  
Submissive posture as an adaptation to aggressive  
behavior in hermit crabs  
Sonderdruck aus Zeitschrift fur Tierpsychologie  
Band 19, Heft 6: 645-651  
HIMB Contribution No. 174  
publ.  
HIMB

Description of the aggressive behavioral patterns of the hermit crab, Calcinus laevimanus, studied in the coral reefs of Kaneohe Bay and also in the laboratories of the Hawaii Marine Laboratory, Kaneohe Bay.

REESE, E. S. 1962  
The behavioral mechanisms underlying shell selection  
by hermit crabs  
Behavior 21: 78-126  
HIMB Contribution No. 185  
publ.  
HIMB

A study conducted in part at the Hawaii Marine Laboratory with animals collected from Kaneohe Bay, on some of the behavioral mechanisms underlying shell selection by hermit crabs, Pagurus sameulis and Calcinus laevimanus. Aspects of the behavior such as the sense organs and motor structures involved, and the properties of the shells releasing such behavior and the variability of the pattern were studied.

Previous rearing experiments showed that the shell behavior is fully and completely expressed the first time it is released.

In this paper, a functional scheme is presented which explains a selection process which is not dependent upon previous experience with the stimulus objects. Weight and internal configuration of the shell appear to contribute to the total determination of the total stimulus value of the shell. Other shell properties may release specific fixed motor patterns as well as contribute to the evaluation of the shell as a stimulus object.

REESE, E. S. 1967  
Water Pollution  
Proceedings of the Hawaiian Academy of Science  
Forty-second annual meeting 1966-1967  
publ.  
HIMB

A discussion of the problem of water pollution in the state of Hawaii and the possible reasons why nothing is being done to correct the situation; the general feeling of apathy in the University personnel and of the public is also examined. The pollution problem in Kaneohe Bay is referred to as one of the author's examples.

REESE, E. S. 1968

Annual breeding seasons of three sympatric species of tropical intertidal hermit crabs, with a discussion of factors controlling breeding

J. Exptl. Mar. Biol. Ecol. 2: 308-318

HIMB Contribution No. 311

publ.

HIMB

A paper examining the annual breeding seasons of three sympatric species of intertidal hermit crabs from Kaneohe Bay - Calcinus laevimanus, C. latens and Clibanarius zebra and these results are compared with the known knowledge of breeding seasons of hermit crabs from tropical as well as north temperate seas. In addition, the breeding seasons of related anomuran crustaceans, 2 species of Emerita and 3 species of Petrolisthes are discussed.

It appears that the classical controlling factor, temperature, is not applicable in limiting the breeding season of C. laevimanus and C. latens but rather the author suggests that a possible competition between planktonic larvae has resulted in minor variations in their breeding seasons. The author feels that variations in breeding activity in the 8 month breeding season of Clibanarius zebra might be due to variations in larval ecology.

With regard to the anomura, the breeding activities of the 2 species examined show more or less the classical temperature dependent pattern but, when viewed in the context of other species, the importance of food and not temperature as a controlling factor becomes apparent.

The breeding season of the Petrolisthes spp. showed no obvious correlation with temperature nor with adult food requirements.

The implications of the term 'controlling factor' are discussed.

REESE, E. S. 1969  
Behavioral adaptations of intertidal hermit crabs  
American Zoologist 9(2): 343-355  
HIMB Contribution No. 326  
publ.  
HIMB

A study of the role of behavior as an adaptation enabling hermit crabs to exploit successfully the rigorous intertidal environment. Various aspects of their behavior are reviewed - patterns of distribution, including studies done in Kaneohe Bay; using the shell as a micro-habitat; predation; desiccation; temperature and salinity including work done in Kaneohe Bay; movement and rhythmic behaviors. The author concludes that because of its movable shell-home, the hermit crabs can exploit environments such as rocky intertidal habitats and reef-flats which are impenetrable to burrowing animals. Hermit crabs have augmented or replaced physiological tolerances by either moving away from them or by creating micro-climate conditions within their shells; and shells seem effective in reducing predation. Hermit crabs are extremely diverse and have often specialized which makes them all the more successful in their environment.

REESE, E. S. 1970  
Hawaii Report  
Oceans 3(1): 71-73  
publ.  
HIMB

A short history of ocean research in Hawaii combining the past history with the present marine programs of the University of Hawaii, including the Hawaii Institute of Marine Biology, the Hawaii Institute of Geophysics and the Engineering School; the Makapuu Oceanic Center; the Pacific Submersibles Inc.; the Federal Bureau of Commercial Fisheries; the Bureau of Sport Fisheries and Wildlife; the State Division of Fish and Game; the Conservation Council; the Hawaii Council of Diving Clubs; the Bernice P. Bishop Museum and the Department of the Navy.

REESE, E. S. and R. A. KINZIE 1968  
 The larval development of the coconut or robber crab,  
Birgus latro (L.) in the laboratory (Anomura, Paguridea)  
 Crustaceana Suppl. 2: 117-144  
 publ.  
 Hamilton L.

A study to complete the story of the development of Birgus contributed to by a few previous authors, by presenting a description of the complete larval development based on laboratory rearing. The newly hatched larvae were collected on Eniwetok Atoll in June 1964 and 1965 and brought back to the marine lab on Coconut Island. The larvae were reared and the young zoea were sampled each day, preserved in alcohol/glycerin/water solution or in a buffered formalin sea water solution. A camera lucida was used in drawing the animals, no staining was done.

ROGERS, R. G. 1967  
 Aspects of the reproduction of the Hawaiian limpet  
Cellana exarata (Reeve) (Mollusca: Gastropoda)  
 MSc. Thesis, University of Hawaii, 27 pp.  
 unpubl.  
 Sinclair L.

A study of certain aspects of the reproduction of the Hawaiian limpet, Cellana exarata. Gonad development, spawning cycle, maturation and sex proportions of C. exarata were examined over a two year period, August 1960 - August 1962. Field collections were made on Pyramid Rock, Kaneohe Bay. Results showed that both males and females matured at the same time when the shell length was 15-22 mm. There is a change in sex proportion of males and females with the males predominating in the smaller sizes and females more abundant at larger sizes. The sex proportion for the whole community of males to females was 1:4:1. Spawning occurred from April to August. The spawning cycle was described using 4 methods - mean egg diameter/month; visual stages of gonad development; egg diameter frequency/month; and the gonad/body volume ratio.

RYAN, E. P. 1965

A study of the reproductive biology of the haole crab,  
Portunus sanguinolentus (Herbst) (Brachyura: Portunidae)

PhD. Thesis, University of Hawaii, 194 pp.

unpubl.

Sinclair L.

A reproductive study of the crab, P. sanguinolentus, including morphology, morphometry and number of sexually mature instars; changes in the gross and histological anatomy of the reproductive systems of the pre-adult and adult instars; functions of parts of the reproductive systems during the reproductive cycles and during copulation; reproductive behavior and determination of site of fertilization and method of ova attachment. The crabs were collected from the southern part of the bay from January 1962 to June 1964.

RYAN, E. P. 1966A

Structure and function of the reproductive system of the  
crab Portunus sanguinolentus (Herbst) (Brachyura: Portunidae)

1. The male system

Proc. Symp. on Crustacea, Mar. Biol. Assoc. India, part II: 506-521

HIMB Contribution No. 218

publ.

HIMB

A complete gross and histological study of the anatomy of the male reproductive system of Portunus sanguinolentus. Crabs were investigated during the molt cycle in pre-adult and the 3 adult instars. Function of each part of the reproductive system was ascertained during the reproductive period and during the process of copulation. Vital staining and the usual histological staining techniques were used to study the systems, experimental methods were used for the remaining studies. Crabs were collected from Kaneohe Bay, January 1962 to June 1964.

RYAN, E. P. 1966B

Structure and function of the reproductive system of the crab Portunus sanguinolentus (Herbst) (Brachyura: Portunidae)

II. The female system

Proc. Symp. on Crustacea, Mar. Biol. Assoc. India, part II: 522-544

HIMB Contribution No. 219

publ.

HIMB

A complete study of the gross and histological anatomy of the female reproductive system of the crab Portunus sanguinolentus. Crabs were investigated during the molt and reproductive cycles of the pre-adult and two adult instars. The function of each part of the reproductive system was ascertained during the reproductive cycle and during the process of copulation. The system was studied using vital staining and usual histological techniques; experimental methods were used for studying copulation and ovulation. Captive individuals were reared after breeding to determine the ovarian cycle. Crabs were collected in Kaneohe Bay in wire traps from January 1962 to June 1964.

RYAN, E. P. 1966C

The morphometry of sexually mature instars in the crab,

Portunus sanguinolentus (Herbst) (Brachyura: Portunidae)

Proc. Symp. on Crustacea, Mar. Biol. Assoc. India, part II: 715-723

HIMB Contribution No. 217

publ.

HIMB

A study conducted over a two-year period in Kaneohe Bay to establish the morphometric and morphological criteria for the determination of two sexually mature instars in females and three in males of Portunus sanguinolentus (Neptunus sanguinolentus). Morphometric and morphological changes were ascertained from crabs which molted in captivity. Criteria of sexual maturity in males were verified by breeding experiments. Crabs were collected by traps set in Kaneohe Bay from January 1962 to June 1964.



RYAN, E. P. 1966D  
Pheromone: evidence in a decapod crustacean  
Science 151(3708): 340-341  
HIMB Contribution No. 234  
publ.  
HIMB

A study conducted at the Hawaii Marine Laboratory on Portunus sanguinolentus collected from Kaneohe Bay, involving the possible release of a sex-attractant pheromone in the urine of a premolt female.

Experiments indicated that a pheromone in the form of a sex attractant permitted the males to detect the premolt condition of the females. It was also indicated that the pheromone was released through the excretory pores. Origin of the pheromone, its chemical nature and the way it is detected by the males remains to be determined.

SATHER, B. T. 1965  
Studies in the mineral metabolism of the Hawaiian crab,  
Podophthalmus vigil (Fab.) throughout the ecdysis cycle  
PhD. Thesis, University of Hawaii, no. 72, 147 pp.  
unpubl.  
Zoology Dept.

A study on the metabolism of the Hawaiian crab during the entire molt cycle with records of the concentrations and distributions of the minerals during times of calcification and decalcification. Consideration is given to the controlling factor of the calcification process and the distribution of the factors involved during the calcification process. In regard to the latter problem, the chromium ion is considered. Crabs were collected in Kaneohe Bay by the use of crabs nets in the southern portion of the Bay between Kaneohe Stream and the Kaneohe Bay marina.

Results showed the possibility of temperature having the greatest influence on the abundance of pre-molt and post-molt crabs. The greatest weight change was observed following ecdysis - the total weight gain was about

34% including exuvial weight on the weight of the pre-molt crabs, excluding exuvial weight, the gain is approximately 170%. The carapace was found to have the greatest alterations in inorganic content during the molt cycle - the midgut and muscles increased in both organic and inorganic matter. Fluctuations in calcium and total phosphorus was noted in all tissues and organs. Calcium extraction from solution occurred immediately after ecdysis. The chromium content of various tissues and organs differed. The uptake and loss of radiochromium was followed for 16 days and it was found that the time interval to equilibrium differed between organs and tissues. Chromium metabolism was altered in the presence of iron.

SATHER, B. T. 1966  
Observations on the molt cycle and growth of the crab,  
Podophthalmus vigil (Fabricus) (Decapoda: Portunidae)  
Crustaceana 11(2): 185-197  
HIMB Contribution No. 229  
publ.  
HIMB

A study conducted at the Hawaii Marine Laboratory using animals collected from Kaneohe Bay noting the duration of the molt stages, the frequency of molting in a wild population and the effects of some environmental factors on the frequency of molting as well as growth measurements during molting. Results showed that 12 hours after ecdysis, calcification had begun in the principle layer; 24 hours after, the crabs were sufficiently calcified to commence near-normal activity; 2-3 days after molting, about half of the skeleton was sclerotized and 4-5 days after, the skeleton was completely calcified. Intermolt stage lasted 2 days. Percentage durations of the molt stages of other crabs studied by other authors are given for comparison. It was difficult to determine exactly what temperature inhibited molting as the annual temperature fluctuated only 6.3°C (22.3° - 28.6°C).

Neither calcium nor phosphate affect the molting occurrence as does temperature. These minerals have a relationship with ecdysis, but they do not initiate the process. The two parameters studied to determine relative growth during ecdysis were a change in weight and increment in length and width between molts.

SATHER, B. T. 1967  
Studies in the calcium and phosphorus metabolism of the  
crab, Podophthalmus vigil (Fabricus)  
Pacific Science 21(2): 193-209  
HIMB Contribution No. 259  
publ.  
HIMB

A study conducted at the Hawaii Marine Laboratory with specimens collected in Kaneohe Bay. The calcium and total phosphorus concentrations of the carapace, mid-gut gland, gills and muscles were followed during the molt cycle. Calcium content was determined by the spectrophotometric analysis of Geyer and Bowie in the ashed samples and by the method of Ferro and Ham with the blood samples. Phosphorus content in both the ashed and blood samples was determined by the method of Bernhardt, Chess and Roy. The carapace had the greatest inorganic fluctuations. The mid-gut gland and muscle tended to increase in both organic and inorganic matter during premolt, suggesting that these organs may serve as reservoirs for these components.

SHANK, B. A. 1969  
On the relative maturity of two diatom populations  
Student report, Marine Ecology  
unpubl.  
Ebert

A study of the maturity in diatom populations using Margalef's (1963) theory of advancing succession in an ecosystem. The author studied the productivity to biomass ratio of the diatoms, species diversity and the

redundancy index of the diatom populations in the south-eastern end of Kaneohe Bay. These parameters were then applied as indices of the population maturity according to Margelef's theory.

SHOUP, J. B. 1963  
Maze learning in the stomatopod, Conodactylus maculata  
Student report, Zoology 606  
unpubl.  
Sinclair L.

A report on the ability of the stomatopod, G. maculata to learn a maze of three choice points. The animals were collected on the reef flat off Coconut Island, where they are common inhabitants of coral heads. No measurable data were obtained in a 2-week period. Only one animal completed the maze arriving at the finish point. Three animals made on correct choice and one animal never left the starting box. It was suggested that the maze was too difficult and a higher level of motivation was needed.

SHOUP, J. B. 1963  
Survey of population density of Chaetopterus and associated animals in two areas of Kaneohe Bay  
Student report, Zoology 620  
unpubl.  
Reese

A study on the measurement and comparison of two polychaete worm populations off Coconut Island, Kaneohe Bay. The author was interested in a possible difference between these two populations and if so, what environmental condition would cause such a difference. The species studied was Chaetopterus variopedatus.

The population density changes from 60 (in a  $m^2$ ) on the windward side to 27 on the lee side or numerically from 144 worms/ $m^2$  to 20 worms/ $m^2$ . The controlling factors seem to be wind (bringing fresh sea water to the

windward side, food, nutrients, larvae etc.) and influxes of freshwater thus lowering the salinity on the lee side.

SHOUP, J. B. and D. STEPHEN-HASSARD 1963  
Irrigation behavior of Chaetopterus variopedatus  
Student report, Marine Ecology 620  
unpubl.  
Reese

A series of experiments carried out to determine the effects of rapid changes in paddling rate of the forms of the tube worm, Chaetopterus variopedatus (Renier) collected from the south end of Coconut Island in forty feet of water.

Chaetopterus does 'acclimate' by increasing the paddling rate with an increase in the temperature of the surrounding medium. There is a straight line correlation between the two. As the temperature approaches normal for the time of year, the paddling rate becomes more irregular.

SILTHORNVISUDH, K. 1965  
Sinking rate of zooplankton as a function of temperature and salinity  
Student report, Marine Ecology 620  
unpubl.  
Reese

A study in conjunction with S. Sudara (1965) on the sinking rate of various plankton species at different temperatures and salinities. Samples were collected in Kaneohe Bay by means of a plankton net. Six categories of animals were studied, each representing a different morphology: copepods, fish larvae, Lucifer faxonii, Sagitta enflata, shrimp larvae and crab zoeal larvae. Sand grains were used as controls.

Results showed that in various temperature, the sinking rate of sand grains and zooplankton was slower as the temperature decreased. At various salinities, the sinking rate of sand grains and zooplankton was faster as the salinity decreased. Various aspects of this phenomena are discussed -

morphological adaptations, position of animals while sinking and the presence of air bubbles in the body of the animal.

SKOLNICK, M. S. 1965  
 Aggressive behavior of the adult portunid crab,  
Portunus sanguinolentus (Herbst)  
 MSc. Thesis, University of Hawaii  
 unpubl.  
 Sinclair L.

A study of various aggressive behaviors plus three display patterns - threat, submissive and defense patterns of the crab, Portunus sanguinolentus. In the laboratory, hierarchy in behavior was studied using small samples. The crabs were collected in the vicinity of Coconut Island in Kaneohe Bay.

Results showed these aggressive displays to be visual and therefore occurred during daylight. Dominance-subordinance situations result from these aggressive encounters in the laboratory while these hierarchies are probably temporary in the field. Size is the most important factor in affecting dominance in intra-sexual situations. Size and sex are both important in inter-sexual encounters.

Phase of molt-cycle, individual differences and prior experience also function in determining dominance. P. sanguinolentus appears to be capable of distinguishing on specifics by visual and tactile senses but it does not appear to distinguish between individuals.

SMYTHE, W. R. and W. HAY ?  
 Comparative populations of macrofauna on four species of Hawaiian marine algae  
 Student report, Marine Ecology 620  
 unpubl.  
 Reese

A study measuring the comparative arthropod fauna on four species of marine algae in Hawaiian shore waters to determine if there were any preferences

of the arthropods for algal coloration. The study site selected was a shallow subtidal reef-flat opposite the old sugar mill in Kaneohe Bay. The algae studied were Ulva fasciata, Halimeda sp., Sargassum sp., and Acanthophora spicifera. There was no identified species list included.

SNIDER, R. H. and K. BROWNSCOMBE 1964  
Hawaiian sandy intertidal communities  
Student report, Zoology 620  
unpubl.  
Reese

A study to define and to characterize the macrofaunal communities of certain selected sandy beaches on Oahu - Ala Moana Park beach, Sandy Beach and Coconut Island beach. These beaches were observed for one day, taking samples along a transect line and then screening the samples.

SOEGIARTO, A. 1969  
Preliminary checklist of marine algae collected from Kaneohe Bay  
Preliminary report - Sea Grant Program, University of Hawaii  
unpubl.  
Chave

A preliminary report of A. Soegiarto on the algae of Kaneohe Bay for Dr. K. E. Chave, director of the Coral Reef Project which is funded by the federal Sea Grant Program. Soegiarto lists seventy-nine species, some of which are rare: Scinaia hormoides and Gibsmithia hawaiiiana, Rosenvingea orientalis and Cladosiphon novae caledoniae, the latter two algae being new records for Kaneohe Bay.

SOULE, D. F. and J. D. SOULE 1968  
Bryozoan fouling organisms from Oahu, Hawaii  
with a new species of Watersipora  
Bull. S. Calif. Acad. Sci. 67(4): 203-218  
publ.  
Hamilton L.

A study of the bryozoan fouling organisms found on fixed and floating docks, rafts, boat hulls in Kaneohe Bay, the Ala Wai Yacht Harbor and in

the Ala Wai Marine Ltd., and from metal test panels and glass slides mounted in screened racks suspended in Kaneohe Bay. The authors refer to the University of Hawaii and to the B. P. Bishop Museum collections. Included is a bibliography of fouling organisms of Oahu and a key to the fouling bryozoans of Oahu.

STEPHENS, G. C. 1960  
Uptake of glucose from solution by solitary coral, Fungia  
Science 131(3412): 1532  
HIMB Contribution No. 129  
publ.  
HIMB

Removal of glucose from seawater by the solitary coral, Fungia, was followed with D-glucose-C<sup>14</sup>, at varying concentrations and rates. The Fungia were collected from Kaneohe Bay.

Results showed that the labelled glucose (1 mg/l concentration) was taken up by the coral at a rate of 5.3  $\pm$  0.68 counts/min. The author concludes that if the naturally occurring carbohydrate in the seawater is utilizable and is taken up at the rate observed for glucose, Fungia can obtain sufficient material to account for maintenance metabolism in selected locations.

STEPHENS, G. C. 1962  
Uptake of organic material by aquatic invertebrates  
1. Uptake of glucose by the solitary coral, Fungia scutaria  
Biol. Bull. 123(3): 648-659  
HIMB Contribution No. 170  
publ.  
HIMB

A study conducted at the Hawaii Marine Laboratory, using specimens collected from Kaneohe Bay, to determine whether the coral, Fungia scutaria, could remove glucose from a dilute solution at a significant rate. This was accomplished by adding measured amounts of uniformly labelled glucose C<sup>14</sup> to a measured volume of seawater and monitoring the radioactivity of the



ambient seawater and of suitable extracts. The data supports the conclusion that Fungia is capable of removing several small organic molecules of biological significance from a very dilute solution. In addition to glucose, tyrosine, lysine, aspartic acid, glycine and lactate were absorbed.

