

The Flora of Romonum Island, Truk Lagoon, Caroline Islands

BENJAMIN C. STONE¹

ROMONUM ISLAND (7° 25' N, 151° 40' W) is one of the smaller central islands in Truk, a large island complex comprising several peaks of volcanic origin within a large atoll-like reef. Hence sometimes Truk is called an "almost-atoll," because it is in a transitional stage between younger islands, such as Ponape or Kusaie, and older atolls, such as those of the Marshall Islands group. Romonum itself is relatively small and low, nearly a mile in length and half a mile in width, with a rounded hill at the eastern end rising to a height of 167 ft, with fairly steep sides on the east and northeast, and flat or gently sloping land to the west and south. Two extensive swamps occur, one toward the western end and another larger one toward the eastern end, both on the south side of the island. A sandy beach occurs along the southwestern tip and at several other localities on the western and southern coasts, while ramparts of black basalt boulders occur at several localities around the perimeter, especially on the east end.

The island is situated slightly northeast about 4 miles from Tol Island (Truk's largest and highest island), and about 2.9 miles due north of Fala-beguets I. (using the name shown on the 1944 edition Hydrographic Office map), and about 2.4 miles slightly northwest of Udot I. Moen Island, location of the U.S. Trust Territory Truk District Headquarters, is nearly 12 miles to the northeast.

As is true of virtually all of the islands within the encircling reef (excluding the coralline reef islets), Romonum is of volcanic origin. Except for the well-developed sandy beach, the island is composed of black basalt; no high raised limestones are found here or anywhere in Truk (although a few terraces scarcely a meter high do occur). The geological history of Truk is complex: the islands are much sunken or eroded; there are drowned valleys, wave-cut terraces (at about 40 m alt. and again

at 100 m alt.), and other evidences of both subsidence and emersion. However, little of this is in sight in Romonum. For a fuller geological account, publications by Tayama (1940), Hess (1946), Bridge (1948), and, for a brief description, Gressitt (1954) may be consulted.

In January 1965, I was enabled to visit both Truk and Ponape (as well as Saipan and Rota) through the generosity of the Trust Territory Government. At that time Prof. Ward Goodenough of the Department of Anthropology, University of Pennsylvania, was engaged in a lengthy restudy of the people of Romonum Island, and he invited me to stay for a time there. This invitation led to a sojourn of several days, from January 28 to 31. During this time a collection of plants was made, and most parts of the little island were visited, with the help of Oliver Goodenough as guide. Dr. Goodenough has allowed me to make use of his map, to which I have added some indications of the vegetation (Fig. 1). He has also provided his critical ear, a knowledge of Trukese dialects, and the orthography for most of the plant names given herein. Most names were verified by Dr. Goodenough; other names are in the form shown in P. J. R. Hill's mimeographed list of Trukese plant names, or are approximations in my own spelling.

ACKNOWLEDGMENTS

I am grateful to the Department of Agriculture, Trust Territory Government, Saipan, for the opportunity to visit Truk and several other islands in December 1964 and January-February 1965; and particularly to Mr. Manuel Sproat, Director of Agriculture, for his continued encouragement, assistance, and hospitality. I also must thank several District Agricultural Officers, both in Truk and Ponape, especially Mr. Leonard Aguigui in Truk, and Mr. Ed. Pavao, Mr. J. D. Zaiger, and Mr. Kesner Hadley in Ponape, for their help. Peter J. R. Hill, Educational Administrator for Truk,

¹Department of Botany, University of Malaya, Kuala Lumpur. Manuscript received January 3, 1966.

