WILDLIFE AND WILDLIFE HABITAT OF AMERICAN SAMOA. II. ACCOUNTS OF FLORA AND FAUNA

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U.S. Fish and Wildlife Service
Washington, D.C.

UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
Washington, D.C. • 1982

FOREWORD

A survey of the status of the wildlife and wildlife habitat of American Samoa, an unincorporated Territory of the United States, was recommended by administrative officials of the U.S. Fish and Wildlife Service (FWS) in the early 1970's. Environment Consultants, Inc. (ECI), based in Dallas, Texas, was selected to conduct a 2-year survey with A. Binion Amerson, Jr., as Principal Investigator. The contract was administered through the Division of Federal Aid in FWS Region I, Portland, Oregon.

The primary objectives of the survey were to define the major ecosystems and to inventory their physical components, vegetation, and wildlife constituents; to prepare maps of these ecosystems; to identify any threatened or endangered species of wildlife; and to recommend wildlife management opportunities and needs. The report of the survey was to be in two parts. The first was to be a non-technical account suitable for wide general distribution; the second was to include the technical aspects of the data and data gathering, with accounts of the wildlife species. This volume represents the second part of ECI's report.

The final report submitted by ECI contained more than 1,200 pages, 200 figures, and 110 tables, many of the latter several pages long. The FWS felt that the report was too lengthy for publication in the form submitted. The task of editing and condensing ECI's report into publishable form, without altering its essentials, was assigned to Richard C. Banks, National Fish and Wildlife Laboratory (now Museum Section), FWS, Washington, D.C. Claudia J. Angle assisted with revision of the figures, and Linda Wolfe retyped the tables and some of the text.

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Abstract

A survey of the status of the terrestrial vertebrate wildlife and the wildlife habitat of American Samoa was conducted from 15 June 1975 to 21 December 1976. Data were collected from 42 study plots representing 16 vegetation communities and habitat types on the seven islands and from 98 linear survey routes.

A checklist of plants includes 489 species of which 33 tree species are first reported for American Samoa. Eleven flowering plants are endemic to American Samoa.

One amphibian and 15 reptiles occur in American Samoa. The amphibian, *Bufo marinus,* and a gecko, *Hemidactylus frenatus,* are recent introductions. The Pacific boa, *Candoia bibroni,* is first reported from American Samoa, and 37 insular distribution records are reported. In number of individuals, reptiles are the most abundant vertebrates on the islands.

The avifauna of American Samoa includes 53 species; the occurrence of 4 others is hypothetical. Four species are reported from a single occurrence, and the listing of seven sea birds is based on sight records of birds flying over or near the islands. Six northern hemisphere shorebirds and one cuckoo are known only as migrants. Two species, *Columba livia* and *Pycnonotus cafer,* are introduced; only the latter is well established. One species, *Gymnomyza samoensis,* is probably extirpated. The friendly quail-dove, *Gallicolumba stairi,* is reported from American Samoa for the first time.

The mammalian fauna includes two native bats, a third hypothetical species, four introduced mice and rats of which one, *Rattus exulans,* probably represents an old introduction, and feral pigs.

Introduction

American Samoa is a group of seven islands at about 14° south latitude and 170° west longitude, along the crest of a submarine ridge. From west to east in the chain, the islands are Tutuila, Aunu'u, Ofu, Olosega, Ta'ū, and Rose Atoll (Fig. 1). The seventh, Swains Island, is about 320 km north-northwest of Tutuila. The island group is about 4,180 km southwest of Honolulu and about 925 km northeast of Fiji (Fig. 2). The total land area is about 197 km². Individual islands range in size from Tutuila (about 142 km²) to Rose Atoll (0.04 km²). The maximum elevation of 966 m is on Ta'ū; in contrast, Rose Atoll and Swains Island are flat and low, rising only about 9 m above sea level. Figures 3-5 show the topography of the individual islands and place names used in this report. The islands are inhabited except for Rose Atoll, which is a National Wildlife Refuge of the U.S. Fish and Wildlife Service.

The natural vegetative cover of most of American Samoa is tropical rain forest. Nearly two-thirds of the rain forest has been destroyed or damaged by man's activities; undisturbed forest exists only on steep slopes. Despite the low fertility of the soil, plantation land is the most extensive type of vegetation (34%). Secondary forest (20%) is another major vegetation type; if undisturbed for a long time, the secondary forest will revert to a condition nearly indistinguishable from primary forest. The only relatively undisturbed vegetation types are cloud forest, montane and littoral scrub, and littoral strand.

For the purposes of this study, "wildlife" was restricted to birds, terrestrial mammals, reptiles, and amphibians.

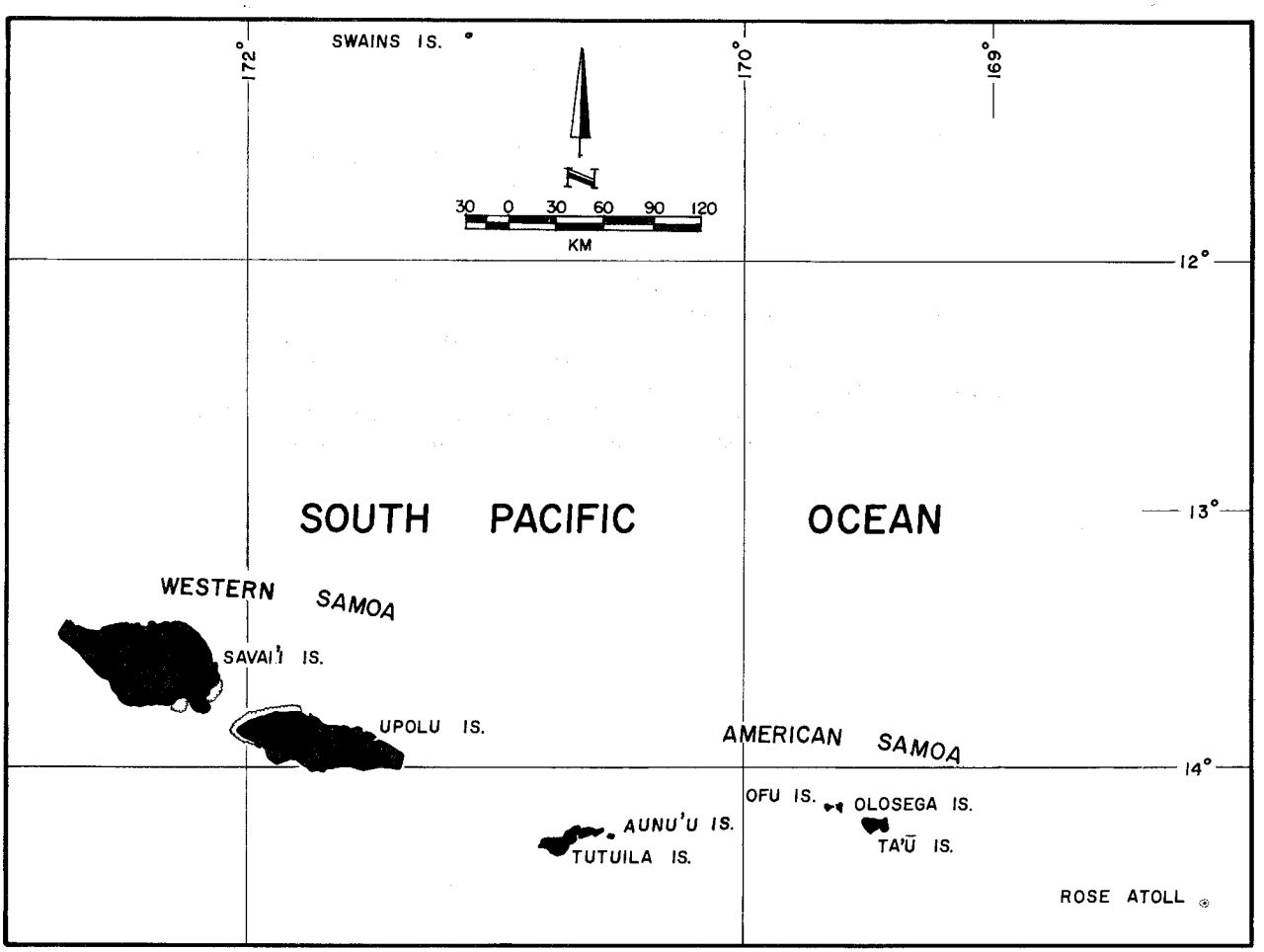

Fig. 1. The islands of American Samoa and their relationship to Western Samoa.

Climate

Temperature.—The average annual temperature of American Samoa is about 23° C (Fig. 6). The southern hemisphere winter months of June, July, and August are the coolest and the summer months of January, February, and March are the warmest. However, the mean annual range of temperature is less than 2° C, in contrast to a mean daily range of about 7° C. Afternoon temperatures ordinarily reach slightly more than 30° C in summer and slightly less than that figure in winter; night temperatures fall to about 25° C in summer and about 22° C in winter. The highest temperatures recorded at the Pago Pago Airport were about 33° C and the lowest about 16° C. Minimum temperatures from April 1964 to March 1966, when the weather station was about 0.8 km farther inland, appear to have been somewhat lower than those at the present location nearer the shore.

Winds.—The prevailing winds throughout the year are the easterly tradewinds. These tend to be more directly from the east from December through March, but from the east-southeast and southeast in the rest of the year. Monthly average wind speeds are 4-10 knots (Fig. 6). The trade winds are less consistent in summer than in winter. At Pago Pago Airport, winds occur with a minimum frequency of about 30% in February to a maximum frequency of about 75% in August. Interruptions of the winds in summer are sometimes associated with the proximity of small tropical storms, bands of converging winds, or low-pressure systems higher in the atmosphere, all conditions that help make summer the rainy season. At other times, the absence of the tradewinds is marked by periods of light and variable winds. Westerly and northerly winds are then more frequent; strong at times, these winds often reflect the nighttime drainage of cooled air from the mountains west and north of the airport.

Hurricanes move into the area generally from the north, occasionally from the east or west. According to historical records, Samoa experienced at least 39 hurricanes between 1831 and 1926; of these, 2 occurred in November, 7 in December, 11 in January, 3 in February, 12 in March, 3 in April, and 1 at an unspecified time. Some have been intense and highly destructive. On 29-30 January 1966, a hurricane battered Pago Pago with gusts of more than 110 mph, deposited 15-36 cm of rain, and caused five deaths and an estimated $4.3 million in property damage.

Precipitation.—Rainfall averages more than 318 cm annually at the Pago Pago Airport, but varies greatly over small distances because of the rugged topography. Pago Pago Village, less than 6.5 km north of the airport at the head of a hill-encircled harbor open to the prevailing wind, receives nearly 510 cm annually. The crest of the mountain receives more than 750 cm annually, and observations during the pre-

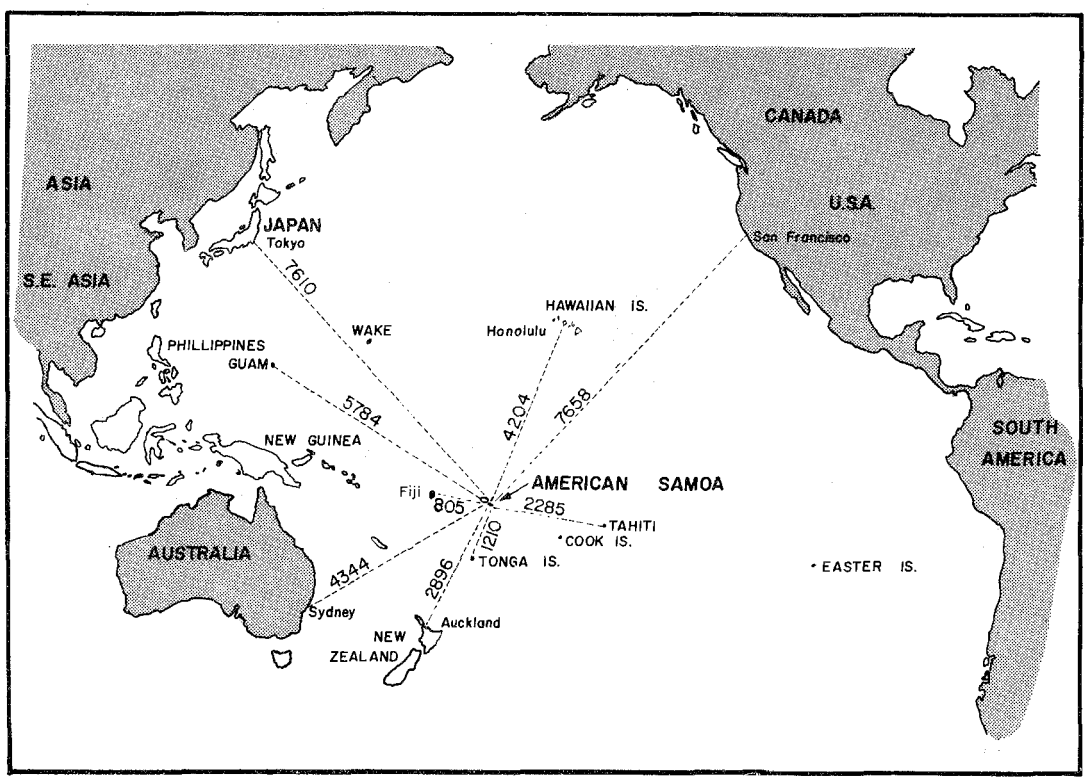

Fig. 2. General location of American Samoa. Distances are shown in kilometers.

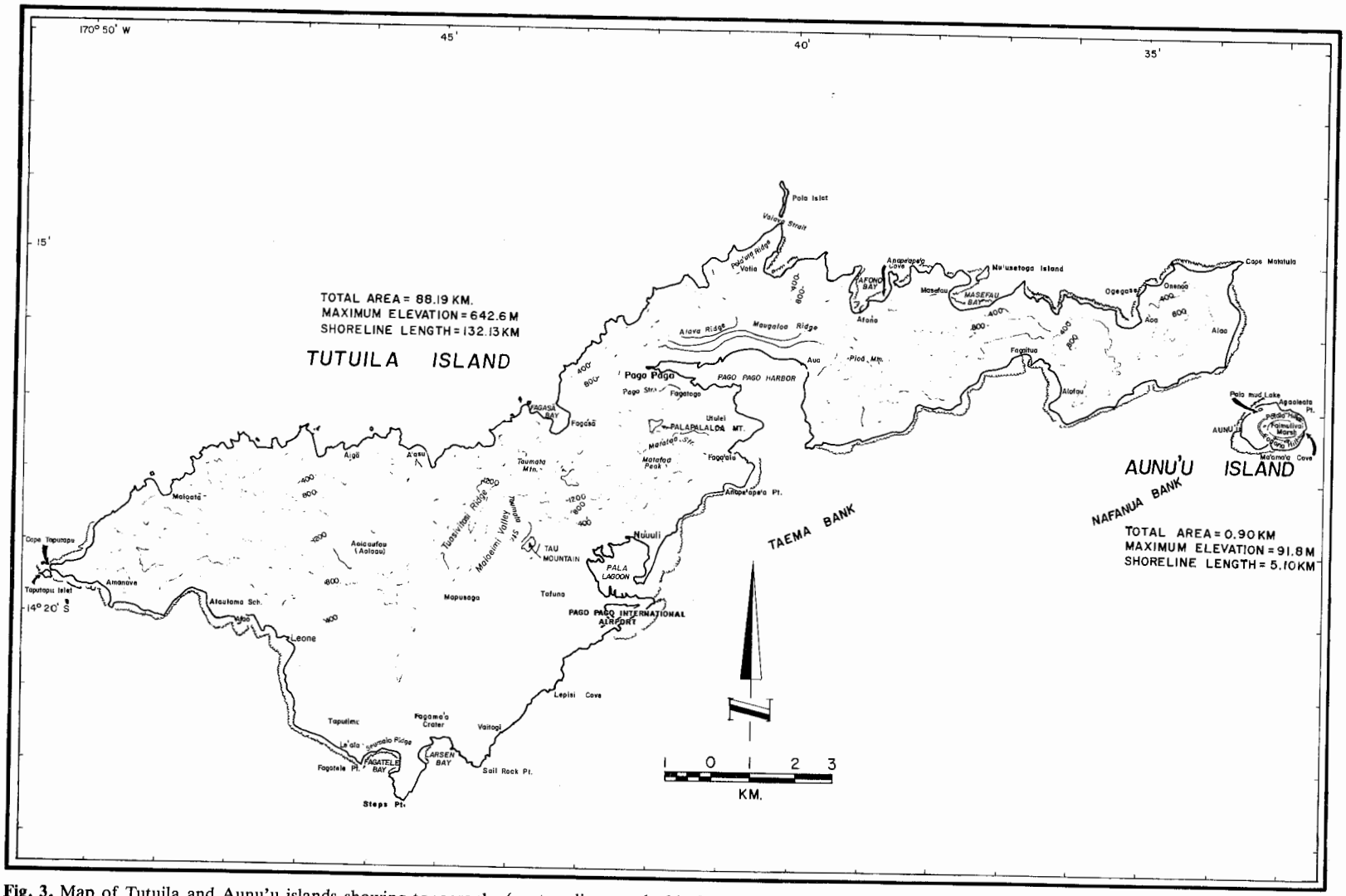

Fig. 3. Map of Tutuila and Aunu'u islands showing topography (contour lines marked in feet) and place names.

sent study indicate that annual rainfall may exceed 1,000 cm in the high-altitude cloud forest. In the average year, the airport records about 300 days with a trace of rain or more, and about 175 days with 0.25 cm or more. The driest months (Fig. 6) are April through September and the wettest are October through March, but seasonal rainfall may vary greatly between years.

Heavy showers and long rainy periods can occur in any month. About 25-30 thunderstorms occur in an average year, mainly in the rainy season. Flooding rains have been associated with hurricanes and tropical storms, but also occur at other times. On 9 October 1967, rainfall totaling 19 cm in 24 hours was recorded at the airport. This rain caused extensive flooding and damage on Tutuila Island.

Relative humidity.—Relative humidity somewhat parallels the wet and dry periods of the year (Fig. 6). In the wetter months, the relative humidity reaches 90% at night and the mid-70's during the day; in drier months it is about 6-8 points lower.

Sky cover.—The mean monthly sky cover (Fig. 6) between sunrise and sunset is 7.4 on a scale of 0 (no clouds) to 10 (complete cover). Periods of relatively clear skies generally occur during the dry season (winter). In an average year there are 25 completely clear days, 145 partly cloudy days, and 195 cloudy days. No data are available on nighttime cloud cover.

Soils

A total of 119 soil samples were taken from 18 of the study plots and from Swains Island. The plots sampled are representative of most of the vegetation community types. Thirteen characteristics of the soil were analyzed with a LaMotte soil testing kit. Particle size distribution (sand, silt, and clay) was evaluated and soil depth was measured (Table 1).

More detailed analyses were made for samples from 18 locations on Rose Island. In addition to the characteristics analyzed on the soils of the other islands (Table 1), Rose Island samples were analyzed for percentages of organic carbon and total nitrogen. The percentage of organic matter ranged from 0.72 to 36.2, that of nitrogen from 0 to 2.99. With an increase in organic matter there was a corresponding increase in total nitrogen. There was also a decrease in pH with an increase in organic carbon. An acid layer under the *Pisonia* forest grades into more alkaline conditions away from the forest and deeper into the soil profile. Bird guano has a great effect on the soils of this island.

Methods

Field work in American Samoa began on 15 June 1975 and terminated on 21 December 1976. An ecosystem approach to data collection was utilized. Sixteen community types were sampled at 41 study plots; Swains Island was an additional (42nd) study area. These study plots were used in gathering data on vegetation structure and composition and on the distribution of the vertebrate wildlife species. All field notes, raw data, photographs accumulated during the survey, as well as material compiled in analysis and in report preparations, are in the files of the Museum Section of the U.S. Fish and Wildlife Service, at the National Museum of Natural History, Washington, D.C. 20560. Voucher specimens taken in the course of this study have been deposited in the National Museum of Natural History (USNM), Washington.

Community study plots.—A set of 41 study plots was established in 16 plant communities (Table 2, Figs. 7-9). The plots were constructed to represent homogeneous communities, although this tends to obscure the patchwork nature of the forests. To facilitate the collection of data, subplots of 10x10 m were marked. The shape of the plot was usually a modified belt transect with 10 contiguous subplots. In areas of limited size, plots of various shapes were used without regard to contiguity of subplots. Quadrats, divisions of the subplots, were used in recording data on vines and small herbaceous plants.

A total of 292 identified trees in and near the plots were measured (dbh) and tagged with numbered aluminum tags attached at breast height by aluminum nails. All trees in the plots on Rose Island were so marked, and all coconut trees on that island were tagged but not measured. In other plots that contained trees, only large trees near the corners (sometimes outside) were tagged to serve as guideposts for future plot location. Because of tree growth these tags will probably not be of value for more than 10 years.

At the completion of the project, certain plots (Table 2) were permanently marked by cooperative effort of the Fish and Wildlife Service and the Government of American Samoa. Galvanized 5.1 cm pipes were buried to depths of 46 cm with 15 cm exposed. Each pipe was capped with a bronze marker cemented into the top.

Four sets of vegetation data were obtained at each of the 41 survey plots: (1) tree species measurements and counts, (2) sapling counts, (3) estimated ground cover, and (4) frequency of climbers. Epiphytes were usually noted but because of their limited importance in the ecosystem and the lack of a method for recording reliable quantitative data, information on epiphytes is discussed only as species occurrence.

Trees.—For this study, a tree was defined as a self-supporting woody plant with a stem diameter of 2.5 cm or greater measured at breast height (dbh) unless the "tree" was shorter. Use of this single criterion does not distinguish between trees and the very few shrubs (small woody plants that branch at or near the base) in the Samoan forests. Trees branching near the base were recorded by measuring the diameters of the major branches. The diameter of forest trees with plank-like buttresses was measured above the origin of the buttresses when possible. Trees on the edges of plots were measured if the plot boundary passed through the trunk.

Banyan trees (*Ficus* sp.), sometimes called strangler figs, presented a special problem. These plants send masses of hanging roots to the ground from the tops of host trees on which they have become established. The roots eventually

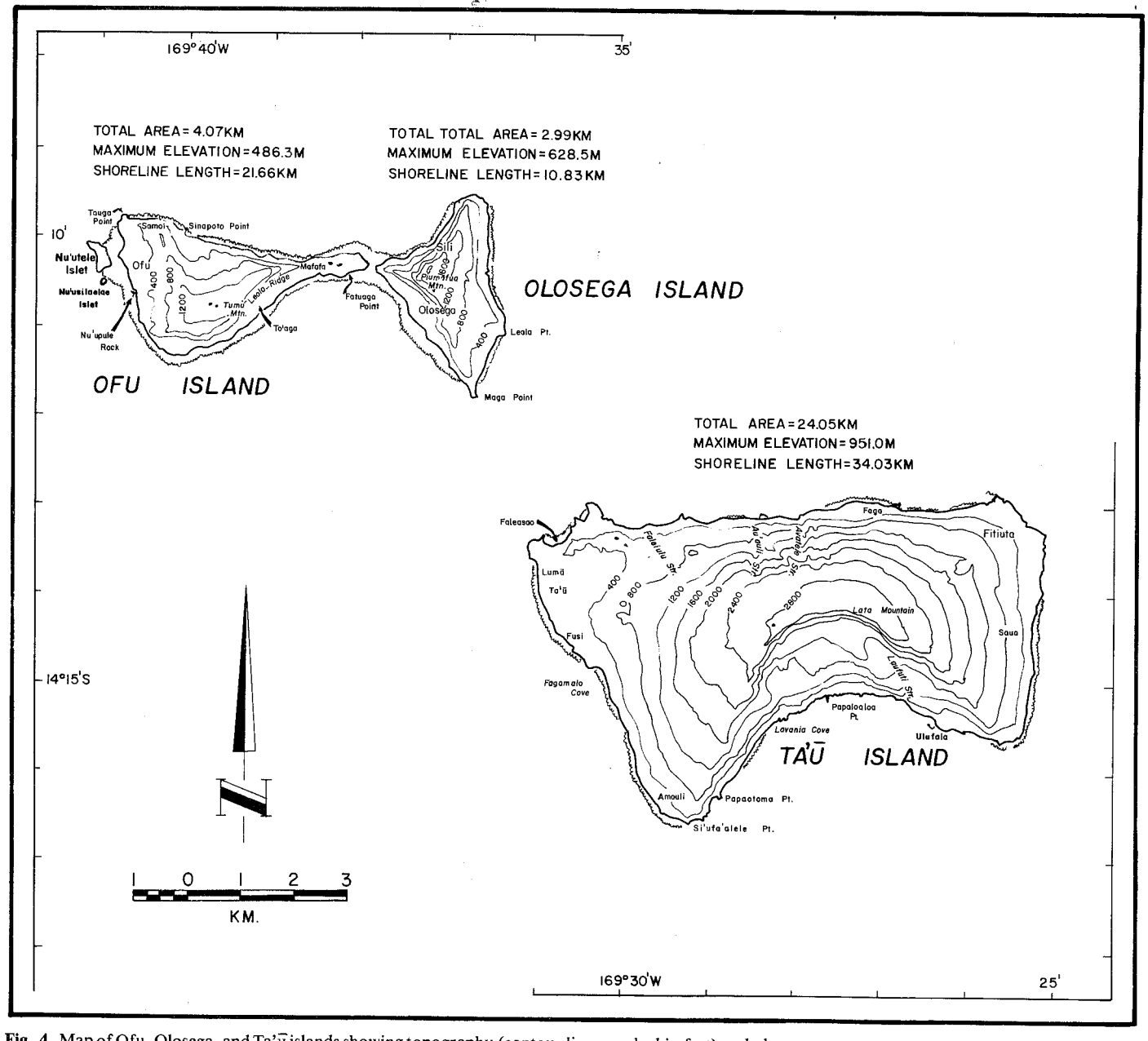

Fig. 4. Map of Ofu, Olosega, and Ta'ū islands showing topography (contour lines marked in feet) and place names.

coalesce to form a trunk and the host tree, locked within, dies. In practice, a banyan trunk was measured and its equivalent diameter was estimated.

The heavy growth of epiphytes or vines on tree trunks, characteristic of cloud florests, may have caused inaccuracies in identification or measurement. Growth was cleared away before measurement or measurements were adjusted for the thickness of vines.

The major problem in obtaining tree data was accurate identification. For tall forest trees the characteristic fruits and flowers were often unavailable and leaves were often difficult to obtain. Bark characteristics could not be used exclusively. At times binoculars were used to identify the leaves in the crown of a tall tree.

Heights of trees were estimated. Stratification was evident only in rain forest and mature secondary forest, but even in these only two layers were found—a canopy layer 18-28 m high and an understory 6-18 m high.

In the cloud forest, where dense undergrowth prevented use of the plot method, an alternative point-centered method was used. At each of a series of points 10 m apart an imaginary line perpendicular to the series formed four quadrants. The nearest tree in each quadrant was measured, as was the distance from the point. A series of 25 points over 250 m yields measurements of 100 trees. Tree density can be obtained by averaging the distance between the points and the trees (Mueller-Dombois and Ellenberg 1974).

At some sites, a quick survey of tree species composition and size was made by randomly selecting a large number of trees and estimating their diameters.

Saplings. —A woody plant more than 50 cm tall but with a dbh of less than 2.5 cm was considered a sapling. Included in these limits were true saplings of large and medium-sized tree species as well as mature shrubs and small trees. The arbitrary separation of saplings from trees artificially divided populations of some small tree species (e.g. *Psychotria insularum* and *Polyscias samoensis).* However, data from the two categories can be combined for more complete information about those species.

Saplings were analyzed in quadrats derived by dividing the 10x10 m subplots into quarters. Usually, a series of 5-10 quadrats, one per subplot, was used; the same quadrat was selected in each subplot. If saplings were relatively few, entire subplots were used. Species, height, and number of saplings were recorded; density was calculated from the number.

Ground cover. —The ground cover consisted of all the low plants, mostly less than 50 cm high, on the forest floor. Most of these were ground ferns, but flowering herbs, creeping vines, and seedlings of tree species were included.

The percentage of ground cover (Mueller-Dombois and Ellenberg 1974) by individual plant species was estimated in 5x5 m quadrats in the subplots using the Braun-Blanquet (1951) cover abundance scale; where cover was sparse, entire subplots were used. Where no fixed plots were established and where ground cover was particularly heavy, as in montane scrub and coastal marsh, ground cover was recorded in plots ranging from 2x2 to 5x5 m. Species, percentage of cover, and frequency of occurrence in quadrats were recorded.

Climbers and vines.—Climbers in a tropical forest may be herbaceous or woody, but commonly have stems that need support. They climb tree trunks by means of tendrils, specialized clinging roots, a spiral growth pattern, or a combination of these. Climbers may or may not reach the canopy, and some species (e.g., the fern *Lomagramma cordipinna)* may climb or not. Where there are fewer trees, and therefore more light on the ground surface, vines spread horizontally over the substrate. Some usually prostrate vines, such as *Ipomoea macrantha,* are also able to climb low trees, as at the edge of coastal strand. Many weedy vines found in disturbed places such as pastureland, plantation land, and secondary forests in American Samoa have been introduced. Most of these require moderate sunlight for establishment and are shaded out by developing forest.

Information on vines and climbers was recorded with tree data, on trees with a dbh of 7.5 cm or more. Species and frequency of occurrence were recorded, and relative dominance of each species was calculated from field estimates of biomass of the individual climbers. Climbers were assigned 5, 3, 2, or 1 points, with higher values to more dominant vines. The total value for a species was divided by the total for all species in a sample to provide a rough percentage of dominance in a plot. Vines and climbers were studied in 23 plots.

Lianas, woody vines often with stems as large as trees, may grow over several treetops. This growth pattern, and the difficulty of identifying leafless and flowerless stems, make it difficult to study these plants from the ground. They may be important or even dominant in canopy layers, but the accuracy of data on such lianas is questionable.

Other surveys.—To provide more extensive data on wildlife, investigators established 98 linear survey routes on the major islands (Table 3). Notes on vegetation were also made during the linear surveys. Some surveys were made on foot, some by automobile. The number of repetitions of the surveys varied.

Special methods were used for study of the various plant types and animal groups. These are discussed with the accounts of the species or groups involved.

Study Plots and Their Vegetation

Plot 1, Nu'uuli Mangrove Forest

Site.—A single rectangular plot 30x50 m, running N 22° E, in mangrove swamp about 1 km west of intersection and about 150 m south of road at closest approach to swamp on Nu'uuli Peninsula, Tutuila Island; elevation sea level. Soft mud, high in organic matter, inundated with salt water at high tide.

Community. —A forest composed entirely of oriental mangrove (*Bruguiera gymnorhiza*) spaced about 4/100 m²

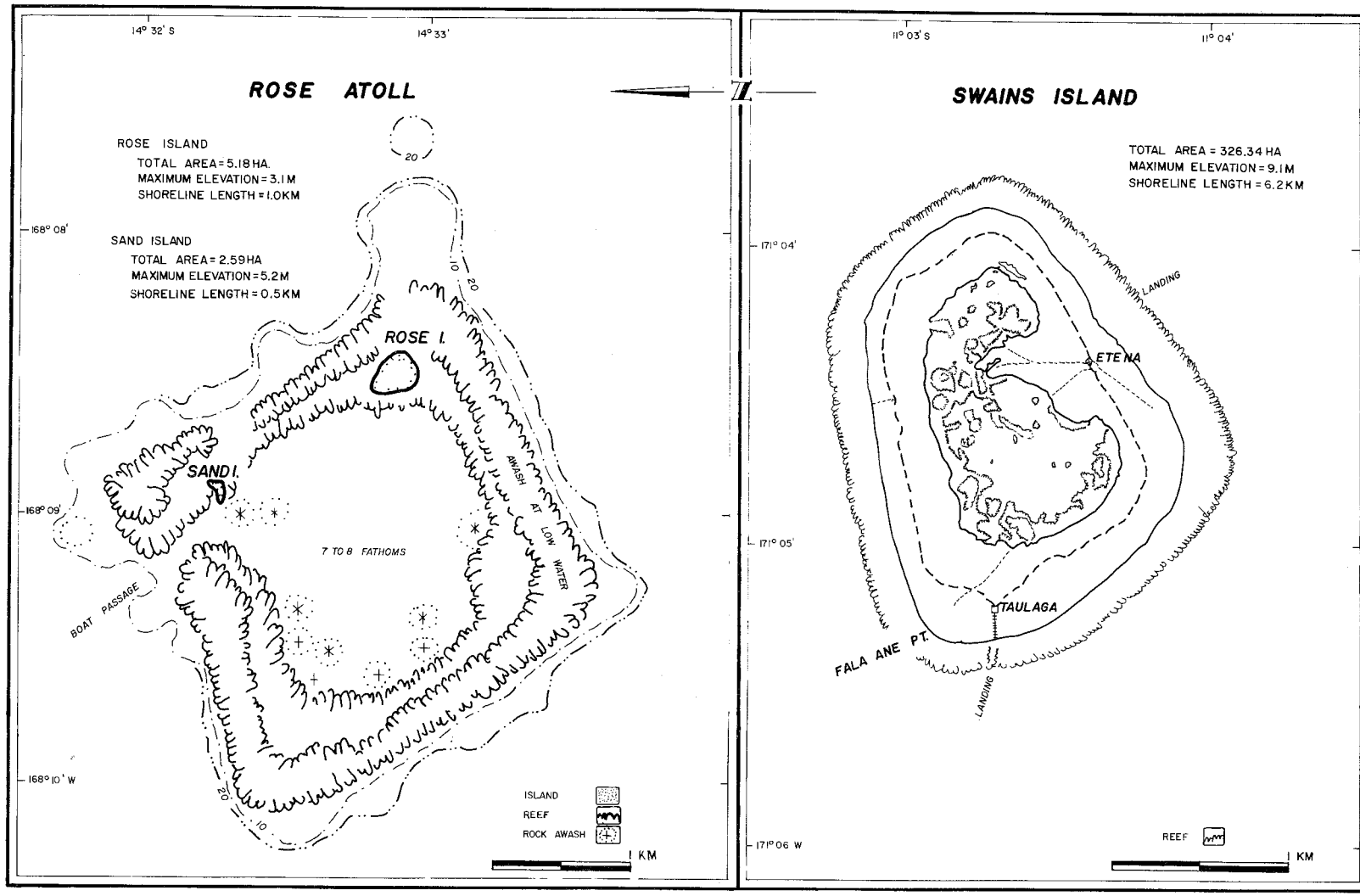

Fig. 5. Maps of Rose Atoll and Swains Island.

and forming a continuous canopy 8-16 m high. Patches of mangrove saplings in forest but not in plot. Ground cover absent except for *Bruguiera* seedlings less than 50 cm (Table 4).

Plot 2, Vaitogi Littoral Forest

Site. —A series of 14 subplots 5x5 m in 2 parallel rows of 7 each, 10 m apart, running N 68° W on lava coast perpendicular to shoreline about 0.7 km west of village of Vaitogi, Tutuila Island, next to small turnout on dirt road; elevation 10 m. Slightly weathered lava rock covered by a thin layer of soil, with patches of loose sand on rock strand. Terrain flat. FWS marker no. 3 is 9 m west of aluminum tree tag no. 929.

Community.—A severely disturbed forest of *Pandanus* trees 3-5 m high (Table 5) with patches of *Scaevola taccada* and *Acrostichum aureum* interspersed with grass. Between the trees and the shore is typical rock strand with obvious species zonation.

Plot 3, Rose Littoral Forest

Site. —Ten subplots, 10x10 m and 10 m apart, curving south in a crescent along the margin of the forest from about 60 m east of the concrete marker on the eastern edge of the *Pisonia* forest on Rose Island; elevation 1-3 m. Soil dark brown, loose, rich in humus, made from guano, leaf litter, and sand. Terrain nearly flat.

Community.—Forest of *Pisonia grandis* trees approaching 20 m in height, some higher in center of island, without stratification (Table 6). No ground cover. *Cocos nucifera* and *Messerschmidia argentea* trees present on island but not in plot.

Plot 4, Aunu'u Littoral Forest

Site.—A single 30x50 m plot 200-300 m from shore southwest of Ma'ama'a Cove on Aunu'u Island; elevation 20 m. Soil brown, loose, dry, without rocks, crossed by extensive surface roots of *Barringtonia.* Forest slopes gently to northeast. Forest inland, cut off from shore.

Community.—Forest consists almost entirely of large, spreading *Barringtonia asiatica* (Table 7) 7-11 m high; trees well spaced (6.8/100 m²). Almost no ground cover.

Plot 5, Onenoa Littoral Forest

Site.—A series of nine unmarked subplots, 10x10 m, 10 m apart, along upper margin of beach about 400 m west of village of Onenoa on northwest-facing shore between Solo and Palau points, Tutuila Island; elevation 0-5 m. Coral rubble with no soil development or accumulated litter. Terrain flat but bordered by steep rocky slope. FWS marker no. 9 is in plot.

Community.—Almost exclusively huge *Barringtonia asiatica* trees, 8-11 m high, behind which is a narrow disturbed forest. Ground cover dominated by seedlings of *Barringtonia* with some *Asplenium nidus.* (Table 8).

Plot 6, Aigā Littoral Forest

Site.—A series of six continuous subplots, 10x10 m, in two rows of three each extending inland from shore in southerly direction, at Aigā, the valley east of abandoned village of Aoloau on north coast of Tutuila Island; elevation 1-5 m. Continuous with Plot 18. Coral rubble and coral plates with no soil or sand. Beach covered by rounded rocks with little sand. Terrain flat.

Community.—Dominant tree, *Barringtonia asiatica* (Table 9), forming a canopy 10-16 m high; forest floor open, trees well spaced. Saplings few, ground cover light and consisting mostly of *Barringtonia* seedlings and *Asplenium nidus.* At 30-50 m inland, *Barringtonia samoensis* replaces *B. asiatica* under lowland rain forest.

Plot 7, Saua Littoral Forest

Site. —Five contiguous subplots, 10x10 m, parallel to shore running N 28°W, 15-25 m from shore about 1.5 km south of end of road at Saua on east coast of Ta'ū Island, west of northern terminus of coral-plate trail; elevation 1-5 m. Coral plates and rocks of various sizes, no sand or soil. Terrain flat.

Community. —Mixed forest to 18 m high, dominated by *Barringtonia asiatica, Pisonia grandis,* and *Hernandia sonora* (Table 10), with no understory; well spaced trees giving open aspect to forest. Saplings scarce, ground cover light.

Plot 8, Pala Littoral Forest

Site.—No plot; dbh estimated for 63 randomly selected trees in forest about 50 m north of Pala Mud Lake about 50 m inland from north coast of Aunu'u Island; elevation 2-5 m. Substratum of coral plates and rubble on flat terrain.

Community. —Open forest of the typical littoral species *Hernandia sonora, Pisonia grandis,* and *Barringtonia asiatica,* and a coastal ridge forest species, *Planchonella costata* (Table 11); canopy about 10-15 m high with no stratification. Few saplings and small trees, very light ground cover.

Plot 9, Sili Coastal Forest

Site. —No plot; dbh estimated for 100 randomly selected trees on northeast tip of Olosega Island about 800 m east of Sili Village, from beginning of plateau plantation land along a trail down to edge of littoral forest; elevation 20-100 m. Soil dry and very rocky, with frequent rock outcroppings and leaf litter on ground. Slope of 40-50° to east and northeast.

Community.—A forest dominated by *Barringtonia asiatica, Syzygium clusiaefolium,* and *Diospyros samoensis* (Table 12) with no stratification and light ground cover.

Plot 10, Pofala Coastal Forest

Site.—No plot; dbh of 65 randomly selected trees estimated along ridge on north side of Aunu'u Island about 50 m east of Pofala Hill; elevation 30 m. Dry soil with few rocks, originating from volcanic tuff. Ridge slopes gently, but ground drops steeply on both sides. Area disturbed by trail.

Community.—Transition between coastal and ridge forest, with *Erythrina variegata* and *Diospyros samoensis* the dominant trees (Table 13); no stratification.

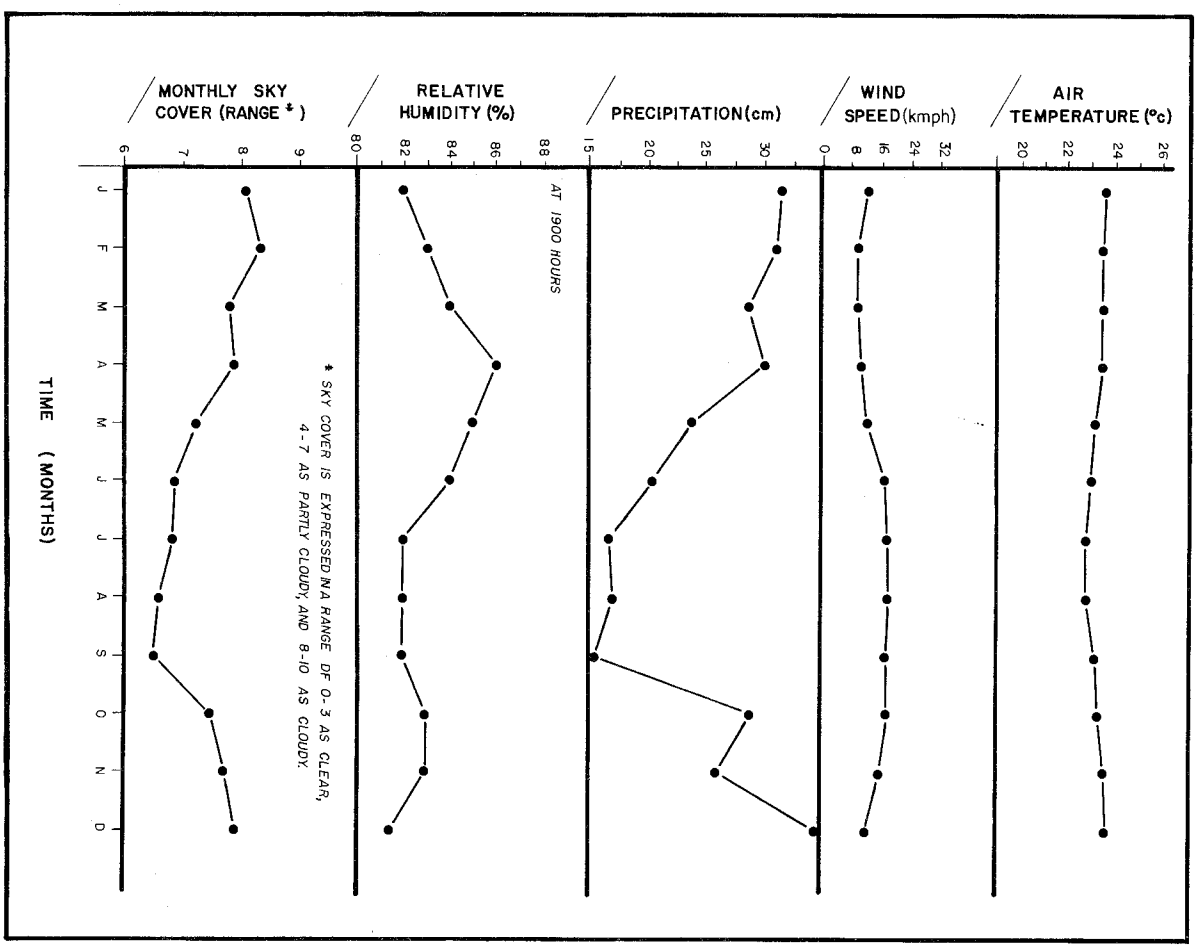

Fig. 6. Historical weather data (1956-76 monthly averages) for Pago Pago International Airport, Tutuila Island.

Plot 11, Nu'utele Coastal Forest

Site.—No plot; dbh estimated for 194 randomly selected trees along ridge toward south end of Nu'utele Islet off west coast of Ofu Island; elevation 70 m. Light, dry soil formed from volcanic tuff with very little leaf litter; terrain flat on top of ridge but steep (30-40°) on sides.

Community.—Forest dominated by *Diospyros elliptica, Syzygium clusiaefolium,* and *S. dealatum* less than 10 m tall with no stratification and light ground cover (Table 14).

Plot 12, Masefau Coastal Forest

Site. —A series of 10 contiguous 10x10 m subplots in a line N 60° E, near top of Nu'usetoga Islet at Masefau Bay on north coast of Tutuila Island, parallel to contour of islet below summit on south facing slope; elevation 70 m. Soil light in color, loose, formed of volcanic tuff; rocks few, leaf litter present particularly in flat places. Moderate slope of 10-30°. FWS marker no. 10 and aluminum tag no. 82 at southwest corner of plot.

Community.—Transition between coastal and lowland ridge forest. Dominant trees *Intsia bijuga* and *Syzygium inophylloides.* Site disturbed in past (World War II) as evidenced by regeneration of *Intsia* trees from cut trunks, by amount of *Rhus taitensis,* and by signs of military occupation. Canopy 10-15 m. Dominant understory species, *Diospyros samoensis* and *Syzygium clusiaefolium.* Saplings few and ground cover light (Table 15)..

Plot 13, Maloatā Ridge Forest

Site. —No plot; dbh estimated for 51 randomly selected trees on top of Tuasina Ridge between Fagali'i and Maloatā villages, northwest coast of Tutuila Island; elevation 110 m. Soil dry with few rocks and moderate leaf litter. Ridge slopes gently, but sides are 30-45°.

Community.—Ridge forest with foothill and lowland rain forest elements; presence of secondary forest species indicates past disturbance. Dominant trees are *Syzygium inophylloides, Canarium samoense,* and *Alphitonia zizyphoides;* canopy trees 15-20 m, not crowded. Ground cover moderate (Table 16).

Plot 14, Alofau Ridge Forest

Site.—Series of eight contiguous 10x10 m subplots along top of Maugaoali'i Ridge southwesterly toward the coast (about 0.8 km distant) northeast of Fagaitua Village and north of Pagai Village, Tutuila Island; elevation 130 m. Ridge sloping gently but sides steep (40-50°); steep 5-m drop-off between subplots 3 and 4. Soil loose and dry, seemingly poor and leached. FWS marker no. 8 next to aluminum tag no. 306 in plot.

Community. —Lowland ridge forest with species not typical of steeper ridges at higher elevations. Open canopy 8-11 m high dominated by *Calophyllum samoense, Syzygium inophylloides,* and *Fagraea berteriana;* saplings scarce, ground cover heavy and dominated by light-requiring ferns *Dicranopteris linearis* and *Davallia solida* (Table 17). Past disturbance of site evidenced by ground cover and presence of cultivated plants, e.g. *Cerbera manghas.*

Plot 15, Au'auli Rain Forest

Site. —A series of five contiguous subplots 10x10 m north of and along road between Ta'ū and Fitiuta villages near Au'auli Cove on north coast of Ta'ū Island, in narrow strip of forest between two streambeds, a road, and a steep coastal cliff; elevation 100 m. Surface uneven, slightly weathered lava with little soil or leaf litter, sloping 10-20° to north. FWS marker no. 15 next to aluminum marker no. 90 at southwest corner of plot.

Community.—Transition between coastal and lowland rain forest, dominated by *Dysoxylum samoense* and *Syzygium inophylloides* (Table 18); canopy 18-23 m high, no stratification of understory. Tree density high, 23/100 m². Moderate ground cover dominated by *Asplenium nidus.* Site shows some signs of disturbance.

Plot 16, Ofu Rain Forest

Site.—A series of 10 contiguous 10x10 m subplots in straight line N 4° E down talus slope at base of coastal cliffs 200 m east and 40 m north of east end of runway of Ofu Airport, south tip of Ofu Island; elevation 50-70 m. Ground covered with large and small rocks from cliff above; soil between rocks loose and coarse-grained. Surface slopes 35-40° toward south.

Community. —Dominant species (Table 19) *Hibiscus tiliaceus, Dysoxylum samoense,* and *Terminalia catappa;* high abundance of *Hibiscus* due to disturbance by rockfalls and landslides. A 15-20 m canopy formed largely of *Dysoxylum, Terminalia,* and *Neonauclea forsteri,* with 3-7 m understory predominately of *Diospyros samoensis, Myristica fatua,* and *Hibiscus.* Saplings few, ground cover light to moderate, dominated by *Asplenium nidus* and an unidentified fern.

Plot 17, Lavania Rain Forest

Site. —Series of 10 contiguous unmarked subplots running down southeast-facing talus slope near trail from Lavania to Li'u Bench, above Lavania Cove on south side of Ta'ū Island; elevation 120 m. Soil loose, very rocky, coarse, with little leaf litter. Terrain sloping 40-50° to southeast.

Community.—Dysoxylum samoense and *Neonauclea forsteri* are dominant trees forming 15-22 m canopy; understory dominated by *Myristica fatua, Pisonia umbellifera,* and *Ficus tinctoria.* Ground cover light, dominated by *Asplenium nidus* (Table 20).

Plot 18, Aigā Rain Forest

Site.—Series of 10 contiguous 10x10 m subplots in two rows of five, beginning about 50 m from shore and running south up the valley in forest at Aigā Bay, east of abandoned village of Aoloau on north coast of Tutuila Island; elevation 5-10 m. Contiguous with Plot 6. Alluvial sand and coral with scattered rocks, light leaf litter. Nearly flat, sloping gently up valley.

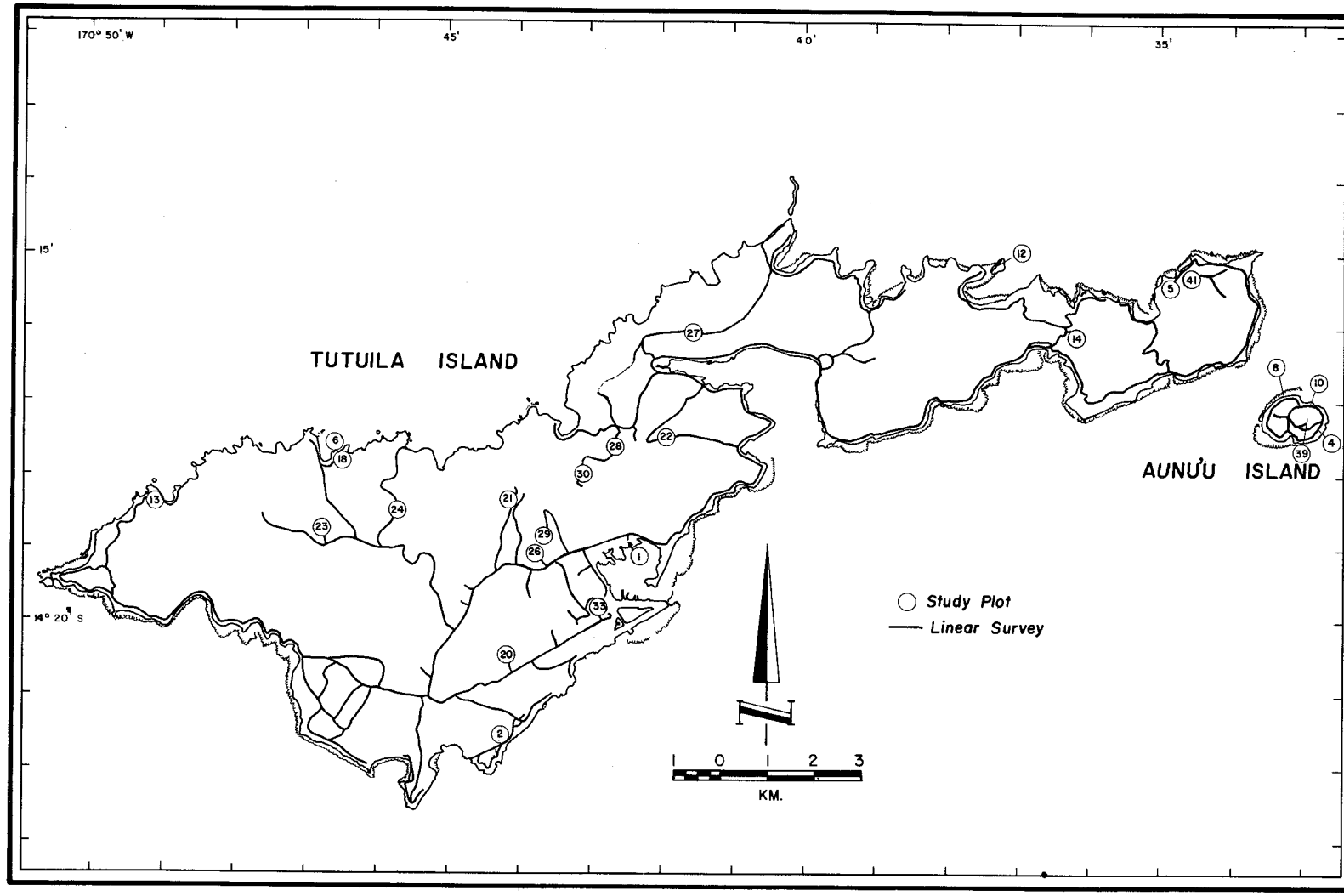

Fig. 7. Locations of community study plots and linear surveys on Tutuila and Aunu'u islands.

Community.—Coastal rain forest dominated by *Dysoxylum samoense* and *D. maota* to 30 m high; understory dominated by *Myristica fatua* and *Barringtonia samoensis.* Ground cover light except in clearings, dominated by *Lomagramma cordipinna* and *Asplenium nidus* (Table 21).

Plot 19, Saua Rain Forest

Site.—A series of 10 contiguous 10x10 m subplots 70 m from and parallel to shore, about 1 km south of end of road at Saua on east coast of Ta'ū Island; elevation 5-10 m. Soil a mixture of sand, coral rubble, and some rocks from nearby steep coastal slope. Terrain flat.

Community.—Open lowland coastal rain forest dominated by *Dysoxylum samoense* 22-26 m high; understory of same species to 22 m high. Low sapling density and light ground cover dominated by *Dysoxylum* seedlings (Table 22).

Plot 20, Tafuna Rain Forest

Site.—Ten subplots 10x10 m in irregular pattern of two rows 10 m apart, running north-south in forest east of Lava Lava Golf Course, northwest of house in clearing at end of dirt road, Tafuna, Tutuila Island; elevation 25 m. Slightly weathered lava with little soil. Terrain level but covered with pits, fissures, and mounds of lava rock.

Community.— *Planchonella torricellensis, Dysoxylum samoense,* and *Pometia pinnata* form a canopy 20-26 m high; understory dominated by *Myristica fatua* and *Cananga odorata* (Table 23). Saplings dense (114/100 m^2), ground cover moderate. Disturbance on margins of small part of remaining forest has increased light in understory.

Plot 21, Malaeimi Rain Forest

Site.—Ten subplots 10x10 m in irregular pattern running N 12-20° W in forest along both sides of intermittent stream at northern end of Malaeimi Valley, Tutuila Island; elevation 100 m. Alluvial soil with many rocks. Terrain flat. Some smooth, bare areas appear to be intermittent streambeds. FWS marker no. 6 located 1.2 m northeast of aluminum tag no. 18 at southeast end of plot.

Community.—Dominant *Dysoxylum samoense* forms canopy 18-26 m high; understory dominated by *Neonauclea forsteri* and *Myristica fatua* up to 16 m high, more than 40% of understory of the latter species. Sapling density light, ground cover abundant and dominated by *Lomagramma cordipinna* (Table 24).

Plot 22, Faga'alu Rain Forest

Site.—Ten subplots of 10x10 m (nine contiguous, one separated by 20-m gap) running east-west along north bank of Matafao Stream in Faga'alu Canyon, about 200 m upstream of the dam of the Vaitanoa pool, Tutuila Island; elevation 130 m. Soil deep, of alluvial deposit and rocks of various sizes. Most of the terrain a gentle (5-10°) slope but edge of plot partly on steeply sloping canyon side. FWS marker no. 12 next to aluminum tag no. 85 at southeast corner of plot.

Community.—Lowland rain forest with riparian elements; no distinct canopy because of stream, sloping canyon sides, and some disturbance. Dominant trees are *Dysoxylum samoense* and *Planchonella torricellensis* to 25 m high, with *Barringtonia samoensis* the riparian element. Most numerous trees are small to medium *Myristica fatua* (Table 25). Sapling and small tree density moderate, ground cover heavy and dominated by *Lomagramma cordipinna.*

Plot 23, Aoloau Rain Forest

Site.—Series of 10 contiguous 10x10 m subplots in two rows running north-south along contour of slope on east facing hillside about 1 km west of Aoloaufou Village, Tutuila Island; elevation 350 m. Soil dark and moist, leaf litter moderate to abundant, scattered rocks. Terrain slopes gently (10-15°) to east. FWS marker no. 2 next to aluminum tag no. 377 at north end of plot.

Community.—Montane rain forest dominated by *Canarium samoense, Myristica hypargyraea, M. fatua,* and *Dysoxylum huntii;* canopy mostly 18-25 m high; understory trees 3-7 m, no distinct stratification. Sapling density moderate; ground cover abundant and dominated by *Loma-gramma cordipinna* (Table 26).

Plot 24, A'asu Rain Forest

Site.—Ten subplots 10x10 m running N 12° E, 50 m east of Aoloaufou-A'asu trail about 1 km north of main road in Aoloaufou, Tutuila Island, on gentle slope on edge of steep-sided canyon leading to A'asu Bay; elevation 350 m. Clay soil with no rocks. Shallow streambed running east-west. Terrain rolling with gentle slope to edge of canyon on the east. FWS marker no. 7 is 2 m southeast of aluminum tag no. 23 at south end of plot.

Community.—Montane rain forest with scattered signs of disturbance. Canopy to 25 m high, dominated by *Buchanania merrillii* and *Dysoxylum huntii,* understory dominated by *Myristica fatua* and *M. hypargyraea* (Table 27). Ground cover heavy and dominated by ground fern, *Lomagramma cordipinna.* Saplings and small trees moderate in number, forest floor relatively open.

Plot 25, Olosega Rain Forest

Site.—No plots; dbh of 100 randomly selected trees estimated, along old trail leading up ridge to summit of Piumafua Mountain on west side of Olosega Island; elevation 350 m. Soil moist, covered with leaf litter, with few rocks; terrain flat but ridge sloping gently.

Community.—Montane rain forest dominated by *Syzygium samoense, Elaeocarpus tonganus,* and *Trichospermum richii* (Table 28), with canopy less than 15 m high. Saplings few, ground cover moderate to heavy.

Plot 26, Tau Ridge Forest

Site.—Six contiguous 10x10 m subplots running N 80° W along east-west ridge on south side of Tau Mountain east of Malaeimi Valley, Tutuila Island, reached from southwest slope of mountain; elevation 130 m. Soil loose, dark, with moderate amount of leaf litter; scattered rocks. Ridge nar-

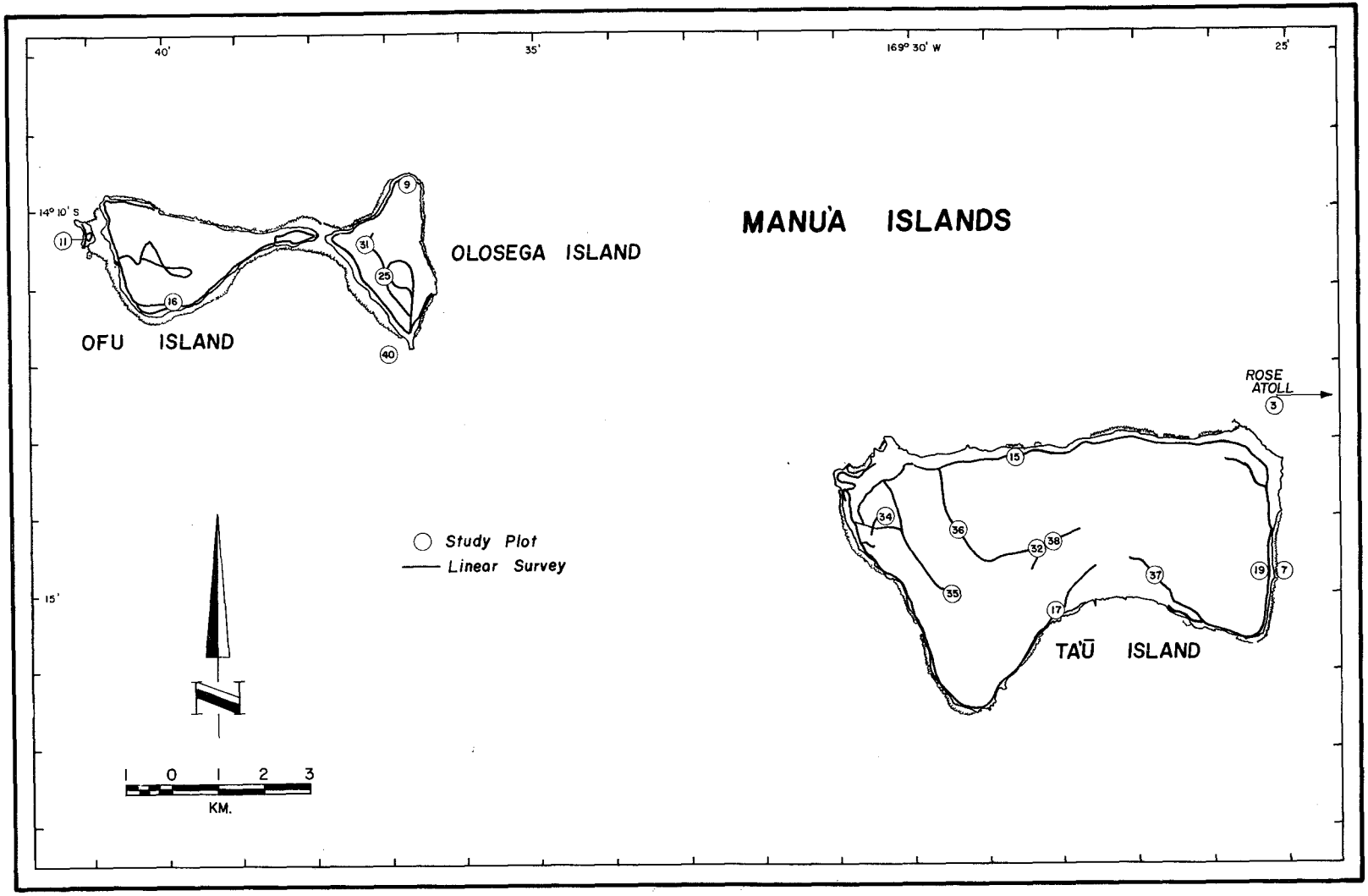

Fig. 8. Locations of community study plots and linear surveys on Ofu, Olosega, and Ta'ū islands.

row, with edges of subplots extending down 28-35° slopes. FWS marker no. 4 next to aluminum tag no. 921 in plot.

Community.—Ridge forest with trees to 20 m high, dominated by *Diospyros obliqua* and *Rhus taitensis;* dense (31 trees/100 m²), with many small and large trees. Ground cover moderate, dominated by *Asplenium nidus* and other ferns (Table 29).

Plot 27, Alava Ridge Forest

Site.—Series of five subplots 10x10 m, two contiguous on north side of trail separated from three contiguous on south by gap of 3 m, running S 63° W about 1 km west of TV transmitter on Alava Ridge, Tutuila Island; elevation 400 m. Plot contains apparent archeological site, but may have been destroyed by road construction in late 1976. Soil loose and dry, with little leaf litter and few rocks; ridge level but narrow, with subplots on sides of ridge at slope of 20-32°.

Community.—Ridge forest dominated by *Dysoxylum huntii, Crossostylis biflora,* and *Syzygium samoense* (Table 30) less than 15 m high with no stratification; trees dense (33/100 m²), sapling density high; ground cover moderate, dominated by *Asplenium nidus.* Plot relatively undisturbed despite trail passing through it.

Plot 28, Matafao Ridge Forest

Site.—Five 10x10 m subplots, three contiguous on east side of trail, two isolated on west side, running N 15° W about 1 km south of pass along trail from Fagasā Pass to Matafao Mountain, Tutuila Island; elevation 350 m. Soil loose and dry with many small rocks and moderate leaf litter. Terrain sloping 30-40° down both sides of ridge. FWS marker no. 11 next to aluminum tag no. 916 in plot.

Community.—Dominated by *Myristica hypargyraea, Alphitonia zizyphoides,* and *Dysoxylum huntii,* but with largest number of tree species of any plot (Table 31); canopy less than 15 m high, no stratification. Tree density (52/100 m²) and sapling density (112/100 m²) very high, ground cover light with dominant species *Lomagramma cordipinna.*

Plot 29, Tau Montane Scrub

Site.—No plot; dbh estimated for 70 randomly selected trees on top of Tau Mountain east of Malaeimi Valley, Tutuila Island; elevation 370 m. Soil light in color, poor in minerals, formed from trachyte. Terrain steep.

Community.—Transition between ridge forest and montane scrub, dominated by *Planchonella linggenensis, Syzygium inophylloides,* and *S. samoense;* open forest less than 12 m high; dominant ground cover *Dicranopteris linearis* (Table 32).

Plot 30, Matafao Montane Scrub

Site.—No plot; dbh estimated for 100 randomly selected trees along trail leading to beacon at summit of Matafao Mountain, Tutuila Island; elevation 500 m. Soil poor, light in color, derived from trachyte. Ridge level but sides steep (more than 50°).

Community.—Montane scrub forest in which biomass of ground cover equals or exceeds that of trees. Dominant trees, scattered and under 5 m high, are *Pandanus reineckei, Rapanea myricifolia, Syzygium brevifolium,* and *Astronidium storckii* (Table 33). Ground cover nearly 100%, up to 1 m high, dominated by *Dipteris conjugata, Dicranopteris linearis,* and *Freycinetia storckii.*

Plot 31, Piumafua Cloud Forest

Site.—No plot; dbh estimated for 71 randomly selected trees along trail near top of ridge just south of summit of Piumafua Mountain, Olosega Island; elevation 530 m. Soil dark, rich, moist, with abundant humus and leaf litter and few rocks. Terrain slopes gently to southeast.

Community.—Cloud forest dominated by *Astronidium pickeringii, Fagraea berteriana,* and *Syzygium samoense;* trees large but less than 13 m high, heavily covered with moss and epiphytes; no stratification. Ground cover moderate, with a number of shrubs (e.g. *Cyrtandra* sp.) present (Table 34).

Plot 32, Lata Cloud Forest

Site.—No plot; point-centered quarter method used to select 100 trees over 250-m stretch of freshly cut trail leading from north edge of Olotania Crater to top of Ta'ū Island, about 0.5-1.0 km from crater; elevation 780 m. Soil clay with few rocks, high in humus, constantly wet. Terrain sloping gently toward northwest. FWS marker no. 14 in plot.

Community.—Disturbed cloud forest dominated by tree ferns, *Syzygium samoense,* and *Weinmannia affinis;* trees heavily covered with mosses and epiphytes; climber *Freycinetia storckii* forming a dense tangle. Ground cover moderate to heavy (Table 35).