STEVENSON, R. A. 1963  
 Life history and behavior of Dascyllus albisella Gill,  
 a pomacentrid reef fish  
 PhD. Thesis, University of Hawaii, 221 pp.  
 unpubl.  
 Sinclair L.

A study of the life history and habits of Dascyllus albisella, including reproduction, growth and food. The author also tried to associate distribution of the species with physical and biological influences in the environment, including temperature, salinity, water movement and predation. The fish are particularly abundant in Kaneohe Bay where they occur along the sloping sides of the shallow reef platforms and around the masses of living coral heads found in the deeper portions of the bay. Although the adults are free-living, they are found mainly in the vicinity of the coral, Porites.

STOKES, D. R. 1965  
 Some aspects of the substratum ecology of Marcanthea cookei Verrill  
 Student report, Marine Ecology 620  
 unpubl.  
 Reese

A study to show the relationship between the distribution of Marcanthea cookei with substrate variation. A general survey of M. cookei was made on a reef near Coconut Island and subsequently, three stations were set up on the reef flat. Physical data on temperature, salinity, light intensity and wave action were recorded. Percent by volume of sieved particle sizes was determined at each station and this was related to the anemone

distribution.

The distribution of M. cookei appears to be limited to sandy areas 2-4 feet below water surface with a layer of rock or coral particles of 3-4 ml. volume about 4" below the sand surface. Predators prevent settling in coral areas. Water currents prevent settling by robbing the larvae of settling time. M. cookei is capable of actively seeking out a desirable substratum.

STOLEN C. ?

Ethological study of the surgeon fish, Zebrasoma flavescens  
Student report, Zoology 606  
unpubl.  
Reese

A study on the behaviour of the surgeon fish, Z. flavescens, to develop a detailed ethogram and then to use this ethogram to determine changes in patterns of behaviour with changing situations. The work was conducted at the Hawaii Marine Laboratory, Kaneohe Bay.

STRASBURG, D. W. 1956

Notes on the blennioid fishes of Hawaii with descriptions  
of two new species  
Pacific Science 10(3): 241-267  
publ.  
Sinclair L.

A study of the blennioid fishes of Hawaii attempting to clarify the nomenclatorial problems, providing a key and a description of each Hawaiian species, and giving a record of previously known species and reports of two previously undescribed species.

SUDARA, S. 1965

Sinking rate of zooplankton as functions of temperature and salinity  
Student report, Marine Ecology 620  
unpubl.  
Reese

A study done in partnership with K. Silthornvisudh examining the sinking rates of various zooplankton species at different temperatures and salinities. For more information see Silthornvisudh, K. 1965.

SUMICH, J. L. 1968

The diurnal variation of catch rates of some zooplankton  
in Kaneohe Bay, Oahu  
Student report, Marine Ecology  
unpubl.  
Ebert

A descriptive study of the diurnal vertical migration of zooplankton in Kaneohe Bay. Samples were collected in the south west end of Kaneohe Bay, near the HIMB pier using a Clark-Bumpus plankton sampler with a mouth diameter of 12.7 cm and net mesh size of 0.15 mm. Tows were made at two hour intervals for 24 hour periods at 0m, 1m, 5m, and 15m depths. The data were analyzed and the vertical distribution pattern described.

TAKANAKA, B. 1970

Preliminary study of the distribution of Dictyosphaeria  
in Kaneohe Bay  
Student report, University of Hawaii  
unpubl.  
HIMB

A survey of the distribution of the algae, Dictyosphaeria, in Kaneohe Bay. The distribution of this algae is believed to be partially dependent on pollution in terms of phosphate and nitrate concentrations, so an attempt was made to correlate the distribution data with the phosphate concentration and current patterns in the bay. Results showed that the growth of the algae was enhanced by the surge as well as the phosphate concentration of the water. Some areas of the bay had far greater concentrations of algae

than others. The algae was usually found growing over coral heads; whether the algae was causing the destruction of the corals and at what rate was not determined.

TAKAYESU, J. M. 1964  
A study of biotic communities on wooden floats at Coconut Island  
Student report, Zoology 620  
unpubl.  
Reese

A study examining the biotic communities on a series of three wooden floats at Coconut Island and comparing them to see if any differences in biotic composition might exist. No definite conclusions were drawn from this study.

TAYLOR, L. 1963  
A study of plankton population density in Kaneohe Bay, Oahu  
Student report, Marine Ecology 620  
unpubl.  
Reese

A study done in conjunction with D. M. Devaney (1963). Population density of plankton communities was studied at seven stations along a transect in Kaneohe Bay during a 2-week period in the second semester of 1963. The data show a definite predominance of copepods in the seaward stations and a predominance of chaetognaths in the stations well inside the bay. There seems to be a correlation between salinity and the distribution of organisms as the salinity decreases along the transect in a landward direction. There is no correlation between population density and temperature but there is a correlation between density and the transparency values which decrease in a landward direction. The data also indicate a relationship between the density of chaetognaths and the occurrence of zoea larva and larvacea but the author cannot explain why.

TAYLOR, L. 1964

Estimates of growth rate of the hermatypic coral, Pocillopora  
meandrina var. nobilis Verrill on dated surfaces found in  
the waters surrounding Oahu

Student report, Zoology 699

unpubl.

Helfrich

A study in which the growth rate of calcified material in colonies of Pocillopora meandrina var. nobilis was determined by collecting samples from substrates which had been exposed to planula settlement for a known period of time. Measurement data including weight, displacement volume, maximum height and average diameter was noted. Rate of growth were calculated by dividing the average of the above parameters by the total assumed time of growth.

The author includes a bibliographical summary of similar work done on coral growth rates.

TESTER, A. L. 1951

The distribution of eggs and larvae of the anchovy,  
Stolephorus purpureus Fowler, in Kaneohe Bay, Oahu,  
with a consideration of the sampling problem

Pacific Science 5(4): 321-346

HML Contribution No. 12

publ.

HIMB

A study of the distribution of nehu eggs and larvae throughout the waters of Kaneohe Bay. This study is one part of an intensive study of the nehu population in the bay to determine essential biological information which might lead to the knowledge of the level of fishing intensity for a maximum sustained yield. The decrease in nehu population, which forms the main baitfish for the tuna industry, prompted this research project which began in 1948. The physical features of the bay were examined and from this, twenty-three stations in representative locations were selected. The stations were sampled using plankton gear for three continuous days in

the months of September and December, 1949 and in March and June, 1950.

The samples were analyzed and treated statistically.

TESTER, A. L. 1952  
Distribution of nehu eggs and larvae in Kaneohe Bay  
HML News Circular No. 13  
publ.  
HIMB

A study of the distribution of nehu eggs and larvae in Kaneohe Bay in an effort to determine whether spawning does occur in the bays and if so, is it in shallow water close to shore or in deeper water away from shore? From August, 1948 until August, 1949, hauls were made once a week at 3 stations in Kaneohe Bay. Hauls were also made irregularly at 23 other stations scattered throughout the bay. Eggs and larvae were found throughout the year with the greatest concentration being in the southern sector of the bay.

TESTER, A. L. 1952  
Establishing tuna and other pelagic fishes in ponds and tanks  
U. S. Dept. Interior - Fish and Wildlife Service  
Special Scientific Report - Fisheries No. 71  
HML Contribution No. 18  
publ.  
HIMB

The report of a study made in attempting to collect various species of tuna, transporting them to the Hawaii Marine Laboratory in Kaneohe Bay in a ship's livewell and there to establish them in ponds and tanks for use in studying their reaction to various stimuli.

The study was moderately successful and demonstrated the feasibility of holding two species of tuna in confinement for an extended period of time. This provided the investigator with the opportunity of studying their behavior, feeding, food consumption, growth and reaction to stimuli under experimental conditions.

TESTER, A. L. 1952  
Reaction of tuna and other fish to stimuli - 1951  
part I. Background and summary of results  
U. S. Dept. Interior - Fish and Wildlife Service  
Special Scientific report, Fisheries No. 91  
HML Contribution No. 22  
publ.  
HIMB

A general paper outlining the aims and results of the study of tuna reactions to various stimuli. The work involved a literature survey on tuna reactions, developing methods for holding and maintaining the fish in captivity and studying the fish either individually or in schools with regard to stimuli such as light, sound, chemicals and electricity with emphasis on the stimuli and their response which may have application to fishing operations.

The tuna were maintained in ponds on Coconut Island, Kaneohe Bay.

TESTER, A. L. 1952  
Reaction of tuna and other fish to stimuli - 1951  
part V. Notes on the response of a tropical fish (Kuhlia sandvicensis) to interrupted direct currents  
U. S. Dept. Interior - Fish and Wildlife Service  
Special Scientific Report, Fisheries No. 91  
HML Contribution No. 26  
publ.  
HIMB

A study to determine the optimum pulse duration for minimum power output to attract aholehole in an interrupted direct current system. This study is an extension of Morgan's work (1951) and his data is summarized in this paper.

Using a short on fraction, the best response was obtained using an on period of 10 milliseconds with a 2 amps average current.

TESTER, A. L. 1953  
Maomao spawning  
HML News Circular No. 14  
publ.  
HIMB

A description of the spawning habits of the damsel fish, the maomao or Abudefduf abdominalis. Maomao are known to congregate at the entrance to one of the ponds on Coconut Island. The author describes what may be their preliminary spawning activity. By chance, a brooding maomao was found close to the shore of Coconut Island, the egg mass was discovered and taken to the laboratory where the eggs were examined and reared. Young maomao were hatched and lived 3-4 days before dying.

TESTER, A. L. 1955  
Variation in egg and larva production of the anchovy  
Stolephorus purpureus Fowler, in Kaneohe Bay, Oahu  
during 1950-1952  
Pacific Science 9(1): 31-41  
HIMB Contribution No. 59  
publ.  
HIMB

The anchovy or nehu is used as baitfish for the skipjack tuna. Populations on Oahu located in Pearl Harbor, Honolulu Harbor, Ala Wai Canal and Kaneohe Bay appear to fluctuate both seasonally and annually. This study investigates, with the population in Kaneohe Bay, one possible cause of this fluctuation: a variation in egg and larva production. Spawning, as indicated by egg and larvae catch, occurs erratically throughout the year with a summer maximum and a winter minimum. Sampling showed a large decrease in numbers between the eggs and larva stage. Several explanations are advanced and the author concludes that the sampling is not adequate to trace the pulses of spawning from the egg to the larval stages.



TESTER, A. L. 1968  
Cooperative shark research and control program  
Annual report 1967-68  
University of Hawaii, Honolulu, 25 pp.  
publ.  
HIMB

The report of a shark program conducted by the University of Hawaii which was recommended by local fishery scientists as the only feasible method of both assembling the scientific information needed to properly assess the shark problem in Hawaii and to initiate some measure of control of shark abundance. This report is a follow-up report to the 1959-60 report of the Shark Research and Control Program conducted by the State Division of Fish and Game. This program was aimed at determining the species and number of sharks present in the inshore waters of Oahu and some of the other islands, their life histories, movements and migrations, growth rate, food, fecundity and reproductive habits and of relating these, if possible, to environmental parameters. Materials were derived from these studies and supplied to other university and state programs studying the behavioural and biological aspects of sharks. The program also tried to determine to what extent shark abundance was decreased by fishing effort and recommended means for controlling the abundance in the future.

Kaneohe Bay is the breeding ground for the scalloped hammerhead shark.

TESTER, A. L. 1963  
The role of olfaction in shark predation  
Pacific Science 17(2): 145-170  
HIMB Contribution No. 179  
publ.  
HIMB

A study conducted in part at the Hawaii Marine Laboratory, Kaneohe Bay, investigating the olfactory response of captive sharks to extracts of natural foods, to human materials and to injured living fish to determine

the role of olfaction in shark feeding activity.

Specimens of Carcharhinus (2 spp.) the grey sharks; Sphyrna lewini, the hammerhead shark; and Galeocerdo cuvier, the tiger shark were caught in Kaneohe Bay with a set line. These animals were maintained in large semi-natural ponds on Coconut Island.

Experiments showed that 'quiescent' prey give off an odor which can be detected by sharks. Whatever the source or nature of the attractant, evidence was found that olfaction is involved in the predation of sharks on normal, healthy fish.

TESTER, A. L. 1963  
Sharks and Survival  
Chapter 8. Olfaction, gustation and the common chemical sense in sharks  
D. C. Heath and Co., Boston. P. W. Gilbert ed.: 255-282  
HIMB Contribution No. 188  
publ.  
HIMB

A discussion of chemoreceptors in sharks making reference to laboratory and field studies which the author conducted at the Hawaii Marine Laboratory in Kaneohe Bay.

TESTER, A. L. and R. W. HIATT 1952  
Variation in the vertebral number of the anchovy (Stolephorus purpureus) in Hawaiian waters  
Pacific Science 6(1): 59-70  
HML Contribution No. 14  
publ.  
HIMB

A study of the variation in vertebral number of the nehu in an attempt to determine whether one or several populations of this valuable baitfish exist in Hawaiian waters. Kaneohe Bay was one of the collection sites. The study showed that vertebral data gave some support to the above hypothesis, but not as much as might have been desired for its adoption as a

basis for regulation of the fishery. The existence of a separate population was shown in the Ala Wai Canal only. For the other areas, the difference in mean vertebral count between localities could have arisen in random sampling from one statistically complex biological population.

TESTER, A. L. and M. TAKATA 1953  
 Contribution to the biology of the aholehole, a potential baitfish  
 Final Report - Industrial Research Advisory Council Grant No. 29  
 HML Contribution No. 38  
 publ.  
 HIMB

The final report of an investigation (1952-1953) of the essential features of the life history and behavior of the aholehole with respect to the possibility of its pond cultivation and use as an auxillary baitfish for tuna fishing. Studies were conducted on one of the abundant populations in Kaneohe Bay, Oahu.

TESTER, A. L., H. YUEN and M. TAKATA 1954  
 Reaction of tuna to stimuli, 1953  
 U. S. Dept. Interior - Fish and Wildlife Service  
 Special Scientific Report, Fisheries No. 134  
 HIMB Contribution No. 56  
 publ.  
 HIMB

The third in a series of studies of the responses of the tunny, Euthynnus affinis to chemical and visual stimuli in concrete tanks on Coconut Island, Kaneohe Bay. Sea tests were also conducted using the same stimuli but they were largely unsuccessful.

Results showed that the sense of vision plays a much greater role in feeding than the sense of smell.

TESTER, A. L. and S. M. TREFZ 1954  
 The food of the aholehole, Kuhlia sandvicensis  
 (Steindacher) in Hawaiian waters  
 Pacific Science 8(1): 3-10  
 publ.  
 Sinclair L.

The report of a study of the food of the aholehole, a study done in connection with a general investigation of the life history of the species to ascertain whether or not it could be raised in ponds. Twenty-two samples comprising 202 fish were taken from various places around Oahu, Kualoa Point in Kaneohe Bay being one of the areas of collection. The fish were weighed, measured and analyzed for stomach contents.

There are slight differences in food of small and large, fresh and salt water forms but generally the aholehole might be described as omnivorous with a preference for motile animal forms. Algae are rarely eaten. From a study of natural foods, crustaceans seem to serve as an ideal bait in angling. Both vegetable material such as bread and poi and animal material such as ground fish and shrimp may be used to chum aholehole to the surface. The author does not conclude whether these findings make it possible to rear aholehole in tanks.

TESTER, A. L., P. B. van WEEL and J. J. NAUGHTON 1955  
 Response of tuna to chemical stimuli  
 U. S. Dept. Interior - Fish and Wildlife Service  
 Special Scientific Report, Fisheries No. 130, part 1  
 HIMB Contribution No. 47  
 publ.  
 HIMB

A study of the response of captive tunny to extracts of fish flesh, viscera, etc., and to certain chemical in solution or suspension. The tuna were caught by trolling with the Salpa off Kaneohe Bay during June 6 - August 31, 1952. Catch: 63 skipjack, Katsuwonus pelamis; 66 kawakawa, Euthynnus affinis; 33 yellowfin, Neothunnus macropterus; 6 dolphin,

Coryphaenus hippurus and 2 wahoo, Acanthocybium solandri. Two species of tuna, tunny and yellowfin, were established in concrete tanks on Coconut Island.

A chemical attractant was noted to be present in the flesh, viscera and blood of certain white-fleshed fish. It was not possible to identify the attractant substances from its chemical properties. It does not appear to be an amino acid, a fatty acid or a lipid, a purine or a protein. In many of its properties it resembles vitamin B12, but this substance when sensed by fish did not promote a typical positive response on testing.

TESTER A. L. and S. C. HSIAO 1955  
 Response of tuna to visual-chemical stimuli  
 U. S. Dept. Interior pt. 2, no. 130  
 HIMB Contribution No. 48: 63-76  
 publ.  
 HIMB

A series of experiments done on a population of 12 little tunny (Euthynnus yaito) in a pond on Coconut Island. The experiments were designed to determine 1) whether visual lures would promote a tropistic response, 2) whether the response was heightened when combined with chemical stimuli and 3) whether the response varied with lures of different colors. Results showed that the white lures were more "attractive" to the fish than the colored ones. The fish made more passes at lures when stimulated with an extract, showing a heightened feeding response.

TESTER, A. L. and E. L. NAKAMURA 1957  
 Catch rate, size, sex and food of tunas and other pelagic fishes  
 taken by trolling off Oahu, Hawaii, 1951-55  
 U. S. Dept. Interior - Fish and Wildlife Service  
 Special Scientific Report, Fisheries No. 250  
 HIMB Contribution No. 96  
 publ.  
 HIMB

A trolling operation conducted off Kaneohe Bay to stock the Coconut Island Laboratory with tuna and other pelagic fish for studies of their response

to various stimuli. Data were collected on the catch rate, size, sex, and food of the species caught to aid researchers studying the biology of these pelagic fishes.

TESTER, A. L. and G. J. NELSON 1967  
Free neuromasts (pit organs) in sharks  
Reprinted from 'Sharks, Skates and Rays'  
Ed. Gilbert, P. W., R. F. Mathewson and D. P. Rall  
Johns Hopkins Press, Baltimore, Md.  
HIMB Contribution No. 258  
publ.  
HIMB

A study on the identification, distribution and histology of free neuromasts in sharks. The scalloped hammerhead, Sphyrna lewini, which was used extensively in the histological investigations, was maintained at the Hawaii Marine Laboratory.

TESTERMAN, J. K. 1970  
Contribution of symbiotic algae to the oxygen supply and survival of Placobranchus ocellatus  
Abstract. Biology of Molluscs. Graduate Training Program, U. H.  
1968  
HIMB Technical Report No. 18  
publ.  
HIMB

A study of the oxygen supply and survival of Placobranchus ocellatus occurring commonly in Kaneohe Bay. The saccoglossan derives respiratory benefit from symbiotic algae lining the inside surface of the parapodia and the dorsum. Specimens maintained in the light consistently outlived those kept in the dark whose oxygen tension was reduced by continuously bubbling nitrogen through the water. Their activity in their normal environment was noted to be light-dependent, the animal being strongly photopositive.

THOMAS, D. D. 1967

A study of the tunicate and anemone populations on  
a sandy reef flat

Student report, Marine Ecology 620

unpubl.

Reese

A distribution study of the tunicate, Ascidia interrupta Heller, in relation to the other common filter feeders such as other tunicates, anemones and corals on the sandy reef flats of Kaneohe Bay. Twenty-five meter transects were made on three reef flats from the reef interior to the reef edge on the north side of Coconut Island. The tunicates and anemones were counted in a square meter laid along the length of the transect and their abundance/ $m^2$  was compared with the other filter feeders present. It was found that the tunicate and anemone populations did not overlap to any significant degree. It was thought that the tunicate population was found near the edge of the reef flat because of physical environmental factors; the anemone population was found on the shallow reef areas, their presence here was thought due to an inability to successfully compete with the tunicate population for food.

THOMSON, D. A. 1963

A histological study and bioassay of the toxic stress  
secretion of the boxfish, Ostracion lentiginosus

PhD. Thesis, University of Hawaii

unpubl.

Sinclair L.

A study concerning the extraction, purification and chemical nature of the ichthyotoxin secreted by the boxfish, Ostracion lentiginosus and a histological study investigating the structure of the various secretory cells.

A comparative histological study on the secretory cells of the cowfish,

Lactoria fornasini, is also reported. The fish were collected in traps in Kaneohe Bay.

TOMLINSON, J. T. 1963  
Lithoglyptes hirsutus (Cirripedia: Acrothoracica)  
 a new burrowing barnacle from Hawaii  
 Pacific Science 17(3): 299-301  
 publ.  
 Sinclair L.

Samples of Psammocora verrilli Vaughan and Porites compressa Dana revealed this new species of acrothoracican burrowing barnacles, the first known representative of this group to be reported from Hawaii. The corals were collected in Kaneohe Bay.

TOMLINSON, J. T. 1969  
 The burrowing barnacles (Cirripedia: Order Acrothoracica)  
 U. S. Nat. Mus. Bull. No. 296, 162 pp.  
 publ.  
 HIMB

A systematic study of the burrowing barnacles in the order Acrothoracica within the crustacean subclass Cirripedia. The author travelled around the world visiting museums and institutions with acrothoracican collections and has noted where the specimens he describes may be found. The Hawaii Institute of Marine Biology was one of the institutions visited.