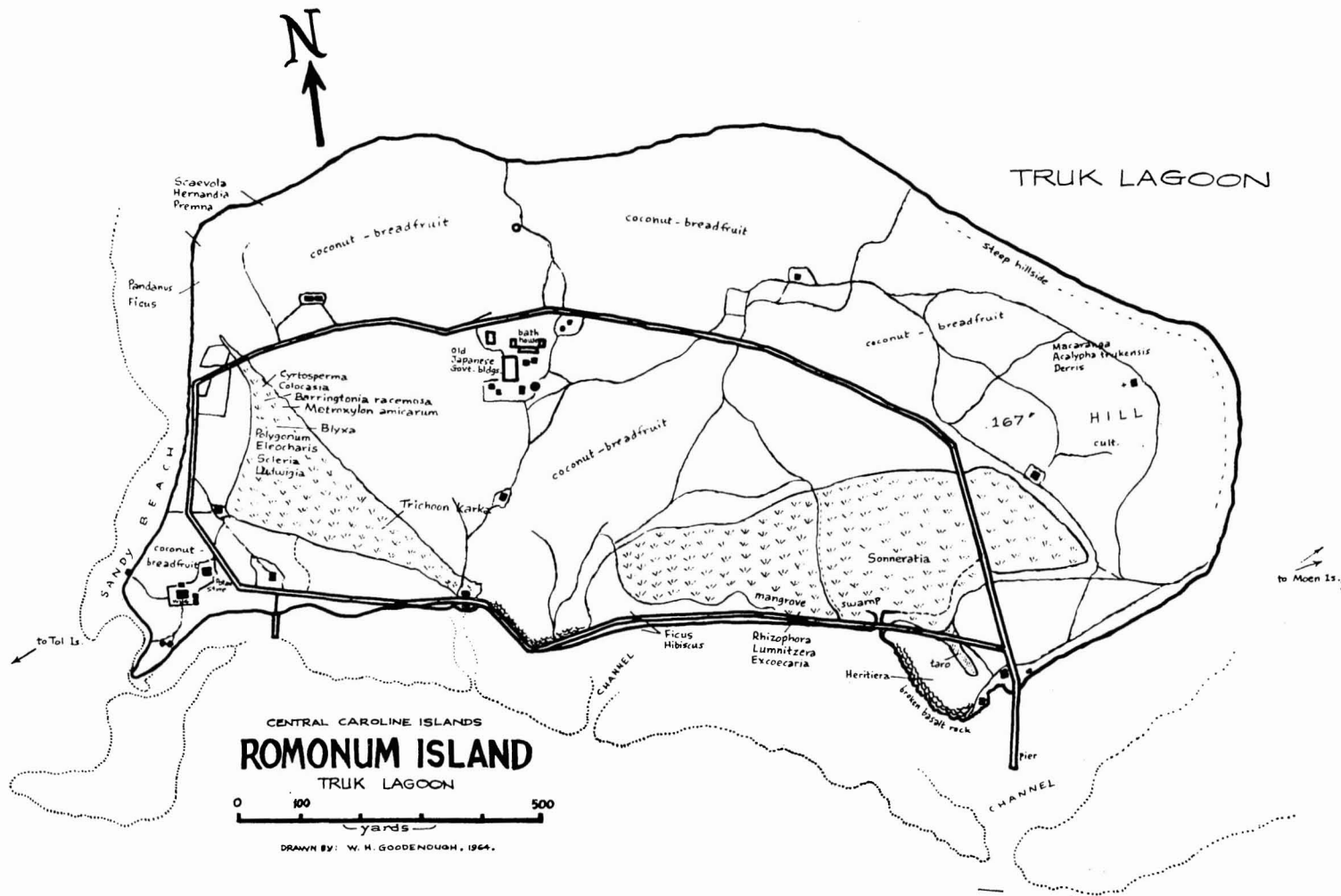


FIG. 1. Romonum Is.

Fig. 1. Map of Romonum Island (courtesy of W. H. Goodenough). Characteristic plant species are indicated. Distances, outline, and details should be considered as approximations.



FIG. 2. Prof. W. H. Goodenough, during his lengthy visit on Romonum.

was helpful in many ways. Prof. W. H. Goodenough and Mrs. Goodenough provided house and sustenance on Romonum, and Oliver Goodenough acted as guide. Finally, I must thank the College of Guam and especially Dr. A. C. Yamashita for the opportunity and support provided for the work undertaken on this

trip; and thanks are also due to the many other friends who were of assistance.

THE FLORA OF ROMONUM ISLAND

The following key and species list is undoubtedly not complete, but it includes the most common species of vascular plants on Romonum. There are probably additional species on the northeastern part of the island, which I did not cover thoroughly; and no doubt some weeds and cultivated plants were missed, or will be introduced in the future; still, the species cited here represent, I believe, the bulk of the island's vegetation. A key to species is provided, but of course it can only account for the species listed, and additional discoveries will have to be added. A number of plants are absent or represented very sparsely; *Messerschmidia*, for example, common on atolls and limestone areas of other islands, was not found; *Pemphis* was seen only once, and as an isolated individual; *Ipomoea pes-caprae* was not found, but may well occur on the north beach (its common associates, such as *Canavalia maritima*, *Wedelia biflora*, and *Scaevola* were found); *Polyscias grandifolia*, *Soulamea amara*, *Suriana*, *Pisonia grandis*, and other representative atoll species, found elsewhere in Truk, did not appear. In this respect Romonum resembles Yanagi Islet, only a few miles away in Truk Lagoon, the vegetation of which was described a few years ago (Hill and Stone, 1961), and which interestingly is also deficient in species typically associated with coral atolls.

KEY TO SPECIES

Only the vascular plants are accounted for here; for bryophytes the reader is referred to Miller, Whittier, and Bonner (1963); for marine algae to Okamura (1915) and Taylor (1950); for other groups there is no comprehensive treatment for Truk, but papers on lichens and fungi have been written by Imazeki (1941), Kobayasi (1939), Jatta (1903), and Sydow and Sydow (1921).

I. Flowerless plants bearing spores in sporangia, these usually borne on the backs or edges of fronds (Ferns)

1. Fronds simple, to several feet long, forming a large nest or rosette; epiphytes; sori (groups of sporangia) oblique, linear *Asplenium nidus*
1. Fronds lobed or divided
 2. Sporangia covering the entire lower surface of the leaflets; fronds to several feet long, leathery, somewhat dimorphic; 1-pinnate; swamp ferns *Acrostichum aureum*
 2. Sporangia in groups (sori)
 3. Fronds deeply parted, the lobes entire; sori sunken in pits, these evident on the upper surface as bumps; terrestrial or epiphytic ferns with creeping rhizomes *Phymatodes scolopendria*
 3. Fronds pinnate or bi- or tripinnate
 4. Fronds 1-pinnate
 5. Sori kidney-shaped; lobes of pinnae crenate *Nephrolepis*