Plot 33, Airport Secondary Forest

Site.—Series of 10 contiguous 10x10 m subplots in two rows running N 67° W about 20 m from fence along road to back entrance of airport at Tafuna, Tutuila Island; elevation 10 m. Surface unweathered lava rock with no soil. Terrain flat but with fissures and mounds of rock. FWS marker no. 5 is 15 m west of aluminum tag no. 907, along chain link fence.

Community.—Disturbed lowland rain forest probably originally similar to that at Plot 20, dominated by *Dysoxylum samoense* and *Macaranga harveyana.* Forest probably disturbed 10-40 years ago. No stratification, most trees less than 10 m high. Sapling density high (100/100 m²), ground cover light (Table 36).

Plot 34, Lumā Secondary Forest

Site.—Two lines each with five contiguous subplots 10x10 m running S 70° E and S 81° E, 50-100 m apart, beginning 20-30 m east of north end of runway of Ta'ū Airport, Ta'ū Island; elevation 75 m. Soil dark and wet with high humus content and few rocks. Terrain flat. Many bare muddy areas show extensive damage by pigs. FWS marker no. 13 in plot.

Community.—Secondary forest slowly taking over an old coconut plantation. Dominant species *Cocos nucifera,*

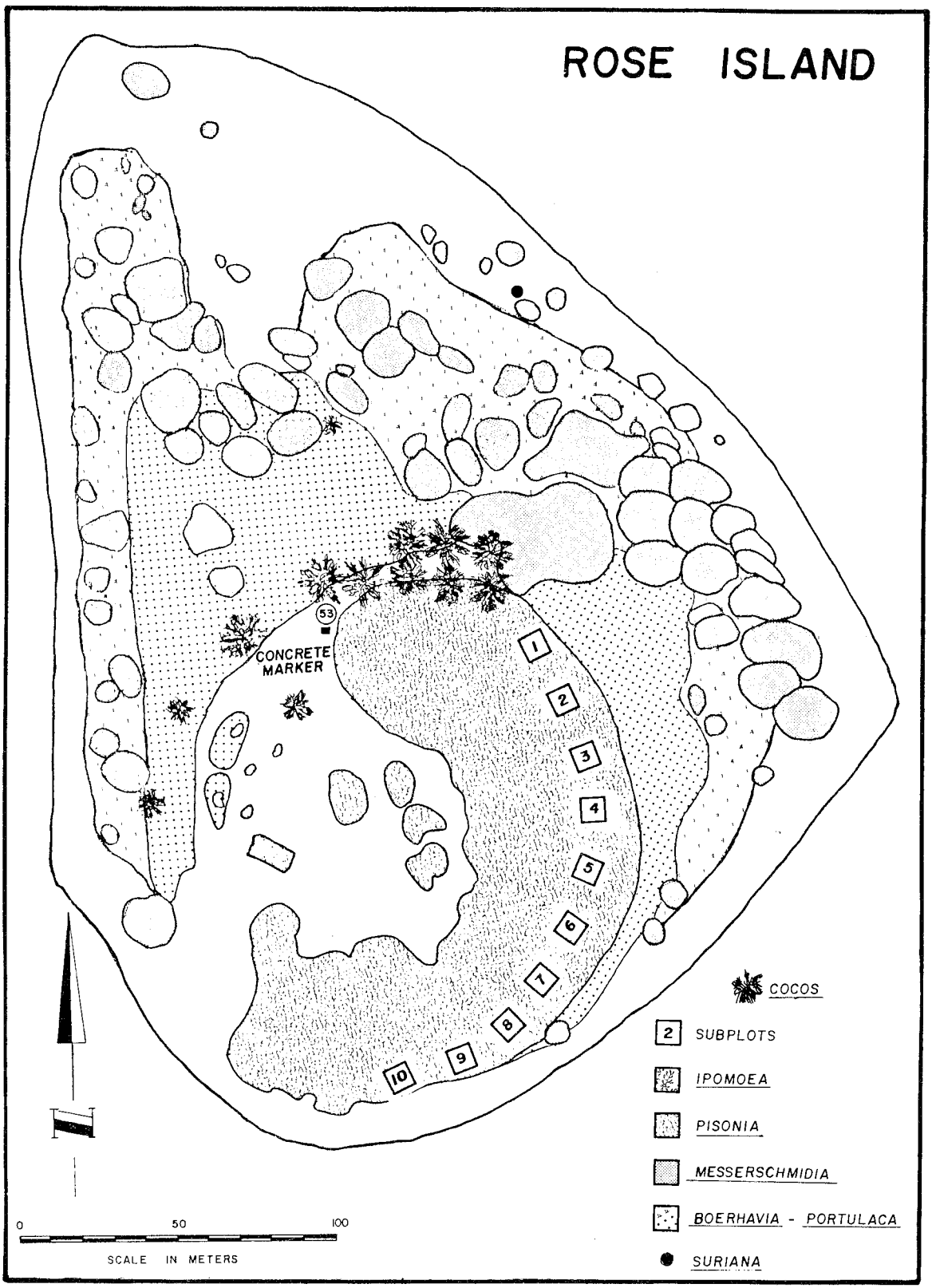

Fig. 9. Rose Island, Rose Atoll, showing community study plot and subplots.

Dysoxylum samoense, and *Neonauclea forsteri.* Tallest trees, to 18 m, are coconut palms; no stratification evident. Ground cover moderate, dominated by weedy species of ferns (Table 37).

Plot 35, Fagamalo Secondary Forest

Site.—Series of 10 contiguous 10x10 m subplots in line due east about 80 m up west-facing slope from old agricultural road on west side of Ta'ū Island, near a streambed; elevation 230 m. Soil fine and deep with few rocks; leaf litter light. Slope moderate, 20-25°. Evidence of damage by pigs. FWS marker no. 18 at northwest corner of plot.

Community.—Forest dominated by tree ferns (*Cyathea* sp.) and secondary forest tree species (Table 38); irregular, with trees to 20 m mixed with smaller trees and ferns and scattered clearings. Probably an abandoned coconut plantation. Ground cover moderate, dominated by ferns, some weedy.

Plot 36, Faleiulu Secondary Forest

Site.—Ten contiguous 10x10 m subplots in rows of seven and three running N 60° W on gently soping ridge about 1.5 km up Faleiulu Stream from main road on north side of Ta'ū Island; elevation 310-320 m. Soil loose with few rocks and a light layer of leaf litter. FWS marker no. 20 in plot.

Community.—Mature forest dominated by *Rhus taitensis* and *Alphitonia zizyphoides* forming even canopy 18-28 m high; understory layer up to 9 m. Ground cover light to moderate, dominated by fern species and *Freycinetia storckii* (Table 39).

Plot 37, Laufuti Secondary Forest

Site.—Ten contiguous 10x10 m subplots in two rows of five perpendicular to and near Laufuti Stream, about 3 km from coast on Laufuti Bench on south side of Ta'ū Island; elevation 340 m. Soil deep and moist with rocks of various sizes on terrain sloping 10-15° to south.

Community.—Mature secondary forest becoming montane rain forest, dominated by *Rhus taitensis* forming even canopy 24-30 m high; understory dominated by *Astronidium pickeringii* showing no stratification; forest with open aspect, perhaps because of shading by canopy. Ground cover light, dominated by various ferns (Table 40).

Plot 38, Olotania Montane Scrub

Site.—Five contiguous 5x5 m subplots (not permanently marked) in east-west line in clearing 100-200 m north of top of steep cliffs on southeast side of Olotania Crater, Ta'ū Island; elevation 830 m. Soil saturated clay with few rocks on flat terrain. Only ground cover measured.

Community.—Dense montane scrub thicket with nearly 100% cover 40-150 cm high, dominated by shrubs, vines, and ferns; dominant species *Blechnum vulcanicum* and *Dicksonia brackenridgei* (Table 41).

Plot 39, Aunu'u Coastal Marsh

Site.—No plot; ten unmarked 2x2 m quadrats 10 m apart along crude trail from south margin of Faimulivai Marsh to edge of main pond in crater on Aunu'u Island; elevation 6 m. Soil saturated with fresh water, much humus.

Community.—Marsh dominated by *Cyclosorus interruptus* and *Eleocharis dulcis* 1.0-1.5 m tall. *Acrostichum aureum* to 3 m high completely dominates edge of pond and eastern half of marsh (Table 42).

Plot 40, Maga Littoral Scrub

Site.—Series of 25 unmarked 2x2 m quadrats 10-20 m apart along trail on steep west-facing slope (45-60°) of Maga Point on south end of Olosega Island; elevation 50-125 m. Soil shallow and loose, lying over volcanic rock which is exposed in many places; little leaf litter.

Community.—Scrub vegetation dominated on parts of slope by *Wedelia biflora* and on other parts by *Scaevola taccada,* all shrubs under 1 m high (Table 43).

Plot 41, Onenoa Kula Fernland

Site.—Ten 2x2 m quadrats, 2 m apart, in north-south line along top of ridge on coastal bluff above and east of main part of Onenoa Village on northeast corner of Tutuila Island; elevation 100 m. Soil dry and poor, with few rocks; terrain flat. An archeological site lies to the south of the plot.

Community.—Fernland dominated by *Dicranopteris linearis* (Table 44) and other nonwoody plants less than 1 m high, with open spots; vegetation type a result of frequent burning and disturbances related to fortifications.

Plants

The following checklist of the vascular plants of American Samoa includes 489 species. It is primarily a list of the native plants found during the survey or reported in the literature. Introduced plants that have become naturalized in undisturbed habitats are included. Exotic weeds, found mainly in open, disturbed areas, were beyond the scope of the project and most are excluded from the list. A few widespread or significant weeds have been included however, partly because the distinction between weeds and naturalized introductions is not always clear. Excluded from the list are ornamental and other cultivated plants such as the yam, taro, and banana. Species erroneously listed from American Samoa in the literature are also excluded.

The list is presented in three sections—Dicotyledonae, Monocotyledonae, and Pteridophyta. In the first two sections, the species are listed alphabetically by and within families; pteridophyte species are listed alphabetically with no other breakdown.

Nomenclature of the flowering plants is taken from earlier reports (e.g. Setchell 1924), monographs of families and genera, annotated specimens in herbaria, and personal communications with botanists specializing in Pacific botany. Little work has been done on Samoan ferns in recent years; nomenclature of the pteridophytes is from Christensen (1943), Yuncker (1945), and other published sources. Recent changes from established taxonomy are indicated where possible. Several species previously considered endemic to

Samoa or to American Samoa are now considered conspecific with more widely ranging species, resulting in nomenclatural changes. Genera that are in taxonomic disarray (e.g., *Pandanus, Premna*) are treated conservatively.

Each account gives the scientific name and authority for the species, followed by the Samoan name, if any. Samoan names recorded only once and those questionably ascribed to a particular species are queried. Names recorded only from Western Samoa or a particular island of American Samoa are so indicated. The few English names available for Samoan plants are noted in the text. Each account notes the life form, abundance, habitat, and distribution of the species. All species are native or indigenous to American Samoa unless otherwise indicated; endemic species are further noted. Finally, specimen numbers are given for those documentary specimens collected in the survey. Numbers listed with "J" were taken by John Kuruc and those listed with "W" by W. Arthur Whistler.

Nearly all of the previously recorded flowering plant species were found during this survey. In addition, 33 tree species are new records for the islands. There are 11 flowering plant species endemic to American Samoa and 68 endemic to the Samoan Archipelago. Despite the presence of many introduced species in American Samoa, nearly 93% of the plants found in undisturbed habitats are native species. Although many habitats appear to be disturbed, the dominance of the native species indicates that relatively little damage has been done to the plant communities by the introduced species except in continuously disturbed areas.

DICOTYLEDONAE

Aizoaceae

Sesuvium portulacastrum (L.) L.: A prostrate succulent herb, common on coastal rocks; widespread in the Pacific. W 3223.

Amaranthaceae

Achyranthes aspera L. Lau tamatama: A small shrub, widespread in coastal areas but nowhere common. Probably an aboriginal introduction, pantropical in distribution. W 3221, 3442.

Achyranthes velutina H. and A.: A small shrub, rare in coastal areas of Swains Island where probably an aboriginal introduction; also found on other South Pacific islands. W 3420.

Anacardiaceae

Buchanania merrillii Chr.: A large tree, occasional in the montane forest. Endemic to Samoa. W 2691, 2962.

Rhus taitensis Guill. Tavai: A tall tree, common in mature secondary forests, often the dominant species. A widespread Pacific species. W 2734.

Spondias dulcis Park. Vī: A medium to tall tree cultivated for its edible fruit, the "vī apple." It is an aboriginal introduction sometimes found in secondary forests and old plantations, but apparently not naturalized. W 3540, 3684.

Annonaceae

Cananga odorata (Lmk.) Hook. f. & Thoms. Moso'oi: A tall tree, common in secondary forests. The "ylang-ylang" tree is an aboriginal introduction with fragrant flowers used for making leis. Native to southern Asia, it is widely cultivated in tropical countries. W 3119.

Apocynaceae

Alstonia godeffroyi Rein.: A small to medium-sized tree, common in the montane scrub and ridge forest. Endemic to Samoa. *A. setchellii* Chr. is probably a synonym. W 2707, 2715.

Alyxia bracteolosa Rich. Lau maile: A woody vine, common in the lowland to montane forest. Endemic to Samoa. W 2771, 2907A, 2982, 3109.

Alyxia stellata (Forst. f.) R.&S. Gau: A vine or scandent shrub, occasional from the lowland to montane forest. Widespread in the South Pacific islands. W 2889, 3070, 3769, 3783.

Cerbera manghas L. Leva: A small to medium-sized tree, occasional in the littoral forest and sometimes found in secondary forests, where probably a remnant of cultivation. Widespread from tropical Asia to eastern Polynesia. W 2835.

Ervatamia obtusiuscula Markgraf. Puluvao: A small tree, uncommon in the lowland forest; widespread in Polynesia. W 3453.

Neiosperma oppositifolia (Lmk.) Fos. & Sachet. Fao; pulufao: A medium-sized tree, occasional in the coastal and littoral forest. It is found in American Samoa only on Swains Island, but is widespread elsewhere in the Pacific. W 3424.

Araliaceae

Meryta macrophylla (Rich) Seem. Fagufagu: A small tree, occasional from the coastal to cloud forest; found also in Tonga. Included with this species is *M. capitata* Chr., which is not sufficiently different to be considered a separate species. W 2718, 3002, 3204.

Polyscias samoensis (A. Gray) Harms. Afia: A small tree, common from the lowland to montane forest. Endemic to Samoa. W 2722, 2799.

Reynoldsia lanutoensis Hochr. Vivao (Western Samoa): A large tree, common in the cloud forest of Ta'ū. Endemic to Samoa; found only on Ta'ū and in the montane forest of Upolu. This is the same as *R. tauensis* A. C. Smith, which does not differ sufficiently to be considered a separate species. W 3184.

Aristolochia cortinata Rein. Fue sā (?): A woody climber, uncommon from the lowland to montane forest. Endemic to Samoa. W 2869.

Asclepiadaceae

Hoya australis R. Br. Fue sele lā; suni: A climbing vine, common in the littoral and coastal forest, uncommon at higher elevations. Widespread in the South Pacific from the New Hebrides and Australia eastward. W 2833.

Hoya betchei (Schltr.) Whistler: A climbing vine, occasional in sunny forest areas. Endemic to Samoa. Previously called *Physotelma betchei* Schltr. A purple-flowered variety on Tutuila has been described as var. *tutuilensis* Chr. (of *H. chlorantha* Rech., a synonym). The specimens from Olosega and Ta'ū differ somewhat from those from other islands (Whistler 1978). W 2765, 3110, 3139.

Hoya pottsii Traill.: A palmately-veined climbing vine of the lowland to montane forest. Widespread from Southeast Asia to Polynesia. W 3602.

Boraginaceae

Cordia aspera Forst. f. Tou (?): A small tree, rare in sunny forest areas; found also in Fiji and Tonga. W 3112, 3113.

Cordia subcordata Lmk. Tauanave: A small to medium-sized tree, occasional in the littoral forest. Widespread from tropical Asia to eastern Polynesia. W 2808, 3406.

Messerschmidia argentea (L. f.) Johnston. Tausuni: A silvery-leafed tree, common in the littoral forest. Widespread from tropical Asia eastward to the Tuamotus. Also known as *Tournefortia argentea* L. f. J 100; W 3214, 3392.

Burseraceae

Canarium harveyi Seem. Mafoa (?): A medium-sized tree, uncommon in the rain forest. Found also in Fiji, Tonga, and Niue. W 2693, 2873, 3813.

Canarium samoense Eng. Ma'ali: A tall tree, common to abundant in primary forest; found also in Tonga. The sap of this tree was formerly used to scent coconut oil. W 2939, 3123.

Garuga floribunda Decne. Vīvao (American Samoa); magaui (Western Samoa): A large tree, occasional in the coastal forest. Found from Java and the Philippines eastward to western Polynesia. W 3116, 3771.

Capparidaceae

Capparis cordifolia Lmk.: A prostrate shrub with large showy flowers, occasional on coastal rocks in Manu'a. Widespread in the Pacific. W 3222, 3315.

Crataeva religiosa Forst. f.: A medium-sized tree, rare in the coastal forest. Collected only once in American Samoa, but widespread in the Pacific.

Caricaeae

Carica papaya L. Esi: A small tree, cultivated and commonly escaping in early secondary vegetation and disturbed areas. The "papaya" is a tropical American species now widespread in the Pacific.

Celastraceae

Gymnosporia vitiensis (A. Gray) Seem.: A small tree, rare in the ridge forest; widespread in the Pacific from Fiji to the Marquesas.

Chloranthaceae

Ascarina diffusa A. C. Smith. Afia: A small tree, common in the cloud forest of Ta'ū; found also in Fiji. W 3190.

Combretaceae

Terminalia catappa L. Talie: A large tree, common in the littoral and coastal forest. The "tropical almond" is widespread from Southeast Asia to eastern Polynesia. W 3498, 3751.

Terminalia richii A. Gray. Mālili: A very large tree, uncommon in the rain forest; found also on Fiji and Niue. W 2955.

Terminalia samoensis Rech. Talie: A medium-sized tree of the littoral forest, rare in American Samoa. Indigenous to Samoa; widespread in Micronesia and as far west as the Celebes. W 2954.

Compositae

Blumea milnei Seem.: A rare herb of the forest, collected only once in American Samoa, on Olosega in 1894. It may be extirpated from Samoa, possibly unable to compete with introduced weeds. Widespread in Melanesia.

Mikania micrantha H. B. K. Fue saina: An abundant herbaceous vine of disturbed places. The "mile-a-minute weed" is the most common weed in Samoa. It was introduced to Samoa before 1920 and is native to tropical America. W 3461.

Wedelia biflora (L.) DC. Ateate: A shrub, common to abundant in the littoral scrub vegetation. Widespread from tropical Asia to eastern Polynesia. W 2915.

Connaraceae

Santaloides samoense (Laut.) Schell.: A woody climber, occasional in the forest. Found also in Fiji and Tonga. Also known as *Rouria minor* (Gaertn.) Leenh. W 2883.

Convolvulaceae

Ipomoea littoralis Bl.: A small creeping vine, occasional in sunny coastal or disturbed areas, widespread in the Pacific.

Ipomoea macrantha R. & S.: A climbing or prostrate vine, occasional in the littoral forest and on sandy beaches; widespread in the tropics. W 2910, 3213, 3393; J 102.

Ipomoea pes-caprae (L.) Roth. Fue moa; fue tai: A creeping vine, common on coastal rocks and sandy beaches. The "beach morning-glory" is pantropical in distribution. W 3145.

Merremia peltata (L.) Merr.: A climbing herbaceous vine, uncommon in disturbed areas and secondary forest. Possibly a recent introduction from Western Samoa,

where it is very common. Widespread from Mauritius to eastern Polynesia. W 3118A.

Cucurbitaceae

Melothria grayana Cogn.: A prostrate or climbing herbaceous vine, occasional in sunny forest areas. Found also in Fiji. W 2958, 3016, 3678.

Melothria samoensis A. Gray: A prostrate or climbing herbaceous vine, occasional in the littoral and lowland forest. Found also in Tonga and Niue. W 2908; J 47.

Cunoniaceae

Spiraeanthemum samoense A. Gray: A medium-sized tree, common in the montane scrub. Endemic to Samoa. W 3838.

Weinmannia affinis A. Gray: A small to medium-sized tree, common to abundant in the cloud forest and montane scrub. Found also in Fiji. W 3094, 3589.

Ebenaceae

Diospyros elliptica (J. R. & G. Forst.) P. S. Green. 'Anume: A medium-sized tree, occasional in the coastal and lowland forest. Found also in Fiji, Tonga, the Wallis Islands, and Niue. W 2881, 2917, 3620.

Diospyros samoensis A. Gray. 'Au'auli: A medium-sized tree, common from the coastal to montane forest. Also found in Fiji, Tonga, the Wallis Islands, and Niue. W 2882, 2988, 3219.

Elaeocarpaceae

Elaeocarpus tonganus Burkill. A'amati'e: A medium-sized tree, occasional from the lowland to montane forest. Found also in Tonga and Niue. W 3632.

Elaeocarpus ulianus Chr.: A medium-sized to large tree, occasional in the foothill and montane forest. Endemic to Samoa. W 2794, 3603.

Euphorbiaceae

Acalypha grandis Benth.: A purple-leafed shrub, uncommon in coastal areas. An aboriginal introduction or possibly native to Samoa, found also from Malaysia to Fiji. W 3149, 3489.

Aleurites moluccana (L.) Willd. Lama: A medium-sized tree, occasional in secondary forest. The "candlenut" is not truly naturalized, but rather is a remnant of cultivation. It is widespread from Southeast Asia to Polynesia. J 91.

Antidesma sphaerocarpum M.-A.: A small tree, occasional in the lowland to montane forest. Found also in the Horne Islands. W 2800, 2941.

Baccaurea taitensis M.-A.: A small tree, common in the ridge forest and montane scrub. It may be endemic to Samoa, since there is only one specimen of it from elsewhere (Tahiti, taken by the USEE, which is known to have made numerous errors in specimen labels and data). W 2701, 2747, 2956A, 3541.

Bischofia javanica Bl. 'O'a: A medium-sized to large tree, occasional in secondary forest. An aboriginal introduction to Samoa, or possibly indigenous; widespread from India to Polynesia. The bark of this tree is used to make a brown dye for coloring tapa cloth. W 3067.

Drypetes sp.: A small to medium-sized tree, rare in the ridge forest on Tau Mountain, Tutuila. The genus is not otherwise known from Samoa and this may be an undescribed species.

Euphorbia atoto Forst. f.: An herb, occasional on beaches and sandy village areas. Widespread from India and the Philippines to eastern Polynesia. J 30.

Euphorbia reineckei Pax: A tall herb, rare in sunny areas in the forest. Endemic to Samoa; occasional in the mountains of Savai'i and Upolu, but rare on Tutuila where it has been collected only once. W 3673.

Glochidion cuspidatum Pax. Masame vao: A small to medium-sized tree, uncommon in disturbed places and secondary forest in the foothills and mountains. Occurs from Malaysia to Samoa, but not found in Fiji, Tonga, or Niue. The variety in Samoa is var. *samoanum* (M.-A.) Pax. W 2743.

Glochidion ramiflorum J. R. & G. Forst. Masame: A small to medium-sized tree, occasional in secondary forest and disturbed areas. Widespread from the New Hebrides to eastern Polynesia. The variety in Samoa is var. *samoanum* (M.-A.) Pax. W 2809, 3741.

Homalanthus nutans (J. R. & G. Forst.) Pax. Fogāmamala; fanuamamala: A small tree, uncommon in disturbed areas. Widespread from New Caledonia to the Society Islands. W 2862.

Macaranga harveyana M.-A. Laupata; pata: A small to medium-sized tree, common in disturbed areas and secondary forest at low elevations. Found also from Fiji eastward to Tahiti. W 3035, 3500.

Macaranga stipulosa M.-A. Patafatu; pata: A medium-sized tree, occasional in secondary forest of the foothills and mountains. Endemic to Samoa. W 2733.

Phyllanthus simplex Retz.: A weedy herb, rare in disturbed or otherwise sunny areas. Indigenous or an aboriginal introduction to Samoa, also found from Fiji to eastern Polynesia.

Securinega samoana Croiz. Poumuli: A medium-sized tree, commonly cultivated and occasionally escaping. Poumuli is not often found in undisturbed areas, although it does exist in mature forest in Savai'i, Western Samoa. This tree was first collected in Samoa in 1921 but the name "poumuli" was not on any earlier list of Samoan plant names. It is also found in the Solomon Islands and was probably introduced to Samoa from there by indentured

Melanesian laborers between 1905 and 1921. Poumuli is used for house posts and is commonly planted in rows along roads. W 3630.

Flacourtiaceae

Casearia sp.: A small tree, occasional in the lowland to montane forest. Identified by Setchell as *C. disticha* A. Gray, a Fijian species, but the undescribed Samoan species has much larger leaves. Endemic to Tutuila. W 2723; J 122.

Erythrospermum acuminatissimum (A. Gray) A. C. Smith: A small to medium-sized tree, uncommon in the ridge forest. Found also in Fiji. W 2892.

Flacourtia rukam Zoll. and Mor. Filimoto: A medium-sized tree, occasional in secondary forest. Indigenous or possibly an aboriginal introduction to Samoa; widespread from Malaysia to western Polynesia. W 3114, 3633.

Homalium whitmeeanum St. John: A small to medium-sized tree, rare in the montane and ridge forest. Endemic to Samoa. W 2976.

Gesneriaceae

Cyrtandra geminata Rein.: A shrub, uncommon in the montane scrub; endemic to Tutuila. W 3669.

Cyrtandra longipedunculata Rech.: A shrub, uncommon in the montane forest. Endemic to Samoa. W 3085, 3086.

Cyrtandra pulchella A. Gray: A shrub, occasional in the montane forest. Endemic to Samoa. W 2709, 3191.

Cyrtandra samoensis A. Gray. Mōmōle'a (?): A shrub, occasional in sunny coastal and inland areas. Indigenous to Samoa, Tonga, and Niue. *C. beckmannii* Rein., known only from the type collection (now lost) from Matafao Stream, is probably a synonym for this species. W 2859, 2878, 3118, 3452.

Cyrtandra sp.: An unbranched shrub, occasional in the montane forest. It is similar to *C. pogonantha* A. Gray of Western Samoa, but instead of having a single cyathiform bract, it has several sheathing bracts per inflorescense. Endemic to Tutuila. W 2731.

Cyrtandra sp.: An unbranched shrub, occasional in the montane forest. It is similar to the above species and to *C. richii* A. Gray of Western Samoa, but lacks conspicuous bracts. Endemic to Manu'a. W 3087, 3473.

Goodeniaceae

Scaevola taccada (Gaertn.) Roxb. To'ito'i: A shrub, abundant to dominant in littoral scrub areas. Widespread in the Pacific from India to eastern Polynesia and Hawaii. W 2854, 3389.

Guttiferae

Calophyllum inophyllum L. Fetau: A medium-sized to large tree, common in the littoral and coastal forest. Widespread from tropical Africa to eastern Polynesia. W 2832, 3407.

Calophyllum samoense Chr. Tamanu: A large tree, occasional from the lowland to montane forest. Found also in Fiji and the Horne Islands. W 2938.

Garcinia vitiensis A. C. Smith: A medium-sized tree, occasional in the montane and cloud forest. Found also in Fiji and the New Hebrides. W 2986, 3175, 3807.

Mammea glauca (Merr.) Kost. Manapau: A medium-sized tree, uncommon in the foothill and ridge forest; endemic to Samoa. W 2764, 3836.

Hernandiaceae

Gyrocarpus americanus Jacq. Vili; pe'ape'a (Ofu): A medium-sized tree, rare in the littoral forest. Pantropical in distribution.

Hernandia moerenhoutiana Guill. Pipi: A medium-sized tree, occasional in the montane forest. Found from Samoa eastward to Melanesia. W 2964, 3124.

Hernandia sonora L. Pu'a: A medium-sized tree, common to abundant in the littoral forest. Widespread in the Pacific. W 2946, 3395.

Icacinaceae

Citronella samoensis (A. Gray) Howard: A small tree, occasional in the lowland to montane forest. Found also in Tonga. W 2702, 2865.

Medusanthera samoensis (Rein.) Howard. Matamō: A small to medium-sized tree, uncommon in the montane forest. Endemic to Samoa. W 2961, 3028, 3700.

Labiatae

Leucas flaccida R. Br. Ogoogo sina (?): A small, white-flowered herb, rare on coastal rocks. Widespread from tropical Asia to western Polynesia. W 3831.

Lauraceae

Cassythia filiformis L. Fetai (Swains): A leafless parasitic vine, uncommon in sunny coastal areas. It is common on Swains Island, but elsewhere in American Samoa is limited to a single rocky islet on Ofu. Pantropical in distribution. W 3047, 3367.

Endiandra elaeocarpa Gill.: A medium-sized tree, occasional in the montane forest of Ta'ū. Found also in Fiji and Tonga. W 3560.

Litsea samoensis (Chr.) A. C. Smith. Papaono: A medium-sized tree, rare in the montane and ridge forest. Endemic to Samoa. W 2782.

Lecythidaceae

Barringtonia asiatica (L.) Kurz. Futu: A large tree, abundant in the coastal and littoral forest; widespread from Madagascar to eastern Polynesia. The fruit is used to make a fish poison. W 2913, 3423.

Barringtonia samoensis A. Gray. Falagā: A small to medium-sized tree, common along streams and occa-

sional in the coastal and ridge forest. Widespread from the Celebes to Samoa and Micronesia. W 2863, 3577.

Leguminosae

Abrus precatorius L. Matamoso: A woody vine, occasional in the coastal forest and thickets near the coast. The pantropical "crab's-eye vine" was introduced to Samoa. W 2952.

Adenanthera pavonina L. Lopā: A medium-sized tree, uncommon in secondary forest and not truly naturalized, but cultivated for its edible seeds. Introduced to Samoa, an Indian species pantropical in cultivation. W 3886, 3738.

Caesalpinia bonduc (L.) Rox. emend. Dandy & Exell. 'Anaoso: A thorny scandent shrub or vine, uncommon in coastal areas; pantropical. W 2814, 3767.

Caesalpinia major (Medic.) Dandy & Excell. 'Anaoso: A thorny climber, uncommon from the coastal to montane forest; pantropical.

Canavalia cathartica Thou.: A climbing vine, uncommon in the coastal and lowland forest. Probably a recent introduction to Samoa; widespread from tropical Asia to Polynesia. W 3003.

Canavalia rosea (Sw.) DC.: A prostrate vine, occasional on rocky and sandy beaches. Widespread in the tropics. W 3144.

Canavalia sericea A. Gray: An herbaceous vine, prostrate or climbing over low vegetation, common in the littoral scrub on Olosega; found elsewhere from Fiji to eastern Polynesia. W 3058.

Cassia alata L. La'au fai lafa: A large shrub, occasional in wet disturbed areas, but not naturalized. Introduced to Samoa and used in making a medicine for ringworm. Widespread in cultivation in the tropics. W 2837.

Derris trifoliata Lour. Fue'o'ona: A high-climbing woody vine, uncommon in the coastal forest. Widespread from tropical Africa to western Polynesia.

Desmodium umbellatum DC. Lala: A large shrub, common on the beach and in rocky coastal areas. Widespread from tropical Asia to Polynesia. W 2855.

Entada phaseoloides (L.) Merr. Fue'inu (the vine); tupe, tifa (the seed): A high-climbing woody vine, occasional from the lowland to montane forest. Widespread from tropical Africa to western Polynesia. W 3624, 3746.

Erythrina fusca Lour. Lalapa: A thorny medium-sized to large tree, rare in the mangrove forest and other coastal or swampy areas. Widespread from India to Polynesia.

Inocarpus fagifer (Park.) Fosb. Ifi: A large tree, common from the margins of the mangrove forest to the lowland and foothill forest. The "Tahitian chestnut" is cultivated for its large edible seed. It is usually found in disturbed forest areas, although it persists in old secondary forest and is semi-naturalized. An aboriginal introduction, it is widespread from tropical Asia to Polynesia. J 89.

Intsia bijuga (Cole.) O. K. Ifilele: A large tree, uncommon in the coastal forest although it is abundant in one locality. It has quality wood which is used to make products such as kava bowls. Widespread from Madagascar to western Polynesia.

Leucaena leucocephala (Lmk.) DeWit. Lopā Samoa; fua pepe: A small tree, common in disturbed areas near the coast. Introduced to Samoa, and widely planted and naturalized in the tropics. W 3792.

Mucuna gigantea (Willd.) DC. Tupe (the seeds): A high-climbing woody vine, occasional in the coastal and lowland forest. Widespread from India to Polynesia. W 2884.

Mucuna platyphylla A. Gray. Fue'inu; tupe (the seeds): A high-climbing woody vine, uncommon in the montane forest. Found from Fiji to eastern Polynesia.

Pongamia pinnata (L.) Merr.: A medium-sized tree, rare in the littoral and coastal forest. Collected only once in Samoa, on Tutuila in 1920. Widespread from the Seychelles Islands to western Polynesia.

Sophora tomentosa L. Lala tai (?): An uncommon shrub which is, however, locally abundant in several sandy coastal areas. Pantropical. W 3048, 3531.

Tephrosia piscatoria Pers. 'Avasā: A small shrub, uncommon in sunny coastal areas and disturbed habitats. This plant was formerly used as a fish poison. Indigenous or possibly an aboriginal introduction to Samoa, it is widespread from tropical Africa to eastern Polynesia.

Vigna marina (Burm.) Merr. Fue sina: An herbaceous vine, common on sandy beaches or climbing over low coastal shrubs. Pantropical. W 3143, 3426.

Loganiaceae

Fagraea berteriana A. Gray. Puālulu; pua vao (Ta'ū): A medium-sized tree, occasional from the lowland to montane forest and sunny disturbed areas, often having a "strangler" habit. Widespread from New Caledonia to eastern Polynesia. W 2804.

Geniostoma samoense Rein. Laufatifati; taipoipo (Western Samoa): A small tree, occasional from the coastal to montane forest. Found also in the Wallis Islands. W 2766, 2940, 2997, 3645.

Loranthaceae

Amylotheca insularum (A. Gray) Danser. Tapuna: A parasitic shrub, occasional on trees from the lowland to montane forest; found also from Fiji to the Cook Islands. W 2783.

Korthasella horneana (V. Tieg.) Eng.: A parasitic shrub, occasional on trees in the montane forest of south Ta'ū. Widespread in the Pacific. W 3597; J 14.

Lythraceae

Pemphis acidula J. R. & G. Forst. Gigie (Swains): A shrub, occasional in sunny coastal areas on Swains Island. Also found on Savai'i, and widespread from tropical Africa to eastern Polynesia. W 3354.

Melastomataceae

Astronidium pickeringii (A. Gray) Chr.: A small to medium-sized tree, common to abundant in the montane scrub and cloud forest. Endemic to Samoa. W 2748, 3096, 3697, 3734, 3821.

Astronidium samoense (S. Moore) Markgraf: A small to medium-sized tree, common in montane scrub. Endemic to Samoa. W 2712, 2977, 3840.

Clidemia hirta (L.) D. Don: A noxious weedy shrub, common to abundant in disturbed sunny places. "Koster's curse" is a recent introduction to Samoa and is widespread in the tropics.

Melastoma denticulatum Labill. Fualole: A shrub, occasional in sunny disturbed areas away from the coast; widespread from New Caledonia to eastern Polynesia. W 2927, 3006.

Medinilla samoensis (Hochr.) Chr.: A woody climbing vine, occasional in the montane forest. Found also in Futuna. W 2779.

Meliaceae

Aglaia samoensis A. Gray. Laga'ali: A small tree, common from the lowland to montane forest. Endemic to Samoa. W 2870, 3027, 3797.

Dysoxylum huntii Merr. Maotamea: A large tree, common to abundant in montane, ridge, and cloud forest. Endemic to Samoa. W 2763, 2776, 3093, 3725.

Dysoxylum maota Rein. Maota: A large tree, occasional in the lowland forest. Endemic to Samoa. In the vegetative state it is difficult to distinguish this tree from the more common *D. samoense*. W 3536; J 105.

Dysoxylum samoense A. Gray. Tufaso; mamala; maota: A large tree, abundant in the lowland forest; replaced at higher elevations by *D. huntii*. Found also in the Wallis and Horne islands. W 2843, 3499.

Xylocarpus moluccensis (Lmk.) Roem. Le'ile'i: A medium-sized tree, rare in the mangrove forest. The "puzzle-nut tree" is widespread from India to Polynesia. W 2810, 2811.

Monimiaceae

Hedycarya denticulata (A. Gray) Perk. & Gilg. Fatimatao (?): A small tree, common in the lowland to montane forest. Found also in Tonga. W 2736, 3034.

Moraceae

Artocarpus altitis (Park.) Fosb. 'Ulu: A medium-sized to large tree, commonly cultivated and rarely persisting in old secondary forest. The "breadfruit tree" is an aboriginal introduction and is widespread in the Pacific. W 3434.

Ficus godeffroyi Warb. Mati: A small to medium-sized tree, occasional in the montane and cloud forest. Endemic to Samoa. W 2726, 3194, 3602, 3823.

Ficus obliqua Forst. f. Āoa: A huge banyan tree beginning as a "strangler," occasional from the lowland to montane forest. Widespread from New Caledonia and Australia eastward to Samoa. W 2923, 3495, 3742.

Ficus prolixa Forst. f. Āoa: A huge banyan tree beginning as a "strangler," occasional from the lowland to montane forest. Widespread from New Caledonia to eastern Polynesia. W 3671.

Ficus scabra Forst f. Mati; mati sosolo (?): A shrub or small tree, common in the littoral scrub and littoral forest, occasional in the lowland forest. Occurs westward to New Caledonia. W 2914, 2998, 3061.

Ficus tinctoria Forst f. Mati; mati'ata (?): A small tree, occasional in the coastal and lowland forest. Widespread from tropical Asia to eastern Polynesia. W 2856, 2857.

Ficus uniauriculata Warb.: A medium-sized tree, uncommon in the foothill and montane forest. Endemic to Samoa. W 2879.

Streblus anthropophagorum (Seem.) Corner: A small to medium-sized tree, common in the cloud forest. Indigenous to Samoa and Fiji. W 3186, 3737; J 8.

Myristicaceae

Myristica fatua Houtt. 'Atone: A medium-sized tree, abundant from the coastal to montane forest. This "Samoan nutmeg" ranges westward to the New Hebrides. W 2721, 2872.

Myristica hypargyraea A. Gray. 'Atone: A medium-sized tree, common from the foothill to montane forest. This "Samoan nutmeg" ranges northward to Micronesia. W 2744.

Myrsinaceae

Embelia vaupelii Mez: A woody vine, uncommon from the lowland to montane forest. Found also in Tonga.

Maesa tongensis Mez. Lalamelo (?); lalavao (?): A shrub or small tree, occasional from the coastal to montane forest. Found also in Fiji and Tonga. W 2762, 2887, 3009, 3105.

Rapanea myricifolia (A. Gray) Mez. Saitamu (?): A small tree, common in the montane scrub. Found also in Fiji. W 3851.

Myrtaceae

Decaspermum fruticosum J. R. & G. Forst. Nu'anu'a: A shrub, occasional in the montane forest and scrub; widespread from tropical Asia to western Polynesia. W 3000, 3660, 3822.

Eugenia reinwardtiana (Bl.) DC.: A shrub or small tree, rare in the coastal forest. Found also from Fiji to eastern Polynesia. W 3353, 3770.

Metrosideros collina (J. R. & G. Forst.) A. Gray: A small to large tree, occasional in the ridge forest and montane scrub. Widespread in Polynesia. W 3662.

Psidium guajava L. Kuava: A small tree, occasional in disturbed areas. Introduced to Samoa; indigenous to tropical America and now pantropical in cultivation. W 3147.

Syzygium brevifolium (A. Gray) C. Muell.: A small to medium-sized tree, occasional in the montane scrub. Endemic to Samoa. W 3850.

Syzygium carolinense (Koidz.) Hosokawa: A small to medium-sized tree, uncommon in the ridge and montane forest. Also found in Micronesia. Previously known as *S. ponapense*. W 2780, 2796A, 3543, 3651.

Syzygium clusiaefolium (A. Gray) C. Muell. Asi vai: A medium-sized tree, common in the coastal forest. Found also in Tonga and the Wallis and Horne islands. W 3492, 3679, 3755, 3779.

Syzygium corynocarpum (A. Gray) C. Muell. Seasea: A small tree, uncommon in plantations and disturbed forest near villages. Probably an aboriginal introduction to Samoa, not naturalized; found also in Fiji, Tonga, and the Horne Islands. J 88.

Syzygium dealatum (Burk.) A. C. Smith. Asi vai (?): A medium-sized tree, occasional in the coastal forest. Found also in Tonga, Niue, and the Wallis and Horne islands. W 2886, 3680, 3750, 3780.

Syzygium inophylloides (A. Gray) C. Muell. Asi: A large tree, common from the coastal to montane forest. Found also in Niue and the Horne Islands. W 2802.

Syzygium malaccense (L.) Merr. & Perry. Nono fi'afi'a: A medium-sized tree, occasional in plantations and sometimes persisting, but not naturalized. The "mountain apple," cultivated for its edible fruit, is an aboriginal introduction to Samoa and is widespread from tropical Asia to eastern Polynesia.

Syzygium neurocalyx (A. Gray) Chr. Fena: A small tree or shrub, rare in plantations, possibly naturalized in Upolu. Probably an aboriginal introduction (originally endemic to Fiji?) which is no longer cultivated; also found in Fiji, Tonga, and the Horne Islands.

Syzygium samarangense (Bl.) Merr. & Perry. Nonu vao (?): A small to medium-sized tree, occasional from the lowland to cloud forest. Found also in Fiji, Tonga, Niue, the Horne Islands, and elsewhere. It may be a recent introduction; it was not collected in Samoa until 1931, but now it is fairly common and occurs on all the high islands of Samoa. J 107; W 2871, 3156, 3210.

Syzygium samoense (Burk.) Whistler. Fena vao (?): A medium-sized tree, common in the montane and cloud forest. Endemic to Samoa. Previously called *Eugenia samoense* Burk. (Whistler 1978). W 2688, 2749, 2957, 3731.

Nyctaginaceae

Boerhavia diffusa L. Ufi'atuli (?): A prostrate herb, occasional in sandy coastal areas, often somewhat weedy. Pantropical.

Boerhavia tetrandra J. R. & G. Forst. Nuna (Swains): A prostrate herb, common in sandy coastal areas of atolls. Widespread from Micronesia to eastern Polynesia. J 83; W 3382.

Pisonia grandis R. Br. Pu'avai: A medium-sized to large tree, common in the littoral forest and dominant on Rose Island. Widespread from tropical Africa to eastern Polynesia and Micronesia. J 98; W 2953, 3215.

Pisonia umbellifera (Forst. f.) Seem.: A small tree, common from the coastal to montane forest; widespread from South Africa to eastern Polynesia. W 2966, 3154, 3207.

Olacaceae

Anacolosa lutea Gill.: A small tree or shrub, rare in the montane scrub and sunny forest areas. Found also in Fiji and Tonga. W 3348.

Oleaceae

Jasminum betchei F. v. M.: A climbing vine, uncommon in the coastal and lowland forest. Found also in Fiji, Tonga, and Niue. W 3609.

Jasminum didymum Forst. f.: A climbing vine, occasional from the coastal to foothill forest. Widespread from tropical Asia to eastern Polynesia. W 3001.

Onagraceae

Ludwigia octivalvis (Jacq.) Raven.: A tall herb, common to abundant in disturbed swampy areas and other wet, sunny places. An aboriginal or early introduction, this species is widespread from India to Polynesia. W 3415.

Piperaceae

Macropiper puberulum Benth. 'Ava'avaaitu: A shrub, occasional from the coastal to montane forest. Found also in Fiji, Tonga, Niue, and the Wallis and Horne islands.

Macropiper timothianum. (A. C. Smith) A. C. Smith. 'Ava'avaaitu: A shrub, occasional to common in the montane and cloud forest. Found also in Fiji. W 3189, 3726.

Peperomia biformis C. DC.: A small herb, occasional from coastal rocks to montane forest. Included here is *P. tutuilana* Yuncker, which does not differ enough from *P. biformis* to be maintained as a separate species. Endemic to Samoa. W 2797, 2985, 3216, 3615.

Peperomia reineckei C. DC.: A small herb, common on the ground and epiphytic in the cloud forest of Ta'ū. Endemic to Samoa. W 3174.

Piper graeffei C. DC. Fue manogi: A climbing vine, common to abundant from the coastal to montane forest. Endemic to Samoa (also found in the Horne Islands, if *P. vaupelii* Laut. cannot be maintained as a separate species). *Piper tutuilae* is a synonym. W 3122.

Rhizophoraceae

Bruguiera gymnorhiza (L.) Lmk. Togo: A large spreading tree, dominating the mangrove forest. The "oriental mangrove" is widespread from tropical Asia to western Polynesia. W 2816.

Crossostylis biflora J. R. & G. Forst.: A small tree, occasional to common in the ridge forest. Found also in eastern Polynesia. W 2700.

Rhizophora mangle L. Togo: A shrub or small tree, common on the seaward margins of the mangrove forest. The "red mangrove" is indigenous or perhaps an early introduction to Samoa; it is found also in tropical America. W 2817.

Rosaceae

Parinari glaberrima Hassk. Ifiifi: A medium-sized tree, rare in cultivation and occasionally persisting in the forest, but not truly naturalized. Probably an aboriginal introduction to Samoa; widespread from tropical Asia to western Polynesia.

Parinari insularum A. Gray. Sea: A medium-sized tree, reported formerly to be in cultivation and possibly persisting. An aboriginal introduction; found also in Fiji, Tonga, and Wallis Islands.

Rubiaceae

Calycosia sessilis A. Gray: A shrub or small tree, occasional in the montane forest. Endemic to Samoa. W 2738.

Canthium barbatum (Forst. f.) Seem.: A small tree or shrub, uncommon in the montane scrub and ridge forest. Widespread in the Pacific islands. W 2891.

Canthium merrillii (Setch.) Chr. Olasina: A medium-sized tree, occasional from the lowland to montane forest. Endemic to Samoa. W 3672.

Gardenia taitensis DC. Pua Samoa; taile: A shrub, rare on coastal rocks, and cultivated for its fragrant flowers. Occurs also from the New Hebrides to eastern Polynesia. W 3435.

Geophila repens (L.) I. M. Johnst. Tono: A prostrate herb, occasional from the lowland to montane forest. Pantropical. W 3015.

Guettarda speciosa L. Puapua: A small to medium-sized tree, occasional in the coastal and littoral forest. Widespread from tropical Asia to eastern Polynesia. W 3212, 3394.

Gynoctodes ovalifolia (Vale.) Kane.: A high-climbing vine, occasional in the lowland to montane forest. Found also in Fiji, Tonga, and Micronesia. W 2874.

Hedyotis biflora (L.) Lmk.: A small herb, occasional in sunny coastal areas. Widespread from Mauritius to western Polynesia. W 2922, 3441.

Hedyotis foetida (Forst. f.) J. E. Smith: A small, somewhat succulent shrubby plant, occasional on coastal rocks. Widespread in the Pacific from eastern Melanesia to western Polynesia and Micronesia. W 3057, 3440.

Hedyotis romanzoffiensis (Cham. & Schlect.) Fosb. Kautokiaveka (Swains): A woody herb, rare in sunny coastal areas. Indigenous to Samoa, but collected only once (Swains Island in 1891); widespread on coral islands.

Ixora samoensis A. Gray. Filofiloa: A shrub or small tree, occasional in sunny forest areas, particularly in the coastal and ridge forest. Found also in Tonga. W 2885, 3621, 3663, 3808.

Morinda citrifolia L. Nonu: A small tree, occasional in the coastal forest and disturbed areas. An aboriginal introduction now naturalized in Samoa, it is widespread from India to Polynesia. W 3419.

Morinda umbellata Seem.: A woody vine, rare from the coastal to montane forest. Widespread from the New Hebrides to eastern Polynesia. W 3670.

Mussaenda raiateensis J. W. Moore. Aloalo vao: A shrub or small tree, often epiphytic, uncommon from the coastal to montane forest, sometimes in disturbed areas and cultivated. Found from the New Hebrides to the Society Islands. W 3151, 3791.

Neonauclea forsteri (Seem.) Merr. Afa: A large tree, occasional in the forest at lower elevations, often in mature secondary forest and along streams. Occurs from the New Hebrides to the Society Islands. W 2956, 3683.

Psychotria forsteriana A. Gray: A small tree, uncommon from the lowland to montane forest. Found also in Fiji. W 2730.

Psychotria garberiana Chr.: A small tree, common in the montane and cloud forest. Endemic to Manu'a. W 3078, 3134, 3197.

Psychotria insularum A. Gray. Matalafi: A small tree, common from the coastal to montane forest and in montane scrub. Found also in Tonga, Niue, and the Wallis and Horne islands. *P. tutuilensis* Chr. does not appear to differ sufficiently to be considered a separate species. W 2737, 2767.

Sarcopygme pacificia (Rein.) Setchell & Chr. 'U'unu: A small tree, occasional to common in the montane and cloud forest. Endemic to Samoa, as is the whole genus. *S. mayorii* (Setchell) Setchell & Chr., named on the basis of a single specimen from Tutuila, does not appear to be sufficiently different to be considered a separate species. W 2732.

Tarenna sambucina (Forst. f.) Durand. Ma'anunu: A small tree, occasional in the forest and sunny disturbed

areas. Widespread in the Pacific from the New Hebrides to eastern Polynesia. W 2925, 2992, 3150, 3775.

Rutaceae

Acronychia heterophylla A. Gray: A small tree, occasional in the montane and cloud forest. Endemic to American Samoa. This species belongs in the genus *Melicope* J. R. & G. Forst., according to T. Hartley (personal communication). W 3181, 3202, 3804.

Acronychia retusa A. Gray: A small tree, rare in the coastal forest. Found also in the Horne Islands. This species belongs in *Melicope* J. R. & G. Forst., according to T. Hartley (personal communication). W 3225, 3689.

Acronychia richii A. Gray: A small tree, uncommon in the montane scrub and cloud forest. Endemic to Samoa. This species belongs in *Melicope* J. R. & G. Forst., according to T. Hartley (personal communication). W 3664.

Citrus macroptera Montr. Moli Samoa; moli u'u: A small tree, uncommon in disturbed or sunny forest areas. This species of orange is probably an aboriginal introduction which sometimes appears to be naturalized. Widespread in the Pacific. W 3153.

Euodia hortensis J. R. & G. Forst. Usi: A shrub, uncommon in primary and secondary forest. Probably an aboriginal introduction to Samoa, where it was formerly cultivated for its aromatic foliage and is now semi-naturalized. Widespread in the Pacific from New Guinea to Polynesia. W 2996, 3806.

Euodia samoensis Chr. So'opine: A small tree, uncommon in primary and secondary forest. Endemic to Samoa. W 2994.

Micromelum minutum (Forst. f.) Seem. Talafalu: A small tree, occasional in the coastal and foothill forest. Widespread from tropical Asia to western Polynesia. W 2944, 3607.

Sapindaceae

Allophylus cobbe (L.) Raeusch.: A shrub, uncommon in the coastal forest. Widespread from Malaysia to Polynesia. J 103.

Arytera samoensis Radlk. Lau lili'i: A small to medium-sized tree, occasional from the coastal to montane forest. Endemic to Samoa. W 3782.

Elattostachys falcata (A. Gray) Radlk. Taputo'i: A medium-sized tree, uncommon in the forest, easily confused with the preceding species. Found also in Fiji, Tonga, and Niue. W 3650.

Pometia pinnata J. R. & G. Forst. Tava: A large tree, occasional in the coastal and lowland forest, sometimes becoming abundant in mature secondary forest. Widespread from Ceylon to western Polynesia. W 3739.

Sapotaceae

Manilkara dissecta (L. f.) Dubard. Pani: A medium-sized tree, rare in the coastal forest. Occurs from New Caledonia to Samoa.

Palaquim stehlinii Chr. Gasu: A large tree, uncommon to rare from the lowland to montane forest. Endemic to Samoa. W 3580.

Planchonella costata (End.) Pierre ex Lam. Ala'a (Aunu'u): A medium-sized tree, occasional in the coastal and lowland forest, but common to abundant on Aunu'u. Widespread from the New Hebrides to Tahiti. W 2945.

Planchonella linggenensis (Burch.) Pierre. Ala'a: A medium-sized tree, common in the coastal to montane forest. Widespread from Southeast Asia to western Polynesia. W 2864, 3537.

Planchonella torricellensis (K. Schum.) H. J. Lam. Mamalava: A large tree, common to abundant from the lowland to montane forest. Found scattered from Bali to western Polynesia. W 2875, 2963, 3627.

Scrophulariaceae

Limnophila fragrans (J. R. & G. Forst.) Seem. Tamole vai (?): An aromatic herb, rare in wet sunny places, sometimes somewhat weedy. Found also in Fiji. W 3305.

Lindernia crustacea F. v. M.: A small herb, uncommon in wet sunny places such as on mossy stream bed rocks. Indigenous or possibly an aboriginal introduction to Samoa, it is pantropical. W 3177.

Simaroubaceae

Suriana maritima L.: A shrub, rare on sandy areas of Rose Island. This widespread species of the tropics is a very recent natural arrival to Rose Island, never before recorded from any island of Samoa. J 101.

Sterculiaceae

Kleinhovia hospita L. Fu'afu'a: A small to medium-sized tree, occasional in disturbed areas. Indigenous or an aboriginal introduction to Samoa, widespread from tropical Asia to western Polynesia. W 3466.

Melochia aristata A. Gray. Ma'o: A small tree, uncommon in disturbed sunny places. Found also in Tonga and the Tuamotu Islands. W 3146.

Sterculia fanaiho Setch. Faga'io: A medium-sized tree, occasional in the coastal to foothill forest. Found also in Tonga, Niue, and Futuna. W 2987.

Theaceae

Eurya japonica Thunb.: A small tree or shrub, occasional in the montane scrub and ridge forest. Widespread in the Pacific, north to Japan. W 2711, 2769.

Thymelaeaceae

Phaleria acuminata (A. Gray) Gilg.: A small tree or shrub, rare from the coastal to montane forest. Found also in Fiji. J 118.

Phaleria disperma (Forst. f.) Baill. Suni: A small tree, uncommon in the coastal forest. Found also in Fiji, Tonga, and Niue. W 2848.

Wikstroemia foetida (L. f.) A. Gray: A shrub, uncommon in sunny forest areas, but common on lava flows in Savai'i. Found also in Fiji. W 2907, 2928.

Tiliaceae

Grewia crenata (J. R. & G. Forst.) Schinz. & Guill. Fauui: A small tree, occasional in the coastal forest and disturbed coastal areas. Widespread from New Caledonia to the Society Islands. W 2839.

Trichospermum richii (A. Gray) Seem. Ma'o sina: A small to medium-sized tree, occasional in the montane forest. Found also in Fiji. W 2777, 2959.

Triumfetta procumbens Forst. f. Mautofutai; totolo (Swains): A prostrate and creeping shrub, occasional on sandy beaches. Widespread from tropical Asia to eastern Polynesia. W 3054, 3403.

Ulmaceae

Trema orientalis (L.) Bl. Magele: A small tree, occasional in sunny disturbed places. Widespread in the Pacific islands. W 3115.

Urticaceae

Boehmeria virgata (Forst. f.) Guill.: A shrub, rare in open places in the montane forest, but more common in Savai'i. Found from Melanesia to western Polynesia.

Cypholophus macrocephalus Wedd. Faupata: An unbranched shrub, uncommon in the cloud forest. Widespread from Malaysia to Tahiti. W 3187.

Dendrocnide harveyi (Seem.) Chew. Salato: A medium-sized tree, rare in the lowland forest on Ta'ū. The "stinging-nettle tree" is reported only from Amouli, where it is said to have been an aboriginal introduction from Western Samoa by the Paramount Chief Malietoa. Found also in Fiji and Tonga.

Elatostema grandifolium Rein.: A large herb, occasional in the montane and cloud forest. Endemic to Samoa. W 3088, 3171, 3574.

Elatostema samoense Rein.: A small herb, rare in the montane forest of Tutuila, occasional on Upolu and Savai'i. This species was recorded by Reinecke, but may be a case of mistaken identity; his specimen may actually belong to the following species. Endemic to Samoa.

Elatostema scabriusculum Setch.: A small herb, occasional in the montane and cloud forest. Endemic to Tutuila and Manu'a. W 3176, 3564.

Elatostema tutuilense Whistler: A small herb, rare in mossy stream beds. Collected only once, by Reinecke in 1894, growing on rocks by Matafao Stream, Tutuila. Previously called *E. radicans* Rein. (Whistler 1978).

Elatostema sp.: An herb, uncommon in the cloud forest. Endemic to Manu'a. This undescribed species is similar to *E. cupreo-viride* Rech. of Western Samoa, but has much larger stipules. It is probably most closely related to the smaller species, *E. scabriusculum,* which is also found in Manu'a. W 3089, 3561.

Leucosyke corymbulosa (Wedd.) Wedd. 'Ala'alatoa: A small tree, uncommon in the foothill forest. Found also from the New Hebrides to the Cook Islands. W 2689, 2890.

Maoutia australis Wedd.: A shrub or small tree, rare in disturbed forest areas. Found also in Fiji and elsewhere. W 3674.

Pipturus argenteus (Forst. f.) Wedd. Sogā; fausogā: A small tree, common in disturbed areas and young secondary forest. Widespread from Malaysia to eastern Polynesia. W 2861, 3404.

Procris pedunculata (J. R. & G. Forst.) Wedd. Fualole; matāvao (Swains): A succulent epiphytic herb, occasional from the coastal to montane forest. Occurs from Java to Tahiti. W 2704, 2725, 3355.

Verbenaceae

Clerodendrum inerme (L.) Gaertn. Aloalo tai: A shrub, common in littoral scrub and on the seaward edge of the littoral forest. Widespread from tropical Asia to western Polynesia. W 2836.

Faradaya powellii Seem. Mamalupe: A climbing woody vine, common from the lowland to montane forest. Endemic to Samoa. W 2951.

Premna obtusifolia R. Br. Aloalo: A small tree, occasional in sunny coastal areas and lowland forest; widespread in the Pacific. This species is very similar to *P. taitensis* Schau. and *P. gaudichaudii* Schau. Samoan specimens at the Bernice P. Bishop Museum have been annotated with all three names by H. Moldenke, and the differences among the three are obscure. J 52, 60, 95.

Vitex trifolia L. Namulega: A small tree, uncommon in the littoral forest, sometimes cultivated. Widespread from tropical East Africa to eastern Polynesia. W 3830.

Violaceae

Melicytus ramiflorus J. R. & G. Forst.: A small tree, uncommon in the cloud forest. Found also in Fiji and New Zealand. The variety in Samoa is var. *samoensis* Chr. W 3196, 3572.

MONOCOTYLEDONAE

Araceae

Amorphophalus campanulatus (Roxb.) Bl. Teve: A rhizomatous herb, occasional in disturbed areas. The "stink lily" is an aboriginal introduction, formerly used as a minor food source; probably native to tropical Asia.

Epipremnum pinnatum (L.) Eng.: An herbaceous climbing vine, common in coastal and lowland forest. Found also in Fiji and elsewhere.

Raphidophora graeffei Eng. Tuafoga: An herbaceous climbing vine, common from the lowland to montane forest. Endemic to Samoa. W 3615A.

Commelinaceae

Aneilema vitiense Seem.: A white-flowered ground herb, occasional from the lowland to montane forest. Also found from the Philippines to western Polynesia. J 129.

Cyperaceae

Cyperus javanicus Houtt. Selesele: A sedge, occasional on coastal rocks and disturbed areas on the coast. Widespread from tropical Africa to eastern Polynesia. W 3416.

Cyperus odoratus L. Selesele: A sedge, occasional in coastal marshy areas, uncommon at higher elevations. Pantropical. W 2858, 3604.

Cyperus polystachyos Rottb.: A sedge, common as a weed, occasional on rocky and sandy shores. An aboriginal introduction to Samoa and a cosmopolitan weed.

Cyperus seemannianus Boeck.: A sedge, occasional from the coastal to montane forest. Found also in Fiji, Tonga, Niue, and the Horne Islands. Several varieties have been named. W 2860, 2900, 2916, 3059, 3648, 3784.

Eleocharis dulcis (Burm. f.) Hens. 'Utu'utu: A leafless herb, abundant in coastal marshes. Probably indigenous to Samoa, it is widespread from tropical Africa to western Polynesia. J 38.

Eleocharis geniculata R. & S.: A small herb, rare in Samoa, found only on the north margin of the brackish water lagoon of Swains Island. Widely distributed in the tropics. W 3352A.

Fimbristyis cymosa R. Br. Mutia: A small sedge, common in sandy or rocky coastal areas. Pantropical. W 2851, 3360, 3417.

Machaerina falcata (Nees) T. Koyama: A sedge, common in the montane scrub. Widespread in the Pacific islands. W 3668.

Mapania macrocephala (Gaud.) K. Schum.: A large *Pandanus*-like sedge, uncommon in the montane forest. Widespread from the Philippines to western Polynesia and Australia.

Rhynchospora corymbosa (L.) Britt. Selesele: A coarse sedge, common in disturbed coastal marshes and other wet areas. Widespread in the tropics. J 44.

Scleria lithosperma (L.) Sw.: A small sedge, occasional in the coastal and foothill forest. Pantropical. W 2846, 3011.

Scleria polycarpa Boeck.: A coarse sedge, common in disturbed areas and forest clearings. Probably indigenous to Samoa, and found from Indonesia to western Polynesia. W 2888, 2898.

Thoracostachyum lucbanense (El.) Kuken.: A sedge, rare in the montane scrub on Tutuila. Also found in the Philippines and elsewhere.

Dioscoreaceae

Dioscorea bulfibera L. Soi: An herbaceous vine, occasional in disturbed forest areas; somewhat weedy. This yam is an aboriginal introduction formerly cultivated in Samoa, and is widespread from Africa to eastern Polynesia. J 57.

Flagellariaceae

Flagellaria gigantea Hook. f. Lafo: A high-climbing bamboo-like plant, uncommon from the coastal to montane forest. Found also in Fiji. W 3837.

Gramineae

Bothriochloa bladhii (Retz.) S. T. Blake: A grass, uncommon as a weed and naturalized on grassy coastal bluffs and ridges. Introduced to Samoa, but indigenous to the South Pacific area. W 3769.

Cenchrus echinatus L. Vao tuitui: A "burr grass," occasional to common in sandy coastal areas and villages. An aboriginal weedy introduction to Samoa, widespread in the tropics.

Centotheca lappacea (L.) Desv. Sefa; vao fali: A medium-sized grass, occasional in disturbed forest and cultivated areas. An aboriginal introduction to Samoa, widespread from tropical Africa to Polynesia. W 2974.

Chrysopogon aciculatus (Retz.) Trin.: A creeping grass, occasional in dry sunny places near the coast. An aboriginal introduction, widespread in the tropics.

Coix lacryma-jobi L. Sagasaga: A tall grass, common in wet disturbed areas and disturbed coastal marshes. "Job's tears," an aboriginal or early introduction to Samoa, is widespread from India to eastern Polynesia.

Cyrtococcum oxyphyllum (Steud.) Stapf.: A grass, occasional in forest clearings. Probably an aboriginal introduction to Samoa, widespread from topical Asia to western Polynesia. W 2845, 3815.

Imperata cylindrica (L.) Beauv.: A grass, uncommon on sunny coastal bluffs and in the montane scrub. Possibly indigenous to Samoa; widespread from Africa to Polynesia. W 2931.

Ischaemum byrone (Trin.) Hitch.: A rare grass in the montane scrub. This plant was collected in 1932 on Pioa Mountain, Tutuila; it is also found in Hawaii and the Cook Islands (Magaia).

Ischaemum murinum Forst. f.: A small grass, occasional to common on coastal rocks. Found also in Fiji, Tonga, and probably Niue. W 2911.

Lepturus repens (Forst. f.) R. Br.: A creeping grass, common on sandy or rocky beaches. Widespread in the tropical Pacific. W 2852, 3379, 3390.

Miscanthus floridulus (Labill.) Warb. 'U; fiso (?): A tall plumose grass, occasional on coastal cliffs and in disturbed coastal areas. Indigenous or possibly an aboriginal introduction to Samoa, it is widespread from eastern Africa to Polynesia.

Oplismenus undulatifolius (Ard.) Beauv. A small grass, uncommon in the coastal to montane forest. Introduced to Samoa and naturalized; widespread in the Pacific (var. *imbecillis* R. Br.). W 2897.

Paspalum distichum L.: A common grass in coastal areas, often on the margins of mangrove swamps and estuaries. "Knotgrass" is pantropical. W 3353A.

Paspalum orbiculare Forst f.: A grass, occasional in swampy areas, stream beds, and on sunny coastal bluffs. Widespread from Southeast Asia to Polynesia. W 2932, 2973, 2989.

Schizostachyum glaucifolium (Rupr.) Munro. 'Ofe: A tall bamboo, uncommon in the rain forest. Probably an aboriginal introduction to Samoa and now naturalized; widespread from Fiji to eastern Polynesia. W 3824.

Stenotaphrum micranthum (Desv.) C. E. Hubb.: A grass, occasional on rocky and sandy shores. Widespread from Southeast Asia to Polynesia. W 3501.

Thuareae involuta (Forst. f.) R. & S.: A creeping grass, occasional on sandy beaches. Widespread from Southeast Asia to Polynesia. W 2948.

Hydrocharitaceae

Halophila ovalis (R. Br.) Hook. f.: A creeping marine herb, occasional to common on sandy reef flats. Widespread in the tropical Pacific and Indian oceans.

Liliaceae

Cordyline fruticosa (L.) Chev. Ti; tivao: A shrub-like plant, common from the coastal to cloud forest. The "ti plant," probably an aboriginal introduction to Samoa, was formerly cultivated for its edible root and is now naturalized. Widespread from tropical Asia to Polynesia. W 2849.

Musaceae

Heliconia paca A. C. Smith. Laofao: A large banana-like plant, common from the lowland to montane forest. Indigenous or possibly an aboriginal introduction to Samoa. Considered by some authors to be *H. bihai,* but A. C. Smith considers *Heliconia* native to Fiji and has named the Fijian species *H. paca.*

Orchidaceae

Agrostophyllum megalurum Rchb. f.: A coarse epiphytic orchid, rare in the rain forest. Found also in Fiji.

Appendicula bracteosa Rchb. f.: A small, white-flowered epiphytic orchid, occasional in the rain forest and cloud forest. Found also in Fiji. W 3092, 3170.