Collections in this area included: p. 36. Weltneria hirsuta (Tomlinson) in Psammocora verrilli from a depth of 3-6 feet in Sand Bar Reef and in Porites compressa on the NE side of Checker Reef, Kaneohe Bay, Oahu.

TOWNSLEY, S. J. 1950  
 Adult and larval stomatopod crustaceans occurring  
 in Hawaiian waters  
 MSc. Thesis, University of Hawaii, 95 pp.  
 unpubl.  
 Sinclair L.

A systematic study of the stomatopods occurring in Hawaiian waters. The author includes keys to the genera and species of Hawaiian Squillidae and keys to the genera of larval Hawaiian stomatopods as well as descriptions of the various larval stages of the five major genera.



One male and two females of Squilla boops Kemp were found in the stomach of a black skipjack caught off Moku Manu Island off the mouth of Kaneohe Bay.

TOWNSLEY, S. J. 1953  
 Adult and larval stomatopod crustaceans occurring in  
 Hawaiian waters  
 Pacific Science 7(4): 399-437  
 HML Contribution No. 37  
 publ.  
 HIMB

Larval stages of the stomatopod rank second in importance as a food source for tuna and other pelagic fishes. In order to assess objectively whether the larval stomatopod stages found over reefs are important in attracting these neritic species inshore, a descriptive study of the species involved is required. This is a descriptive study of both larval and adult stomatopods found in Hawaiian waters so they may be both qualitatively and quantitatively analyzed in the plankton and stomach of pelagic fishes. Keys to both adult and larval Squillidae are included in this paper.

Pseudosquilla ciliata (Fabricus) was found on the reef flat of Kaneohe Bay.

TOWNSLEY, S. J., D. F. REID and W. T. EGO 1960  
 Uptake of radioisotopes and their transfer through food  
 chains by marine organisms  
 HML Annual Report 1959-1960  
 publ.  
 HIMB

A two part study (1) on the cichlid, Tilapia mossambica, concerning the mechanism by which osmotic equilibrium is maintained, the relationship of the organ size to fish size and the laboratory handling of this species, and (2) on the uptake of radioactive zinc in an artificial food web of Chlamydomonas sp., Artemia salina and Chaetodon miliaris and the uptake of  $\text{Na}_{22}$  in a food web of Chlamydomonas sp., Artemia salina, and Lingula reevi.

TULLIS, R. E. 1968  
 Relationship between Stylifera linckiae and its host,  
Linckia multiflora  
 MSc. Thesis, plan B-Zoology, University of Hawaii  
 unpubl.  
 Zoology Dept.

The relationship between the prosobranch gastropod, Stylifera linckiae Sarasin, and the starfish, Linckia multiflora, is reviewed. Studies were done on the interaction between the symbiont and its host, the life cycle of the symbiont and the biochemical interactions occurring during the relationship. Specimens of parasitized and non-parasitized L. multiflora were collected off the shallow reefs in Kaneohe Bay.

TUN, P. and E. LAN 1963  
 Distribution of live and dead Porites compressa on the reef  
 at Coconut Island  
 Student report, Zoology 620  
 unpubl.  
 Reese

A class project studying the reef of Coconut Island to determine the distribution of live and dead P. compressa across the reef. Eight transects were made on various spots on the reef. The data tended to show that P. compressa was denser toward the outer edge of the reef and that coral growth covered a greater area on the windward side of the island than on the leeward side of the island. There was no species list included in this report.

TUSOV, J. 1967  
 The influence of environmental factors on the growth of  
 the colonial hydroid, Bougainvillia sp.  
 MSc. Thesis, plan B, University of Hawaii  
 unpubl.  
 Zoology Dept.

A study to extend the methods of previous investigators to the culturing of a marine hydroid under controlled conditions and to determine how changes

in the environment affect the growth rate. A clone of Bougainvillia sp. was collected on November 1966 at the Hawaii Marine Lab in Kaneohe Bay. A vigorous growth of Bougainvillia sp. was attained using previously developed culture methods. The culture required a high concentration of seawater and a high absolute concentration of ions for good growth. A change in growth form was noted when colonies were cultured at high temperatures.

UDVARDY, M. D. F. 1961  
Continental migrants and shore birds on Oahu during 1958-59  
Journal of the Hawaiian Audobon Society, January 1961, 5 pp.  
HIMB Contribution No. 145  
publ.  
HIMB

A list of sightings of migrant birds recorded on Oahu during 1958-1959.

One reference to Kaneohe Bay:

Dec. 21 1 black-crowned night heron  
78 golden plovers  
31 ruddy turnstones  
3 wandering tattlers  
27 Hawaiian stilts

ULBRICK, M. L. 1970  
Studies on Crucibulum spinosum (Sowerby)  
Abstract. Biology of Molluscs. Graduate Training Program, U. H.  
1968  
HIMB Technical Report No. 18  
publ.  
HIMB

A collection of studies on the biology of Crucibulum spinosum found in Kaneohe Bay. Populations were found on solid substrates swept by moderate currents; the angle of slope of the shells decreases with shelter; individuals may move about although they may remain stationary for days; the

male moves about chiefly to find a mate; the female moves to spawn; food is collected in suspension but is also rasped from the substratum; reproductive behavior is noted.

ULBRICK, M. L. 1969  
 Studies on Crucibulum spinosum (Sowerby)  
 Proc. Malac. Soc. Lond. 38: 431-438  
 HIMB Contribution No. 331  
 publ.  
 HIMB

A study of certain aspects of the biology of Crucibulum spinosum - shell shape, growth and movement, habitat, mating behaviour and feeding mechanisms. Most of the specimens used in this study were found on pieces of dead coral or basalt rocks dredged from the sand and rock bottom at 15-25 feet in Kaneohe Bay. The only other described habitat for C. spinosum is in southern California.

UTINOMI, H. 1960  
 On the world wide dispersal of a Hawaiian barnacle,  
Balanus amphitrite hawaiiensis Brock  
 Pacific Science 14(1): 43-50  
 publ.  
 Sinclair L.

A paper presenting the argument that the Atlantic barnacle, Balanus amphitrite var. denticulata Brock and the Pacific barnacle, Balanus amphitrite hawaiiensis Brock are identical with each other and possibly with other forms or subspecies. The distribution of these related forms is presented. B. amphitrite hawaiiensis was reported from Kaneohe Bay by Edmondson and Ingram, 1939 and Edmondson, 1949.

VAN HEUKELEM, W. 1966  
 Some aspects of the ecology and ethology of Octopus cyanea Gray  
 MSc. Thesis, University of Hawaii, 104 pp.  
 unpubl.  
 Sinclair L.

A study of the description and classification of the behavior of the octopus, Octopus cyanea, in terms of the ecological significance or the survival value of the behavior to the species. In the course of the work, data was obtained on the ecology of the species which is included also. All investigations were carried out in the field or in the lab on Coconut Island, Kaneohe Bay. Behaviors studied were the predatory sequence which was found to consist of 5 steps; natural aquarium behaviors; defense mechanisms; courtship and copulation behaviors; and their ritualized fighting behaviors.

van WEEL, P. B. 1952  
 Reaction of tuna and other fish to stimuli - 1951  
 part II. Observations on the chemoreception of tuna  
 U. S. Dept. Interior - Fish and Wildlife Service  
 Special Scientific Report - Fisheries No. 91  
 HML Contribution No. 23  
 publ.  
 HIMB

A study to determine whether tuna have a sense of taste or smell whereby they might be attracted (or repelled) by food substances in solution or suspension. The aim was to find some attractive food component which might be used in making a cheap fish meal to replace the live bait obtained by line and pole in the Pacific, which is becoming in short supply. Experiments were conducted on Neothunnus macropterus and Euthynnus yaito maintained in a concrete tank on Coconut Island, Kaneohe Bay. Both the yellowfin and tunny were shown to have a well-developed sense of smell or taste whereby they might be attracted to certain food substances. They were strongly attracted to colorless extracts of tuna flesh -

investigation showed that this attraction was caused by the protein rather than the fat fraction of the extract. Asparagine did not prove to be an attractant. Copper acetate, a well known shark repellent was repellent to the tuna as well.

VAUGHAN, W. T. 1907  
Recent Madreporaria of the Hawaiian Islands and Laysan  
Smithsonian Institution, United States National Museum Bull. 59  
publ.  
Sinclair L.

The classical work on the Hawaiian Islands corals. A full taxonomic account of the Madreporaria collected by the U. S. Bureau of Fisheries steamer Albatross expedition of 1902. A number of new species are described.

VonFRANZISKET, L. 1968  
Zur Okologie der Fadenalgen im Skelett lebender Riffkorallen  
Zool. Jb. Physiol. Bd. 74, S. 246-253  
HIMB Contribution No. 302  
publ.  
HIMB

A study of the coral-algae complex of the filamentous alga, Ostreobium, enmeshed in the skeleton of living reef corals in Kaneohe Bay. The amount of light intensity at several distances below the coral surface was measured and this was correlated with maximum photosynthesis and respiration. Based on small biomass and low photosynthetic production, it was concluded that the algae did not contribute significantly to the primary production of the reef.

WAINWRIGHT, S. A. 1963  
Skeletal organization in the coral, Pocillopora damicornis  
Quart. J. Micr. Sci. 104(2): 169-183  
HIMB Contribution No. 187  
publ.  
HIMB

A study presenting data and inferences on the major chemical constituents of the skeleton of P. damicornis collected from the reefs of Porites

compressa in Kaneohe Bay and describing the unit shapes and sizes, orientation and physical relationships of these skeletons.

The skeleton was found to contain at least 99.9% by weight aragonite, present as submicroscopic crystals in spheric arrangements. The organic component of the skeleton comprises 0.01 to 0.1% of the total weight and has 3 microscopic constituents - 1. filaments of lime-boring algae, 2. a dispersed network of fibers  $1\mu$  in diameter and 3. a transparent, milky, regionally birefringent matrix of chitin. The chitin was observed to be a spongework of fibrils of average diameter  $20\mu$ . The chitin fibrils were inferred to be randomly oriented in the plane of the skeletogenic epithelium perpendicular to the direction of growth of the long axes of the aragonite crystals.

WALSH, G. E. 1967

An ecological study of a Hawaiian Mangrove Swamp

Estuaries George H. Laft (ed.)

AAAS Publ. No. 83. Washington D. C. : 420-431

HIMB Contribution No. 203

publ.

HIMB

A study of an ecological analysis and integration of the physical, chemical and biological aspects of the Heeia Mangrove Swamp in the Kaneohe Bay watershed area. Data includes diurnal, monthly and seasonal data on physical and chemical factors such as dissolved nitrate, phosphate, oxygen and salinity and a discussion on the physiological adaptations and food interrelationships of the fauna.

WASS, R. C. 1966

A study of the population ecology of Lissocarcinus orbicularis

Student report, Zoology 620

unpubl.

Reese

A study of the association between the portunid crab L. orbicularis Dana and the sea cucumber, Holothuria atra. An attempt was made to correlate the frequency of occurrence with the size of the host. Correlations were also sought between the sex of the crabs and the size of the cucumber and where, in relation to the cucumber, each sex was most likely to be found. The flat between Kapapa Island and Sand Island in Kaneohe Bay was one of four areas studied on Oahu.

Results showed that the frequency of occurrence of the commensal relationship between L. orbicularis and H. atra is greater in areas in which a sandy substratum predominates and in which the surge conditions are light or non-existent. Larger specimens of H. atra are more likely to be hosting L. orbicularis. Females of L. orbicularis are more aggressive than males.

WASS, R. C. 1967

Removal and repopulation of fishes on an isolated patch

coral reef in Kaneohe Bay, Oahu, Hawaii

Terminal report on contract no. 14-16-0001-2430

MSc. Thesis, University of Hawaii

unpubl.

Helfrich

A study in which an entire community of fish on an isolated patch reef was studied, standing crop determined, species classified as herbivore, carnivore or omnivore and % composition of each trophic category in the total biomass was calculated and compared with previous studies. Recolonization of the experimental reef was studied to determine which species repopulated first, whether they were mainly adults and/or juveniles and the time interval involved.



The patch reef studied was in Kaneohe Bay - 21° 27' 58" N longitude  
157° 48' 55" W latitude

Results showed that the standing crop of fishes on the experimental reef was 1,117 lbs/acre. Of this biomass, 1.3% were herbivores, 26.4% carnivores and 72.3% omnivores. The adults and sub-adults of most reef fishes showed migratory tendencies. Scarids were the dominating re-populating fishes observed during this study. Repopulation requires more than 241 days to achieve complete equilibrium. The visual census technique is valuable in determining the relative abundance of reef fishes, provided the investigator is aware of the limitations of the technique.

WATERMAN, P. S. 1969  
Analyzing a diatometer sample using a truncated normal curve  
Student report, Marine Ecology  
unpubl.  
Ebert

A mathematical analysis of the diatom population in two areas of Kaneohe Bay. Sampling was done near a sewage outlet and off HIMB at Coconut Island using a Catherwood diatometer. The diatometers were collected 1-4 weeks after they had been set out, species were identified and the data was graphed according to Preston's (1948) method. The results were analyzed using formulae in Partick.

WATSON, M. 1963  
Sinking rate of plankton as a function of temperature  
Student report, Marine Ecology 620  
unpubl.  
Reese

A study to determine a possible change in the sinking rates of several common species of zooplankton in respect to a raising or lowering of the temperature of normal sea water. Plankton were taken from three localities on Oahu: the Ala Wai Boat Harbor, near the Waikiki marine laboratory and

at the entrance to the Kaneohe Marine Laboratory.

Results showed a general tendency for the plankton to sink rapidly with an increase in water temperature. Except for the chaetognaths, the planktoners showed a sinking curve comparable to that of sand grains.

WATSON, M. 1969

Some aspects of the pharmacology, chemistry, and biology of the mid-gut gland toxins in some Hawaiian sea hares  
PhD. Thesis, University of Hawaii, 241 pp.

unpubl.

Sinclair L.

A study of two toxic extracts, termed the 'ether-soluble toxin' and the 'water-soluble toxin', obtained from the mid-gut gland of four species of Hawaiian sea hares (Mollusca: Gastropoda: Aplysiidae). Both toxins were extracted from the homogenized mid-gut glands. Both toxins were found stable to short term temperature changes up to and including 90°C, as well as to recurrent freezing and thawing over a period of 2 years. Both were effective at low to moderate pH levels and were inactivated above pH 8. Neither toxin was orally toxic to mice, but they displayed potent intravenous and intraperitoneal effects. These effects are discussed and a possible mechanism of action of the water-soluble toxin at receptor site(s) is put forward.

Specimens were caught by snorkeling at several places around Oahu. Kaneohe Bay was one area of collection. Aplysia pulmonica Gould 1852, was found on the reef flats directly facing the yacht harbor. They showed seasonal appearances with peak abundance in mid-October in 1966 and 1967, but not in 1968 for some reason.

WEBBER, H. H. 1970

Tolerance to environmental stresses and distribution of

Nerita picea (Gastropoda: Neritidae)

Abstract. Biology of Molluscs. Graduate Training Program, U. H.

1968

HIMB Technical Report No. 18

publ.

HIMB

A study of population densities of Nerita picea on two habitats located on the sea wall adjacent to HIMB, Coconut Island in Kaneohe Bay. Population density was found to be higher on the protected habitat (up to 200/m<sup>2</sup>) than on the exposed side (10/m<sup>2</sup>). Movement during the tidal cycle, resistance to desiccation and temperature tolerance was studied in Nerita and compared in these respects to Littorina scabra which also inhabits exposed areas. The author proposes that a functional difference between Littorina and Nerita permits Littorina to maintain a greater population density in exposed habitats. Littorina has a mucus thread by which it remains attached to the substrate when it withdraws into its shell under adverse conditions. Nerita does not have as strong a mucus thread and so it can be readily dislodged.

WERTZBERGER, J. 1967

Oxygen consumption in Metopograpsus messor at lowered temperatures

Student report, Marine Ecology 620

unpubl.

Reese

A study to determine the oxygen consumption of Metopograpsus messor at 10°C and at 23°C (normal sea water temperature) respectively. It was hoped to gain data which would be useful for incurring the least number of fatalities when shipping crabs from distant collecting points by using cold/cooled water at minimum quantity and temperature. The crabs were collected with hand nets from the sea wall of Coconut Island. Results were uncertain but they seemed to indicate that M. messor consumes less

$O_2$ /hr/gm body weight at lower temperatures; larger crabs consume less  $O_2$ /hr/gm body weight than smaller crabs; no difference in  $O_2$  consumption between males and non-pregnant females of the same weight; starvation inhibits molting; a water temperature of  $10^{\circ}C$  lower than normal will induce thermal shock; and the  $Q_{10}$  slope is as expected.

WHIPPLE, J. A. 1966  
The comparative ecology of the Hawaiian Littorina Ferussac  
(Mollusca: Gastropoda)  
PhD. Thesis, University of Hawaii, 296 pp.  
unpubl.  
Sinclair L.

A study concerned with two species of Littorina, L. pintado and L. picta, which are the most abundant of the five species found in Hawaii. The study includes their systematics, life history, substratum, distribution, density and abundance as well as their ecology.

WIERSMA, C. A. G. and S. H. RIPLEY 1952  
Innervation patterns of crustacean limbs  
Physiologia Comparata et Oecologia 2(4): 391-405  
HML Contribution No. 20  
publ.  
HIMB

A study of the innervation patterns in the limbs of Palinura and Anomura in the hopes of making a generalized pattern of innervation within these groups. Comparative work was done also on the Decapod Natantia and Stomatopoda. The crabs were collected in Kaneohe Bay and the laboratory work was done at Coconut Island.

The results for each crustacean group agreed with previously reported work except for one or two points. The differences in musculature and innervation in the legs of the Decapod crustacea support the division of this group into Natantia and Reptantia, with a subdivision of the latter into 4 tribes: Palinura, Astacura, Anomoura and Brachyura as opposed to the other classifications which have been used.

WIERSMA, C. A. G. and A. BUSH 1963  
 On the movements of the eyestalks of crabs  
 particularly of Calappa hepatica (L.)  
 Koninkl. Nederl. Akademie van Wetenschappen  
 Amsterdam Proceedings, Series C, 66(1): 13-17  
 HIMB Contribution No. 177  
 publ.  
 HIMB

A study conducted at the Waikiki laboratory on specimens collected around Coconut Island, Kaneohe Bay. The crabs were operated on and stimulated in various ways with the resulting eye movements being noted. Although C. hepatica is regarded to be more primitive in comparison with other crabs, the specialization of the eye appears to be very advanced. The eyes are very well protected and no control adjustments are necessary to compensate for changes in the orientation of visual fields between the withdrawn and extended positions of the eye.

WIMBERT, J. 1964  
 Water-propulsion rates in the tunicate, Ascidia interrupta  
 Heller in temperature controlled conditions  
 Student report, Marine Ecology 620  
 unpubl.  
 Reese

A study done in partnership with M. Beldia on water propulsion rates in A. interrupta and the effects of temperature on this pumping action. For more details, see Beldia, M. 1964.

WONG, M. 1964  
 A community study of organisms on the floats at Coconut  
 Island, Kaneohe Bay  
 Student report, Zoology 620  
 unpubl.  
 Reese

A study of communities on the floats in the lagoon of Coconut Island to determine any differences in community structure over a distance and if there is any symbiosis. There were no definite conclusions drawn from

this study as the organisms seemed to show no structure. This study was done in conjunction with J. M. Takayesu, 1964.

WORCESTER, W. S. 1969  
Some aspects of the ecology of Lingula (Brachiopod) in  
Kaneohe Bay, Hawaii  
MSc. Thesis, University of Hawaii, 49 pp.  
unpubl.  
HIG L.

A study extending from June 1967 to February 1969, dealing with the distribution, limiting factors, interspecific interactions, feeding, growth and other aspects of the life history of Lingula reevi found in the southern section of Kaneohe Bay, Oahu. An effort was made to ascertain the ecological position of L. reevi in respect to limiting factors, interspecific interactions, distributional pattern and growth and to use this information as an aid to understanding the ancient environments in which Lingula is found as a fossil. Results showed that the distributional pattern was dependent on substrate, predators, food supply and clam diggers and to be intraspecifically independent. There was no preferred shell orientation; a good adaptation to sediment instability; a preference to salinities between 20 and 35‰; portunid crabs appeared to be the important predators and their predatory effect may account for the absence of the brachiopod in the deeper parts of the bay. Although L. reevi and the clam Tapes philippinarum co-occur, their niches appeared to be separate. The sex ratio of L. reevi is 1:1 and spawning occurs year round. Growth was found dependent on food supply and shell length was found to decrease linearly with increasing size. Longevity is estimated to be 5-8 years. The brachiopod is not considered to be an important member of the Kaneohe Bay ecosystem. Fossilization of L. reevi is probably not occurring in Kaneohe Bay.

YAMASHITA, D. T. 1951

The embryological and larval development of the nehu,  
 an engraulid baitfish of the Hawaiian Islands  
 MSc. Thesis, University of Hawaii  
 unpubl.  
 Sinclair L.