5. Sori round; lobes of pinnae acute *Cyclosorus*
 4. Fronds bi- or tripinnate, deltoid in outline *Davallia*

II. Flowering plants

1. Monocotyledons (seed with 1 cotyledon; leaves usually with parallel venation; root system fibrous or without a tap-root; woody species with numerous discrete fibres traversing a softer tissue; flower parts frequently in 3's or multiples of 3)
 2. Trees or large woody shrubs
 3. Palms; trunks large, unbranched, erect, or in *Nypha* submerged, \pm horizontal, with terminal crown of large pinnate leaves
 4. Stems horizontal, submerged in swamps *Nypha*
 4. Stems erect
 5. Fruits ovoid, smooth, large (to 12 inches diameter or more), edible (coconuts) *Cocos nucifera*
 5. Fruits smaller, subglobose, covered closely by glossy brown overlapping scales, inedible *Metroxylon*
 3. Trunks branching, leaves not divided
 6. Leaves elongate, toothed; fruit a large head; trunks usually with basal proproots *Pandanus*
 6. Leaves not toothed; fruit a small berry; trunks without proproots *Cordyline*
 2. Herbs, vines, or creepers; including grasslike plants (these sometimes with tall, moderately rigid, canelike stems)
 7. Plants strictly aquatic, submerged or floating
 8. In salt water only; marine plants rooted in sand or sandy debris in quiet lagoon waters
 9. Leaves up to 3 ft long or more, mostly 12–17 mm wide; rooted portion with black persistent fibres *Enbalus*
 9. Leaves seldom as much as 1 ft long, 4–10 mm wide; rooted portion lacking black fibres *Thalassia*
 8. In fresh water only, floating or loosely rooting in mud *Blyxa octandra*
 7. Plants terrestrial, rooted in soil
 10. Grasses and grasslike plants (grasses, sedges, reeds), i.e., usually with sublinear leaves with parallel veins, but leaves sometimes reduced or absent; small green or brown flowers; tufts of fibrous roots
 11. Stems triangular in cross section; inflorescence surrounded by leaflike bracts
 12. Inflorescence a buttonlike head *Cyperus kyllingia*
 12. Inflorescence with evident branching
 13. Coarse plants to 5 ft tall *Cyperus odoratus*
 13. Slender herbs to 2–3 ft *Cyperus javanicus*
 11. Stems round or nearly so in cross section; inflorescence without or with rather inconspicuous bracts
 14. Stems solid; rosette plants
 15. Leafy plants with branched inflorescences
 16. Seeds brown *Fimbristylis*
 16. Seeds white *Scleria*
 15. Leafless plants with apical inflorescence on scapes *Eleocharis*
 14. Stems hollow, nodose; rosette or creeping plants
 17. Tall (to 9–12 ft) with canelike stems, large plumose inflorescences of minute slender spikelets
 18. Inflorescence green or brown; swamp reeds *Trichoon karka*
 18. Inflorescence white or silvery (sugarcane of gardens) *Saccharum officinarum*
 17. Not tall reeds
 19. Fruit a spiny burr *Cenchrus echinatus*
 19. Fruit not a spiny burr
 20. Inflorescence narrow cylindric, breaking at joints when mature *Lepturus repens*
 20. Inflorescence not jointed and disarticulating
 21. Spikes digitate, 2 or more borne umbellately
 22. Spikelets awned
 23. Spikes 3–5; spikelets of several florets each, in several rows on lower side of rachis *Dactyloctenium*
 23. Spikes usually 2; spikelets paired, 1 stalked, 1 sessile *Ischaemum*
 22. Spikelets not awned
 24. Spikelets each with 1 floret
 25. Spikes 2, conjugate; fruit indurate, broader or broad as long .. *Paspalum*
 25. Spikes usually 3 or more; fruit cartilaginous; longer than broad *Digitaria*
 24. Spikelets each with several florets *Eleusine indica*
 21. Spikes not digitate
 26. Spikelets all on one side of rachis
 27. Spikes several, distant; grass of shady forest *Oplismenus*
 27. Spikes 1 or 2, close, hidden; beach grass *Tbuarea*
 26. Spikelets on both sides of rachis
 28. Leaves elliptic, $\frac{1}{2}$ –1 inch wide; panicle large, pale, complex *Centotheca lappacea*
 28. Leaves narrow, less than $\frac{1}{4}$ inch wide
 29. Spikelets minute, in a diffuse compound panicle; no awns *Eragrostis*
 29. Spikelets in a stiff reddish few-branched panicle; awns present *Chrysopogon*
 10. Not grasses or grasslike plants; herbs, often very large or giant, as in bananas; or vines
 30. Leaves with reticulate (network) venation

31. Vines *Dioscorea*
 31. Not vines
 32. Leaves palmately then pinnately divided; flowers on tall leafless scapes, in clusters bearing also long threadlike pendent filaments; tuberous *Tacca*
 32. Leaves not divided; leaves heart-shaped, with rounded or pointed (then arrow-shaped) lobes
 33. Large herbs with pointed (arrow-shaped) lobes *Cyrtosperma*
 33. Small or large herbs with rounded lobes
 34. Smaller plants, rarely over 3 or 4 ft tall, leaves pale or glaucous *Colocasia*
 34. Larger plants with dark leaves *Alocasia*
 30. Leaves with parallel veins
 36. Terrestrial plants
 37. Giant herbs with oblong leaves 3-6 ft long, often 1 ft broad, later splitting into segments to the midrib; parallel veins perpendicular to midrib (bananas) *Musa*
 37. Smaller herbs with parallel longitudinal veins
 38. Tall herbs with leaves arranged alternately along the erect stems *Alpinia*
 38. Leaves basal from a short usually underground corm or bulb
 39. Leaves stiff and pointed, spiny; compound fruit with a crown of leaflike bracts .. *Ananas*
 39. Leaves otherwise; fruit not as above
 40. Large herbs (leaves to several ft long); flowers white
 41. Flowers with a corona *Hymenocallis*
 41. Flowers without corona *Crinum*
 40. Small herbs (leaves seldom to 1 ft long) with pink flowers *Zephyranthes rosea*
 36. Epiphytes with short, somewhat leathery leaves; alternating on the stem *Dendrobium* sp.
 1. Dicotyledons (seed with 2 cotyledons; leaves usually with reticulate venation; taproot often present; woody species often with "solid," cambium-formed, annularly incremented wood; flowers often in 4's or 5's or multiples thereof)
 42. Leafless, often orange-stemmed parasitic vines *Cassytha*
 42. Not as above
 43. Leaves compound, divided into fully distinct leaflets
 44. Leaves with 3 leaflets (in *Derris trifoliata* leaves of both 3 and 5 leaflets found)
 45. Trees or shrubs
 46. Leaflets with slightly toothed edges; fruit a round berry *Allophylus*
 46. Leaflets entire, smooth edged; fruit a short flat segmented pod *Desmodium*
 45. Vines or herbs
 47. Flowers yellow *Vigna marina*
 47. Flowers pink or white
 48. Flowers rosy pink, the banner petal with a white splotch; pod somewhat inflated; leaflets always 3, broadly ovate *Canavalia maritima*
 48. Flowers pale pink to white; pod very flat; leaflets sometimes 3, sometimes 5 .. *Derris trifoliata*
 44. Leaves with more than 3 leaflets
 49. Erect shrubs, or herbs
 50. Leaves 1-pinnate
 51. Flowers papilionate, 2 petals joined to form a keel, 2 petals as lateral wings, 1 as a banner; fruit an inflated pod *Crotalaria*
 51. Flowers mimosoid, not as above; fruit thick but not inflated *Cassia*
 50. Leaves bi- or tripinnate *Polyscias fruticosa*
 49. Vines or creepers
 52. Leaflets usually 5 or 7 per leaf, more than 1 inch long; plants seldom climbing .. *Derris elliptica*
 52. Leaflets more numerous but smaller; high climbers; seed small, red, with black spot *Abrus precatorius*
 43. Leaves simple or merely lobed or parted, not divided into distinct leaflets
 53. Leaves markedly lobed (not merely toothed)
 54. Trees, giant softwooded herbs, or herbs, with thick milky latex
 55. Herbs; upper leaves with basal red patches *Euphorbia heterophylla*
 55. Trees or tree-like herbs
 56. Leaves pinnately lobed (lobing quite variable, some trees with nearly entire leaves) *Artocarpus*
 56. Leaves palmately parted *Carica papaya*
 54. Vines or herbs; sap not milky
 57. Climbing vines
 58. Leaves mostly 3-lobed; flowers large, rotate, with an ornately lacinate calyx, not tubular *Passiflora foetida*
 58. Leaves 3- or mostly 5-parted; flowers tubular, trumpetlike; calyx not lacinate *Ipomoea digitata*
 57. Herbs or prostrate creepers (sometimes slightly woody)
 59. Prostrate creepers; fruit a burr *Triumfetta procumbens*
 59. Erect (somewhat woody) herbs
 60. Fruit a burr; leaves mostly 3-lobed *Triumfetta semitriloba*
 60. Fruit a hairy capsule; leaves mostly 5-lobed *Abelmoschus moschatus*
 53. Leaves not at all lobed, sometimes toothed
 61. Trees or large notably woody shrubs
 62. Sap milky white, or noticeably yellowish latex
 63. Sap yellowish; leaves with numerous curved parallel lateral veins; fruit a hard woody sphere of golfball size *Calophyllum inophyllum*

