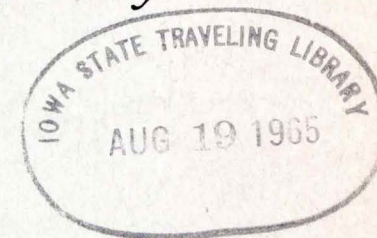


The University of Iowa
Studies in Natural History



FLORISTIC RELATIONSHIPS
OF NEW CALEDONIA

ROBERT F. THORNE

VASCULAR PLANTS COLLECTED BY
R. F. THORNE IN NEW CALEDONIA
IN 1959

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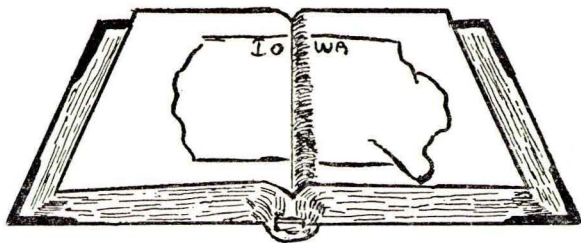
Iowa
505
I09
v.20
no.7

Volume XX

August 1965

Number 7

Iowa v.20
No. 505 Class Io9 Vol. no.7



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G. W. MARTIN, *Editor*

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IOWA STATE TRAVELING LIBRARY,
DES MOINES, IOWA

SUMMARY

The location, geology, climate, and flora of the French island of New Caledonia on the Inner Melanesian Arc of the southwest Pacific Ocean are briefly described. The floristic relationships of the island with the New Hebrides, Fiji, New Guinea, Australia, Tasmania, and New Zealand are discussed. The Papuan Subregion, particularly New Guinea and coastal Queensland, is considered the principal source area for the New Caledonian flora, with the Fijis, New Hebrides, and New Zealand of lesser importance. The contrast between the relatively harmonic and ancient woody flora and the disharmonic fauna provides an incongruity. It can be explained by assuming that the island had much more complete "stepping stone" connections with New Guinea to the northwest and with New Zealand to the southeast in Eocene or Cretaceous time, or earlier, but never complete terrestrial connections with any continental land mass. The affinities of the highland New Caledonia biota with the temperate New Zealand and montane New Guinea biotas are pointed out. The disharmonic, poorly represented herbaceous flora of Tertiary origin indicates a waif dispersal over wide sea gaps and isolation of the island since at least Eocene time, if not longer. The long isolation of Australia is also briefly discussed as well as the biogeographical classification of New Caledonia, coastal Queensland, and New Zealand.

FLORISTIC RELATIONSHIPS OF NEW CALEDONIA

Robert F. Thorne

Rancho Santa Ana Botanic Garden, Claremont, California*

NEW CALEDONIA

New Caledonia, an Overseas Territory of France, is a mountainous, mineral-rich, and geologically complex island. The main island, la Grande-Terre, is about 250 miles long (400 km) by an average 28 miles (50 km) wide, or eight times as long as wide, and approximately 6,360 square miles (17,000 square km) in area. It is thus a relatively small island, only about one-seventh the area of Cuba or the North Island of New Zealand. Oriented along a NNW-SSE axis, it lies about 225 miles SW of Aneityum of the New Hebrides, 760 miles E of Sandy Cape, Queensland, 780 miles SW of Viti Levu, Fiji, 1,000 miles NW of North Cape, New Zealand, and 1,140 miles SE of South Cape, New Guinea, at 20° 0' - 22° 25' S Latitude and 163° 56' - 167° 03' E Longitude.

The island has been greatly disturbed geologically with many, possibly Cretaceous or Eocene, metamorphics. It has apparently been violently unstable with much mountain-building, peneplanation, laterization, and vertical oscillation until relatively recent times. There has been no volcanic activity, however, since the Oligocene, and the island is now a stable area (Compton, 1917; Jensen, 1924; Faivre et al, 1953). There are extensive areas of serpentines and peridotites bearing most of the island's mineral wealth and a rich, endemic flora of sparse, sclerophyllous, scrubby vegetation (maquis). Although much of the terrain is mountainous, the highest mountain, Mt. Panié, of gneissic rocks, is only about 5,400 feet high (1,640 m).