A study of the physical and biological factors affecting the supply of the nehu in the Ala Wai Canal and in Kaneohe Bay in order to exploit the population to secure the maximum sustained yield.

The development of the nehu eggs was divided into 8 stages of morphological differentiation from early cleavage to hatching. The development of the nehu larvae is also described. Field experiments showed the time of spawning the duration of incubation period, the development of eggs under varying temperature conditions and the growth of larvae. There was found to be a significant difference in both the size of the nehu eggs and the newly hatched larvae between Ala Wai Canal and Kaneohe Bay: 1.18 mm - 1.35 mm (egg length) and 1.87 mm - 2.12 mm (newly hatched larval length). In both areas, nehu spawn throughout the year with erratic day to day fluctuations. Rearing experiments failed, so larval growth rate was estimated by correlating lab and field observations.

YAMAZATO, K. 1963

Effect of salinity on calcium deposition of a coral,  
Fungia scutaria  
 Student report, Marine Ecology 620  
 unpubl.  
 Reese

A study using radioactive calcium to determine the effect of salinity on the calcium deposition in corals. Calcium deposition is thought to be one of the physiological changes that occurs with changes in salinity. Specimens of Fungia scutaria Lamarck were collected at Coconut Island and brought to the laboratory for experimentation.

Results showed the rate of calcium deposition to be the greatest in 100% seawater, followed by 125, 75, and 50% in order. When the effect of available Ca present in seawater is disregarded, the rate is highest in 50% seawater, followed by 100, 75 and 125% in order.

YAMAZATO, K. 1966

Calcification in a solitary coral, Funqia scutaria Lamarck,  
in relation to environmental factors

PhD. Thesis, University of Hawaii

unpubl.

Sinclair L.

A study concerned with the role of zooxanthellae in calcification of corals which was broken into two phases: analyzing the effects of some environmental factors on the rate of calcium uptake by F. scutaria; and obtaining a clear picture of the uptake and release of phosphorus by the same animal under varying conditions. Funqia scutaria and Porites compressa were collected from a coral reef flat on the southern coast of Kaneohe Bay, Oahu. Results showed that the Ca uptake rate increased in the dark, linearly with an increase in temperature within the range 15<sup>o</sup>-31<sup>o</sup>C while in the light, the rate attained a maximum value at 24<sup>o</sup>C. The change in the rate of phosphorus uptake with changing temperature paralleled that of the rate of Ca uptake both in the light and in darkness. The rate of Ca uptake decreased in the dark with decreasing salinity. In the dark, with an increase in Ca concentration from 0 to 200 mg/l, the rate of Ca uptake increased linearly and reached a steady state. The same situation happened in the light but continued to 400 mg/l and above. Above this concentration, the rate started to increase sharply with increasing Ca concentration. Rate of Ca uptake decreased linearly in the dark with the logarithmic increase in the ambient phosphate concentration, while in light conditions, the decrease in this rate was more rapid. Dinitrophenol completely



inhibited Ca uptake at concentrations of  $10^{-4}$ M in both light and dark. The author concluded that the zooxanthellae accelerated calcification in corals under various environmental conditions, and the adverse effects of environment on calcium uptake is reduced by the presence of zooxanthellae in the coral tissue. This effect of the presence of zooxanthellae is achieved through 2 processes - the removal of  $\text{CO}_2$  from the  $\text{CO}_2$ - $\text{CO}_3$  system and the removal of phosphorus compounds, a possible inhibitor of calcification, from the site of  $\text{CaCO}_3$  deposition.

YARNELL, J. L. 1970  
Aspects of the behavior of Octopus cyanea Gray  
Abstract. Biology of Molluscs. Graduate Training Program, U. H.  
1968  
HIMB Technical Report No. 18  
publ.  
HIMB

The behavior of Octopus cyanea was observed in two reef ponds on Coconut Island for a period of 60 days. Crepuscular activity pattern was noted to peak at 0600 and 1800 hours local time. Hunting trips may extend up to 50 meters and may last one hour. The feeding method was noted to be speculative rather than objective. O. cyanea was concluded to be a major predator on crabs and an important member of the coral reef community.

YEO, C. K. 1963  
Preliminary studies on the salinity tolerances of Opheodesoma spectabilis  
Student report, Marine Ecology 620  
unpubl.  
Reese

A study done in partnership with B. E. MacDougall on the salinity tolerances of O. spectabilis found on Coconut Island. For more details see MacDougall, B. E. 1963.

YOSHIDA, R. H. ?

Function of the caudal neurosecretory stem in the Aholehole  
Student report, Zoology 699  
unpubl.  
Zoology Dept.

An investigation into the effects of osmotic manipulation in the aholehole (Kuhlia sandvicensis) and the possible role of the caudal neurosecretory system in osmoregulation. All the analytical work was done on blood and serum drawn from the heart. The experimental fish were hooked in Kaneohe Bay near Coconut Island and the Kaneohe Bay Marina while the experimental work was done in the University laboratories.

Results showed that the osmotic and ionic changes associated with transferring the aholehole from seawater to freshwater, with the exception of  $\text{Na}^+$ , were as expected. The most interesting effect in this transfer was a 30% increase in hematocrit. The results of this study support the possible functional significance of hematocrit regulation as postulated by Imori (1965) that the caudal neurosecretory system is involved in a 'fine adjustment' role in osmo (iono) regulation, and this study also gives evidence for a possible mechanism of this 'fine adjustment'.

YOSHIDA, J. and L. KIDO 1963

A comparison of the communities present in three dead coral heads collected at different distances from the sea wall at Coconut Island  
Student report, Zoology 620  
unpubl.  
Reese

A study to observe the floral and faunal communities of dead Porites heads and to see if there are any variations in community structure in the heads at different distances from the sea wall. Burrowing annelids were found to be dominant in all three heads examined. The coral head found at the greatest depth and the greatest distance from the sea wall had the largest

number of individual animals but there appeared to be a multiplicity of factors involved in the structure of the communities which made a comparison between the heads very difficult.

There was no species list included in this report.

YOUNG, S. D. 1969

Studies on the skeletal organic material in hermatypic corals, with emphasis on Pocillopora meandrina

PhD. Thesis, University of California, Los Angeles  
unpubl.

HIMB

An abstract of a dissertation done by Stephen D. Young on the skeletal organic material in hermatypic corals, especially in Pocillopora meandrina.

The amino acid composition of the matrix of the 14 species from the suborders Astrocoeniina, Fungiia, Faviina and Dendrophylliina are described; the distribution of  $C^{14}$  in skeleton and tissue of corals incubated with  $Na_2C^{14}O_3$  is described; and the results of experiments testing the hypothesis that matrix formation is necessary for deposition of calcium carbonate is discussed. Specimens from Kaneohe Bay were used in the study.

Results indicated that all corals examined have a similar amino acid composition. Glucosamine is present in varying proportions, the origin of this compound is uncertain. With regard to the distribution of fixed  $C^{14}O_2$  - the coral had 87% of the  $C^{14}$  in the skeletal carbonate and 1% in protein and chitin - the remaining 12% appeared in a previously undetected skeletal lipid fraction - this unknown lipid was found to be an integral part of the skeleton. Experiments showed that the deposition of a new matrix is necessary for the deposition of calcium carbonate thus supporting the hypothesis.

YOUNGBLUTH, M. J. 1968  
Aspects of the ecology and ethology of the cleaning fish  
Labroides phthiophagus Randall  
Z. Tierpsychol. 25: 915-932  
HIMB Contribution No. 317  
publ.  
HIMB

A study of the endemic Hawaiian cleaning wrasse, L. phthiophagus, to quantify aspects of its behavior and ecology. Research was done in Kaneohe Bay by skin and SCUBA diving. Ecological studies included a study of the density and distribution around a patch reef, an analysis of the diet, an estimate of the rate of cleaning and a study of depopulation of the species from selected patch reefs. Aquarium observations provided information on cleaning behavior, the sequence and frequency of the fixed motor patterns of this behavior, the relationship between the inspecting and feeding of different areas of the host fish and the relationship between the amount of time inspecting a host fish and the frequency of feeding. Reproductive behavior was observed in the field from March 1965 to March 1966.

ZIMMERMAN, S. T. 1969  
The transformation of energy by Lucifer chacei  
(Borradaile) Bowman (Crustacea, Decapoda)  
MSc. Thesis, University of Hawaii, 66 pp.  
unpubl.  
Sinclair L.

A laboratory study of energy transformations by the pelagic decapod, Lucifer chacei. Three stages were studied: the zoea-prototrocha stage, the combined early and late schizopod stage and the combined adult stages. Respiration was measured using a micro Winkler technique. Assimilation was determined using S35. Dry weight, ash content, calorific values were determined for each stage. The number of calories/hour ingested, assimilated, and respired were determined for each stage and an energy flow diagram was constructed. The animals were collected in Kaneohe Bay.

GEOLOGY

BELSHE<sup>1</sup>, J. C. 1968  
 Ocean Sediments Sampled During 1964-1967 in the Hawaiian Archipelago  
 Applied Oceanography Series No. 6  
 HIG Report No. 68-7  
 publ.  
 HIG L.

A report describing the marine sediments collected November 1964 to June 1967 by the Hawaii Institute of Geophysics. This report is one of the preliminary studies of the sea floor northeast of Oahu for the project MOHOLE. Eight samples were collected from Kaneohe Bay. Other reports of studies include: size distribution of sediments, X-ray diffraction studies, diatom ooze, magnetic studies, engineering properties and depths of samples.

CHAMBERLAIN, T. 1968  
 The Littoral Sand Budget, Hawaiian Islands  
 Pacific Science 22(2): 161-183  
 HIG Contribution No. 124  
 publ.  
 Sinclair L.

The seasonal fluctuation in the volume of sand as measured by profile studies, water-jet borings and measurements made from aerial photographs of 80 selected Hawaiian beach and nearshore environments are presented in this paper covering a study period from 1962-1963. Kaneohe Bay was one of the study areas.

EMERY, K. O. and D. K. COX 1956  
 Beachrock in the Hawaiian Islands  
 Pacific Science 10: 382-402  
 HIMB Contribution No. 76  
 publ.  
 HIMB

A study of the beachrock, calcarenite and calcirudite occurring along the shores of the Hawaiian Islands in an attempt to determine whether its distribution is related to abundance and composition of ground water or to other

factors of the shore environment.

Sample Data

North Kaneohe Bay - 0.18 (medium diameter in mm); 1.69 sorting coefficient and 99% soluble in dilute HCl per cent by weight

Makahoa Point to Mokapu Peninsula - 33.6 miles of coast; 20.8 miles of sandy beach and 1.0 mile beachrock.

HIRASHIMA, G. T. 1962

Effect of the Haiku Tunnel on Kahaluu Stream, Oahu, Hawaii

U. S. Geological Survey, Prof. Paper 450-C, 1962

Geological Survey Research: C118-C120

publ.

HIMB

An article exploring the possibility that the decrease in water flow of Kahaluu Stream was due to the withdrawal of ground water by the tunnel bored in Haiku Valley, 2 1/2 miles away. The article appraises quantitatively the decrease of the annual runoff of Kahaluu Stream, while comparing it with other streams in the area. The author concludes that as water trapped behind intrusive dikes could possibly move parallel to the Koolau Range and that the change in Kahaluu Stream flow occurred some after the Haiku Tunnel was bored, the decrease in flow of Kahaluu Stream was due to the ground water being withdrawn by the Haiku Tunnel.

HITCHCOCK, C. H. 1900

Geology of Oahu

Geol. Soc. America Bull., 11: 15-60

publ.

Hamilton L.

One of the earlier reports of the geology of the island of Oahu, including such topics of interest as geomorphology, secondary craters, artesian wells, coral reefs, rocks at the Pali, Pearl River series, fossil land snails, black ash and the order of events in the geologic history of Hawaii and a

short chapter on the tertiary geology of Oahu by W. H. Dall. The report includes eight photographs and one map of Oahu.

KUNISHI, H. M. 1956  
 Mineral Analysis of Hawaiian Surface and Seepage Waters  
 MSc. Thesis - University of Hawaii  
 unpubl.  
 Sinclair L.

A study of the analysis of surface and seepage waters of the Hawaiian Islands, Oahu, Maui, Kauai and Hawaii, to determine the amount and the type of substances being carried in solution. For these analyses, relative rates of removal of soluble substances were determined and finally, attempts were made to determine the soil forming processes being favored by such movement. Work was done on the Halawa Stream on Oahu.

MOBERLY, R. JR. 1963  
 Rate of Denudation in Hawaii  
 J. Geol., 71(3): 371-375  
 HIG Contribution No. 35  
 publ.  
 HIG L.

A new approach in determining the rate of denudation of the larva shield in the Kaneohe Bay watershed area based on calcium. This approach agrees with other estimates of ages and rates of geologic processes in Hawaii except those derived from recent reports of paleomagnetic data. Solutions of silicate rocks are shown to be far more important in warm, humid basaltic terrains than in a temperate, cooler region of diverse lithology.

MOBERLY, R. J. JR. 1963  
 Amorphous Marine Muds from Tropically Weathered Basalt  
 Amer. Jour. Sci., 261: 767-772  
 HIG Contribution No. 39  
 publ.  
 Hamilton L.

A study of the composition and mode of origin of the detrital muds in the recent sediments of Hawaii. Samples were collected from shallow nearshore

areas of Kaneohe Bay and analyzed with the standard X-ray diffraction procedures.

MOBERLY, R. J. JR. 1963  
Coastal Geology of Hawaii  
Final Report, Hawaii State Dept., Planning and Economic Development  
Contract No. 6031: 216 pp.  
HIG Report No. 41  
publ.  
HIG L.

A comprehensive report of the geology of all segments of coastline on the islands of Kauai, Oahu, Molokai, Lanai, Maui and Hawaii with specific characteristics of the island shoreline being mapped. Oahu has more coastal plain and reefs than the other islands and has the greatest urban development in its coastal areas. Included are several studies and summaries of previous investigations on coastal geomorphology, sources of energy in nearshore environments, sand characteristics, Tsunami behavior, windation and protection. Included also is an annotated bibliography on the most significant articles on nearshore marine processes, topical sedimentation and local geology. Kaneohe Bay is described in the island of Oahu.

MOBERLY, R. JR. 1967  
Loss of Hawaiian Littoral Sand  
J. Sed. Petrology 38(1): 17-34  
HIG Contribution No. 191  
publ.  
HIG L.

A paper discussing the avenues of loss of Hawaiian littoral sand and using these studies to summarize the factors of the Hawaiian littoral sand budget. Sand beaches were studied on the islands of Niihau, Kauai, Oahu, Molokai, Lanai, Maui and Hawaii, but most of the studies were concentrated on Kauai and Oahu: the sand transportation by the Waihee Stream into Kaneohe Bay was studied on Oahu. Methods of beach surveying and sand analysis were reported in a previous paper.



MOBERLY, R. JR. and J. F. CAMPBELL 1969  
Hawaiian Shallow Marine Sand Inventory  
HIG 69-10, Sea Grant 69-1: 24 pp.

A sea grant program involving the mapping of shallow-sand bodies around the Hawaiian Islands intended to encourage the exploitation of sand deposits that do not affect beach areas. The project is described, and a bibliography of carbonate sands and reef structure is presented. Part two of this study is concerned with Ahu O Laka deposit in Kaneohe Bay, Oahu. This body of sand lies on the lagoonward edge of the large barrier reef flat in Kaneohe Bay. Jet probing indicated a deposit of not less than one million cubic yards of sand. Studies of the preliminary seismic results and of the probable origin of the deposit indicates that it may actually be larger. This sand compares favorably with other Hawaiian calcareous littoral sands. According to the author, exploitation would not affect the shores of Kaneohe Bay and probably would not disturb an adjacent proposed marine refuge.

RUHE, R. V., J. M. WILLIAMS and E. F. HILL 1965  
Shorelines and Submarine Shelves, Oahu, Hawaii  
J. Geology 73: 485-497  
publ.  
HIG L.

A paper on the analysis of shorelines and shelves on Oahu. Aerial photographs and topographical maps (7.5 minute series, scale 1:24,000) were used in the field mapping. The topographical maps (1953-1960) had a contour interval of 40 feet with a 10-foot interval in areas of broad coastal lowland. Elevations in coastal areas were checked with a transit and rod. Bathymetric charts were also analyzed and checked for accuracy. The 5-foot submarine shelf of Kapapa Island in Kaneohe Bay is geologically of recent time (p. 486 on p. 495, there is a topographical profile of the Kaneohe coastal area).

STEARNS, H. T. 1935  
Shore Benches on the Island of Oahu, Hawaii  
Bull. Geol. Soc. Amer., 46: 1467-1482  
publ.  
HIG L.

A study of the shore benches on Oahu conducted from 1930 to 1934 while making a systematic survey of the geology and ground water resources of Oahu. The formative processes are discussed and the discovery of certain critical stratigraphic data and a few exceptional bench localities are cited here. Kapapa Island and Moku Manu were two bench areas studied in Kaneohe Bay. Included in the discussion of Kapapa Island is a cross-section of the island showing the geological formations composing the island.

STEARNS, H. T. 1935  
Pleistocene Shorelines on the Islands of Oahu and Maui, Hawaii  
Bull. Geol. Soc. Amer. 46: 1927-1956  
publ.  
HIG L.

A study of the pleistocene shorelines of Oahu and Maui determined by the author during a systematic investigation of the geology and ground-water resources of these islands by the United States Geological Survey. The work began in 1930 and was still in progress at the time of publication. Profiles down the slopes of the alluvial fans in the Heeia and Libbyville areas of Kaneohe Bay are discussed in context with profiles from other areas of Oahu. On p. 1930, the author has mapped the island of Oahu showing areas of fringed and submerged reefs, the main reef in the bay is a fringing reef whereas most of Mokapu Peninsula is an emerged reef area.

STEARNS, H. T. 1939

Geologic Map and Guide of the Island of Oahu, Hawaii (with a Chapter on Mineral Resources)

Division of Hydrography of the Territory of Hawaii - Bull. 2: 75 pp. publ.

HIG L.

The geological mapping of Oahu was done in the field using topographical maps of 15-minute quadrangles on a scale of 1 to 20,000 (approx. 3 inches to the mile). The author also gives a guide of the geology along the main highways to be used in conjunction with the geologic map. Routes in the Kaneohe area are Route 6 in the Makapu region and Route 1, a circum-island highway. Included also are a few pictures, one being a view of the Kaneohe area from the Pali lookoff showing the secondary cinder cones in the lava plain and the barrier reef in the bay.

STEARNS, H. T. 1940

Supplement to the Geology and Ground-Water Resources of the Island of Oahu Hawaii Div. Hydrography Bull. 5: 164 pp.

publ.

HIG L.

This report brings up-to-date the progress in ground-water development on Oahu since Bulletin 1 was issued in 1935. Ten shafts constructed since 1935 and capable of delivering 100,000,000 gallons of water a day are described. The knowledge gained by the construction of the shafts and the results obtained by plugging dikes in tunnels to store water underground are given. On p. 95-164 are supplemental ground-water statistics with a listing of the public water supplies including the population of the area, sources of water, geologic structure, owner of the water system, consumption and chloride content of the water.

STEARNS, H. T. 1961  
 Eustatic Shorelines on Pacific Islands  
 Zeits. fur Geomorphologie Suppl. 3: 3-16  
 publ.  
 Hamilton L.

An article which is a summary of a paper given at the 10th Pacific Science Congress in Honolulu, 1961. This paper considers only the eustatic shorelines on the island of Oahu with passing reference made to the other Pacific Islands. The definition of a eustatic shoreline is given before the author discusses the origins of the shores of Oahu. Moku Manu and Kapapa Islands in Kaneohe Bay are included in the discussion. The bibliography contains 44 titles.

STEARNS, H. T. 1967  
 Geology of the Hawaiian Islands  
 U. S. Government, Geological Survey Bulletin No. 8: 112  
 publ.  
 HIMB

A publication much the same as the Geology of the State of Hawaii by the same author published in 1966. A brief summary of the geography, climate and geomorphology of the Hawaiian Island chain is presented and then a synopsis of the present knowledge of the geology of each volcanic mountain, as well as a table of the rock units, and geologic maps of all the major islands is given. The geology of the Kaneohe area is discussed on p. 78-82.

STEARNS, H. T. and K. N. VATSVIK 1935  
 Geology and Ground-Water Resources of the Island of Oahu  
 Hawaii Div. Hydrog. Bull., 1: 479 pp.  
 publ.  
 HIG L.

The first in a series of 13 bulletins from the joint efforts of the U. S. Geological Survey and the Hawaii Division of Hydrography on the geology of the Hawaiian Islands. Included in a description of the evidence for higher

and lower stands of sea level in the pleistocene. This bulletin remains the one basic book on Oahu Geology, according to some reviewers. The reef in Kaneohe Bay is described on p. 36-37 and the volcanos of Kaneohe are discussed on p. 111 and 112.

STEARNS, H. T. and K. N. VAKSVIK 1938  
Records of Drilled Wells of Oahu  
Hawaii Div. Hydrography Bull. 4: 213 pp.  
publ.  
HIG L.