- 63. Sap milky; leaves not as above
 - 64. Old leaves turning red just before falling; fruit a small 3-celled capsule; latex poisonous *Excoecaria agallocha*
 - 64. Old leaves usually turning yellow; fruit a small "fig"; not poisonous
 - 65. Small, somewhat shrubby tree; leaves usually asymmetric at base; dioecious; figs orange *Ficus tinctoria*
 - 65. Large trees with aerial roots; leaves symmetric; figs pink *Ficus virens*
- 62. Sap clear, watery
 - 66. Mangrove trees with prominent aerial proproots or ascending breather-roots
 - 67. Leaves spirally arranged, longer than broad; stipules present
 - 68. Flowers with scarlet corolla, tubular; leaves narrowly obovate, often notched at tip; seed germinating after falling *Lumnitzera littorea*
 - 68. Flowers with inconspicuous white or orange petals (but calyx may be deep red); seed germinating on tree, radicle growing to a length of a foot or more before falling
 - 69. Calyx of 7-14 narrow lobes, usually red (rarely white); flowers shortly stalked, pendent *Bruguiera gymnorhiza*
 - 69. Calyx of 4 short deltoid lobes, usually green
 - 70. Inflorescence branched, of several flowers *Rhizophora mucronata*
 - 70. Inflorescence short, of few flowers *Rhizophora apiculata*
 - 67. Leaves opposite, nearly as broad as long or broader; stipules absent *Sonneratia*
 - 66. Not mangrove trees as above
 - 71. Stamens fused into a tube surrounding the style; corolla tubular, yellow, of 5 petals; hibiscus-like flowers
 - 72. Leaves broadly cordate, grayish beneath, tip not much drawn out *Hibiscus tiliaceus*
 - 72. Leaves narrowly cordate, green, tip long drawn out *Thespesia populnea*
 - 71. Stamens not fused as above
 - 73. Leaves pale beneath, covered closely by minute peltate scales; fruit a keeled, woody, boat-like structure *Heritiera littoralis*
 - 73. Leaves not as above
 - 74. Twigs thorny; foliage with odor of lime *Citrus*
 - 74. Not thorny; not with lime odor
 - 75. Leaves alternate or spiralled
 - 76. Leaves distichous (alternating in 1 plane)
 - 77. Flowers bisexual
 - 78. Leaves coarsely toothed; flowers yellow; a scrambling shrub *Colubrina asiatica*
 - 78. Leaves entire; trees
 - 79. Fruit muricate (with soft blunt thorns), edible ... *Annona muricata*
 - 79. Fruit not muricate *Cananga odorata*
 - 77. Flowers unisexual *Glochidion*
 - 76. Leaves not distichously arranged
 - 80. Leaves peltate or nearly so
 - 81. Flowers bisexual; leaf entire with red spot at junction of petiole; fruit a black berry set inside a lantern-like calyx *Hernandia*
 - 81. Flowers unisexual; leaf with 3 large teeth and many small ones; without red spot; fruit a small capsule *Macaranga carolinensis*
 - 80. Leaves not at all peltate
 - 82. Leaves concave, saucerlike *Polyscias scutellaria*
 - 82. Leaves flat
 - 83. Flowers unisexual; leaves coarsely toothed *Acalypha*
 - 83. Flowers bisexual; leaves entire
 - 84. Corolla orange *Cordia*
 - 84. Corolla white, greenish, pink, or cream
 - 85. Leaves mostly 1-2 inches long, crowded on stems, fleshy; flowers white with separate petals *Pemphis*
 - 85. Leaves larger, mostly 4-16 inches long
 - 86. Leaves elliptic, glabrous; fruit a mango .. *Mangifera indica*
 - 86. Leaves obovate
 - 87. Leaves pale, often softly hairy with indistinct veins; flowers in short cymes; berry white *Scaevola*
 - 87. Leaves darker, with distinct veins; fruit not white
 - 88. Flowers in narrow spikes, less than 1/4 inch wide; fruit a red drupe *Terminalia*
 - 88. Flowers in long racemes or clusters; fruit a green or brownish, angular, boxlike structure
 - 89. Flowers pink, in long pendent racemes; fruit about 3 inches long, with rounded angles; tree of fresh-water swamps *Barringtonia racemosa*