The climate of New Caledonia is mostly mild and not very moist. The rainfall is rather evenly distributed through much of the year except for the marked drier season from August through November. The windward east coast receives about 79 inches (2,000 mm) average rainfall a year, the center of the island 67 inches (1,700 mm), and the dry west coast 40 inches (1,000 mm). The high northern and southern

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mountains may receive an average of more than 118 inches (3,000 mm). The prevailing winds are from the E and SE, including the trade winds from the middle of austral spring to the middle of austral autumn. Destructive cyclones can strike violently from the middle of December to the middle of April. The mean annual temperature for Nouméa during a four-year period was about 74° F (23.5° C), with mean temperatures of 80° F (26.9° C) in February and 68° F (20° C) in July. The amplitude of annual and diurnal temperature variation is low (Schmidt, 1944; Faivre et al, 1953).

FLORISTIC RELATIONSHIPS

There is probably no region of comparable area in the world with such a rich, archaic, peculiar, and endemic seed-plant flora as that of New Caledonia. It abounds in araucariads, podocarps, and other conifers; vesselless angiosperms (Winteraceae and *Amborella*); and many other taxa (Monimiaceae, Escalloniaceae of the Saxifragaceae, Cunoniaceae, *Nothofagus*, Araliaceae, Rutaceae, Areaceae, etc.) that are probably relicts of ancient floras. At least thirty-eight recognized species of gymnosperms are indigenous. Of 662 indigenous genera of flowering plants (van Balgooy, 1960), 101 or 15.3 per cent are endemic in New Caledonia, the Isle of Pines, and the Loyalty Islands. The total known indigenous seed-plant flora of New Caledonia is estimated at 2,660 species, of which about 2,450, or more than 90 per cent, are endemic (Baumann-Bodenheim, 1956). Although many of the known species names will probably have to be reduced to synonymy, numerous species remain to be discovered and named. The final totals, therefore, may not be far different from these estimates. At least 146 seed-plant families, based upon a broad family concept, are represented on the island by apparently indigenous species. Particularly without close recognizable relationships elsewhere are such peculiar relicts, some perhaps autochthonous, as *Amborella*, *Austrotaxus*, *Canacomyrica*, *Dugezia*, *Maxwellia*, *Memecylanthus*, *Neocallitropsis*, *Oceanopapaver*, *Oncothea*, *Pachydiscus*, *Paracryphia*, *Phelline*, *Serresia*, *Solmsia*, and *Strasburgeria*. Five of the ten known genera of primitively vesselless woody angiosperms are represented on the island, three of them endemic. The highly endemic and relictual nature of the New Caledonian flora can be explained by the long period the island has been elevated above sea level and isolated from other lands. The richness of the flora is due also to the relatively mild tropical climate, varied topography, and special habitats furnished by the extensive areas of serpentine and peridotite.

Table I presents a numerical summary of the genera presently known to comprise the indigenous flora of New Caledonia and adjacent islands. In addition to my own counts I have used statistics compiled by van Balgooy (1960) and Good (1960). The counts are as reliable as can be expected considering the possible discrepancies in the generic concepts of different authors and the difficulty of deciding whether or not some genera present in an area are actually indigenous there or introduced by man. Further exploration undoubtedly will change the statistics for all these areas, but perhaps not significantly.

As pointed out by van Balgooy (1960), the flora of the Loyalty Islands is essentially New Caledonian. All but 2 of the 259 genera are represented also on New Caledonia, and no endemic genera are recognized. Thus the New Caledonian and Loyalty Island floras are best treated as a unit.

The high percentages of New Hebridean and Fijian genera represented on New Caledonia indicate that the floras of these two island groups are closely related to the New Caledonian flora, presumably because of the same Papuan Subregional source area (Thorne, 1963). The greater number of genera and the much higher percentage of generic endemism of the New Caledonian flora can be attributed to the longer isolation and the greater distance of New Caledonia from New Guinea. The relative paucity of the New Hebridean flora is probably due in part to less intensive collecting, but mainly to its more recent origin than either the New Caledonian or Fijian floras.

When the shared number of total genera found in New Caledonia and the New Hebrides, Fiji Islands, Queensland, or New Guinea is considered, there is remarkable similarity in the percentages of shared genera, 37.8, 37.6, 32.8, and 31.5 percent respectively. Thus considering relative distances, size and diversity, probable age, length of isolation, and percentage of generic endemism of each island group, the New Caledonian flora is rather equally related to all these areas.