The description, location, log and meter tests of all the drilled wells on Oahu are given as of March 1, 1938. Wells in the Kaneohe Bay watershed area are given on p. 209-211 which include wells 405-1 to 407-1 in the Kaaawa and Kahaluu areas.

WENTWORTH, C. K. and J. E. HOFFMEISTER 1939  
Geology of Ulupau Head, Oahu  
Bull. Geol. Soc. Amer. 50: 1553-1572  
Publ.  
HIG L.

Ulupau Head is a secondary tuff crater forming the eastern salient of Mokapu Peninsula on the northeastern coast of Oahu. This study is a combination of a study of reefs and reef limestones on Oahu by one author with the study of the marine bench forming processes on limestone and other rocky shores by the other author. This area proved to have remarkable geomorphic and stratigraphic features.

HISTORY

BATES, G. W. 1854  
 Sandwich Island Notes by a Haole  
 Published by Harper Bros., New York: 493 pp. Illus.  
 publ.  
 Archives

A collection of notes written by Bates during his travels to and around the Hawaiian Islands in 1853. Bates describes not only the physical features of Honolulu but also the cultural, social and political aspects of the city prior to annexation. There are delightful narratives of trips taken around Oahu, including a chapter of a trip to Kaneohe. Other trips include Kauai, Molokai, Maui and Hawaii

BISHOP, S. E. 1916  
 Reminiscences of Old Hawaii  
 Publ. Hawaiian Gazette Co. Ltd.  
 publ.  
 B.P.B.M.

A collection of personal memories, reminiscences and writings of Sereno Edwards Bishop. This is the first such "history" book published about Hawaii. The book includes a brief biography of S. E. Bishop by Lorrin A. Thurston. Bishop did most of his missionary work on the Kona coast of Hawaii, but he made several trips to the other islands and during one of these trips he met Rev. B. W. Parker and his wife in Kaneohe (p. 51).

BOWSER, G. 1880  
 An Itinerary of the Hawaiian Islands with a Description of the Principal Towns and Places of Interest  
 The Hawaiian Kingdom - Statistical and Commercial Directory and Tourists Guide: 1880-1881; 435-576  
 publ.  
 Archives

An itinerary of a trip around the Hawaiian Islands with chapters on Honolulu, Oahu, Maui, Hawaii, Kauai, and Niihau and Molokai, Lanai and Kahoolawe.

Chapter two is a short account of a horseback trip around Oahu--the author left Honolulu to travel over the Pali to Waimanalo, then to Kaneohe, Waikane, Laie and back to Honolulu. At this time, most of the land in Kaneohe was cultivated with sugar, there being three plantations and the Honorable C. C. Harris, Chief Justice of the Kingdom had the largest plantation. In the Heeia district, the big sugar plantation belonged to John McKeague. Rice was also planted in Heeia, cultivated by Mr. Ah Kau. Mr. John Crowder maintained a fishery ground in an area 3 miles along the beach to the sea. At the far end of the bay, near Waiahole and Waikane, most of the land was cultivated with rice. Horse raising was the chief industry of Kualoa, there being over one hundred head of horses on the land which was at one time a sugar plantation.

BRIGGS, L. V. 1926

Experiences of a Medical Student in Honolulu and on the Island of Oahu, 1881

Publ. D. D. Nickerson Co., Boston: 251 pp.

publ.

Sinclair L.

The diary of a medical student who traveled around the island of Oahu vaccinating the people against smallpox from January 3-21, 1881. It was because of his efforts that when smallpox broke out in Honolulu, the epidemic did not spread to the rest of the island. Briggs wrote extensively about the people he met and the country through which he traveled as well as the political atmosphere of Honolulu at this time. In the addenda, Briggs records the number of vaccinations he gave during his travels; the records for Kaneohe are on p. 227 and 228.

BROWN, M. F. 1953  
 Leatherneck City  
 Paradise of the Pacific 65(6): 11-15  
 publ.  
 HIMB/Sinclair L.

A pictorial history of the Kaneohe Marine Air Corps Station on the Mokapu Peninsula. The station is the home base for the First Provisional Marine Air-Ground Task Force, F.M.F., which is the marine corps newest fighting force (at that time).

CHAMBERLAIN, L. 1828  
 Tour Around Oahu, 1828  
 Hawaiian Historical Society Reports, 1956: 25-41  
 publ.  
 Archives

An account of a journey around the island of Oahu undertaken by Levi Chamberlain, business agent of the Sandwich Islands Mission, 1823-1849, to determine the progress of the American missionaries in teaching the Hawaiians to read and write in their own language. This is one of the earliest descriptions of a circuit of Oahu. The author unfortunately, makes no reference to the size of the school in Kaneohe, except to say that the pupils were well trained. The school in Kikiwelawela was visited along with the school in Heeia. The latter had 24 scholars. Waihee, Kalaea, Hakepuu and Kualoa on the edge of Kaneohe Bay were also visited, but the author gave no reference to the size of the schools.

FIDDLER, F. 1956  
 Mokapu - A Study of the Land  
 U. S. Marine Corps Air Station, Kaneohe Bay, Oahu, T. H.: 19 pp.  
 publ.  
 B.P.B.M.

A short comprehensive history of the Mokapu Peninsula from the geological beginnings through an era of kingly pagentry and religious hieaus, cattle



grazing and truck farming and finally in 1939 to the Navy Department for the site of the Kaneohe Marine Corps Air Station.

FIDDLER, F. 1956  
Mokapu - A Study of the Land  
The Windward Marine Newspaper, October 5 - November 23  
publ.  
B.P.B.M.

A series of eight articles, the first one is unfortunately missing, published in the Windward Marine Newspaper by Frank Fiddler, Technical Sergeant, U. S. Marine Corps. These articles were printed privately (see previous reference). The newspaper articles contain several black and white photographs and a map of the present-day Mokapu which the printed-paper does not include.

GILMAN, G. D. 1848  
Notes of a Tour of Oahu  
Personal Notes  
unpubl.  
H.H.S.

A tour of Oahu made by Mr. G. S. Gilman in September 1828. The author took the eastern road around the island, passing through the villages of Waikiki, Waimanalo and Kaneohe. The author mentions that one of the prettiest sites he has seen is after climbing the long and steep hill and passing through a cut in the mountains just wide enough for a horse to pass, and seeing the blue waters of Kaneohe Bay with a little green island in the center. The tour continued on through Kahaku, Waimea and back to Honolulu.

GREEN, C. P. 1933  
Benjamin Wyman and Mary Elizabeth Parker  
The Friend (May): 104-115  
publ.  
Archives

The copy of a paper prepared for and read at the 1933 meeting of the Hawaiian Mission Children's Society by Caroline Parker Green about her grandparents

who were missionaries at the Kaneohe Mission from October, 1834 to 1863. This account contains some of the outstanding events in their lives drawn from their journals and letters. The district of the Kaneohe Mission comprised about 10,000 Hawaiians living in the area extending from Waimanalo to Kualoa.

HIATT, R. W. 1951  
The Hawaiian Marine Laboratory  
Pacific Science 5(4): 291-297  
HML Contribution On. 8  
publ.  
HIMB

A history of the Waikiki Laboratory and the Coconut Island Laboratory with emphasis on the latter. Included in this report is a general description of the lab and the research facilities available.

JARVES, J. J. 1843  
Scenes and Scenery in the Sandwich Islands and a Trip Through Central America  
Publ. by James Munroe and Company, Boston, 1843  
publ.  
Archives

A series of sketches illustrating the life and conditions and other interesting features of the Sandwich Islands compiled from Jarves personal notebook written during the years, 1837-1842. The author describes the volcanic eruption of Kilauea in 1840 very vividly on a trip to Hawaii. On one of his trips around Oahu, Jarves describes the view of the town and the mission houses of Kaneohe from the Pali lookoff.

MACCAUGHEY, V. 1917  
A Footpath Journey  
Mid-Pacific Magazine 14: 181-196  
publ.  
B.P.B.M.

A delightful narrative of a tramp from Honolulu to the Mokapu Peninsula on Oahu. A map of Oahu depicts a pineapple cannery, old mill and coral gardens

as well as Coconut Island near the shores of Kaneohe Bay. The terrain, flora and fauna of the area are described. The author also draws a map of the western portion of Mokapu Peninsula showing Hawaii Loa Crater and ancient ruins.

NATIONAL PARKS SURVEY, 1962

The National Survey of Historic Sites and Buildings, Theme 21, Political and Military Affairs, 1865-1910

Special Study - Hawaii History, 1778-1910: 201 pp.

U. S. Government, Dept. Interior

publ.

Archives

The report of a special study under the directorship of C. L. Wirth on the historic sites and buildings of Hawaii, 1778-1910. On p. 199 (site 41) mention is made of the Kualoa Sugar Mill near the Kualoa Point on the east shore of the island of Oahu. This impressive ruins is all that remains of the mill built by S. G. Wilder during the 1860's.

PARKER, B. W. 1835-1862

Kaneohe Missionary Station Reports

unpubl.

HMCS

In the 1836 report, Rev. Parker notes the census of the whole population of the Kaneohe station, which was recorded during the previous year. The census was 4636, "351 less than in 1831". The records of births and deaths commenced in January of 1836, 14 births and 28 deaths in a period of January 1 to June 1, when Rev. Parker submitted his report.

In the 1838 report, Rev. Parker makes reference to a stone house having been built at the station at a cost of \$1500.

In the 1840 report, Rev. Parker notes that the natives had planted several acres of sugar cane and have sent it to the states for an iron sugar mill. They also "applied to the king for permission to establish a road

across the Pali at their own expense possible for horses and mules and establish a toll to meet the expenses of the road--the work already commenced".

In the 1841 report, the population is stated to be 4000 according to the census of the district taken in the previous year.

In the 1843 report, the completion of the new stone meeting house is noted. The house has eight glass windows, six koa doors and plaster on the walls and ceiling (no dimensions are given).

In the 1846 report, a register of births and deaths at Kaneohe among a population of 1000 inhabitants for the last six years is given:

<u>Year</u>	<u>Births</u>	<u>Deaths</u>
1840	21	59
1841	22	45
1842	17	30
1843	19	60
1844	23	55
1845	24	65

Rev. Parker mentions that there is some evidence of a dimution in the population although it is not very rapid. In 1845, the increase in the death rate was due to an epidemic which spread through the islands in April of that year. There has been no census of the entire population associated with the station although the number was not far from 6000 according to Rev. Parker.

In the 1849 report, the census was 2813 compared with the census of 4987 in the year 1832.

In the 1862 report, mention is made of the beginnings of rice cultivation in the area by foreigners.

PRINTING OFFICE, WASHINGTON 1947  
 Building the Navy's Bases in World War II  
 History of the Bureau of Yards and Docks and the Civil Engineers Corps,  
 1940-1946, Vol. 1 and 2: 522 pp.  
 U. S. Government  
 publ.  
 Archives

A report of the work accomplished by the Bureau of Yards and Docks, the Corps of Engineers, the Construction Battlions or "Seebees", the many civilian employees, engineering firms and contractors. Information pertaining to Kaneohe Bay may be found on the following pages of volume two: p. 121--the first CPFF contract awarded by the Navy during the war construction program was on August 5, 1939, to cover the construction of a new naval air station at Kaneohe as well as other bases in the Pacific; p. 155--construction of the MCAS began in September of 1939 under a PNAB contract; p. 138-139--the major project (of MCAS) entailed extensive dredging to provide the necessary seaplane runways. The dredging continued for 3 years during which time 11,000,000 cubic yards of material was removed.

STEELE, A. 1968-1969  
 Myths, Martyrs and Marines of Mokapu  
 Pali Press - Dec. 30, Jan. 8, Jan. 22, Jan. 29, Feb. 5, Feb. 19  
 publ.  
 HIMB

A series of seven articles, the third of which is missing in the HIMB files due to unavailibility, taken from the writings of Staff Seargeant Al Steele who wrote the history of the Mokapu Peninsula while assigned to the Marine Crops Air Base.

WATERMAN, T. T. 1934  
 An Ancient Hawaiian Sugar Mill  
 Paradise of the Pacific 46(9): 29-32  
 publ.  
 HIMB/Sinclair L.

The story of the reconstruction of the two stone grinders which were once used for grinding sugar cane at the sugar mill in Kualoa on the shore of Kaneohe Bay. The mill is presently on the grounds of the Swanzy Ranch.

WILKES, C. 1845  
 Narrative of the U. S. Exploring Expedition During the Years of 1838, 1839  
 1840, 1841 and 1842, Vol. IV  
 Publ. by Lea and Blanchard, Philadelphia, 1845  
 publ.  
 Archives

The account of the U. S. Exploring Expedition to the Hawaiian Islands, 1838 to 1842. In volume four, p. 76-84, Wilkes makes reference to Kaneohe--the condition of the land, the mission station, the harbor of Waialai, and the king's fish ponds.

WILSON, W. F. 1922  
 With Lord Byron at the Sandwich Islands in 1825, Being Extracts from the MS  
 Diary of James Macrae, Scottish Botanist  
 Privately publ. by W. F. Wilson, Honolulu, 1922  
 publ.  
 Archives

Extracts from the diary of James Macrae, botanist on Byron's voyage to Hawaii in 1824-1826 compiled by William F. Wilson. The diary is now in the possession of the Royal Horticultural Society, London; and the herbarium is either in Kew or in the British Museum in London, Wilson was not sure.

This is one of the earlier accounts of visiting the islands--the author not only describes the scenery, but also the culture and makes special note of the flora of the islands. On one of his trips around Oahu, Macrae visited Kaneohe. Here, the natives cultured noni or Morinda citrifolia for the sake

of its fruits as a yellow color for tapa and cloths. Macrae noted that Kaneohe Bay was open, exposed and "full of rocks in many places above water which renders it unsafe for vessels to anchor. It is full of fish."

WOOD, W. M. 1849

Wandering Sketches of People and Things in South America, Polynesia,  
California and Other Places Visited During a Cruise on Board the U. S.

Ships Levant, Portsmouth and Savannah

Publ. Carey and Hart, Philadelphia, 1849

publ.

B.P.B.M.

Notes written by William M. Wood, M. D. Surgeon, U. S. Navy and late fleet surgeon of the Pacific Squadron during his time on board the U. S. ships Levant, Portsmouth and Savannah on their trips to South America, Polynesia, California and other smaller places. Wood rode on horseback to the Pali look-off and descended the precipice on foot. His comments on his travels are very interesting to read.

WOODBURY, D. O. 1946

Builders for Battle - How the Pacific Naval Air Bases Were Constructed

N. Y., E. P. Dutton and Co., Ltd.: 415 p.

publ.

Archives

The story of the construction of the Pacific Naval Air Bases before World War II. On p. 78-91, the author tells the story of the dredging operations and the building of the Kaneohe Naval Marine Base on Mokapu Peninsula. In a period of a month, they removed 175,000 cubic yards of coral and deposited it on the flat land where the station is now located. Seven million dollars were spent on building Kaneohe Base, more than half what Congress had allotted to the whole Pacific group. It doesn't say exactly where they were dredging, but it mentions working in 10-25 foot seas and heavy surge; so it must have been outside the reef area.

HYDROLOGY WASTE DISPOSAL

BARKELEY, R. A., B. M. ITO, and R. P. BROWN 1964  
Releases and Recoveries of Drift Bottles and Cards in the Central Pacific  
U. S. Dept. Interior, Fish and Wildlife Service  
Special Scientific Report No. 492  
publ.  
HIG L.

Data is presented here on all releases and recoveries of drift bottles and cards in the Central Pacific from January 1961 through June 1963, together with charts showing release and recovery points. Kaneohe Bay was sited as one of the recovery points. Analysis of this data indicates a seasonal change in the direction and speed of the current system near the Hawaiian Islands which coincides with the strength of the trade-wind system.

BATHEN, K. H. 1968  
A Descriptive Study of the Physical Oceanography of Kaneohe Bay, Oahu, Hawaii  
University of Hawaii - Institute of Marine Biology Technical Report No. 14  
publ.  
HIG L.

A 13-month (June 1, 1966 to June 30, 1967) hydrographic study of Kaneohe Bay including hypsographic conditions, tides, circulation patterns, volume transport, sewage distribution, heat budget, precipitation, runoff and the distribution of water properties in the bay. The inter-relationships of these parameters were also considered.

## BOARD OF WATER SUPPLY

Surface Water Supply of the Island of Oahu, 1909-1928

City and County of Honolulu

Suppl. to the Report of the Honolulu Sewer and Water Commission to the  
Legislature of the Territory of Hawaii; 15th Session, J. F. Kunesh, Engineer  
publ.

BWS

A supplementary report dealing with surface water resources on the island of Oahu. The study began in 1927. Data was compiled rainfall gages in the Kaneohe area and presented on p. 131-179.



BOARD OF WATER SUPPLY 1962  
 The Hydrology of Waihee Tunnel and Upper Waihee Valley by J. F. Mink  
 City and County of Honolulu  
 unpubl.  
 BWS

A study of the hydrology of the Waihee Valley preparatory to the completion of the transmission main in mid-1962. The purpose of this study was to determine the flow available for storage and recharge, to establish the relationship between flow and head and to determine the time intervals throughout which selected flows could be maintained. All objectives were attained.

BOARD OF WATER SUPPLY 1963  
 Oahu Water Plan  
 City and County of Honolulu  
 publ.  
 HIMB

A report of the Board of Water Supply presenting "the factual information pertinent to water resources of Oahu and to forecast their probable future development in meeting the requirements of a rapidly growing population and an aggressive economy". The report includes the geology, geography and economy, hydrology and development and water resources of Oahu. Kaneohe area is included in service area number two (Waimanalo-Kailua-Kaneohe) and is on p. 18 to 23.

BOARD OF WATER SUPPLY 1966  
 Oahu's Water Systems Development Plan, Part I, by K. K. Wallace  
 City and County of Honolulu  
 publ.  
 BWS

A report on Oahu's water system development plan including population projections, related estimated water requirements and proposed additional water works facilities for the City and County of Honolulu, 1965-1985. Data for service area number two (Kailua-Kaneohe-Waimanalo) is on p. 37-40.

BOARD OF WATER SUPPLY 1967  
 Report on the Use of Waihee Tunnel for Storage  
 City and County of Honolulu  
 unpubl.  
 BWS

A report prepared by the Waihee Tunnel for Storage Committee in the feasibility of using Waihee Tunnel to store water from the Punaluu district. The Waihee Tunnel Reservoir has a storage capacity of about 2,200 million gallons and could be recharged during periods of low demand with water from other sources. This report also discusses other water sources for service area number two (Koolaupoko) and their utilization and future capacity. These

sources (as of May, 1967):	Waimanalo tunnels	0.7 MGD
	Waimanalo wells	0.5 MGD
	Luluku tunnel	0.6 MGD
	Kuou wells	1.5 MGD
	Kahaluu tunnel	2.9 MGD
	Haiku tunnel	1.9 MGD
	Waihee tunnel	<u>3.5 MGD</u>
	Total	11.6 MGD

BOARD OF WATER SUPPLY 1969  
 Supplement to the 1968 Annual Report - Statistics for a 12-Month Period,  
 July 1, 1967-June 30, 1968  
 City and County of Honolulu  
 publ.  
 BWS

A compilation of statistics for a 12-month period (July 1, 1967 to June 30, 1968) for Oahu of rainfall indexes, wells, artesian well data, water mains, water quality, distribution analyses, water rates and other statistics pertaining to the water resources of Oahu. Supplements are published for 1967, 1966, 1965, 1964, and 1963.

DEPARTMENT OF PUBLIC WORKS, DIVISION OF SEWERS 1957  
A Report on the Sewage Master Plan for Kaneohe, Koolaupoko, Oahu  
City and County of Honolulu  
publ.  
HIG 64-1

Bacterial analyses in Kaneohe Bay show very low concentrations except close to shore. No current studies were made and wind and tide conditions at time of sampling were not given.

HOLMES AND HARVOR INC. and BELT-COLLINS ASSOC.  
Kailua Ocean Outfall Sewer - Ocean Portion  
publ.  
BCA

A study of the Kailua sewage treatment plant done for the Dept. Public Works, City and County of Honolulu. This is a report of the results, summary and conclusions of a 12-month investigation to pre-determine the probable extent and effect of secondary sewage effluent injection into Kailua Bay. Existing marine, surface and subsurface environment information as well as climatological data of Kailua Bay are also presented in this report.

HOLMES AND NARVOR INC. and BELT-COLLINS ASSOC.  
Nuupia Pond Outfall Study  
publ.  
BCA

A study of the Kailua sewage treatment plant at Kailua submitted to the Dept. Public Works, City and County of Honolulu. The investigators were interested in a temporary effluent outfall sewer discharging into Nuupia Pond and the suitability of this area as a safe disposal site. Primary consideration were placed on the pond's physical, chemical, bacterial and biological characteristics; various species of marine life and wildlife animals and their populations as well as plant life were discussed.

HOLMES AND NARVOR INC. and BELT-COLLINS ASSOC. 1959  
Kailua Sewage Treatment Plant, Kailua, Oahu, June 1959  
publ.  
BCA

A preliminary submittal including the basis of design (revised), outline specifications (revised), cost estimate and calculations on the Kailua sewage treatment plant submitted to the Dept. Public Works, City and County of Honolulu.