Bulbophyllum atrorubens Schltr.: A small epiphytic orchid, uncommon in the rain forest. Found also in and originally named from New Caledonia.

Bulbophyllum betchei F. v. M.: A tiny epiphytic orchid, uncommon in the rain forest. Endemic to Samoa. W 3727.

Bulbophyllum gibbonianum Schltr.: A small-leafed, creeping epiphytic orchid, uncommon in the rain forest. Originally named from Palau. W 2901.

Bulbophyllum longiscapum Rolfe: An epiphytic orchid with white flowers spotted with red, occasional from the mangrove forest up into the rain forest. Found also in Fiji and Niue. W 2827.

Bulbophyllum nigroscapum Ames: An epiphytic orchid with whitish flowers, uncommon in the rain forest and cloud forest. Endemic to Samoa.

Bulbophyllum pachyanthum Schltr.: An epiphytic orchid with large whitish flowers spotted with red, uncommon in the rain forest and montane scrub. Originally named from New Caledonia.

Bulbophyllum samoanum Schltr.: A small epiphytic orchid with yellowish flowers tinged with red, occasional from the rain forest to cloud forest. This name is apparently synonymous with *B. christophersenii* L. O. Wms. Endemic to Samoa. W 2787.

Bulbophyllum savaiiense Schltr.: A tiny epiphytic orchid, uncommon in the rain forest. Endemic to Samoa. W 3735.

Bulbophyllum sp.: A small epiphytic orchid with a long-stalked yellow flower, rare in the ridge forest. It is apparently the same as an unnamed species found on Niue.

Calanthe hololeuca Rchb. f.: A large, white-flowered ground orchid, occasional in the rain forest, cloud forest, and montane scrub. Found also in Fiji. W 3159.

Calanthe triplicata (Wille. f.) Ames: A large ground orchid with showy white flowers, occasional from the lowland rain forest to cloud forest. Widespread in the Pacific. W 3025.

Coelogyne lycastoides F. v. M. et Krzl.: A large-leafed epiphytic orchid with large white and brown flowers, occasional in the rain forest and cloud forest. Endemic to Samoa. W 2796.

Cryptostylis alismifolia F. v. M.: A medium-sized ground orchid, rare in the rain forest and cloud forest. Endemic to Samoa.

Dendrobium biflorum (Forst. f.) Sw.: A white-flowered epiphytic orchid with grass-like leaves, common from the coastal forest to the rain forest. Found also in Fiji and the Society Islands. W 2696, 2791.

Dendrobium glomeriflorum Krzl.: A small epiphytic orchid with clustered flowers, uncommon in the rain forest and cloud forest. W 2903.

Dendrobium goldfinchii F. v. M.: A white-flowered epiphytic orchid with laterally-compressed leafy stems, uncommon in the coastal and lowland rain forest. Found on Tutuila, originally named from the Solomon Islands. W 2895, 3622.

Dendrobium tokai Rchb. f.: A thick-leafed, epiphytic orchid with large, showy, cream-colored flowers, occasional from the littoral forest up to the rain forest. Found also in Fiji and Tonga.

Dendrobium triviale Krzl.: A long-stemmed epiphytic orchid with orange flowers, uncommon from the mangrove forest to rain forest. Endemic to Samoa. W 3623.

Dendrobium vaupelianum Krzl.: A medium-sized epiphytic orchid, common from the coastal forest to rain forest. Endemic to Samoa. W 2919.

Didymoplexis pallens Griff.: A small, leafless, saprophytic ground orchid with a purple stem, occasional from the coastal forest to rain forest. Widespread in the Pacific. W 3069, 3133.

Diplocaulobium fililobum (F. v. M.) Krzl.: A small epiphytic orchid with a whitish flower having linear petals, occasional from the rain forest to cloud forest. Endemic to Samoa. W 3095.

Ephemerantha comata (Bl.) P. F. Hunt & Summerh.: A thick-leafed epiphytic orchid with showy white flowers spotted with maroon, occasional from the mangrove forest to the montane forest. Originally named from Java and previously known as *Dendrobium thysanochilum* Schltr. W 2829, 2894, 3162.

Epiblastus sciadanthus Schltr.: A pink-flowered epiphytic orchid, uncommon in the rain forest and cloud forest. Endemic to Samoa. W 3693.

Eria aeridostachya Rchb. f. ex Lindl.: A thick-leafed epiphytic orchid with cream-colored flowers, rare in the rain forest and open areas in the mountains. Widespread westward from Samoa to Southeast Asia and the Philippines.

Erythrodes lilyana (Fleisch. & Rech.) Schltr.: A medium-sized ground orchid, rare in the montane and cloud forest. Endemic to Samoa.

Erythrodes sp.: A small ground orchid, rare in the rain forest and cloud forest. Endemic to Manu'a (?).

Glomera reineckeana Schltr.: A medium-sized epiphytic orchid with white flowers, occasional in the rain forest and cloud forest. Endemic to Samoa. W 3182.

Goodyera rubens Bl.: A medium-sized ground orchid, uncommon in the rain forest. Found from Samoa westward to Southeast Asia. W 3021.

Habenaria supervacunea Rchb. f.: A tall ground orchid, uncommon in the rain forest and cloud forest. Found also in Fiji. W 3745.

Habenaria tradescantifolia Rchb. f.: A small ground orchid, occasional in the rain forest. Found also in Fiji. W 3163.

Habenaria vaupelii Schltr.: A large ground orchid, uncommon in the rain forest and cloud forest. Endemic to Samoa.

Hetaeria oblongifolia Bl.: A small ground orchid, occasional in the rain forest. Widespread westward to Malaysia. W 3022, 3084, 3165.

Liparis caespitosa (Thou.) Lindl.: A tiny epiphytic orchid, rare in the montane scrub. It is possibly endemic to Samoa.

Liparis disticha (Thou.) Lindl.: A tiny epiphytic orchid, rare in the montane scrub. Found on Tutuila; originally named from Malaya.

Liparis longipes Lindl.: An epiphytic orchid with tiny white flowers, occasional to common from the lowland to rain forest. Found also in Fiji. It is also known as *L. savaiiensis* Fleisch. & Rech. W 2739, 3005.

Liparis stricta Schltr.: A small ground orchid with white flowers, uncommon in the rain forest. Endemic to Samoa.

Malaxis resupinata (J. R. & G. Forst.) O.K.: A medium-sized ground orchid, uncommon in the rain forest.

Malaxis samoensis (Schltr.) Whistler: A small, yellow-flowered ground orchid, occasional from the coastal to montane forests. Endemic to Samoa. Previously called *Microstylis samoensis* Schltr. (Whistler 1978). W 2742.

Mediocalcar paradoxum (Krzl.) Schltr.: A creeping epiphytic orchid, rare in the rain forest, cloud forest, and montane scrub. Endemic to Samoa. W 3853.

Moerenhoutia heteromorpha Benth. & Hook. f.: A medium-sized ground orchid with white flowers, occasional in the rain forest. Found also in Fiji. Previously called *Platylepis heteromorpha* Rchb. f. W 2775, 3097, 3172.

Nervilia aragoana Gaud.: A small ground orchid with basal, heart-shaped leaves, rare in the rain forest. Widespread from Micronesia and western Polynesia to tropical Asia.

Oberonia equitans (Forst. f.) Mutel: A small epiphytic orchid with tiny white flowers, occasional in the rain forest. Widespread in the Pacific islands. W 3012, 3809.

Oberonia heliophila Rchb. f.: A small epiphytic orchid with tiny white flowers, uncommon from the coastal to rain forests. Found also in Fiji. W 2790.

Phaius graeffei Rchb. f.: A large ground orchid with large white flowers, occasional in the rain forest. Found also in Tonga and Fiji. W 2687.

Phaius tankervilleae (Banks) Bl.: A large ground orchid with large showy flowers, occasional in the rain forest and

cloud forest. Widespread from tropical Asia to the Cook Islands. W 3026, 3071.

Phreatia graeffei Krzl.: A medium-sized ephiphytic orchid with tiny white flowers, occasional in the rain forest. Found also in Fiji, Tonga, and Niue. W 2740.

Phreatia stenostachya (Rchb. f.) Krzl.: A tiny epiphytic orchid with tiny white flowers, occasional in the rain forest. Found also in Fiji.

Pseuderia ramosa L. O. Wms. A long-stemmed epiphytic orchid, common in the cloud forest and montane scrub. Found also in Futuna. W 3345.

Spathoglottis pacifica Rchb. f.: A large, somewhat weedy ground orchid with pink flowers, occasional in sunny disturbed places and montane scrub. Widespread in the Pacific.

Taeniophyllum fasciola (Forst. f.) Rchb. f.: A tiny, leafless, stemless, epiphytic orchid with flattened green roots, occasional in the coastal forest and lowland rain forest. Widespread in the Pacific. W 2918, 3004.

Taeniophyllum vitiense L. O. Wms.: A tiny, leafless, stemless, epiphytic orchid with flattened green roots, rare in the coastal and lowland rain forest. Found also in Fiji.

Thrixspermum graeffei Rchb. f.: A tiny epiphytic orchid with white flowers, uncommon in the rain forest. Found also in Fiji.

Vrydagzynea whitmeei Schltr.: A small ground orchid, uncommon in the rain forest and cloud forest. Endemic to Samoa.

Vrydagzynea samoana Schltr.: A small ground orchid, uncommon in the rain forest. Endemic to Samoa (?).

Zeuxine androcardium Schltr. (?): A small ground orchid, uncommon in the rain forest. Endemic to Samoa. W 2741 (?).

Zeuxine sphaerochila Fleisch. & Rech.: A medium-sized ground orchid, uncommon in the rain forest and cloud forest. Endemic to Samoa. W 3696.

Palmae

Cocos nucifera L. Niu: A tall palm, abundant in the littoral forest. An aboriginal introduction or possibly indigenous to Samoa, pantropical in distribution. The "coconut palm" appears to be unable to compete with other trees in the littoral and coastal forests, and dispersal by cultivation may be responsible for its being so common and widespread.

Pandanaceae

Freycinetia hombronii Mart. 'Ie'ie: A coarse climber, occasional in the montane forest. Endemic to Samoa.

Freycinetia reineckei Warb. 'Ie'ie: A coarse climber, common from the lowland to montane forest. Endemic to Samoa. W 3594.

Freycinetia storckii Seem. 'Ie'ie: A coarse climber, common in the lowland to montane forest and cloud forest. Found also in Fiji and Futuna. The roots are used to make fish traps. W 2983, 3640, 3698.

Pandanus reineckei Warb. Fasa (?); paogo (?): A "pandanus tree," common in the montane scrub. Endemic to Samoa. W 2713, 3659.

Pandanus tectorius Park. Fala: A medium-sized tree-like monocot, common in the littoral forest, sometimes forming dense thickets. This "pandanus tree" is widespread across the Pacific. *Pandanus odoratissimus* L. f. is a name often used for this species. In its wide sense, *P. tectorius* includes *P. upoluensis* Mart., *P. calostigma* Mart., and *P. tauensis* Mart., all species previously attributed to Samoa (Martelli 1934). This genus has a bewildering number of varieties and forms, many of which are cultivated. W 3102, 3408, 3432, 3617, 3687, 3688, 3754, 3774.

Pandanus tutuilensis Mart. Paogo (?): A small "pandanus tree," occasional in the littoral forest and sometimes inland. Endemic to Samoa.

Pandanus whitmeeanus Mart. Paogo: A small "pandanus tree," uncommon in the montane scrub, sometimes cultivated. Widespread from New Caledonia to the Cook Islands. W 3778.

Taccaceae

Tacca leontopetaloides (L.) O.K. Masoā; pia: A large, somewhat weedy herb, occasional in the littoral forest. The "Polynesian arrowroot" is indigenous or an aboriginal introduction to Samoa; formerly cultivated for its edible root, it is now naturalized. Widespread from tropical Asia to eastern Polynesia. W 3373.

Zingiberaceae

Geanthus vignaui (Rech.) Loes.: A tall herb with large inflorescences of white flowers, rare in the montane forest. Endemic to Samoa.

Zingiber zerumbet (L.) Smith. 'Avi pui: An herb, common in the lowland to montane forest. Indigenous, or an aboriginal introduction to Samoa, now naturalized. Widespread from tropical Asia to eastern Polynesia. W 3848.

PTERIDOPHYTA

Achrostichum aurem L. Sa'ato: A large clump-forming fern, common in coastal marshes, rocky coastal areas, and along the margins of the mangrove forest. The "swamp fern" is pantropical. W 2823.

Adiantum capillus-vernis L.: A rare fern of the forest. This "maidenhair fern" has been collected only once in American Samoa ("Manu'a"); found also in Tahiti and elsewhere.

Adiantum philippense L.: A rare fern of the forest, collected only once in American Samoa (Aunu'u?). Occurs westward to Africa. J 138.

Amphineuron opulenta (Kaulf.) Holttum: A ground fern, rare in Samoa but widespread in the Pacific.

Angiopteris evecta (Forst. f.) Hoff. Gase (?); manase (?): A large ground fern, common in the forest. Widespread in Polynesia. J 145.

Angiopteris opaca Copel.: A large ground fern, uncommon in the forest. Found also in Fiji.

Antrophyum alatum Brack.: An epiphytic fern with spathulate fronds, occasional in the forest. Widespread in the Pacific. J 146.

Antrophyum plantagineum (Cav.) Kaulf.: An epiphytic fern with strap-shaped fronds, occasional in the forest. Occurs also from Malaysia to Polynesia. Yuncker (1945) called this species *A. angustatum* Brack. W 3036.

Arthropteris obliterata (R. Br.) J. Smith: A creeping epiphytic fern, common in the lowland and coastal forest on trees and lava rocks. Widespread from Africa to eastern Polynesia. W 3532.

Asplenium cuneatum Lmk.: A small ground fern, occasional in the forest. Pantropical. J 147.

Asplenium falcatum Lmk.: A ground or epiphytic fern, occasional in the forest. Widespread from Africa to Easter Island. J 140.

Asplenium feejeense Brack.: A medium-sized ground fern, occasional in the forest. Found also in Fiji. J 144.

Asplenium horridum Kaulf.: A medium-sized ground fern, occasional in the montane and cloud forest. Widespread in the Pacific. W 3590.

Asplenium insiticium Brack.: A medium-sized ground fern, rare in the cloud forest. Found also in Fiji, Hawaii, and New Caledonia. W 3701.

Asplenium laserpitiifolium Lmk.: A ground fern, uncommon in the forest. Widespread from the Seychelles Islands to Tahiti.

Asplenium lobulatum Mett.: A ground (?) fern, uncommon in the forest. Widespread in the Pacific.

Asplenium marattioides (Brack.) C. Chr.: A ground fern, occasional in the forest. Found from the Celebes (?) to western Polynesia.

Asplenium multifidum Brack.: A medium-sized epiphytic fern, uncommon in the cloud forest. Found also in Fiji and Tahiti. W 3579.

Asplenium nidus L. Laugapāpā: A large epiphytic or ground fern, common to abundant from the littoral to cloud forest. The "bird's-nest fern" is widespread in the Old World tropics and subtropics. W 2838.

Asplenium powellii Baker: A medium-sized epiphytic fern, rare in the cloud forest of Ta'ū. Possibly just a variety of *A. multifidum*. Endemic to Samoa.

Asplenium tenerum Forst. f.: A small fern, rare in the forest. Widespread from India to the Marquesas. W 3533.

Asplenium unilaterale Lmk.: A medium-sized fern, uncommon in the forest. Widespread from Africa to western Polynesia.

Blechnum lanceolatum (R. Br.) Sturm: A medium-sized ground fern, rare in Samoa. It was reported from Tutuila by Christ (in Christensen 1943), but no specimens are listed. Widespread in the Pacific.

Blechnum orientale L.: A large ground fern, occasional in sunny areas at higher elevations. Widespread from tropical Asia to eastern Polynesia. J 149.

Blechnum vulcanicum (Bl.) Kuhn: A medium-sized ground fern, common to abundant in the montane scrub. Widespread in the Pacific. W 3699.

Bolbitis lonchophora (O. K.) C. Chr.: A medium-sized ground fern, occasional in the forest. Widespread from New Caledonia and Australia to eastern Polynesia. W 3554.

Cristella dentata (Forssk.) Brownsey & Jermy: A ground fern, rare in Samoa. Widespread from tropical Asia to Polynesia. Previously called *Dryopteris nymphalis* (Forst. f.) Copel.

Cristella harveyi (Mett.) Holttum: A large ground fern, occasional to common in sunny areas. Widespread in the Pacific. Previously called *Dryopteris harveyi* (Mett.) O. K.

Cristella parasitica (L.) Leveille: A ground fern, rare in Samoa. Widespread in the Pacific. Previously called *Drypoteris parasitica* (L.) O. K.

Cristella subjuncta (Baker) Holttum: A ground fern, occasional in sunny places. Endemic to Samoa. Previously called *Dryopteris subjuncta* (Baker) C. Chr.

Culcita straminea (Labill.) Maxon: A large ground fern, occasional in the montane scrub. Found from New Caledonia to central Polynesia.

Cyathea lunulata (Forst. f.) Copel.: Olioli: A large tree fern, common in the forest and montane scrub. Widespread in Polynesia.

Cyathea subsessilis Copel.: A tree fern, uncommon in the montane scrub. Endemic to Samoa.

Cyathea truncata (Brack.) Copel. Olioli: A tree fern, common in the montane scrub and forest at higher elevations. Found also in Fiji and the Celebes. W 2717.

Cyathea vaupelii Copel.: A tree fern, common in the montane and cloud forests and montane scrub. Endemic to Samoa. W 3593.

Cyclosorus interruptus (Willd.) H. Ito: A ground fern, dominant in the coastal marsh. In the literature this pantropical fern is often referred to as *C. gongylodes* or *Dryopteris gongylodes.*

Davallia epiphylla (Forst. f.) Spreng.: An epiphytic or ground fern, common in sunny areas. Found also in Tahiti and elsewhere. J 150.

Davallia plumosa Baker: A medium-sized fern, rare in forest and sunny areas. Reported by Christ (Christensen 1943) as found on Tutuila, but no specimens were cited. Endemic to Samoa.

Davallia solida (Forst. f.) Sw.: An epiphytic or ground fern, common in the forest. Widespread from tropical Asia to eastern Polynesia. W 2825.

Dennstaedtia faccida (Forst. f.) Bern.: A rare fern in the forest at higher elevations. Reported from Tutuila (Christensen 1943), but no specimens cited. Found also in the New Hebrides.

Dicksonia brackenridgei Mett.: A small tree fern, common in the cloud forest of Ta'ū. Found also in Fiji. W 3585.

Dicranopteris linearis (Burm.) Under. Asaua: A medium-sized ground fern, common to abundant in the montane scrub, ridge forest, and other sunny areas with poor soil. The "false staghorn fern" is widespread in the Old World tropics and subtropics. W 2929.

Diplazium dilatum Bl.: A medium-sized ground fern, uncommon in sunny areas. Widespread from Southeast Asia to Polynesia.

Diplazium harpeodes Moore: A medium-sized ground fern, common in the forest. Found also in Fiji and eastward to Pitcairn Island. W 3625.

Diplazium petersenii (O. K.) Christ.: A medium-sized ground fern, uncommon in the forest. Widespread from Southeast Asia to western Polynesia and New Zealand.

Diplazium proliferum (Lmk.) Thou.: A large spiny ground fern, common in sunny or disturbed areas. Widespread from Africa to western Polynesia. J 148.

Diplazium silvaticum (Bory) Sw.: A ground fern, uncommon in sunny areas. Reported from American Samoa but no specimens cited by Christensen (1943). Widespread from Africa to western Polynesia.

Dipteris conjugata Reinw.: A large ground fern with fan-shaped fronds, common to abundant in the montane scrub of Tutuila. Widespread from tropical Asia to western Polynesia. W 2714.

Doryopteris concolor (Langs. & Fischer) Kuhn: A rare fern reported only on "lava rocks near the coast" (USEE). Pantropical.

Dryopteris arborescens (Baker) O. K.: A ground fern, uncommon at high elevations in the forest. Endemic to Samoa.

Dryopteris davalloides (Brack.) O. K.: A ground fern, occasional in sunny places at higher elevations. Found also in Fiji, Tahiti, and the New Hebrides. W 3704.

Dryopteris dissecta (Forst. f.) O. K.: A ground fern, apparently common in disturbed areas. Widespread from India to western Polynesia. This identification is by Yuncker (1945), as Christensen (1943) did not include Manu'a in the range of this species.

Elaphoglossum feejeense Brack.: An epiphytic fern with simple oblanceolate fronds, occasional in the montane scrub. Found also in Fiji.

Elaphoglossum reineckei Hier. and Laut.: An epiphytic fern with simple lanceolate fronds, uncommon in the montane and cloud forests. Found also in Fiji.

Histiopteris incisa (Thunb.) J. Smith: A ground fern, occasional in the forest at higher elevations. Widespread in the tropics and subtropics.

Humata banksii Alston: An epiphytic fern, common on trees in disturbed areas and forest. Widespread from Borneo to Tahiti. W 2820.

Humata botrychioides Brack.: An epiphytic fern, uncommon in sunny areas at higher elevations. Found also in Fiji.

Humata heterophylla (Smith) Desv.: An epiphytic fern, common in forest and disturbed areas. Widespread from Java to western Polynesia. W 2819.

Humata serrata Brack.: An epiphytic fern, occasional in the forest. Found also in Fiji and New Caledonia. W 3708.

Hymenophyllum formosum Brack.: A small epiphytic fern, occasional in wet forest areas. Widespread from Malaysia to Tahiti. W 3588.

Hymenophyllum polyanthos Sw.: A small epiphytic fern, common in wet forest areas. Pantropical.

Hymenophyllum praetervisum Christ.: A small epiphytic fern, uncommon in wet forest. Endemic to Samoa.

Hypolepis aspidioides Christ.: A ground fern, occasional in the forest. Endemic to Samoa.

Hypolepis tenuifolia (Forst. f.) Bern.: A ground fern, occasional in the forest at higher elevations. Widespread from Malaysia to western Polynesia.

Leucostegia pallida (Mett.) Copel.: A ground fern, uncommon in the forest at higher elevations. Widespread from Malaysia to Tahiti.

Lindsaea decomposita Willd.: A small ground fern, occasional in the mountain forests. Widespread from Malaysia to Polynesia. W 3592.

Lindsaea merrillii Copel.: A small ground fern, rare in the cloud forest. Found also in Malaysia and New Guinea.

Lindsaea pulchra (Brack.) Carr.: A small ground fern, uncommon in the forest at higher elevations. Found also in Fiji.

Lindsaea tenuifolia Bl.: A small ground fern, uncommon in the forest. Widespread from Malaysia to western Polynesia.

Lomagramma cordipinna Holttum: A ground and climbing fern, common to dominant in the rain forest. Found also in Fiji. W 2967.

Lycopodium carinatum Desv.: An epiphytic club moss, occasional in the forest. Widespread from India to Polynesia.

Lycopodium cernum L.: A ground club moss, common in the montane scrub and other sunny areas on poor soil. Pantropical. W 2934.

Lycopodium phlegmaria L.: An epiphytic club moss, occasional in the forest at higher elevations. Widespread in the Old World tropics.

Lycopodium squarrosum Forst. f.: An epiphytic club moss, occasional in the forest. Widespread from Africa to Polynesia. W 3573.

Macrothelypteris polypodioides (Hook.) Holttum: A ground fern, rare in Samoa. Widespread from tropical Asia to eastern Polynesia. Previously called *Dryopteris leucolepis* (Presl) Maxon.

Macrothelypteris torresiana (Gaug.) Ching: A ground fern, occasional in sunny places. Widespread in the tropics. Previously called *Dryopteris uliginosa* (O. K.) C. Chr.

Marattia smithii Mett.: A ground fern, uncommon in the forest. Found also in Melanesia.

Microlepia speluncae (L.) Moore: A ground fern, occasional in the forest. Widespread in the Old World tropics. J 154.

Microsorium scolopendria (Burm.) Copel. Lau magamaga: A medium-sized epiphytic or ground fern, common to abundant in forest and disturbed areas. It is often called *Polypodium scolopendrium* or *Phymatodes scolopendria*. Widespread and common from Africa to Easter Island. W 3401.

Nephrolepis biserrata (Sw.) Schott: A large ground or epiphytic fern, common in sunny areas at higher elevations. Pantropical. W 3544.

Nephrolepis hirsutula (Forst. f.) Presl. Vao tuāniu: A large ground fern, common to abundant in disturbed sunny places. Widespread from tropical Asia to Polynesia. W 3399.

Oleandra neriiformis Cav.: An epiphytic fern, occasional at higher elevations in the forest and montane scrub. Widespread from tropical Asia to Polynesia. W 3549.

Ophioglossum parvifolium Grev. & Hook.: A tiny ground fern, rare in the montane and cloud forest. This "adder's-tongue fern" is widespread from tropical Asia to Polynesia.

Ophioglossum pendulum L.: A hanging epiphytic fern with a single strap-shaped frond, occasional in the forest. This "adder's-tongue fern" is widespread from Madagascar to Polynesia. W 2926.

Ophioglossum reticulatum L.: A tiny ground fern with heart-shaped leaves, rare in the forest at higher elevations. This "adder's-tongue fern" is pantropical.

Pityogramma brackenridgei (Carr.) Maxon: A small ground fern, uncommon in open sunny areas. Endemic to Samoa. W 3753.

Pleisoneuron attenuatum (Brack.) Holttum: A ground fern, uncommon in the forest. Found also in Fiji and elsewhere in the Pacific. Previously called *Dryopteris brackenridgei* (Mett.) O. K.

Pneumatopteris bryanii (C. Chr.) Holttum: A large ground fern, occasional in sunny disturbed places. Endemic to Samoa. Previously called *Dryopteris bryanii* C. Chr. W 3626 (?).

Pneumatopteris glandulifera (Brack.) Holttum: A large ground fern, occasional in Samoa. Widespread in the Pacific. Previously called *Dryopteris subspinosa* C. Chr. W 3567.

Pneumatopteris rodigasiana (T. Moore) Holttum: A large ground fern, uncommon in Samoa. Widespread in the Pacific. Previously called *Dryopteris transversaria* var. *rodigasiana* (Linden) C. Chr.

Pneumatopteris transversaria (Brack.) Holttum: A ground fern, occasional in sunny places. Widespread in the Pacific. Previously called *Dryopteris transversaria* (Brack.) Brause.

Polypodium blechnoides (Grev.) Hook.: A small epiphytic fern, occasional in the montane scrub. Widespread in the Pacific. W 2788.

Polypodium contiguum (Forst. f.) J. Smith: A small epiphytic fern, uncommon in the forest. Widespread from tropical Asia to eastern Polynesia. Yuncker (1945) called this species *Prosaptia contigua* (Forst. f.) Presl.

Polypodium emersonii (Hook. & Grev.) C. Chr.: A small epiphytic fern, occasional in the forest at higher elevations. Widespread from India to Polynesia. The Polynesian variety is var. *samoense* C. Chr. W 3709.

Polypodium hookeri Brack.: A small epiphytic fern, rare in the forest. Found also in Fiji and Hawaii.

Polypodium nigrescens Bl.: A small fern, uncommon in the forest. Widespread from tropical Asia to the Marquesas.

Polypodium lepidium Brause: A small epiphytic fern, occasional in the forest. Found also in Fiji.

Polypodium polynesicum C. Chr.: A large ground fern, occasional to common in the forest. Widespread in Polynesia. Yuncker (1945) called this species *P. vitiense* Baker. J 151.

Polypodium samoense Baker: A small epiphytic fern, rare in the forest. Found also in Hawaii (?).

Polypodium subauriculatum Bl.: A large ground fern, uncommon in the forest at higher elevations. Widespread from Malaysia to western Polynesia.

Polypodium tenuisectum Bl.: A small, finely dissected fern, rare in the cloud forest. Widespread from Malaysia to western Polynesia. W 3707.

Polystichium aculeatum (L.) Schott: A medium-sized ground fern, rare in Samoa; a single specimen from Manu'a was listed as doubtful by Christensen (1943). Widespread.

Psilotum complanatum Sw.: A hanging, leafless epiphyte with flat stems, occasional in the forest. Pantropical. W 3433.

Psilotum nudum (L.) Griesb.: A small leafless ground herb, occasional in sunny places on Swains Island. Found in Western Samoa and on Swains Island; pantropical. W 3359.

Pteris comans Forst. f.: A medium-sized ground fern, occasional in the littoral to coastal forest. Widespread in the Pacific. W 2909.

Pteris ensiformis Burm.: A small epiphytic or ground fern, occasional in the forest. Widespread from Southeast Asia to western Polynesia. J 139.

Pteris pacifica Hier.: A medium-sized ground fern, occasional in the forest. Widespread in the Pacific. J 143.

Pteris tripartita Sw.: A large ground fern, occasional in sunny areas. Widespread in the Old World tropics. W 3777.

Pteris vaupelii Hier.: A large ground fern, occasional in the forest. Endemic to Samoa (?). W 3794.

Pteris vittata L. A small ground fern, occasional in sunny areas on poor soil. Widespread. W 2975.

Pyrrosia adnascens (Forst. f.) Ching: A small creeping fern, common on trees in disturbed places. Formerly called *Cyclophorus adnascens*. Widespread from tropical Asia to Polynesia. W 2821.

Schizaea dichotoma (L.) Smith: A tiny leafless ground fern, uncommon in the forest. Widespread from Madagascar to Polynesia. J 141.

Selaginella christii Hier.: A small ground herb, collected once on Tutuila and once in "Samoa." Endemic to Samoa.

Selaginella laxa Spring: A tiny herb, uncommon in the forest. Found also in Tahiti, Fiji, and Tonga.

Selaginella reineckei Hier.: A small ground herb, occasional in the forest at higher elevations. Endemic to Samoa. W 3045.

Selaginella whitmeei Baker: A small ground herb, occasional on mossy stream bed rocks. Endemic to Samoa.

Sphaerostephanos reineckei (C. Chr.) Holttum: A ground fern, uncommon in the forest at higher elevations. Endemic to Samoa. Previously called *Dryopteris reineckei* C. Chr.

Sphaerostephanos unitus (L.) Holttum: A ground fern, occasional in sunny disturbed places. Widespread from Madagascar to Polynesia. Previously called *Dryopteris unitus* (L.) Holttum.

Sphenomeris chinensis (L.) Maxon: An epiphytic fern, rare in the forest. Widespread from Madagascar to the Marquesas. Previously called *Stenoloma chusanum* (L.) Ching.

Tectaria chrysotricha (Baker) C. Chr.: A medium-sized ground fern, occasional in the forest. Its presence in American Samoa is based on a single specimen of Graeffe (Christensen 1943), whose data are occasionally in error. Found also in Fiji (?).

Tectaria decurrens (Presl) Copl.: A ground fern, occasional in the forest at higher elevations. Widespread from tropical Asia to Tahiti.

Tectaria setchellii Maxon: A medium-sized ground fern, occasional in the forest. Found also in Tonga (?). W 3793.

Tectaria stearnsii Maxon: A medium-sized ground fern, common in the forest. Endemic to Samoa (?).

Trichomanes apiifolium Presl: A small epiphytic fern, uncommon in the forest at higher elevations. Widespread from Sumatra to western Polynesia. W 3710.

Trichomanes assimile Mett.: A tiny, filmy epiphytic fern, uncommon in the forest at higher elevations. Found also in New Caledonia and the New Hebrides.

Trichomanes bimarginatum van der Bosch: A tiny, filmy epiphytic fern, uncommon in the forest. Widespread from tropical Asia to Polynesia.

Trichomanes bipunctatum Poir.: A tiny, filmy epiphytic fern, occasional in the forest at higher elevations. Widespread from Africa to Polynesia.

Trichomanes boryanum O. K.: A small ground fern, occasional in the forest at higher elevations. Widespread in the Pacific. W 3570.

Trichomanes dentatum van der Bosch: A ground fern, occasional in the forest and stream beds. Found also in New Caledonia and Tahiti.

Trichomanes endlicherianum Presl: A small, delicate epiphytic fern, occasional in the forest at higher elevations. Widespread in Polynesia.

Trichomanes humile Forst. f.: A small, delicate epiphytic fern, occasional at higher elevations in the forest. Widespread from tropical Asia and Australia to Polynesia.

Trichomanes intermedium van der Bosch: A small, delicate epiphytic fern, common to abundant on trees in the montane and cloud forest. Found also in Fiji and New Guinea. W 3562.

Trichomanes omphalodes (Vieil.) C. Chr.: A tiny, delicate epiphytic fern with round leaves appressed to the tree bark, rare in the forest. Widespread from Tahiti to Java.

Trichomanes pallidum Bl.: A small, delicate epiphytic fern, rare in the forest at higher elevations. Widespread from Ceylon to the Marquesas.

Trichomanes saxifragoides Presl.: A tiny, delicate epiphytic fern, occasional in the montane and cloud forests. Widespread from tropical Asia to the Marquesas. W 3715.

Vaginularia angustissima (Brack.) Mett.: A tiny, delicate epiphytic fern with clumped strap-shaped fronds, occasional in the forest. Found also in Tahiti (?) and Fiji. Yuncker (1945) calls this species *V. paradoxa* (Fee) O. K. W 3019.

Vittaria elongata Sw.: A strap-shaped, epiphytic fern, rare in the forest. Widespread in the Old World tropics.

Vittaria rigida Kaulf.: A strap-shaped epiphytic fern, occasional in the forest at all elevations. Widespread in Polynesia. W 2822.

Vittaria scolopendria (Bory) Thou.: A strap-shaped epiphytic fern, rare in the forest. Widespread from Madagascar to western Polynesia.

Weatherbya accedens (Bl.) Copel.: An epiphytic fern, occasional in the forest and plantations. This widespread fern was previously called *Athyrium accedens* (Bl.) Milde.

Vertebrate Animals

Samoan names of vertebrates are from Pratt (1893), Goo and Banner (1963) and Milner (1966) for all groups. For some groups, Samoan names are also found in Whitmee (1875), Mitchell (1909), Armstrong (1932), Mayr (1945), Yaldwyn (1952), Ashmole (1963), and Marsack (1973). Some of the names provided by these authors are specific in Western Samoa, and a species may have another name in American Samoa. In addition, Samoan names are often applied to more than one species. In general, the Samoan names listed first in the species accounts are in current use in American Samoa.

Specimens taken in this study are deposited in the U.S. National Museum of Natural History, Washington, D.C. Specimens taken by the Whitney South Seas Expedition in the 1920's are in the American Museum of Natural History, New York (AMNH). The Pacific Ocean Biological Survey Program (POBSP) of the Smithsonian Institution was responsible for the collection of a number of specimens in 1966 and 1967, many of which have not previously been reported; these are in the USNM. The location of a few other specimens is noted in the species accounts.

Names heading a few species accounts are in square brackets; these are species that have been reported in the past with inadequate supporting data or species reported from American Samoa in error.

Amphibians and Reptiles

The rocky lava soil, with its many cracks and crevices, and the dense ground cover in many habitats prohibited the use of many conventional survey techniques. Most skinks were surveyed by walking slowly through study plots or along measured transects, counting and collecting the lizards. Observations were usually made in the morning hours when the skinks were active. Geckos were counted on building walls, trees, rock facings, and other places where they were found at night. The marine toad was counted at night in open areas and during the day where concentrations were found along streams, marshes, or in mangrove swamps.

The 41 community study plots were augmented by 88 herpetofauna collecting sites for studies on distribution and abundance of the amphibian and reptiles. Data obtained from sampling in plots and along transects were converted to average numbers of lizards per 100 m^2. Densities presented are averages for all similar habitats sampled. The abundance of certain arboreal or secretive species is given as the number of individuals per tree or building. Where sample sizes are adequate, inter-island differences in density are noted. Population estimates for species on which adequate data are available are summarized in Table 45.

Table 46 summarizes the distribution of the herpetofauna of American Samoa, indicates specimens taken on the islands, and notes distributional records reported for the first time in this paper. One species of amphibian and 15 species of reptiles occur in American Samoa. In population numbers, they are the most abundant vertebrates on the islands. The only amphibian is the marine toad, *Bufo marinus,* an introduction on Tutuila and Aunu'u. The 15 reptiles include 2 marine turtles, 7 skinks, 5 geckos, and 1 snake. One species, the house gecko (*Hemidactylus frenatus*), is believed to be a recent introduction. The Pacific boa, *Candoia bibroni,* not previously reported from American Samoa, is restricted to Ta'ū Island. A total of 37 new insular distributional records are presented.

Scientific and English names are those used by Burt and Burt (1932), Loveridge (1945), Brown (1957), and Cogger (1975) unless otherwise noted.

The species are listed in taxonomic order by family and genus; they are listed alphabetically within each genus because of uncertainty of phylogenetic relationships.

Marine Toad, *Bufo marinus*

Samoan name.—Lage. Milner (1966) listed the name *rane,* meaning frog, but gave no Samoan word for toad.

Status.—Recent introduction, restricted to Tutuila and Aunu'u. A population of 2,296,000 marine toads was estimated on Tutuila (Table 45).

Discussion.—The marine toad was collected or observed at locations shown in Fig. 10. Breeding sites were identified by the presence of tadpoles or clasping pairs. On Tutuila, toads were concentrated in lowland areas near standing fresh

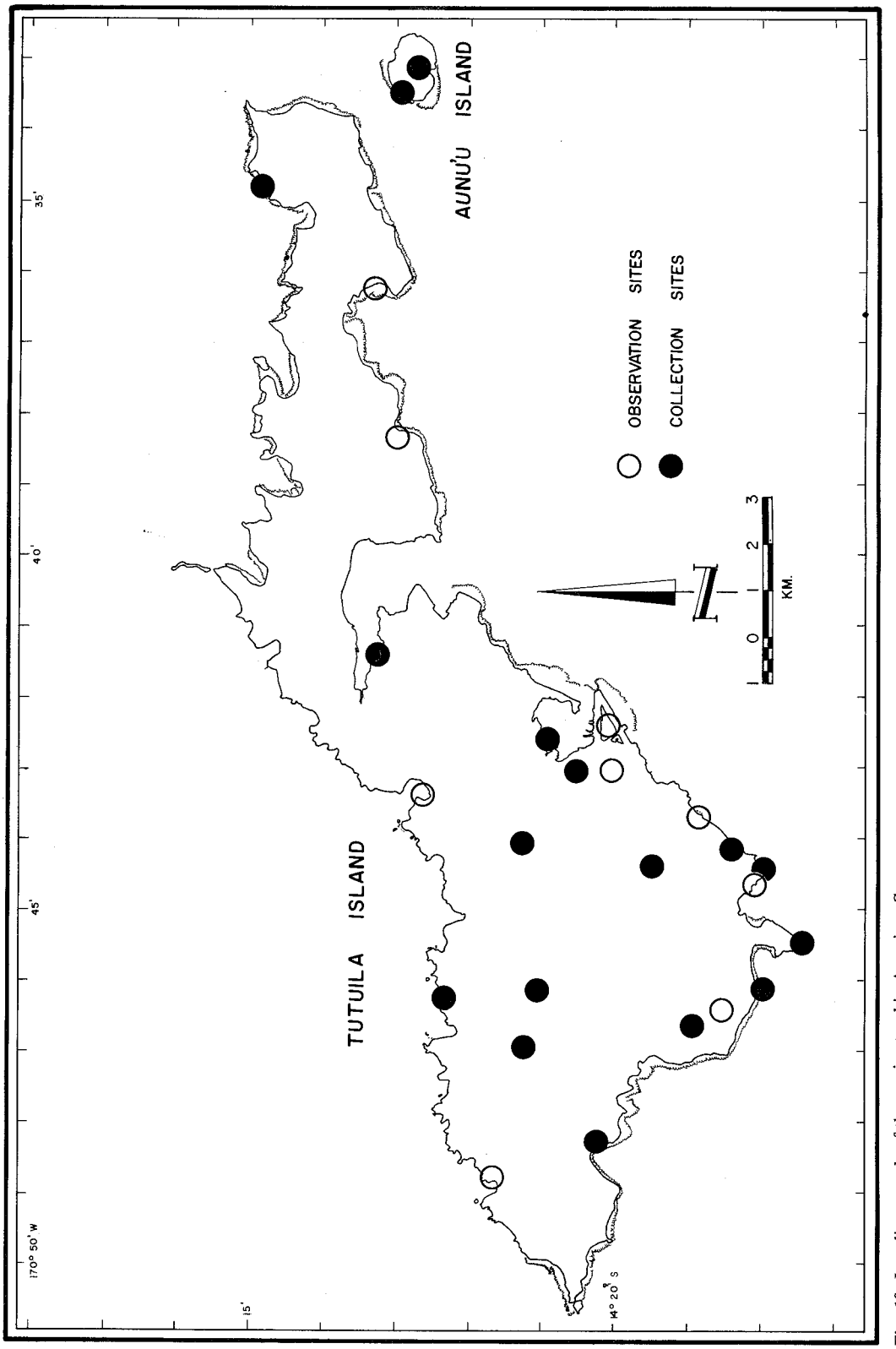

Fig. 10. Locality records of the marine toad in American Samoa.

water, in streams, and in brackish tide pools. None was found, and presumably the species does not live, on the higher mountain peaks. On Aunu'u, populations were largest near the disturbed Taufusitele Marsh. A specimen was collected and several were sighted on the fern and sedge growth of the undisturbed Faimulivai coastal marsh.

The largest populations (Table 47) were found in lowland areas, particularly near human habitation, frequently on mowed lawns. Toads were active only at night; during the day they were found hiding in hedgerows, under garden rocks, in tree stumps or rotted logs, and in rock crevices, often near the mouths of streams. Active adult specimens were observed in every month of the study. Tadpoles or clasping pairs were also observed each month, but no egg masses were found and tadpoles were not found in any one locality in all months. Casual observations of tadpoles in streams subject to rapid changes of water level and flow indicated that many may be washed out to sea after heavy rains.

The marine toad was introduced to Tutuila from Hawaii in 1953 by the U.S. Department of Agriculture as a general control on insect pests (Government of American Samoa 1953). According to Sipaia Fatuesi, a Samoan who assisted the U.S. Department of Agriculture in the introduction, several pairs were bred in artificial ponds at Taputimu Farms on Tutuila. Tadpoles were removed to standing fresh water in at least two other localities on Tutuila—at Tafuna, near the government housing area, and near the governor's mansion. No data on the introduction of the toad to Aunu'u are available.

Although this toad was introduced to control insects and centipedes, no benefits have been assessed to date. Examination of stomachs of marine toads revealed a variety of insects and some vegetation, largely bits of grass. Roaches and caterpillars were common items of diet. These observations are similar to those summarized by Zug et al. (1975) for introduced *B. marinus* in New Guinea, and by Tyler (1976) for introduced populations in Australia.

This toad may have caused more damage than benefit in American Samoa. No direct evidence exists, but there may be a correlation between the high incidence of polluted drinking water and dysentery on Tutuila and the high densities of toads near human dwellings. A high incidence of *Salmonella* in toads (and various reptiles), particularly near human habitations, was reported by Kourany et al. (1970) in Panama. Further, the large number of marine toads on Tutuila and Aunu'u causes a public nuisance. At night toads congregate near outdoor lighting fixtures to catch insects; some inevitably find their way into houses. On Tutuila, toads congregate on roads beneath streetlights where many are killed by passing vehicles, causing an unsightly mess and a potential driving hazard.

A study to determine the toad's effectiveness in reducing unwanted insects and other arthropods is needed; possible detrimental effects should also be studied. No introductions should be made to the other islands.

Specimens.—A total of 50 specimens (and tadpoles) were collected in 1976 on Tutuila and Aunu'u. Four unreported specimens were collected on Tutuila by the POBSP (USNM).

Black Turtle, *Chelonia agassizii*

Samoan name.—Laumei; i'asa. Laumei is applied specifically to the hawksbill turtle, *Eretomochelys imbricata,* by Pratt (1893) and Goo and Banner (1963).

Status.—Rare; breeds annually on Rose and Sand islands, possibly on Swains Island; infrequent visitor to Tutuila, Aunu'u, Ofu, Olosega, and Ta'ū. Populations at Rose Atoll have been small throughout the years (Table 18). Many old nest pits were seen on Rose and Sand islands in October 1975 and May 1976, but few recent nests were found.

Discussion.—Records of the black turtle on Rose Island from recent observations and the literature are given in Table 48. One black turtle hatchling was captured, photographed, and released in October 1975 near Rose Atoll. Four individuals were observed swimming in the lagoon at Rose Island 5-7 May 1976, and two large, recently killed turtles, identified by their carapaces, were noted at Swains Island on 20 May 1976.

Evidence of the black turtle's presence on other Samoan islands is from native sources; all reports indicate infrequent visitation by the turtle, primarily along the reefs. On Tutuila, the black turtle was reported in small numbers within Pago Pago Harbor, Pala Lagoon, the Vaitogi coast area, Larsen Bay, Fagatele Bay, and Masefau Bay. On Aunu'u, turtles were reported to lay eggs occasionally on the sand beaches along the Agaoleatu Point area on the north side of the island. Inhabitants on Ofu reported that black turtles previously nested in small numbers on the sand beaches along the southeast shore, but have been seen only offshore in recent years. Olosega inhabitants likewise reported previous nesting by black turtles in small numbers on the sand beaches, but none in recent years. On Ta'ū, the black turtle reportedly bred on the sand beaches historically; in recent years it has been seen only offshore, where it is occasionally captured for food and for the shell.

Because black turtles were known to dig numerous false pits before depositing eggs, any attempt to count pits in the absence of adult turtles must be interpreted with care. The number of pits and frequency of observations, however, indicate that a breeding population of black turtles survives on Rose Atoll. During the October 1975 and 1976 visits to Rose Atoll, the mean number of black turtles, estimated from beach tracks, was 47; the mean number of nest pits was 401 (239 on Rose Island and 162 on Sand Island). Few turtles were actually seen during our survey and some of the nest pits could have been those of the hawksbill turtle.

Nests have been reported on Rose Atoll from August to November, but egg laying and hatching have been observed only in November.

Because of the black turtle's similarity to the endangered hawksbill, and because the black turtle population and its migratory patterns are relatively unknown, native Samoans

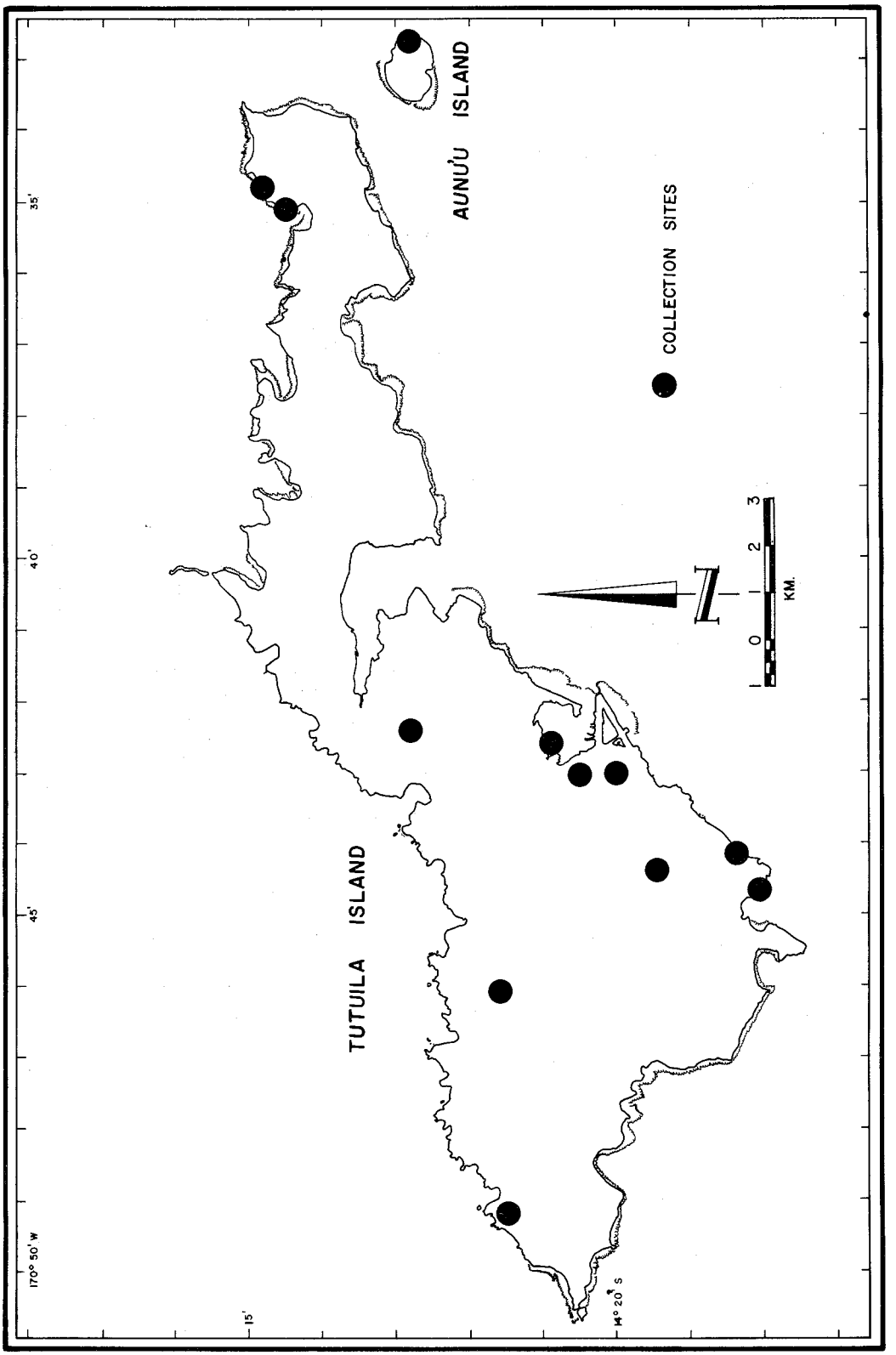

Fig. 11. Distributional records of the Polynesian gecko on Tutuila and Aunu'u islands.

should be encouraged to distinguish between the species. Further study is needed to obtain better population and breeding data throughout the islands, and additional study of predation on black turtles by Polynesian rats (*Rattus exulans*) should be made at Rose Atoll National Wildlife Refuge.

We follow Carr (1972) in considering *C. agassizii* a species distinct from the green turtle, *C. mydas*. Data to help clarify the taxonomic status of these forms should be accumulated during future studies in Samoa.

Hawksbill Turtle, *Eretmochelys imbricata*

Samoan name.—Laumei.

Status.—Very rare; apparently an infrequent visitor to Rose Atoll and Tutuila.

Discussion.—Graeffe (1873) recorded the hawksbill turtle at Sand Island, Rose Atoll, from observations by a Capt. Rantzau, who visited the atoll on unknown dates while a German firm was trying to establish a fishing station there (see Sachet 1954). Most visiting scientists recorded black turtles, but few observed the hawksbill. Sekora (1974) observed two hawksbill turtles in the Rose Atoll lagoon 22-23 November 1974, and stated that S.N. Swerdloff "informs me that the hawksbill turtle nests here in the early part of the year (May, June, and July) . . . however, the nesting numbers are not known." None was recorded on the three visits to the atoll during the present study. A hawksbill turtle was reported in Pago Pago Harbor, Tutuila, in recent years (J. Yamasaki, personal communication, 1976).

Pelagic Gecko, *Cyrtodactylus pelagicus*

Samoan name.—Mo'o, mo'osina, mo'otai. The term pili mo'o is commonly used by American Samoans for several or all of the geckos.

Status.—Possibly abundant locally, but collected at only a single locality each on Tutuila and Ta'ū islands. The density estimate for the Lavania Cove study area, Ta'ū, was 14.7/100 m^2.

Discussion.—The pelagic gecko, widely distributed in the Pacific area, is secretive and nocturnal. Unlike other geckos in American Samoa, this species lacks toe pads. Its large eyelids may protect the eyes during foraging under debris. This gecko hides under the coral and lava rocks that form the substrate of the *Barringtonia* forest at Lavania Cove. On two nights at this locality, 19-20 July 1976, Schwaner and Amerson captured 23 specimens and observed 21 others in a study area 10x30 m. The geckos emerged from under rocks about 1830 and climbed *Barringtonia* trees. Some were seen retreating down the tree trunks just before 2030 and none was observed on the trees after then. When pursued on the trees, the lizards invariably attempted escape downward toward the rocks rather than upward; similar observations have been reported for this species by Hediger (1934) in New Britain. A single gecko was found beneath a large lava rock near an unoccupied dwelling at Nua Village, Tutuila, at 1830 on 26 July 1976.

Several of the captured females were gravid; each had two eggs clearly visible through the abdominal wall.

Specimens.—A total of 15 female specimens of pelagic geckos was collected from Tutuila and Ta'ū during this study.

Polynesian Gecko, *Gehyra oceanica*

Samoan name.—Mo'o (see pelagic gecko).

Status.—Common on all islands. We estimated the population of the Polynesian gecko in American Samoa to be about 6,105,000, making it the second most abundant vertebrate species on the islands (Table 45). More than 90% of the population was living in plantations and most of the remaining 10% inhabited littoral and coastal forests.

Discussion.—The Polynesian gecko, a nocturnal species, is widely distributed in a number of habitats (Table 49) from sea level to about 366 m on all the islands of American Samoa (Figs. 11-13). Most specimens and observations of adults were obtained at night in areas of human habitation, especially on the walls of buildings with wooden roofs. Periodic counts from such buildings indicated an average of 2 or 3 adult lizards per housing unit at Tafuna. Eggs and adults were also found in vegetation, sometimes in abundance. On Swains Island, adults and juveniles were taken from under the bark of dead breadfruit trees, and communal clutches (up to 10 eggs) were found under the bark of coconut trees. Eggs and adults were found under the bark of coconut stumps on Ofu and Olosega. Adults were observed less often on tree trunks and in bird's-nest ferns, but one large adult was observed high in a small *Barringtonia* tree at Lavania Cove on Ta'ū. Many were observed hiding by day under the tin coverings of concrete water reservoirs on Olosega. On Rose Atoll, geckos were concentrated on a hollow concrete marker near the coconut trees. Eggs were collected from under dead *Pisonia* tree bark nearby and clutches were often found near the bases of the tree stumps (in contrast to eggs of the mourning gecko, which were located near the tops of the stumps).

The Polynesian gecko apparently lays two eggs per clutch and presumably reproduces year round (Fitch 1970); our data tend to support this for the species in American Samoa. Egg clutches were collected or observed from February to July 1976, and juveniles were observed in all months of the study.

Specimens.—A total of 66 specimens were collected from all seven islands during the study. Of these, 13 were hatchlings or embryos with egg shells. Burt and Burt (1932) reported two specimens collected at Tutuila during the Whitney South Sea Expedition of the 1920's (AMNH). One unreported specimen (USNM) collected by the POBSP, 1966-67, is known from Swains Island.

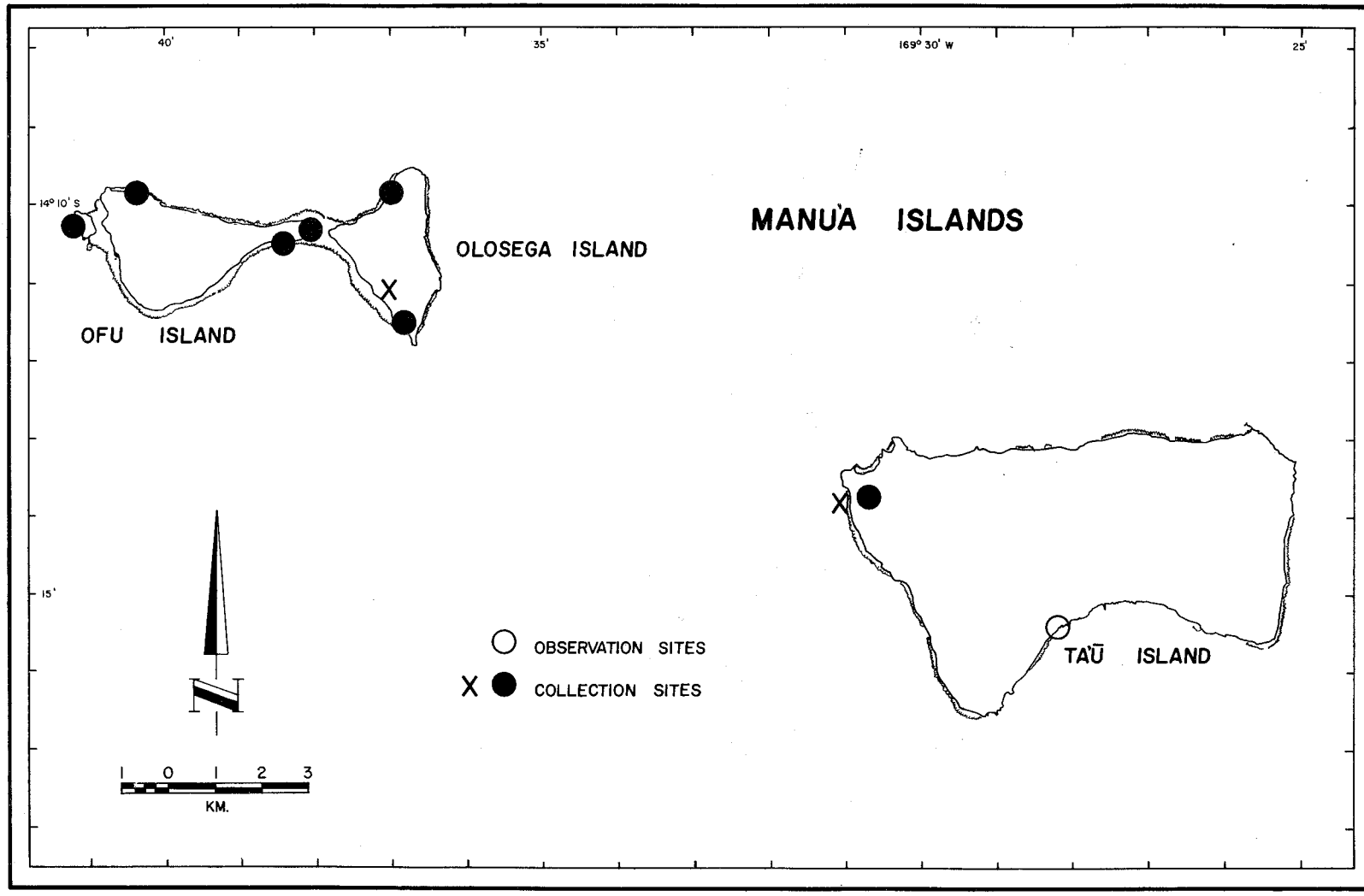

Fig. 12. Locality records of the Polynesian gecko (circles) and stump-toed gecko (X) on Ofu, Olosega, and Ta'ū islands.

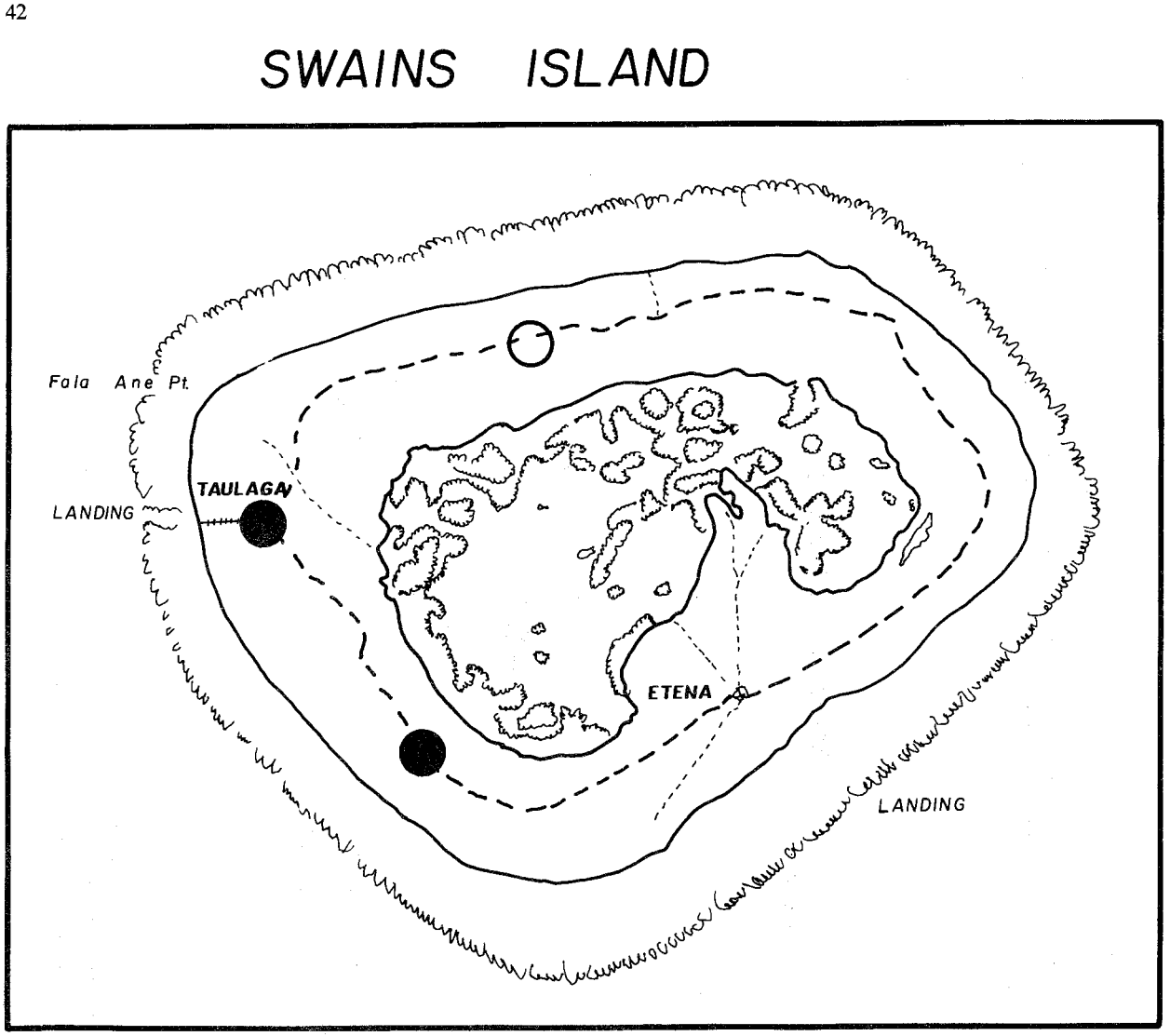

Fig. 13. Records of the Polynesian gecko (3 localities) and mourning gecko (collection sites only) on Swains Island. Solid dots represent collection sites, circle is observation site.

House Gecko, *Hemidactylus frenatus*

Samoan name.—Mo'o (see pelagic gecko).

Status.—Very common in a single locality on Tutuila; apparently a recent introduction which has been unable to expand its range. At the six buildings of the Air Force housing complex an average of 10 house geckos per building was counted around lights at night.

Discussion.—The house gecko was found only on the single-story barracks known as "Air Force housing" on Tutuila, although a single clutch of two eggs was collected from a rotting wooden crate about 1,000 m away. The barracks are adjacent to Pago Pago International Airport, and they and the airport have a frequent turnover of people and cargo from various parts of the Pacific region, where this species is widely distributed. Adult and juvenile house geckos were taken from the wooden roof overhangs and exterior walls of these buildings. The Polynesian and mourning geckos share these overhangs with the house gecko, but are not as abundant here as they are where house geckos are absent.

Specimens.—Eleven specimens were collected on Tutuila; two were hatchlings with eggshells.

Mourning Gecko, *Lepidodactylus lugubris*

Samoan name.—Mo'o (see pelagic gecko).

Status.—Very common on all the islands; the second most abundant gecko in American Samoa, where the population was estimated to be about 5,238,000 (Table 45). More than 99% of the population lived in plantation land (all islands) and 1% inhabited littoral forest (Tutuila, Aunu'u, and Rose

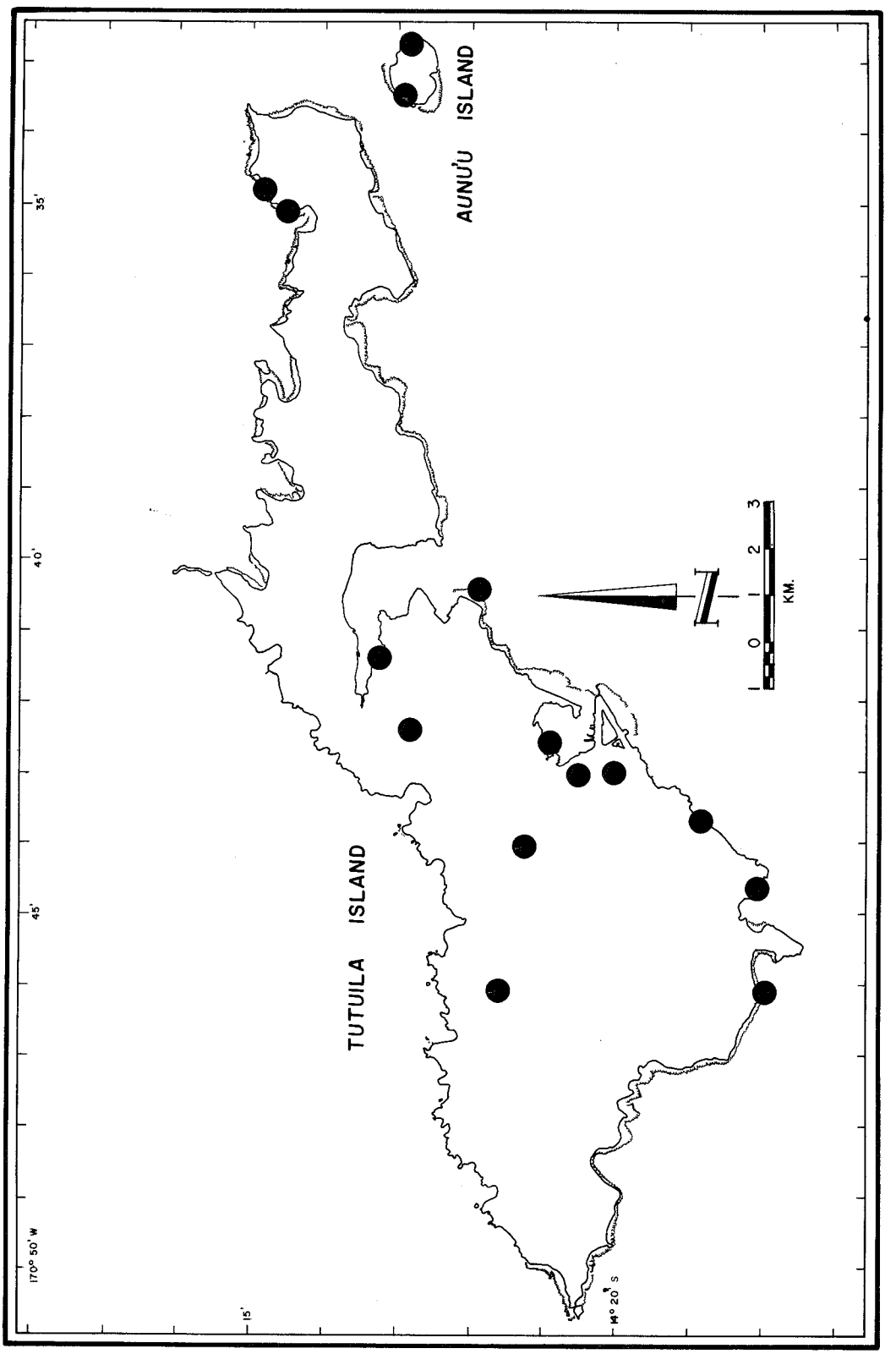

Fig. 14. Collection sites of the mourning gecko on Tutuila and Aunu'u islands.

islands). None was observed at elevations above 366 m (Figs. 13-15).