Coastal Queensland and New Guinea are undoubtedly the principal source areas for the New Caledonian flora. At least 474 of the 660 New Caledonian phanerogamic genera are shared with Queensland, and 482 are shared with New Guinea. Thus, exclusive of the 97 endemic New Caledonian genera, only 89 indigenous New Caledonian seed plant genera are unrepresented in Queensland and 81 unreported from New Guinea. In addition to the highly distinctive endemic New Caledonian genera *Amborella*, *Canacomyrica*, *Paracryphia*, and *Strasburgeria*, each perhaps constituting a distinct angiospermous family, Queensland lacks only the Taxaceae (represented on New Caledonia

TABLE I

	Indigenous Genera	Number and Percent Shared with New Caledonia	Shared % of Total Genera from Area and New Caledonia	Limited to Area and New Caledonia	Endemic Genera and Percent of Total Generic Flora
1. New Caledonia	660 ¹	— — —	—	—	97 or 14.7 %
2. Loyalty Islands	259 ¹	257 ¹ or 99.2%	38.8%	4	0 ¹ or 0.0 %
3. New Hebrides ²	371 ¹	283 ¹ or 76.3%	37.8%	5 ¹	2 ¹ or 0.54%
4. Fiji Islands	449 ¹	303 ¹ or 67.5%	37.6%	4	12 ¹ or 2.67%
5. Queensland	1268	474 or 37.6%	32.8%	17 ³	45 or 2.78%
6. New Guinea	1350 ⁴	482 or 35.7%	31.5%	1	141 ⁴ or 10.4 %
7. New Zealand	336 ¹	118 or 35.1%	13.4%	3	31 or 9.23%
8. Tasmania	367 ¹	122 or 33.2%	13.5%	1	13 or 3.54%

¹=figures from van Balgooy (1960)

²=including Santa Cruz Islands

³=mostly shared also with other parts of Australia

⁴=figures from Good (1960)

Floristic Relationships of New Caledonia

by *Austrotaxus*) and Chloranthaceae (*Ascarina*) and New Guinea lacks only the Taxaceae (*Austrotaxus*), Balanopaceae (*Balanops*), Phytolaccaceae (*Monococcus*), and possibly Caprifoliaceae (should *Memecylanthus* and *Pachydiscus* prove to be correctly placed in that family). On the other hand, New Caledonia lacks 50 families represented in Australia by 137 indigenous genera and 55 families represented in New Guinea by 101 indigenous genera, a total of 70 unrepresented Australian and New Guinea families. Of 193 total phanerogamic Papuan families, only 21 families represented by 36 genera in New Guinea are unreported from Australia, and only 15 represented by 21 genera of 188 Australian families are unknown from New Guinea. This much closer relationship of the Australian and New Guinea floras, despite the vast disparity in their climates, is readily explained by the proximity of the two islands on the same continental mass, with occasional continuous terrestrial connection in the past.

Seventeen genera are restricted in their total distribution to New Caledonia and Queensland (and other parts of Australia), whereas only one genus, *Pelma* of the Orchidaceae, is apparently restricted to New Caledonia and New Guinea. This disparity is understandable in view of the greater proximity on a wide front of coastal Queensland to New Caledonia. Only the southeastern tip of New Guinea points toward New Caledonia, and New Guinea's South Cape is almost four hundred miles farther away from New Caledonia than the closest point of the Queensland coast, Sandy Cape of Fraser's Island. A fairer comparison is permitted by citation of the seventeen genera restricted to New Caledonia and the Melanesian islands from New Guinea to Fiji and Samoa. Both the tropical rain-forest flora of Queensland and the flora of the Melanesian archipelago are essentially attenuations of the Papuan flora (Thorne, 1963).

New Zealand has a considerably smaller percentage, 13.4, of genera shared with New Caledonia of the total genera on both island groups. Tasmania has a similar percentage, 13.5. These smaller percentages are to be expected because of the temperate climate of these southern islands as compared with the tropical climate of New Caledonia. The approximately equal affinity of the two temperate island floras with that of New Caledonia can be accounted for by the balancing effect of the greater proximity of New Zealand to New Caledonia against the recent Pleistocene continuity of more distant Tasmania with the Australian-Papuan source area.