HOLMES AND NARVOR INC. and BELT-COLLINS ASSOC. 1959  
Kailua Sewage Treatment Plant, Kailua, Oahu, October, 1959  
publ.  
BCA

An index submitted to the Dept. Public Works, City and County of Honolulu on the equipment manufacturers data for the raw sewage plant at Kailua.

HOLMES AND NARVOR INC. and BELT-COLLINS ASSOC. 1959  
Kailua Sewage Treatment Plant, Kailua, Oahu, October, 1959  
publ.  
BCA

A report submitted to the Dept. Public Works, City and County of Honolulu.  
A supplement to the schematic submittal for a raw sewage pump station including wet well capacity, pump and motor selection and engine-generator selection and a discussion of preliminary review comments.

HOLMES AND NARVOR INC. and BELT-COLLINS ASSOC. 1960  
Kailua Sewage Treatment Plant, Kailua, Oahu, February, 1960  
publ.  
BCA

A report submitted to the Dept. Public Works, City and County of Honolulu, on the structural calculations of the sludge drying beds, raw sewage pumphouse, primary clarifier, final clarifier, sludge holding tank, digester control building, trickling filter, digester tank, recirculating pump station, chlorine building, sludge thickener tank and T. F. division box.

HOLMES AND NARVOR INC. and BELT-COLLINS ASSOC. 1960  
 Kailua Sewage Treatment Plant, Kailua, Oahu, February, 1960  
 publ.  
 BCA

A report to the Dept. Public Works, City and County of Honolulu on the hydraulic calculations of the various systems: main line conduits, raw sewage pumping recirculation pumping, hydropneumatic system, sludge pumping and miscellaneous assumptions.

PARARAS-CARAYANNIS, G. 1965  
 The Bathymetry of the Hawaiian Islands, Part I, Oahu  
 HIG Report No. 65-15  
 publ.  
 HIG L.

Bathymetric charts are discussed with regard to their usefulness in geological, geophysical and oceanographical investigations. Bathymetric charts of Oahu are given along with explanations, the scales used, the geographic data, the sea-level data, the control of data, the possibility of errors and the accuracy and reliability of bathymetric charts in general. Ten of these charts show nearshore bathymetry and one shows deep ocean bathymetry. Old charts concerning Kaneohe Bay and vicinity are USC and GS#3252(1910); 88 (1927) and 88 add wk(1933); 5288(1932); 89(1933) all of which are available at the Honolulu office of the U.S.G.S., 1149 Bethel Street. On p. 5, there is a reference to Hamilton's work near the Mokapu Peninsula.

DEPT. LAND AND NATURAL RESOURCES 1963  
 Flood Control and Flood Water Conservation in Hawaii, Vol I: 40 pp.  
 State of Hawaii  
 publ.  
 HIMB

The first in a series of three volumes on the State of Hawaii's flood control program. This volume discusses flood control terminology, flood control methods and multiple-purpose project development to provide a common under-

standing of the various aspects of flood control. In chapter two, basic data on storms and floods is summarized and the significance of flood control to the economy and the general welfare of the state and the need for improved methods of reporting flood damage are stressed. The specific functions of the State Flood Control Agency are outlined in chapter five.

DEPT. LAND AND NATURAL RESOURCES 1963  
 Flood Control and Flood Water Conservation in Hawaii, Vol. II: 52 p.  
 State of Hawaii  
 publ.  
 HIMB

The second in a series of 3 volumes on flood control in the State of Hawaii. In this volume, the flood control program is defined and the existing and planned flood control programs for the islands of Kauai, Oahu, Molokai, Maui, and Hawaii are outlined. In 1963, there were no existing flood control programs in the Kaneohe areas; however, several programs are planned for the following areas--the Kahana-Kaaawa area; the Waikane-Waiahole area; the Kahaluu area and the Kaneohe area, maps are provided for each area showing prospective plans.

DEPT. LAND AND NATURAL RESOURCES 1965  
 Effects of Water Withdrawals by Tunnels, Waihee Valley, Oahu by G. T. Hiroshima.  
 State of Hawaii  
 publ.  
 HIMB

The purpose of this report was to show the inter-relationship of surface and ground water in the Waihee Valley based on analysis of the records of stream-flow data available up to July, 1964. The program originated in an effort to find possible additional sources of water which could readily be provided to the growing windward communities. The report describes briefly the control, movement and amount of water available at different places along the Waihee

Stream under natural (pretunnel) conditions and under conditions imposed by the withdrawal of water through the Waihee Tunnel and a proposed second tunnel. This report is concerned only with that part of the Waihee Stream above an altitude of 143 feet.

DEPT. LAND AND NATURAL RESOURCES 1965  
Floods of December, 1964 - February, 1965, in Hawaii by S. H. Hoffard  
State of Hawaii  
publ.  
HIMB

A report of the data compiled during the serious flooding which occurred in Hawaii from December, 1964 to February, 1965. In the Kaneohe Bay area, serious rainfall occurred on December 9th, 10th and February 4th. Rainfall data for this area is found on p. 26-33, 54-55 and 63-64.

HAWAII WATER AUTHORITY 1959  
Water Resources in Hawaii  
State of Hawaii (Territory of Hawaii)  
publ.  
HIMB

A water resources report compiled to inform legislators and the general public of the status of water resources, the problems peculiar to the Territory of Hawaii and the areas recommended for further study. Data pertaining to the Kaneohe Bay watershed area is found on the following pages:

- p. 96 - map of winter rainfall for the island of Oahu
- p. 105 - rainfall gauge data for Kaneohe Mauka
- p. 127 - monthly rainfall for the Waihee Valley

TSEU, W. S. L. 1953

Seasonal Variation in the Physical Environment of the Ponds at the Hawaii  
Marine Laboratory and Adjacent Waters of Kaneohe Bay, Oahu  
Pacific Science 7(3): 278-290

H.M.L. Contribution No. 31

publ.

Sinclair L.

A seasonal study (February, 1949 - January, 1951) divided into four parts:  
the survey of the ponds to determine their demensions and depths; a study of  
currents and tides in the pond area; a study of the meteorology (rainfall,  
wind and air temperature and water temperature) in the ponds and adjacent  
waters; and an investigation of the changes in chlorine and oxygen content  
of the water.

DEPT. AGRICULTURE, SOIL CONSERVATION SERVICE

Kaneohe-Kailua Flood Control Program

U. S. Government

unpubl.

DWLD

A tentative plan to dam up the Kamoalii Stream (or "the Kaneohe Stream")  
above the Keapuka subdivision to produce a reservoir and in so doing, prevent  
further flooding and damage to housing and silting in Kaneohe Bay by soil  
erosion.

DEPT. AGRICULTURE, SOIL CONSERVATION SERVICE

Watershed Work Plan - Kahaluu Watershed, 1969

U. S. Government

unpubl.

DWLD

A copy of the tentative Kahaluu Watershed Work Plan is available at the Div.  
of Water and Land Development, fourth floor, corner of King and Punchbowl  
Streets. The plan was prepared by the Windward Oahu Soil and Water Conserva-  
tion district and the City and County of Honolulu with the assistance of the  
Soil Conservation Service under the authority of the Watershed Protection and  
Flood Prevention Act.



The Kahaluu watershed covers 4,420 acres. The primary objectives of this project were to provide an effective land treatment on watershed lands and to prevent flood water and sediment damage in the flood plain. The secondary objective was to provide a water-based recreational development in the flood plain area.

DEPT. OF THE ARMY - CORPS OF ENGINEERS 1963  
 Interim Report on Survey of the Coasts of the Hawaiian Islands Harbors for  
 Light-Draft Vessels  
 U. S. Government  
 publ.  
 BCA

The interim report of a survey to determine the need and advisability of Federal Construction at this time of harbors for small boats in the Hawaiian Islands, Niihau included. Information pertinent to Kaneohe Bay is on plate three and includes Heeia Kea, Kaneohe Anchorage, Kaneohe Yacht Club, Marine Corps Air Station, Oneawa Canal, Kailua Bay and Kailua Harbor. Other information on these areas is scattered throughout the report.

DEPT. OF THE ARMY - CORPS OF ENGINEERS 1970  
 Kaneohe-Kailua Flood Control Project  
 U. S. Government  
 publ.  
 HIMB

A copy of the preliminary flood control survey plans for the proposed damming of the Kaneohe Stream in the Kaneohe-Kailua Flood Control Project as well as a copy of a letter from Col. J. Hughes to Janet Gordon, Chairman, Sierra Club, explaining the project. The proposed dam would have a maximum height above the stream channel of about 80 feet and have a length of about 2,300 feet. It is hoped that the dam would have some effect in reducing the amount of water-transported material, such as soil runoff, to reduce the amount of

soil erosion into Kaneohe Bay. The Army estimates that about 3,000 cubic yards of such material would be trapped annually.

U. S. GEOLOGICAL SURVEY 1962  
 Preliminary Summary of Findings in Water Resources fo Windward Oahu  
 Hawaii Div. Water and Land Development, Water Resources Circ. No. 10: 15 pp.  
 by K. J. Takasaki, G. Yamanaga and E. R. Lubke  
 U. S. Government  
 publ.  
 HIMB

A summary of the preliminary findings in a study of the water resources of windward Oahu, Hawaii. The occurrence of water in the area and the geologic features which control the movement and availability of water are briefly described. Methods of the development of water and areas that appear to hold the most promise for further development are also described. The study area includes the northeast coast of Oahu between Kaluani Valley at Hauula and Makapuu Point. The Kaneohe area is described on p. 9. Figure 3 shows a map of windward Oahu with the principal streams flowing into Kaneohe Bay and the positions of the gauging stations and wells along these streams.

U. S. GEOLOGICAL SURVEY 1963  
 Influence of Water-Development on Stream Flow-Ground Water Relations in  
 Haiku-Kahaluu Area, Oahu, Hawaii  
 Hawaii Div. Water and Land Development Cir. C 21: 11 p. by G. T. Hirashima  
 U. S. Government  
 publ.  
 HIMB

An intensive study of the low-flow characteristics of the streams on the windward side of Oahu was prompted by the rapid development of the communities of Kailua and Kaneohe. Analysis of stream-gauging records in the area revealed that the base flow of Kahaluu Stream decreased at about the same time that a water-development tunnel was bored in Haiku Valley. The flow of Iolekaa Stream also decreased at about the same time. This change in flow

is discussed and possible causes are debated. For a preliminary report, see Hirashima, 1962.

U. S. GEOLOGICAL SURVEY 1964  
 Compilation of Records of Surface Waters of Hawaii, July, 1950 to June, 1960.  
 Water Supply Paper 1739: 136 p.  
 U. S. Government  
 publ.  
 HIMB

Previous publications of the surface water series:

WSP 1719, 1639, 1569, 1449, 1399, 1349, 1289, 1249, 1219, 1185, 1155,  
 1125, 1095, 1065, 1045, 1015, 965, 935, 905, 885, 865, 835, 815,  
 795, 770, 755, 740, 725, 710, 695, 675, 655, 635, 615, 595, 575,  
 555, 535, 516, 515, 485, 465, 445, 430, 373, 336, and 318.

A report presenting monthly and yearly summaries of stream-flow data collected by the Geological Survey during the period July 1, 1950 to June 30, 1960.

This report includes data furnished by other federal, state and private agencies. Corrections of errors found in earlier reports has been noted.

Stream-flow data recorded in the Kaneohe Bay watershed area is on p. 60-69.

Plate 2 shows the locations of the gauging stations on Oahu.

U. S. GEOLOGICAL SURVEY 1965  
 Ground Water Levels in the United States, 1961-1965. Southwestern States,  
 Water Supply Paper 1855: 66-83  
 U. S. Government  
 publ.  
 HIMB

Previous publications of ground water level series:

WSP 1770, 1409, 1326, 1270, 1226, 1196, 1170, 1161, 1131, 1101, 1076,  
 1028, 1021, 991, 949, 941, and 911.

U. S. GEOLOGICAL SURVEY 1965

Floods of December, 1964 to February, 1965 in Hawaii. Report R 26 by  
S. H. Hoffard: 68 p.

U. S. Government  
publ.  
HIMB

The data report of flooding occurring in Hawaii from December 1964 to February, 1965. Some of these floods were of record magnitude and their severity undoubtedly influenced and future design of floods channels, culverts and bridges, and the zoning of flood inundation areas. This report provides rainfall, runoff and flood damage done by these storms as a basic information source to various agencies and engineering firms involved in flood control and drainage design. Data for Kaneohe Bay is on p. 11-13, 18-20, and 26-31. Hydrographs showing the discharge from Waihee and Waiahole Streams are on p. 33.

U. S. GEOLOGICAL SURVEY 1965

Flow Characteristics of Selected Streams in Hawaii. Basic Data Release  
1965: 114 p. Report R 27 by G. T. Hirashima

U. S. Government  
publ.  
HIMB

A report prepared by the U. S. Geological Survey in cooperation with the Division of Water and Land Development of the State Dept. Land and Natural Resources. Statistical summaries of flow characteristics of streams in Hawaii have been compiled for the use of the Dept. Land and Natural Resources. and other water suppliers and users concerned with water projects within the state. Daily discharge data was collected and from this the following statistics were computed using a computer-flow duration tables, low-flow tables and high-flow tables. Data from the Kaneohe Bay area is on p. 53-54 from Haiku Streat, Kahaluu Stream and Waihee Stream.

U. S. GEOLOGICAL SURVEY 1965  
Effects of Water Withdrawals by Tunnels, Waihee Valley, Oahu, Hawaii. Report  
R. 28: 38 p., by G. T. Hirashima  
U. S. Government  
publ.  
HIMB

A report prepared in cooperation with the Division of Water and Land Development of the State Dept. Land and Natural Resources. The report shows the inter-relationship of surface and ground water in the Waihee Valley based upon analysis of the records of stream flow available up to July, 1964. The report describes briefly the control, movement and amount of water available at different places along the Waihee Stream under natural (pre-tunnel) conditions and under conditions imposed by the withdrawal of water through the Waihee Tunnel and a proposed second tunnel. Study was limited to that part of the Waihee Stream above an altitude of 193 feet.

U. S. GEOLOGICAL SURVEY 1966  
Floods in Kahaluu Area, Oahu, Hawaii. Hydrologic Investigations Atlas HA-  
239 by M. M. Miller  
U. S. Government  
publ.  
HIMB

An atlas prepared by the U. S. Geological Survey in cooperation with the Division of Water and Land Development with the State Dept. of Land and Natural Resources. Included in the report is hydrologic data concerning the extent, depth and frequency of flooding--such data is pertinent for the economic development of flood plains in the Kahaluu area. The data provide a technical basis for solving flood-plain problems and formulating regulations for land use and development that will reduce future flood damage.

U. S. GEOLOGICAL SURVEY 1967

Water Resources Data for Hawaii and Other Pacific Areas. Pt. 1 - Surface Water Records, and Pt. 2 - Water Quality Records: 267 p.

U. S. Government

publ.

HIMB

A report compiling the surface-water records for the 1967 fiscal year for gauging stations, partial-record stations and miscellaneous sites within the State of Hawaii and other Pacific areas--Mariana Island, Ryukyu Island and Samoa Island. Data for the Kaneohe Bay watershed area is found on p. 84-98--Kamooalii Stream, Haiku Stream, Iolekoea Stream, Kahaluu Stream, South Fork Waihee Stream, North Fork Waihee Stream, Waihee Stream near Heeia and Kahaluu, Waiahole Stream, Waiahole Tunnel (4 gauging stations) Waikane Stream and Kahana Stream.

U. S. GEOLOGICAL SURVEY 1968

Ground Water Levels in the United States, 1961-1965. The Southwestern States, Water Supply Paper 1855: 66-83, 1968.

U. S. Government

publ.

HIMB

Publication of records of water levels in the U. S. in the annual series of Water Supply Papers was begun by the Geological Survey in 1935. Beginning in 1956, only water-level data from a basic network of observation wells has been published. These wells are so located that the most significant data are obtained from the fewest wells in the most important aquifers. In Hawaii (p. 61-83), systematic water-level measuring began in 1910. There are two observation wells in the Kaneohe Bay watershed area, as of 1965: Local No. 405 on the M. E. Foster Estate in Kahana and Local No. 406 on the F. M. Swanzy Estate in Kaaawa (p. 76).

U. S. GEOLOGICAL SURVEY 1968  
An Investigation of Floods in Hawaii Through June 30, 1967. Progress  
Report No. 10: 167 p., by S. H. Hoffard and K. H. Fowler  
U. S. Government  
publ.  
HIMB

A basic data release prepared in cooperation with the State Dept. Land and  
Natural Resources and the City and County of Honolulu. This report contains  
records of annual peak stages and discharges at 125 stations through June  
30, 1967 and a compilation of peak stages at miscellaneous sites. Data from  
Kaneohe Bay area is on p. 74-85 and includes the following streams--Kawa,  
Kamooalii, Keaahala, Haiku, Heeia, Kahaluu, Ahuimanu, Waihee, Waiahole,  
Waikane and Kahana Stream.

U. S. GEOLOGICAL SURVEY 1968  
Water-Resources Data for Hawaii and Other Pacific Areas, FY 1967. Part 1 -  
Surface Water Records; Part 2 - Water Quality Records: 267 p.  
U. S. Government  
publ.  
USGS

Previous reports of this same type date back to 1961. A report for the fiscal  
year compiling data from the surface water records for gauging stations,  
partial record stations and miscellaneous sites within the State of Hawaii  
and other Pacific areas. The reports also contains stream-flow records and  
related data.

U. S. GEOLOGICAL SURVEY 1968  
An Investigation of Floods in Hawaii Through June 30, 1967, Basic Data  
Release, Progress Report No. 10: 167 p.  
U. S. Government  
publ.  
HIMB

Previous reports of this same type date back to Progress Report No. 5.

U. S. GEOLOGICAL SURVEY 1969  
Water Resources of Windward Oahu, Hawaii. Water Supply Paper No. 1894:  
119 p., by K. J. Takasaki, G. T. Hirashima and E. R. Lubke  
U. S. Government  
publ.  
HIMB

A study to determine the occurrence, chemical quality and quantity of water in windward Oahu, described as the area from Hauula to Makapuu Point. Occurrence of water and the geologic features that control its movement and availability are described. This report outlines methods of development of water, describes areas that are most promising for further development and gives estimates of quantity and quality of water. The geologic setting and ground water resources of the Kaneohe Bay area are discussed on p. 63-76, of the Kaawa Valley and Kahana Valley on p. 76-88. The development of high-level water and the effect of tunnels in the Kaneohe Bay area is discussed on p. 102-107.



LAND STUDIES

CITY PLANNING DEPARTMENT  
 General Plan - Oahu  
 City and County of Honolulu  
 publ.  
 HIMB

A long-range comprehensive physical development plan for the City and County of Honolulu. This report on the product of an extensive economic and planning study done by the Oahu Planning Associates Unc., the Planning Commission, the Planning Department, and other city, state and federal agencies, civic organizations and civic leaders and private citizens and private enterprises.

CITY PLANNING DEPARTMENT  
 Comprehensive Zoning Code of the City and County of Honolulu, 1969  
 Oahu Development Conference, 119 Merchant Street, Honolulu, 96813  
 City and County of Honolulu  
 publ.  
 HIMB

A publication describing in general terms the provisions of the new comprehensive zoning code for the City and County of Honolulu. This code became effective January 2, 1969 and replaced the zoning ordinance of 1922.

Included in this new code are provisions of the land use intensity scale for all apartment and hotel districts; planned development districts; preservation districts; historic, cultural and scenic districts; flood hazards, performance standards and height regulations.

INLAND MARINE DEVELOPMENT INC.  
 Alii Bluffs  
 publ.  
 HIMB

A pamphlet describing the housing development in Kaneohe called "Alii Bluffs". Future plans call for greater expansion of the present housing development and also for the future partial filling in of the Heeia fish pond in order to build more housing facilities. Inland Marine Developments Inc.

is situated in Honolulu, 1341 Lusitania Street, with the Mike McCormack Realtor Company being the exclusive realtor for sales.

DEPT. PLANNING AND ECONOMIC DEVELOPMENT 1962  
Hawaii's Shoreline, 134 p.  
State of Hawaii  
publ.  
HIMB

An area plan of the State of Hawaii "to establish a system of state parks which will provide a range of recreational opportunities". In this study, the goals and objectives of such a study were determined; data relevant to the shore was collected and expanded--which involved a special shoreline recreation survey, a study of the geophysical aspects of shorelines compiled from the field, a series of tests and measurements of currents taken in waters off heavily populated areas and the preparation of reference data sheets for various coastal sites having potential for recreation or resort areas. Planning principles and standards for shoreline design were adopted, while law and ownership rights were reviewed. Land uses along the shoreline were reviewed and from this a number of essential programs to meet the development and conservation problems of the shoreline were extracted.