Discussion.—The mourning gecko is a nocturnal or partly crepuscular species, with high activity periods in the early evening and morning. Several major habitats of the mourning gecko and the density in each are shown in Table 50. Areas of human habitation, particularly occupied buildings, supported large populations of this gecko. The difference in the density of these lizards in occupied and unoccupied buildings may be related to the presence in the former of lights that attract many small insects upon which the geckos feed (Hediger 1934).

Concentrations of adult and juvenile mourning geckos were also found in frangipani and *Morinda* trees. At night the geckos perched near the flowers or fruits, catching small moths and other insects.

Communal clusters of eggs were commonly found in rock strand areas; these clusters ranged from a few clutches of 2 eggs each in narrow crevices to as many as 50 eggs in a single large patch. The eggs were usually stuck together and affixed to horizontal rock overhangs. Clusters of eggs laid in this position may be protected from crab predation since crabs are presumably unable to hang upside down from a rock surface. Cagle (1946) reported similar observations on Tinian in the Mariana Islands.

Eggs, juveniles, and adults were observed year-round; Fitch (1970) reported that in Hawaii an individual female may lay one or two eggs per clutch every 2 weeks.

Specimens.—A total of 137 specimens was collected from all seven islands. Of these, 21 were hatchlings or embryos with eggshells. One specimen (MCZ) was collected by Mayor (1924) from Rose Island. Burt and Burt (1932) reported a specimen from Tutuila (AMNH). Seven previously unreported specimens (USNM) were taken by the POBSP, 1966-67—one from Swains Island and six from Tutuila.

Stump-toed Gecko, *Peropus mutilatus*

Samoan name.—Mo'o (see pelagic gecko).

Status.—Locally common, but restricted in habitat; known from Olosega, Ta'ū, and Swains islands (Figs. 12, 16).

Discussion.—This species was restricted to large buildings with wooden roof overhangs. On 9-10 June 1976, 10 individuals were seen along the perimeter of the roof overhang of the Olosega Village Church, and 7 were counted on the bellfry of the abandoned church at Ta'ū on 13 July 1976. At Swains Island the species was found only at a copra barn.

Wermuth (1965) lists this species as *Gehyra mutilata,* but we prefer to retain the generic name *Peropus.*

Specimens.—Nine specimens were taken on Olosega, Ta'ū, and Swains islands.

Snake-eyed Skink, *Ablepharis boutonii*

Samoan name.—Pili; pilialosama; pilileofeti'i; pili oua'; piliuli. The most common term in American Samoa for the skinks is pili.

Status.—Rare; only two individuals were seen during this survey.

Discussion.—A single specimen of snake-eyed skink was collected at Leaumasili Point, Olosega, about 10 m from pounding surf in bare lava rock; the closest vegetation was *Scaevola,* about 5 m away at the base of a steep cliff. Schwaner saw one on Futi Rock, Tutuila, on 27 March 1976; only its tail was obtained when he attempted to capture it.

The scarcity of this lizard was unexpected, because several specimens were taken by earlier investigators. The snake-eyed skink is one of the most commonly reported species on atolls and other low islands throughout the Pacific region and has been reported as a frequent and initial colonizer of low islands, where it is found in beach debris or adjacent vegetation (Burt and Burt 1932; Loveridge 1945).

One explanation for the rarity of this species in American Samoa may be compeition with the azure-tailed skink, *Emoia cyanura,* which was abundant along the coasts in beach litter and adjacent coastal strand vegetation. The two species are of similar size and body proportions, and it is likely that they take food items of similar size. Both species occur on several islands in the Pacific, but many of the coexisting populations are on larger, more diverse islands. On such islands, the azure-tailed skink may occupy interior lowlands, particularly near human habitation, whereas the snake-eyed skink occupies the coastal areas. Coastal areas are subject to tidal fluctuation and may be inundated by storm waters. Animals living in such precarious habitats must disperse readily and must have wide distributions to avoid local extinction (MacArthur and Wilson 1967). Since the 1920's, much of Tutuila's southern coast has been developed or otherwise changed by human intervention. Such changes may have caused a reduction in suitable habitat for *A. boutonii* or an increase in habitat favorable for *E. cyanura.*

Additional studies are needed to determine the actual size of the population of the snake-eyed skink in American Samoa, to delineate its range accurately, and to determine any adverse conditions for the species.

Specimens.—One specimen from Olosega and one tail from Tutuila were collected in this study, as noted above. Burt and Burt (1932) reported seven specimens from Tutuila and six from Olosega (AMNH). A previously unreported specimen (USNM) was taken by Lt. H. C. Keller on Ta'ū in 1917 or 1918 (date unrecorded).

Micronesian Skink, *Emoia adspersa*

Samoan name.—Pili (see snake-eyed skink).

Status.—Fairly common on Swains Island (Fig. 17), where the population was estimated to be about 35,300 (Tables 45, 51).

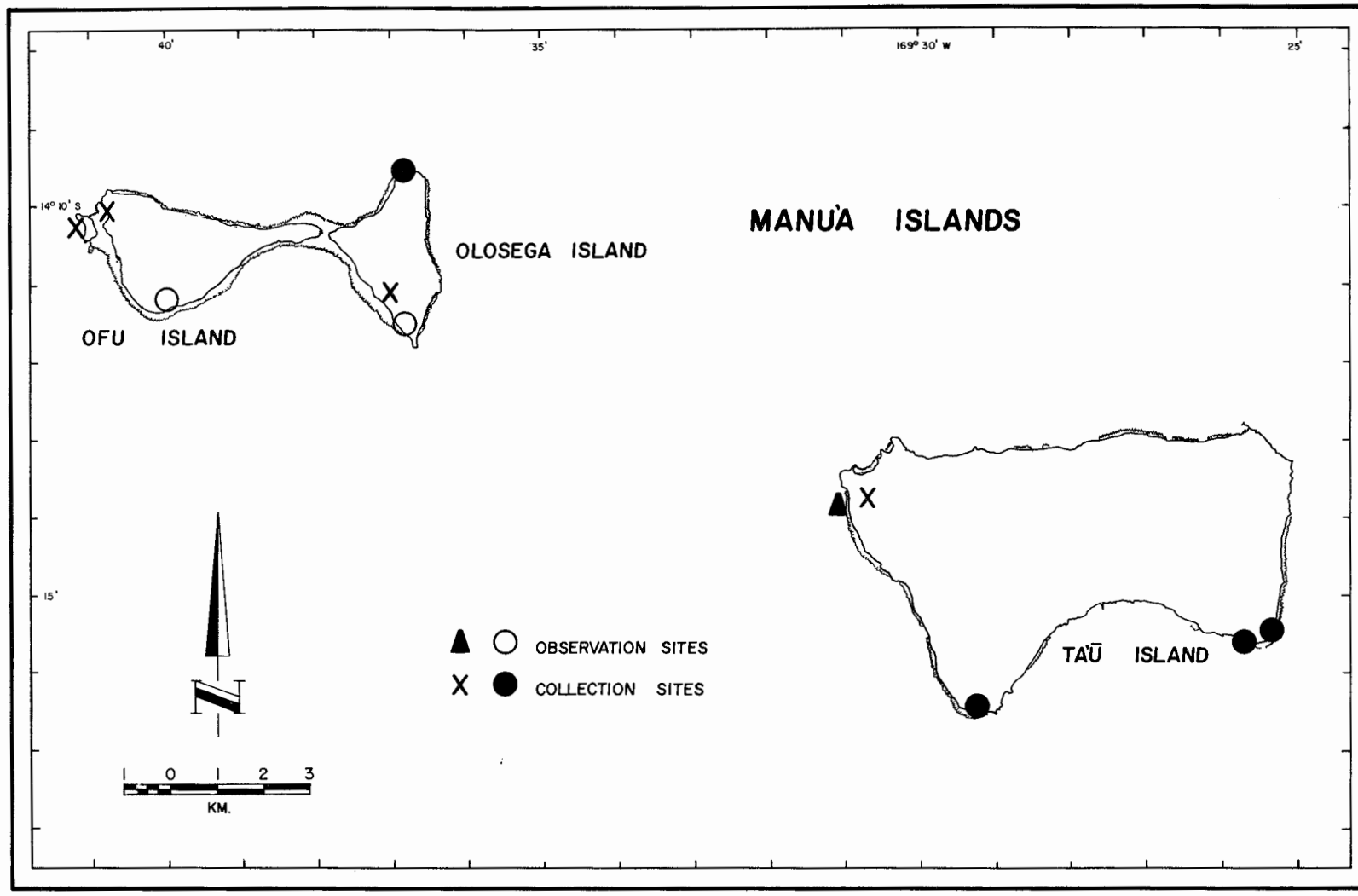

Fig. 15. Records of the mourning gecko (X's, triangles) and Lawes skink (circles) on Ofu, Olosega, and Ta'ū islands.

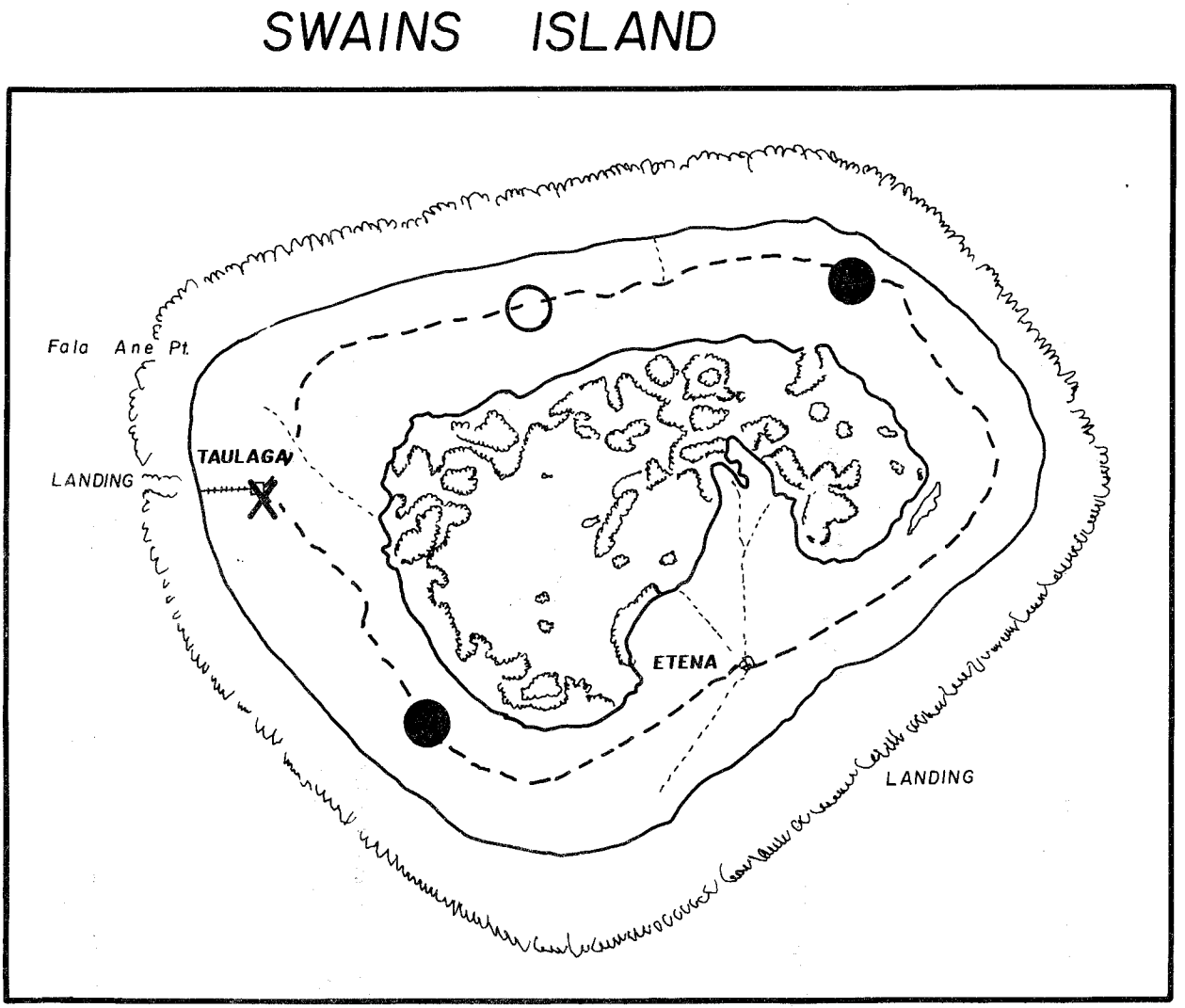

Fig. 16. Locality records of the stump-toed gecko (X, collection site) and moth skink (circle, observation site; dots, collection sites) on Swains Island.

Discussion.—The Micronesian skink, the largest lizard on Swains Island, is diurnal and semi-fossorial. Activity began at sunrise, slightly earlier than in the other diurnal skink on the island, *E. cyanura.* Individuals were seen emerging from and escaping to burrows or holes at the bases of large breadfruit trees. Many were captured or observed as they perched on fallen coconuts or logs. Distribution was fairly even around the island in forested areas. Many were seen along the pathway around the island where direct sunlight penetrated to the forest floor at some portion of the day; slightly greater numbers were observed in the more heavily forested areas.

Casual examination of stomach contents of specimens revealed a diet consisting primarily of isopods, insects, and snails; one individual had swallowed a small fiddler crab.

Specimens reported as *E. adspersa* from Olosega Island (Burt and Burt 1932) are actually *E. lawesii,* which had been synonymized with *adspersa* by Boulenger (1887). We follow Sternfeld (1920) in recognizing both species.

Specimens.—Twelve specimens were collected on Swains Island in the present study. A previously unreported specimen (USNM) taken by the POBSP is the basis for Clapp's (1968) mention of the black skink, *E. nigra,* on Swains Island.

Azure-tailed Skink, *Emoia cyanura*

Samoan name.—Pili (see snake-eyed skink).

Status.—Extremely abundant; found on all islands except Rose Atoll; present in most habitats but less common in heavy forest at higher elevations. This is the most common vertebrate on each of the Samoan islands where it occurs

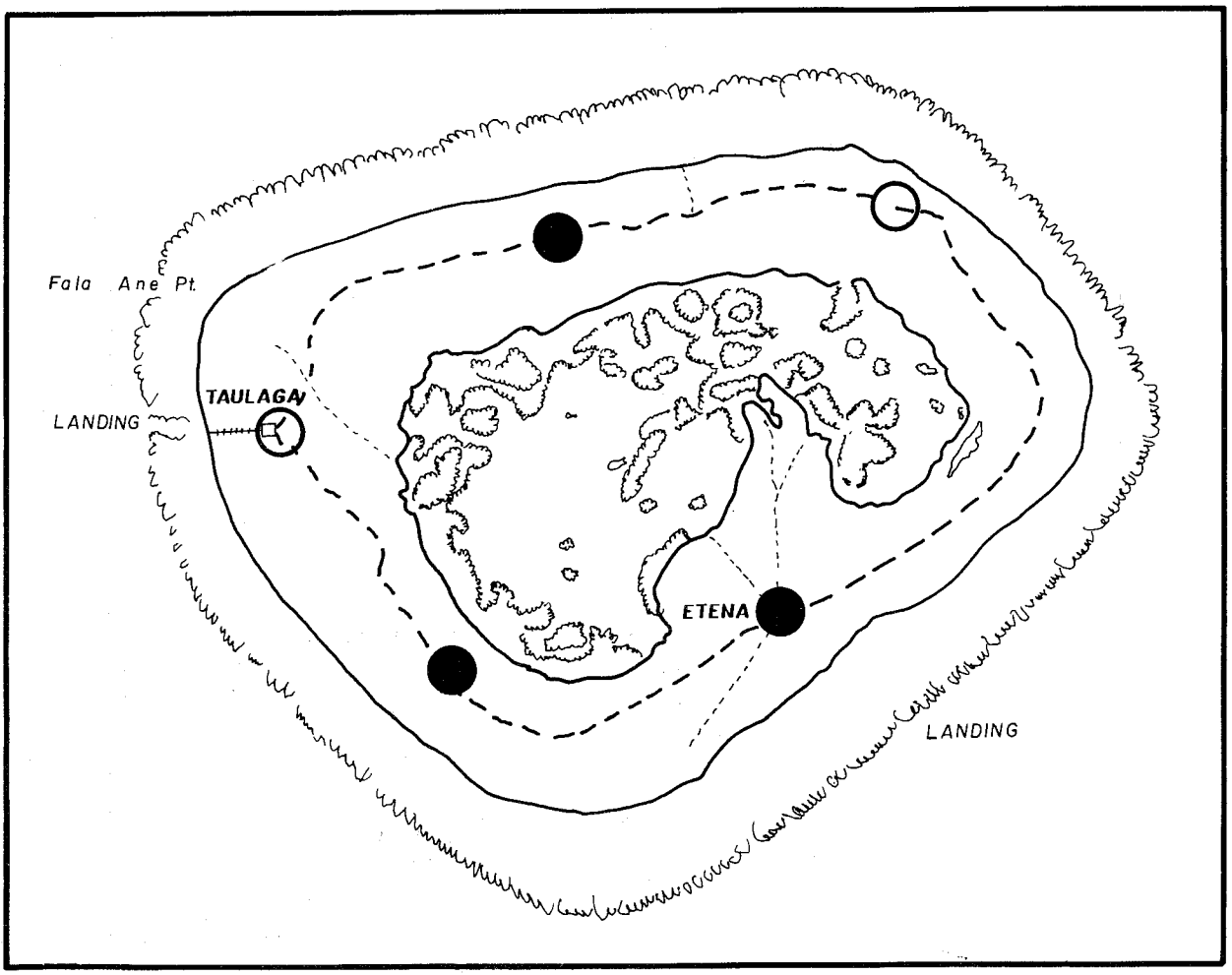

Fig. 17. Records of the Micronesian skink on Swains Island. Dots are collection sites, circles are observation sites.

(Figs. 18-20); the total population on American Samoa was estimated at about 17,540,000 individuals (Table 45).

Discussion.—The azure-tailed skink prefers open areas with direct sunlight (Table 52) and was absent from heavily forested regions along mountain ridges (Tutuila and the summit of Ta'ū) and from the Ofu rain forest slope study plot. Its presence at the top of Matafao Mountain, Tutuila, may be accounted for by the absence of trees at the summit and the numerous trails, along which sunlight penetrates to the forest floor, leading to the peak. On Ta'ū, a single individual was observed under forest canopy on Liu Bench (elevation 366 m). On Ofu, three were seen in a patch of sun provided by a break in the forest canopy near the top of Tumu Mountain, but no others were seen at that elevation. Data (Table 52) suggest a decrease in density from lowland (particularly disturbed or open habitats) to highland areas where forest predominates.

Despite the name, most of these skinks in American Samoa have green or brown tails. Individuals with blue tails in life frequented shaded areas at the forest edges. Green-tailed individuals were most active in open habitats, particularly in *Pandanus,* banana, or breadfruit leaf litter, and in the mulch of taro plantations. A particularly dense population occurred along the roadway around Swains Island. Fallen coconut leaves were favorite basking sites, as were rocks in gardens and low vines, shrubs, or herbaceous vegetation in disturbed areas.

Clusters of eggs were found under garden rocks or rotting coconut stumps from February to August 1976, when most of our herpetological observations were made. This species lays two eggs per clutch (Baker 1947; Greer 1968) and the clusters represent communal nesting sites. We found 75 eggs and egg casings under one rock; about 60% were unhatched eggs in various stages of development and the rest were empty

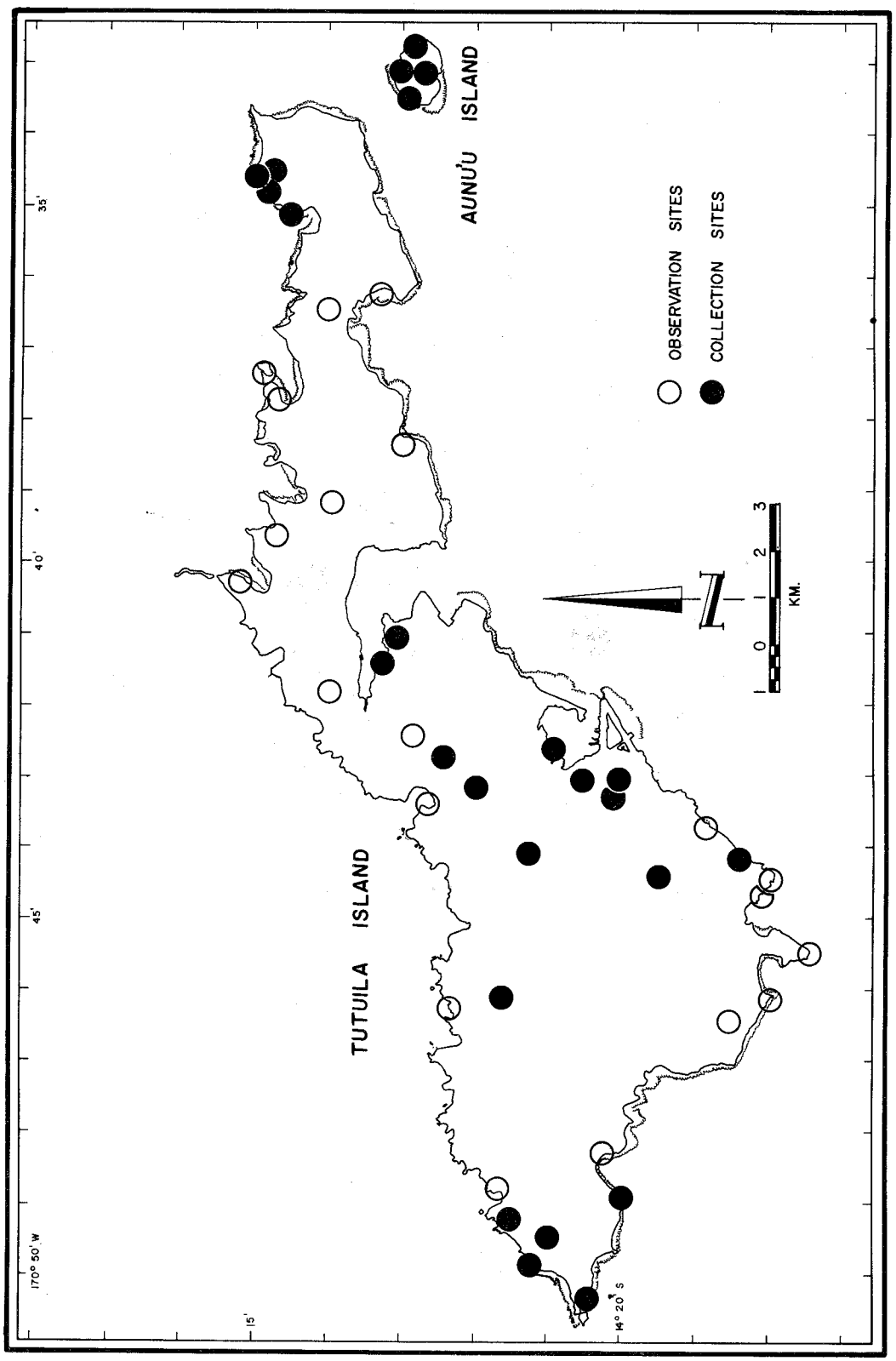

Fig. 18. Localities where the azure-tailed skink was found on Tutuila and Aunu'u islands.

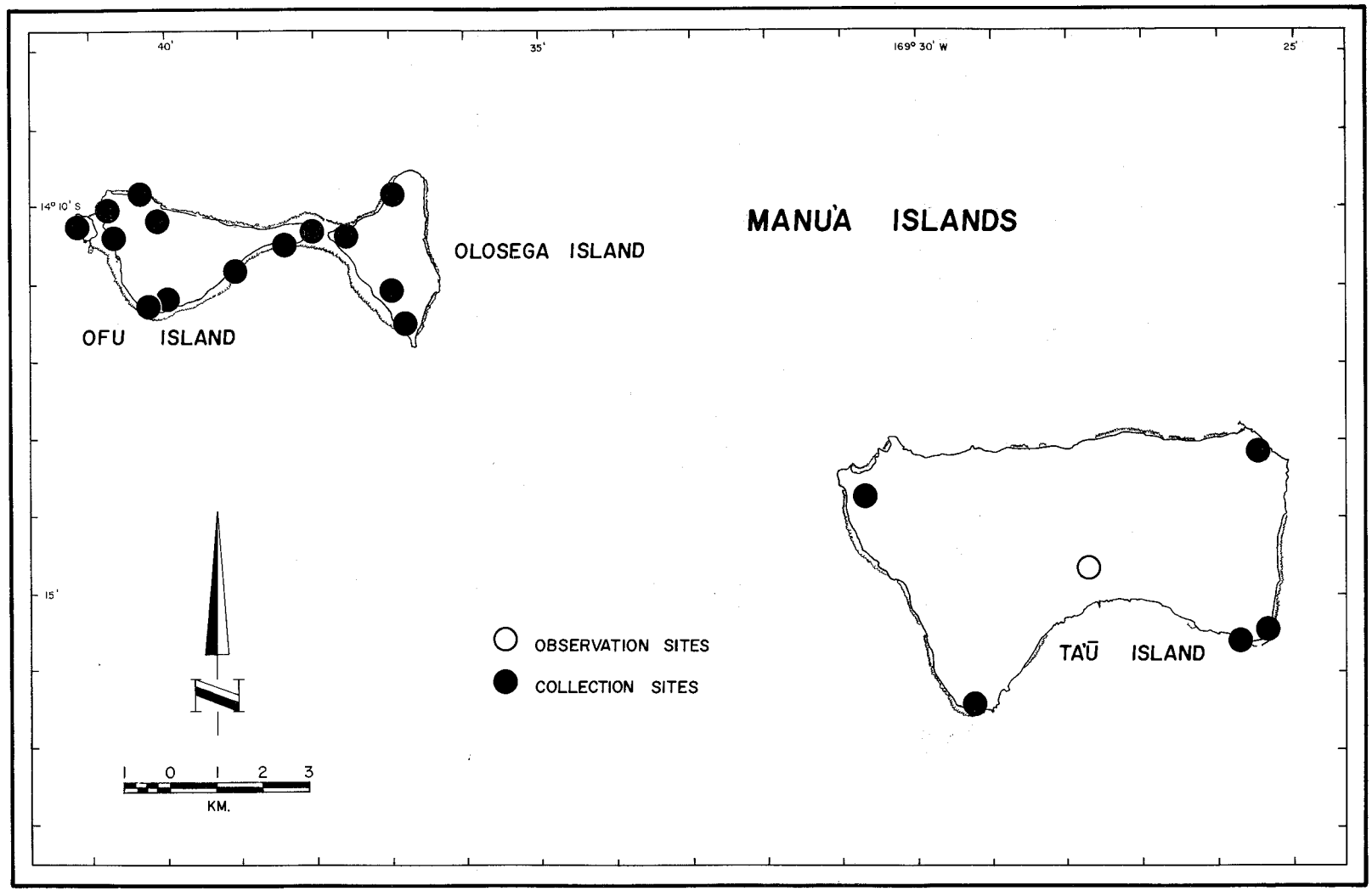

Fig. 19. Records of the azure-tailed skink on Ofu, Olosega, and Ta'ū islands.

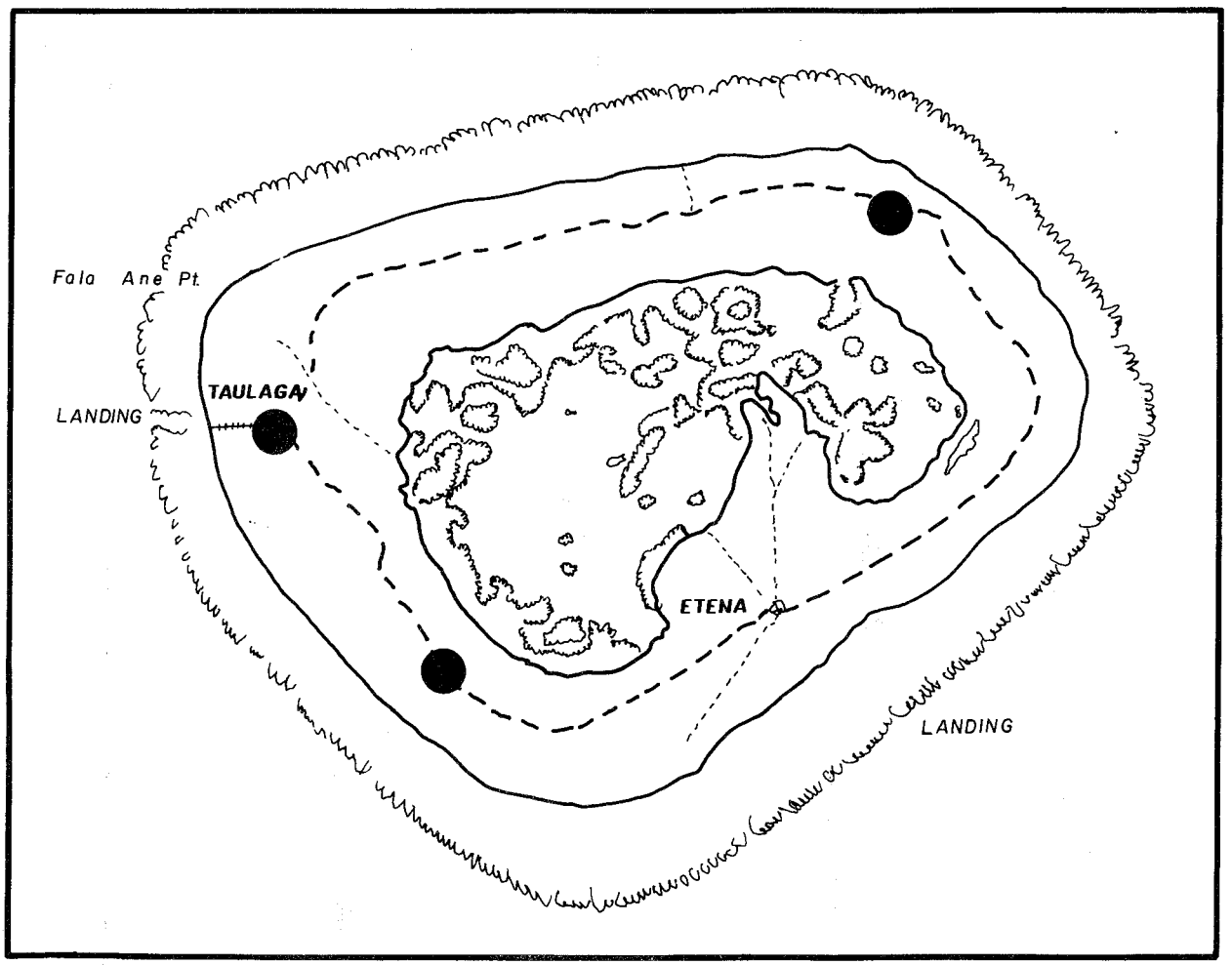

Fig. 20. Collection sites of the azure-tailed skink on Swains Island.

casings. Mating was observed in March and April. The species reportedly breeds year-round, with a peak of activity coinciding with the longest days, from November to January (Baker 1947).

Specimens.—A total of 365 specimens was collected from Tutuila, Aunu'u, Ofu, Olosega, Ta'ū, and Swains Island; 35 were hatchlings. Several unhatched eggs and parts of eggshells were collected on Tutuila. Burt and Burt (1932) reported six specimens from Tutuila and one from Olosega (AMNH). Seven previously unreported specimens include four from Swains Island and three from Tutuila taken by the POBSP (USNM).

Lawes Skink, *Emoia lawesii*

Samoan name.—Pili; pili oua' (see snake-eyed skink).

Status.—Locally common on Olosega and Ta'ū; one possible sighting on Ofu. Populations were restricted to the coastal margins of Olosega and Ta'ū (Fig. 15) and did not penetrate the higher forests. Fourteen were counted along a 300-m transect of coral rubble pathway (2 m wide) on Olosega near Sili Village; 17 were counted along a similar transect at Siu Point on Ta'ū. One skink believed to be of this species was seen near the airport at the base of a steep rocky slope on Ofu.

Discussion.—Lawes skink is a secretive species, preferring to hide among coral rock. Its chalky gray or brown coloration on Olosega often matched that of the coral plates. On Ta'ū, the color and pattern varied from a light brown with or without small yellow spots (single scales) to a light brown with irregular dark brown or black markings across the back. Two solid black individuals, indistinguishable at a glance from the black skink, were collected on lava rocks. This species appeared to be active much earlier in the morning than other skinks with which it occurred on Ta'ū. When ap-

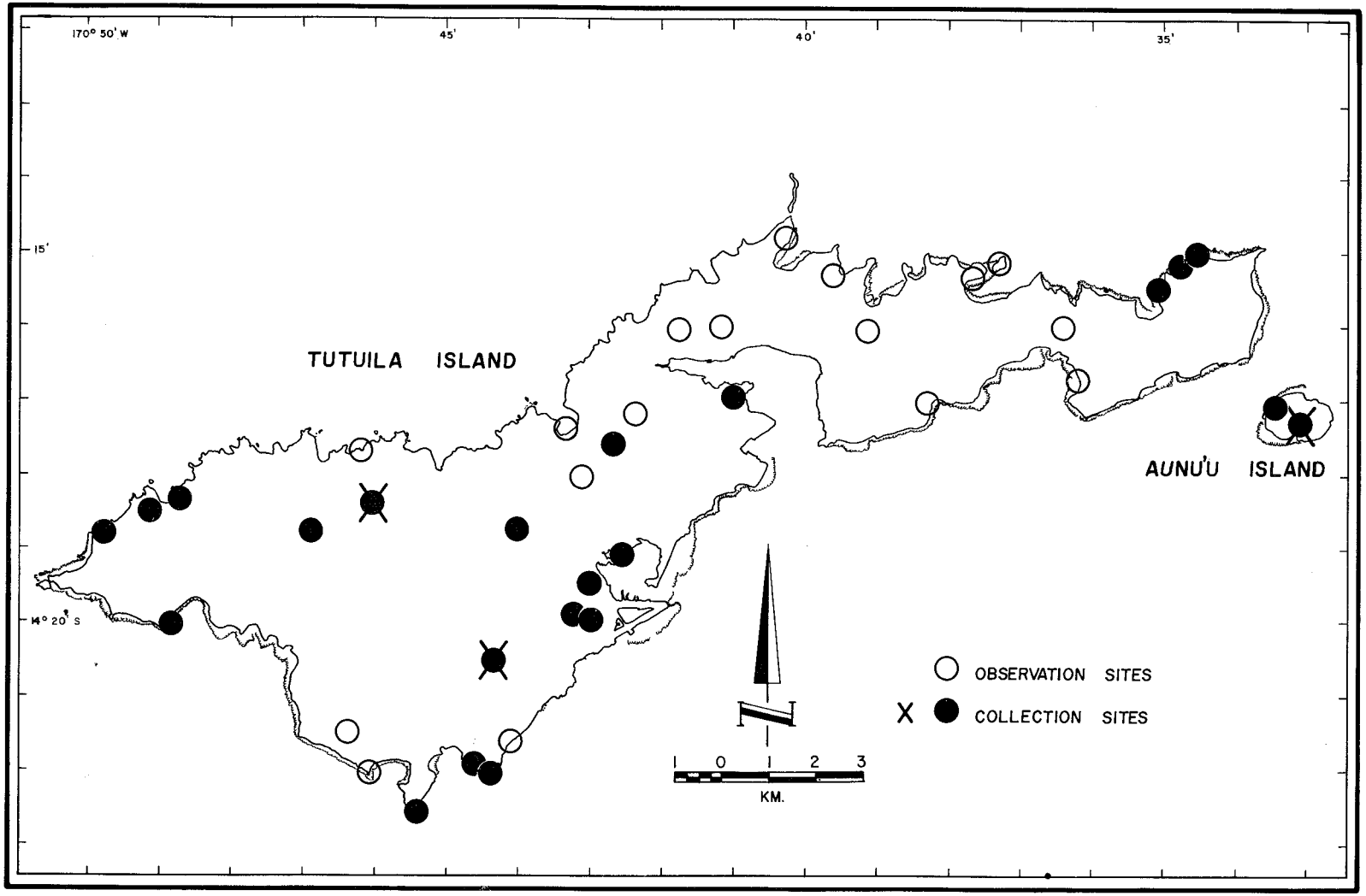

Fig. 21. Locality records for the black skink (all localities marked) and the moth skink (X's only) on Tutuila and Aunu'u islands.

proached, they darted beneath coral plates and were impossible to locate.

The favored habitat was coastal strand of *Barringtonia* with a substrate of coral rubble; peculiar to these areas were long walkways constructed by Samoans from large coral plates. Three of these skinks were seen on exposed black lava rocks at Siufa'alele Point on Ta'ū, only a few meters from the surf; vegetation on nearby rocks was *Scaevola.* Only one was observed along the path through the Maga littoral scrub study plot, where vegetation was dense *Wedelia* and *Scaevola.*

Gravid females were collected in June 1976 on Olosega and in July 1976 on Ta'ū.

This species has generally been merged with *E. adspersa,* but we follow Sternfeld (1920) in recognizing it as distinct.

Specimens.—Twenty-one specimens were collected on Olosega and Ta'ū. Burt and Burt (1932) reported, as *E. adspersa,* two specimens from Olosega (AMNH).

Black Skink, *Emoia nigra*

Samoan name.—Pili uli; other general names for skinks are listed under the snake-eyed skink.

Status.—Common on Tutuila, Aunu'u, Ofu, Olosega, and Ta'ū (Figs. 21 and 22). The population in American Samoa was estimated to be about 3,150,000 (Table 45).

Discussion.—The largest lizard in American Samoa, the black skink is diurnal and terrestrial, foraging among leaf litter and rocks. This species basks in direct sunlight in the morning before foraging. Basking sites were usually about a meter up on lava rocks near the coast or on the trunks of trees or fallen logs at forest edges. Casual observations of head bobbing and aggressive interactions with other lizards of both the same and different species suggested territorial defense of basking sites. After several minutes of intense sun, the lizards moved to the ground to forage, stopping momentarily to bask in patches of sun on the ground.

The densest populations of this species were found in open or second-growth areas or near plantations (Table 53). A particularly dense population existed along the coast at station 60 on Ofu in a habitat of lava rocks, *Pandanus,* coconut, and banana trees, on a sandy substrate (an old plantation site). Few of these lizards live in shaded, heavily forested areas or at higher elevations; none were observed in cloud forest. Decreasing population density with increasing elevation could result from increasing territoriality associated with access to sunlight, food, or other resources.

On Ofu, the population on Mako Ridge, in the montane rain forest near the summit of Tumu Mountain, was small; however, an almost regular spacing of single adult individuals was evident in adjacent 10x10 m plots.

Examination of stomachs of preserved specimens indicated that the black skink feeds on a variety of arthropods, mollusks, and occasionally other smaller lizards (*Emoia cyanura*) and lizard eggs (*E. samoense*). Several individuals were induced to eat bits of coconut meat, but there was little indication that they consume plant material regularly.

Eggs of the black skink were found under rotting coconut stumps and in the base of a bird's-nest fern in March 1976. Hatchlings were observed in March, April, and July 1976. Greer (1968) reported two or three eggs in a clutch; the present study confirmed this. No other reproductive data concerning the black skink have been reported. This study indicated that the species may reproduce throughout the year and that mature females can lay two or three clutches of eggs a year. Alcala and Brown (1967) came to a similar conclusion for *Emoia atrocostata,* another terrestrial species of similar size in the Philippines.

A report of this species on Swains Island (Clapp 1968) is erroneous and refers instead to *E. adspersa.*

Specimens.—A total of 191 specimens was taken from Tutuila, Aunu'u, Ofu, Olosega, and Ta'ū; eight were hatchlings. Unhatched eggs were collected on Tutuila. Burt and Burt (1932) reported on 60 specimens, from Tutuila, Olosega, and Ta'ū (AMNH). Ten unreported specimens collected on Tutuila by the POBSP, 1966-67, are in the USNM.

Samoan Skink, *Emoia samoense*

Samoan name.—Pili lape; see also snake-eyed skink.

Status.—Common on forested or second-growth areas on Tutuila and Ta'ū (Figs. 23, 24). The population in American Samoa was estimated to be about 3,570,000 (Table 45).

Discussion.—The Samoan skink is diurnal and largely arboreal; most were collected during the day from tree trunks. Skinks observed on the ground quickly climbed trees when disturbed. Individuals were seen at daybreak high on the trees, up to 20 m. Along lowland forest edges, this skink appeared to begin basking earlier than the black or azure-tailed skinks where the three were found together. The Samoan skink basked high on the trees in the early morning and descended the trunks slowly, following the optimal angle of the sun's most intense rays. They were noted foraging around the bases of the trees in which they basked.

This skink appears to have the greatest range of elevation of any reptile in American Samoa. On Tutuila they were observed from sea level to 460 m. They were collected on Ta'ū at numerous lowland localities, and on a clear day one was observed in *Freycinetia storckii* in the edge of cloud forest at the south rim of Lata Mountain at 914 m. Densities of the Samoan skink in several forested habitats are given in Table 54. More lizards were found in second-growth or partially disturbed habitats than in other types. On Tutuila a particularly dense population existed along pasture fencerows of *Hibiscus tiliaceus* trees under which grew clumps of Koster's Curse (*Clidemia hirta*); the lizards fed on the small purple fruits of this weed. Analysis of stomach contents revealed about 20% plant material and several kinds of winged arthropods and their larvae in the diet.

In April 1976, a single egg of the Samoan skink was found in the rotting base of a bird's-nest fern, 2 m above ground in a

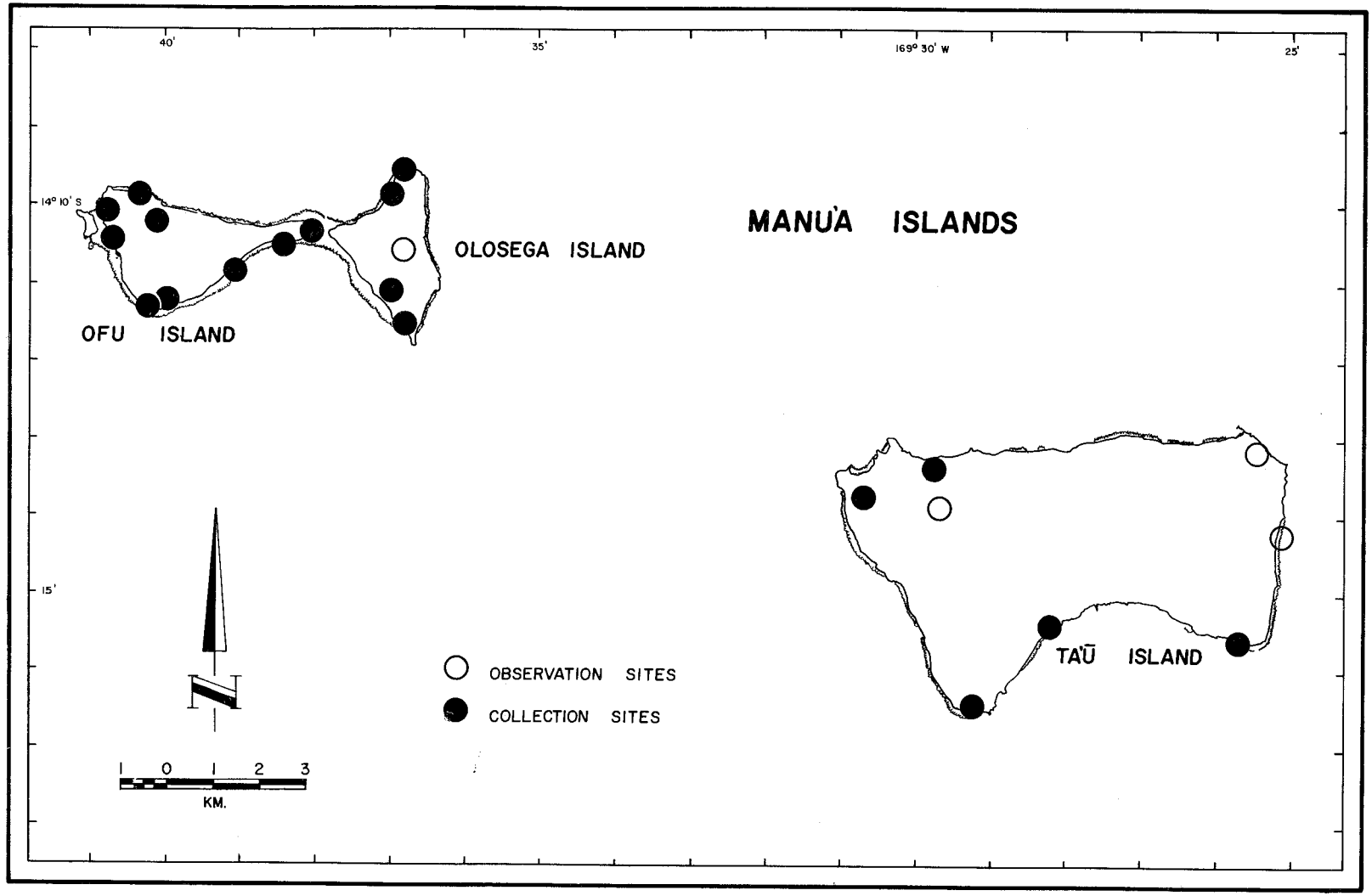

Fig. 22. Records of the moth skink on Ofu, Olosega, and Ta'ū islands.

tree, where two black skink eggs were also found. Greer (1968) reported five eggs ready for laying in the oviducts of a specimen of this species. Examination of specimens indicates a range of clutch sizes from five to seven eggs. Hatchlings or small juveniles were collected in June and July 1976.

Specimens.—We took 71 specimens of Samoan skink on Tutuila and Ta'ū (figs. 20, 21); one hatchling and one eggshell were collected on Tutuila. Burt and Burt (1932) reported nine specimens from Tutuila and eight from Ta'ū (AMNH). Five specimens, previously unreported, were collected by the POBSP on Tutuila, 1966-67 (USNM).

Moth Skink, *Lipinia noctua*

Samoan name.—Pili (see snake-eyed skink).

Status.—Locally common; known from Tutuila, Aunu'u, Ofu, Olosega, Ta'ū, and Swains islands (Figs. 16, 21, 24). The population estimate of the moth skink in American Samoa was about 1,800,000 (Table 45).

Discussion.—The moth skink is shy and secretive. Although it is diurnal, only two individuals were visibly active on the surfaces of trees. Almost all collections were made while carefully stripping loose bark from dead trees, particularly coconut trees and stumps. The moth skink is found in lowland and coastal areas as well as in highland regions, where specimens were collected from a recently fallen tree limb covered with mosses and epiphytes.

Measurements of relative density of moth skinks were restricted to counts for single dead trees; an average of two specimens was found per dead tree or stump. This species was rarely found in beach debris, in bird's-nest fern litter, and on live trees.

Specimens.—Seventeen specimens were collected on Tutuila, Aunu'u, Ofu, Olosega, and Swains islands. One previously unreported specimen (USNM) was collected on Ta'ū by Lt. H. C. Keller, probably in 1917 or 1918.

Pacific Boa, *Candoia bibroni*

Samoan name.—Gata.

Status.—Present in small numbers on Ta'ū Island.

Discussion.—Despite intensive search, only two Pacific boas were found during this study, both near Lavania Cove in the southern portion of Ta'ū. Although the species has been known from Western Samoa, the specimens reported here represent an extension of the known distribution of terrestrial snakes eastward into the Pacific of about 115 nautical miles.

A live boa taken 18 October 1976 was held in Samoa temporarily. In captivity it fed on both Polynesian and mourning geckos but refused small Polynesian rats (*Rattus exulans*). It was later transferred to the Dallas, Texas, Zoo where it was held 9 months before it died. During this time it fed on mice and young laboratory rats, suggesting that it may take Polynesian rats in the wild. Autopsy of this snake revealed two fully formed embryos and 12 undeveloped ova.

The boas found on Ta'ū are extremely melanistic, almost black, and may be taxonomically distinct. We follow the taxonomy of McDowell (1979).

Specimens.—As noted, two specimens were secured during this study. Previously unreported specimens from Ta'ū include four taken by H. C. Keller, probably in 1917 or 1918 (USNM), and one taken in 1953 by Lowell D. Holmes (California Academy of Sciences). A specimen taken in early 1977 is in the J. P. Haydon Museum in American Samoa (Afasa Sesepasara, personal communication).

Birds

Bird data were recorded in 34 of the 41 vegetation study plots and one additional plot, on Swains Island; descriptions and dates of the bird surveys are given in Table 55. In each survey, species and number of birds were recorded every 20 m through the plot. Density is presented by plot and season (Table 56) and in summarized form by habitat (Table 57). Population estimates (Table 57) were derived according to density and amount of habitat. Linear surveys were designed to provide more extensive coverage of the islands and a more comprehensive estimate of abundance. Information on 98 linear surveys is given in Table 2, and the results are summarized in Table 58.

Population estimates for seabirds were usually made by direct counts at colonies and are relatively accurate. At Rose Atoll, for example, the two islands are small enough so that total counts of adults, eggs, or young could be made for most species; counts were made by both day and night. Population estimates for seabirds are given in Table 59. Birds were observed at sea in the course of trips to Rose Atoll and Swains Island (Table 60).

Table 61 summarizes the distribution of the birds of American Samoa by island, indicates specimens taken in this study and by others, and notes distributional records reported for the first time. Specimens taken in this study are deposited in the National Museum of Natural History.

In addition to the species for which complete species accounts are provided, several domesticated birds occur or have occurred on these islands. Primary among these is the chicken (*Gallus gallus*), which is often seen foraging some distance from human habitation but of which no truly feral population seems to exist. Domestic geese (*Anser anser*) and ducks (*Cairina moschata*) are much less abundant. Peafowl (*Gallopavo cristata*) were introduced some time ago, but no longer occur. Some residents keep caged exotic parrots (and perhaps other cage birds); should such species escape and become established, competition with native species could result in substantial changes in the avifauna. Of two exotic species discussed beyond, only the red-vented bulbul (*Pycnonotus cafer*) is truly established.

Names of birds are those used by the American Ornithologists' Union (1957, 1973, 1976) to the extent possible. Other sources of names, for species not found also in North America, were Mayr (1945), duPont (1976), Watson (1966),

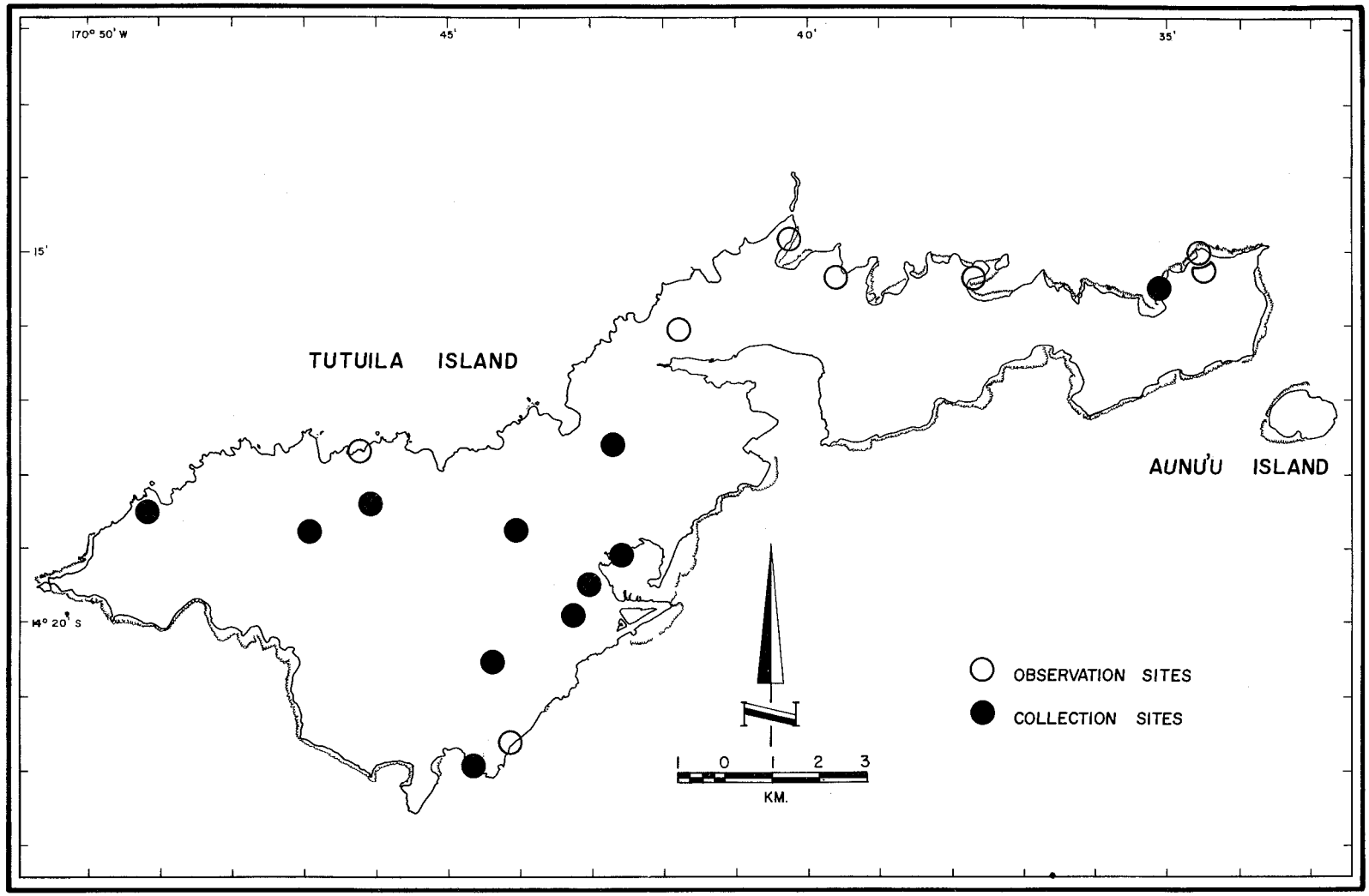

Fig. 23. Distribution of the Samoan skink on Tutuila Island.

and King (1967), the last two particularly for seabirds. The order of species accounts follows Peters (1931-1970) with the exception of the Procellariiformes (Alexander 1965), Gruiformes (Olson 1973), and Charadriiformes (Bock 1958; Jehl 1968).

Species whose recorded occurrence is considered doubtful or hypothetical are enclosed in square brackets [ ].

White-necked Petrel, *Pterodroma externa*

Samoan name.—Ta'i'o (refers to all shearwaters and petrels).

Status.—Very uncommon migrant; eleven birds were observed at sea on four trips (Table 60).

Discussion.—The white-necked petrel breeds on the Kermadec Islands in the South Pacific from November to June; the main wintering area is in the Central Pacific between the equator and Hawaii (King 1967). Specimens are needed to determine the subspecific identity of the birds in this part of the Pacific, which King (1967) lists as *P.e. cervicalis.*

Tahiti Petrel, *Pterodroma rostrata*

Samoan name.—Ta'i'o.

Status.—Uncommon resident, nesting on Ta'ū Island and seen at sea (Table 60). The population in the cloud forest of Ta'ū was estimated to be 500 in October 1976 (Table 59).

Discussion.—R.S. Crossin (personal communication) recorded Tahiti petrels on Ta'ū Island in April and May 1971, and found a nest cavity beneath a large fallen tree fern. He considered it to be the most abundant of the shearwater-petrel group on Lata Mountain. In his notes for 3-5 May 1971, he wrote that "Birds can be heard all along the top from the first lookout [Olotania Crater] to way beyond the top toward Saua. They appear to range deep into the forest . . . the number of calling birds indicates that thousands are present."

We observed one Tahiti petrel flying over Olotania Crater in the late morning of 18 January 1976; the bird flew very close to us several times. On two visits, 14-16 and 19-21 October 1976, Tahiti petrels were heard each night; a courting pair was captured at 0100 on 15 October. This species was observed at sea on only one trip (Table 60).

Specimens.—A male and a female were collected at the base of Olotania Crater, Ta'ū, 15 October 1976. R.S. Crossin (personal communication) collected several specimens in May 1971. These specimens are referred to *P. r. rostrata*, which also breeds in the Society and Marquesas islands (Mayr 1945; Alexander 1963; King 1967).

Collared Petrel, *Pterodroma leucoptera*

Samoan name.—Ta'i'o.

Status.—Uncommon resident on Ta'ū Island; also seen at sea (Table 60). The present population is estimated as at least 1,000 (Table 59).

Discussion.—On 14-16 October 1976, Amerson observed birds on Ta'ū that were tentatively identified as this species. They came in from the ocean at dusk and flew along the montane scrub that covers the steep cliff that drops abruptly from the rim of Lata Mountain at 945 m to Liufau Stream Plateau at 550 m. Since they never flew above the rim of the cliff, attempts to collect specimens were futile. The birds flew and called until about 2300, when they settled into the montane scrub. They apparently nest only in the montane scrub along this steep cliff. None were heard or seen in similar habitat on Tutuila.

King (1967:22) wrote: "Old records of 'Blue Petrels' from Fiji and Samoa are probably referable to Collared Petrels," a name used for the race *P. l. brevipes.* R. S. Crossin (personal communication) heard an unidentified species of gadfly petrel during his visit to Ta'ū in 1971, which may have been this species. The white-winged (= collared) petrel was listed as breeding in Samoa by duPont (1976). Specimens are needed to verify the presence and breeding of this species on Ta'ū, and to indicate which subspecies occurs; *P. l. brevipes* is the race expected.

Slender-billed Shearwater, *Puffinus tenuirostris*

Samoan name.—Ta'i'o.

Status.—Common migrant at sea around the islands (Table 60).

Discussion.—The slender-billed shearwater breeds along the southeast coast of Australia from November to March (Alexander 1963). It migrates north, primarily through the tropical Pacific, in April and May, winters in the North Pacific north of the subtropical convergence, and returns south to its breeding grounds in October (King 1967). King lists it as a migrant in the Samoan Islands, and duPont (1976) noted that it visits the area.

Wedge-tailed Shearwater, *Puffinus pacificus*

Samoan name.—Ta'i'o.

Status.—Rare; seen only at sea (Table 60) but may nest on Pola Islet, Tutuila, and on Ta'ū.

Discussion.—No wedge-tailed shearwaters were seen on the islands of American Samoa in this study. Chief Sale'aumua Tevi, Mayor of Vatia Village, and Chief Tuapa Manutui, Mayor of Afono Village, reported that it nests in small numbers in the inaccessible montane scrub and rocky cliffs on Pioa (Rainmaker) Mountain and on the cliffs of Pola Islet. It may also nest in montane scrub on Ta'ū. Murphy (1951), Ashmole (1963), King (1967), and duPont (1976) list Samoa as a breeding locality for this species.

We saw dark-plumaged birds of this species at sea on several occasions in May and October (Table 42). Clapp and Sibley (1966) observed dark-plumaged birds in November, March, and February.

The wedge-tailed shearwater breeds on islands in the warmer parts of the Pacific and Indian oceans. Specimens

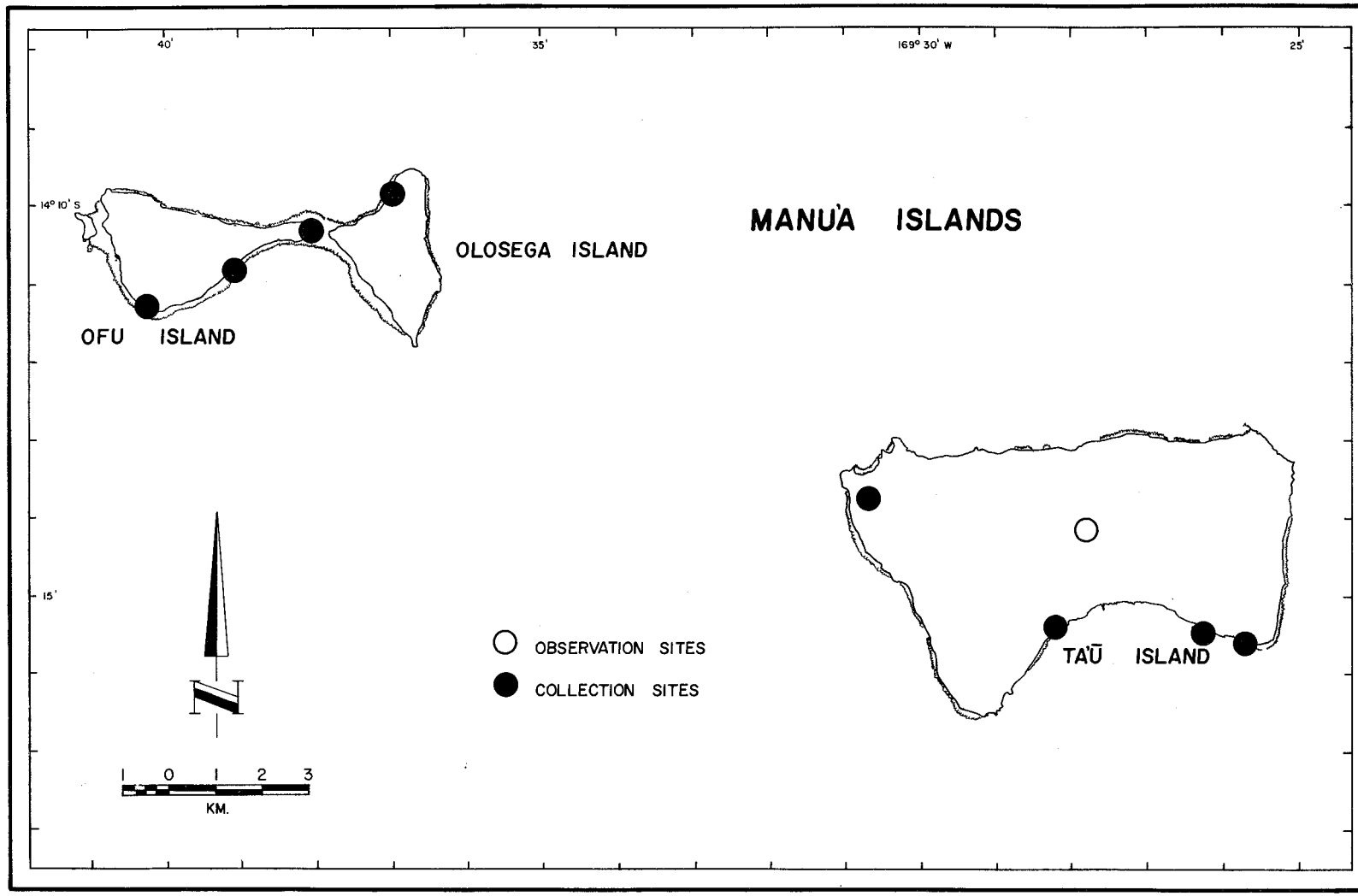

Fig. 24. Locality records for the Samoan skink on Ta'ū Island and the moth skink on Ofu and Olosega islands.

are needed from American Samoa to verify its occurrence here and to document which subspecies is present. The race *P. p. pacificus* is expected.

Christmas Shearwater, *Puffinus nativitatus*

Samoan name.—Ta'i'o.

Status.—Rare; nests on Ta'ū Island, and seen at sea. A rough estimate of 200 birds was made for Ta'ū (Table 59).

Discussion.—On 13 January 1976, Amerson saw one Christmas shearwater at dusk and heard several at night in the rain forest east of Laufuti Stream on the south side of Ta'ū Island. On 15 October he heard two at night in the cloud forest of Olotania Crater near the summit of Ta'ū. Apparently it nests here in small numbers. Observations at sea are shown in Table 60.

This species breeds on the Hawaiian, Line, Marshall, Phoenix, Henderson, Ducie, Tuamotu, Samoan, and Austral islands (King 1967; Amerson 1969). Specimens are needed from American Samoa to verify the records reported here.

Audubon's Shearwater, *Puffinus lherminieri*

Samoan name.—Ta'i'o; Armstrong (1932) cited T. Powell as using "taio or taiko" for the "Dusky Petrel or Shearwater," *P. obscurus,* a record now thought to be of Audubon's shearwater.

Status.—Uncommon; nests only on Ta'ū Island, and seen at sea. We estimated that about 200 breed in the cloud forest on Ta'ū (Table 59).

Discussion.—During this study, only one Audubon's shearwater was observed on land. In the late afternoon of 19 July 1976, Amerson and Schwaner saw one fly inland at Lavania Cove on Ta'ū Island. R.S. Crossin (personal communication) recorded this species calling and flying at night (dusk to 2030 and again at dawn) near Olotania Crater on Ta'ū in April and May, 1971.

Clapp and Sibley (1966) reported the sighting of a single Audubon's shearwater off Tutuila on 21 February 1965. We recorded several observations at sea (Table 60).

Mayr (1945), Alexander (1963), Ashmole (1963), King (1967), and duPont (1976) attributed certain early reports of shearwaters in Samoa to this species, especially those of the "Dusky Petrel or Shearwater," *P. obscurus,* and "Gould's Shearwater," *P. assimilis,* cited by Armstrong (1932). King (1967:100) notes an old December breeding record for Samoa.

Armstrong (1932) quoted the Rev. T. Powell on the Dusky Petrel as follows: "These birds are found in the mountains of Manua in holes . . . . The natives are very fond of them, and catch and consume great numbers, hunting them with dogs."

Specimens are needed from American Samoa to verify the above records and permit subspecific identification. The race *P. l. polynesiae,* which nests in Fiji, Marquesas, Society, and Tuamotu islands, is expected.

White-throated Storm-Petrel, *Nesofregatta albigularis*

Samoan name.—Ta'i'o. The name seu-ta-peau used for this species by many authors, originally credited to the Rev. T. Powell by Armstrong (1932), was unknown in American Samoa.