89. Flowers white or faintly pinkish, in large not pendent inflorescences; fruit 4-5 inches long, boxlike with 4 (rarely 5) fairly sharp angles, seaside tree *Barringtonia asiatica*
75. Leaves opposite
90. Stipules present; flowers white, regular
91. Fruit compound, fleshy, whitish, lumpy; flowers 4 or 5 petaled .. *Morinda*
91. Fruit not compound; flowers 8-petaled *Guettarda speciosa*
90. Stipules absent; flowers whitish or pale lavender, very small, 2-lipped .. *Premna*
61. Not trees; herbs (erect or prostrate) or vines
92. Leaves with petioles much longer than the cordate blades; low herbs with inconspicuous umbels of small flowers *Centella asiatica*
92. Not as above
93. Sap milky
94. Small, more or less prostrate herbs
95. Hairy and purplish leaves *Euphorbia hirta*
95. Glabrous *Euphorbia thymifolia*
94. Erect, sometimes slightly woody herbs; all leaves pale green, entire .. *Euphorbia chamissonis*
93. Sap not milky
96. Leaves opposite
97. Stamens long, protruding from the corolla; woody climbing or scrambling vines *Clerodendrom inerme*
97. Stamens included; small, somewhat woody, shrubby herbs
98. Flowers purple or blue, borne on spikes *Stachytarpheta*
98. Flowers white or yellow, not in spikes
99. Garden herbs with very pungent minty odor *Ocimum sanctum*
99. Wild or weedy plants without strong odor
- 99a. Leaves entire; flowers white *Hedyotis biflora*
- 99b. Leaves coarsely toothed, flowers yellow *Wedelia biflora*
96. Leaves alternate
100. Flowers yellow with clawed petals; erect herb of freshwater swamps ... *Ludwigia octovalvis*
100. Flowers greenish-white, minute, petals not clawed; herb of dry ground *Phyllanthus amarus*

TAXONOMIC CHECK LIST

PTEROPSIDA

Class FILICINAE (Ferns)

Acrostichum aureum L.

A giant fern of swamps, usually mingled with mangrove species; it may reach 10 or 12 ft in height. The fertile fronds are slightly smaller than the sterile, which may be 18 inches wide.

Asplenium nidus L. "nnuk"²

The birds'-nest fern. A large species, usually epiphytic, with long strap-shaped fronds forming a rosette; sporangia in oblique linear sori.

Cyclosorus gongilodus (Schkuhr) Link

A fern of swamps (fresh-water) and taro patches. Sometimes called *C. gongyloides*.

Davallia solida (Forst.) Sw.; "peceen attu" (5281)³

² The vernacular names given are in the orthography used by Prof. Goodenough, and fuller rules on pronunciation will be found in his works. It should be noted here, however, that *c* is equivalent to *j* as in *just*; and that doubled vowels indicate extension of the sound.

³ These numbers refer to the author's collections,

A common epiphyte with a long, scaly rhizome closely attached to trunks or branches, bearing broadly deltoid tripinnatifid fronds.

Nephrolepis exaltata (L.) Schott; "amääre" (5275)

Terrestrial, rarely epiphytic; fronds pinnate.

Phymatodes scolopendria (Burm.) Ching; "wännüme" (5273)

Terrestrial or epiphytic; fronds deeply pinnately parted. Also called *Microsorium* ("*Microsorium*") *scolopendria*.

Class ANGIOSPERMAE (Flowering Plants)

Subclass MONOCOTYLEDONAE

PANDANACEAE

Pandanus carolinensis Martelli; "fach"

HYDROCHARITACEAE

Blyxa octandra (Roxb.) Planch. ex Thw.

The flowers of this aquatic plant are borne at the end of narrow scapes and are minute.

The originals of which are deposited in the College of Guam Herbarium; duplicates have been sent to the Bishop Museum, Honolulu, and to the U. S. National Herbarium.

Enbalus acoroides (L.f.) Rich. ex Chatin
In lagoons; more common than *Thalassia*.

Thalassia hemprichii (Ehrb.) Aschers.

GRAMINEAE

PANICOIDEAE group

Tribe ANDROPOGONEAE

Ischaemum muticum L.; "fetinin wuumw"
(5285)

Chrysopogon aciculatus (Retz.) Trin.

Saccharum officinarum L.; sugarcane

Tribe PANICEAE

Cenchrus echinatus L.; burgrass

Digitaria pruriens (Fisch. ex Trin.) Buse var.
microbachne (Presl) Fosb.

Oplismenus compositus (L.) Beauvois

Paspalum orbiculare Forst.

Thuarea involuta (Forst. f.) Roemer and
Schultes

POOIDEAE group

Tribe FESTUCEAE

Centotheca lappacea Desvaux.; "fetinin wum-
wunë" (5284)

Tribe ARUNDINEAE

Trichoon karka (Retz.) Roth in Roem. (5289)

Hitherto generally known as *Phragmites*
karka (Retz.) Trin. ex Steudel. Unfortunately
this name cannot be maintained; see Stone
(1964).

Tribe ERAGROSTEAE

Eragrostis amabilis (L.) Wight and Arnott

Dactyloctenium aegyptium (L.) Willd.

Eleusine indica (L.) Gaertner

Tribe LEPTUREAE

Lepturus repens (Forst.) R. Brown

CYPERACEAE

Cyperus javanicus Houtt.

Cyperus kyllingia Endl.

Cyperus odoratus L. (5305)

Cyperus sp.

Eleocharis geniculata (L.) Roemer and Schultes
(5300)

Fimbristylis cymosa R. Br. (5314)

Scleria sp. (5306)

PALMAE

Cocos nucifera L.; coconut palm

Metroxylon amicarum (Wendland) Beccari;
ivory-nut palm

Generally in standing water or wet locations
in valleys.

Nypa fruticans Wurmbr.

The nipa palm. Easily recognised by its trunk-
less appearance in swamps.

ARACEAE

Alocasia macrorrhiza (L.) Schott ex Schott and
Endlicher

Colocasia esculenta (L.) Schott; taro

Cyrtosperma chamissonis (Schott) Merrill

BROMELIACEAE

Ananas comosus (L.) Merrill; pineapple
Occasionally in cultivation.

AGAVACEAE

Cordyline fruticosa (L.) Goepf.

Hitherto known as *Cordyline terminalis* (L.)
Kunth (see Stone, 1964).

AMARYLLIDACEAE

Crinum asiaticum L.; spider-lily

Hymenocallis littoralis (Jacq.) Salisb.; seaside-
lily

Zephyranthes rosea (Sprengel) Lindley

TACCACEAE

Tacca leontopetaloides (L.) O. Kuntze (5309)

DIOSCOREACEAE

Dioscorea bulbifera L.?; yam (5366)

MUSACEAE

Musa balbisiensis X *acuminata* (*M. paradisiaca* L.); banana

ZINGIBERACEAE

Alpinia purpurata (Vieill.) K. Schumann; red ginger

ORCHIDACEAE

Dendrobium sp.; "nikocopwocpw" (5282)
Epiphytic. A native species.