Appendix I - Coastal Geology of Hawaii, HIG Report No. 41, 1964

Appendix II - Coastal Geology of Hawaii, HIG Report No. 64-1

DEPT. PLANNING AND ECONOMIC DEVELOPMENT 1964  
Hawaii's Shoreline - Appendix I-The Geology of Hawaii by R. Moberly, Jr.,  
HIG, University of Hawaii, 1964: 216 p.  
HIG Report No. 41  
State of Hawaii  
publ.  
HIMB

A report on the geology of beaches and coast of the State of Hawaii by the Hawaii Institute of Geophysics for the State Dept. of Planning and Economic

Development. Field work started in 1962. The report is intended both as a contribution to fundamental scientific information and as the scientific basis for a general shoreline plan being formulated by the Dept. of Planning and Economic Development. The geology of all the segments of coastline on the islands of Kauai, Oahu, Molokai, Lanai, Maui and Hawaii are described and the specific characteristics of the island shorelines have been mapped. The geology of Kaneohe Bay is discussed on p. 31-32 and p. 174. Detailed analysis of the beach at Kahana Bay is given on p. 85-86 with a map (fig. 4).

DEPT. OF PLANNING AND ECONOMIC DEVELOPMENT 1964  
Hawaii's Shoreline - Appendix II-Coastal Currents and Sewage Disposal in  
the Hawaiian Islands by T. Laevastu, D. E. Avery and D. C. Cox, HIG,  
University of Hawaii, 1964: 101 p.  
HIG Report 64-1  
State of Hawaii  
publ.  
HIMB

One of the component studies involved in the development of a general shoreline plan by the Dept. of Planning and Economic Development. The study's objectives were to summarize information applicable to the problems of coastal currents, mixing and remineralization of sewage; to provide answers to the most pressing local problems concerning the marine environment and sewage disposal; to investigate the seasonal changes in oceanographic and meteorological conditions and to define the 'critical conditions' to be considered in planning and designing of the outfalls; to generalize from the inter-related information in such a way as to permit its adaptation to a variety of locations and to prepare plans, procedures, methods and equipment for such additional local investigations as may be required when new related problems arise.

Water circulation, current measurements and water quality of Kaneohe Bay are discussed on p. 35-36 with a figure, fig. 4. The chemical properties pertaining to sewage disposal in Kaneohe Bay are discussed on p. 63.

DEPT. PLANNING AND ECONOMIC DEVELOPMENT 1968  
1968 Annual Report: 32 p.  
State of Hawaii  
publ.  
HIMB

The 1968 report of the Dept. Planning and Economic Development to the Governor of the State of Hawaii. The report reviews the goals and achievements of the department over the past year. There is no mention of Kaneohe Bay in this report, but it is interesting to see what sort of programs this department conducts in the state.

DEPT. LAND AND NATURAL RESOURCES 1964  
Regulation No. 4  
State of Hawaii  
publ.  
HIMB

A regulation of the Dept. Land and Natural Resources providing for land use regulations within conservation districts pursuant to section 19-70, revised laws of Hawaii, 1955. This is particularly important to the Kaneohe area as the islands within the bay are zoned as conservation districts by the Land Use Commission.

## HAWAII STATE PLANNING OFFICE 1960

## Visitor Destination Areas in Hawaii

- Pt. 1 - Summary of Recommendations- Hawaii State Planning Office
- Pt. 2 - Selected Destination Areas of the World- John Child and Company
- Pt. 3 - First Stage Plans for Public Improvement- Belt-Collins and Assoc.
- Pt. 4 - Hawaii Hotel Operation- Harris, Kerr, Forster and Harland Bartholomew Assoc.

State of Hawaii

publ.

BCA

A series of four articles on tourism in Hawaii in an effort to best utilize the tourist potential in all the islands rather than just in Waikiki and in this manner improve the economy of the neighbor Hawaiian Islands. Information about Kaneohe Bay is found on p. 66-67.

## STATE PLANNING OFFICE AND DEPT. TRANSPORTATION 1961

## The General Plan of the State of Hawaii

State of Hawaii

publ.

BCA

This report presents the first general plan for the State of Hawaii and provides the basis for an integrated and coordinated land development policy geared directly to the anticipated population and economic growth. This report covers the physical conditions, land use (1960), land use and circulation, population distribution, public facilities, state parks and open spaces and domestic water supply. The data for Kaneohe Bay and surrounding areas is projected along with the data for the other islands towns on p. 33-46.

## LAND USE COMMISSION - DEPT. PLANNING AND ECONOMICS DEVELOPMENT 1969

- Pt. 1 - Rules of Practice and Procedure, 1969
- Pt. 2 - Land Use District Regulations, 1969
- Pt. 3 - Land Use District Boundaries, 1969

State of Hawaii

publ.

HIMB

Three recent publications of the Land Use Commission, a division of the State Dept. Planning and Economic Development. These publications set out

the rules of practice and procedure involving land use, the district regulations and the district boundaries. These publications are accompanied by charts showing the district boundaries.

LAND USE COMMISSION - DEPT. PLANNING AND ECONOMIC DEVELOPMENT 1969  
 Land Use District Boundaries  
 State of Hawaii  
 unpubl.  
 HIMB

Three charts of the Kaneohe area, district maps 0-14, 0-12 and 0-11, showing the boundary lines of the land use districts. The land has been divided into urban, rural, agricultural and conservation uses. These boundaries were set by the Land Use Commission, a division of the State Dept. Planning and Economic Development.

LIVINGSTON, T. 1970  
 Voyager Park - A Proposal for Kaneohe Bay  
 Mimeography copy  
 unpubl.  
 HIMB

A personal plan by Mr. Ted Livingston for the Development of Kaneohe Bay. These ideas were prompted by the State Legislature appropriation of \$500,000 for Kaneohe Bay Planning.

NUNNS, F. K. 1959  
 Oahu-Lands Suitable for Intensive Agriculture and Other Uses on the Island of Oahu (A Generalized Land Classification)  
 State of Hawaii, University of Hawaii, Land Study Bureau Circular No. 1  
 publ.  
 HIG L.

This circular is the first in a series on information about the quality, quantity and location of lands suitable for various uses on each of the Hawaiian Islands. Land areas are classified A through D from the greatest to least suitability for intensive agriculture. Specific definitions for each land class are given in the appendix. Kaneohe Bay is bordered by class B, C and D areas.

NUNNS, F. K. 1959  
Oahu's Land Situation  
State of Hawaii, University of Hawaii, Land Study Bureau Circular No. 4  
publ.  
HIG L.

A preliminary report on Oahu showing the relative suitability of the land for intensive agriculture and the land in the present land uses, in proposed areas of urban development, in areas of greatest population growth and in large private holdings. Kaneohe Bay areas was studied and is listed as an area where the population growth is predicted to be 222% or more between 1960 and 1980.

NUNNS, F. K. 1963  
Detailed Land Classification - Island of Oahu  
State of Hawaii, University of Hawaii, Land Study Bureau Bull. No. 3  
publ.  
HIMB

A publication of the Land Study Bureau which provides a ready source of objective information about the location, quality and extent of Oahu's lands suitable for agricultural usage. All available information soil, geology, climate, topography and the crop sciences was used to prepare this report, together with field inspections and consultations with land operators and other informed sources. Aerial photographs of the Kaneohe Bay watershed area are on sheets 90-91, 84-85, 77-79, 71 and 72.

VARGHA, L. A. 1962  
Urban Development on Oahu, 1946-1962  
State of Hawaii, University of Hawaii, Land Study Bureau Bull.No. 2  
publ.  
HIG L.

A report on the conversion of land on Oahu to urban purposes from 1946 to 1962. Data included pertain to the following types of urban uses: residential or other subdivisions including industrial and commercial; utilities; schools

and other public buildings; private institutions, recreation and additions to the system of local roads and streets. An estimate of the intensification of land use in previously urbanized areas is provided by tabulating the amount of land resubdivided for several urban uses. The above two sets of data combined give an estimate of gross (addition of land) and net (utilization of land) changes in the urban areas of Oahu. The island was divided into the tax zones for study, Kaneohe Bay is in zone 4.

VARGHA, L. A. 1964  
 Urban Development on Oahu, 1962-1963  
 State of Hawaii, University of Hawaii, Land Study Bureau Bull. No. 2.,  
 Suppl. No. 1  
 publ.  
 HIG L.

A report giving more current information about urban development in the Honolulu metropolitan area as well as correcting previous reporting errors. Data is included in this report which was not available for the earlier report (Vargha, 1962). Subdivision activity in the number and average of new land sites is given for the tax zones of Oahu, Kaneohe Bay is in zone 4.

VARGHA, L. A. 1964  
 An Economic View of Leasehold and Fee Simple Tenure of Residential Land in  
 Hawaii  
 State of Hawaii, University of Hawaii, Land Study Bureau Bull. No. 4  
 publ.  
 HIG L.

A study on the economic evaluation of leasehold tenure. It approaches in turn, investment returns to landowners from residential leaseholds, the financial impact tenure upon the home owner and the relationships between the leasehold system, land values and home ownership rates. In addition, community benefits derivable from leasehold tenure are discussed and changes in leasehold tenure evaluated. The island of Oahu is considered by tax zone, Kaneohe Bay area is in zone 4.



R. W. TOWILL CORPORATION  
 Engineering/Surveying  
 Jobs Completed Concerning Kaneohe Bay  
 unpubl.  
 Towill Corp.

<u>Date</u>	<u>Job No.</u>	<u>Client</u>	<u>Remarks</u>
1936	205	C. R. Holmes	Topographical survey (see No. 222)
1936	225	C. R. Holmes	Locating new electrical conduits and additions to garden
7-12-37	303	C. R. Holmes	Survey of new improvements and correct tracings
6-7-39	493	C. R. Holmes	Locate new features at Moku O Loe Island
Nov. 39	565	C. R. Holmes	Preparing three linen tracings for proposed channel and wharf at Coconut Island
1-22-63	7676-1-S	Coconut Island	Profile, x-section road, topo-reef area
8-12-64	9454	E. W. Pauley	Preliminary study of filling around Coconut Island, Kaneohe

(Plus several contracts for the Kaneohe Ranch Co.)

G. S. WALTERS, LANDSCAPE ARCHITECT, and D. WOEBRINK AND ASSOCIATES 1965  
 The Nuuanu Pali Natural Park and Region  
 publ.  
 BCA

A study preparing the schematic physical plan for the preservation and the development of the Nuuanu Pali Natural Park. Matters of existing land use and man-made elements, new opportunities and natural features are considered. Integral parts of this study are recommendations for areas for possible acquisition, responsibilities by various governmental agencies and possible legislation relating to use and control of the land. The land area includes the Pali plus land 3 miles to either side of the Pali lookout.

MAPS AND PHOTOS

ALEXANDER, W. D. 1889  
 Kaneohe Bay from Hawaiian Government Survey  
 Bull. Mus. Comp. Zoology, Harvard Coll. 17(3):121-170, Plate 5  
 publ.  
 B.P.B.M.

A bathymetric chart of Kaneohe Bay showing transects done in both the main channel and in the sampan channel, in the south eastern part of the bay and over the main reef. A very valuable chart as many sounding lines were run. This chart is a copy of the chart surveyed by Jackson in 1882 (personal communication E. C. Wilder, Jr., State Survey Office).

BALDWIN and ALEXANDER 1913  
 Map of Heeia, Koolaupoko, Oahu  
 publ.  
 Archives

A map of Heeia surveyed by Baldwin and Alexander in 1913 showing boundaries of L. C. awards; rice and taro land; pineapple land of the Koolau Fruit Co., Ltd.; Konohiki land; L. C. awards owned by the Bishop Estate, R. C. mission and other parties. The map also shows the owners of the Kuleanas. The waters from inside Chinaman's Hat to Moku o Loe were charted with a scale of 400 feet 1 inch.

CALDWELL, J. W. 1903-1913  
 Topographical Map of the Island of Oahu, City and County of Honolulu  
 U. S. Geological Survey  
 maps  
 Hamilton L.

A map of Oahu surveyed in 1903-1913 by the Engineer Troops, U. S. Army under the control of the Coast and Geodetic Survey and the Hawaiian Territorial Survey. Scale 1/62, 500 with a contour interval of 40 feet. Superimposed on the map are the contour lines of the mean annual rainfall statistics: Kaneohe

is station no. 3 with an altitude of 60 feet, 29 years of record and 53 inches of rain annually. The chart also shows the pineapple cannery near Kahaluu landing on the shores of Kaneohe Bay.

ENVIRONMENTAL SCIENCE SERVICES ADMINISTRATION  
Charts of Kaneohe Bay  
U. S. Government  
R. C. Munson  
ESSA

A series of six bathymetric charts of areas in Kaneohe Bay done by the U. S. Geological Survey in the years between 1927 and 1933.

<u>Number</u>	<u>Area Covered</u>	<u>Date</u>	<u>Scale</u>
4788	SE Kaneohe Bay	1927	5,000
4832			
4833	Waiahole-Heeia	1933	5,000
4834	Waiahole-Chinaman's Hat	1927	5,000
5288	Mokapu	1932	5,000
5289	Outer Reef Area	1933	10,000

HEALY, J. R. 1959  
The Mapping of the Hawaiian Islands from 1778-1848  
M. A. Thesis, University of Hawaii: 123 p.  
unpubl.  
Sinclair L.

A study compiling, describing and evaluating the maps, charts and surveys of the Hawaiian Islands constructed between the time of their discovery in 1778 and the middle of the nineteenth century. The year 1848 was taken as the terminal date for it marks the beginning of general division of feudal lands in the Hawaiian Islands. The author includes the 1842 chart of Kaneohe Bay by Wilkes (p. 98) and a chart of Oahu by Berghaus in which Kaneohe Bay is referred to by another name--but the reproduction of the photograph is so that it cannot be read.

JACKSON, GEORGE E. G. 1882  
 Field Notes, 1882  
 unpubl.  
 HTMB

Xeroxed copies of pages in George Jackson's notebook concerning the bathymetry done in Kaneohe Bay. The notes include data of station positions and the soundings across the bay. The chart was published by the Hawaiian Government in 1882. It is interesting to note that Jackson refers to the bay as Kaneohe Bay in his notebook; but, on the completed chart, he used the older name Koolau Bay. The original notebook is in the State Survey Office in Honolulu.

JACKSON, G. E. G. 1882  
 Kookau Bay and Anchorages, Oahu  
 Hawaiian Government Survey  
 publ.  
 HTMB

A bathymetric chart of Koolau Bay, now known as Kaneohe Bay, surveyed and drawn by George Ed. Gresley Jackson for the Hawaiian Government Survey, W. D. Alexander, Surveyor General. Soundings are in fathoms at low water, scale 1/12000. According to E. C. Wilder, Jr., State Survey Office, this was the first chart done of its kind in Kaneohe Bay and later charts are copied of Jackson's work, i.e., Alexander, 1889. The original chart is in the State Survey Office.

MAP OF KANEOHE BAY 1928  
 City and County of Honolulu  
 Island of Oahu - Kaneohe Quadrangle  
 publ.  
 Helfrich

A map of the Kaneohe quadrangle showing contour intervals of 10 and 15 feet. The map also shows Coconut Island before the dredging operations.

MARSHALL, R. B., G. R. DAVIS, C. H. BIRDSEYE and A. T. FOWLER 1917  
 Topographical Map of the Island of Oahu - City and County of Honolulu  
 Dept. Interior, U. S. Geological Survey  
 maps  
 Hamilton L.

A map of Oahu showing the grid system for military maps. The island was surveyed in 1903-1913 by the Engineer Troops of the U. S. Army under the control of the U. S. Coast and Geodetic Survey and the Hawaiian Territorial Survey, scale 1/62,5000 and contour interval of 40 feet. Drawn on the map are the villages, roads, trails, bridges, dams, district lines, land-grant lines, triangulation station, churches and schools, lighthouses, streams, ditches, aqueduct tunnels, marshes (fresh and salt), tidal flats, lakes, height above mean sea level, contours and depression contours, taro fields and sand dunes.

ROY, KENNETH 1969  
 Kaneohe Bay, Oahu, Hawaii: Bathymetry  
 Sea Grant Program, Coral Reef Project, Grant No. GH 28-1  
 unpubl.  
 HIMB

A bathymetric chart of Kaneohe Bay showing depth in feet at mean low water, irregular contour intervals, navigational buoys and shoal areas. Copies are available from Dr. Keith Chave's office, HIG 315, Oceanography Department.

R. W. TOWILL CORPORATION  
 Photogrametry  
 unpubl.  
 Towill Corp.

Aerial photographs of the Kaneohe Bay area taken by the R. W. Towill Corporation:

<u>Date</u>	<u>Vertical/Oblique</u>	<u>Area of Bay Photographed</u>
1948	Vertical	Eight transects from Kaneohe to Nuupia Pond on Mokapu Peninsula
	Vertical	Three transects from the Koolau Range to Libbyville

<u>Date</u>	<u>Vertical/Oblique</u>	<u>Area of Bay Photographed</u>
1949	Vertical	Four parallel transects from the Waiahole Forest Reserve to the swamp behind Kailua
1952	Vertical	Transect Mokoli'i to Honolulu
	Vertical	Transect Mokoli'i to Libbyville
	Vertical	Transect from leeward end of Sampan Channel to Koolau Range in the Haiku Valley
	Vertical	Ten transects from the southeast coast of Kaneohe Bay into the Koolaus
	Vertical	Five transects from the leeward of Ahu o Laka and four transects from the shoreline into the Koolau Range
	Oblique	One transect along the shoreline from the Waiahole homestead to the Heeia Pond
1953	Vertical	Three parallel transects, one running from the inside of the Sampan Channel to Ulupau Head, one running from Moko o Loe to Kapoho Point, and the third running in between them
	Vertical	One transect running from Nuupia Pond into the Koolaus near the base of the Nuuanu Pali
1954		None
1955	Vertical	Four transects running parallel from the shoreline into the Koolaus: Nuupia Pond to the Koolaus above Waimanalo, through the Maunawili Training School for Girls; near Pyramid Rock to Puu Kampo in the Koolaus; off Pohakea Point into the Koolaus near the Nuuanu Pali; and Heeia Pond to the Nuuanu Valley
1956	Vertical	One small transect near Libbyville
1957		None
1958		None

<u>Date</u>	<u>Vertical/Oblique</u>	<u>Area of Bay Photographed</u>
1959	Vertical	Seven transects on the shoreline (not over the water) between Heeia Pond and Hakipuu, one of which extends as far as Helema
	Vertical	One transect in the southeast corner of the bay from Moku o Loe to Kailua
	Vertical	Three short transects around Kaneohe and one from Kaneohe into the Koolau Range, near Puu Keahiakahoe
1960	Vertical	Three short transects near Libbyville, one crossing the shoreline. One landward transect from Libbyville to Kaneohe and another from Heeia Pond to the base of the Nuuanu Pali. One short transect over the Nuuanu Pali and down the windward side
	Vertical	One very short transect at the head of the swamp behind Kailua
1961	Vertical	A transect from the point of land to the leeward of Aku o Laka across the southeast end of the bay (over Coconut Island) and ending at Wailea Point
	Vertical	One transect running along the shoreline west of Kaneohe
	Vertical	Three short transects running between the town of Kaneohe and the Nuuanu Pali
1962	Oblique	Transect on the shoreline between Libbyville and the inner harbor of Kaneohe, passing over Coconut Island
	Vertical	Transect from Kaneohe to Wailea Point
	Vertical	Transect from the inner harbor of Kaneohe to Wailea Point
	Vertical	Transect from Kapoho Point to Kailua
1963	Oblique	Transect from Lae O Okaoio to the vicinity of Libbyville
	Vertical	Transect from Waikane to the Koolaus above Waimanalo

<u>Date</u>	<u>Vertical/Oblique</u>	<u>Area of Bay Photographed</u>
1963	Vertical	Transect from Waiahole to the Nuuanu Pali (overland)
	Vertical	Transect from Ahu o Laka to Hanauma Bay (over Coconut Island)
	Vertical	Transect from Kapapa to seaward of Koko Crater
	Vertical	Transect seaward of Pyramid Rock to Makapuu Head
1964	Vertical	Short transect in the area near Libbyville
	Vertical	Land transect from Heeia Pond to the base of the Nuuanu Pali
1964	Vertical	Land transect from Waikane to Waihee
1965		None
1966	Vertical	Ten small transect from the town of Kaneohe to the Nuuanu Pali
	Vertical	Transect from Ahuiman Ranch to the Waiahole homesteads
1967	Vertical	Transect from Kaalaea to Koko Crater
	Vertical	Five smaller transects in the area of Kaneohe
1968	Vertical	One transect Hakipuu to Kahulu
	Vertical	Transect from Mokoli'i to seaward of Mokapuu Point
	Vertical	Transect from Kekepa to Bellows A.F.B.
	Vertical	Transect from Kekepa to Sandy Beach (near Koko Crater)
	Vertical	Transect from the Koolaus near Kaalaea to the Koolaus above Waimanalo
	Oblique	Transect from Sunset Beach to Honolulu along the shoreline, covering all of Kaneohe Bay. Job. No. 4839, 6" camera, 9000' elevation. (We have contact prints of the areas of Kaneohe Bay photographed on this transect.)