Status.—Rare; doubtfully recorded from Ta'ū and Tutuila islands and at sea.

Discussion.—On 18 January 1976, Amerson saw a small, all black storm-petrel flying just above treetop level (5-6 m) in the cloud forest southwest of Olotania Crater on Ta'ū Island. Mist nets set overnight failed to capture a specimen, and none was seen on other visits to the area. Single birds seen at sea on 17 and 22 May 1976 may have been of this species (Table 60).

Earlier records of this species in and around American Samoa are uncertain. A single all sooty-black bird taken at an unknown date by the Rev. T. Powell in the "Samoan Islands" (either Tutuila or the Manu'a group) was described as *Fregatta moestissima* by Salvin (1879). Most recent authors (Murphy and Snyder 1952; King 1967; Crossin 1974; duPont 1976) equate that unique bird with *N. albigularis.* Keith (1957) saw "some 30 to 40 birds, all sooty black . . ." on 5 July 1957, between Upolu (Western Samoa) and Tutuila. He now (personal communication) believes he saw two "Samoan Storm Petrels" at Breaker's Point at the mouth of Pago Pago Harbor. Fry (1966) recorded five "Samoan Storm Petrels" at the mouth of this harbor on 4 July 1965. All these records may be referable to *N. albigularis.*

Salvin (1879) and Armstrong (1932) quoted T. Powell on this species, as follows: "They often float on the sea in great numbers. They inhabit all the islands of the group, but are most abundant on Manua. They sleep in holes under the trunks of trees at an elevation of 2,500 feet, whence they are taken with dogs, which scent them. They are easily extracted from their holes." Armstrong noted that no recent records of the birds were available.

Specimens.—A single specimen from American Samoa, the type of *F. moestissima,* is known (USNM). Additional specimens of storm-petrels are necessary to document the occurrence and status of this species.

Red-tailed Tropicbird, *Phaethon rubricauda*

Samoan name.—Tava'e'ula; tava'etoto (no longer used).

Status.—Rare resident on Rose Island, Rose Atoll; recorded once at Swains Island. The adult population at Rose Atoll has varied from an estimated three in October 1976 to 40 in May 1976 (Table 62).

Discussion.—During this study, red-tailed tropicbirds were observed only on Rose Island (Table 59). Clapp (1968) collected one over the southest beach at Swains Island on 30 November 1966.

On Rose Island, nests were found on the ground under *Messerschmidia* and *Pisonia* trees, a few within the hollowed-out bases of old *Pisonia* (Fig. 25). Nests with eggs have been recorded in May 1976, June (?) 1973, and August 1970 (Table 62). Young have been observed in these same months and in October 1975 and 1976, suggesting a southern winter breeding season (Table 62).

Specimens.—One specimen (USNM) has been taken at Swains Island (Clapp 1968). It is of the subspecies *P. r. melanorhynchos.* Additional material from American Samoa would be desirable, particularly because of the similarity between the young of this species and the red-billed tropicbird, *P. aethereus.*

White-tailed Tropicbird, *Phaethon lepturus*

Samoan name.—Tava'e.

Status.—Common resident, probably nesting on all islands. The population estimate for each island is given in Table 59.

Discussion.—Dunmire (1960) first reported the white-tailed tropicbird in American Samoa, on Tutuila and Ta'ū islands. Clapp and Sibley (1966) and Clapp (1968) added records from Tutuila and from Swains Island. Orth (1973) and Sekora (1974) found the species at Rose Island.

We found this tropicbird on all the islands; it was one of the most common seabirds on the main islands. On Tutuila, Aunu'u, Ofu, Olosega, and Ta'ū islands, nests were placed in high trees, in hollows, bird's-nest ferns, and even in dense vines. Trees in undisturbed coastal forest, rain forest, ridge forest, and secondary forest were preferred. Because of the difficulty in finding and reaching nests, egg dates are unknown. Chicks, because of their noisy calling during feeding, have been recorded year-round.

Nesting may take place in the few *Pisonia* and *Hernandia* trees on Swains Island. Clapp (1968) flushed two birds from a tall *Pisonia,* but could find no nest. We saw only one bird circling over that island, on 20 May 1976, north of Etena. On Rose Island, Amerson saw one bird on 24 September 1975, while on an aerial reconnaissance. Nesting in a hollow 9 m high in a *Pisonia* tree was reported on Rose Atoll by Orth (1973); Sekora saw a bird on 22-23 November 1974 but found no nest.

Specimens.—Two specimens were taken on Tutuila Island—a male on 13 May and a female on 10 July 1976. Clapp and Sibley (1966) and Clapp (1968) report two others from Tutuila and one from Swains Island, all in the USNM. These are referred to the subspecies *P. l. dorotheae,* which breeds throughout the tropical Pacific.

Blue-faced Booby, *Sula dactylatra*

Samoan name.—Fua'ō, which applies also to the red-footed and brown boobies.

Status.—Uncommon resident, recorded only at Rose Atoll and at sea (Tables 59-60). On Rose Island, population estimates were 25 adults in October 1975, 30 in May 1976, and 200 in October 1976. A maximum estimate of 540 was made by Sekora (1974) in November 1974 (Table 63).

Discussion.—Blue-faced boobies were recorded at sea only in the vicinity of Rose Atoll during visits in October 1975 and May 1976. All recent observers have found this species nesting and roosting primarily on the southeast corner of Rose Island; a few have been seen on the northwest part (Fig. 26). In 1975-76, both areas were open stretches of coral rubble covered with low-growing *Boerhavia* and *Portulaca.*

Nest scrapes were placed directly on the ground, with no nest material used. Eggs have been recorded in May (1976), June (1973), August (1970), and November (1974). Young have been observed in June (1939), August (1970), and October (1975, 1976).

The subspecies present is probably *S. d. personata,* which breeds on many low sandy atolls in the Tropical Pacific where human disturbance is minimal. Specimens are needed from American Samoa for verification.

Brown Booby, *Sula leucogaster*

Samoan name.—Fua'ō. The name "ta'i'o" was incorrectly applied to this species by several authors.

Status.—Uncommon resident on Tutuila, Aunu'u, Ofu, Olosega islands, common on Rose Island, and visits Swains and Ta'ū islands. Common at sea (Table 60). Population estimates are given in Table 59. At its maximum, the brown booby population on Rose Atoll may be the largest and densest in the Central and South Pacific, with the possible exception of Palmyra Island in the Line Islands (R. B. Clapp, personal communication).

Discussion.—There are few published records of the brown booby in American Samoa. Mayor (1924) reported *Sula* with half-grown young on coral breccia of Rose Island; two of his plates show this species. Keith (1957) reported it as common at sea between Tutuila and Upolu islands in July 1957. Clapp and Sibley (1966) reported small numbers of brown boobies on most of their six visits to Tutuila, 1963-65, seen either off the east end of the island or near the harbor mouth. Other authors, e.g., Mayr (1945), Alexander (1963), King (1967), and duPont (1976), either failed to list this species from Samoa or considered it a nonbreeding visitor.

During this study, brown boobies were recorded nesting on Rose Island and for the first time on Tutuila, Aunu'u, Ofu, and Olosega islands. They were observed off Ta'ū and Swains islands. On Tutuila, we located nesting colonies in three areas. One group nested on the sea cliffs at the southern tip of Steps Point— just northeast of Matautuloa Point, between Fa'asouga Point and Fagatele Point, and along the west side of Fagatele Bay. Two groups nested on the north shore; one used the sea cliffs at Pola Islet north of Vatia Village, and a small number nested at Manuelo Rock north of the abandoned Aoloautuai Village. On Aunu'u Island, nesting brown boobies were found on the rocky sea cliffs of the northeast portion, between Agaoleatu Point and

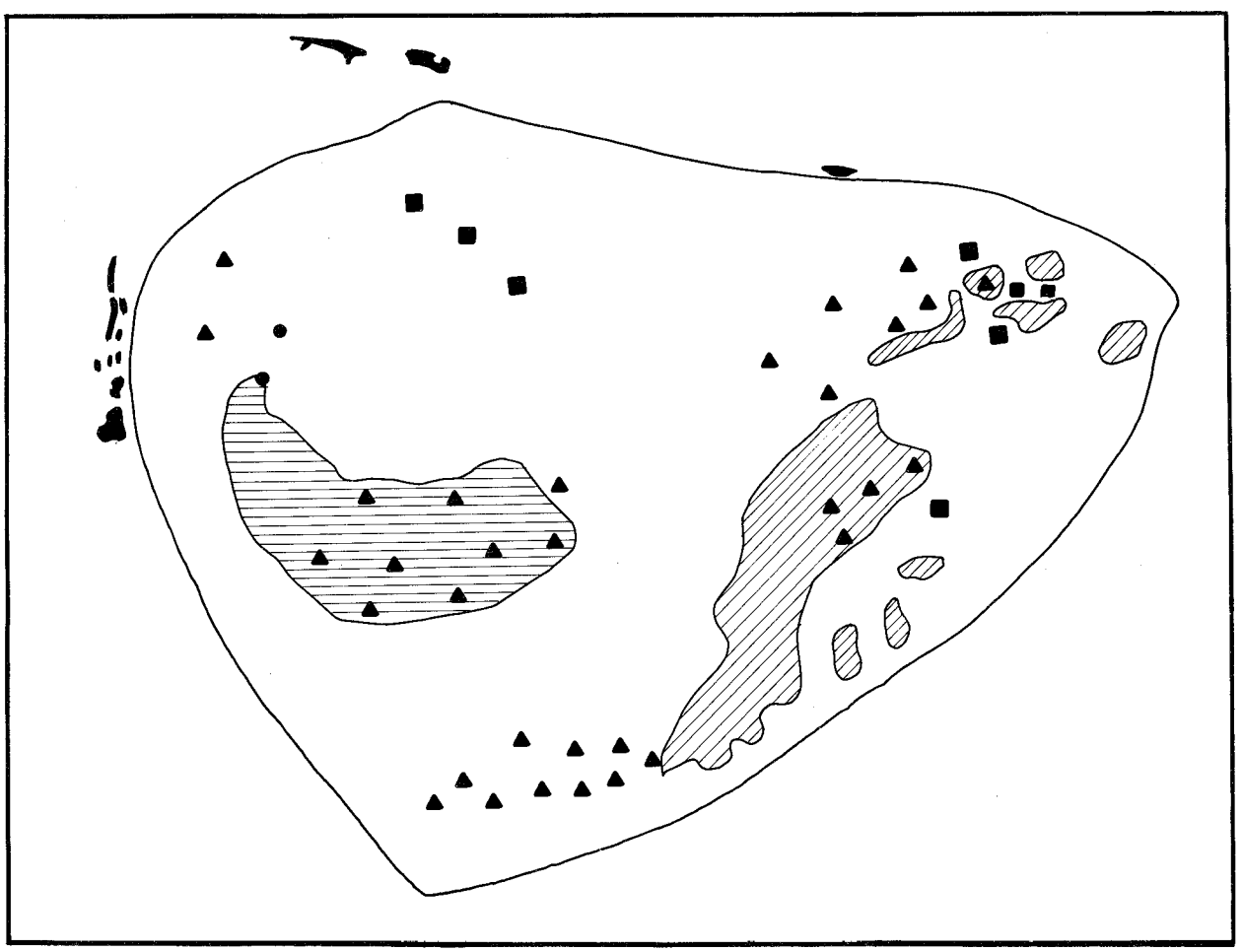

Fig. 25. Nesting distribution of tropicbirds and terns on Rose Island, Rose Atoll. Ground nesters: diagonal slash, sooty tern; squares, brown noddy; triangles, red-tailed tropicbird. Tree nesters: horizontal ruling, white tern and black noddy; circles, reef heron.

Ma'ama'a Cove. On Ofu Island, nests were placed on the isolated, rocky west side of Nu'utele Islet. At Olosega Island, this species nested on the east sea cliffs of Maga Point.

At Rose Island, Rose Atoll, brown booby nests were found on the ground almost everywhere (Fig. 26). Most were in the open area covered by *Portulaca* and *Boerhavia* on the southeast corner; others were scattered over the same type of habitat on the north portion. Some were under *Pisonia* trees. Nests were built of sticks and twigs and included leaves of *Pisonia* and *Messerschmidia*, as well as bits and pieces of *Portulaca* and *Boerhavia*. Roosting primarily occurred on the ground in the nesting areas, but some birds roosted in *Messerschmidia, Pisonia,* and *Cocos* trees, and on the large coral boulders along the reef to the east and south of the island. Some may have roosted at night on Sand Island. Observations of the brown booby at Rose Island are summarized in Table 64.

Brown boobies were common at sea off Tutuila and Aunu'u islands, especially between Steps Point, Taema Bank, and Nafanua Bank. They were also common between Tutuila and the Manu'a Group and around Rose Atoll (Table 60).

The breeding period may be extended. New nests have been recorded in May (1976) and June (1973); eggs were found in June (1973), August (1970), and October (1975-76). Chicks are known from May (1976), June (1920, 1973), August (1970), and October (1975-76).

Specimens.—A male and a female were collected on Nu'utele Islet off Ofu on 9 September 1976. Sachet (1954) reported a specimen taken by L. P. Schultz on 4 August 1938 at Rose Atoll (USNM). Specimens are referred to the race *S. l. plotus,* found in most of the tropical Indian and Pacific oceans.

Red-footed Booby, *Sula sula*

Samoan name.—Fua'ō. The name "ta'i'o" has been misapplied to this species by various authors.

Status.—Uncommon resident found on all islands and at sea (Table 60), but breeding only on Tutuila, Ofu, and Rose islands. Population estimates are given in Table 59.

Discussion.—Wilkes (1845) first recorded this species in American Samoa when he observed boobies with nests "on the tops of trees fifty feet high" at Rose Atoll. Most visitors to Rose Island since then have noted this species (Table 65). On our visits, red-footed boobies were roosting and nesting in the tops of the *Pisonia* trees and *Messerschmidia* bushes. Nests were constructed of twigs and sticks. Breeding here has been reported in June (1920, 1939, 1973) and October (1975 and 1976).

On 28 September 1976, Amerson and A. Sesepasara discovered nesting colonies on Pola Islet and on the northwest cliffs of Pola'uta Ridge, both north of Vatia Village, Tutuila. Nests were in scrubby coastal forest trees on Pola Islet and on the cliffs of Pola'uta Ridge. Birds were occasionally seen flying over Tutuila Island, and were frequently observed offshore. They were most commonly seen off the east tip at Cape Matatula and Papaloa Point, the south tip at Steps Point and Sail Rock Point, and feeding over Taema Bank and Nafanua Bank, shallow water areas south of Tutuila.

Amerson observed adult and subadult red-footed boobies at the northwest tip of Nu'utele Islet, Ofu Island, in August and October 1975 and September 1976; they apparently roosted there at night. R. S. Crossin (personal communication) found the species nesting there in 1970, but not in May 1971. Human activity and introduced pigs and cats probably interfere with breeding on Nu'utele Islet.

Amerson estimated 10 adult boobies roosting on Maga Point, Olosega Island in October 1975; none were seen in June 1976. It is doubtful that this species nests here because there is little vegetation. Four red-footed boobies were seen off the southeast coast of Ta'ū Island at Tufu Point in August 1975. One subadult was seen in captivity at Swains Island in May 1976.

Specimens.—A subadult female was collected 9 September 1976, at Nu'utele Islet. Clapp (1968) reported a specimen from Swains Island (USNM). These are of the race *S. s. rubripes,* which breeds on many islands in the Indian Ocean and the Western and Central Pacific.

Great Frigatebird, *Fregata minor*

Samoan name.—Atafa, which is applied to both the great and lesser frigatebirds in American Samoa.

Status.—Uncommon resident; nests at Rose Island and perhaps on Pola Islet and on Pola'uta Ridge, Tutuila. Visitor to the other islands, and seen at sea (Table 60). Population estimates are given in Table 59.

Discussion.—At least two early visitors to Rose Atoll noticed frigatebirds; Freycinet (1826) saw them flying offshore and Wilkes (1845) reported them nesting. It is uncertain, however, which species was involved.

Clapp and Sibley (1966) observed the great frigatebird at Tutuila, 1963-65. Fry (1966) also observed it on Tutuila in June and July 1965. We saw great frigatebirds soaring above various shores of Tutuila Island throughout the year. In September 1976, about 25 were observed roosting and soaring over Pola Islet and Pola'uta Ridge, on the north shore north of Vatia Village. Both these isolated locations are breeding sites for several seabird species, and great frigatebirds also may nest there. In the Manu'a Group, this species roosts at night in the trees on the northwest tip of Nu'utele Islet off the west shore of Ofu Island and on the rocks atop Maga Point at Olosega Island. Roosting and breeding birds were recorded at Rose Island, Rose Atoll (Fig. 26). The tops of the tallest *Pisonia* trees were preferred for both roosting and nesting. Nests were built of sticks and twigs. Nesting at Rose has been recorded in June (1839 and 1873) and October (1939 and 1975). Because of the heights of the nests, no egg dates are known; chicks have been recorded only in October 1975 (Table 66).

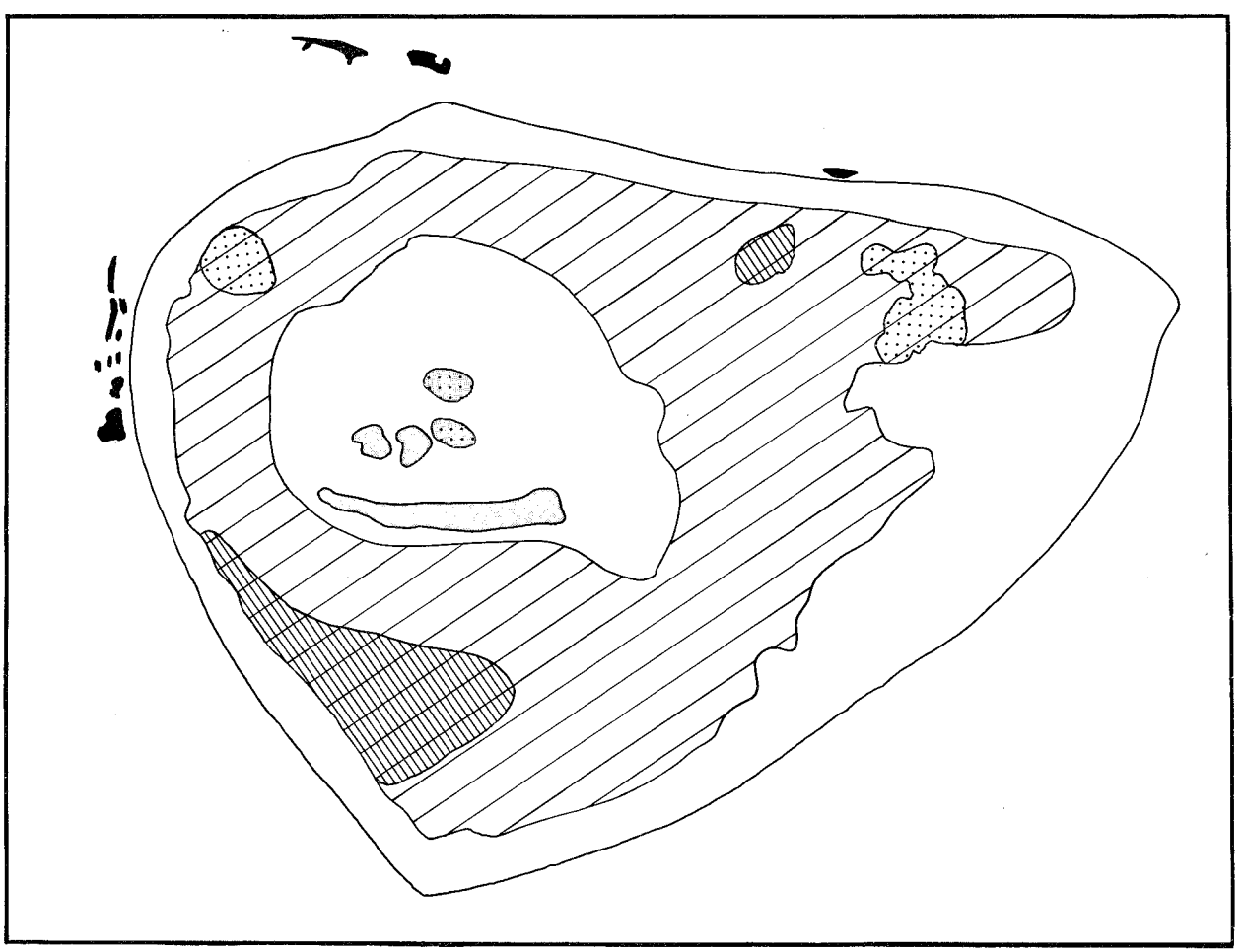

Fig. 26. Nesting distribution of boobies and frigatebirds on Rose Island, Rose Atoll. Ground nesters: narrow rule, blue-faced booby; wide rule, brown booby. Tree dwellers: light stripple, red-footed booby; dark stipple, great and lesser frigatebirds.

Specimens.—Specimens of the great frigatebird were mentioned by Armstrong (1932) from either American or Western Samoa. The race *Fregata minor palmerstoni* is found on most islands in the tropical Central and South Pacific.

Lesser Frigatebird, *Fregata ariel*

Samoan name.—Atafa, also applied to the great frigatebird.

Status.—Uncommon resident; nests at Rose Island, Rose Atoll, perhaps on Pola Islet and Pola'uta Ridge, Tutuila; visitor to other islands (Table 59).

Discussion.—Some early records of frigatebirds from American Samoa may apply to this or the preceding species or both. The lesser frigatebird has been reported from Tutuila by Dunmire (1960), Clapp and Sibley (1966), and Fry (1966). We saw this species on all the islands. Individuals may have roosted at night in trees on the northwest tip of Nu'utele Islet at Ofu and on the rocky top of Maga Point, Olosega Island. At Tutuila, a roosting and possibly nesting colony was found at Pola Islet and Pola'uta Ridge. Lesser frigatebirds were nesting in the tops of the tallest *Pisonia* trees at Rose Island (Fig. 26). Nests were recorded here in May and October 1976, but eggs were noted only in May (Table 67).

These birds are presumably of the Pacific subspecies *F. a. ariel,* but this was not verified by the taking of specimens.

Cattle Egret, *Bubulcus ibis*

The Rev. Fred Anderson (personal communication) reported seeing a cattle egret on the Lava Lava Golf Course in Tafuna Village, Tutuila Island, early in 1975. This is the only record of this species which in recent decades has been noted on several of the Central Pacific islands (Amerson 1971; Amerson and Shelton 1976).

Reef Heron, *Egretta sacra*

Samoan name.—Matu'u.

Status.—Uncommon resident on all islands. Data from 35 study plots suggested a total population of about 4,000 birds (Table 57).

Discussion.—Clapp and Sibley (1966) noted a small roosting colony of reef herons on Futi Rock near the mouth of Pago Pago Harbor in 1964-65. We found a small roost on Fatu Rock, southeast of Futi Rock. Nesting may take place on Fatu Rock and on other rocky islets scattered along the coast of Tutuila. We saw none on the north coast of Tutuila, but two birds seen flying over Fagasā Pass had apparently been feeding on the north shore and were returning to the south shore to roost. Reef herons were seen on exposed reefs of Aunu'u, Ofu, Olosega, and Ta'ū islands, and on Rose Atoll. We saw none at Swains Island, but Clapp (1968) reported four there in August 1966. In October 1975, three nests were found in hollow bases of *Pisonia* trees on Rose Island, and a fresh egg, apparently dropped by a stressed female, was found on the beach.

Within our study plots, reef herons were found only in littoral forest; densities in winter were slightly greater than in summer (Table 56). Abundance estimates based on linear surveys are shown in Table 58.

Reef herons appear in dark, white, and mottled color morphs. We observed all three morphs at Rose Atoll (Table 68). All birds seen by us on other islands or previously reported by others (Dunmire 1960; Clapp and Sibley 1966; Clapp 1968) were of the dark morph.

Specimens.—We collected a male at Ofu Island on 8 September 1976, a female on Ta'ū on 12 October 1976, and an egg at Rose Island on 23 October 1975. Mayr and Amadon (1941) reported 14 specimens from several islands (AMNH). Sachet (1954) mentioned a specimen taken at Rose Atoll in 1939, and Clapp and Sibley (1966) reported one from Tutuila (USNM). Specimens are referred to the race *E. s. sacra,* widely distributed in the southwest Pacific.

[Rufous Night Heron, *Nycticorax calendonicus*]

Mitchell (1909) described a heron from American Samoa and reported that "the species has only been found on the island of Manua [sic] of the Samoan group." Armstrong (1932) believed that record applied to this species.

Australian Gray Duck, *Anas superciliosa*

Samoan name.—Toloa.

Status.—Rare resident on Tutuila and Aunu'u islands; old reports exist for Ofu, Olosega, Ta'ū, and Swains islands. Study plot data suggested a total population of about 35 birds (Table 57).

Discussion.—Amadon (1943), Mayr (1945), and Keith (1957) have recently reported this species from Tutuila and Aunu'u islands, where it was observed on four occasions in this study (Tables 56, 58). On 29 August 1975, one was swimming in Faimulivai Marsh Lake and one was at the edge of Pala Lake, Aunu'u. Single individuals were seen at Pala Lake on 7 April 1976, and 23 November 1976. Seven birds were reported to have been shot at Faimulivai Marsh Lake in November 1976. On Tutuila, Amerson and R. Bond saw a male and a female at Pala Lagoon on 17 July 1975.

Reliable Samoan sources (Seuma'ala Fitiause, Moreli Nuiatoa, Toatolu Nua, T.M. Puailso, Wallace H. Jennings, and Malaefono Lemafa, all personal communications) indicated that "in olden times" ducks were present on all the coastal marshes, including those of Ofu, Olosega, and Ta'ū islands, as well as the lagoon at Swains Island and Pala Lagoon on Tutuila Island. Ducks were reported to have bred "in olden times" in the Faimulivai Marsh area of Aunu'u Island.

Specimens.—Amadon (1943) listed one specimen each from Tutuila and Aunu'u islands as the race *A. s. pelewensis.*

Banded Rail, *Gallirallus philippensis*

Samoan name.—Ve'a.

Status.—Common resident on Tutuila, Aunu'u, Ofu, Olosega, and Ta'ū. Data from our study plots led to an estimate of a population of 2,030 on these five islands (Table 57).

Discussion.—Banded rails were observed in most habitats of the main islands in our study, but not in kula fernland, cloud forest, or montane scrub. The species frequented both primary and secondary vegetation, especially village land, plantation land, pasture, coastal marsh, and mangrove forest. Rails were common in the lowland area between Tafuna and Leone villages (including the airport area) of Tutuila Island, the disturbed marshes on Aunu'u, and the lowland area around the airports on Ofu and Ta'ū. Rails were often seen on open grassy areas; when disturbed they quickly disappeared by running and flying short distances to nearby cover. In forests they appeared more frequently in areas with open ground cover. The species becomes quite tame on populated islands and around towns (duPont 1976).

Data from our study plots ranked this bird less abundant than data from the linear surveys (Tables 56, 58). The estimate based on study plot information may be low because no plots were in plantation land or village land.

Breeding occurs twice a year in American Samoa. We did not find nests but saw chicks being cared for by both parents on several occasions. One pair raised three broods near Amerson's house in Tafuna; chicks appeared in September 1975 and in March and September 1976. Young birds were seen around the Tutuila airport in October 1975, and in April and September 1976. Armstrong (1932) also noted twice yearly reproduction, citing March, April, and August. A bird taken on 8 March 1964, was in breeding condition (Clapp and Sibley 1966).

Specimens.—A male and a female were collected on Tutuila Island 9 and 10 July 1976. Clapp and Sibley (1966) reported one specimen taken there in 1964 (USNM). Murphy (1924*b*) listed specimens (AMNH) from Tutuila, Olosega, Ta'ū, and Ofu, taken from November 1923 to January 1924. These birds are of the subspecies *G. p. goodsoni,* found only in American and Western Samoa.

[White-browed Rail, *Poliolimnas cinereus*]

The range given by duPont (1976) for this species included "American Samoa (Manua [sic] Islands, Tutuila)." We know of no data to support this listing, and consider it to be in error.

Sooty Rail, *Porzana tabuensis*

There is a single record for this species in American Samoa; Murphy (1924*b*) listed a specimen from Ta'ū Island collected in 1923, but gave no details on habitat or precise locality. We were unable to find the species in marshy or wet areas of Ta'ū.

[Samoan Wood Rail, *Pareudiastes pacificus*]

There are early references to the occurrence of this species on Tutuila and Ta'ū islands (Mitchell 1909, Armstrong 1932), but their accuracy is doubtful (Olson 1975).

Purple Swamphen, *Porphyrio porphyrio*

Samoan name.—Manu ali'i, manu sa.

Status.—Uncommon resident; found on Tutuila, Aunu'u, Ofu, Olosega, and Ta'ū. Data from 35 study plots led to an estimate of about 700 birds on the five main islands (Table 57).

Discussion.—Although Ashmole (1963) referred to the purple swamphen as "a very common bird," recent workers in American Samoa have not found it to be abundant. Keith (1957) reported three birds on Tutuila Island; Dunmire (1960) did not record it on Tutuila or Ta'ū. Clapp and Sibley (1966) "saw this bird rather infrequently." Our infrequent observations were widely distributed about the islands. The population estimate may be low because within the 35 study plots we found this species only in mangrove forest (Tables 56, 57). Linear surveys (Table 58) suggested a somewhat greater abundance.

We found this species in both primary and secondary vegetation. It frequented village, plantation, and pasture land, as well as lowland secondary forest. It was common in the grassy areas adjacent to Pago Pago International Airport and in coastal marsh and mangrove forests as well as in lowland rain forest. It was not found in kula fernland or montane scrub.

Informants reported that this species does considerable damage in the plantations, digging up young taro plants and eating bananas and other fruit. Wodzicki (1976) reported damage to various crops, including taro, tapioca, sweet corn, yam, and pineapple, on Niue Island. We occasionally observed swamphens perched in breadfruit trees and banana trees, but never saw them feeding on fruits.

Specimens.—Two purple swamphens were collected, a male on Ofu Island on 5 June 1976 and a female on Tutuila on 14 July 1976. Murphy (1924*b*) reported specimens from the five main islands (AMNH). These are of the subspecies *P. p. samoensis,* found only in Western and American Samoa.

Golden Plover, *Pluvialis dominica*

Samoan name.—Tulī. The name tuli-a-tagaloa used by various authors is incorrect.

Status.—Common migrant, found on all islands. A population of about 4,500 was estimated from study plot data (Table 57).

Discussion.—Golden plovers were especially prevalent on the sandy and rocky beaches of all islands. On Tutuila they

frequented grassy areas throughout the island, especially in and around villages and at the airport. They were at Pala Mud Lake on Aunu'u Island. On Ofu and Ta'ū islands they were commonly seen on dirt and grassy areas. Clapp (1968) found them on paths in heavily forested portions of Swains Island. We found them on all parts of Rose Atoll. On our study plots, density was highest in littoral forest.

This species was present throughout the year in American Samoa, although summer populations were higher than winter (Table 56). Information on abundance on linear surveys is given in Table 58.

Specimens.—A female was taken on 21 May 1976 at Swains Island and another on 20 November 1976 at Tutuila Island. Stickney (1943) listed 11 specimens from Tutuila, Olosega, and Rose islands, taken in 1923-24 (AMNH). Clapp (1968) reported two from Swains Island (USNM). Specimens are of the subspecies *P. d. fulva,* which nests in the Arctic of eastern Asia and Alaska and migrates throughout the Central and South Pacific.

Ruddy Turnstone, *Arenaria interpres*

Samoan name.—Tulī. The name tulialomalala used by various authors is incorrect.

Status.—Uncommon migrant, found on all islands. The total population was estimated at about 550 birds (Table 57).

Discussion.—During our survey, the ruddy turnstone was found on beaches, exposed reef flats, rocky islets, open grassy areas, and mud lakes; sandy and rocky beaches were especially frequented. On Tutuila, Ofu, and Ta'ū, they were noted on dirt and grassy areas of the airports and even in puddles on the asphalt runways. At Aunu'u they were on Pala Mud Lake. In our study plots, ruddy turnstones were seen only in littoral forest and only in winter (Table 56), but the species is actually more abundant in summer, October through March (Table 58).

A ruddy turnstone was seen breaking an egg of a sooty tern on Rose Island; others were observed eating the contents of broken tern eggs.

Specimens.—We obtained one specimen, a female, on Ofu Island, 2 December 1976. Stickney (1943) reported two specimens from Olosega and one from Rose Atoll (AMNH) taken in 1923, and Clapp (1968) listed four from Swains Island taken in 1966 and 1967 (USNM). These are of the subspecies *A. i. interpres,* the Pacific migratory pattern of which has been discussed by Thompson (1973).

Bristle-thighed Curlew, *Numenius tahitiensis*

Samoan name.—Tulī. The names tuliolovalu and tuliisutele have been applied incorrectly.

Status.—Uncommon migrant, observed on Tutuila, Ta'ū, and Swains islands and on Rose Atoll.

Discussion.—In American Samoa, the bristle-thighed curlew has been seen in an open field near the airport on Tutuila (Clapp and Sibley 1966), on the shore of the lagoon on Swains Island (Clapp 1968), on extensive mud flats at low tide in Pala Lagoon, Tutuila, and on sandy beaches and exposed reef flats on Ta'ū and Rose islands (this study). None were seen in our study plots but some were seen on the linear surveys (Table 58). These curlews are present in small numbers in the summer and occasionally in the winter months.

Specimens.—Stickney (1943) reported two specimens taken 11 December 1923 at Rose Atoll (AMNH).

Bar-tailed Godwit, *Limosa lapponica*

Samoan name.—Tulī.

Status.—Rare migrant.

Discussion.—The bar-tailed godwit has previously been reported from Rose Atoll (Wilkes 1845; Peale 1848; Cassin 1858) and Tutuila Island (Stickney 1943). Amerson saw one on the mud flats at Pala Lagoon, Tutuila, on 6 July 1975 (Table 58).

Specimens.—Stickney (1943) reported a male of the race *L. l. baueri* collected on Tutuila on 30 November 1924 (AMNH).

Wandering Tattler, *Heteroscelus incanus*

Samoan name.—Tulī.

Status.—Common migrant, seen on all islands. The estimated population is about 900 (Table 57).

Discussion.—We recorded wandering tattlers on all the islands of American Samoa. Most were seen singly or in pairs on sandy or rocky beaches; at low tide they ventured onto the exposed reef. On several occasions one was observed along the Faga'alu Stream at elevations between 70 and 240 m on Tutuila Island; Clapp and Sibley (1966) also noted one feeding along a fast-flowing mountain stream on the ridge west of Pago Pago. At the Pago Pago International Airport, several often could be seen foraging in rain puddles along the paved runways. Occasional birds were seen on the dirt and grass runways on Ofu and Ta'ū islands. On Aunu'u, they frequented Pala Mud Lake. Clapp (1968) saw them on the rocky outcroppings along the outer beaches of Swains Island; a few foraged around the central lagoon.

Clapp and Sibley (1966) saw wandering tattlers on Tutuila Island "with relatively greater frequency than any other shorebird species." In our study plots we recorded this species in mangrove forest and littoral forest habitats; they were slightly more abundant in summer than in winter (Table 56).

It is possible that the closely related Polynesian tattler, *H. brevipes,* also occurs in Samoa. Records should be verified by the taking of specimens.

Specimens.—We took two specimens, a female on 20 May 1976 at Swains Island and a male on 8 June 1976 at Olosega. Stickney (1943) reported eight specimens (AMNH) from Tutuila, Olosega, and Rose islands, taken between 30 October and 31 December 1923. Sachet (1954) mentioned one bird taken at Rose Island in June 1939 (USNM).

Sanderling, *Calidris alba*

Samoan name.—Tulī.

Status.—Very uncommon migrant.

Discussion.—Amerson saw four sanderlings on the beach at Rose Island 21-24 October 1975 (see also Zeillemaker 1975), and he and W. Pulich saw two there 5-7 May 1976. On Tutuila, Amerson and Sesepasara saw two on the exposed reef at Avaloa Point near Taputimu Village on 1 October 1976. Clapp (1968) had previously reported this species on Swains Island on February and November 1966.

Specimens.—Two (USNM) were taken at Swains Island in February and November 1966 (Clapp 1968).

Black-naped Tern, *Sterna sumatrana*

Samoan name.—Gogosina may refer to this species, although most Samoans do not know the name.

Status.—Rare visitor.

Discussion.—The only recent record of this species in American Samoa is of one bird in a flock of brown noddies, *Anous stolidus,* roosting on Swains Island 27 April 1967 (Clapp 1968). There is one specimen from Rose Atoll in the American Museum of Natural History (R. B. Clapp, personal communication). Reports that the black-naped tern "apparently breeds" in Samoa (Ashmole 1963; King 1967) seem to be based on indefinite early records (Layard 1876). Dhondt (1976) saw mottled birds that he considered to be immature in Western Samoa.

Specimens.—There is a report of one specimen from Rose Atoll (AMNH; see above).

Gray-backed Tern, *Sterna lunata*

Samoan name.—Gogosina.

Status.—Uncommon breeding bird on Tutuila and Aunu'u islands and on Sand Island, Rose Atoll; the total population is probably under 200 birds (Table 59).

Discussion.—Amerson and A. Sesepasara saw 8-10 gray-backed terns in Fagatele Bay and off Steps Point, Tutuila, on 17 February 1976. About 100 birds were seen in Larsen Bay on 1-2 March 1976, most flying around an inaccessible cliff north of Matautuloa Point. Their behavior suggested they were nesting there. Flocks of 10-20 were feeding offshore, and individual birds were seen along the coast as far east as Vaitogi Village. During 12-16 July 1976 about 125 adult birds were seen in Larsen and Fagatele bays, and an immature bird accompanied by two adults was seen just off Sail Rock Point on 14 July.

On Aunu'u Island, Amerson counted eight terns near sheer rock cliffs on the east and northeast sides on 6-8 April 1976. On 23 November 1976, he estimated 30 adults and 2 immatures on the northeast cliffs.

On the 21-24 October 1975 trip to Rose Atoll, Amerson observed four adult and two fledgling gray-backed terns on Sand Island (see Zeillemaker 1975). Amerson and W. Pulich recorded 8-10 adults and 4 fledglings roosting on or flying over the sandy beach crest on the south side of this island on 5-7 May 1976; old nest sites were observed just behind this beach crest.

Plumage similarities of *S. lunata* and *S. anaethetus* may have led to confusion in early records of both species in Samoa. Voucher specimens would be useful.

Brown-winged Tern, *Sterna anaethetus*

Samoan name.—Gogouli may refer to this species.

Status.—Vagrant.

Discussion.—King (1967) listed this species as a vagrant in Samoa, noting one record and several sightings, with no details. R. S. Crossin (personal communication) reported collecting a specimen of brown-winged tern off Tutuila Island, but details are not available.

Sooty Tern, *Sterna fuscata*

Samoan name.—None.

Status.—Common breeding bird on Rose Atoll; visitor to Tutuila and Swains islands, and seen at sea. This is the most common of the seabirds (estimated 300,000), but the population is local.

Discussion.—On a visit to Rose Island 21-23 October 1975 Amerson estimated that 300,000 adult sooty terns were pres ent (Table 59). Numerous nests with single eggs were seen on the northeastern portion of the island (Fig. 25), most under or near *Messerschmidia* bushes. During a 5-7 May 1976 visit, up to 10,000 adult birds were in flight over the island; they appeared to be in a period of prebreeding activity. In the late morning, a swirling flock formed downwind of the island. The flock increased in number as the day progressed, with the mass moving closer to Rose Island as night approached. The noisy flock swirled low over the island after dark, when the highest estimate was made, until 0300-0400 when most birds left. During 20-21 October 1976, Sekora (1976) estimated 305 adults and 4,300 fledglings in the area of *Pisonia* die-off.

Other authors have recorded sooty terns on Rose Island at other times. Mayor (1924) reported them in January and June, 1920; Donaghho (1952) noted them in August 1938, and Schultz (1940) saw them in June 1939. Recent observations by personnel of the U.S. Fish and Wildlife Service and the Marine Resources Department of the Government of American Samoa are summarized in Table 69.

A ruddy turnstone was seen breaking a sooty tern egg on Rose Island. Other turnstones, golden plovers, bristle-thighed curlews, sanderlings, and Polynesian rats were noted eating the contents of broken eggs.

Sooty terns were seen or heard flying above or around Tutuila Island on three occasions during this study—11 October 1975 at the Air Force housing area near the airport; 10 March 1976 off Sail Rock Point; and 25 September 1976 over the Tafuna housing area. The observations over land were at night in light rain.

Clapp (1968) reported three birds off Swains Island in February 1966, and Gould (1974) reported them near that island. We saw the birds at sea on several occasions (Table 60).

Specimens.—A specimen from Rose Atoll is in the American Museum of Natural History (R. B. Clapp, personal communication). The Samoan race is presumed to be *S. f. serrata.*

Crested Tern, *Sterna bergi*

Samoan name.—None.

Status.—Rare visitor to Tutuila Island.

Discussion.—On 26 November 1976 Amerson observed two adults in Pago Pago Harbor for about 2 hours, and on 27 November saw one offshore from Matu'u Village. R. S. Crossin (personal communication) saw crested terns in Pago Pago Harbor in early 1971. King (1967) and duPont (1976) listed this species as a vagrant or visitor, but gave no specific records. It is presumed that these birds are of the race *S. b. cristata.*

Blue-gray Noddy, *Procelsterna cerulea*

Samoan name.—Laia.

Status.—Uncommon resident on Tutuila, Aunu'u, Ofu, Olosega, and Ta'ū islands. The total population is estimated at about 200 (Table 59); at-sea observations are given in Table 60.

Discussion.—Clapp and Sibley (1966) recorded blue-gray noddies on each of six visits to Tutuila Island from November 1963 to June 1965, flying high up the mountain ridge east of Tutuila with white terns and brown noddies and frequently along the coastline at Futi Rock and Malo Point, and in Pago Pago Harbor. A nearly fledged young and several old nests were found on Malo Point. Dhondt (1976) reported the species nesting in Larsen Bay on 10 August 1974 on a cliff with brown noddies.

We found them on the south coast of Tutuila, roosting and nesting at Fagatele Bay, Steps Point, Larsen Bay, Sail Rock Point, Toa Point, Laumeimamalie Point, Fatu Rock, and Matalesolo Point. On the north coast, roosting and nesting were recorded at Pola Islet, Folau Point, and Malo Point. A few were seen inland, on a sheer rock cliff on the southeast face of Tau Mountain. On Aunu'u Island, blue-gray noddies were seen off the cliffs north of Pofala Hill, past Ma'ama'a Cove to the cliffs south of Fogatia Hill; nests were noted only on the north and east cliffs. At Ofu, nesting occurred on the west face of Nu'utele Islet. Nesting and roosting areas included the cliffs around Maga Point on Olosega. At Ta'ū Island, these noddies were seen at Fagatele Point.

Specimens.—Two specimens, both males, were taken south of Pola Islet, Tutuila Island, 28 September 1976. Clapp and Sibley (1966) reported five (USNM) from Futi Rock taken 24 February 1965. These are referred to *P. c. nebouxi.*

Brown Noddy, *Anous stolidus*

Samoan name.—Gogo, used for both brown and black noddies. Fua'ō, used by some authors, is incorrect.

Status.—Very common resident; nests on all islands. Observations at sea are listed in Table 60. The population is estimated to be over 21,000 (Table 59).

Discussion.—Brown noddies were seen along the coasts and in the inland mountains of the main islands of American Samoa. Small nesting colonies inland were in tall trees along steep cliffs in coastal, rain, ridge, and secondary forests, usually in trees that stood higher than the surrounding forest. On the coast, nests were placed directly on ledges of isolated sea cliffs. Most nests on Rose Atoll (Fig. 25) were on the ground in bare coral or open *Boerhavia* and *Portulaca* areas; one inactive nest was in a low *Messerschmidia.*

On Tutuila Island, nests were found on the cliffs at the southern tip from Fagatele Point east to Toa Point, and at the northern tip on Pola Islet. Clapp and Sibley (1966) and Dhondt (1976) mentioned nesting colonies at Larsen Bay. Inland colonies on Tutuila were found along the west side of Malaeimi Valley, on Tau Mountain, on the west side of Milomilo Mountain, in the Faga'alu Stream Valley, along Pola'uta Ridge, and along Lefutu Ridge. On Aunu'u Island nests were found only along sea cliffs on the north, east, and south shores, from Agaoleata Point to Fogatia Hill.

Nesting colonies were seen along the northwest coast of Ofu from Tauga Point to Sinapotu Point and on the south cliffs above Toaga, as well as on the west side of Nu'utele Islet. At Olosega, nesting occurred on the rock cliffs of Maga Point, and on trees along the east, northwest, and southwest cliffs. At Ta'ū, small colonies nested in trees along the north, east, and west coasts; there were large colonies on the south coast from Papaotoma Point east to Ulufala Point.

Brown noddies were seen throughout Swains Island, with concentrations on the north and south sides of the central lagoon. Clapp (1968) encountered slightly greater densities on the north side of the island. Most of the nests were in *Cocos* trees, but some were in *Pisonia* and *Barringtonia.*

No seasonal fluctuations were noted in the brown noddy populations on Tutuila, Aunu'u, Ofu, Olosega, or Ta'ū islands in this study, but at Rose Island numbers fluctuated from 500 to none, and as many as 3,700 had been estimated in 1974 (Table 70). Clapp (1968) reported 1,500-3,000 at Swains Island on five visits in 1966-67, but on another visit in 1966 only 40 were seen.

Nesting in American Samoa seems to occur year-round. Clapp and Sibley (1966) reported a nesting in June 1965 and 200 nests in October 1964. During our survey young brown noddies were heard in nests on Tutuila in February and April 1976, and December 1975. Young were heard at Ofu in September 1976, and at Ta'ū in July and October 1976. At Rose Atoll, nests are known from January and June 1920 (Mayor 1924), August 1970 (Swerdloff and Needham 1970), and October 1975. Brown noddy nests contained eggs and young at Swains Island in May 1976, and Munro (1944) noted

breeding there in July 1938. Regarding Swains Island, Clapp (1968) reported that "Gonadal and molt data from collected birds indicates that at least some birds were breeding from October through April. The low August numbers suggest that summer may be a non-breeding period or a period of much reduced breeding on this island."

Specimens.—We took three voucher specimens, a male and a female on 19 May 1976 at Swains Island and a male 9 March 1976 at Tutuila. Clapp (1968) reported 13 specimens (USNM) from Swains, and Sachet (1954) mentioned one (USNM) collected by L. P. Schultz at Rose Atoll in June 1939. These represent the subspecies *A. s. pileatus.*

Black Noddy, *Anous tenuirostris*

Samoan name.—Gogo, used for both black and brown noddies.

Status.—Uncommon resident; nests on Tutuila, Ta'ū, Rose, and Swains islands, and seen on the other islands and at sea (Table 60). Abundance on the various islands, indicated in Table 59, totals about 7,500.

Discussion.—The black noddy is present year-round in Samoa, but populations fluctuate. Small numbers of black noddies nested on Pola Islet and the adjacent Pola'uta Ridge north of Vatia Village on the north shore of Tutuila. Fry (1966) found eight nesting pairs on 16 June 1965 on the steep wooded cliffs along the shore of Fagaitua Bay, but Clapp and Sibley (1966) recorded only two birds, feeding at sea, in six visits to Tutuila from 1963 to 1965. In July 1976, Amerson and Schwaner saw small numbers of black noddies on the south shore of Ta'ū in the vicinity of Lavania Cove; in October of that year, Amerson estimated that a minimum of 5,000 birds nested there. This major colony was in *Barringtonia* trees in the littoral and coastal forest from the cove to Ulufala Point. At Swains Island in May 1976, black noddies were nesting in large *Pisonia* trees on the northeast corner of the island. Clapp (1968) found varying numbers at this island, from 0 to 350-400 in a series of visits in 1966 and 1967, and noted an active colony of 125 nests high in *Pisonia* on the east-northest corner of the island. These noddies were nesting on *Pisonia* branches on Rose Island in October 1975, and a few were roosting on *Pisonia* and *Messerschmidia* trees in May 1976. Other observations from Rose Island are summarized in Table 71. We saw birds off the shores of Ofu and Olosega islands, but found no evidence of nesting.

Specimens.—Two specimens taken are a male from Swains Island 20 May 1976 and a female from Ta'ū 4 October 1976. Clapp (1968) reported 12 specimens from Swains Island (USNM). The subspecies represented is *A. t. minutus.*

White Tern, *Gygis alba*

Samoan name.—Manu sina; "manusinas" (Mitchell 1909) is an incorrect spelling.

Status.—Common resident, nesting on all islands. Population estimates totaling about 7,800 are given in Table 59, and observations at sea are presented in Table 60.

Discussion.—White terns were observed breeding throughout American Samoa. On Tutuila, small numbers were seen in coastal colonies at Pola Islet, Fatu Rock, Steps Point, and Fagatele Point, and small flocks were observed in the secondary forest and montane rain forest. At Aunu'u, a few nested on the sheer rock cliffs on the north, east, and south coasts. Several nested on the sheer rock cliffs of Nu'utele Islet and in the secondary forests of Ofu. At Olosega, a few nested on the cliffs of Maga Point; occasionally, birds were sighted in the secondary forest on the east portion of the island. On Ta'ū, white terns nested in the littoral and coastal forests from Lavania Cove to Ulufala Point on the isolated south coast, where about 2,000 birds were seen in October 1976.

Observations of white terns at Rose Island are summarized in Table 72; the species was recorded nesting on *Pisonia* branches in 1975 (Fig. 25). None was nesting on Swains Island in May 1976, but they were present in large numbers. Clapp (1968) recorded white terns on each of six visits to Swains Island in 1966 and 1967; they nested on dead palm (*Cocos*) stubs and branches of *Pandanus* trees.

Our data generally support Clapp's (1968) suggestion that this species breeds primarily from September or October through February, the southern summer.

Specimens.—Two specimens were collected, a female 20 May 1976 at Swains Island and a male 7 July 1976 at Tutuila. Clapp and Sibley (1966) reported 3 specimens from Tutuila and Clapp (1968) mentioned 10 from Swains Island. The subspecies is *G. a. candida.*

Rock Dove, *Columba livia*

Samoan name.—Lupe pālagi.

Status.—Introduced; rare on Tutuila.

Discussion.—Amerson saw a lone black rock dove in Nu'uuli Village, Tutuila, on 25 August 1976 and learned that it was the survivor of five brought from Western Samoa at an unknown time. Another black dove was seen in Pago Pago Village in September 1976, by A. Sesepasara, the last of a pair brought from Western Samoa in the previous year. In the 1950's a population of 20-30 birds lived in the Pago Pago Harbor area (H. Sesepasara, personal communication).

[White-throated Pigeon, *Columba vitiensis*]

Records of this species in American Samoa (Keith 1957; Ashmole 1963) are believed to result from a misidentification.

Many-colored Fruit Dove, *Ptilinopus perousii*

Samoan name.—Manu mā; manu lua is an old name.

Status.—Very uncommon resident, reported previously on Tutuila, Ofu, Olosega, and Ta'ū islands but seen in this survey only on Tutuila (Table 58).

Discussion.—Many-colored fruit doves were seen only on 28-29 September 1976 when Amerson and A. Sesepasara found an isolated population on the north shore of Tutuila, from Afono Village to Vatia Village. Two were seen on 28 September on the east side of Pola'uta Ridge. About 25 adult and immature birds were observed on 29 September feeding in *Ficus prolixa* and *F. obliqua* on the west side of that ridge, and 10 birds were counted in the coastal forest between Vatia and Afono villages. Clapp and Sibley (1966) saw two birds on Palapalaloa Mountain, Tutuila, in June 1965, but reported only four birds in six visits to that island, 1963-65.

A male bird taken in June 1965 had enlarged testes, and specimens taken in September 1976 had enlarged testes and ovaries. This suggests that breeding takes place in the southern winter months.

It is not clear whether the population of this species in American Samoa has ever been large. The present restricted distribution on Tutuila and the lack of observations on the other islands may indicate a decline.

Specimens.—Four specimens were taken 29 September 1976 at Pola'uta Ridge. One (USNM) was reported by Clapp and Sibley (1966). Murphy (1924*a*) and Ripley and Birckhead (1942) listed collection localities on Tutuila, Olosega, Ofu, and Ta'ū (AMNH). Specimens are of the race *P. p. perousii*, which is found only in Samoa.

Crimson-crowned Fruit Dove, *Ptilinopus porphyraceus*

Samoan name.—Manu tagi (adult), manu fili (young); manu tangi of some authors is an incorrect spelling.

Status.—Common resident on Tutuila, Aunu'u, Ofu, Olosega, and Ta'ū islands. Estimates of densities in various habitats and the total population (about 326,000) are given in Table 57.

Discussion.—This species was common in coastal forest, ridge forest, lowland rain forest, and montane rain forest of the primary vegetation types and in plantation land and secondary forest of the secondary vegetation types, and absent from other habitats (Table 57).

These birds fed on fruits of many kinds of trees, especially *Ficus*. Ashmole (1963) noted their fondness for figs and noted that there was seasonal wandering in search of ripe fruit, perhaps involving inter-island flight.

Enlarged gonads in specimens taken in June 1965 (Clapp and Sibley 1966) and July 1976 suggest that breeding takes place in the southern winter months. This is similar to information given by Armstrong (1932) for Western Samoa.

Specimens.—Eight specimens were taken from Tutuila in July, August, and September 1976 (five preserved in fluid and three as skins) and one was taken from Ta'ū (fluid) in July 1976. Clapp and Sibley (1966) took one male bird on Tutuila in 1965 (USNM). Murphy (1924*a*) reported specimens (AMNH) from Tutuila, Ta'ū, Ofu, and Olosega. These are of the subspecies *P. p. fasciatus.*

Pacific Pigeon, *Ducula pacifica*

Samoan name.—Lupe; lotu and mataisu are old names.

Status.—Uncommon resident on Tutuila, Aunu'u, Ofu, Olosega, and Ta'u. Data on density are given in Tables 56 and 58. The population is estimated at about 58,000 birds (Table 57).

Discussion.—Pacific pigeons live throughout the forested areas. All observations were of birds flying overhead or roosting and feeding in large forest trees; no birds were seen on the ground. Most were seen singly or in pairs. Although this species was occasionally seen flying over village land, it did not feed or roost in this disturbed situation. The species was absent from habitats lacking fruit trees. Its distribution is similar to that of the crimson-crowned fruit dove—coastal forest, lowland and montane ridge and rain forest, and secondary forest.

Breeding data for the Pacific pigeon are scant. Specimens taken in April and October 1976 had small ova. Whitmee (1875) reported that eggs were found from July to September, and that young birds were shot in August and September. He further reported that nests contained single eggs.

Early reports (Whitmee 1875; Armstrong 1932) indicate that the Pacific pigeon was an abundant bird in both Western and American Samoa, and that at times it was heavily utilized as food by the Samoans. More recent observers (Dunmire 1960; Clapp and Sibley 1966) have not recorded the species or have seen it only in small numbers. Hunting pressure, particularly after the availability of shotguns, has been implicated as a cause of the population decline (Armstrong 1932; Clapp and Sibley 1966).

Specimens.—Two specimens were taken, on 23 April 1976 on Tutuila, and on 7 October 1976 on Ta'ū; both were females. Murphy (1924*a*) reported specimens from those two islands and from Ofu and Olosega (AMNH). These birds are of the subspecies *D. p. pacifica.*

Friendly Quail Dove, *Gallicolumba stairi*

Samoan name.—Tu'aimeo.

Status.—Rare resident on Ofu Island, possibly on Olosega; total population about 100 birds (Table 57).

Discussion.—The friendly quail dove has not previously been reported from American Samoa, but older Samoans who were familiar with the "bush" knew of it. Our three observations of this species on Ofu (Tables 56, 58) were at elevations less than 60 m on the south side of the island near the airport. One bird was collected by Schwaner and W. Pulich in study plot 14 in the coastal forest on 3 June 1976. Amerson saw one bird on 8 September and collected one on 1 December 1976 in plantation land. These birds were on the ground, eating fallen fruits of *Macaranga harveyana,* a common tree in secondary coastal forests. We did not find it on Olosega, but reliable Samoan contacts there knew of it and reported that it had been seen on that island.

Specimens.—Two specimens taken on Ofu (see above) are of the race *G. s. stairi*, endemic to Samoa.

Blue-crowned Lory, *Vini australis*

Samoan name.—Sega, sega'ula, sega Samoa.

Status.—Common resident on Ofu, Olosega, and Ta'ū islands; the population is estimated at about 47,000 (Table 57).

Discussion.—We found blue-crowned lories in all habitats on Ofu, Olosega, and Ta'ū islands except littoral scrub (Tables 56, 58). They were most common around village and plantation lands, where small flocks (two to five birds) frequented the blossoms of *Cocos*. When *Erythrina* was in bloom, lories traveled through the primary and secondary vegetation in search of blossoming trees. They were less frequently found at higher elevations in secondary forest and montane rain forest where there is little or no *Cocos,* and were seldom observed in cloud forest. These observations are consistent with those made by others in Western Samoa (Whitmee 1875; Mitchell 1909; Armstrong 1932; Yaldwyn 1952; Dhondt 1976). No nesting was noted in this study.

Snares made of coconut fibers were traditionally used to capture small numbers of the blue-crowned lory in Western Samoa (Whitmee 1875) and the Manu'a group. The red and blue feathers were used to adorn "fine mats" and ceremonial costumes.

Specimens.—Four specimens were taken, two on Ofu 4 June 1976 and two on Ta'ū 4 October 1976. Amadon (1942) reported specimens from those islands and Olosega (AMNH).

Long-tailed Cuckoo, *Urodynamis taitensis*

Samoan name.—'Āleva.

Status.—Uncommon year-round visitor, reported from all islands; a migrant from breeding grounds in New Zealand but present in both winter and summer. Birds remaining in the north during the breeding season are usually immature (Bogert 1937). The population was estimated to be about 26,000 birds.

Discussion.—The long-tailed cuckoo occurred in all habitats but village land, montane rain forest, cloud forest, and montane scrub (Tables 56, 58). It frequented deep forest as well as shrub areas, preferring cover to extensive open areas. Clapp and Sibley (1966) cited reports that these birds were often seen walking along dirt roads, but we observed no terrestrial activity.

Our data (Table 56) revealed slightly higher densities in the winter months (1.5 birds/0.2 ha) than in the summer (1.0 birds/0.2 ha). Clapp (1968) reported the species "in small to moderate numbers throughout much of the year" on Swains Island.

Specimens.—Amerson collected a tail feather that was lost by one of two cuckoos seen on Rose Island on 5 May 1976. A female bird was taken 7 October 1976 on Ta'ū. Bogert (1937) reported eight specimens from Tutuila, Ta'ū, Ofu, Olosega, and Aunu'u (AMNH); Clapp and Sibley (1966) and Clapp (1968) listed seven (USNM) from Tutuila and Swains islands.

Barn Owl, *Tyto alba*

Samoan name.—Lulu.

Status.—Uncommon resident on Tutuila, Aunu'u, Ofu, Olosega, and Ta'ū, with an estimated population of about 19,600 (Table 57).

Discussion.—Barn owls were observed on the five main islands in all habitat types except cloud forest, montane scrub, and montane rain forest (Tables 56, 58). Their distribution was influenced by availability of prey (probably mainly Polynesian rats), heavy rainfall, and dense vegetation. On Tutuila, barn owls were common at dusk throughout the secondary forest, village land, and plantation land of Tafuna Village, especially just west of the Pago Pago International Airport. Owls frequently were sighted at night sitting on electric lines or flying along the coastal road between Tafuna and Utelei villages. They were also seen at night along the coast road from Aua Village to Tula Village. Few were observed during the daytime, perhaps because of the concentration of human inhabitants on Tutuila. On Aunu'u, a single barn owl was sighted at dusk in the old coconut plantation area just north of Aunu'u Village.

On Ofu, Olosega, and Ta'ū islands, barn owls were observed by day and night. On Ofu, owls were especially common in the vicinity of the airport and along the coastal road. On Olosega, a single owl was sighted at dusk on the north edge of the disturbed coastal marsh behind Olosega Village. On Ta'ū, owls were observed in the airport area and along the north coastal road.

This is the only raptor in American Samoa. Mayr (1945) noted that "it feeds on rats, mice and small birds, also on lizards, beetles, and other insects." Yaldwyn (1952) reported that it often took chickens in Western Samoa. In August 1976, A. Sesepasara saw one feeding on a Polynesian rat near Fagasā Pass, Tutuila. Partially eaten carcasses of fruit bats found on Alava Ridge may have been killed by owls.

Armstrong (1932) reported a pair nesting in a banyan tree in December. No nests were found in this survey.

Specimens.—Females were taken on 6 June 1976 on Ofu Island and 22 July 1976 on Ta'ū. Clapp and Sibley (1966) reported a specimen from Tutuila (USNM) and Amadon (1942) mentioned specimens from Tutuila, Ofu, Olosega, and Ta'ū (AMNH). The subspecies is *T. a. lulu,* found throughout the southwest Pacific.

White-rumped Swiftlet, *Collocalia spodiopygia*

Samoan name.—Pe'ape'a.

Status.—Common resident on Tutuila, Aunu'u, Ofu, Olosega, and Ta'ū islands. The total population was estimated to be nearly 350,000 birds (Table 57).

Discussion.—White-rumped swiftlets were observed fly-

ing over all types of habitat on the major islands, but the preferred habitat was secondary forest and plantation land (Tables 56, 58). They regularly frequented high windswept ridges.

This species feeds aerially on small insects. It usually flies above the forest canopy but will penetrate the canopy when the understory is open, as along trails or streams. It congregates around flowering trees, especially of the genus *Ficus*, over disturbed coastal marshes, and over pig-raising areas, all of which produce or attract flies and mosquitoes. It rests during night or day in deep caves, where it builds its nests.

On Tutuila Island, one major swiftlet cave and a minor one are located on the north shore at Anape'ape'a (= swiftlet cave) Cove, Afono Village. Both caves are on the east edge of Afono Bay, about 750 m northeast of the village. Access by land is difficult because of high cliffs. At extreme low tide both cave entrances can be reached by way of the exposed reef; at high tide, entrance can be gained only by canoe. The major cave is large and almost hidden by dense vegetation. An entrance about 9 m wide by 15 m high opens into a room at least 75 m long. The cave gradually decreases in both width and height, and through an opening 3 m wide by 1 m high opens into another room about 9 m wide, 6 m high, and 15 m deep. The floor of the cave is covered with deep guano, and the back room is flooded. The smaller cave is located at the water's edge about 60 m north of the larger one. The entrance is about 6 m wide and 3 m high, and the single large room is about 23 m long. The floor of this cave is also covered with guano. Small bats were found in the rocky crevices of both caves; large numbers were present in the more isolated back room of the larger cave.

On the afternoon of 29 September 1976 fewer than 10 white-rumped swiftlets were seen by Amerson and A. Sesepasara in these two caves, although at least 11,000 swiftlets were estimated to use them. Five fresh nests were discovered; two contained single eggs, one had a hatchling, and two were empty. The nests, made of liverworts and moss, were glued to the walls of the front room of each cave. No evidence of old nests was noted. Human intrusion was apparent in both caves. Bottles and cans were scattered about the floors and the remains of several wood fires were seen. Samoan children play in the caves and adults frequently enter; smoldering fires are set to facilitate capture of the swiftlets. From 1961 to 1967, several hundred sacks of guano were taken from these caves; knowledge of the value of the guano may have made the caves more vulnerable to human intrusion.

No nesting colonies were found on Ofu Island. There is a possible cave and nesting area on the north shore between Lepua and Sinapoto points. Three large caves cut by surge channels under Nu'utele Islet may be nesting areas, but exploration is impossible. On Olosega, a cave with nesting swiftlets was reported on the northwest face of Alei Ridge above Sili Village, but we could not visit it.

A large cave at Lavania Cove on the rocky south shore of Ta'ū Island formerly contained both swiftlets and bats. This site was examined in October 1976. The entrance had collapsed, perhaps during the earthquake of 1 December 1975, and there was no evidence that either birds or bats could penetrate the mass of rock rubble. Guano could be seen and smelled among the rocks of the old cave entrance. Another cave was reported on the cliffs in the vicinity of Faleasao Village on the northwestern tip of Ta'ū, but we were unable to find it.

The discrepancy in the number of swiftlets seen in the caves on Tutuila and the overall population estimate suggests that other suitable nesting caves exist on the major islands.

Most information on the nesting of this swiftlet is from Western Samoa (Whitmee 1875; Armstrong 1932; Dhondt 1976). Throughout Samoa, nesting has been reported in February, April, June, September, and November. Dhondt (1976) has suggested a year-round breeding season for this species in Samoa and has presented data showing overlap of breeding and molt. Normal clutch size is one.

Specimens.—Two specimens were taken during this survey, a male on 4 June 1976 on Ofu and a female on 9 September 1976 on Nu'utele Islet near Ofu. Clapp and Sibley (1966) reported a specimen from Tutuila (USNM). These are of the subspecies *C. s. spodiopygia*, endemic to Western and American Samoa.

White-collared Kingfisher, *Halcyon chloris*

Samoan name.—Ti'otala.

Status.—Uncommon resident on the five major islands; our total population estimate (Table 57) was about 147,000.

Discussion.—White-collared kingfishers ranged throughout all habitats of Tutuila, Aunu'u, Ofu, Olosega, and Ta'ū islands (Tables 56, 58). They were commonly seen sitting motionless on electric and telephone wires in the village lands, as noted by Clapp and Sibley (1966). In plantation and pasture lands they preferred perches on *Cocos* fronds, dead tree limbs, and wire fences. In secondary rain forests they preferred small exposed limbs of trees in the understory. Some were seen sitting on rocks at the edge of beaches.

Two nests were observed in hollowed-out spaces in the bases of dead bird's-nest ferns, *Asplenium nidus*, 1.2 and 2.4 m above the ground. One found on 19 February 1976 in Malaeimi Valley, Tutuila, held two nestlings. Clapp and Sibley (1966) reported a nest with young on 7 March 1964 on Tutuila, near the top of a 12-meter-high mud bank. None of five specimens taken by those writers in March 1964 and June 1965 had enlarged gonads. Of 14 specimens that we took in April, June, July, and August 1976, none had enlarged gonads. This species probably beeds in the southern summer.

The main food of this species appears to be large insects. A bird sitting motionless and peering at the ground would suddenly fly to the ground, capture its prey, and return to the same perch or another nearby. Of 14 birds collected, five stomachs contained beetles and three contained grasshop-

pers, caterpillars, and unidentified insects; six were empty. On Ofu in September 1976, a bird sitting high on a limb captured two lizards, probably *Emoia cyanura.* After returning to its perch the bird held the rear of the lizard in its bill and hit the lizard several times on the limb before swallowing it. Clapp and Sibley (1966) reported "a green lizard 2 inches long and a green insect resembling a katydid" among food items brought to nestlings. They found "two green katydids and the head of a large beetle" in a stomach sample.