Subclass DICOTYLEDONAE

PIPERACEAE

Peperomia pellucida (L.) HBK.
Piper sp., "enes" (5274)

MORACEAE

Artocarpus altilis (Park.) Fosb.; breadfruit
Ficus tinctoria Forst. f. (5298, 5310)
Ficus virens Ait.; "aaw" (5291)
Hitherto known as *F. carolinensis* Warb.
(see Corner, 1965).

URTICACEAE

Procris pedunculata (Forst. f.) Wedd.; "kimm-wit" (5292)

POLYGONACEAE

Polygonum minus var. *procerum* (Danser) Steward? (5303)
[If this is the same as the *Polygonum* in Guam.]

ANNONACEAE

Annona muricata L.; soursop
Cananga odorata (Lam.) Hook. f. and Thomson; ylangylang

LAURACEAE

Cassytha filiformis L.

HERNANDIACEAE

Hernandia sonora L.

LEGUMINOSAE

Abrus precatorius L.; prayerbead
Cassia occidentalis L.; coffee senna
Canavalia maritima (Aublet) Thouars; seaside peavine, "cëëcon" (5272)
Crotalaria sp.; "afanafan" (5283)
Derris elliptica (Roxb.) Bentham; "wüüp" (5276)
Derris trifoliata Loureiro; "wunenipot" or "wupenipot"
Desmodium umbellatum (L.) DC.
Vigna marina (Burm.) Merr.

RUTACEAE

Citrus aurantiifolia (Christm.) Swingle; lime, "näyimis" (5277)

EUPHORBIACEAE

Acalypha trukensis Pax and Hoffman; "mön-now" (5270)
An endemic small tree, fairly common throughout Truk.
Euphorbia chamissonis (Klotszch and Garcke) Boissier (5313)
Euphorbia heterophylla L.
Euphorbia birta L.
Excoecaria agallocha L. (5294)
The sap of this tree is reputedly dangerous, especially to the eyes. It may be recognized by its prevalence in or near mangrove swamps or rocky seaside locales, the tendency for the mature leaves to turn red before falling, and the small catkins of flowers. The sap is notably milky.
Glochidion ramiflorum Forst.?; "afor" or "ofor" (5365)
Macaranga carolinensis Volkens; "tuupw" or "kuruwen" (5271)
Endemic in the Caroline Islands.
Phyllanthus amarus Schum. and Thonn.

ANACARDIACEAE

Mangifera indica L.; mango

SAPINDACEAE

Allophylus timorensis (Bl.) DC. (5311)

RHAMNACEAE

Colubrina asiatica (L.) Brongniart

TILIACEAE

Triumfetta procumbens Forst. f. (5308)
Triumfetta semitriloba Jacq.?; "sacawer"
 (5280)

MALVACEAE

Abelmoschus moschatus (L.) Medik; "nikönö-köön" (5288)
Hibiscus tiliaceus L. (5290)
Malvastrum coromandelianum (L.) Garcke;
 "siyöyinen" (5286)
Thespesia populnea (L.) Solander ex Correa

STERCULIACEAE

Heritiera littoralis Dry. (5299)
 Copiously fruiting, Jan. 28, 1965.

GUTTIFERAE

Calophyllum inophyllum L.; *kamani* or Alexandrian laurel

CARICACEAE

Carica papaya L.
 Only a few seen.

PASSIFLORACEAE

Passiflora foetida L. var. *hispida* (DC.) Killip;
 "pwompwom" (5279)

LYTHRACEAE

Pemphis acidula Forst.
 Apparently rare on Romonum; only one individual seen.

RHIZOPHORACEAE

Bruguiera gymnorrhiza (L.) Lam.
 Also called *B. conjugata* (L.) Merrill. The usual form has the calyx scarlet; a form with a pure white calyx was described from Namonuito (Stone, 1959). This requires a nomenclatural adjustment, as follows:

Bruguiera gymnorrhiza forma *alba* B.C. Stone, comb. nov.

B. conjugata (L.) Merr. forma *alba* B.C. Stone, Pacific Sci. 13:102 (1959). Type: Namonuito, Pisarach Islet, 2 July 1957, Stone 2144 (BISHOP MUSEUM). N.v. "ong."

Rhizophora apiculata Bl.; "ciyaan iimw"
Rhizophora mucronata Lam.; "ciyaan wuumw"
 (5297)

Since *Rhizophora stylosa* Griff. has been reported from Guam (Stone 4437, GUAM and LEIDEN) by Ding Hou (in litt.), it may turn up in other parts of Micronesia also. The three species are distinguished in Flora Malesiana (Ser. I, vol. 5, part 4, p. 450), 1958, as follows:

1. Inflorescences 2-flowered, shorter than the petiole, in the axils of leaf scars of last year's or last season's growth; bracteoles at the base of the flower completely connate; petals glabrous *R. apiculata*
1. Inflorescences 2-16-flowered, longer than the petiole, in the axils of current year's or season's growth; bracteoles connate only at base; petals hairy
2. Style obscure or very short, to 1.5 mm long *R. mucronata*
2. Style filiform, 4-6 mm long . . . *R. stylosa*

Since only the first two species are recorded in Kanehira's check list of the Micronesian flora (1935), it will be of interest to see if the occurrence of *R. stylosa* elsewhere in Micronesia can be established.

SONNERATIACEAE

Sonneratia caseolaris (L.) Engler (5295)

COMBRETACEAE

Lumnitzera littorea (Jack) Voigt (5293)
Terminalia samoensis Rechinger

LECYTHIDACEAE

Barringtonia asiatica (L.) S. Kurz
Barringtonia racemosa (L.) Blume (5302)

ONAGRACEAE

- Ludwigia octovalvis* (Jacq.) Raven, Kew Bull.
15:476 (1962). (5304)
Hitherto known as *Jussiaea suffruticosa* L.