UNITED STATES COAST AND GEODETIC SURVEY - MAP DIVISION  
 Navigational Charts  
 U. S. Government  
 unpubl.  
 USC&GS

In the years 1927 to 1933, navigational charts of Kaneohe Bay were plotted by the U.S.C.&G.S. After the war years, the navigational charts of this area were plotted and released by the U. S. Navy. In the Honolulu office of the U.S.C.&G.S., there are available the following charts:

- \*U.S.C.&G.S., reg. no. 4788, south part of Kaneohe Bay including Moku o Loe, scale 5000, charted 1927
- U.S.C.&G.S., reg. no. 5288, area around Mokapu Peninsula, scale 5000, charted 1932
- U.S.C.&G.S., reg. no. 5289, outer reef area, covering main reef, scale 10,000, charted 1933
- U.S.C.&G.S., reg. no. 4833, Waiahole to Heeia, scale 5000, charted 1933
- U.S.C.&G.S., reg. no. 4834, Waiahole to Chinaman's Hat, scale 5000, charted 1927

\*Copy at the Hawaii Institute of Marine Biology

U. S. EXPLORING EXPEDITION      1840  
 Kaneohe Harbor, Oahu  
 maps  
 Hamilton L.

A chart of Kaneohe Bay Harbor in 1840 done by the U. S. Exploring Expedition. There is no mention of the scale of the chart. The inner harbor is called Matau Bay, while the other islands in the main bay have been given names, there is no name given to Coconut Island. Chinaman's Hat is called Namu Island; Kapapa Island is called Kimoa Island; Sand Island is called Nuku Island; and Kehepa Island is called Nohinohi Island with a siting of lat: 21° 29.00 N, long: 157° 48.00 W, and var: 8° 15.00 E.

U. S. GEOLOGICAL SURVEY 1909-1913  
 Topographical Map of the Island of Oahu, City and County of Honolulu  
 U. S. Government  
 publ.  
 Hamilton L.

A map surveyed in 1909-1913 by the Engineer Troops, U. S. Army with the Coast and Geodetic Survey and the Hawaiian Territorial Survey compiled by the U. S. Geological Survey in cooperation with the Territory of Hawaii. The map shows the rainfall statistics for the various judicial districts of Oahu.

<u>District</u>	<u>Years</u>	<u>Altitude in Feet</u>	<u>Rainfall in Inches</u>
Koolaupoko - Kaneohe	29	60	53
Heeia	18	50	56
Ahuimanu	24	350	83
Waiahole	11	750	128
Waikane	11	850	163

The map is drawn to scale 1/62,500 with a contour interval of 40 feet.

U. S. GEOLOGICAL SURVEY - MAP DIVISION  
 Kaneohe - Mokapu Quadrangle, 1928  
 U. S. Government  
 unpubl.  
 USGS

A map of the Kaneohe-Mokapu area surveyed in 1928 for the U. S. Geological Survey and the Hawaiian Territorial Survey by the U.S.G.S. and the Air Corps of the U. S. Army. Scale 1/20,000. No maps of the Kaneohe Bay area were surveyed in the years between 1928 and 1954. The U. S. Navy now conducts surveys of the Kaneohe areas for the U.S.G.S.

U. S. GEOLOGICAL SURVEY 1928  
Topographical Chart of the Kaneohe Quadrangle  
U. S. Government  
publ.  
HTMB

A topographical map of the Kaneohe area including Coconut Island but very little of the bay itself. The map was surveyed by the U. S. Geological Survey in cooperation with the Territory of Hawaii and the War Department. Scale 1/20,000 with a contour interval of 10 and 50 feet.

U. S. GEOLOGICAL SURVEY - MAP DIVISION  
Topographical Map of Oahu, 1927-1930  
U. S. Government  
publ.  
USGS

A topographical map of Oahu surveyed by A. O. Buckland in 1927-1930 with aerial photography by the Air Corps of the U. S. Army. Scale 1/62,500.

U. S. GEOLOGICAL SURVEY - MAP DIVISION  
Kaneohe Quadrangle, 1954  
U. S. Government  
publ.  
USGS

A map of the Kaneohe area surveyed in 1954 by the U.S.G.S. Scale 1/24,000. Available at cost from Trans-Pacific Instruments and at the State Survey Office.

U. S. GEOLOGICAL SURVEY - MAP DIVISION  
Kaneohe Quadrangle, 1959  
U. S. Government  
publ.  
USGS

A map of the Kaneohe area surveyed in 1959 by the U.S.G.S. Scale 1/24,000. Available at cost from Trans-Pacific Instruments, Honolulu, and at the State Survey Office.

U. S. GEOLOGICAL SURVEY - MAP DIVISION  
Kaneohe Quadrangle, 1969  
U. S. Government  
publ.  
USGS

A map of the Kaneohe area surveyed in 1969 by the U.S.G.S. Scale 1/24,000.  
Will be available at Trans-Pacific Instrument Company, Honolulu, and at the  
State Survey Office.

WALL, W. E. 1902  
Oahu - Hawaiian Islands  
Hawaii Territory Survey  
maps  
Hamilton L.

A map of Oahu, scale 1/60,000, showing public lands, sisal plantations,  
homestead settlement tracts, approximate area of grazing lands, approximate  
area of pineapple lands, federal reservations, approximate area of forest  
lands not in reserve, approximate area of wet lands (rice and taro) and  
schools and post offices. Kaneohe Bay is shown with the reef charted, fish  
ponds, rice mill and Coconut Island.

WALL, W. E. 1922  
Portion of Kaneohe, Koolaupoko, Oahu  
Hawaii Territory Survey, 1922  
Hamilton L.

A blueprint map of the Kaneohe district showing the Mokapu road location with  
a scale of 600 feet - 1 inch.

PHOTOGRAPH 1786  
A View of the Bay of Oahu  
Archives Neg. No. 17,712  
HIMB

A voyage round the world journeyed in 1785, 1786, 1787, and 1788 in the ships  
King George and Queen Charlotte with Captains Portlock and Dixon. The  
account of the voyage was published by G. Goulding in London, 1789.

There is one copy in the Photograph file at H.I.M.B.

PHOTOGRAPH 1840-1841  
 Pali, Oahu 1840-1841  
 Archives Neg. No. 17,737  
 HIMB

A photo of a print done by the United States Exploring Expedition during the years 1838, 1839, 1840, 1841, 1842. The narrative of the voyage is published by Lea and Blanchard of Philadelphia in 1845. The captain was Charles Wilkes on the ship Vincennes with the artists A. T. Agate, T. R. Peale, J. Drayton and C. Wilkes.

There is one copy in the Photograph file at H.I.M.B.

PHOTOGRAPH 1924  
 Aerial View of Windward Oahu from North West at 9,000 Feet  
 Archives Neg.  
 HIMB

An aerial view showing rice at Kahaluu and behind Kaneohe as well as pineapple near the present Pali golf course. The view also shows Coconut Island before the dredging operations were carried out.

There is one copy in the Photograph file at H.I.M.B.

PHOTOGRAPHS 1870-1920  
 IA - File in the Bishop Museum Library  
 Bernice P. Bishop Museum, Honolulu  
 B.P.B.M.

A collection of photographs of the windward side of Oahu including pictures of Kaneohe Bay. There are no negatives to these photos.

Complete file:

- IA 15 - Waimanalo, 1890
- IA 15 - Hiking trip by Baker and friends (seven photos)
- IA 15 - On the way to Makapuu, pass to Waimanalo, 1870
- IA 15 - Hawaiian ruins at Waimanalo
- IA 15 - Banana fields at upper Kailua, 1920
- IA 15 - Kaneohe Bay with Nuuanu Pali in distance
- IA 15 - Kualoa-Swanzy ranch
- IA 15 - Kualoa from the north showing the mouth of the Kaawa Valley
- IA 15 - Kaawa, Oahu
- IA 15 - Kaneohe Bay from Koolau Ridge and Kaneohe Bay, 1910
- IA 15 - Waimanalo, sugar cane (two photos)

## PHOTOGRAPH

Loading Rice Near Waiahole 1

Archives Neg. No. 17,074

HIMB

A view near Waiahole loading rice onto ships to be taken to Honolulu. The church steeple in the background is that of the Waikane Catholic Church.

There is one copy in the Photograph file at H.I.M.B.

## PHOTOGRAPH

Loading Rice Near Waiahole 2

Archives Neg. No. 17,069

HIMB

A view near Waiahole carting the rice by oxen to the ships moored in Kaneohe Bay.

There is one copy in the Photograph file at H.I.M.B.

## PHOTOGRAPH

Meeting House and School House, Kaneohe

Hawaiian Mission Children's Society, Honolulu

HIMB

A photographic copy of a Lahainaluna engraving of the meeting house and school house in Kaneohe--exact date unknown.

There is one copy in the Photograph file at H.I.M.B.

METEOROLOGY

CARSON, M. H. 1942  
 Rainfall and Water Supply  
 Hawn. Acad. Sci. Symp., 1941. Reprinted from the Paradise of the Pacific  
 February, March, April and May, 1942  
 publ.  
 B.P.B.M.

A discussion of the annual rainfall in the Hawaiian Islands with isohyetal maps for each island. Kaneohe is not directly referred to; but, according to the isohyetal map of Oahu, Kaneohe receives 40-60 inches of rain a year.

DEPT. COMMERCE  
 Climates of the States - Hawaii in Climatology of the U. S., No. 60-51, by  
 D. I. Blumenstock  
 U. S. Government  
 publ.  
 HIMB

A report dealing with the climatology of the State of Hawaii. Records of monthly mean temperature and precipitation are given in the appendix. Kaneohe Mauka station 781 has an annual temperature of 74.2° and an annual precipitation of 65.47 inches.

ENVIRONMENTAL SCIENCE SERVICES ADMINISTRATION  
 Climatological Data - Hawaii  
 U. S. Government, Dept. Commerce  
 publ.  
 HIMB

A data sheet for the climatological data of the State of Hawaii, giving temperature, precipitation, daily readings, evaporation and wind velocity data as well as a station index.

IIDA, K., D. C. COX, and G. PARARAS-CARAYANNIS 1967  
 Preliminary Catalog of Tsunamis Occurring in the Pacific Ocean  
 HIG 67-10, Data Report No. 6, University of Hawaii  
 publ.  
 HIG L.

A preliminary edition of a definitive catalog of tsunamis of the Pacific Ocean. Included also are tsunamis in seas that are adjacent to the Pacific Ocean.

The report includes data on the earthquakes time, epicenter, magnitude, and depth; and on the tsunamis region of the world, generating area, magnitude, place of observation, height,  $\Delta t$ , period, effects and remarks and references.

IIDA, K., D. C. COX and G. PARARAS-CARAYANNIS 1967  
Bibliography to the Preliminary Catalog of Tsunamis Occurring in the Pacific Ocean  
HIG 67-25, Data Report No. 5, University of Hawaii  
publ.  
HIG L.

A companion to the HIG 67-10, Data Report No. 6.

LEOPOLD, L. B. 1948  
Diurnal Weather Patterns on Oahu and Lanai, Hawaii  
Pacific Science 2(2): 81-95  
publ.  
Sinclair L.

A meteorological study of Oahu and Lanai in an attempt to develop a method of local forecasting. Kaneohe was one of the weather stations on Oahu.

LEOPOLD, L. B., S. BURN and C. K. STIDD 1948  
A Key to the Rain Gauges in Hawaii  
The Hawaiian Planters Record 52(3 and 4): 201-246  
publ.  
Bryan

A collection of maps of the Hawaiian Islands showing the locations of all the rain gauge stations operating in 1948 with an indication as to how often the gauges were read. Data pertinent to Kaneohe Bay:

<u>Gauge No.</u>	<u>Name</u>	<u>Elev. (Ft.)</u>	<u>Maintained By</u>	<u>Year Began</u>	<u>Freq. Read</u>	<u>Publ. U.S. Weather B.</u>
838	Kaneohe Ranch	90	Kaneohe Ranch Co.	1944	Daily	Daily
840	Kaneohe NAS	200	Naval Air Station	1941	Daily	Daily
781	Kaneohe Mauka	200	Terr.Hosp. Insane	1928	Daily	Daily
839	Kahaluu	360	U.S.G.S.	1935	Recorder	-



<u>Gauge No.</u>	<u>Name</u>	<u>Elev. (Ft.)</u>	<u>Maintained By</u>	<u>Year Began</u>	<u>Freq. Read</u>	<u>Publ. U.S. Weather B.</u>
837	Waiahole	750	Oahu Sugar Co.	1917	Daily	Daily
885	Waikane	800	Oahu Sugar Co.	1917	Daily	Daily
885a	Kaaawa Mauka	100	F.S.Morgan, Kualoa Range	1948	Weekly	-
886	Kahana	800	Oahu Sugar Co.	1924	Daily	Daily
886a	Hahipu	100	F.S.Morgan, Kualoa Range	1948	Daily	Daily
886b	Kaaawa	20	F.S.Morgan, Kualoa Range	1948	Daily	Daily
886c	Kualoa	10	F.S.Morgan, Kualoa Range	1948	Daily	Daily

NAKAMURA, W. T. 1933

A Study of the Variation in Annual Rainfall of Oahu Island (Hawaiian Islands)

Based on the Law of Probabilities

U. S. Dept. Agriculture - Weather Bureau

Monthly Weather Review 61: 354-360

publ.

Bryan

The probabilities of the occurrence of extreme rainfalls were computed from data taken at a number of stations on Oahu. The complete data is presented along with the computed coefficients of variation for the 42 stations. At Kaneohe, station No. 11, 26 observations were made and the average annual rainfall was 52.80 inches.

U. S. MARINE CORPS AIR STATION 1969-1970

Astronomical Data

U.S.M.C.A.S. - Meterology Branch

publ.

HIMB

A monthly compilation of astronomical data of the rise and fall of the sun and moon and the rise and fall of the tides computed for Kaneohe Bay. Included also are temperature, wind and rainfall climatological data. There is a

file being kept of these monthly reports in the library of the Hawaii Institute of Marine Biology starting in December, 1969.

VOORHEES, J. F.

A Quantitative Study of the Rainfall of the Island of Oahu

U. S. Weather Bureau

publ.

Bryan

Data obtained from 88 stations within the eleven districts or drainage areas of Oahu was used in this study. Isohyetal maps and their important relationship to the island's topography, the annual rainfall in various districts, the disposition of the rainfall and the prediction of rainfall are discussed. Kaneohe Bay, in the Koolaupoko judicial district, had the following data:

<u>Station</u>	<u>Name</u>	<u>Years Record</u>	<u>Altitude (Ft.)</u>	<u>Ave. Ann. Rainfall (In.)</u>
3	Kaneohe	29	60	53
4	Heeia	18	50	56
5	Ahuimanu	24	350	83
6	Waihole	11	750	128
7	Waikane	11	850	163

PUBLIC HEALTH

DEPT. AGRICULTURE 1969

I. Evaluation of Pesticide Problems in Hawaii

II. Appendix

State of Hawaii

publ.

HIMB

A study compiling and evaluating pesticide use data and scientific information to establish a foundation for possible course of action on the complex and imperative contamination problem. The use of pesticides in soils and on various crops (including in the Kaneohe area) is reviewed for the State of Hawaii and the mainland. The hazards of using pesticides and the monitoring and regulation of such use are reviewed. Research activities both in Hawaii and on the mainland are outlined. On p. 79-83 Dr. Donald Crosby discusses "pollution problems of Oahu" in relation to pesticide use. He mentions the Kaneohe area as having restricted tidal flushing due to the barrier reef and continues to show how this is reflected in pesticide pollution in the area.

DEPT. PUBLIC HEALTH 1957

A Report on Sewage Master Plan for Kaneohe, Koolaupoko, Oahu

State of Hawaii

publ.

HIMB

A report of the Division of Sewers, Dept. Public Health to the Dept. Public Works of the City and County of Honolulu. The bacterial analyses in Kaneohe Bay showed very low concentrations of bacteria except close to the shoreline. No current studies were made and wind and tidal conditions and the times of sampling are not given.

DEPT. PUBLIC HEALTH 1966  
Standards of Water Quality for the Kaneohe Bay Area, the Kailua Bay Area,  
and the Waimanalo Bay Area  
State of Hawaii  
unpubl.  
HIMB

A complete set of the statements made during the public hearing held on September 27, 1966, at the Castle High School on the Standards of Water Quality for the three bay areas of Kaneohe, Kailua and Waimanalo. The meeting was conducted by Robert G. Hodge, master on water uses and quality standards. This was the first hearing carried out in the intent of the Federal Water Quality Act of 1965 to be held in Hawaii. The purpose of the hearing was to establish standards of water quality and water uses which would then be referred to the state agency, the Dept. Health, which would then in turn make recommendations to the Secretary of the Interior in establishing federal standards of water uses and water qualities.

DEPT. PUBLIC HEALTH  
Monthly Monitoring in Kaneohe Bay  
State of Hawaii  
unpubl.  
DPH

Raw data is available from the State Dept. Health on the bacterial counts from two stations in Kaneohe Bay--at Kokokahee Pier and at the foot of Mikiola Drive. Another station, at the foot of Kaneohe Bay Drive, has data from previous years but nothing recently.

DEPT. PUBLIC HEALTH  
Public Health Regulations  
Chapter 37 - Water Pollution Control  
Chapter 37a - Water Quality Standards  
State of Hawaii  
publ,  
DPH

A report of the Dept. Health defining the public health regulations for the coastal waters of the Hawaiian Islands. The waters of Kaneohe Bay have the following classifications:

Class AA - Portion of Kaneohe Bay designated by H.T.M.B.

Class A - Portion not designated by Class AA or Class B

Class B - Kaneohe Bay, small boat harbor adjacent to the Kaneohe Yacht Club and the Kaneohe Marine Corps Air Station and the small boat harbor and pier area.

TRANSPORTATION

DEPT. TRANSPORTATION and LUBLIN, MCGAUGHY AND ASSOC. 1961  
Recreational Boating in Hawaii  
State of Hawaii  
publ.  
BCA

A report of a one phase of a long-range program on the investigation of the need for harbors for light draft vessels for refuge, recreation, fishing and commerce along the coast of the Hawaiian Islands. The objectives of this study done by Lublin, McGaughy and Assoc. was to enumerate and locate all light-draft vessels in the state and to determine the value of these craft and to obtain information from recreational boat users regarding the requirements for future recreational boating. This survey was done in conjunction with a Corps of Engineers study to provide basic data for the state program for small boat harbors. Kaneohe Bay data is on p. 67-71. Over one thousand boats are located in the bay, either on private property or in one of the three boat havens--Kaneohe Yacht Club, the anchorage and the Heeia Kea Pier.

DEPT. TRANSPORTATION and LUBLIN, MCGAUGHY AND ASSOC. 1961  
Commercial Fishing Boat Operations in Hawaii  
State of Hawaii  
publ.  
BCA

A report on the commercial fishing boat operations in Hawaii, a study limited to the number, distribution and usage of craft, operating costs and to the potential effect of new harbors on operations. This reports supplements data compiled by the Corps of Engineers on other features of the commercial fishery such as location of fishing grounds, size and value of fish catch, marketing, etc. In this report, figures are presented for the number, type, size and location of craft and these figures represent the actual field census of the county conducted from March to June, 1961. There is no mention specifically to Kaneohe Bay.

GILMAN AND COMPANY, INC. 1969  
 Development of a Bus Transit System for Windward Oahu  
 publ.  
 MRL. City Hall

A feasibility study on the development of a bus transit system for windward Oahu done by the W. C. Gilman Co., Inc. in conjunction with the Dept. Traffic, City and County of Honolulu. The study found a 'real need' for the initiation of a bus system in the area in the near future. The study considered a recommended transit system and fare structure, estimated ridership; financial analysis; and implementation of such a program. Appendix table D lists the occupation of the people of the area by census tracts and divides the people into nine occupations. Appendix table H shows the population statistics for the census tracts covering the entire windward area. In the Kaneohe Bay area, the statistics are as follows:

<u>Census Tract</u>	<u>Population</u>
103	8,325
104	State Hospital
105	10,353
106	8,169
107	5,186
108	6,329 (Mokapu Peninsula)

MARINE LABORATORIES

BANNER, A. H. 1963  
 Hawaii Marine Laboratory, University of Hawaii  
 American Zoologist 3(3): 282-284  
 HIMB Contribution No. 191  
 publ.  
 HIMB

A full issue of the American Zoologist devoted to the field stations of the United States and Canada which have published in this periodical. A short history and description of the Coconut Island Marine Laboratory and the Waikiki Laboratory was presented by Dr. Banner.

HIATT, R. W. 1963  
 World Directory of Hydrobiological and Fisheries Institutions  
 publ.  
 HIMB

A directory of laboratories which are devoted largely to marine or fresh-water biology, with a description, on a world-wide basis, of existing facilities, together with the scope of activities in research and instruction in the marine and fresh-water biological sciences. Hawaii Institute of Marine Biology (formerly The Hawaii Marine Laboratory) is among those listed.

UNIVERSITY OF HAWAII 1955  
 A Guide to Exhibits  
 unpubl.  
 Helfrich

A mimeograph copy of the guide to the exhibits of the open house which the Hawaii Marine Laboratory held on March 19, 1955. The guide contains a short paragraph concerning each of the investigators and their research at that time. Mr. Edwin Bryan of the Bishop Museum has in his files press releases concerning the opening of the marine lab as well as lists of the laboratory contributions.