Specimens.—Fourteen specimens were taken, seven from Tutuila, three each from Ofu and Olosega, and one from Ta'ū. Clapp and Sibley (1966) reported five specimens (USNM) and Mayr (1941) listed 59 specimens from Ofu, Olosega, and Ta'ū in his description of the race *manuae.* Two subspecies of this bird are found in American Samoa. *Halcyon chloris pealei* occurs on Tutuila and Aunu'u, and *H. c. manuae* is on Ofu, Olosega, and Ta'ū.

Red-vented Bulbul, *Pycnonotus cafer*

Samoan name.—Manu pālagi; manu papālagi, an alternate form, is plural.

Status.—Introduced; common in and around villages on Tutuila Island, where the population was estimated at about 119,000 (Table 57).

Discussion.—The red-vented bulbul was first reported from Tutuila Island and American Samoa by Clapp and Sibley (1966), who found it at Pago Pago in 1963 and presumed it had been introduced sometime after 1957. It had not been reported by Keith (1957) nor did Dunmire (1960) mention it. The Rev. Fred Anderson (personal communication) reported that he first saw bulbuls at Satala Village, in the Pago Pago Harbor area, in late 1958.

The species has spread rapidly and we observed it in almost every village on Tutuila. Bulbuls preferred inhabited areas (Table 56) and frequented both native and exotic vegetation around houses, and perched on wires (Table 58). In early mornings in 1976, Amerson often saw bulbuls at Tafuna eating insects that had been attracted to outside porch lights during the night. They were seldom seen in forested areas.

No active nests were found in the present survey, but independent young were seen in November and December. Specimens taken in early December had enlarged gonads. In Western Samoa, where this bulbul was introduced during World War II, active nests have been found in November and January (Goodman 1969). In Fiji, where they have also been introduced, the bulbul's nesting season extends from November to January (Mercer 1967). The species has an extended breeding season and up to three successive broods in its native range in India (Ali and Ripley 1971). On the basis of nest records and molt data, Dhondt (1977) suggested that the red-vented bulbul breeding season in Samoa is similar to that in Fiji, and that in Samoa the species is often double-brooded.

Specimens.—Four specimens were taken in December 1976, three males and one female. A previously unreported specimen (USNM) was taken in 1968 by the POBSP (R. B. Clapp, personal communication). These are of the race *P. c. bengalensis,* native to India.

Fiji Shrikebill, *Clytorhynchus vitiensis*

Samoan name.—Segaolevau is listed by various authors, but unknown to present Samoans.

Status.—Uncommon resident at middle elevations of Ta'ū Island (Table 57); previously known also from Ofu and Olosega, but not found there in this survey. The population on Ta'ū was estimated to be about 4,400 birds.

Discussion.—On Ta'ū Island, one Fiji shrikebill was heard near Olomanu Crater on 22 August 1975 and a single bird was seen in, and subsequently collected near, the Laufuti secondary forest study plot on 14 July 1976 (Tables 56, 58). Another was taken 17 July 1976 within the Lafuti forest at an elevation of about 260 m. Single birds were observed in the Liu Bench secondary forest on 19 July 1976 and in the Fagamalo secondary forest study plot on 13 October 1976. All observations were in secondary and montane rain forests between about 250 and 600 m. The small amount of these habitats remaining on Ofu and Olosega may account for the species' apparent absence from those islands.

Specimens.—Two specimens, both females, were taken as mentioned above. Mayr (1932) listed specimens from Ofu, Olosega, and Ta'ū islands taken 1923-24 (AMNH). These are of the race *C. v. powelli,* found only on these three islands.

Mao, *Gymnomyza samoensis*

Samoan name.—Ma'oma'o.

Status.—Previously reported from Tutuila Island, but now probably extirpated.

Discussion.—Peale (1848) and Cassin (1858) reported this bird on Tutuila in listing observations by the U.S. Exploring Expedition in 1839; that remains the only record for American Samoa. Only one of many Samoans that we interviewed knew of this bird; Chief Tuapā Manutui of Afono Village thought that he had heard the loud whistle of this species many years before on Tagau Mountain east of Afono Village, Tutuila. Despite intensive searching, the mao was not observed or heard during this survey.

Wattled Honey-eater, *Foulehaio carunculata*

Samoan name.—Iao.

Status.—Common resident on Tutuila, Aunu'u, Ofu, Olosega, and Ta'ū islands, where it is the most abundant land bird with an estimated population of about 550,000 (Table 57).

Discussion.—In this study, the wattled honey-eater was recorded from all habitats of the five major islands. Birds were found singly and in small flocks. They moved through the vegetation in a searching fashion, going from limb to limb, peering under leaves and flowers for food. When ap-

proached by human or animal intruders they became noisy and inquisitive. Densest populations were found in mangrove forest, the lowest in montane scrub and coastal marsh (Tables 56, 58).

Specimens taken in June 1976 showed gonadal enlargement or brood patches indicative of breeding. Clapp and Sibley (1966) found no gonadal development in birds taken in March and October 1964 and June 1965. In Western Samoa, Dhondt (1976) observed nest-building activity in April and June 1973 and in January-February 1974.

Specimens.—Eleven specimens were taken during this survey, seven males and four females, as follows: two from Tutuila, four from Ofu, three from Olosega, and two from Ta'ū. Clapp and Sibley (1966) listed 11 specimens (USNM). Mayr (1932) reported 27 specimens from Ofu, Olosega, and Ta'ū, as well as a series from Tutuila (AMNH). The subspecies in American Samoa is *F. c. carunculata.*

Cardinal Honey-eater, *Myzomela cardinalis*

Samoan name.—Segasegamau'u; tōlai'ula, used by some authors, is incorrect.

Status.—Common resident on Tutuila Island, where the population was estimated at 118,000 (Table 57).

Discussion.—Cardinal honey-eaters were found in all habitats except Kula fernland on Tutuila. More were encountered at lower elevations than higher, and density was greatest in mangrove forest (Tables 56, 58). They were observed feeding on the nectar of flowering plants, especially exotic species (such as *Hibiscus rosa-sinensis*) in and around inhabited areas and native species (such as *Syzgium samoensis*) on the ridges above Pago Pago Harbor.

One of two adults collected in June 1976 showed gonadal enlargement, but neither of two taken in July were in breeding condition; an immature bird was also taken in July. Clapp and Sibley (1966) found no evidence of breeding in specimens taken in March 1964 or June 1965. On the other hand, Dhondt (1976) reported breeding activity in both March and June 1974 in Western Samoa.

Specimens.—We took five specimens, as noted above; three were males and two were females. Clapp and Sibley (1966) reported two specimens taken in 1964 and 1965 (USNM). Mayr (1932) reported others from 1923 and 1924 (AMNH). The subspecies on Tutuila is *M. c. nigriventris,* found also in Western Samoa.

Polynesian Starling, *Aplonis tabuensis*

Samoan name.—Miti vao; the shortened form miti is also used.

Status.—Common resident on Tutuila, Aunu'u, Ofu, Olosega, and Ta'ū; the total population is about 106,000 birds (Table 57).

Discussion.—We found Polynesian starlings in all habitats except littoral strand. They were in both primary and secondary vegetation (Tables 56, 58) but were seen only rarely below about 120 m elevation. Seen singly and in pairs, they were rarely in flocks. Although they are secretive, their presence in the bush was often betrayed by the musical song. Frequently they were seen eating small caterpillars. Food-searching activities took them from the lower portions of the forest to the canopy, but never to the ground.

Specimens.—Eight Polynesian starlings were collected, two females and three males on Ta'ū and three males on Tutuila. Clapp and Sibley (1966) reported two specimens from Tutuila (USNM). Mayr (1942) mentioned 22 specimens from Ta'ū and Ofu islands and 19 from Tutuila (AMNH), series that formed the basis for his description of the two subspecies found in American Samoa. *Aplonis t. manuae* is endemic to Ofu, Olosega, and Ta'ū, whereas *A. t. tutuilae* is found only on Tutuila and Aunu'u islands.

Samoan Starling, *Aplonis atrifusca*

Samoan name.—Fuia.

Status.—Common resident on Tutuila, Aunu'u, Ofu, Olosega, and Ta'ū islands, with a total estimated population of about 334,000 (Table 57).

Discussion.—Samoan starlings were seen singly and in small to medium flocks in all habitats of the five major islands of American Samoa (Tables 56, 58). They commonly fed on fruit, especially banana and papaya. Damage to fruit by this species appears to be greater than that caused by the purple swamphen, because starling populations are larger.

Gonads were small in specimens taken in March and October 1964 but enlarged in those from June 1965 (Clapp and Sibley 1966). Three specimens taken in this survey, in March and June 1976, had enlarged gonads. In Western Samoa, Armstrong (1932) saw young being fed in late June 1924, and Dhondt (1976) reported evidence of breeding in May and June. Whitmee (1875) and Mayr (1945) noted that the eggs are pale blue.

Specimens.—We took six specimens on Olosega (two females) and Tutuila (three males and one female). Clapp and Sibley (1966) reported 11 specimens (USNM). Mayr (1942) listed 29 specimens from Olosega, and suggested that birds from the Manu'a group of islands had slightly heavier and larger bills than those from Western Samoa.

Mammals

Data on mammals were obtained in 10 of the 41 vegetation study plots and one additional plot on Swains Island (Table 73). Rodents were captured in folding Sherman-type live traps with oatmeal bait. Traps were set at 10-m intervals along a 300-m transect in each study plot, for up to 5 days in each trapline. Some animals were sexed and aged, and marked by toe clipping. Population density was calculated by the Jolly (1965) method when possible. Some bats were captured in mist nets; colonies of sheath-tailed bats were visited and linear surveys (Table 2) provided information on flying foxes. Information on density and population estimates by

habitat are given in Table 74. Distribution by island is summarized in Table 75.

Dogs, cats, horses, cows, and pigs are kept by Samoans. Only the pig, discussed below, and a few cats exist in feral populations.

English and scientific names of mammals in American Samoa follow Carter et al. (1945), Hall and Kelson (1959), and Tomich (1969). The sequence used follows Anderson and Jones (1967).

One species whose occurrence is considered hypothetical is enclosed in square brackets [ ].

Flying Fox, *Pteropus samoensis*

Samoan name.—Pe'a.

Status.—Common on Tutuila, Aunu'u, Ofu, Olosega, and Ta'ū islands. The total population was estimated at over 140,000 individuals (Table 74).

Discussion.—The main roost of flying foxes on Tutuila is at Fagatele Point, where thousands of these large bats roost in large trees in the coastal forest on the southern tip of Seumalo Ridge. Smaller roosts are scattered throughout the island, and at dusk the bats can be seen over the entire island, especially along the ridges. On Aunu'u they roost in a large colony on the isolated southeast slope of Fogatia Hill, whence they range across the island. Roosts are located on the cliffs along the south coast of Ofu and on Nu'utele Islet. On Olosega, roosts are in tall trees along the rock cliffs above Olosega Village and Sili Village, and along the east coast north of Leala Point. Flying foxes roost in two major areas on Ta'ū—in the plantation land above Fagamalo Cove and in the lowland rain forest above Papaotoma Point.

These bats feed on large fleshy fruits such as bananas, breadfruit, mangos, and papayas. They feed both day and night, but most frequently at sunset and for a few hours thereafter.

Data from study plots indicated that the population density was highest in secondary forest, plantation land, and pasture land. No seasonal variation was noted. Linear surveys showed that the bats were more abundant on islands of the Manu'a group than on Tutuila and Aunu'u (Table 76).

Specimens.—Three were taken on Ofu, five on Olosega, and one on Tutuila in this study. Sanborn (1931) reported 10 from Tutuila, Olosega, and Ta'ū, 5 labeled only "Samoan Islands," and 1 labeled "Manu'a Group" (AMNH). The Smithsonian's POBSP collected four specimens from Tutuila (USNM). These represent the subspecies *P. s. samoensis.*

Sheath-tailed Bat, *Emballonura semicaudata*

Samoan name.—Pe'ape'avai; sometimes called by the name of the white-rumped swiftlet, Pe'ape'a, with which it is sometimes confused.

Status.—Uncommon, found on Tutuila, Aunu'u, Ofu, Olosega, and Ta'ū islands, with an estimated total population of about 11,000.

Discussion.—The major sheath-tailed bat roost in American Samoa is the pair of caves at Anape'ape'a Cove on Tutuila Island, described in detail in the account of the white-rumped swiftlet. Other roosting caves on this island were at Sail Rock Point and Mataae Point. On Aunu'u, these bats utilize a cave on Nu'utele Islet and along the Sinapoto Point area of the north coast of Ofu. The single known roosting cave on Olosega is on the cliff above Sili Village. On Ta'ū, this species roosts in caves along the south coast above Lavania Cove. A formerly used cave at Lavania Cove has been mentioned in the account of the swiftlet. There may, of course, be other caves that these bats use. We occasionally saw these bats flying at dusk around trees in the villages, and in lowland areas and beaches near known roosts.

Our estimate of the population is based on data from roost sites. About 10,000 bats were found in the larger cave at Anape'ape'a Cove; 15 to 20 individuals were seen in each of the other caves we investigated. Despite the large roost on Tutuila, we saw bats flying only once on that island, and they generally avoided mist nets set at night. On Ta'ū Island, we estimated that there were about 500 bats in the Lavania Cove area. The estimate by habitat (Table 74) assumes uniform density throughout the islands, an admittedly unlikely situation.

Specimens.—We took three specimens on Tutuila, all females. Sanborn (1931) reported nine specimens from Ta'ū (AMNH). Three were taken on Tutuila in December 1966 by the POBSP (USNM).

[Mouse-eared Bat, *Myotis insularum*]

This species is known from a single specimen taken before 1878 at "Navigators' Islands," an old name for the Samoan Islands.

House Mouse, *Mus musculus*

Samoan name.—'Isumu.

Status.—Introduced; uncommon on Tutuila, where the population is estimated to be less than 800 individuals.

Discussion.—Two mice were collected and others were observed in houses in the Tafuna Village area of Tutuila; others were reported in houses throughout the island. Only one house mouse was trapped in a naturally vegetated area, in littoral strand.

Specimens.—The two specimens noted above were both males and were taken on 9 December 1975 and 15 April 1976.

Roof Rat, *Rattus rattus*

Samoan name.—'Isumu.

Status.—Introduced; uncommon on Tutuila, Aunu'u, and Ofu. The estimated population (Table 74) is about 113,000.

Discussion.—On Tutuila, the roof rat is found in villages, in plantation and pasture land, in secondary forest, and in adjacent natural areas along the south shore. On Aunu'u, rats were trapped in undisturbed coastal marsh (Faimulivai Marsh) and were observed in disturbed marshes and in village and plantation land; the species may be in almost all parts of that island. A single roof rat was found on Ofu in village land near the airport.

This species may be a relatively recent introduction. It was first found by personnel of the POBSP in 1964 and was later reported by Nass (1971); neither record has been published.

Specimens.—We collected two specimens on Tutuila, one on Aunu'u and one on Ofu. There is one earlier specimen from Pago Pago (USNM).

Norway Rat, *Rattus norvegicus*

Samoan name.—'Isumu.

Status.—Introduced; rare, if still extant, on Tutuila.

Discussion.—No Norway rats were observed or trapped in this survey. Tate (1935) reported specimens taken in 1924 on Tutuila, and Nass (1971) reported this species near Tafunafou and Fagasā.

Specimens.—Tate (1935) reported three specimens from Tutuila. Specimens that may have been taken by Nass (1971) could not be located.

Polynesian Rat, *Rattus exulans.*

Samoan name.—'Isumu.

Status.—Very common, found on all islands. Numbers were estimated to exceed 2,000,000 (Table 74).

Discussion.—The Polynesian rat was trapped or observed on Tutuila in all vegetative types except kula fernland and montane scrub. Similarly, they were found over most of the other major islands, but not in higher montane rain forest or cloud forest. These rats were common in plantation and village land on Swains Island.

Polynesian rats were found throughout vegetated parts of Rose Island. They were active by day but more active at night. Their nest burrows were in holes under *Pisonia* and *Messerschmidia* roots; some rats nested in rotten portions of *Pisonia* trees. Several rats were seen feeding on *Pisonia* fruits. Swerdloff and Needham (1970) observed large numbers of these rats preying on turtle hatchlings and eggs and on bird eggs on this island. Nass (1971) visited the island to investigate predation by rats, but did not observe any evidence of it. We did not observe predation on seabirds or their eggs or young, but rats were seen eating eggs broken by ruddy turnstones. No turtle eggs or hatchlings were present during our visits.

From limited capture-recapture data on Rose Island, we estimated the density of Polynesian rats to be 55/0.4 ha and the population to be about 220 individuals. Other observations and population estimates on this island are presented in Table 77.

Specimens.—We collected 26 specimens from several islands, as follows: Aunu'u, 7; Ofu, 9; Olosega, 4; Rose, 6. Tate (1935) reported one from Ofu, one from Ta'ū, and two from Rose (AMNH). POBSP personnel took one from Tutuila (USNM). Kirkpatrick (1966) reported collecting 12 specimens on Swains Island (USNM). The subspecies is *R. e. exulans.*

Pig, *Sus scrofa*

Samoan name.—Pua'a.

Status.—Introduced; feral on Tutuila, Ofu, Olosega, Ta'ū, and Swains islands, and at least formerly on Aunu'u.

Discussion.—Feral pigs are found in plantation land, secondary forest, and lowland and montane rain forest on the various islands, generally in low to moderate numbers. The largest population seems to be on Ofu, where large areas have been rooted out to the north and northeast of Tumu Mountian. No population estimates were made. Hunting pressure helps to control pig populations on most of the islands, but some adverse impact on native wildlife populations is inevitable.

Marine mammals

A pilot whale, *Globicephala* sp., was captured, killed, and eaten by the people of Olosega Village, Olosega, in early June 1976. An individual, possibly a pilot whale, was seen off Matu'u Village, Tutuila, on 2 October 1976. Three whales, species unknown, were seen at Rose Atoll in October 1976 (Sekora 1976) and one unidentified whale was seen east of Ta'ū in October 1975. S. N. Swerdloff saw 27 pilot whales near Tutuila on 24 November 1974 and a small unidentified whale near Rose Atoll on 23 November 1974 (Sekora 1974). Unidentified porpoises were seen several times in this survey—3 off Rose Atoll on 21 October 1975, 20 off Tutuila on 2 December 1975, 4 off Ofu on 10 September 1976, and about 15 north of Ofu and Olosega on 21 October 1976.

Acknowledgments

This study was conducted by Environment Consultants, Inc., for the U.S. Fish and Wildlife Service under U.S. Department of the Interior Contract No. 11-16-0001-5782FA. Edward S. Marvich, of the FWS Division of Federal Aid, Portland, Oregon, was the project supervisor. The core ECI field team consisted of A. Binion Amerson, Jr., Principal Investigator, W. Arthur Whistler, Terry D. Schwaner, Warren M. Pulich, Richard M. Bond, John J. Kuruc, and Afasā Sesepasara. Daniel M. Coffman was the project administrator and senior editor, and Phyllis R. Allison was project coordinator. Many other staff members of ECI contributed to the project.

We thank the following FWS personnel: Matt Dillion, former Special Agent-in-Charge, Honolulu, Hawaii, who assisted in obtaining permits; Eugene Kridler, formerly of the Office of Endangered Species, Honolulu, Hawaii, whose expertise in Pacific plants and animals greatly assisted the field team; Palmer C. Sekora, former Refuge Manager, Rose Atoll National Wildlife Refuge, Honolulu, Hawaii, who granted permission for the field team to visit Rose Atoll, and who supplied data from the October 1976 Rose Atoll trip; and C. Fred Zeillemaker, former Assistant Refuge Manager, Kilauea, Hawaii, who greatly assisted the field team on the October 1975 Rose Atoll trip.

We acknowledge the following Government of American Samoa officials for their assistance: John M. Haydon, Earl B. Ruth, and Frank E. Barnett, Governors of American Samoa, who gave their full support; Richard A. Berg, Special Assistant to the Governor; Donald F. Graf, Government Ecologist, who acted as liaison between the field team and the Government of American Samoa; Patitaoto Faiai, originally Ecology Assistant and now Government Ecologist, who assisted in liaison with various government departments; Tulī Le'iato and Francis Shimasaki, Samoan Affairs, who acted as liaison between the field team and the village chiefs; Edgar Marcus, Director of Economic Development and Planning, who supplied land-use and population information; Robert Page, Director of Public Works, whose office assisted in transportation and housing while the field team was in the Manu'a Group; Stanley N. Swerdloff, former Director of Marine Resources, Henry S. Sesepasara, Manager of Marine Resources, Richard C. Wass, Fisheries Biologist, and Jeanette Yamasaki, former Secretary of Marine Resources, whose offices we shared during the entire field operation; Pemerika L. Tau'ili'ili, Director of Agriculture, and Sipaia Fateusi, Manua Extension Officer, who supplied much agricultural information; Li'a F. Tufele, Director of Public Safety, and J. Lloyd Jackson, Chief of Police, who granted a gun permit for collecting scientific bird specimens; and Palauni M. Tuiāsosopo, Chairman of the Board, Jean P. Haydon Museum of American Samoa, Konelio Moce, Museum Curator, and George Sanderson, Museum Curator, who provided temporary storage space for plant, bird, and mammal voucher specimens.

We also thank A. P. Lutali, Delegate-at-Large, Government of American Samoa, Washington, D.C., and his staff, for assistance and support throughout the entire study.

We acknowledge local Government officials, including Tausulu Misa'alefua, Manu'a District Governor, and Faufano Toeaina, Manu'a District Clerk, who both provided liaison and support during our surveys of the Manu'a District; also Seuma'ala Fitiause, Mayor of Ofu; Moreli Niuatoa, County Chief of Olosega; F. Koli Saiaona'i, Mayor of Olosega; Toatolu Nua, County Chief of Ta'ū; Seanoa Tamaaleve'a, Mayor of Lumā; Mauga 'Aufotu, Mayor of Siufaga; Faresa Paopoa, County Chief of Fitiuta; Mauga I. Taufa'asau II, Eastern District Governor; Malaefono Lemafa, County Chief of Sa'ole; Sepetaio Matila, Mayor of Aunu'u; Tuapā Manutui, Mayor of Afono; Sale'aumua Tevi, Mayor of Vatia; T. M. Puailoa, Mayor of Nu'uuli; F. Toloa Letuli, Western District Governor; Sefe Tau'ese, Mayor of Tafuna; Sape Tauāola, Mayor of Aoloau; Jack Thompson, House of Representatives Member representing Swains Island; and Wallace H. Jennings, owner, Swains Island.

For access to various scientific manuscripts, technical reports, and unpublished data, we thank the Rev. Fred Anderson, Griffin, Georgia; Myrtle J. Ashmole, Peebles, Scotland; Edwin H. Bryan, Bernice P. Bishop Museum, Honolulu, Hawaii; Roger B. Clapp, FWS, Washington, D.C.; Richard S. Crossin, Tucson, Arizona; Arthur L. Dahl, South Pacific Commission, Noumea, New Caledonia; Lowell D. Holmes, Wichita State University, Wichita, Kansas; Wallace H. Jennings, owner, Swains Island; Allan R. Keith, New Vernon, New Jersey; Mary Prichard, Vaitogi, Tutuila Island; and Kazimierz Wodzicki, Victoria University of Wellington, Wellington, New Zealand.

For identification and verification of scientific specimens, we thank Archie F. Carr (turtles), University of Florida, Gainesville, Florida; W. C. Brown (skinks and geckos), Menlo College, Menlo Park, California; F. Raymond Fosberg and Marie-Hélène Sachet (miscellaneous plants), Smithsonian Institution, Washington, D.C.; Tissa Herat (ferns), University of Dar es Salaam, Dar es Salaam, Tanzania; Arnold Klug (geckos), University of Michigan, Ann Arbor, Samuel B. McDowell (snake), Rutgers University, New Brunswick, New Jersey; and Peter Taylor (orchids), Kew Herbarium, Richmond, Surrey, England. We thank Philip S. Humphrey, Museum of Natural History, University of Kansas, Lawrence, and former Director of the Pacific Ocean Biological Survey Program (POBSP), Smithsonian Institution, Washington, D.C., for allowing us use of unpublished POBSP field notes and specimen data. The support of William E. Duellman, Curator of Herpetology, University of Kansas, in supplying research space for herpetological specimen verification is gratefully acknowledged. The curators of the following museums

graciously loaned herpetological specimens for comparative purposes: American Museum of Natural History, New York, New York; Australian Museum, Sydney, Australia; British Museum (Natural History), London, England; California Academy of Sciences, San Francisco; Department of Scientific and Industrial Research (Ecology Division), Lower Hutt, New Zealand; Field Museum of Natural History, Chicago, Illinois; National Museum of New Zealand, Auckland, and United States National Museum of Natural History (Smithsonian Institution), Washington, D.C. James B. Murphy, Curator of Reptiles, Dallas Zoo, Dallas, Texas, kindly kept the Pacific boa alive for several months while conducting behavioral studies on this rarely collected species. The support of Dieter Mueller-Dombois, Botany Department, University of Hawaii, Honolulu, who commented on and contributed to the botany methodology, is also appreciated.

We especially thank the people of American Samoa for their contributions throughout this study. Our apologies are given to those whose contributions are undocumented, either because we did not personally meet them or because we simply could not keep track of the many persons on each of the islands who helped with transportation, supply, Samoan animal and plant names, and who acted as sources of information.

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Table 1. Averaged soil plot data from community study plots on American Samoa (L = low; M = medium; T = trace; VL = very low).

Study plot number and name[a]	Soil types (%)			Soil depth (cm)	Soil pH	Soil constituents (parts per million)											
	Sand	Silt	Clay			Ammonia	Nitrite	Nitrate	Chloride	Sulfate	Phosphorus	Aluminum	Calcium	Magnesium	Manganese	Potassium	Iron
1. Nu'uli mangrove forest (2)	76.7	12.5	6.7	Surface	6.8	5	1	10	3,750	50	50	5	325	60	3	160	1
2. Vaitogi littoral forest (8)	57.5	15.1	26.4	12.7	6.7	VL	0	5	500	150	65	VL	2,625	M	VL	50	30
3. Rose littoral forest (18)	60.2	25.8	14.0	12.7	6.9	VL	0	40	T	0	165	VL	360	L	T	75	4
5. Onenoa littoral forest (1)	73.3	20.0	6.7	7.6	7.5	—	—	5	—	—	75	—	—	—	—	85	—
8. Pala littoral forest (1)	Peat Material			Surface	7.5	10	0	75	—	—	—	—	—	—	—	—	—
16. Ofu rain forest (6)	80.1	15.1	4.8	7.6	6.8	0	0	13	5	0	70	5	225	75	0	170	8
20. Tafuna rain forest (4)	43.0	34.5	21.5	20.3	6.3	VL	0	50	500	2,000	75	VL	2,800	L	VL	50	8
21. Malaeimi rain forest (6)	47.4	24.8	27.8	30.5	6.1	5	0	6	T	0	30	45	155	60	10	130	8
22. Faga'alu rain forest (7)	54.8	32.8	12.4	20.3	6.2	0	0	5	0	0	20	5	25	50	0	50	5
23. Aoloau rain forest (7)	30.5	53.3	16.2	22.9	6.0	T	0	5	0	0	8	6	15	60	T	50	7
26. Tau ridge forest (6)	66.0	20.0	13.0	7.6	6.5	VL	0	5	50	—	75	L	2,800	L	VL	95	5
28. Matafao ridge forest (8)	55.6	29.0	15.0	17.8	6.5	VL	0	8	75	75	50	VL	890	L	L	50	8
32. Lata cloud forest (4)	30.9	21.8	47.3	17.8	6.0	0	0	5	0	0	3	100	0	30	0	50	7
37. Laufuti secondary forest (1)	5.9	5.9	88.2	Surface	6.0	0	0	5	0	0	T	100	T	20	0	50	8
38. Olotania montane shrub (7)	46.9	21.5	31.6	12.7	6.0	0	0	5	0	0	T	100	0	20	0	50	8
39. Aunu'u coastal marsh (5)	65.2	20.6	14.2	35.6	6.1	5	1	T	25	15	100	5	330	50	5	70	7
40. Maga littoral scrub (15)	82.9	12.9	4.9	7.6	6.3	0	0	9	5	0	45	10	40	75	2	105	6
41. Onenoa kula fernland (7)	77.0	14.8	8.2	12.7	5.6	2	0	5	10	20	6	65	40	35	4	60	6
Swains Island (4)	87.0	9.1	2.9	10.2	7.3	VL	0	4	275	125	100	VL	2,800	L	VL	60	4

[a] Numbers in parentheses are number of samples

Table 2. The 41 study plots in American Samoa.

Plot number	Plot name	Island	FWS permanent marker no.
1	Nu'uuli mangrove forest	Tutuila	
2	Vaitogi littoral forest	Tutuila	3
3	Rose littoral forest	Rose	
4	Aunu'u littoral forest	Aunu'u	
5	Onenoa littoral forest	Tutuila	9
6	Aigā littoral forest	Tutuila	
7	Saua littoral forest	Ta'ū	
8	Pala littoral forest	Aunu'u	
9	Sili coastal forest	Olosega	
10	Pofala coastal forest	Aunu'u	
11	Nu'utele coastal forest	Ofu	
12	Masefau coastal forest	Tutuila	10
13	Maloatā ridge forest	Tutuila	
14	Alofau ridge forest	Tutuila	8
15	Au'auli rain forest	Ta'ū	15
16	Ofu rain forest	Ofu	
17	Lavania rain forest	Ta'ū	19
18	Aigā rain forest	Tutuila	
19	Saua rain forest	Ta'ū	16
20	Tafuna rain forest	Tutuila	1
21	Malaeimi rain forest	Tutuila	6
22	Faga'alu rain forest	Tutuila	12
23	Aoloau rain forest	Tutuila	2
24	A'asu rain forest	Tutuila	7
25	Olosega rain forest	Olosega	
26	Tau ridge forest	Tutuila	4
27	Alava ridge forest	Tutuila	
28	Matafao ridge forest	Tutuila	11
29	Tau montane scrub	Tutuila	
30	Matafao montane scrub	Tutuila	
31	Piumafua cloud forest	Olosega	
32	Lata cloud forest	Ta'ū	14
33	Airport secondary forest	Tutuila	5
34	Lumā secondary forest	Ta'ū	13
35	Fagamalo secondary forest	Ta'ū	18
36	Faleiulu secondary forest	Ta'ū	20
37	Laufuti secondary forest	Ta'ū	
38	Olotania montane scrub	Ta'ū	
39	Aunu'u coastal marsh	Aunu'u	
40	Maga littoral scrub	Olosega	21
41	Onenoa kula fernland	Tutuila	

Table 3. List of linear surveys conducted in American Samoa.

No.	Location	Km	No. of surveys
	Tutuila		
1	Onenoa Plot 5 to Onenoa	0.64	4
2	Onenoa to Tula (road)	2.09	3
3	Lauagae Ridge to Ogefao	0.80	1
4	Maupua to Ogefao	1.29	1
5	Tula to Fagaitua (road)	10.62	2
6	Fagaitua to Lauli'ifou (road)	7.24	2
7	Amouli to Aoa (road)	2.25	1
8	Aoa to Malo Point	1.77	1
9	Fagaitua to Masefau	3.38	1
10	Fagaitua to Masausi	2.74	1
11	Masefau to Vainu'u Point	0.97	1
12	Lauli'ifou to Lepua (road)	3.38	2
13	Lepua to Pago Pago	3.70	2
14	Aua to Afono	2.74	2
15	Afono to Vatia	4.02	2
16	Vatia to E. Pola'uta Ridge	1.29	1
17	Vatia to W. Pola'uta Ridge	1.77	1
18	TV tower to Vatia	2.57	2
19	TV tower to Pago Pago	4.02	1
20	Pago Pago to Fagasā	3.38	4
21	Fagasā Pass to Fatifati Mountain	0.97	1
22	Fagasā Pass to Matafao Mountain	1.93	1
23	Fagasā to Fagatele	0.64	1
24	Pago Pago to Faga'alu	5.31	2
25	Faga'alu to Plot 22	1.77	4
26	Plot 22 to upper reservoir to Fagatogo	2.74	2
27	Faga'alu to Tafuna Housing (road)	7.40	3
28	Nu'uuli to Mulinu'u Point	1.45	1
29	Tafuna Housing Roads	2.57	1
30	Airport Complex Roads	3.86	2
31	Airport to Futiga	5.47	2
32	Vaitogi to 'Ili'ili	2.09	3
33	Vaitogi to Plot 2	0.48	2
34	Plot 2 to Leti Point	1.77	3
35	Lepine to Plot 26	0.48	1
36	Malaeimi Valley Plantation Road	1.93	6
37	Malaeimi Valley Housing Road	0.97	2
38	Tafuna Road to Futiga	6.76	1
39	Airport Road to Fogagogo	1.61	2
40	Airport Road to Plot 20	0.48	3
41	Vaitele Valley Road	0.80	1
42	Pava'ia'i to Aoloaufou	5.15	1
43	Aoloaufou to Plot 23	1.29	3
44	Aoloaufou to Plot 24	1.29	1
45	Futiga to Steps Point	3.22	2
46	Futiga to Leone	3.38	1
47	Taputimu Road to Leone	4.99	1
48	Malaeloa Road	2.41	1
49	Leone to Poloa	8.69	2
50	Poloa to Fagali'i	1.45	1
51	Poloa to Vaitele Stream	1.13	1
52	Poloa to Cape Taputapu	1.29	1
53	Fagali'i to Moloatā	1.29	1
54	Moloatā to end of road	1.13	2
	Total	148.85	97

Table 3. Continued

No.	Location	Km	No. of surveys
	Aunu'u		
55	Village to Pala Lake	0.97	1
56	Pala Lake to sand beach	0.32	1
57	Sand beach to village	0.64	1
58	Village to Marsh Plot 39	0.97	4
59	Marsh Plot 39 to Ma'ama'a Cove	0.80	5
60	Ma'ama'a Cove to Pala Lake	0.80	3
61	Ma'ama'a Cove to village	2.09	1
62	Village to second mud lake	0.64	1
	Total	7.23	17
	Ofu		
63	Asagatai Point to Airport	5.15	2
64	Asagatai Point to Fa'ala'aga Beach	0.97	1
65	Mafafa Beach to Tuafanua Beach	1.29	1
66	Airport to Ofu Church	2.57	3
67	Ofu Church to Motor Pool House	0.80	2
68	Motor Pool House to Samo'i Beach	1.61	1
69	Ofu Village to Tumu Mountain	3.70	1
70	Motor Pool House to Tauga	0.64	1
71	Nu'utele Island	0.32	1
72	Plot 16 to Toaga	1.61	2
	Total	18.66	15
	Olosega		
73	Tamatupu Point to Pouono Point	1.77	2
74	Pouono Point to Plot 40	1.77	2
75	Plot 40 to Oge Beach	1.29	2
76	Plot 40 to Talaisina Stream	1.77	2
77	Plot 40 to Piumafua Mountain	2.90	1
78	Tamatupu Point to Leaumasili Point	3.06	1
	Total	12.56	10
	Ta'ū		
79	Fusi to Fatatele Point	6.11	3
80	Fatatele Point to Lavania Cove	3.22	2
81	Lavania Cove to Liu Beach	1.77	1
82	Faleiulu Stream to Plot 36	1.45	4
83	Plot 36 to Olotania Crater	2.57	2
84	Lata Mountain Rim	0.80	2
85	High School to Faleiulu Stream	2.41	1
86	Road to Plot 35	3.54	1
87	Au'auli Cove to Faleiulu Stream	2.25	1
88	Leusoali'i Village to Siu Point	4.51	2
89	Road to Judd's Crater	0.64	1
90	Siu Point to Laufuti Stream	2.41	2
91	Siu Point to Maefu Beach	1.93	1
92	Laufuti Stream to lip of upper Liu Bench	1.13	1
93	Lumā to Faleasao	1.13	1
94	High School to Airport	0.64	2
95	Airport to Agriculture Road	0.48	1
96	Fusi to Fagamalo Cove	1.13	2
97	High School to Maia Village	10.30	2
98	High School to Ta'ū Village	0.80	2
	Total	49.22	34
	Grand total	236.52	173

Table 4. Vegetative characteristics of Plot 1, Nu'uuli Mangrove Forest. Surveyed 18 December 1976.

Trees	Basal area	No. of	No. of trees with	Relative dominance
Species	(cm^2)	trees	dbh ≥ 15 cm	(%)
Bruguiera gymnorhiza	82,492	62	62	100

Saplings	Height class (m)					Density	
Species	0.5 to 0.9	1.0 to 1.4	1.5 to 1.9	2.0 to 2.4	2.5 and higher	Total number	Average per 100 m^2
Bruguiera gymnorhiza	1	3	0	0	0	4	0.3

Table 5. Vegetative characteristics of Plot 2, Vaitogi Littoral Forest, based on 6 subplots. Surveyed 9 November 1976.

Trees	Basal area	No. of	No. of trees with	Relative dominance
Species	(cm^2)	trees	dbh ≥ 15 cm	(%)
Pandanus tectorius	1,154	8	1	100

Table 6. Vegetative characteristics of Plot 3, Rose Littoral Forest. Surveyed 20-21 October 1975.

Trees	Basal area	No. of	No. of trees with	Relative dominance
Species	(cm^2)	trees	dbh ≥ 15 cm	(%)
Pisonia grandis	246,809	161	136	100

Table 7. Vegetative characteristics of Plot 4, Aunu'u Littoral Forest, based on plot 30 x 30 m. Surveyed 23 August 1976.

Trees	Basal area	No. of	No. of trees with	Relative dominance
Species	(cm^2)	trees	dbh ≥ 15 cm	(%)
Barringtonia asiatica	50,477	57	51	98
Pisonia grandis	988	1	1	2
Morinda citrifolia	18	1	0	<1
Planchonella costata	13	1	0	<1
Diospyros elliptica	7	1	0	<1
Total	51,503	61	52	

Saplings	Height class (m)					Density	
Species	0.5 to 0.9	1.0 to 1.4	1.5 to 1.9	2.0 to 2.4	2.5 and higher	Total number	Average per 100 m^2
Barringtonia asiatica	30	0	0	0	0	30	3.3
Geniostoma samoense	1	3	0	0	0	4	0.4
Psychotria insularum	3	1	0	0	0	4	0.4
Diospyros elliptica	2	1	0	0	0	3	0.3
Terminalia catappa	0	0	1	0	0	1	0.1
Planchonella costata	1	0	0	0	0	1	0.1
Diospyros samoensis	1	0	0	0	0	1	0.1
Ficus scabra	1	0	0	0	0	1	0.1
Pandanus sp.	1	0	0	0	0	1	0.1
Inocarpus fagifer	1	0	0	0	0	1	0.1
Morinda citrifolia	1	0	0	0	0	1	0.1
Total	42	5	1	0	0	48	5.3

Table 8. Vegetative characteristics of Plot 5, Onenoa Littoral Forest, based on 9 subplots. Surveyed 2 September 1975.

Trees Species	Basal area (cm^2)	No. of trees	No. of trees with dbh ≥ 15 cm	Relative dominance (%)
Barringtonia asiatica	212,143	51	47	95
Hibiscus tiliaceus	6,457	9	7	3
Morinda citrifolia (?)	1,791	1	1	1
Hernandia sonora	1,451	1	1	1
Total	221,842	62	56	

Table 9. Vegetative characteristics of Plot 6, Aigā Littoral Forest. Sapling and ground cover data based on 3 subplots, trees on 6 subplots. Surveyed 10 August 1976.

Trees Species	Basal area (cm^2)	No. of trees	No. of trees with dbh ≥ 15 cm	Relative dominance (%)
Barringtonia asiatica	23,617	29	16	78
Erythrina variegata	4,993	1	1	16
Cocos nucifera	754	1	1	3
Ficus scabra	631	2	1	2
Morinda citrifolia	164	1	0	1
Total	30,159	34	19	

Saplings	Height class (m)					Density	
Species	0.5 to 0.9	1.0 to 1.4	1.5 to 1.9	2.0 to 2.4	2.5 and higher	Total number	Average per 100 m^2
Barringtonia asiatica	10	12	13	5	1	41	13.7
Ficus scabra	0	1	0	0	0	1	0.3
Psychotria insularum	1	0	0	0	0	1	0.3
Diospyros samoensis	1	0	0	0	0	1	0.3
Total	12	13	13	5	1	44	14.7

Ground cover Species	Cover (%)	Frequency
Barringtonia asiatica (seedlings)	11	3/3
Asplenium nidus	10	2/3
Epipremnum pinnatum	5	1/3
Microsorium scolopendria	1	1/3
Pteris comans (?)	1	1/3
Dysoxylum samoense (seedlings)	<1	1/3
Procris pedunculata	<1	1/3
Total	28	

Vines and Climbers Species	Frequency	Dominance (%)
Derris trifoliata	9	56
Epipremnum pinnatum	9	44

Table 10. Vegetative characteristics of Plot 7, Saua Littoral Forest. Surveyed 18 October 1976.

Trees	Basal area (cm^2)	No. of trees	No. of trees with dbh ≥ 15 cm	Relative dominance (%)
Species				
Barringtonia asiatica	23,626	28	15	55
Pisonia grandis	13,042	15	4	31
Hernandia sonora	5,992	3	3	14
Hibiscus tiliaceus	49	1	0	<1
Diospyros samoensis	16	1	0	<1
Guettarda speciosa	5	1	0	<1
Total	42,730	49	22	

Saplings	Height class (m)					Density	
Species	0.5 to 0.9	1.0 to 1.4	1.5 to 1.9	2.0 to 2.4	2.5 and higher	Total number	Average per 100 m^2
Barringtonia asiatica	8	5	2	0	1	16	3.2
Pisonia grandis	2	0	0	0	0	2	0.4
Hernandia sonora	1	0	0	0	0	1	0.2
Total	11	5	2	0	1	19	3.8

Ground cover		
Species	Cover (%)	Frequency
Ipomoea macrantha	5	5/5
Asplenium nidus	4	4/5
Epipremnum pinnatum	<1	3/5
Hoya australis	<1	1/5
Total	9	

Vines and Climbers		
Species	Frequency	Dominance (%)
Clerodendrum inerme	3	3
Epipremnum pinnatum	3	5
Hoya australis	16	25
Ipomoea macrantha	41	67

Table 11. Tree species composition of Plot 8, Pala Littoral Forest, based on 63 randomly selected trees. Surveyed 23 August 1976.

Species	Basal area (cm^2)	No. of trees	No. of trees with dbh ≥ 15 cm	Relative dominance (%)
Planchonella costata	10,903	32	11	35
Hernandia sonora	7,163	4	3	23
Pisonia grandis	5,307	4	4	17
Barringtonia asiatica	3,424	1	1	11
Diospyros elliptica	2,370	7	2	8
Diospyros samoensis	881	4	3	3
Guettarda speciosa	583	3	2	2
Morinda citrifolia	306	6	0	1
Ficus tinctoria	46	1	0	<1
Syzygium dealatum	20	1	0	<1
Total	31,003	63	26	

Table 12. Tree species composition of Plot 9, Sili Coastal Forest, based on estimated dbh of 100 randomly selected trees. Surveyed 10 June 1976.

Species*	Basal area (cm^2)	No. of trees	No. of trees with dbh ≥ 15 cm	Relative dominance (%)
Barringtonia asiatica	25,652	5	3	30
Syzygium clusiaefolium	17,078	38	29	20
Diospyros samoensis	15,884	25	19	18
Dysoxylum samoense	6,524	5	5	8
Erythrina variegata	5,333	3	3	6
Hernandia sonora	4,214	2	2	5
Alphitonia zizyphoides	2,451	1	1	3
Sterculia fanaiho	2,335	3	3	3
Hibiscus tiliaceus	1,772	5	4	2
Diospyros elliptica	1,362	2	2	2
Thespesia populnea	1,297	1	1	1
Ficus obliqua	993	1	1	1
Guettarda speciosa	956	3	2	1
Ficus scabra	679	5	2	<1
Inocarpus fagifer	81	1	0	<1
Total	86,611	100	77	

Table 13. Tree species composition of Plot 10, Pofala Coastal Forest, based on estimated dbh of 65 randomly selected trees. Surveyed 23 August 1976.

Species	Basal area (cm^2)	No. of trees	No. of trees with dbh ≥ 15 cm	Relative dominance (%)
Erythrina variegata	19,991	9	9	44
Diospyros samoensis	10,936	19	14	24
Ficus obliqua	5,855	1	1	13
Diospyros elliptica	3,005	8	5	7
Planchonella costata	1,930	3	3	4
Syzygium dealatum	878	3	1	2
Hibiscus tiliaceus	870	1	1	2
Micromelum minutum	428	12	0	1
Grewia crenata	413	5	0	1
Pisonia grandis	324	1	1	1
Pandanus sp.	309	2	1	1
Ficus tinctoria	20	1	0	<1
Total	44,959	65	36	

Table 14. Tree species composition of Plot 11, Nu'utele Coastal Forest, based on estimated dbh of 194 randomly selected trees. Surveyed 30 November 1976.

Species	Basal area (cm^2)	No. of trees	No. of trees with dbh ≥ 15 cm	Relative dominance (%)
Diospyros elliptica	8,313	38	16	30
Syzygium clusiaefolium	5,737	46	12	21
Syzygium dealatum	2,968	28	3	11
Terminalia catappa	2,882	3	3	11
Diospyros samoensis	2,575	17	6	9
Planchonella linggenensis	2,249	30	2	8
Arytera samoensis	1,367	14	3	5
Hibiscus tiliaceus	890	6	1	3
Morinda citrifolia	182	6	0	1
Stercula fanaiho	181	3	0	1
Hernandia sonora	62	1	0	<1
Allophylus cobbe	20	1	0	<1
Psychotria insularum	5	1	0	<1
Total	27,431	194	46	

Table 15. Vegetative characteristics of Plot 12, Masefau Coastal Forest. Tree data from 10 subplots 10 x 10 m; sapling data from 8, ground cover from 7 quadrats 5 x 5 m. Surveyed 2 November 1976.

Trees Species	Basal area (cm^2)	No. of trees	No. of trees with dbh ≥ 15 cm	Relative dominance (%)
Intsia bijuga	8,101	21	11	21
Syzygium inophylloides	7,773	65	14	20
Rhus taitensis	5,249	8	5	14
Calophyllum inophyllum	3,849	15	2	10
Terminalia catappa	3,090	1	1	8
Syzygium clusiaefolium	2,617	34	4	7
Diospyros elliptica	1,967	34	2	5
Diospyros samoensis	1,947	9	2	5
Alphitonia zizyphoides	1,132	4	3	3
Myristica fatua	579	9	0	2
Geniostoma samoense	434	17	0	1
Arytera samoensis	373	2	1	1
Barringtonia samoensis	308	1	1	1
Glochidion ramiflorum	197	6	0	1
Pandanus sp. (cultivated)	188	1	1	<1
Antidesma sphaerocarpum	117	1	0	<1
Planchonella linggenensis	96	5	0	<1
Canthium merrillii	81	1	0	<1
Psychotria insularum	54	8	0	<1
Hibiscus tiliaceus	49	1	0	<1
Cyathea sp.	46	1	0	<1
Polyscias samoensis	43	1	0	<1
Flacourtia rukam	38	2	0	<1
Micromelum minutum	16	2	0	<1
Meryta macrophylla	15	1	0	<1
Planchonella costata	12	2	0	<1
Ixora samoensis	10	2	0	<1
Aglaia samoensis	5	1	0	<1
Total	38,386	255	47	

Table 15. Continued

Saplings

Species	Height class (m) 0.5 to 0.9	1.0 to 1.4	1.5 to 1.9	2.0 to 2.4	2.5 and higher	Density Total number	Average per 100 m²
Psychotria insularum	5	2	9	2	4	22	11.0
Planchonella linggenensis	8	4	5	0	4	21	10.5
Diospyros elliptica	3	2	1	2	0	8	4.0
Calophyllum inophyllum	1	1	1	1	2	6	3.0
Glochidion ramiflorum	1	0	1	0	1	3	1.5
Eugenia reinwardtiana	0	0	2	0	0	2	1.0
Ixora samoensis	0	1	1	0	0	2	1.0
Diospyros samoensis	1	0	1	0	0	2	1.0
Geniostoma samoense	0	0	0	0	1	1	0.5
Syzygium inophylloides	0	0	0	1	0	1	0.5
Flacourtia rukam	0	0	0	1	0	1	0.5
Intsia bijuga	0	0	1	0	0	1	0.5
Myristica fatua	0	0	1	0	0	1	0.5
Total	19	10	23	7	12	71	35.5

Ground cover

Species	Cover (%)	Frequency
Asplenium nidus	8	4/7
Davallia solida (?)	2	3/7
Freycinetia sp.	2	1/7
Microsorium scolopendria	1	7/7
Asplenium falcatum	1	5/7
Dioscorea bulbifera	<1	2/7
Alyxia stellata	<1	3/7
Total	14	

Vines and Climbers

Species	Frequency	Dominance (%)
Alyxia bracteolosa	5	19
Alyxia stellata	2	7
Dioscorea bulbifera	2	11
Epipremnum pinnatum	2	11
Gynochtodes ovalifolia	10	46
Hoya australis	1	4
Jasminum didynum	1	3

Table 16. Tree species composition of Plot 13, Maloatā Ridge Forest, based on estimated dbh of 51 randomly selected trees. Surveyed 22 November 1976.

Trees Species	Basal area (cm^2)	No. of trees	No. of trees with dbh ≥ 15 cm	Relative dominance (%)
Syzygium inophylloides	14,254	11	10	43
Canarium samoense	6,831	3	3	21
Alphitonia zizyphoides	3,338	4	4	10
Hibiscus tiliaceus	2,470	4	4	7
Myristica fatua	1,723	5	3	5
Rhus taitensis	1,617	3	2	5
Diospyros samoensis	1,141	6	1	3
Planchonella linggenensis	755	4	1	2
Calophyllum inophyllum	214	1	0	1
Elaeocarpus tonganus	208	3	1	1
Fagraea berteriana	182	1	0	1
Diospyros elliptica	169	2	0	1
Terminalia catappa	81	1	0	<1
Calophyllum samoense	81	1	0	<1
Glochidion ramiflorum	20	1	0	<1
Arytera samoensis	15	1	0	<1
Total	33,099	51	29	

Table 17. Vegetative characteristics of Plot 14, Alofau Ridge Forest. Tree data based on 8 and sapling data on 6 subplots 10x10m, ground cover from 5 quadrats 5x5 m. Surveyed 15 November 1976.

Trees Species	Basal area (cm^2)	No. of trees	No. of trees with dbh ≥ 15 cm	Relative dominance (%)
Calophyllum samoense	9,211	28	16	35
Syzygium inophylloides	5,875	17	9	23
Fagraea berteriana	5,717	6	5	22
Arytera samoensis (?)	1,222	5	2	5
Hernandia moerenhoutiana	996	3	2	4
Hibiscus tiliaceus	664	7	0	3
Glochidion cuspidatum (?)	442	7	0	2
Ixora samoensis	384	12	0	1
Diospyros elliptica	290	6	0	1
Diospyros samoensis	221	7	0	1
Planchonella linggenensis	188	1	1	1
Canthium merrillii	153	1	1	1
Cerbera manghas	102	3	0	<1
Glochidion ramiflorum	78	2	0	<1
Ficus obliqua	70	3	0	<1
Desmodium umbellatum	68	3	0	<1
Alphitonia zizyphoides	61	3	0	<1
Ficus tinctoria	49	1	0	<1
Descaspermum fruticosum	13	1	0	<1
Total	25,804	116	36	

Table 17. Continued

Saplings

Species	Height class (m) 0.5 to 0.9	1.0 to 1.4	1.5 to 1.9	2.0 to 2.4	2.5 and higher	Density Total number	Average per 100 m²
Diospyros samoensis	1	3	7	1	1	13	2.2
Calophyllum samoense	7	0	0	0	0	7	1.2
Ixora samoensis	1	1	0	2	2	6	1.0
Garcinia vitiensis	1	0	1	2	1	5	0.8
Psychotria insularum	1	2	1	0	0	4	0.7
Melastoma denticulatum	0	0	2	0	1	3	0.5
Planchonella linggenensis	1	1	0	1	0	3	0.5
Wikstroemia foetida	1	0	1	0	0	2	0.3
Desmodium umbellatum	0	0	0	0	1	1	0.2
Glochidion ramiflorum	0	0	1	0	0	1	0.2
Cerbera manghas	0	0	1	0	0	1	0.2
Hibiscus tiliaceus	0	1	0	0	0	1	0.2
Canthium merrillii	1	0	0	0	0	1	0.2
Total	14	7	14	6	6	48	8.0

Ground cover

Species	Cover (%)	Frequency
Dicranopteris linearis	53	3/5
Davallia solida	16	4/5
Alyxia bracteolosa	4	4/5
Freycinetia sp.	3	1/5
Melastoma denticulatum	1	1/5
Scleria polycarpa	1	3/5
Microsorium scolopendria	<1	4/5
Clidemia hirta	<1	4/5
Alyxia stellata	<1	2/5
Nephrolepis hirsutula	<1	2/5
Scleria lithosperma	<1	1/5
Paspalum orbiculare	<1	1/5
Total	78	

Vines and Climbers

Species	Frequency	Dominance (%)
Alyxia bracteolosa	48	66
Alyxia stellata	3	5
Freycinetia spp.	18	22
Hoya australis	5	5
Hoya betchei	6	1
Jasminum didynum	2	1

Table 18. Vegetative characteristics of Plot 15, Au'auli Rain Forest. Tree data from 5 subplots 10 x 10 m, sapling and ground cover data from 5 quadrats 5 x 5 m. Surveyed 15 October 1976.

Trees Species	Basal area (cm^2)	No. of trees	No. of trees with dbh ≥ 15 cm	Relative dominance (%)
Neonauclea forsteri	15,264	1	1	28
Dysoxylum samoense	14,055	3	3	25
Syzygium inophylloides	7,659	9	5	14
Erythrina variegata	4,172	1	1	8
Sterculia fanaiho	3,587	8	4	6
Myristica fatua	2,910	28	5	5
Syzygium clusiaefolium	1,846	8	4	3
Rhus taitensis	1,474	3	2	3
Garuga floribunda	1,313	1	1	2
Cananga odorata	902	2	2	2
Diospyros samoensis	585	27	0	1
Planchonella linggenensis	554	3	1	1
Pometia pinnata	477	2	1	1
Ficus scabra	243	8	0	<1
Hibiscus tiliaceus	220	2	0	<1
Ficus tinctoria	40	1	0	<1
Flacourtia rukam	36	2	0	<1
Morinda citrifolia	20	1	0	<1
Aglaia samoensis	18	1	0	<1
Genistomoa samoense	16	1	0	<1
Syzygium samarangense	14	2	0	<1
Bischofia javanica	11	1	0	<1
Psychotria insularum	5	1	0	<1
Total	55,421	116	30	

Saplings	Height class (m)					Density	
Species	0.5 to 0.9	1.0 to 1.4	1.5 to 1.9	2.0 to 2.4	2.5 and higher	Total number	Average per 100 m^2
Diospyros samoensis	15	10	12	1	0	38	30.4
Psychotria insularum	3	4	0	0	0	7	5.6
Ficus scabra	2	1	1	0	1	5	4.0
Myristica fatua	1	1	1	0	1	4	3.2
Planchonella linggenensis	3	1	0	0	0	4	3.2
Syzygium clusiaefolium	3	0	0	0	0	3	2.4
Aglaia samoensis	3	0	0	0	0	3	2.4
Syzygium samarangense	0	0	1	0	0	1	0.8
Inocarpus fagifer	0	1	0	0	0	1	0.8
Syzygium inophylloides	1	0	0	0	0	1	0.8
Glochidion ramiflorum	1	0	0	0	0	1	0.8
Erythrina variegata	1	0	0	0	0	1	0.8
Neonauclea forsteri	1	0	0	0	0	1	0.8
Total	34	18	15	1	2	70	56.0

Table 18. Continued

Ground cover

Species	Cover (%)	Frequency
Asplenium nidus	26	5/5
Microsorium scolopendria	8	3/5
Asplenium falcatum	2	4/5
Arthropteris obliterata	2	5/5
Piper graeffei	1	3/5
Nephrolepis hirsutula	1	1/5
Procris pendunculata	<1	1/5
Dryopteris sp. (?)	<1	1/5
Total	40	

Vines and Climbers

Species	Frequency	Dominance (%)
Arthropteris obliterata	7	7
Dioscorea bulbifera	3	2
Epipremnum pinnatum	20	19
Faradaya powellii	2	2
Gynochtodes ovalifolia	3	2
Hoya australis	15	11
Hoya pottsii	12	11
Jasminum didynum	3	2
Mikania micrantha	2	2
Mucuna gigantea	19	21
Piper graeffei	20	20

Table 19. Vegetative characteristics of Plot 16, Ofu Rain Forest. Tree data from 10 subplots 10x10 m, sapling and ground cover data from 6 quadrats 5x5 m. Surveyed 30 November 1976.

Trees

Species	Basal area (cm^2)	No. of trees	No. of trees with dbh ≥ 15 cm	Relative dominance (%)
Hibiscus tiliaceus	7,733	28	12	18
Dysoxylum samoense	7,328	10	8	17
Terminalia catappa	5,582	1	1	13
Myristica fatua	5,161	28	10	12
Neonauclea forsteri	4,723	3	3	11
Guettarda speciosa	4,558	1	1	11
Diospyros samoensis	3,446	34	4	8
Ficus scabra	1,350	12	2	3
Stercula fanaiho	1,283	4	1	3
Planchonella linggenensis	324	1	1	1
Bischofia javanica	270	1	1	1
Morinda citrifolia	73	1	0	<1
Geniostoma samoense	73	1	0	<1
Barringtonia samoensis	72	2	0	<1
Psychotria insularum	49	1	0	<1
Ervatamia obtusiscula	43	1	0	<1
Ficus tinctoria	33	2	0	<1
Diospyros elliptica	16	2	0	<1
Syzygium dealatum	5	1	0	<1
Total	42,122	134	44	

Table 19. Continued

Saplings

Species	Height class (m) 0.5 to 0.9	1.0 to 1.4	1.5 to 1.9	2.0 to 2.4	2.5 and higher	Density Total number	Average per 100 m²
Diospyros samoensis	10	3	5	1	1	20	13.3
Myristica fatua	5	2	3	1	0	11	7.3
Barringtonia samoensis	2	2	1	1	0	6	4.0
Psychotria insularum	1	1	0	0	0	2	1.3
Syzygium dealatum	2	0	0	0	0	2	1.3
Ficus scabra	0	1	0	0	0	1	0.7
Diospyros elliptica	0	1	0	0	0	1	0.7
Total	20	10	9	3	1	43	28.7

Ground cover

Species	Cover (%)	Frequency
Dryopteris sp. (?)	13	3/6
Asplenium nidus	7	6/6
Pteris vaupelii	4	5/6
Dioscorea bulbifera	4	5/6
Procris pedunculata	3	1/6
Epipremnum pinnatum	<1	4/6
Faradaya powellii	<1	2/6
Tectaria setchellii	<1	3/6
Asplenium falcatum	<1	2/6
Hoya australis	<1	1/6
Asplenium cuneatum	<1	1/6
Total	31	

Vines and Climbers

Species	Frequency	Dominance (%)
Alyxia bracteolosa	2	7
Dioscorea bulbifera	8	20
Epipremnum pinnatum	17	51
Faradaya powellii	2	7
Hoya australis	3	5
Mucuna gigantea	3	10

Table 20. Vegetative characteristics of Plot 17, Lavania Rain Forest. Tree data are from 6 subplots 10x10 m, ground cover data from 5 quadrats 5x5 m. Surveyed 23 October 1976.

Trees

Species	Basal area (cm^2)	No. of trees	No. of trees with dbh ≥ 15 cm	Relative dominance (%)
Dysoxylum samoense	18,422	10	9	49
Neonauclea forsteri	7,865	8	4	21
Myristica fatua	2,010	20	3	5
Inocarpus fagifer	1,676	1	1	5
Pisonia umbellifera	1,527	10	3	4
Ficus scabra	1,189	6	3	3
Ficus tinctoria	965	11	2	3
Syzygium inophylloides	952	3	2	3
Sterculia fanaiho	754	1	1	2
Diospyros samoensis	742	5	1	2
Planchonella linggenensis	545	9	1	1
Bischofia javanica	248	1	1	1
Psychotria insularum	185	5	0	<1
Morinda citrifolia	145	4	0	<1
Antidesma sphaerocarpum	29	1	0	<1
Aglaia samoensis	12	2	0	<1
Micromelum minutum	5	1	0	<1
Total	37,271	98	31	

Ground cover

Species	Cover (%)	Frequency
Asplenium nidus	12	4/5
Lomagramma cordipinnia	6	2/5
Dryopteris sp. (?)	4	2/5
Piper graeffei	1	4/5
Epipremnum pinnatum	1	3/5
Pteris comans	1	2/5
Hoya australis	1	2/5
Freycinetia sp.	<1	4/5
Pteris pacifica (?)	<1	3/5
Dioscorea bulbifera	<1	3/5
Hoya pottsii	<1	1/5
Microsorium scolopendria	<1	1/5
Arthropteris obliterata	<1	1/5
Total	26	

Vines and Climbers

Species	Frequency	Dominance (%)
Derris trifoliata	5	3
Dioscorea bulbifera	22	18
Embelia vaupelii	2	1
Epipremnum pinnatum	38	31
Freycinetia spp.	16	14
Hoya australis	22	18
Hoya pottsii	5	5
Lomagramma cordipinna	2	0
Mucuna gigantea	7	6
Piper graeffei	5	4

Table 21. Vegetative characteristics of Plot 18, Aigā Rain Forest. Tree data from 10 subplots 10x10 m; sapling data from 10 subplots 5x5 m; ground cover data from 6 quadrats 5x5 m. Surveyed 10 August 1976.

Trees

Species	Basal area (cm^2)	No. of trees	No. of trees with dbh ≥ 15 cm	Relative dominance (%)
Dysoxylum samoense	26,290	12	12	43
Dysoxylum maota	18,771	5	4	31
Myristica fatua	9,441	40	22	15
Barringtonia samoensis	4,268	25	9	7
Artocarpus altilis	1,839	2	2	3
Inocarpus fagifer	132	2	0	<1
Planchonella torricellensis	94	1	0	<1
Ficus scabra	44	4	0	<1
Macaranga stipulosa	43	1	0	<1
Sterculia fanaiho	23	2	0	<1
Diospyros samoensis	22	2	0	<1
Polyscias samoensis	10	1	0	<1
Total	60,977	97	49	

Saplings

Species	Height class (m) 0.5 to 0.9	1.0 to 1.4	1.5 to 1.9	2.0 to 2.4	2.5 and higher	Density Total number	Density Average per 100 m^2
Diospyros samoensis	17	11	5	0	0	33	22.0
Barringtonia samoensis	13	4	5	2	2	26	17.3
Psychotria insularum	8	5	3	0	1	17	11.3
Myristica fatua	7	0	0	1	0	8	5.3
Ficus scabra	5	1	1	0	0	7	4.7
Artocarpus altilis	2	2	0	0	0	4	2.7
Planchonella costata	2	0	0	0	0	2	1.3
Polyscias samoensis	0	0	0	1	0	1	0.7
Syzygium clusiaefolium	0	1	0	0	0	1	0.7
Planchonella torricellensis	0	1	0	0	0	1	0.7
Total	54	25	14	4	3	100	66.7

Ground cover

Species	Cover (%)	Frequency
Lomagramma cordipinna	21	3/6
Asplenium nidus	4	4/6
Pteris comans (?)	1	4/6
Geophila repens	1	5/6
Epipremnum pinnatum	<1	6/6
Dysoxylum sp. (seedlings)	<1	5/6
Piper graeffei	<1	4/6
Dryopteris sp. (?)	<1	1/6
Derris trifoliata	<1	1/6
Arthropteris obliterata	<1	1/6
Total	27	

Vines and Climbers

Species	Frequency	Dominance (%)
Aristolochia cortinata	1	0
Arthropteris obliterata	1	1
Derris trifoliata	25	18
Epipremnum pinnatum	55	45
Faradaya powellii	3	1
Freycinetia spp.	1	1
Hoya pottsii	10	5
Lomagramma cordipinna	1	1
Piper graeffei	36	30

Table 22. Vegetative characteristics of Plot 19, Saua Rain Forest. Tree data from 10 subplots 10x10 m, sapling and ground cover data from 10 quadrats 5x5 m. Surveyed 14 October 1976.

Trees

Species	Basal area (cm^2)	No. of trees	No. of trees with dbh ≥ 15 cm	Relative dominance (%)
Dysoxylum samoense	53,204	12	12	86
Diospyros samoensis	4,331	29	7	7
Pisonia umbellifera	1,708	8	4	3
Sterculia fanaiho	1,261	4	1	2
Ficus scabra	691	7	1	1
Barringtonia asiatica	551	7	1	1
Morinda citrifolia	197	10	0	<1
Myristica fatua	69	3	0	<1
Psychotria insularum	56	6	0	<1
Ficus tinctoria	11	1	0	<1
Meryta macrophylla	5	1	0	<1
Total	62,084	88	26	

Saplings

Species	Height class (m) 0.5 to 0.9	1.0 to 1.4	1.5 to 1.9	2.0 to 2.4	2.5 and higher	Density Total number	Density Average per 100 m^2
Diospyros samoensis	8	7	7	3	4	29	11.6
Psychotria insularum	3	5	4	4	3	19	7.6
Morinda citrifolia	4	3	4	1	0	12	4.8
Barringtonia asiatica	4	0	0	0	0	4	1.6
Ficus scabra	0	1	0	1	0	2	0.8
Myristica fatua	1	1	0	0	0	2	0.8
Sterculia fanaiho	0	0	0	1	0	1	0.4
Meryta macrophylla	0	0	0	1	0	1	0.4
Dysoxylum samoense	0	0	1	0	0	1	0.4
Pisonia umbellifera	1	0	0	0	0	1	0.4
Total	21	17	16	11	7	72	28.8

Ground cover

Species	Cover (%)	Frequency
Dysoxylum samoense (seedlings)	11	9/10
Piper graeffei	9	8/10
Lomagramma cordipinna	8	8/10
Asplenium nidus	7	7/10
Pteris sp. (?)	3	9/10
Arthropteris obliterata	1	7/10
Geophila repens	<1	1/10
Epipremnum pinnatum	<1	1/10
Total	39	

Vines and Climbers

Species	Frequency	Dominance (%)
Arthropteris obliterata	5	3
Epipremnum pinnatum	16	15
Freycinetia spp.	5	3
Hoya australis	5	4
Hoya pottsii	7	6
Piper graeffei	57	68

Table 23. Vegetative characteristics of Plot 20, Tafuna Rain Forest. Tree data from 10 subplots 10x10 m; sapling and ground cover data from 10 quadrats 5x5 m. Surveyed 9 November 1976.