ARALIACEAE

- Polyscias fruticosa* (L.) Harms.
Polyscias scutellaria (Burm. f.) Fosb.
Polyscias pinnata Forst. cultivar "trichochleata"

UMBELLIFERAE

- Centella asiatica* (L.) Urban

CONVOLVULACEAE

- Ipomoea digitata* L. (5367)
Ipomoea indica (Burm. f.) Merrill
The same as *I. congesta* R. Br.

BORAGINACEAE

- Cordia subcordata* Lam. (5312)

VERBENACEAE

- Clerodendron inerme* (L.) Gaertner
Premna obtusifolia R. Br. (5307)
Stachytarpheta jamaicensis (L.) Vahl; "sakura"
(5287)

The vernacular name, obviously Japanese (sakura = cherry), indicates the relative recency of this plant's introduction. Informants placed the first appearance of the species in the 1920's.

LABIATAE

- Ocimum sanctum* L.; "warüg" (5278)
Cultivated as an herb used with fish. The herbage is very rank.

ACANTHACEAE

- Blechnum ?brownei*

RUBIACEAE

- Guettarda speciosa* L.
Hedyotis biflora (L.) Lam. (5367-a)
Morinda citrifolia L.

GOODENIACEAE

- Scaevola taccada* (Gaertn.) Roxb.
Variously called *S. frutescens* or *S. koenigii* in older literature. Also known as *S. sericea* Vahl.

COMPOSITAE

- Wedelia biflora* (L.) DC. (5296)
Vernonia cinerea (L.) Less.

ECOLOGICAL NOTES ON THE
VEGETATION OF ROMONUM*Major Patterns of Vegetation*

Very little, if any, of the original vegetation is left intact. Instead the island presents a picture of the long-existing interaction of man on the insular environment. Because of the small size and low elevation of the island, every square foot has probably had, from time to time at least, the imprint of the human foot or the effects of the agricultural hand. In fact, throughout Truk, it is difficult to envision what the original lowland vegetation was like except in the areas which, because of their marginal nature—such as mangrove swamps, freshwater swamps, and sandy beach areas—have been considered useless or too difficult to change. Of course, in the more advanced areas (e.g., Moen) even these areas are now much altered through the use of modern techniques and machinery. On Romonum, however, we may look to these marginal areas for at least a partially persistent element of pre-human vegetation.

Outside these marginal areas, Romonum consists largely of cultivated trees, usually rather well spaced, and consisting primarily of coconut palms and breadfruit trees. These two species are the only large trees in some localities, especially in the immediate neighborhood of houses. On the hill in the eastern part, and toward the central part of the island, mango trees are also found in considerable numbers. Wherever "villages" are located quite near the coast, there are small numbers—sometimes single individuals—of various arborescent species, especially *Hernandia sonora*, *Ficus virens*, *Metroxylon amicorum*, *Calophyllum inophyllum*, *Hibiscus tiliaceus*, or *Thespesia populnea*. Although there are exceptions, the mangrove trees—



FIG. 3. View of the south coast of Romonum looking slightly eastward. (The pier of basalt rocks is that shown on the map just short of the western tip of the island.) The appearance is very characteristic, with the numerous coconut palms. The tree at the left is a *Hernandia*.

Rhizophora, *Bruguiera*, *Lumnitzera*, *Sonneratia*, *Excoecaria*—and the littoral *Heritiera* are seldom found very near houses. To summarize, then, the major visual aspect of the forested portions of the island is the predominance of *Cocos*, *Artocarpus*, and scattered individuals of *Mangifera*, *Ficus*, and occasional other trees.

Other than this fairly homogeneous and largely man-made "forest" type, several other major features are evident. These are the mangrove forest; the freshwater swamps; the sandy beach; and the basalt-boulder coast.

Mangrove Formation

Tree species: *Rhizophora mucronata*, *R. apiculata*, *Bruguiera gymnorrhiza*, *Sonneratia caseolaris*, *Excoecaria agallocha*, *Nypa fruticans*, *Lumnitzera littorea*.

Other characteristic species: *Acrostichum aureum*.

Marginal species: *Hibiscus tiliaceus*; species of the freshwater swamps, which to some extent interpenetrate the mangrove area.

In general, the Micronesian mangrove formations are not as rich in species, or so productive in individuals, or so notable for large trees, as are the formations in the Malaysian or Caribbean areas. In turn, the mangrove areas in Truk are rather less rich in species than those of Palau, farther west and consequently nearer the vast Philippine mangrove regions. Such species as *Scyphiphora hydrophyllacea* (Rubiaceae), *Dolichandrone spathacea* (Bignoniaceae; occasional at margins of mangrove areas), and *Ceriops candolleana* (Rhizophoraceae), although found in Palau (and Yap) do not occur in Truk,



FIG. 4. The swamp fern, *Acrostichum aureum*, in the foreground; behind, a marginal zone of *Trichoon karka*, with intermixed coconut palms.

Ponape, Kusaie, the Marianas, or the Marshall Islands. Many other mangrove formation plants, common enough in Malaysia and the Philippines, do not occur anywhere in Micronesia (e.g., *Aegiceras*, *Kandelia*, other species of *Rhizophora*). *Xylocarpus granatum* occurs elsewhere in Truk, but I did not find it in Romonum.

Rhizophora stylosa Griff. has been found in Ponape (Stone 1773) and in Guam (Stone 4437) and probably occurs in Truk also.

The mangrove formation of Romonum is on the whole rather poorly developed. The one extensive area is on the southern side of the island, from about the middle to within a few hundred yards of the east end. Small parts of the periphery have been converted to taro (*Colocasia*) or *Cyrtosperma* plots. The larger central area of the swamp is composed of scattered and

fairly small individuals of the various species, seldom over 10 ft high, interspersed with clumps of *Acrostichum*.

Freshwater Swamps

All of these are now to some extent planted with taro or *Cyrtosperma*, but they also include, to quite varied extent, various other species. Some swamps have been essentially cleared of vegetation, which has then been replaced by the cultivated aroids. Others, perhaps abandoned at various times of earlier cultivation, have become overrun with "weedy" species or with invading native elements. In time the freshwater swamp trees, *Barringtonia racemosa* and *Metroxylon amicarum*, become a conspicuous feature (Fig. 6). Also, the periphery of such swamps is constantly undergoing slight changes, depending on the adjacent area; advancing on



FIG. 5. Ivory-nut palms (*Metroxylon amicarum*) in the west freshwater swamp. Below, left and right, clumps of *Cyrtosperma chamissonis*. Center, *Trichoon karka*.

or retreating from them in accordance with such factors as rainfall, changes in tides, or man's activities.

Tree species: *Barringtonia racemosa*, *Metroxylon amicarum*. Some other trees are also to be found in or at the edges of these swamps; they exhibit varying degrees of tolerance to standing water. Some, for example *Glochidion*, may endure the swamp conditions for an appreciable time, but succumb eventually, and meanwhile present an unhealthy appearance, the leaves being few and often chlorotic. Typically, only the *Barringtonia* and *Metroxylon* are bona fide members of such swamp communities, and even the *Metroxylon* is not restricted to such communities but, for example, as on Tol Island, may be found in moist rocky valleys.

Other characteristic species: the aroids, either actively cultivated or persisting from former

cultivation (*Colocasia*, *Cyrtosperma*, and, rarely, *Alocasia*); the tall reed *Trichoon karka*; *Ludwigia octovalvis*; *Polygonum minus*; *Cyperus odoratus*; other Cyperaceae on occasion (*Cyperus* sp., *Eleocharis geniculata*, *Scleria*); the fern *Cyclosorus goggilodus*; the aquatic *Blyxa octandra*.

Marginal species: *Hibiscus tiliaceus*, *Acrostichum aureum*.

Sandy Beach Formation

(*Cocos* and *Artocarpus* must be included also.)

Tree species: (1) Canopy trees—*Hernandia sonora*, *Calophyllum inophyllum* (scarce on Romonum), *Barringtonia asiatica*, *Thespesia populnea*, *Pandanus* (rarely). (2) Understory or smaller trees, or large shrubs—*Scaevola taccada*, *Guettarda speciosa*, *Premna integrifolia*,



FIG. 6. The ivory-nut palm, *Metroxylon amicarum*.

Morinda citrifolia, *Allophylus timorensis*, *Ficus tinctoria*, *Terminalia samoensis*, *Cordia subcordata*.

Climbing vines or scrambling low shrubs: *Clerodendron inerme*, *Piper* sp., *Wedelia biflora*, *Colubrina asiatica*, *Cassytha filiformis*.

Prostrate vines: *Canavalia maritima*, *Vigna marina*.

Herbs or shrubs of low stature (generally less than 1 ft high): *Euphorbia chamissonis*, *Triumfetta procumbens*, the grasses *Lepturus repens*, *Tbuarea involuta*, and the sedge *Fimbristylis cymosus*.

Erect herbs: *Tacca leontopetaloides*, *Crinum asiaticum*, *Nephrolepis*.

Epiphytes: *Phymatodes scolopendria* (also terrestrial on occasion), *Davallia solida*, *Dendrobium* sp., *Asplenium nidus*.

These weedy grasses frequently are found in sand: *Eragrostis amabilis*, *Cenchrus echinatus*, *Dactyloctenium aegyptium*, and, less commonly, *Eleusine indica*. *Euphorbia hirta* and *E. thymifolia*, *Passiflora foetida*, and *Stachytarpheta jamaicensis* are all found around houses near the beach.

Except for the absence of certain species (e.g.,

Messerschmidia argentea, *Soulamea amara*, *Suriana maritima*, etc.) the plants enumerated here would be found on the reef islets of Truk and on most atolls in Micronesia as well.

Rocky Coastal Vegetation

Trees: *Ficus virens*, *Heritiera littoralis*, *Barringtonia asiatica*, *Thespesia populnea*, *Hibiscus tiliaceus*.

Shrubs: *Allophylus timorensis*, *Desmodium umbellatum*, *Pemphis acidula*.

Herbs, low shrubs, or vines: *Derris trifoliata* (generally prostrate, but also a climbing vine), *Nephrolepis*, *Procris pedunculata*, *Wedelia biflora*.

Areas Under Cultivation, Past or Present

This term is preferable to a specific one indicating a formation, since so little evidence of a recognizable indigenous formation is left. As such it is a loose heading under which may be assembled the various "villages" (really small groups of houses) with their immediate environs, as well as the entire inner or central portion of the island (including the hill area) in which only a few scattered houses occur, but throughout which there are nearly continuous signs of either present or former cultivation. This is often not intensive nor extensive, but may consist of one or a few fruit trees (limes, soursops, *Carica papaya*, the edible pandans, mango) scattered under virtually continuous cover of coconuts, breadfruits, and occasional mangoes or large *Ficus*, and mixed with such relatively persistent, aggressive, or fast-growing noncultivated species as *Acalypha indica*, *Macaranga carolinensis*, and *Glochidion pramiflorum*; with ornamental species such as *Cananga odorata* or *Cordyline fruticosa*; or with occasional native species which may be remnants of an earlier type of vegetation or perhaps are randomly opportunistic individuals of other formations, usually at the margins of their area (e.g., *Premna*, *Pandanus*, *Hernandia*).

The ground-cover species (in the sense of being at ground level—these may be scattered rather than continuous) include a number of weeds, such as *Euphorbia heterophylla*, *Malvastrum*, *Triumfetta semitriloba*, and the weedy grasses. Most evident is the very extensive cover



FIG. 7. *Phymatodes scolopendria* growing epiphytically on a branch of *Hernandia sonora* on the west beach of Romonum.

formed, usually jointly, by *Ischaemum muticum* and *Derris elliptica*. In small clearings may be found *Cassia occidentalis*, *Ipomoea digitata*, *I. indica*, *Dioscorea*, and *Abrus precatorius*.

In gardens around houses, or on old house sites, and also sometimes at random in various parts of the higher parts of the island, will be found ornamental species and hedgerow species, i.e., *Polyscias* (various species), *Zephyranthes rosea*, *Hymenocallis*, bananas, variegated leaf pandans, *Ocimum sanctum* (used as a flavoring), *Cordyline fruticosa*, the aroids, and *Cananga*.

In the west-central part of the island are the remains of the former Japanese colonial administration unit, with school, baths, well, generator plant, and other structures now mostly reduced to mere foundations or walls. In this

area there are several ornamentals not found elsewhere.

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