Trees Species	Basal area (cm^2)	No. of trees	No. of trees with dbh ≥ 15 cm	Relative dominance (%)
Planchonella torricellensis	43,337	9	6	41
Dysoxylum samoense	17,783	2	2	17
Pometia pinnata	12,179	16	5	11
Myristica fatua	7,433	20	8	7
Syzygium inophylloides	5,891	5	5	6
Inocarpus fagifer	5,676	4	3	5
Ficus prolixa	5,121	1	1	5
Neonauclea forsteri	4,962	1	1	5
Cananga odorata	1,554	21	3	1
Pisonia umbellifera	1,147	3	2	1
Morinda citrifolia	1,080	1	1	1
Diospyros samoensis	506	1	1	<1
Rhus taitensis	98	1	0	<1
Micromelum minutum	46	1	0	<1
Sterculia fanaiho	39	2	0	<1
Polyscias samoensis	35	5	0	<1
Citronella samoensis	16	2	0	<1
Psychotria insularum	13	1	0	<1
Antidesma sphaerocarpum	11	1	0	<1
Canarium samoense	7	1	0	<1
Total	106,934	98	38	

Saplings	Height class (m)					Density	
Species	0.5 to 0.9	1.0 to 1.4	1.5 to 1.9	2.0 to 2.4	2.5 and higher	Total number	Average per 100 m^2
Diospyros samoensis	48	26	16	11	10	111	44.4
Pometia pinnata	20	17	5	2	14	58	23.2
Polyscias samoensis	2	4	3	2	13	24	9.6
Psychotria insularum	6	6	3	1	0	16	6.4
Dysoxylum samoense	7	4	1	0	1	13	5.2
Planchonella torricellensis	3	3	2	2	1	11	4.4
Ficus scabra	0	0	2	2	6	10	4.0
Myristica fatua	0	2	2	1	2	7	2.8
Syzygium inophylloides	4	0	0	0	2	6	2.4
Antidesma sphaerocarpum	0	1	1	0	1	3	1.2
Morinda citrifolia	1	0	1	0	1	3	1.2
Flacourtia rukam	0	3	0	0	0	3	1.2
Phaleria acuminata	2	1	0	0	0	3	1.2
Elaeocarpus ulianus	1	0	1	0	0	2	0.8
Pisonia umbellifera	0	0	1	1	0	2	0.8
Aglaia samoensis	0	2	0	0	0	2	0.8
Rhus taitensis	1	0	0	0	1	2	0.8
Planchonella linggenensis	0	0	0	0	1	1	0.4
Neonauclea forsteri	0	0	0	0	1	1	0.4
Calophyllum samoense	0	0	0	0	1	1	0.4
Terminalia richii	0	0	0	0	1	1	0.4
Bischofia javanica	0	0	1	0	0	1	0.4
Sterculia fanaiho	0	0	1	0	0	1	0.4
Arytera samoensis	1	0	0	0	0	1	0.4
Canarium samoensis	1	0	0	0	0	1	0.4
Casearia sp.	0	0	1	0	0	1	0.4
Total	97	69	41	22	56	285	114.0

Table 23. Continued

Ground cover

Species	Cover (%)	Frequency
Pometia pinnata (seedlings)	8	9/10
Tectaria stearnsii (?)	7	10/10
Clidemia hirta	4	6/10
Arthropteris obliterata	2	10/10
Diospyros samoensis (seedlings)	2	10/10
Freycinetia storckii	2	8/10
Piper graeffei	1	10/10
Raphidophora graeffei (?)	1	9/10
Dysoxylum samoense (seedlings)	1	9/10
Calanthe triplicata	1	6/10
Bolbitis lonchophora	<1	4/10
Planchonella torricellensis (seedlings)	<1	8/10
Aneilema vitiense	<1	4/10
Microsorium scolopendria	<1	3/10
Nephrolepis hirsutula	<1	2/10
Procris pedunculata	<1	2/10
Asplenium falcatum	<1	1/10
Didymoplexis pallens	<1	1/10
Oplismenus compositus	<1	1/10
Total	29	

Vines and Climbers

Species	Frequency	Dominance (%)
Alyxia bracteolosa	2	1
Arthropteris obliterata	51	11
Epipremnum pinnatum	35	12
Freycinetia hombronii	20	6
Freycinetia spp.	2	1
Hoya australis	2	1
Hoya pottsii	20	3
Melothria grayana	2	1
Piper graeffei	73	22
Raphidophora graeffei	84	42

Table 24. Vegetative characteristics of Plot 21, Malaeimi Rain Forest. Tree data are from 10 subplots 10x10 m; data on saplings and ground cover are from 10 quadrats 5x5 m. Surveyed 16 August 1976.

Trees Species	Basal area (cm^2)	No. of trees	No. of trees with dbh ≥ 15 cm	Relative dominance (%)
Dysoxylum samoense	38,368	22	21	65
Terminalia richii	6,503	1	1	11
Neonauclea forsteri	5,340	15	8	9
Myristica fatua	5,306	53	7	9
Barringtonia samoensis	1,992	10	2	3
Planchonella torricellensis	800	3	1	1
Ficus scabra	130	3	0	<1
Elaeocarpus ulianus	118	5	0	<1
Flacourtia rukam	81	3	0	<1
Psychotria forsteriana	72	3	0	<1
Ficus godeffroyi	62	1	0	<1
Syzygium samarangense	34	1	0	<1
Antidesma sphaerocarpum	34	1	0	<1
Diospyros samoensis	29	1	0	<1
Psychotria insularum	22	1	0	<1
Pisonia umbellifera	20	1	0	<1
Hedycarya denticulata	18	1	0	<1
Cananga odorata	9	1	0	<1
Hibiscus tiliaceus	5	1	0	<1
Total	58,943	127	40	

Saplings	Height class (m)					Density	
Species	0.5 to 0.9	1.0 to 1.4	1.5 to 1.9	2.0 to 2.4	2.5 and higher	Total number	Average per 100 m^2
Myristica fatua	10	6	5	2	2	25	10.0
Pisonia umbellifera	1	2	4	0	0	7	2.8
Planchonella torricellensis	1	3	0	0	0	4	1.6
Barringtonia samoensis	3	0	0	0	1	4	1.6
Ficus scabra	1	0	0	1	1	3	1.2
Diospyros samoensis	0	0	1	0	1	2	0.8
Elaeocarpus ulianus	0	1	1	0	0	2	0.8
Psychotria forsteriana	0	0	0	0	1	1	0.4
Canthium merrillii	0	0	0	0	1	1	0.4
Flacourtia rukam	0	0	0	0	1	1	0.4
Dysoxylum samoense	0	0	1	0	0	1	0.4
Myristica hypargyraea	0	0	1	0	0	1	0.4
Elaeocarpus tonganus	0	0	1	0	0	1	0.4
Antidesma sphaerocarpum	0	1	0	0	0	1	0.4
Syzygium samarangense	0	1	0	0	0	1	0.4
Calophyllum samoense	0	1	0	0	0	1	0.4
Syzygium inophylloides	1	0	0	0	0	1	0.4
Planchonella linggenensis	1	0	0	0	0	1	0.4
Total	18	15	14	3	8	58	23.2

Table 24. Continued

Ground cover

Species	Cover (%)	Frequency
Lomagramma cordipinna	63	10/10
Tectaria stearnsii (?)	14	10/10
Bolbitis lonchophora (?)	2	1/10
Diplazium harpeodes	<1	1/10
Dryopteris sp. (?)	<1	2/10
Faradaya powellii	<1	1/10
Piper graeffei	<1	7/10
Barringtonia samoensis (seedlings)	<1	2/10
Raphidophora graeffei	<1	5/10
Trichomanes boryanum	<1	2/10
Clidemia hirta	<1	2/10
Total	79	

Vines and Climbers

Species	Frequency	Dominance (%)
Freycinetia spp.	4	1
Hoya pottsii	10	3
Lomagramma cordipinna	95	46
Melothria grayana	3	0
Mikania micrantha	1	0
Piper graeffei	44	17
Raphidophora graeffei	65	33

Table 25. Vegetative characteristics of Plot 22, Faga'alu Rain Forest. Tree data from 10 subplots 10x10 m; sapling and ground cover data from 10 subplots 5x5 m; data for ground cover from 5 quadrats 5x5 m. Surveyed 6 October 1976.

Trees

Species	Basal area (cm^2)	No. of trees	No. of trees with dbh ≥ 15 cm	Relative dominance (%)
Dysoxylum samoense	23,027	9	6	29
Planchonella torricellensis	12,461	9	5	15
Myristica fatua	6,896	52	12	9
Neonauclea forsteri	6,465	4	4	8
Bischofia javanica	5,924	1	1	7
Macaranga stipulosa	5,274	6	6	7
Inocarpus fagifer	3,830	1	1	5
Hibiscus tiliaceus	3,614	7	4	4
Alphitonia zizyphoides	3,345	1	1	4
Myristica hypargyraea	2,677	5	5	3
Barringtonia samoensis	2,085	9	5	3
Elaeocarpus ulianus	1,497	6	3	2
Syzygium samarangense	1,494	8	1	2
Canarium samoense	1,124	1	1	1
Sterculia fanaiho	392	1	1	<1
Polyscias samoensis	154	5	0	<1
Diospyros samoensis	112	3	0	<1
Citronella samoensis	89	1	0	<1
Buchanania merrillii	49	1	0	<1
Ficus uniauriculata	45	2	0	<1
Hedycarya denticulata	33	2	0	<1
Calophyllum samoense	33	2	0	<1
Canarium harveyi	9	1	0	<1
Total	80,629	137	56	

Table 25. Continued

Saplings

Species	Height class (m) 0.5 to 0.9	1.0 to 1.4	1.5 to 1.9	2.0 to 2.4	2.5 and higher	Density Total number	Average per 100 m²
Myristica fatua	12	8	4	0	1	25	10.0
Planchonella torricellensis	11	6	2	0	2	21	8.4
Syzygium samarangense	5	6	0	1	2	14	5.6
Barringtonia samoensis	9	2	0	1	2	14	5.6
Diospyros samoensis	6	3	3	0	1	13	5.2
Calophyllum samoensis	4	2	1	0	0	7	2.8
Dysoxylum samoense	2	2	0	0	0	4	1.6
Aglaia samoensis	1	1	1	0	0	3	1.2
Casearia sp.	0	0	1	0	1	2	0.8
Elaeocarpus ulianus	0	1	1	0	0	2	0.8
Ficus uniauriculata	0	1	1	0	0	2	0.8
Medusanthera samoensis	0	2	0	0	0	2	0.8
Citronella samoensis	1	1	0	0	0	2	0.8
Elattostachys falcata (?)	0	0	1	0	0	1	0.4
Psychotria insularum	0	1	0	0	0	1	0.4
Ficus scabra	0	1	0	0	0	1	0.4
Bischofia javanica	1	0	0	0	0	1	0.4
Syzygium inophylloides	1	0	0	0	0	1	0.4
Buchanania merrillii	1	0	0	0	0	1	0.4
Hedycarya denticulata	1	0	0	0	0	1	0.4
Antidesma sphaerocarpum	1	0	0	0	0	1	0.4
Flacourtia rukam	1	0	0	0	0	1	0.4
Canthium merrillii	1	0	0	0	0	1	0.4
Total	58	37	15	2	9	121	48.4

Ground cover

Species	Cover (%)	Frequency
Lomagramma cordipinna	43	5/5
Tectaria stearnsii (?)	16	5/5
Diplazium harpeodes (?)	4	3/5
Planchonella torricellensis (seedlings)	2	5/5
Piper graeffei	1	1/5
Blechnum sp. (?)	1	2/5
Clidemia hirta	<1	4/5
Raphidophora graeffei	<1	4/5
Asplenium nidus	<1	3/5
Bolbitis lonchophora (?)	<1	2/5
Dryopteris sp.	<1	2/5
Embelia vaupelii	<1	1/5
Asplenium feejeense	<1	1/5
unidentified fern	<1	1/5
Zeuxine sp.	<1	1/5
Geophila repens	<1	1/5
Total	67	

Vines and Climbers

Species	Frequency	Dominance (%)
Faradaya powellii	3	1
Freycinetia spp.	5	3
Hoya pottsii	25	5
Lomagramma cordipinna	90	38
Mikania micrantha	3	0
Piper graeffei	60	21
Raphidophora graeffei	65	31

Table 26. Vegetative characteristics of Plot 23, Aoloau Rain Forest. Tree data from 10 subplots 10x10 m; sapling data from 5 and ground cover data from 6 quadrats 5x5 m. Surveyed 9 October 1976.

Trees

Species	Basal area (cm^2)	No. of trees	No. of trees with dbh ≥ 15 cm	Relative dominance (%)
Canarium samoense	11,908	7	4	20
Myristica hypargyraea	8,147	18	13	14
Dysoxylum samoense	7,782	1	1	13
Myristica fatua	6,807	21	13	12
Dysoxylum huntii	6,039	2	2	10
Neonauclea forsteri	3,216	1	1	5
Macaranga stipulosa	2,633	1	1	4
Canthium merrillii	2,503	7	3	4
Polyscias samoensis	2,266	52	0	4
Fagraea berteriana	1,771	1	1	3
Pisonia umbellifera	1,283	19	1	2
Litsea samoensis	1,155	1	1	2
Syzygium samoense	1,093	3	2	2
Syzygium samarangense	566	5	1	1
Bischofia javanica	457	1	1	1
Hedycarya denticulata	372	10	0	1
Planchonella torricellensis	169	8	0	<1
Cyathea sp.	164	4	0	<1
Antidesma sphaerocarpum	122	2	0	<1
Elaeocarpus tonganus	199	4	0	<1
Ficus godeffroyi	90	3	0	<1
Elaeocarpus ulianus	61	2	0	<1
Calycosia sessilis	24	2	0	<1
Flacourtia rukam	18	1	0	<1
Sarcopygme pacifica	16	1	0	<1
Psychotria forsteriana	14	2	0	<1
Baccaurea taitensis	9	1	0	<1
Total	58,804	180	45	

Saplings

Species	Height class (m) 0.5 to 0.9	1.0 to 1.4	1.5 to 1.9	2.0 to 2.4	2.5 and higher	Density Total number	Density Average per 100 m^2
Calycosia sessilis	3	4	3	0	0	10	8.0
Planchonella torricellensis	1	2	1	0	4	8	6.4
Syzygium samarangense	3	0	3	1	1	8	6.4
Pisonia umbellifera	4	2	0	1	0	7	5.6
Elaeocarpus ulianus	1	2	0	0	2	5	4.0
Ficus godeffroyi	0	2	3	0	0	5	4.0
Aglaia samoensis	0	0	1	0	2	3	2.4
Elaeocarpus tonganus	1	0	0	1	1	3	2.4
Syzygium samoense	1	1	0	1	0	3	2.4
Calophyllum samoense	2	1	0	0	0	3	2.4
Psychotria forsteriana	1	0	1	0	1	3	2.4
Polyscias samoensis	0	0	0	0	2	2	1.6
Myristica fatua	1	0	0	0	1	2	1.6
Neonauclea forsteri	0	0	0	0	1	1	0.8
Canarium samoense	0	0	0	1	0	1	0.8
Elattostachys falcata	0	0	1	0	0	1	0.8
Rhus taitensis	0	1	0	0	0	1	0.8
Hedycarya denticulata	0	1	0	0	0	1	0.8
Terminalia richii	1	0	0	0	0	1	0.8
Dysoxylum huntii	1	0	0	0	0	1	0.8
Total	20	16	13	5	15	69	55.2

Table 26. Continued

Ground cover

Species	Cover (%)	Frequency
Lomagramma cordipinna	54	6/6
Cyathea sp.	6	3/6
Diplazium harpeodes	4	5/6
Piper graeffei	1	5/6
Polypodium samoense	1	3/6
Tectaria stearnsii	1	3/6
Alyxia bracteolosa	<1	3/6
Dryopteris sp. (?)	<1	1/6
Freycinetia storckii (?)	<1	2/6
Clidemia hirta	<1	2/6
Nephrolepis biserrata	<1	1/6
Malaxis resupinata	<1	1/6
Trichomanes boryanum	<1	1/6
Asplenium cuneatum	<1	1/6
Total	67	

Vines and Climbers

Species	Frequency	Dominance (%)
Alyxia bracteolosa	1	1
Freycinetia spp.	6	4
Hoya pottsii	5	4
Lomagramma cordipinna	82	67
Piper graeffei	33	21
Raphidophora graeffei	4	3

Table 27. Vegetative characteristics of Plot 24, A'asu Rain Forest. Data for trees from 10 subplots 10x10 m; sapling and ground cover data from 10 quadrats 5x5 m. Surveyed 6 August 1976.

Trees Species	Basal area (cm^2)	No. of trees	No. of trees with dbh ≥ 15 cm	Relative dominance (%)
Buchanania merrillii	18,994	9	8	30
Dysoxylum huntii	8,122	2	1	13
Canarium samoense	4,530	11	4	7
Myristica fatua	4,321	44	5	7
Canthium merrillii	3,774	8	5	6
Rhus taitensis	3,731	2	2	6
Calophyllum samoense	3,452	2	1	6
Myristica hypargyraea	3,298	17	8	5
Cyathea sp.	2,582	6	2	4
Syzygium samoense	2,350	4	4	4
Pisonia umbellifera	1,351	17	1	2
Elaeocarpus tonganus	1,209	11	2	2
Hibiscus tiliaceus	1,030	5	2	2
Macaranga stipulosa	658	1	1	1
Syzygium carolinense (?)	458	6	0	1
Baccaurea taitensis	386	3	1	1
Diospyros samoensis	347	3	0	1
Elaeocarpus ulianus	326	2	1	1
Astronidium pickeringii	317	3	0	<1
Aglaia samoensis	314	3	1	<1
Syzygium inophylloides	279	2	1	<1

Table 27. Continued

Trees

Species	Basal area (cm^2)	No. of trees	No. of trees with dbh ≥ 15 cm	Relative dominance (%)
Hernandia moerenhoutiana	166	3	0	<1
Polyscias samoensis	132	3	0	<1
Hedycarya denticulata	90	2	0	<1
Meryta macrophylla	88	2	0	<1
Sarcopygme pacifica	81	3	0	<1
Canarium harveyii	81	2	0	<1
Garcinia vitiensis	49	1	0	<1
Psychotria forsteriana	16	1	0	<1
Planchonella linggenensis	15	1	0	<1
Psychotria insularum	5	1	0	<1
Glochidion ramiflorum	5	1	0	<1
Total	62,557	181	50	

Saplings

Species	Height class (m) 0.5 to 0.9	1.0 to 1.4	1.5 to 1.9	2.0 to 2.4	2.5 and higher	Density Total number	Average per 100 m^2
Aglaia samoensis	8	8	3	5	2	26	10.4
Dysoxylum huntii	10	2	2	1	1	16	6.4
Myristica fatua	9	2	1	0	0	12	4.8
Calophyllum samoense	3	3	5	0	0	11	4.4
Psychotria insularum	4	2	2	1	0	9	3.6
Syzygium carolinense	2	2	0	4	0	8	3.2
Elaeocarpus tonganus	6	1	0	0	1	8	3.2
Hedycarya denticulata	2	2	3	0	1	8	3.2
Syzygium samarangense	4	2	1	0	0	7	2.8
Elaeocarpus ulianus	4	0	1	0	0	5	2.0
Baccaurea taitensis	1	2	1	0	0	4	1.6
Canthium merrillii	2	0	2	0	0	4	1.6
Ficus godeffroyi	0	0	3	0	0	3	1.2
Syzygium inophylloides	1	1	1	0	0	3	1.2
Planchonella torricellensis	2	0	0	1	0	3	1.2
Diospyros samoensis	0	0	1	1	0	2	0.8
Pisonia umbellifera	0	0	0	1	1	2	0.8
Hernandia moerenhoutiana	2	0	0	0	0	2	0.8
Buchanania merrillii	1	0	0	0	0	1	0.4
Meryta macrophylla	0	1	0	0	0	1	0.4
Planchonella linggenensis	1	0	0	0	0	1	0.4
Psychotria forsteriana	0	1	0	0	0	1	0.4
Arytera samoensis	1	0	0	0	0	1	0.4
Citronella samoensis	1	0	0	0	0	1	0.4
Astronidium pickeringii	0	1	0	0	0	1	0.4
Garcinia vitiensis	0	0	0	1	0	1	0.4
Total	64	30	26	15	6	141	56.4

Ground cover

Species	Cover (%)	Frequency
Lomagramma cordipinna	53	10/10
Nephrolepis biserrata	2	3/10
Cyathea sp.	2	3/10
Faradaya powellii	2	7/10
Freycinetia storckii	1	10/10
Alyxia bracteolosa	1	10/10
Diplazium harpeodes (?)	<1	1/10
Piper graeffei	<1	6/10
Asplenium nidus	<1	4/10

Table 27. Continued

Ground cover

Species	Cover (%)	Frequency
Clidemia hirta	<1	2/10
Selaginella reineckei	<1	1/10
Diplazium dilatum	<1	1/10
Zingiber zerumbet	<1	1/10
Tectaria stearnsii (?)	<1	1/10
Lindsaea decomposita	<1	1/10
Moerenhoutia heteromorpha	<1	1/10
Total	59	

Vines and Climbers

Species	Frequency	Dominance (%)
Alyxia bracteolosa	1	0
Caesalpinia major	1	0
Freycinetia spp.	26	21
Gynochtodes ovalifolia	1	0
Hoya pottsii	2	1
Jasminum didynum	1	0
Lomagramma cordipinna	51	39
Piper graeffei	48	33
Raphidophora graeffei	8	5

Table 28. Tree species composition of Plot 25, Olosega Rain Forest, based on estimated dbh of 100 randomly selected trees. Surveyed 1 December 1976.

Trees

Species	Basal area (cm^2)	No. of trees	No. of trees with dbh ≥ 15 cm	Relative dominance (%)
Syzygium samoense	10,079	27	15	36
Elaeocarpus tonganus	5,418	23	11	19
Trichospermum richii	4,548	3	3	16
Rhus taitensis	1,646	4	2	6
Fagraea berteriana	1,326	3	3	5
Syzygium dealatum	1,117	6	2	4
Syzygium inophylloides	1,053	2	2	4
Calophyllum samoense	993	1	1	4
Alphitonia zizyphoides	410	1	1	1
Hibiscus tiliaceus	305	8	1	1
Myristica fatua	213	3	1	1
Flacourtia rukam	205	4	0	1
Canarium harveyi	182	1	1	1
Ficus tinctoria	81	1	0	<1
Meryta macrophylla	81	1	0	<1
Geniostoma samoense	64	3	0	<1
Garcinia vitiensis	62	1	0	<1
Cyathea sp.	46	1	0	<1
Ixora samoense	10	2	0	<1
Antidesma sphaerocarpum	10	2	0	<1
Psychotria garberiana	7	1	0	<1
Planchonella linggenensis	5	1	0	<1
Maesa tongensis	5	1	0	<1
Total	27,866	100	43	

Table 29. Vegetative characteristics of Plot 26, Tau Ridge Forest. Tree data from 6 subplots 10x10 m; sapling and ground cover data from 5 quadrats 5x5 m. Surveyed 23-24 September 1976.

Trees

Species	Basal area (cm^2)	No. of trees	No. of trees with dbh ≥ 15 cm	Relative dominance (%)
Diospyros samoensis	11,633	34	11	24
Ficus obliqua	8,627	1	1	18
Rhus taitensis	7,576	5	5	16
Planchonella linggenensis	5,015	5	4	10
Syzygium dealatum	3,036	2	2	6
Syzygium inophylloides	2,641	5	2	5
Calophyllum samoense	1,739	6	3	4
Arytera samoensis	1,572	6	3	3
Erythrospermum acuminatissimum	1,493	22	0	3
Planchonella costata	1,432	17	2	3
Canarium harveyi	1,321	6	2	3
Aglaia samoensis	412	8	0	1
Psychotria insularum	250	12	0	1
Litsea samoensis	248	1	1	1
Ixora samoensis	202	11	0	<1
Diospyros elliptica	190	5	0	<1
Meryta macrophylla	146	8	0	<1
Casearia sp.	137	11	0	<1
Allophylus cobbe	132	1	0	<1
Glochidion ramiflorum	79	4	0	<1
Canarium samoense	69	1	0	<1
Citronella samoensis	66	2	0	<1
Drypetes sp.	53	2	0	<1
Homalium whitmeeanum	43	3	0	<1
Micromelum minutum	43	2	0	<1
Ficus tinctoria	40	2	0	<1
Polyscias samoensis	30	3	0	<1
Canthium barbatum	6	1	0	<1
Total	48,231	186	36	

Saplings

Species	Height class (m) 0.5 to 0.9	1.0 to 1.4	1.5 to 1.9	2.0 to 2.4	2.5 and higher	Density Total number	Density Average per 100 m^2
Aglaia samoensis	19	11	7	3	2	42	33.6
Psychotria insularum	3	11	22	5	1	42	33.6
Ixora samoensis	6	9	8	2	1	26	20.8
Meryta macrophylla	9	7	2	0	1	19	15.2
Syzygium inophylloides	10	4	4	0	0	18	14.4
Diospyros samoensis	14	2	0	1	0	17	13.6
Polyscias samoensis	7	1	3	3	1	15	12.0
Calophyllum samoense	7	2	4	0	0	13	10.4
Casearia sp.	2	3	3	2	0	10	8.0
Planchonella linggenensis	2	4	2	1	0	9	7.2
Canarium harveyi	5	1	0	1	1	8	6.4
Arytera samoensis	1	2	0	1	3	7	5.6
Diospyros elliptica	4	2	0	0	0	6	4.8
Glochidion ramiflorum	1	1	1	0	1	4	3.2
Citronella samoensis	1	0	1	1	0	3	2.4
Phaleria acuminata	3	0	0	0	0	3	2.4
Rhus taitensis	0	0	1	1	0	2	1.6
Planchonella costata	1	0	0	0	1	2	1.6
Syzygium dealatum	1	1	0	0	0	2	1.6
Allophylus cobbe	2	0	0	0	0	2	1.6

Table 29. Continued

Saplings

Species	Height class (m) 0.5 to 0.9	1.0 to 1.4	1.5 to 1.9	2.0 to 2.4	2.5 and higher	Density Total number	Density Average per 100 m²
Ficus tinctoria	2	0	0	0	0	2	1.6
Canthium barbatum	0	0	1	0	0	1	0.8
Morinda citrifolia	0	0	1	0	0	1	0.8
Maesa tongensis	0	1	0	0	0	1	0.8
Erythrospermum acuminatissimum	0	1	0	0	0	1	0.8
Ficus scabra	1	0	0	0	0	1	0.8
Homalium whitmeeanum	1	0	0	0	0	1	0.8
Total	102	63	60	21	12	250	206.4

Ground cover

Species	Cover (%)	Frequency
Asplenium nidus	14	5/5
Nephrolepis biserrata (?)	12	5/5
Alyxia bracteolosa	11	5/5
Mircosorium scolopendria	8	3/5
Dryopteris sp. (?)	6	3/5
Davallia epiphylla (?)	4	3/5
Freycinetia hombronii (?)	3	1/5
Alyxia stellata	2	3/5
Asplenium falcatum	1	1/5
Tectaria stearnsii	1	2/5
Procris pedunculata	<1	2/5
Vittaria rigida	<1	3/5
Clidemia hirta	<1	1/5
Total	62	

Vines and Climbers

Species	Frequency	Dominance (%)
Alyxia bracteolosa	9	21
Faradaya powellii	1	3
Gynochtodes ovalifolia	1	3
Hoya australis	10	19
Hoya pottsii	22	46
Jasminum didynum	1	3
Santaloides samoense	2	6

Table 30. Vegetative characteristics of Plot 27, Alava Ridge Forest. Tree data from 5 subplots 10x10 m; sapling and ground cover data from 5 quadrats 5x5 m. Surveyed 8 and 16 September 1976.

Trees Species	Basal area (cm^2)	No. of trees	No. of trees with dbh ≥ 15 cm	Relative dominance (%)
Dysoxylum huntii	7,265	2	2	22
Crossostylis biflora	5,898	11	8	18
Syzygium samoense	4,325	12	6	13
Palaquium stehlinii	3,087	6	2	9
Hedycarya denticulata	2,346	29	3	7
Myristica hypargyraea	2,314	17	4	7
Diospyros samoensis	1,623	1	1	5
Myristica fatua	1,023	18	2	3
Buchanania merrillii	1,002	9	1	3
Syzygium inophylloides	961	2	1	3
Canarium harveyi	440	4	1	1
Hibiscus tiliaceus	341	1	1	1
Calophyllum samoense	293	1	1	1
Baccaurea taitensis	259	11	1	1
Canthium merrillii	254	2	0	1
Garcinia vitiensis	189	1	1	1
Elaeocarpus tonganus	169	3	0	1
Syzygium samarangense	163	7	0	1
Psychotria insularum	159	7	0	<1
Ixora samoensis	99	2	0	<1
Canarium samoense	98	1	0	<1
Meryta macrophylla	70	3	0	<1
Hernandia moerenhoutiana	69	2	0	<1
Cyathea sp.	68	2	0	<1
Glochidion ramiflorum	64	2	0	<1
Aglaia samoensis	62	1	0	<1
Sarcopygme pacifica	51	5	0	<1
Polyscias samoensis	44	2	0	<1
Total	32,556	164	35	

Saplings Species	Height class (m) 0.5 to 0.9	1.0 to 1.4	1.5 to 1.9	2.0 to 2.4	2.5 and higher	Density Total number	Average per 100 m^2
Psychotria insularum	7	5	8	3	1	24	19.2
Glochidion ramiflorum	4	3	1	1	0	9	7.2
Myristica fatua	6	1	0	1	0	8	6.4
Hedycarya denticulata	2	1	2	1	1	7	5.6
Aglaia samoensis	2	1	0	2	1	6	4.8
Syzygium samarangense	4	2	0	0	0	6	4.8
Baccaurea taitensis	1	0	1	1	1	4	3.2
Garcinia vitiensis	3	1	0	0	0	4	3.2
Sarcopygme pacifica	0	0	3	0	0	3	2.4
Astronidium navigatorum	2	0	1	0	0	3	2.4
Psychotria forsteriana	1	1	0	0	0	2	1.6
Dysoxylum huntii	2	0	0	0	0	2	1.6
Crossostylis biflora	0	0	0	0	1	1	0.8
Calophyllum samoense	0	0	0	0	1	1	0.8
Elattostachys falcata (?)	0	0	0	0	1	1	0.8
Meryta macrophylla	0	0	0	1	0	1	0.8
Myristica hypargyraea	0	0	1	0	0	1	0.8
Canthium merrillii	0	1	0	0	0	1	0.8
Hernandia moerenhoutiana	1	0	0	0	0	1	0.8
Ficus godeffroyi	1	0	0	0	0	1	0.8

Table 30. Continued

Saplings

Species	Height class (m) 0.5 to 0.9	1.0 to 1.4	1.5 to 1.9	2.0 to 2.4	2.5 and higher	Density Total number	Average per 100 m²
Planchonella torricellensis	1	0	0	0	0	1	0.8
Buchanania merrillii	1	0	0	0	0	1	0.8
Diospyros samoensis	1	0	0	0	0	1	0.8
Total	39	16	17	10	7	89	71.2

Ground cover

Species	Cover (%)	Frequency
Asplenium nidus	14	5/5
Syzygium samoense (seedlings)	11	3/5
Freycinetia storckii	10	5/5
Lomagramma cordipinna	7	5/5
Clidemia hirta	6	2/5
Cyathea sp.	3	1/5
Hedycarya denticulata (seedlings)	2	3/5
Dryopteris sp. (?)	1	2/5
Piper graeffei	1	1/5
Selaginella reineckei	<1	4/5
Alyxia bracteolosa	<1	3/5
Moerenhoutia heteromorpha	<1	3/5
Lindsaea decomposita	<1	2/5
Zeuxine sp.	<1	1/5
Microsorium scolopendria	<1	1/5
Total	55	

Vines and Climbers

Species	Frequency	Dominance (%)
Alyxia bracteolosa	1	0
Freycinetia spp.	60	49
Hoya betchei	4	3
Hoya pottsii	2	1
Lomagramma cordipinna	35	20
Medinilla samoensis	4	3
Mikania micrantha	2	1
Piper graeffei	37	21
Raphidophora graeffei	3	1

Table 31. Vegetative characteristics of Plot 28, Matafao Ridge Forest. Tree data from 5 subplots 10x10 m; sapling and ground cover data from 5 quadrats 5x5 m. Surveyed 7 and 13 September 1976.

Trees

Species	Basal area (cm^2)	No. of trees	No. of trees with dbh ≥ 15 cm	Relative dominance (%)
Myristica hypargyraea	6,967	31	12	23
Alphitonia zizyphoides	2,627	2	2	9
Dysoxylum huntii	2,413	2	2	8
Buchanania merrillii	2,175	5	3	7
Crossostylis biflora	2,089	10	4	7
Myristica fatua	1,708	30	3	6
Baccaurea taitensis	1,373	24	0	5
Polyscias samoensis	1,327	33	0	4
Homalium whitemeeanum	1,176	8	3	4
Elaeocarpus tonganus	1,103	11	1	3
Elattostachys falcata (?)	845	4	2	3
Hernandia moerenhoutiana	618	4	1	2
Canarium samoense	612	5	0	2
Hedycarya denticulata	533	8	1	2
Barringtonia samoensis	523	4	1	2
Elaeocarpus ulianus	522	2	1	2
Litsea samoensis	467	1	1	1
Neonauclea forsteri	441	1	1	1
Canarium harveyi	407	6	0	1
Rhus taitensis	345	4	1	1
Psychotria insularum	339	16	0	1
Garcinia vitiensis	304	2	1	1
Cyathea sp.	271	6	0	1
Canthium merrillii	233	3	0	1
Astronidium navigatorum	208	2	0	1
Meryta macrophylla	126	9	0	<1
Glochidion ramiflorum	109	3	0	<1
Diospyros samoensis	98	2	0	<1
Calophyllum samoense	68	6	0	<1
Syzygium samoense	54	1	0	<1
Casearia sp.	49	4	0	<1
Citronella samoensis	40	2	0	<1
Aglaia samoensis	32	1	0	<1
Palaquium oxyspermum	22	1	0	<1
Macaranga stipulosa	22	1	0	<1
Syzygium inophylloides	20	2	0	<1
Syzygium carolinense	15	1	0	<1
Syzygium samarangense	15	1	0	<1
Cyrtandra pulchella	11	1	0	<1
Geniostoma samoense	11	1	0	<1
Sterculia fanaiho	10	1	0	<1
Ficus godeffroyi	7	1	0	<1
Medusanthera samoensis	7	1	0	<1
Total	30,342	263	40	

Saplings

Species	Height class (m) 0.5 to 0.9	1.0 to 1.4	1.5 to 1.9	2.0 to 2.4	2.5 and higher	Density Total number	Density Average per 100 m^2
Psychotria insularum	3	3	3	3	8	20	16.0
Calophyllum samoense	3	3	5	0	3	14	11.2
Diospyros samoense	6	2	2	2	1	13	10.4
Baccaurea taitensis	6	2	1	2	1	11	8.8
Polyscias samoensis	1	1	3	1	4	10	8.0
Myristica fatua	3	1	2	0	1	7	5.6

Table 31. Continued

Saplings

Species	Height class (m) 0.5 to 0.9	1.0 to 1.4	1.5 to 1.9	2.0 to 2.4	2.5 and higher	Density Total number	Average per 100 m²
Garcinia vitiensis	1	1	1	0	3	6	4.8
Syzygium samarangense	2	1	1	0	2	6	4.8
Palaquium oxyspermum	2	0	0	0	3	5	4.0
Elattostachys falcata (?)	2	1	1	0	2	5	4.0
Hedycarya denticulata	1	1	2	1	0	5	4.0
Ficus godeffroyi	0	1	2	1	1	5	4.0
Meryta macrophylla	0	1	1	2	0	4	3.2
Barringtonia samoensis	2	1	1	0	0	4	3.2
Elaeocarpus tonganus	1	0	0	1	1	3	2.4
Aglaia samoensis	0	2	1	0	0	3	2.4
Glochidion ramiflorum	2	0	1	0	0	3	2.4
Myristica hypargyraea	2	1	0	0	0	3	2.4
Homalium whitmeeanum	0	0	0	0	2	2	1.6
Syzygium samoense	0	1	1	0	0	2	1.6
Astronidium navigatorum	0	0	0	1	0	1	0.8
Elaeocarpus ulianus	0	0	1	0	0	1	0.8
Buchanania merrillii	0	0	1	0	0	1	0.8
Phaleria acuminata	0	0	1	0	0	1	0.8
Syzygium inophylloides	0	0	1	0	0	1	0.8
Hernandia moerenhoutiana	0	1	0	0	0	1	0.8
Casearia sp. nova	0	1	0	0	0	1	0.8
Rhus taitensis	1	0	0	0	0	1	0.8
Dysoxylum huntii	1	0	0	0	0	1	0.8
Total	39	25	32	13	31	140	112.0

Ground cover

Species	Cover (%)	Frequency
Lomagramma cordipinna	14	5/5
Freycinetia storckii (?)	8	5/5
Alyxia bracteolosa	1	5/5
Clidemia hirta	1	5/5
Dryopteris sp. (?)	1	2/5
Tectaria stearnsii (?)	<1	2/5
Asplenium falcatum	<1	2/5
Piper graeffei	<1	1/5
Nephrolepis hirsutula	<1	1/5
Selaginella reineckei	<1	1/5
Microsorium scolopendria	<1	1/5
Total	25	

Vines and Climbers

Species	Frequency	Dominance (%)
Alyxia bracteolosa	18	13
Faradaya powellii	2	1
Flagellaria gigantea	1	0
Freycinetia spp.	36	29
Gynochtodes ovalifolia	5	4
Hoya australis	1	0
Hoya betchei	6	4
Hoya pottsii	3	1
Jasminum didynum	6	3
Jasminum betchei	2	1
Lomagramma cordipinna	25	17
Medinilla samoensis	2	1

Table 31. Continued

Vines and Climbers

Species	Frequency	Dominance (%)
Mikania micrantha	16	9
Piper graeffei	17	15
Raphidophora graeffei	4	2
Santaloides samoense	2	1

Table 32. Vegetative characteristics of Plot 29, Tau Montane Scrub. Tree data from 70 randomly selected trees, dbh estimated; ground cover data from 5 quadrats 2 x 2 m. Surveyed 12 December 1976.

Trees

Species	Basal area (cm^2)	No. of trees	No. of trees with dbh ≥ 15 cm	Relative dominance (%)
Planchonella linggenensis	2,649	6	3	27
Syzygium inophylloides	2,587	15	7	26
Syzygium samoense	1,896	8	4	19
Spiraeanthemum samoense	1,135	10	2	11
Eurya japonica	300	3	0	3
Myristica hypargyraea	254	2	0	3
Cyathea sp.	218	7	0	2
Calophyllum samoense	140	2	0	1
Pandanus reineckei	127	1	0	1
Fagraea berteriana	97	3	0	1
Astronidium navigatorum	92	2	0	1
Alphitonia zizyphoides	86	2	0	1
Astronidium samoense	81	1	0	1
Crossostylis biflora	55	2	0	1
Hernandia moerenhoutiana	46	1	0	<1
Glochidion ramiflorum	46	1	0	<1
Syzygium carolinense	46	1	0	<1
Psychotria insularum	9	1	0	<1
Hibiscus tiliaceus	5	1	0	<1
Diospyros samoensis	5	1	0	<1
Total	9,874	70	16	

Ground cover

Species	Cover (%)	Frequency
Dicranopteris linearis	73	5/5
Davallia epiphylla	8	1/5
Freycinetia sp.	4	2/5
Melastoma denticulatum	3	2/5
Lycopodium cernuum	3	1/5
Scleria polycarpa	2	4/5
Spathoglottis pacifica	1	2/5
Spiraeanthemum samoense	1	1/5
Zingiber zerumbet	1	1/5
Blechnum vulcanicum	1	2/5
Eurya japonica	1	1/5
Cordyline fruticosa	1	1/5
Miscanthus floridulus	<1	1/5
Homalium whitmeeanum	<1	1/5
Pseuderia ramosa	<1	1/5
Fagraea berteriana	<1	1/5
Paspalum orbiculare	<1	1/5
Total	100	

Table 33. Vegetative characteristics of Plot 30, Matafao Montane Scrub. Tree data based on 84 trees of estimated dbh; ground cover data from 10 quadrats 2x2 m. Surveyed 19 December 1976.

Trees Species	Basal area (cm^2)	No. of trees	No. of trees with dbh ≥ 15 cm	Relative dominance (%)
Pandanus reineckei	3,409	30	4	49
Rapanea myricifolia	1,367	23	2	20
Syzygium brevifolium	994	7	2	14
Astronidium samoense	714	7	2	10
Spiraeanthemum samoense	314	11	0	5
Alstonia godeffroyi	72	3	0	1
Eurya japonica	31	2	0	<1
Weinmannia affinis	5	1	0	<1
Total	6,906	84	10	

Ground cover

Species	Cover (%)	Frequency
Dipteris conjugata	22	9/10
Dicranopteris linearis	22	10/10
Machaerina falcata	20	7/10
Freycinetia storckii	10	7/10
Davallia epiphylla	8	5/10
Pseuderia ramosa	5	6/10
Blechnum vulcanicum	3	2/10
Oleandra neriiformis	3	1/10
Pteris vittata	2	4/10
Paspalum orbiculare	2	3/10
Scleria polycarpa	2	1/10
Clidemia hirta	1	3/10
Spathoglottis pacifica	1	2/10
Cyathea sp.	1	1/10
Lycopodium cernum	<1	1/10
Mediocalcar paradoxa	<1	1/10
Glomera reineckeana	<1	1/10
Total	100	

Table 34. Tree species composition of Plot 31, Piumafua Cloud Forest, from estimated dbh of 71 randomly selected trees. Surveyed 1 December 1976.

Trees Species	Basal area (cm^2)	No. of trees	No. of trees with dbh ≥ 15 cm	Relative dominance (%)
Astronidium pickeringii	8,050	27	14	24
Fagraea berteriana	4,745	4	4	14
Syzygium samoense	4,742	8	6	14
Dysoxylum huntii	4,523	4	2	13
Weinmannia affinis	4,199	3	2	12
Syzygium samarangense	3,887	6	3	12
Cyathea sp.	1,176	9	3	4
Neonauclea forsteri	1,053	1	1	3
Trichospermum richii	1,004	2	1	3
Hibiscus tiliaceus	421	2	1	1
Meryta macrophylla	46	1	0	<1
Garcinia vitiensis	46	1	0	<1
Cyrtandra sp.	16	1	0	<1
Ficus godeffroyi	5	1	0	<1
Sacropygme pacifica	5	1	0	<1
Total	33,918	71	37	

Table 35. Vegetative characteristics of Plot 32, Lata Cloud Forest. Tree data from point-centered quadrants, 100 trees; sapling data from 56 samples; ground cover from 5 randomly selected quadrats 2x2 m. Surveyed 20 October 1976.

Trees

Species	Basal area (cm^2)	No. of trees	No. of trees with dbh ≥ 15 cm	Relative dominance (%)
Cyathea sp.	6,495	29	14	31
Syzygium samoense	5,947	23	14	28
Weinmannia affinis	3,370	5	3	16
Dysoxylum huntii	1,201	4	4	6
Ascarina diffusa	1,002	9	1	5
Streblus anthropophagorum	731	8	0	4
Astronidium pickeringii	595	10	1	3
Acronychia heterophylla	548	1	1	3
Fagraea berteriana	332	1	1	1
Reynoldsia lanutoensis	198	2	1	1
Sarcopygme pacifica	132	5	0	1
Ficus godeffroyi	131	2	0	1
Meryta macrophylla	49	1	0	<1
Total	20,731	100	40	

Saplings

Species	Height class (m) 0.5 to 0.9	1.0 to 1.4	1.5 to 1.9	2.0 to 2.4	2.5 and higher	Number
Astronidium pickeringii	13	3	7	0	0	23
Syzygium samoense	6	3	2	0	0	11
Psychotria garberiana	8	1	1	0	1	11
Ascarina diffusa	0	0	0	1	1	2
Meryta macrophylla	0	0	1	1	0	2
Weinmannia affinis	0	0	0	0	1	1
Elaeocarpus tonganus	0	0	0	0	1	1
Reynoldsia lanutoensis	0	0	0	1	0	1
Ficus godeffroyi	0	0	0	1	0	1
Melastoma denticulatum	0	0	1	0	0	1
Sarcopygme pacifica	0	0	1	0	0	1
Melicytus ramiflorus	0	1	0	0	0	1
Total	27	8	13	4	4	56

Ground cover

Species	Cover (%)	Frequency
Dryopteris davalloides	16	4/5
Freycinetia storckii	13	5/5
Cyathea sp.	7	4/5
Dryopteris sp.	5	2/5
Elatostema grandifolium	4	5/5
Calanthe hololeuca	2	3/5
Peperomia reineckei	2	5/5
Asplenium multifidum	2	4/5
Blechnum vulcanicum	2	1/5
Lomagramma cordipinna (?)	1	2/5
Syzygium samoense	<1	4/5
Phaius tankervilleae	<1	1/5
Astronidium pickeringii (seedlings)	<1	3/5
Asplenium nidus	<1	1/5
Cyrtandra sp. (seedlings)	<1	3/5
Lindsaea decomposita	<1	1/5
Trichomanes sp.	<1	1/5
Total	54	

Table 35. Continued

Vines and Climbers

Species	Frequency	Dominance (%)
Faradaya powellii	8	7
Freycinetia spp.	65	89
Lomagramma cordipinna	4	4

Table 36. Vegetative characteristics of Plot 33, Airport Secondary Forest. Tree data from 10 subplots 10x10 m; sapling and ground cover data from 10 quadrats 5x5 m. Surveyed 17-18 August 1976.

Trees Species	Basal area (cm^2)	No. of trees	No. of trees with dbh ≥ 15 cm	Relative dominance (%)
Dysoxylum samoense	8,433	50	11	33
Macaranga harveyana	4,211	15	7	19
Ficus scabra	2,316	23	2	10
Pometia pinnata	1,998	8	2	9
Morinda citrifolia	1,510	24	3	7
Planchonella torricellensis	882	1	1	4
Sterculia fanaiho	686	3	1	3
Myristica fatua	662	4	2	3
Syzygium samarangense	436	10	1	2
Grewia crenata	361	2	1	2
Ficus obliqua	349	1	1	2
Diospyros samoensis	285	15	0	1
Adenanthera pavonina	269	4	1	1
Aglaia samoensis	261	5	0	1
Polyscias samoensis	180	7	0	1
Flacourtia rukam	144	3	0	1
Casearia sp.	77	1	0	<1
Micromelum minutum	70	2	0	<1
Codiaeum variegatum	69	3	0	<1
Ficus tinctoria	33	2	0	<1
Planchonella linggenensis	17	2	0	<1
Syzygium inophylloides	5	1	0	<1
Total	23,254	186	33	

Table 36. Continued

Saplings

Species	Height class (m) 0.5 to 0.9	1.0 to 1.4	1.5 to 1.9	2.0 to 2.4	2.5 and higher	Density Total number	Average per 100 m²
Diospyros samoensis	43	35	24	11	22	135	54.0
Morinda citrifolia	6	6	4	3	4	23	9.2
Dysoxylum samoense	9	2	4	1	4	20	8.0
Syzygium samarangense	7	7	0	2	2	18	7.2
Ficus scabra	2	2	0	0	4	8	3.2
Aglaia samoensis	5	0	1	0	1	7	2.8
Adenanthera pavonina	3	3	1	0	0	7	2.8
Phaleria acuminata	4	2	0	0	0	6	2.4
Myristica fatua	3	0	1	1	0	5	2.0
Codiaeum variegatum	0	1	0	0	4	5	2.0
Polyscias samoense	2	0	2	0	0	4	1.6
Planchonella torricellensis	0	1	1	0	1	3	1.2
Planchonella linggenensis	2	1	0	0	0	3	1.2
Ficus tinctoria	0	0	1	0	0	1	0.4
Psychotria insularum	1	0	0	0	0	1	0.4
Antidesma sphaerocarpum	0	0	0	0	1	1	0.4
Elaeocarpus ulianus	1	0	0	0	0	1	0.4
Inocarpus fagifer	0	0	1	0	0	1	0.4
Total	88	60	40	18	43	249	99.6

Ground cover

Species	Cover (%)	Frequency
Faradaya powellii	6	7/10
Epipremnum pinnatum	6	10/10
Piper graeffei	2	8/10
Ruellia repens	2	1/10
Ipomoea macrantha	1	10/10
Arthropteris obliterata	1	9/10
Asplenium falcatum	<1	4/10
Clidemia hirta	<1	3/10
unidentified fern	<1	1/10
Mikania micrantha	<1	1/10
Freycinetia sp.	<1	1/10
Total	16	

Vines and Climbers

Species	Frequency	Dominance (%)
Arthropteris obliterata	10	3
Epipremnum pinnatum	76	44
Faradaya powellii	22	13
Flagellaria gigantea	1	0
Freycinetia spp.	2	1
Hoya australis	23	12
Hoya pottsii	1	0
Ipomoea macrantha	4	1
Jasminum didynum	1	0
Jasminum betchei	5	1
Medinilla samoensis	5	1
Mikania micrantha	2	1
Mucuna gigantea	5	2
Piper graeffei	46	20
Santaloides samoense	1	0

Table. 37. Vegetative characteristics of Plot 34, Luma Secondary Forest. Tree data from 10 subplots 10x10 m; sapling data from 5 subplots 10x10 m; ground cover data from 5 quadrats 5x5 m. Surveyed 24 October 1976.

Trees Species	Basal area (cm^2)	No. of trees	No. of trees with dbh ≥ 15 cm	Relative dominance (%)
Cocos nucifera	10,129	13	13	26
Dysoxylum samoense	7,329	8	5	19
Neonauclea forsteri	6,370	7	5	16
Bischofia javanica	3,436	6	4	9
Cyathea sp.	2,591	15	3	7
Myristica fatua	2,327	5	4	6
Cananga odorata	1,332	3	2	3
Inocarpus fagifer	1,323	1	1	3
Euodia samoensis	1,290	3	3	3
Fagraea berteriana	884	1	1	2
Morinda citrifolia	671	4	1	2
Rhus taitensis	354	3	0	1
Flacourtia rukam	290	2	1	1
Ficus tinctoria	254	3	0	1
Geniostoma samoense	205	2	0	1
Ficus scabra	99	2	0	<1
Psychotria insularum	51	4	0	<1
Artocarpus altilis	31	2	0	<1
Elaeocarpus tonganus	7	1	0	<1
Total	38,973	85	43	

Saplings	Height class (m)					Density	
Species	0.5 to 0.9	1.0 to 1.4	1.5 to 1.9	2.0 to 2.4	2.5 and higher	Total number	Average per 100 m^2
Psychotria insularum	11	14	17	3	0	45	9.0
Myristica fatua	6	3	1	2	0	12	2.4
Ficus tinctoria	4	2	4	0	0	10	2.0
Ficus scabra	2	3	0	1	0	6	1.2
Rhus taitensis	3	1	2	0	0	6	1.2
Flacourtia rukam	0	2	0	2	1	5	1.0
Fagraea berteriana	0	1	1	1	0	3	0.6
Elaeocarpus tonganus	2	0	1	0	0	3	0.6
Cocos nucifera	3	0	0	0	0	3	0.6
Bischofia javanica	0	0	1	0	1	2	0.4
Tarenna sambucina	0	0	0	2	0	2	0.4
Morinda citrifolia	1	0	0	1	0	2	0.4
Neonauclea forsteri	1	0	1	0	0	2	0.4
Sterculia fanaiho	0	0	0	1	0	1	0.2
Dysoxylum samoense	0	0	1	0	0	1	0.2
Inocarpus fagifer	0	1	0	0	0	1	0.2
Syzygium samoense	1	0	0	0	0	1	0.2
Total	34	27	29	13	2	105	21.0

Table 37. Continued

Ground cover

Species	Cover (%)	Frequency
Dryopteris sp. (?)	21	5/5
Nephrolepis hirsutula	8	2/5
Freycinetia storckii (?)	7	5/5
Asplenium nidus	6	5/5
Zingiber zerumbet	<1	5/5
Cyathea sp.	<1	4/5
Tectaria stearnsii (?)	<1	3/5
Microsorium scolopendria	<1	3/5
Cyperus seemannianus	<1	2/5
Oplismenus compositus (?)	<1	2/5
Dioscorea bulbifera	<1	1/5
Total	42	

Vines and Climbers

Species	Frequency	Dominance (%)
Dioscorea bulbifera	20	10
Embelia vaupelii	2	0
Faradaya powellii	2	1
Freycinetia spp.	84	55
Hoya australis	23	9
Hoya pottsii	11	4
Mikania micrantha	9	2
Piper graeffei	41	18

Table 38. Vegetative characteristics of Plot 35, Fagamalo Secondary Forest. Tree data from 10 subplots 10x10 m; sapling and ground cover data from 10 quadrats 5x5 m. Surveyed 13 and 17 October 1976.

Trees Species	Basal area (cm^2)	No. of trees	No. of trees with dbh ≥ 15 cm	Relative dominance (%)
Cyathea sp.	31,523	100	18	59
Rhus taitensis	8,116	4	3	15
Hibiscus tiliaceus	2,487	5	2	5
Alphitonia zizyphoides	2,094	12	7	4
Syzygium inophylloides	1,735	4	2	3
Elaeocarpus tonganus	1,379	7	1	3
Fagraea berteriana	1,147	2	2	2
Terminalia richii	799	3	1	1
Canthium merrillii	672	3	1	1
Syzygium samarangense	605	7	2	1
Cananga odorata	584	5	1	1
Calophyllum samoense	331	2	1	1
Trichospermum richii	324	1	0	1
Sarcopygme pacifica	224	7	0	<1
Astronidium pickeringii	200	6	0	<1
Myristica fatua	168	2	0	<1
Dysoxylum samoense	164	6	0	<1
Euodia samoense	135	3	0	<1
Dysoxylum huntii	132	1	0	<1
Hernandia moerenhoutiana	112	1	0	<1
Syzygium samoense	105	2	0	<1
Flacourtia rukam	85	4	0	<1
Palaquium stehlinii	78	1	0	<1
Ficus godeffroyi	61	3	0	<1
Syzygium carolinense	43	1	0	<1
Ficus scabra	40	2	0	<1
Bischofia javanica	32	2	0	<1
Meryta macrophylla	14	2	0	<1
Total	53,389	198	41	

Saplings	Height class (m)					Density	
Species	0.5 to 0.9	1.0 to 1.4	1.5 to 1.9	2.0 to 2.4	2.5 and higher	Total number	Average per 100 m^2
Elaeocarpus tonganus	2	7	3	1	2	15	6.0
Astronidium pickeringii	6	0	2	1	1	10	4.0
Psychotria insularum	2	3	1	1	0	7	2.8
Syzygium samoense	0	2	1	1	2	6	2.4
Dysoxylum samoense	2	2	1	1	0	6	2.4
Sarcopygme pacifica	5	1	0	0	0	6	2.4
Syzygium samarangense	0	2	1	1	0	4	1.6
Syzygium inophylloides	3	0	0	0	1	4	1.6
Terminalia richii	1	0	2	0	1	4	1.6
Myristica fatua	0	2	0	1	0	3	1.2
Glochidion ramiflorum	2	1	0	0	0	3	1.2
Ficus scabra	0	0	1	0	1	2	0.8
Flacourtia rukam	1	0	1	0	0	2	0.8
Calophyllum samoense	0	1	1	0	0	2	0.8
Endiandra elaeocarpa	0	0	1	0	0	1	0.4
Rhus taitensis	0	0	1	0	0	1	0.4
Palaquium oxyspermum	0	0	1	0	0	1	0.4
Bischofia javanica	1	0	0	0	0	1	0.4
Total	25	21	17	7	8	78	31.2

Table 38. Continued

Ground cover

Species	Cover (%)	Frequency
Dryopteris sp. (?)	9	9/10
Lomagramma cordipinna	8	5/10
Cyathea sp.	5	5/10
Freycinetia storckii (?)	3	8/10
Nephrolepis biserrata (?)	2	4/10
Asplenium nidus	1	3/10
Calanthe hololeuca	1	5/10
Piper graeffei	<1	5/10
Selaginella reineckei	<1	5/10
Pseuderia ramosa	<1	4/10
Lindsaea decomposita	<1	4/10
Zingiber zerumbet	<1	3/10
Oplismenus compositus	<1	3/10
Oplismenus imbecillus	<1	1/10
Habenaria tradescantifolia	<1	1/10
Total	29	

Vines and Climbers

Species	Frequency	Dominance (%)
Alyxia bracteolosa	2	2
Embelia vaupelii	2	1
Faradaya powellii	4	6
Freycinetia spp.	40	53
Hoya betchei	2	2
Lomagramma cordipinna	2	2
Medinilla samoensis	2	3
Piper graeffei	21	25
Pseuderia ramosa	6	7

Table 39. Vegetative characteristics of Plot 36, Faleiulu Secondary Forest. Tree data from 10 subplots 10x10 m; sapling and ground cover data from 5 quadrats 5x5 m. Surveyed 25 October 1976.

Trees

Species	Basal area (cm^2)	No. of trees	No. of trees with dbh ≥ 15 cm	Relative dominance (%)
Rhus taitensis	22,428	12	12	40
Alphitonia zizyphoides	19,209	12	12	35
Cyathea sp.	2,976	38	2	5
Syzygium inophylloides	2,203	6	3	4
Terminalia richii	1,752	1	1	3
Myristica fatua	1,321	6	1	2
Elaeocarpus tonganus	1,046	4	2	2
Dysoxylum samoense	833	3	2	2
Cananga odorata	766	1	1	1
Fagraea berteriana	628	2	1	1
Astronidium pickeringii	555	17	1	1
Endiandra elaeocarpa	429	3	1	1
Meryta macrophylla	367	4	0	1
Flacourtia rukam	246	5	0	<1
Neonauclea forsteri	176	1	0	<1
Hernandia moerenhoutiana	157	4	0	<1
Sarcopygme pacifica	142	5	0	<1
Palaquium stehlinii	119	2	0	<1
Canthium merrillii	104	2	0	<1
Glochidion ramiflorum	69	1	0	<1

Table 39. Continued

Trees

Species	Basal area (cm^2)	No. of trees	No. of trees with dbh ≥ 15 cm	Relative dominance (%)
Calophyllum samoense	62	1	0	<1
Ficus scabra	52	2	0	<1
Streblus anthropophagorum	45	2	0	<1
Syzygium samoense	28	2	0	<1
Syzygium samarangense	27	1	0	<1
Cyrtandra sp.	15	1	0	<1
Psychotria garberiana	15	1	0	<1
Ficus godeffroyi	9	1	0	<1
Total	55,779	140	39	

Saplings

Species	Height class (m) 0.5 to 0.9	1.0 to 1.4	1.5 to 1.9	2.0 to 2.4	2.5 and higher	Density Total number	Average per 100 m^2
Elaeocarpus tonganus	9	7	5	1	1	23	18.4
Myristica fatua	1	4	2	0	0	7	5.6
Astronidium pickeringii	1	1	3	0	1	6	4.8
Psychotria insularum	1	1	2	1	0	5	4.0
Flacourtia rukam	0	0	3	0	0	3	2.4
Canthium merrillii	0	1	2	0	0	3	2.4
Planchonella linggenensis	0	3	0	0	0	3	2.4
Psychotria garberiana	0	0	1	0	1	2	1.6
Glochidion ramiflorum	1	0	0	0	1	2	1.6
Sarcopygme pacifica	1	0	0	1	0	2	1.6
Terminalia richii	1	1	0	0	0	2	1.6
Syzygium inophylloides	1	1	0	0	0	2	1.6
Dysoxylum samoense	0	0	0	0	1	1	0.8
Syzygium samarangense	0	0	1	0	0	1	0.8
Ficus tinctoria	0	0	1	0	0	1	0.8
Palaquium oxyspermum	0	1	0	0	0	1	0.8
Ficus scabra	0	1	0	0	0	1	0.8
Calophyllum samoense	0	1	0	0	0	1	0.8
Neonauclea forsteri	1	0	0	0	0	1	0.8
Endiandra elaeocarpa	1	0	0	0	0	1	0.8
Syzygium samoense	1	0	0	0	0	1	0.8
Total	19	22	20	3	5	69	55.2

Ground cover

Species	Cover (%)	Frequency
Freycinetia storckii	15	5/5
Dryopteris sp. (?)	12	4/5
Lomagramma cordipinna	4	5/5
Cyathea sp.	4	4/5
Medinilla samoensis	2	5/5
Pseuderia ramosa	1	4/5
Selaginella reineckei	<1	5/5
Calanthe triplicata	<1	3/5
Nephrolepis hirsutula	<1	3/5
Lindsaea decomposita	<1	2/5
Zingiber zerumbet	<1	2/5
Tacca leontopetaloides	<1	1/5
Asplenium nidus	<1	1/5
Trichomanes boryanum	<1	1/5
Hoya pottsii	<1	1/5
Total	38	

Table 39. Continued

Vines and Climbers

Species	Frequency	Dominance (%)
Faradaya powellii	3	2
Freycinetia spp.	75	59
Hoya betchei	2	1
Hoya pottsii	8	4
Lomagramma cordipinna	41	21
Medinilla samoensis	10	4
Mikania micrantha	2	1
Piper graeffei	3	1
Pseuderia ramosa	10	7

Table 40. Vegetative characteristics of Plot 37, Laufuti Secondary Forest. Tree data from 10, ground cover data from 3 subplots 10x10 m. Surveyed 17 July 1976.

Trees

Species	Basal area (cm^2)	No. of trees	No. of trees with dbh ≥ 15 cm	Relative dominance (%)
Rhus taitensis	42,955	3	3	80
Astronidium pickeringii	2,536	21	5	5
Dysoxylum huntii (?)	2,446	2	2	4
Endiandra elaeocarpa	1,575	7	3	3
Myristica fatua	1,275	6	3	2
Sarcopygme pacifica	897	21	0	2
Ficus godeffroyi	837	9	1	2
Neonauclea forsteri	378	2	1	1
Aglaia samoensis	353	2	1	1
Weinmannia affinis	66	1	0	<1
Acronychia heterophylla	59	2	0	<1
Total	53,377	76	19	

Ground cover

Species	Cover (%)	Frequency
Lomagramma cordipinna	7	3/3
Cyathea sp.	5	2/3
Asplenium nidus	3	3/3
Tectaria chrysotricha	3	3/3
Trichomanes boryanum	1	3/3
Freycinetia storckii	1	2/3
Elatostema sp.	1	2/3
Aneilema vitiense	1	1/3
Bolbitis lonchophora	<1	1/3
Nephrolepis biserrata	<1	1/3
Total	22	

Vines and Climbers

Species	Frequency	Dominance (%)
Freycinetia spp.	36	12
Hoya pottsii	23	9
Lomagramma cordipinna	86	68
Medinilla samoensis	5	1
Melothria grayana	23	9
Piper graeffei	9	1

Table 41. Ground cover on Plot 38, Olotania Montane Scrub. Surveyed 19 October 1976.

Species	Cover (%)	Frequency
Blechnum vulcanicum	51	5/5
Dicksonia brackenridgei	21	5/5
Freycinetia storckii	7	5/5
Ascarina diffusa	7	5/5
Paspalum conjugatum	4	5/5
Reynoldsia lanutoensis	2	3/5
Cordyline fruticosa	2	3/5
Fagraea berteriana	1	3/5
Astronidium pickeringii	1	4/5
Psychotria garberiana	1	4/5
Selaginella reineckei	<1	4/5
Weinmannia affinis	<1	2/5
Pseuderia ramosa	<1	4/5
Elatostema grandifolium	<1	4/5
Peperomia reineckei	<1	3/5
Cyrtandra longipedunculata	<1	3/5
Erechtites valerianiaefolia	<1	2/5
Melastoma denticulatum	<1	1/5
Total	100	

Table 42. Ground cover of Plot 39, Aunu'u Coastal Marsh, based on estimated percentage of cover in 9 quadrats 2x2 m. Surveyed 23 August 1976.

Species	Cover (%)	Frequency
Cyclosorus interruptus	93	9/9
Eleocharis dulcis	7	9/9
Ipomoea macrantha	<1	1/9
Mikania micrantha	<1	1/9
Total	100	

Table 43. Ground cover in two associations in Plot 40, Maga Littoral Scrub, based on estimate of percentage of cover. Surveyed 1 December 1976.

Species	Cover (%)	Frequency
Wedelia Association (20 quadrats 2x2m)		
Wedelia biflora	82	20/20
Ficus scabra	7	10/20
Canavalia sericea	6	4/20
Microsorium scolopendria	2	5/20
Scaevola taccada	1	2/20
Ipomoea littoralis	<1	4/20
Vigna marina	<1	4/20
Dioscorea bulbifera	<1	2/20
Mikania micrantha	<1	2/20
Morinda citrifolia	<1	1/20
Pipturus argenteus	<1	1/20
Cyperus javanica	<1	1/20
Tacca leontopetaloides	<1	1/20
Total	100	
Scaevola Association (5 quadrats 2x2 m)		
Scaevola taccada	90	5/5
Wedelia biflora	8	5/5
Ipomoea littoralis	1	2/5
Microsorium scolopendria	<1	1/5
Ischaemum murinum	<1	2/5
Total	100	

Table 44. Ground cover on Plot 41, Onenoa Kula Fernland, based on estimate of percentage of cover. Surveyed 12 November 1976.

Species	Cover (%)	Frequency
Dicranopteris linearis	55	10/10
Paspalum orbiculare	5	8/10
Chrysopogon aciculatus	5	9/10
Glochidion ramiflorum	2	2/10
Melastoma denticulatum	<1	2/10
Imperata cylindrica	<1	3/10
Desmodium heterocarpon	<1	4/10
Scleria polycarpa	<1	8/10
Emilia sonchifolia	<1	6/10
Nephrolepis hirsutula	<1	1/10
Total	68	

Table 45. Densities (no./100 m²) and rounded population estimates of the marine toad and seven lizards in selected vegetation community (habitat) types on the islands of American Samoa. Population estimates are based on habitat acreage and species distribution.

	Community type					
	Mangrove forest		Mangrove forest edge		Littoral forest	
Species	Density	Pop. est.	Density	Pop. est.	Density	Pop. est.
Marine toad[b]			4.0	53,700	1.0	13,400
Micronesian skink[d]					+	
Azure-tailed skink	0.0[b]		10.0[e]	134,400	9.1[f]	205,100
Black skink	0.8[b]	6,800	1.5[b]	20,200	2.44[l]	55,000
Samoan skink	0.2[b]	1,700	1.33[b]	17,900	0.95[o]	17,400
Polynesian skink			2.0[b]	26,900	12.0[r]	272,400
Mourning gecko					2.3[t]	52,200
Moth skink					1.0[d]	22,500
Total[v]	1.0	8,500	18.83	253,000	30.49	638,200

	Community type					
	Coastal forest		Ridge and rain forest		Cloud forest[a]	
Species	Density	Pop. est.	Density	Pop. est.	Density	Pop. est.
Marine toad[b]			0.1	38,000		
Micronesian skink						
Azure-tailed skink	3.13[g]	289,000	0.75[h]	386,000		
Black skink	0.98[m]	90,500	0.3[m]	154,400		
Samoan skink	1.55[o]	105,100	0.4[o]	202,600	1.0[p]	48,000
Polynesian skink	2.0[b]	184,700				
Mourning gecko						
Moth skink						
Total	7.66	669,300	1.55	781,000	1.0	48,000

	Community type					
	Secondary forest		Montane scrub		Coastal marsh	
Species	Density	Pop. est.	Density	Pop. est.	Density	Pop. est.
Marine toad[b]						
Micronesian skink						
Azure-tailed skink			3.0[b]	45,800	0.6[i]	600
Black skink			1.0[b]	15,300	0.0[i]	
Samoan skink	2.0[o]	759,600	0.0[b]			
Polynesian skink						
Mourning gecko						
Moth skink						
Total	2.0	759,600	4.0	61,000	0.6	600

Table 45. Continued

	Community type			
	Littoral scrub		Plantation land	
	Density	Pop. est.	Density	Pop. est.
Marine toad[b]			4.5	2,190,800[e]
Micronesian skink			1.7	35,300
Azure-tailed skink	6.7[j]	45,800	19.3[k]	13,053,900
Black skink	2.6[n]	17,400	2.8[l]	1,835,700
Samoan skink	0.0[b]		2.8[b]	1,659,000[q]
Polynesian skink	1.0[b]	6,800	8.3[s]	5,613,800
Mourning gecko			7.8[l]	5,275,700
Moth skink			1.75[u]	1,183,600
Total	10.3	70,000	47.25	30,847,800

	Community type		
	Rain and ridge forest edge		
Species	Density	Pop. est.	Total population estimate[v]
Marine toad[b]			2,296,000
Micronesian skink			35,300
Azure-tailed skink	8.5[b]	3,379,700	17,540,300
Black skink	2.4[b]	954,300	3,149,400
Samoan skink	2.0[b]	759,600	3,571,000
Polynesian skink			6,104,700
Mourning gecko			5,327,900
Moth skink	1.5[b]	596,400	1,802,600
Total	14.4	5,690,000	36,992,700

\+ Indicates species present, but not collected
[a] Ta'ū only
[b] Tutuila only
[c] Based on area of littoral forest
[d] Swains Island only
[e] Tutuila and Aunu'u only
[f] Tutuila, Olosega, Nu'utele, Ta'ū
[g] Tutuila, Ofu, Ta'ū
[h] Tutuila, Ofu
[i] Aunu'u only
[j] Tutuila, Ofu, Olosega
[k] Tutuila, Aunu'u, Ofu, Ta'ū, Swains
[l] Tutuila, Aunu'u, Ofu, Olosega, Ta'ū
[m] Tutuila, Ofu, Olosega, Ta'ū
[n] Tutuila, Olosega
[o] Tutuila, Ta'ū
[p] Single specimen observed on Lata Mt., Ta'ū (900 m.)
[q] Only if trees are present
[r] Tutuila, Rose
[s] Tutuila, Aunu'u, Ofu, Olosega, Ta'ū, Swains
[t] Tutuila, Aunu'u, Rose
[u] Aunu'u, Ofu, Olosega, Swains
[v] Totals were calculated before rounding estimates for each habitat

Table 46. Summary of distribution of amphibians and reptiles on the islands of American Samoa. S, specimen taken in this study; s, other specimens taken; r, reported but no specimens; F, distributional record first reported in this paper.

Species	Island						
	Tutuila	Aunu'u	Ta'ū	Ofu	Olosega	Swains	Rose
Bufo marinus	S, s, F	S, F					
Chelonia agassizi	r, F	r, F	r, F	r, F	r, s	r, F	r
Eretmochelys imbricata	r, F						r
Cyrtodactylus pelagicus	S, F		S, F				
Gehyra oceanica	S, s	S	S	S	S	S, s	S, F
Hemidactylus frenatus	S, F						
Lepidodactylus lugubris	S, s	S, F	S, F	S, F	S, F	S, s, F	S, s
Peropus mutilatus			S, F		S, F	S, F	
Ablepharis boutonii	S[a], s		s, F		S, s		
Emoia adspersa					[b]	S, s, F	
Emoia cyanura	S, s	S, F	S, F	S, F	S, s	S, s, F	
Emoia lawesii			S, F	r?, F	S, s[c], F		
Emoia nigra	S, s	S, F	S, s	S, F	S, s	[b]	
Emoia samoense	S, s		S, s				
Lipinia noctua	S, F	S, F	s, F	S, F	S, F	S, F	
Candoia bibroni			S, s, F				

[a] Tail only.
[b] Erroneously reported in past literature.
[c] Earlier specimens were reported as *E. adspersa.*

Table 47. Density (no./100 m²) of the marine toad in some habitats on Tutuila Island. A, adult; J, juvenile; T, tadpole; C, clasping pair; D, day; N, night.

Habitat	Average elevation (m)	Density and (number of samples)	Life stage	Time of observation
Mangrove forest	0.3	4.00(1)	A	D
Littoral forest	0.6	1.00(5)	A	N
Coastal rock strand	1.5	11.00(1)	A,J,T,C	D
Coastal village	1.5	7.00(2)	A	D
Lowland village	3.0	12.18(10)	A	N,D
Lowland (plantation)	12.2	6.00(1)	A	N
Lowland (plantation)	18.3	7.00(6)	A,T,C	N,D
Lowland (pasture)	42.7	4.00(4)	A	N
Highland (village)	366.0	1.00(8)	A	N
Highland (forest)	366.0	0.10(8)	A	D

Table 48. Observations of the black turtle on Rose Atoll.

Date	Numbers	Observations and references
7 October 1839	?	A "great number" (Girard 1858; Sachet 1954)
21 August 1970	2	In water; 3 nests excavated, no eggs found (Swerdloff and Needham 1970)
21 October - 6 November 1971	?	Turtle pits distributed throughout the island (Nass 1971)
August - October (no year given)	?	Nesting period (Swerdloff *in* Sekora 1974)
22-23 November 1974	10	Large adults (daytime); 1 large adult (night); 1 observed laying eggs; 6 hatchlings emerging from nest, rats attacked 2; 135 recent pits on Sand Island; 173 recent pits and 124 old pits on Rose Island (Sekora 1974)
21-24 October 1975	26	Estimated from track counts; 148 pits on Sand Island; 247 pits on Rose Island (Zeillemaker 1975)
5-7 May 1976	4	Adults
20-21 October 1976	?	63 tracks and 231 pits on Rose Island; 52 tracks and 175 pits on Sand Island (Sekora 1976)

Table 49. Densities (average number of individuals/structure) of the Polynesian gecko in various habitats on islands of American Samoa; averages are based on adults seen or numbers of adults calculated from egg clutches and juveniles.

			Density by island						
Habitat	Structure	Average elevation (m)	Tutuila	Aunu'u	Ofu	Olosega	Ta'ū	Rose	Swains
Littoral scrub	Tree	12.2	1						
	Building	12.2	1						
Littoral forest	Concrete marker	1.5						15	
	Tree	1.5						1	
	Bird's-nest fern	1.5	8						
Mangrove forest edge	Bird's-nest fern	0.6	2						
Rain forest edge	Tree	33.5	1						
Coastal forest	Tree	122.0	2						
Village/plantation land	Building	3.0	11						
	Building	72.0		5			4		
	Tree	3.0	1		4	15			11

Table 50. Average densities (number/100 m²) of the mourning gecko in American Samoa; the number of plots sampled is in parentheses.

		Density by island						
Habitat	Average elevation(m)	Tutuila	Aunu'u	Ofu	Olosega	Ta'ū	Rose	Swains
Littoral strand	12.2	24.25(5)						
Littoral forest	1.5	1.13(9)	4.00(1)				1.80(10)	
Village/plantation land	14.6	4.12(11)	2.00(2)	13.50(2)	6.53(3)	12.75(4)		5.30(1)

Table 51. Average density (no./100 m²) of the Micronesian skink in two habitats on Swains Island.

Habitat	Elevation (m)	Density	Samples
Littoral forest, atoll	3.0	2.0	2
Littoral forest, *Pandanus*	3.0	1.4	2

Table 52. Average densities (number/100 m²) of the azure-tailed skink in several habitats in American Samoa; the number of plots sampled is in parentheses.

		Density by island						
Habitat	Average elevation(m)	Tutuila	Aunu'u	Ofu	Olosega	Nu'utele Islet	Ta'ū	Swains
Littoral strand	1.5	0.49(6)						
Littoral scrub	3.0	7.00(2)		7.00(1)	6.20(1)			
Coastal marsh	3.0		0.60(5)					
Mangrove forest edge	0.6	11.00(1)	9.00(1)					
Littoral forest	1.5	10.00(2)			9.00(2)	9.50(12)[a]	8.00(2)	
Coastal forest	152.0	7.00(1)		2.25(9)			0.10(1)[b]	
Rain and ridge forest	366.0			1.50(2)				
Rain forest edge	33.5	8.50(10)						
Montane scrub	640.0	3.00(2)						
Village/plantation land	6.1	10.60(3)	32.00(1)[c]	20.25(3)			13.60(3)	20.00(6)

[a] Extensive pig damage in study areas.
[b] On Liu Bench.
[c] Banana plantation with refuse and mulch at edge of marsh.

Table 53. Average densities (no./100 m²) of black skinks in habitats in American Samoa; the number of plots sampled is in parentheses.

		Density by island				
Habitat	Average elevation(m)	Tutuila	Aunu'u	Ofu	Olosega	Ta'ū
Littoral strand	4.9	2.00(2)	2.00(1)	2.00(2)	1.50(1)	2.50(1)
Littoral scrub	61.0	1.33(3)			3.88(2)	
Mangrove forest	0.3	0.80(5)				
Mangrove forest edge	0.6	1.50(2)				
Littoral forest	3.4	3.18(10)	3.00(1)	2.50(2)	2.50(2)	1.02(4)
Coastal forest	152.0	0.58(2)		1.12(8)	1.30(1)	0.96(3)
Rain and ridge forest	263.0	1.00(1)			0.20(1)	
Rain forest edge	33.5	2.38(8)				
Montane scrub	640.0	1.00(2)				
Village/plantation land	14-335	3.00(14)	3.31(4)	3.02(21)	2.08(2)	2.75(1)

Table 54. Average densities (no./100 m²) of the Samoan skink in various habitats in American Samoa; the number of plots sampled is in parentheses.

Habitat	Average elevation (m)	Density by island	
		Tutuila	Ta'ū
Mangrove forest	0.3	0.20(5)	
Mangrove forest edge	0.6	1.33(12)	
Littoral forest	2.4	0.94(15)	1.00(5)
Coastal forest	122.0	1.62(2)	1.50(2)
Rain and ridge forest	61.0	0.83(3)	
Rain forest edge	137.0	2.00(38)	
Cloud forest	914.0		1.00(1)[a]
Village/plantation land	156.0	2.80(14)	
Secondary forest	32.0	1.00(4)	3.00(1)

[a] A single sighting on Lata Mountain.

Table 55. Descriptions and dates of bird surveys in the study plots; see Table 2 and text for names and descriptions of plots.

Plot number	Study dates	Survey description
1	17 July 1975; 29 March 1976	From study plot 300 m south to edge of mangrove forest at Pala Lagoon
2	1-5 March 1976; 12-15 July 1976	Within study plot and 100 m north of dirt road
3	20-24 October 1975; 6 May 1976	Within study plot
4	23 August 1976	Within study plot and 100 m north and south
5	2 September 1975; 14 March 1976; 20-21 April 1976	Within study plot
7	18 October 1976	Within study plot and 100 m northeast and southwest
8	23 August 1976	From plot 200 m west parallel to coast
10	23 August 1976	From plot 200 m west parallel to coast
11	30 November 1976	From plot 200 m north along ridge of islet
12	2 November 1976	Within plot and 100 m northeast and southwest
13	22 November 1976	Within plot and 100 m north and south
16	3-4 June 1976; 30 November 1976	Within study plot
17	20 July 1976	From plot 100 m north
19	14 October 1976	From plot 100 m north
20	5-6, 12-13 February 1976; 30 June-3 July 1976	Within study plot
21	30 December 1975; 8-9 July 1976	Within study plot
22	2, 10-12 December 1975; 19, 21-22 July 1976	Within study plot and 100 m southwest
23	10 July 1975; 15 March 1976	Within study plot and 100 m north
24	16 August 1976	Within study plot
25	8 August 1975	From plot 200 m northwest
26	23 September 1976	Within plot and 100 m northwest
27	16 September 1976	Within plot and 100 m southwest along ridge
28	7 September 1976	Within plot and 100 m southeast
31	8 August 1975	Within plot and 100 m northwest

Table 55. Continued

Plot number	Study dates	Survey description
32	August 1975; 14 October 1976	Within study plot
33	17 August 1976	Within study plot
34	4 October 1976	Within study plot
35	13 October 1976	Within study plot
36	14 October 1976	Within study plot
37	17 July 1976	Within study plot
38	August 1975; 15 October 1976	Within plot and 100 m south
39	29 August 1975; 6-9 April 1976; November 1976	Edge to center of marsh and 100 m along southwest edge
40	7-8 August 1975	Along trail for 200 m containing the study plot
41	8 September 1975	From study plot 100 m south
Swains Island	19 May 1976	100 m south along trail from central lagoon to freshwater well, and 100 m west along trail toward main village

Table 56. Mean densities (birds/0.2 ha) of waterfowl, marsh, and land birds in vegetation study plots in American Samoa. W = winter (Apr.-Sept.), S = summer (Oct.-March), Y = year-round. See Tables 2 and 55 for details on plots and dates and locations of surveys.

	1			2			3			4	5		
Species	W	S	Y	W	S	Y	W	S	Y	W	W	S	Y
Reef heron				0.3	0.8	0.6	7	6	6.5				
Australian gray duck													
Banded rail	3	1	2	0.8	1.2	1							
Purple swamphen	2	1	1.5										
Golden plover				0.8	2.8	1.8	3	2	2.5				
Ruddy turnstone							1		0.5				
Wandering tattler	1		0.5	0.3	0.8	0.6							
Crimson-crowned fruit dove	2		1										
Pacific pigeon													
Friendly quail dove													
Blue-crowned lory													
Long-tailed cuckoo							2		1				
Barn owl													
White-rumped swiftlet	4	2	3	1	0.8	0.9					1.5	2.5	2
White-collared kingfisher	12	8	10	0.5	0.6	0.6				2	6	6.5	6.3
Red-vented bulbul	2		1										
Fiji shrikebill													
Wattled honey-eater	25	12	18.5	1.5	0.6	1.1				3	2	3	2.5
Cardinal honey-eater	15	10	12.5										
Polynesian starling					0.2	0.1							
Samoan starling	5	2	3.5		0.2	0.1				1	1	1	1
Density, all species	71	36	53.5	5.2	8	6.8	13	8	10.5	6	10.5	13	11.8
Number of species	10	7	10	7	9	9	4	2	4	3	4	4	4

Table 56. Continued

Species	7	8	10	11	12	13	16			17	19
	S	W	W	S	S	S	W	S	Y	W	S
Reef heron											
Australian gray duck											
Banded rail											
Purple swamphen											
Golden plover											
Ruddy turnstone											
Wandering tattler											
Crimson-crowned fruit dove				2	3	4		6	3	4	5
Pacific pigeon					1			1	0.5	1	1
Friendly quail dove							0.5		0.3		
Blue-crowned lory				3			0.5	2	1.3		
Long-tailed cuckoo					1						
Barn owl											
White-rumped swiftlet	2	3	4		4		1.5	2	1.8	4	2
White-collared kingfisher	3			1	2					2	3
Red-vented bulbul											
Fiji shrikebill											
Wattled honey-eater		4	5	4	10		47	20	33.5	8	6
Cardinal honey-eater											
Polynesian starling							1.5	1	1.3	2	2
Samoan starling	3	2	2	1	4		18	5	11.5	4	3
Density, all species	8	9	11	11	25	4	69	37	53.2	25	22
Number of species	3	3	3	5	7	1	6	7	8	7	7

Species	20			21			22			23		
	W	S	Y	W	S	Y	W	S	Y	W	S	Y
Reef heron												
Australian gray duck												
Banded rail												
Purple swamphen												
Golden plover												
Ruddy turnstone												
Wandering tattler												
Crimson-crowned fruit dove	9.8	8.5	9.2	2	4	3	5.3	3.3	4.3	10	8	9
Pacific pigeon		0.5	0.3				0.3	1.3	0.8	4	3	3.5
Friendly quail dove												
Blue-crowned lory												
Long-tailed cuckoo												
Barn owl												
White-rumped swiftlet	0.5	3.5	2		3	1.5	3	1	2	3	1	2
White-collared kingfisher	0.8	0.5	0.7	0.5	1	0.8	1.7	2.3	2	1	2	1.5
Red-vented bulbul												
Fiji shrikebill												
Wattled honey-eater	15	13.5	14.3	6	8	7	4.7	1.8	3.3	8	8	8
Cardinal honey-eater	2.3	0.3	1.3				0.3		0.2	1		0.5
Polynesian starling	1.3	0.3	0.8		3	1.5		0.3	0.2	1	3	2
Samoan starling	22.3	3	12.7	3.5	2	2.8	2.7	1.8	2.3	6	5	5.5
Density, all species	52	30.1	41.3	12	21	16.6	18	11.8	15.1	34	30	32
Number of species	7	8	8	4	6	6	7	7	8	8	7	8

Table 56. Continued

Species	24	25	26	27	28	31	32			33	34
	W	W	W	W	W	W	W	S	Y	W	S
Reef heron											
Australian gray duck											
Banded rail											
Purple swamphen											
Golden plover											
Ruddy turnstone											
Wandering tattler											
Crimson-crowned fruit dove	9	3	5	4	3					2	2
Pacific pigeon	1	1	1	1	1						
Friendly quail dove											
Blue-crowned lory						2	1	2	1.5		4
Long-tailed cuckoo											
Barn owl										1	1
White-rumped swiftlet	3		2	2	8					5	
White-collared kingfisher	2		5		3					2	1
Red-vented bulbul										3	
Fiji shrikebill											
Wattled honey-eater	12	2	8	5	5		2	2	2	5	10
Cardinal honey-eater			2	3	4					2	
Polynesian starling	2		1	2	1	1	1	1	1		
Samoan starling	6	1	3	4	3	2	2	4	3	4	5
Density, all species	35	7	27	21	28	5	6	9	7.5	24	23
Number of species	7	4	8	7	8	3	4	4	4	8	6

Species	35	36	37	38			39			40		
	S	S	W	W	S	Y	W	S	Y	W	S	Y
Reef heron												
Australian gray duck							0.2	1	0.6			
Banded rail								1	0.5			
Purple swamphen							0.6		0.3			
Golden plover												
Ruddy turnstone												
Wandering tattler												
Crimson-crowned fruit dove	2	4	8				1.6	4	2.8			
Pacific pigeon	1	1	2									
Friendly quail dove												
Blue-crowned lory	2	1			2	1						
Long-tailed cuckoo		1										
Barn owl												
White-rumped swiftlet							0.4	0.5	0.5	8	5	6.5
White-collared kingfisher										2		1
Red-vented bulbul												
Fiji shrikebill	1		1									
Wattled honey-eater	3	4	3	1	1	1	1	1	1	10	8	9
Cardinal honey-eater												
Polynesian starling	1	1	2	1	1	1						
Samoan starling	2	2	5	2	3	2.5	1.8	1	1.4	2	3	2.5
Density, all species	12	14	21	4	7	5.5	5.6	8.5	7.1	22	16	19
Number of species	7	7	6	3	4	4	6	6	7	4	3	4

Table 56. Continued

Species	41 W	Swains W	Total plots W	S	Y
Reef heron			2	2	2
Australian gray duck			1	1	1
Banded rail			2	3	3
Purple swamphen			2	1	2
Golden plover		2	3	2	3
Ruddy turnstone			1		1
Wandering tattler			2	1	2
Crimson-crowned fruit dove			14	13	22
Pacific pigeon			9	8	15
Friendly quail dove			1		1
Blue-crowned lory			3	7	8
Long-tailed cuckoo		1	2	2	4
Barn owl			1	1	2
White-rumped swiftlet			17	13	21
White-collared kingfisher	1		15	12	20
Red-vented bulbul			2		2
Fiji shrikebill			1	1	2
Wattled honey-eater	2		24	18	30
Cardinal honey-eater			8	2	8
Polynesian starling			12	11	18
Samoan starling	1		24	19	32
Density, all species	4	3			
Number of species	3	2			

Table 57. Densities (birds/0.2 ha) and rounded population estimates of waterfowl, marsh, and land birds in the vegetation community (habitat) types of the islands of American Samoa. Density figures are yearly means from 35 study plots; figures for "Plantation land (other islands)" are estimates based on data obtained for "Secondary forest." Population estimates are based on habitat acreages and species distribution. Species diversity, $H_T = 1/\sum_i p_i^2$ (where p_i is the proportion of all individuals of species i).

Species	Mangrove forest Density	Pop. est.	Littoral forest Density	Pop. est.	Coastal forest Density	Pop. est.
Reef heron			3.6	4,000		
Australian gray duck						
Banded rail	2.0	900	1.0	1,100		
Purple swamphen	1.5	700				
Golden plover			2.2	2,500		
Ruddy turnstone			0.5	550		
Wandering tattler	0.5	200	0.6	700		
Crimson-crowned fruit dove	1.0	450			2.5	11,400
Pacific pigeon					1.0	4,600
Friendly quail dove						
Blue-crowned lory					3.0	6,200[b]
Long-tailed cuckoo			1.0	1,100	1.0	4,600
Barn owl						
White-rumped swiftlet	3.0	1,300	2.0	2,200	2.7	12,300
White-collared kingfisher	10.0	4,500	3.0	3,400	1.0	4,600
Red-vented bulbul	1.0	400				

Table 57. Continued

Species	Mangrove forest		Littoral forest		Coastal forest	
	Density	Pop. est.	Density	Pop. est.	Density	Pop. est.
Fiji shrikebill						
Wattled honey-eater	18.5	8,300	2.7	3,000	6.3	28,800
Cardinal honey-eater	12.5	5,300[d]				
Polynesian starling			0.1	100		
Samoan starling	3.5	1,600	1.4	1,600	2.3	10,500
Total	53.5	23,650	18.1	20,250	19.8	83,000
Species richness	10.0		12.0		9.0	
Species diversity	4.80		6.03		5.56	

Species	Ridge and rain forest		Cloud forest		Secondary forest	
	Density	Pop. est.	Density	Pop. est.	Density	Pop. est.
Reef heron						
Australian gray duck						
Banded rail						
Purple swamphen						
Golden plover						
Ruddy turnstone						
Wandering tattler						
Crimson-crowned fruit dove	5.0	127,200			3.6	70,700
Pacific pigeon	1.1	28,000			1.3	25,500
Friendly quail dove	0.3	100[a]				
Blue-crowned lory	1.3	8,600[b]	1.8	4,300[b]	2.3	8,700
Long-tailed cuckoo					1.0	19,600
Barn owl					1.0	19,600
White-rumped swiftlet	2.8	71,200			5.0	98,300
White-collared kingfisher	2.2	56,000			1.5	29,500
Red-vented bulbul					3.0	47,600
Fiji shrikebill					1.5	4,400[c]
Wattled honey-eater	9.3	236,500	2.0	4,800	5.0	98,300
Cardinal honey-eater	1.8	33,800[d]			2.0	31,700[d]
Polynesian starling	1.4	35,600	1.0	2,400	1.3	25,500
Samoan starling	4.9	124,600	2.5	6,000	3.6	70,700
Total	30.1	721,600	7.3	17,500	32.1	550,100
Species richness	11.0		4.0		13.0	
Species diversity	5.79		3.68		9.90	

Species	Montane scrub		Coastal marsh		Littoral scrub		Kula fernland	
	Density	Pop. est.	Density	Pop. est.	Density	Pop. est.	Density	Pop. est.
Reef heron								
Australian gray duck			0.6	35				
Banded rail			0.5	30				
Purple swamphen			0.3	20				
Golden plover								
Ruddy turnstone								
Wandering tattler								
Crimson-crowned fruit dove			2.8	200				
Pacific pigeon								
Friendly quail dove								
Blue-crowned lory	1.0	350[b]						

Table 57. Continued

Species	Montane scrub Density	Montane scrub Pop. est.	Coastal marsh Density	Coastal marsh Pop. est.	Littoral scrub Density	Littoral scrub Pop. est.	Kula fernland Density	Kula fernland Pop. est.
Long-tailed cuckoo								
Barn owl								
White-rumped swiftlet			0.5	30	6.5	2,200		
White-collared kingfisher					1.0	350	1.0	5
Red-vented bulbul								
Fiji shrikebill								
Wattled honey-eater	1.0	750	1.0	60	9.0	3,000	2.0	10
Cardinal honey-eater								
Polynesian starling	1.0	750						
Samoan starling	2.5	1,900	1.4	100	2.5	800	1.0	5
Total	5.5	3,750	7.1	475	19.0	6,350	4.0	20
Species richness	4.0		7.0		4.0		3.0	
Species diversity	3.27		4.29		2.77		2.67	

Species	Plantation land (Swains) Density	Plantation land (Swains) Pop. est.	Plantation land (other islands) Density	Plantation land (other islands) Pop. est.	Total pop. est.	Percent of est. total population
Reef heron					4,000	0.182
Australian gray duck					35	0.002
Banded rail					2,030	0.093
Purple swamphen					720	0.031
Golden plover	2.0	2,000			4,500	0.204
Ruddy turnstone					550	0.025
Wandering tattler					900	0.041
Crimson-crowned fruit dove			3.6	116,600	326,550	14.737
Pacific pigeon					58,100	2.621
Friendly quail dove					100	0.005
Blue-crowned lory			2.3	19,200	47,350	2.140
Long-tailed cuckoo	1.0	1,000			26,300	1.190
Barn owl					19,600	0.887
White-rumped swiftlet			5.0	162,000	349,530	15.776
White-collared kingfisher			1.5	48,600	146,955	6.625
Red-vented bulbul			3.0	70,900	118,900	5.364
Fiji shrikebill					4,400	0.197
Wattled honey-eater			5.0	162,000	545,520	24.620
Cardinal honey-eater			2.0	47,300[d]	118,100	5.326
Polynesian starling			1.3	42,100	106,450	4.808
Samoan starling			3.6	116,600	334,405	15.094
Total	3.0	3,000	27.3	785,300	2,214,995	99.999
Species richness	2.0		9.0			
Species diversity	1.80		7.59			

[a] Ofu, Olosega, and Ta'ū only
[b] Tutuila only
[c] Ta'ū only
[d] Ofu and Olosega only

Table 58. Abundance (birds/1.6 km) of waterfowl, marsh, and land birds on the linear surveys; see Table 3 for locations of surveys.

	Tutuila									
Species Survey no.	1	2	3	4	5	6[a]	7	8	9	10
Reef heron		0.3			0.2					
Australian gray duck										
Banded rail	0.6	1.5	2.0	2.5	0.3				1.4	1.8
Purple swamphen		0.3	2.0	1.3	0.1				0.5	0.6
Golden plover										
Ruddy turnstone										
Bristle-thighed curlew										
Bar-tailed godwit										
Wandering tattler	1.9	0.5			0.2			1.8		1.2
Sanderling										
Rock dove										
Many-colored fruit dove										
Crimson-crowned fruit dove		2.8	20.0	13.8			3.6	0.9	3.8	4.7
Pacific pigeon		0.8	6.0	5.0					1.0	1.2
Friendly quail dove										
Blue-crowned lory										
Long-tailed cuckoo		0.3	2.0						0.5	
Barn owl					0.1					
White-rumped swiftlet	3.1	3.6	16.0	8.8	1.4		4.3		5.7	5.3
White-collared kingfisher	6.9	2.8	10.0	6.3	1.0	2.3	3.6	3.6	3.8	2.9
Red-vented bulbul	0.6	0.3			0.1	0.6	0.7	0.9		
Fiji shrikebill										
Wattled honey-eater	10.6	5.9	30.0	15.0	2.7		7.9	11.9	7.6	10.0
Cardinal honey-eater		0.3			0.2		1.4			
Polynesian starling			2.0	2.5					0.5	
Samoan starling	5.6	2.8	18.0	12.5	1.4		4.3	7.3	3.8	4.7
Total birds/1.6 km	29.3	22.2	108.0	67.7	7.7	2.9	25.8	26.4	28.6	32.4
Species richness	7	13	10	9	11	2	6	6	10	9

	Tutuila									
Species Survey no.	11	12[a]	13[a]	14	15	16	17	18	19	20
Reef heron						1.3	1.1			
Australian gray duck										
Banded rail				2.6	2.4	2.5	4.5	1.6	0.8	1.3
Purple swamphen				1.2	1.0			0.3		0.2
Golden plover										
Ruddy turnstone										
Bristle-thighed curlew										
Bar-tailed godwit										
Wandering tattler	3.3				0.8	1.3	0.9			
Sanderling										
Rock dove										0.1
Many-colored fruit dove					2.0	2.5	22.7			
Crimson-crowned fruit dove				5.0	6.6	6.3	9.1	7.5	6.0	4.0
Pacific pigeon				1.5	1.6	1.3	4.5	2.2	1.6	0.8
Friendly quail dove										
Blue-crowned lory										
Long-tailed cuckoo					0.2		0.9	0.3		
Barn owl										
White-rumped swiftlet	8.3			9.7	7.4	22.5	10.9	10.6	4.8	5.2
White-collared kingfisher	3.3	2.4	0.9	3.8	3.2	7.5	4.5	4.4	3.6	3.5
Red-vented bulbul		25.0	21.7	1.5	0.2			0.3	0.4	5.6
Fiji shrikebill										
Wattled honey-eater	13.3			9.4	6.2	18.8	13.6	9.1	8.4	8.8

Table 58. Continued

Species	Survey no.	Tutuila 11	12[a]	13[a]	14	15	16	17	18	19	20
Cardinal honey-eater					2.9	0.4			5.0	7.2	4.9
Polynesian starling					0.9	1.0	1.3	2.7	1.6	0.8	0.5
Samoan starling		5.0			5.0	4.0	8.8	8.2	4.4	4.4	4.5
Total birds/1.6 km		33.2	27.4	22.6	43.5	37.0	74.1	83.6	47.3	38.0	39.4
Species richness		5	2	2	11	14	11	12	12	10	12

Species	Survey no.	Tutuila 21	22	23	24[a]	25	26	27[a]	28	29	30
Reef heron											
Australian gray duck											
Banded rail		1.7		2.5		1.4	0.6				3.5
Purple swamphen						0.2	0.3				1.0
Golden plover				2.5					47.8		8.5
Ruddy turnstone									22.2		4.2
Bristle-thighed curlew									2.2		
Bar-tailed godwit									2.2		
Wandering tattler				5.0		0.7			5.6		0.6
Sanderling											
Rock dove								0.2			
Many-colored fruit dove											
Crimson-crowned fruit dove		15.0	10.8			4.8	5.0				0.2
Pacific pigeon		5.0	4.2			1.1	2.1				
Friendly quail dove											
Blue-crowned lory											
Long-tailed cuckoo											
Barn owl											
White-rumped swiftlet		30.0	17.5	5.0		6.1	5.9		5.6	5.0	3.3
White-collared kingfisher		5.0	2.5	2.5	1.8	3.6	1.8	1.4	7.8	3.8	2.3
Red-vented bulbul		5.0	1.7	2.5	8.2	3.0	1.5	2.4	8.9	9.4	2.9
Fiji shrikebill											
Wattled honey-eater		26.7	15.8	7.5		10.0	8.2		8.9	11.9	6.0
Cardinal honey-eater		21.7	20.8	2.5		6.4	4.1		5.6	6.9	2.3
Polynesian starling		3.3	2.5			1.4	0.9				
Samoan starling		15.0	11.7			7.3	5.6		2.2	3.1	2.3
Total birds/1.6 km		128.4	87.5	30.0	10.0	46.0	36.0	4.0	119.0	39.2	37.1
Species richness		10	9	8	2	12	11	3	11	6	12

Species	Survey no.	Tutuila 31	32	33	34	35	36	37	38[a]	39	40
Reef heron										1.5	
Australian gray duck											
Banded rail		1.2	4.9	5.0	1.5		4.0	4.2		4.0	7.8
Purple swamphen		0.1	0.3		0.3		0.6	0.8		2.5	
Golden plover			5.1	8.3							
Ruddy turnstone											
Bristle-thighed curlew											
Bar-tailed godwit											
Wandering tattler				1.7						1.0	
Sanderling											
Rock dove											
Many-colored fruit dove											
Crimson-crowned fruit dove		1.6			4.5	6.7	15.7	2.5		1.5	8.9
Pacific pigeon					0.3		1.0				1.1
Friendly quail dove											
Blue-crowned lory											

Table 58. Continued

Species	Survey no.	Tutuila 31	32	33	34	35	36	37	38[a]	39	40
Long-tailed cuckoo											
Barn owl										1.5	
White-rumped swiftlet		3.5	3.3	8.3	8.8	3.3	5.4	6.7		10.6	16.7
White-collared kingfisher		1.8	2.8	3.3	2.7	3.3	2.8	2.5	2.1	5.5	10.0
Red-vented bulbul		2.5	2.3			3.3	1.1	4.2	2.6	3.5	6.7
Fiji shrikebill											
Wattled honey-eater		5.7	6.4	11.7	14.2	10.0	13.8	14.2		10.0	22.2
Cardinal honey-eater		4.0	0.8		5.5	3.3	5.7	6.7		6.0	7.8
Polynesian starling					0.9		1.0				
Samoan starling		3.4	0.8	1.7	7.9	3.3	14.7	2.5		4.5	7.8
Total birds/1.6 km		23.8	26.7	40.0	46.6	33.2	65.8	44.3	4.7	51.0	89.0
Species richness		9	9	7	10	7	11	9	2	12	9

Species	Survey no.	Tutuila 41	42	43	44	45	46	47	48	49	50
Reef heron						3.1					
Australian gray duck											
Banded rail				2.1	3.8	1.9		1.0		0.4	
Purple swamphen				0.8	1.3	1.3					
Golden plover								1.0			
Ruddy turnstone											
Bristle-thighed curlew											
Bar-tailed godwit											
Wandering tattler						1.9		0.6			
Sanderling								0.3			
Rock dove											
Many-colored fruit dove											
Crimson-crowned fruit dove		6.0		14.6	6.3	7.5		0.6		0.3	13.3
Pacific pigeon		2.0		4.2		0.6					3.3
Friendly quail dove											
Blue-crowned lory											
Long-tailed cuckoo											
Barn owl											
White-rumped swiftlet		10.0	3.8	8.8	13.8	10.6	1.4	2.6	1.3	2.0	10.0
White-collared kingfisher		6.0	2.5	6.7	3.8	3.1	2.4	1.6	3.3	0.8	2.2
Red-vented bulbul		8.0	1.9	2.9	2.5	1.3	1.9	1.0	1.3	0.9	
Fiji shrikebill											
Wattled honey-eater		22.0	4.7	15.4	16.3	10.6	3.8	3.5	4.0	3.5	27.8
Cardinal honey-eater		10.0	0.9	5.4	3.8	4.4	1.4	1.9	1.3	0.6	1.1
Polynesian starling				2.9	1.3	0.6					
Samoan starling		12.0	2.5	16.7	8.8	7.5	1.0	1.0	0.7	1.4	22.2
Total birds/1.6 km		76.0	16.3	80.5	61.7	54.4	11.9	15.1	11.9	9.9	79.9
Species richness		8	6	11	10	13	6	11	6	8	7

Table 58. Continued

Species / Survey no.	Tutuila 51	52	53	54	Aunu'u 55	56	57	58	59	60	61	62
Reef heron		2.5	1.2			5.0	2.5	1.3				
Australian gray duck					1.7							
Banded rail	1.4				3.3			2.9	0.4	2.7	0.8	5.0
Purple swamphen					1.7			0.8				2.5
Golden plover					10.0							
Ruddy turnstone												
Bristle-thighed curlew												
Bar-tailed godwit												
Wandering tattler		1.3			6.7	5.0	2.5	0.8	0.8	0.7		
Sanderling												
Rock dove												
Many-colored fruit dove												
Crimson-crowned fruit dove	8.6	1.3	36.3	7.1				2.5	1.6	2.0	3.8	
Pacific pigeon	1.4	1.3		1.4								
Friendly quail dove												
Blue-crowned lory												
Long-tailed cuckoo						5.6	2.5	0.4	0.4			2.5
Barn owl												
White-rumped swiftlet	5.7	3.8	12.5	8.6						5.3	3.1	7.5
White-collared kingfisher		3.8	5.0	5.7				1.3	1.6	2.0	1.5	2.5
Red-vented bulbul		1.3										
Fiji shrikebill												
Wattled honey-eater	5.7	20.0	65.0	10.0	5.0		7.4	3.3	0.4	4.0	4.6	12.5
Cardinal honey-eater	1.4											
Polynesian starling		1.3		2.8				0.8			0.8	
Samoan starling	17.1	10.0	16.3	7.1	3.3	30.0	15.0	6.7	5.6	6.0	2.3	5.0
Total birds/1.6 km	41.3	46.3	135.1	42.7	31.7	45.6	29.9	20.8	10.8	22.7	16.9	37.5
Species richness	7	10	5	7	7	4	5	10	7	7	7	7

Species / Survey no.	Ofu 63	64	65	66	67	68	69	70	71	72
Reef heron	0.5	3.6	2.5	1.7		2.0				
Australian gray duck										
Banded rail	2.0		1.3	2.5			1.3		5.0	1.0
Purple swamphen	0.3			0.4						
Golden plover	0.8	1.7	2.5	1.5						1.0
Ruddy turnstone	0.5			0.8						
Bristle-thighed curlew										
Bar-tailed godwit										
Wandering tattler	0.3									
Sanderling										
Rock dove										
Many-colored fruit dove										
Crimson-crowned fruit dove	3.8		5.0	1.6		5.0	7.4		5.0	2.5
Pacific pigeon	1.1		2.5	0.2			3.9			0.5
Friendly quail dove										1.0
Blue-crowned lory	4.4	5.0	10.0	1.6	6.0		5.7		10.0	
Long-tailed cuckoo	0.2						0.4			
Barn owl				0.2						
White-rumped swiftlet	3.8	5.0	6.3	4.6	8.0	9.0	6.5	12.5	5.0	4.0
White-collared kingfisher	2.3	3.3	3.8	3.5	3.0	3.0	2.2	10.0		3.0
Red-vented bulbul										
Fiji shrikebill										
Wattled honey-eater	6.3	8.3	11.3	6.9	11.0	8.0	9.1	7.5	15.0	7.5

Table 58. Continued

Species	Survey no.	Ofu 63	64	65	66	67	68	69	70	71	72
Cardinal honey-eater											
Polynesian starling		0.5						0.9			
Samoan starling		3.1	1.7	3.8	2.1	3.0	5.0	3.5	5.0	10.0	2.0
Total birds/1.6 km		29.9	28.6	49.0	27.6	31.0	32.0	40.9	35.0	50.0	22.5
Species richness		15	7	10	13	5	6	10	4	6	9

Species	Survey no.	Olosega 73	74	75	76	77	78	Ta'ū 79	80	81
Reef heron		2.3	0.9	1.3				0.6	0.5	
Australian gray duck										
Banded rail		0.5	1.4		1.4		1.1	0.6		
Purple swamphen								0.2		
Golden plover		3.2					1.1	0.3		
Ruddy turnstone										
Bristle-thighed curlew										
Bar-tailed godwit										
Wandering tattler		0.9	1.8				0.5	0.4	0.5	
Sanderling										
Rock dove										
Many-colored fruit dove										
Crimson-crowned fruit dove				1.3	10.9	6.7	1.1	1.3	1.5	11.8
Pacific pigeon					1.8	2.8		0.8	0.5	2.7
Friendly quail dove										
Blue-crowned lory		5.5	1.8	3.1	3.6	4.4	3.2	2.3	2.5	4.5
Long-tailed cuckoo					0.5			0.1		
Barn owl										
White-rumped swiftlet		5.9	5.0	1.9	6.4	2.8	2.6	2.0	5.3	7.3
White-collared kingfisher		3.6	2.3		2.3		1.6	1.1	1.8	
Red-vented bulbul										
Fiji shrikebill										0.9
Wattled honey-eater		8.6	4.5	6.3	12.7	10.0	4.2	5.5	8.0	11.8
Cardinal honey-eater										
Polynesian starling					1.4	1.7		0.3	0.5	2.7
Samoan starling		1.8	1.4	2.5	7.3	6.1	1.6	1.9	4.3	10.0
Total birds/1.6 km		32.3	19.1	16.4	48.3	34.5	17.0	17.4	25.4	51.7
Species richness		9	8	6	10	7	9	14	10	8

Species	Survey no.	Ta'ū 82	83	84	85	86	87	88	89	90	91
Reef heron								0.9			
Australian gray duck											
Banded rail		1.4			2.0	2.3	2.1	1.3	2.5	1.0	
Purple swamphen					0.7	0.9					
Golden plover								0.4			
Ruddy turnstone											
Bristle-thighed curlew											
Bar-tailed godwit											
Wandering tattler								0.5			
Sanderling											
Rock dove											
Many-colored fruit dove											
Crimson-crowned fruit dove		10.8	2.2		3.3	6.8	2.1	1.3	7.5	4.7	
Pacific pigeon		3.3	0.3		0.7	3.2			2.5	1.7	
Friendly quail dove											
Blue-crowned lory		8.3	1.9	4.0	4.0	3.6	2.9	2.5	5.0	1.7	

Table 58. Continued

Species	Survey no.	Ta'ū 82	83	84	85	86	87	88	89	90	91
Long-tailed cuckoo		0.3									
Barn owl					0.7	0.5					
White-rumped swiftlet		2.8		13.0	6.0	4.1	5.0	3.6	5.0	2.7	5.0
White-collared kingfisher		1.4			4.7	3.2	3.6	1.8	2.5	1.0	1.7
Red-vented bulbul											
Fiji shrikebill										0.3	
Wattled honey-eater		13.9	4.1	10.0	8.7	7.7	7.9	6.4	12.5	13.3	7.5
Cardinal honey-eater											
Polynesian starling		1.9	1.3	3.0		0.9		0.5	2.4	1.7	
Samoan starling		9.4	3.1	6.0	5.3	3.6	6.4	2.9	7.5	4.3	2.5
Total birds/1.6 km		50.3	12.9	36.0	36.1	35.9	29.4	22.1	47.4	32.4	16.7
Species richness		10	6	5	10	11	7	11	9	10	4

Species	Survey no.	Ta'ū 92	93	94	95	96	97[a]	98	Total surveys
Reef heron			2.9			0.7			24
Australian gray duck									1
Banded rail			4.3	7.5	6.7	2.1	0.8	4.0	63
Purple swamphen			1.4		3.3		0.1		33
Golden plover									16
Ruddy turnstone									4
Bristle-thighed curlew									1
Bar-tailed godwit									1
Wandering tattler						0.7			32
Sanderling									1
Rock dove									2
Many-colored fruit dove									3
Crimson-crowned fruit dove		12.9	5.7	6.3	10.0	4.3	2.1	2.0	70
Pacific pigeon		7.1			3.3	0.7	0.1		46
Friendly quail dove									1
Blue-crowned lory		2.9	4.3	11.3		5.0	1.6	8.0	31
Long-tailed cuckoo									16
Barn owl				1.3	3.3				7
White-rumped swiftlet		7.1	7.1	21.3	13.3	5.0	2.2	14.0	85
White-collared kingfisher		2.9	4.3	6.3	10.0	4.3	1.5	4.0	88
Red-vented bulbul									41
Fiji shrikebill									2
Wattled honey-eater		15.7	14.3	15.0	16.7	14.3	3.6	16.0	91
Cardinal honey-eater									35
Polynesian starling		4.3			3.3		0.1		40
Samoan starling		10.0	4.3	8.8	13.3	3.6	1.3	5.0	91
Total birds/1.6 km		61.7	48.7	54.4	69.0	39.2	11.8	53.0	
Species richness		8	9	8	10	10	10	7	

[a] Incomplete counts.

Table 59. Population estimates and counts of seabirds on the islands of American Samoa, summarized from colony observations. Final total is rounded.

Species	Islands							Rounded Totals
	Tutuila	Aunu'u	Ofu	Olosega	Ta'ū	Rose	Swains	
Tahiti petrel					500			500
Collared petrel					1,000			1,000
Christmas shearwater					200			200
Audubon's shearwater					200			200
Red-tailed tropicbird						40		40
White-tailed tropicbird	2,000	10	200	500	1,000	2	2	3,700
Blue-faced booby						540		540
Brown booby	270	35	75	50	2	1,000	2	1,400
Red-footed booby	500	10	25	10	4	3,500	2	4,000
Great frigatebird	25	3	10	2	4	750	5	800
Lesser frigatebird	10	1	3	1	1	425	3	450
Gray-backed tern	125	32				14		175
Sooty tern	5					300,000	3	300,000
Blue-gray noddy	150	12	15	10	5			200
Brown noddy	5,000	100	500	250	10,000	3,700	2,000	21,550
Black noddy	200	5	10	6	5,000	2,000	300	7,500
White tern	3,000	50	100	75	1,000	550	3,000	7,800
Totals	11,285	258	938	904	18,916	312,521	5,317	350,000

Table 60. Numbers of seabirds observed at sea between the islands of American Samoa.

	Area observed											
Trip	Tutuila to Ta'ū	Rose to Ta'ū	Ta'ū to Rose	Rose to Ta'ū	Aunu'u to Tutuila	Tutuila to Swains[a]	Tutuila to Swains[b]	Swains to Tutuila[b]	Swains to Tutuila[a]	Tutuila to Ta'ū	Rose to Ta'ū	
Date	20 Oct. 1975	24 Oct. 1975	4 May 1976	7 May 1976	8 May 1976	17 May 1976	18 May 1976	21 May 1976	22 May 1976	19 Oct. 1976	21 Oct. 1976	
Observation time (h:min)	8:02	6:30	10:42	4:28	1:35	8:46	5:20	6:54	5:20	3:45	8:37	
Km traveled	103.3	81.1	134.2	55.0	17.4	109.0	67.0	84.2	67.0	44.4	107.8	
Species												Total
White-necked petrel			2				4	3		2		11
Tahiti petrel										1		1
Collared petrel			2									2
Unidentified petrel										7		7
Slender-billed shearwater	1			82	5	5	18	6		8	4	129
Wedge-tailed shearwater	28	14	15			13	2		1	16	7	96
Christmas shearwater		2	3			1						6
Audubon's shearwater	7		1			2		1	2			13
Unidentified shearwater	5		3			5	12	1		15	40	81
White-throated storm-petrel						1			1			2
White-tailed tropicbird	5		1		5	10	3	1	11			36
Blue-faced booby				1						4		5
Brown booby	12	14	2	3	1				6		4	42
Red-footed booby	25	34	24	8	22	78	1		44			236
Great frigatebird	2						1					3
Lesser frigatebird					1							1
Sooty tern		88	12	27							45	172
Blue-gray noddy	3				1							4
Brown noddy	135	4	3	1		293	58		38	7	165	704
Black noddy	44	2				252			1			299
White tern	96	6	1		10	103	2	11	29	141	23	422
Unidentified bird			2	1			2			1		6
Total	363	164	71	123	45	763	103	23	133	202	288	2,278

[a] Southern portion
[b] Northern portion

Table 61. Summary of distribution of birds on the islands of American Samoa. S, specimen taken in this study; s, other specimens taken; r, reported but no specimens; F, distributional record first reported in this paper.

Species	At sea	Tutuila	Aunu'u	Ta'ū	Ofu	Olosega	Rose	Swains
White-necked petrel	r, F							
Tahiti petrel	r			S, s, F				
Collared petrel	r			r, F				
Slender-billed shearwater	r							
Wedge-tailed shearwater	r	r?		r?				
Christmas shearwater	r, F			r, F				
Audubon's shearwater	r			r, F				
White-throated storm-petrel[a]	r	r		r				
Red-tailed tropicbird							r	s
White-tailed tropicbird	r	S, s	r, F	r	r, F	r, F	r, F	s
Blue-faced booby	r						r	
Brown booby	r	r	r, F	r, F	S, F	r, F	s	r
Red-footed booby	r	r	r, F	r, F	S, F	r, F	r	s
Great frigatebird[b]	r	r	r, F	r, F	r, F	r, F	r	r
Lesser frigatebird	r	r	r, F	r, F	r, F	r, F	r, F	r, F
Cattle egret		r, F						
Reef heron		s	r, F	S, F	S, s	r, s	S, s	r
Australian gray duck		r, s	r, s	r, F	r, F	r, F		r, F
Banded rail		S, s	r, F	s	s	s		
Sooty rail				s				
Purple swamphen		S, s	s	s	S, s	s		
Golden plover		S, s	r, F	r, F	r, F	s	s	S, s
Ruddy turnstone		r	r, F	r, F	S, F	s	s	s
Bristle-thighed curlew		r		r, F			s	r
Bar-tailed godwit		s					r	
Wandering tattler		s	r, F	r	r, F	S, s	s	S
Sanderling		r, F					r, F	s
Black-naped tern							s	r
Gray-backed tern		r, F	r, F				r, F	
Brown-winged tern	r	s, F						
Sooty tern	r	r, F					s	r
Crested tern		r, F						
Blue-gray noddy	r	S, s	r	r, F	r, F	r, F		
Brown noddy	r	S	r, F	r	r, F	r, F	s	S, s
Black noddy	r	r	r, F	S, F	r, F	r, F	r, F	S, s
White tern	r	S, s	r, F	r	r, F	r, F	r	S, s
Rock dove		r, F						
Many-colored fruit dove		S, s		s	s	s		
Crimson-crowned fruit dove		S, s	r, F	S, s	s	s		
Pacific pigeon		S, s	r	S, s	s	s		
Friendly quail dove					S, F	r, F		
Blue-crowned lory				S, s	S, s	s		
Long-tailed cuckoo		s	s	S, s	s	s	S, F	s
Barn owl		s	r	S, s	S, s	s		
White-rumped swiftlet		s	r, F	r	S, F	r, F		
White-collared kingfisher		S, s	r	S, s	S, s	S, s		
Red-vented bulbul		S, s						
Fiji shrikebill				S, s	s	s		
Mao		r						
Wattled honey-eater		S, s	r, F	S, s	S, s	S, s		
Cardinal honey-eater		S, s						
Polynesian starling		S, s	r, F	S, s	s	r		
Samoan starling		S, s	r, F	r	r	S, s		

[a] One specimen from unspecified island in American Samoa.

[b] Specimens reported from unspecified island(s), perhaps Western Samoa.

Table 62. Recent observations of the red-tailed tropicbird at Rose Island, Rose Atoll.

Date	Numbers	Observations and references
21 August 1970	8	Adults estimated; 4 nests (1 egg, 3 immatures) under low-growing *Pisonia* at edge of grove (Swerdloff and Needham 1970)
1 June 1973	?	1 young seen, 4 nests noted; 58 nests estimated, roosting birds not estimated (Orth 1973)
22-23 November 1974	10	Adults noted, not commonly seen (Sekora 1974)
21-24 October 1975	10	Adults estimated; 2 adults observed, 4 nearly fledged chicks counted (3 under *Messerschmidia,* 1 under *Pisonia*) (Zeillemaker 1975)
5-7 May 1976	40	Adults estimated; 16 active nests, 10 with eggs and 6 with hatchlings to almost fledged young under *Messerschmidia* and *Pisonia*; individuals and courting pairs seen flying over island and lagoon
20-21 October 1976	3	Adults seen, 2 nearly fledged young found (Sekora 1976)

Table 63. Observations of the blue-faced booby at Rose Island, Rose Atoll.

Date	Numbers	Observations and references
11-21 June 1939	?	Nesting on the ground with their white and downy young; also photo by L. P. Schultz (Sachet 1954)
21 August 1970	?	Most common booby; nests of 1-2 eggs and/or chicks common on open coral rubble or under trees (Swerdloff and Needham 1970)
1 June 1973	?	8 young, 7 eggs (Orth 1973)
22-23 November 1974	540	Adults, 32 nests with eggs (Sekora 1974, and personal communication)
21-24 October1975	25	Adults estimated; 7 adults, 5 nearly fledged or fledged chicks counted (Zeillemaker 1975)
5-7 May 1976	30	Adults estimated; 2 active nests, 1 with 1 egg and 1 with 2 eggs
20-21 October 1976	200	Adults estimated; 25 nearly fledged chicks counted, no active nests with eggs (Sekora 1976)

Table 64. Observations of the brown booby at Rose Island, Rose Atoll.

Date	Numbers	Observations and references
5-6 June 1920	?	"Several hundred boobies (*Sula*), most of which had half-grown young, were nesting on the coral breccia of Rose Islet . . . " (Mayor 1924). This could have referred to either *S. dactylatra* or *S. leucogaster*; two of his plates (27B and 28B) showed adult *S. leucogaster* with young
4 August 1938	?	Nesting (Donaghho 1952)
11-21 June 1939	?	Species recorded and a specimen collected by L. P. Schultz (Sachet 1954)
21 August 1970	?	Nests containing 1-3 eggs and/or chicks found on rubble and in *Pisonia* grove (Swerdloff and Needham 1970)
1 June 1973	?	3 young and 9 eggs; 103 inactive nests and 14 nests being built attributed to either *S. dactylatra* or *S. leucogaster* (Orth 1973)
22-23 November 1974	330	Adults observed, 32 nests; second most common booby (Sekora 1974 and personal communication)
21-24 October 1975	1,000	Adults, several subadults and fledglings noted; 90 nests counted in open *Boerhavia* and *Portulaca* areas, 7 nests containing eggs (Zeillemaker 1975)
5-7 May 1976	700	Adults, 5 young, 217 nests: 5 nests with chicks (1 small downy, 1 large downy, 3 fledglings), 212 new nests (73 under *Pisonia*, 100 under *Messerschmidia*, and 39 on open *Boerhavia-Portulaca* areas)
20-21 October 1976	700	Estimated; fledglings seen; 23 nests with eggs (Sekora 1976)

Table 65. Observations of the red-footed booby at Rose Island, Rose Atoll.

Date	Numbers	Observations and references
7 October 1839	?	Nesting in tops of 50-foot high trees (Wilkes 1845)
5-6 June 1920	?	"*Sula* . . . had constructed nests of sticks high among the branches of the *Pisonia* trees" (Mayor 1924)
4 August 1938	?	"Red-footed boobies were sitting in the trees" (Donaghho 1952)
11-12 June 1939	?	"In the *Pisonia* trees were nesting boobies" (Schultz 1940)
21 August 1970	?	"Not commonly seen but a few immatures were found in the main booby nesting area on the rubble on the northeast side of Rose Islet" (Swerdloff and Needham 1970)
1 June 1973	350	Roosting birds and 150 nests estimated in *Pisonia* grove (Orth 1973)
22-23 November 1974	200	Adults counted; flying only, no nesting (Sekora 1974)
21-24 October 1975	3,500	Adults and subadults; subadults outnumbered adults indicating some were immigrants from other colonies; most adults had dark phase plumage; 14 active nests containing chicks of various ages in *Pisonia* and *Messerschmidia* (Zeillemaker 1975)
5-7 May 1976	1,000	Dark phase adults and subadults roosting in *Pisonia* and *Messerschmidia*; 2 inactive nests in *Messerschmidia*
20-21 October 1976	700	Estimated; eggs and nearly-fledged young present (Sekora 1976)

Table 66. Observations of the great frigatebird at Rose Island, Rose Atoll. Early observations may apply also to the lesser frigatebird (see Table 67).

Date	Numbers	Observations and references
21 October 1819	?	"We particularly noticed frigate birds" offshore (Freycinet 1826)
7 October 1839	?	"The frigate-birds . . . nest[s] . . . were here found on the tops of trees fifty feet high" (Wilkes 1845)
5-6 June 1920	?	"Frigate-birds were hovering over the island, but none were nesting" (Mayor 1924)
4 August 1938	?	"Frigate birds were flying above" (Donaghho 1952)
11-21 June 1939	?	Nesting in *Pisonia* trees (Schultz 1940)
21 August 1970	200	Estimated; hovering, no nests seen (Swerdloff and Needham 1970)
1 June 1973	105	Roosting birds; 350 nests estimated, 6 nests counted in 15 *Pisonia* trees (Orth 1973)
22-23 November 1974	300	Estimated; approximately 125 soaring over area (Sekora 1974)
21-24 October 1975	300	Estimated; 10 active nests containing downy or partially feathered chicks in *Pisonia* (Zeillemaker 1975)
5-7 May 1976	50	Adults and subadults, maximum at night; 10 to 15 circling during day
20-21 October 1976	750	Adults and subadults estimated; no nesting observed (Sekora 1976)

Table 67. Observations of the lesser frigatebird at Rose Atoll; see also Table 66.

Date	Numbers	Observations and references
21 October 1975	200	Estimated population, no nests (Zeillemaker 1975)
5-7 May 1976	60	Adults at night, 20 to 30 circling during day; 10 nests, 8 active and 2 inactive, broken eggs on ground
20-21 October 1976	425	Observed during daylight, 4 nests observed (Sekora 1976)

Table 68. Observations of the reef heron at Rose Atoll.

Date	Numbers	Observations and references
11-21 January 1939	1	Collected by Schultz (Mayr and Amadon 1941; Sachet 1954)
21 August 1970	1	White phase (Swerdloff and Needham 1970)
1 June 1973	2	Maximum number in one sighting (Orth 1973)
22-23 November 1974	3	Seen (Sekora 1974)
21-24 October 1975	6	Estimate based on 3 white and 2 gray birds and 3 nests (Zeillemaker 1975)
5-7 May 1976	7	3 white, 3 black, 1 mottled
20-21 October 1976	9	7 white, 2 dark (Sekora 1976)

Table 69. Recent observations of the sooty tern at Rose Island, Rose Atoll.

Date	Numbers	Observations and references
21 August 1970	Very abundant	Nests with eggs and immature birds (Swerdloff and Needham 1970)
1 June 1973	1	Maximum number in one sighting (Orth 1973)
May 1974	400,000	Nesting in the forest area (Swerdloff estimate *in* Sekora 1974)
23 November 1974	150	(Sekora 1974)
22-23 October 1975	300,000	Estimated population; numerous eggs (Zeillemaker 1975)
5-7 May 1976	10,000+	Adults flying; no nests
20-21 October 1976	4,600	Adults 300, fledglings 4,300, estimated; no nesting (Sekora 1976)

Table 70. Recent observations of the brown noddy at Rose Atoll.

Date	Numbers	Observations and references
21 August 1970	?	Nesting on the ground on exposed rubble on Rose and Sand islands; nests were "simple gatherings of twigs or just a hollow in the sand" (Swerdloff and Needham 1970)
22-23 November 1974	3,700	Approximate number estimated; no nesting (Sekora 1974)
21-24 October 1975	500	Estimated on Rose and Sand islands; 6+ nests with eggs observed primarily in north section (Zeillemaker 1975)
5-7 May 1976	10	Adults estimated on Rose Island, none on Sand Island; observed flying singly over island and occasionally roosting in *Messerschimidia* during the day and night
20-21 October 1976	0	None seen (Sekora 1976)

Table 71. Recent observations of the black noddy at Rose Island, Rose Atoll.

Date	Numbers	Observations and references
21 August 1970	?	Probably the most abundant tern on the island; hundreds of nests constructed of leaves, sticks and seaweed, containing a single spotted egg high in the *Pisonia* trees (Swerdloff and Needham 1970)
1 June 1973	1	(Orth 1973)
22-23 November 1974	25	Adults estimated; no nests found (Sekora 1974 and personal communication)
21-24 October 1975	2,000	Adults estimated; 351 nests, some containing eggs, counted on *Pisonia* branches (Zeillemaker 1975)
5-7 May 1976	10	Adults estimated; observed flying singly during daytime; primarily seen at dusk and at night roosting in *Pisonia* and *Messerschmidia* trees
20-21 October 1976	5	Adults seen; 2 nests with young (Sekora 1976)

Table 72. Recent observations of the white tern at Rose Island, Rose Atoll.

Date	Numbers	Observations and references
21 August 1970	?	"Common . . . in the *Pisonia* grove"; no nests seen (Swerdloff and Needham 1970)
1 June 1973	235	Roosting birds estimated; no nests (Orth 1973)
22-23 November 1974	325	Adults observed; not nesting (Sekora 1974)
21-24 October 1975	550	Adults estimated; 100 nests with eggs estimated on *Pisonia* branches (Zeillemaker 1975)
5-7 May 1976	40	Adults estimated; flying about during day and night in *Pisonia* and *Messerschmidia* trees
20-21 October 1976	30	Observed in the air; no nests found (Sekora 1976)

Table 73. Descriptions and dates of mammal surveys in the study plots; see Table 2 for names and locations of plots.

Plot number	Study dates	Description
1	17 July 1975; 29-30 March 1976	30 traps about 10 m apart on tree limbs within study plot and 100 m south toward Pala Lagoon
2	2-5 March 1976; 13-15 July 1976	30 traps 10 m apart in plot
3	21-22 October 1975; 7 May 1976	10 traps within the study plot (*Pisonia* area), 10 traps in the *Messerschmidia* area on the east beach, and 10 traps in the *Messerschmidia, Boerhavia,* and *Portulaca* area on the northwest beach; traps 10 m apart
5	2-3 September 1975; 15-16 March 1976	30 traps 10 m apart, parallel to the coast and running through the study plot
16	5-6 August 1975; 3-5 June 1976	15 traps along west edge of study plot, 15 traps in plantation land next to runway; traps 10 m apart
20	5-6, 11-13 February 1976; 1-3, 5-6 July 1976	30 traps 10 m apart in the study plot
21	22, 24, 31 December 1975; 8-10 July 1976	30 traps 10 m apart in study plot
22	10-12 December 1975; 19, 21, 22, 26 July 1976	15 traps on northeast side of stream and 15 traps on southwest side of stream, 10 m apart
27	16 September 1976	No traps; observation of flying fox
33	17 August 1976	30 traps in study plot
39	29 August 1975; 7-8 April 1976	15 traps in vegetation plot in marsh, 15 set along southwest edge; 10 m apart
40	7-8 August 1975; 8-9 June 1976	25 traps along trail, 10 m apart, in study plot
Swains Island	18-20 May 1976	30 traps along trail from central lagoon 100 m south to freshwater well, and 100 m along trail toward main village, then 100 m toward coast

Table 74. Densities (mammals/0.3 ha) and rounded population estimates of rodents and bats in the vegetation community (habitat) types of the islands of American Samoa. Density figures are yearly means from 14 study plots. Population estimates are based on habitat acreages and species distribution.

	Species										
	Polynesian rat		Roof rat		House mouse		Flying fox		Sheath-tailed bat	Total	
Habitat	Density	Population estimate	Density	Population estimate	Density	Population estimate	Density	Population estimate	Population estimate	Density	Population estimate
Mangrove forest									50		50
Littoral forest	39.039[a]	29,200	0.287	160	0.143	60	0.818	600	130	40.286	30,150
Coastal forest	39.039[c]	118,800					0.818	2,500	550	39.857	121,850
Rain and ridge forest	17.582[a]	298,100	2.143	27,200			1.700	28,800	3,000	21.425	357,100
Secondary forest	37.156[b]	486,700	1.750	18,850			3.000	39,300	2,350	41.906	547,200
Coastal marsh	7.688[b]	1,000	1.000	75					25	8.688	1,100
Kula fernland									1		1
Littoral scrub	48.175[b]	10,850							40	48.175	10,890
Plantation land (Swains)	20.572[a]	14,100								20.572	14,100
Plantation land (other islands)	44.418[b]	959,400	3.375	58,100			3.000	64,800	3,900	50.793	1,086,200
Pasture land	44.418[d]	6,400					3.000	400	25	47.418	6,825
Village land	44.418[d]	237,500	1.750	8,900	0.143	700	0.818	4,300	950	47.129	252,350
Total		2,162,050		113,285		760		140,700	11,021		2,427,816

[a] Jolly (1965) method
[b] Mammals/0.069 ha x 5.125
[c] Estimated from littoral forest
[d] Estimated from plantation land (other islands)

Table 75. Summary of distribution of mammals on the islands of American Samoa. S, specimen taken in this study; s, other specimens taken; r, reported, but no specimens; F, distributional record first reported in this paper.

Species	Tutuila	Aunu'u	Ofu	Olosega	Ta'ū	Rose	Swains
Flying fox	S, s	r, F	S, F	S, s	s		
Sheath-tailed bat	S, s, F	r, F	r, F	r, F	S, s		
House mouse	S, F						
Roof rat	S, s, F	S, F	S, F				
Norway rat	s						
Polynesian rat	s, F	S, F	S, s	S, F	s	S, s	s
Pig (feral)	r	r	r	r	r		r

Table 76. Abundance of flying foxes on linear surveys of main islands of American Samoa.

Island	Survey lines	No. of surveys	Bats/1.6 km
Tutuila	54	97	1.4
Aunu'u	8	17	2.9
Ofu	10	15	4.5
Olosega	6	10	3.9
Ta'ū	20	34	6.3

Table 77. Observations of the Polynesian rat at Rose Island, Rose Atoll.

Date	Numbers	Observations and references
5-6 June 1920	?	Abundant (Mayor 1924)
21 August 1970	?	Commonly seen in *Pisonia* grove (Swerdloff and Needham 1970)
21 October - 5 November 1971	?	Under *Pisonia* and *Messerschmidia* during day but completely traverse island by night (Nass 1971)
22-23 November 1974	several hundred	(Sekora 1974)
21-24 October 1975	?	Abundant beneath *Pisonia* trees (Zeillemaker 1975)
5-7 May 1976	220	Estimated using Jolly (1965) method; abundance estimate 55 rats/0.4 ha; observed in *Pisonia*; 8 specimens collected
20-21 October 1976	?	Abundant day and night; substantial increase over past few years (Sekora 1976)