ISOLATION OF NEW CALEDONIA

New Caledonia is a continental island, but it combines the biogeo-

graphical characteristics of both a continental and an oceanic island. Many of its geological formations are of a continental type, old and highly metamorphosed, and it is located well within the Andesite or Sial Line on the Inner Melanesian Arc (a chain of islands or shallow sea areas running from southeastern New Guinea through New Caledonia and Norfolk Island to New Zealand). In the indigenous fauna there are no strictly fresh-water fishes, no amphibians, no mammals other than a few bats, no land snakes, tortoises, fresh-water turtles, nor other reptiles except some highly vagile skinks and geckos, and no fresh water mussels (Myers, 1953a, 1953b; Carter et al, 1945; Darlington, 1957; McMichel and Hiscock, 1958). The absence of these animal groups and the rather disharmonic representation among the birds and the insects and other terrestrial invertebrates (Mayr, 1940; Gressitt, 1956, 1961; Solem, 1959) strongly indicate that there have been no continuous terrestrial connections between New Caledonia and any continental land mass.

Part of the New Caledonian flora, the conifers and more primitive woody flowering plants, does seem to be more harmonic and to indicate continental origin. There is a large and varied representation of the families Araucariaceae, Podocarpaceae, Cupressaceae, Arecaceae, Pandanaceae, Winteraceae, Monimiaceae, Lauraceae, Rutaceae, Meliaceae, Sapindaceae, Dilleniaceae, Clusiaceae, Flacourtiaceae, Myrsinaceae, Sapotaceae, Ebenaceae, Symplocaceae, Elaeocarpaceae, Euphorbiaceae, Moraceae, Solanaceae, Celastraceae, Oleaceae, Saxifragaceae, Cunoniaceae, Pittosporaceae, Casuarinaceae, Proteaceae, Myrtaceae, Araliaceae, Apocynaceae, Loganiaceae, and Rubiaceae. The New Caledonian representatives of these families mostly retain many primitive, i.e., unspecialized characteristics (see also Lam, 1940; Smith, 1945; van Steenis, 1953; Corner, 1958, 1963). All are surely as ancient in origin as late Cretaceous time. The living representatives of many of these families seem to be incapable of long distance dispersal (Smith, 1945, 1955; van Steenis, 1962; Thorne, 1963). Therefore, the ancestors of this assemblage of woody families must have migrated onto the New Caledonian land mass by normal short-range dispersal methods during Cretaceous time, and the conifers perhaps even earlier, when more extensive land areas existed along the Inner Melanesian Arc. The disharmonic oceanic fauna, as discussed above, rules out complete terrestrial connections to the Australo-Papuan continent, but the disharmonic early woody flora requires relatively short sea gaps northward toward the Papuan Subregion and southward toward the New Zealand archipelago. The Arc probably existed as an insular chain

furnishing easy "stepping stones" for the plants but a difficult "sweepstakes" route (Simpson, 1953) for the animals.

Geologic analysis of New Caledonia suggests that the island has been violently unstable in the past. Most or all of it has been under water at various periods in its long Mesozoic and early Cenozoic history. Sediments coming from the west required rather high and extensive land masses west of the present axis of the island. This western land was probably linked to a greater or lesser extent at various times to the New Zealand geanticline postulated by Fleming (1949, 1962), Oliver (1953), Paramonov (1955, 1963), Ross (1956), and other scientists. This land mass existed during the Mesozoic west and north of the present New Zealand island axis. Fleming (1962) pointed out that "The Triassic rocks and fossils of New Caledonia are so like those of New Zealand that the geosyncline and its border ridge probably extended at least to there, but geology cannot prove that the bridge was continuous land." He also stated that "especially during the Early Cretaceous orogeny the geanticline west of the New Zealand geosyncline could have extended north to New Caledonia, perhaps beyond." Norfolk Island, with its strong New Caledonian and New Zealand biotic relationships, may represent a mere fragment of this ancient New Zealand ridge. It has been established from strata on New Caledonia that at least some areas of the New Caledonian geosyncline rose above sea level toward the end of Jurassic or early Cretaceous time. However, not until the Oligocene did a much extended New Caledonia emerge above the sea, with its marine history largely terminated (Faivre et al, 1953). Presumably, continuous terrestrial connection between the sinking geanticline and emerging geosyncline enabled the biota to migrate readily onto the new island, since considerably reduced in area.

Libocedrus (sensu Florin, 1963), *Knightia*, and *Xeronema*, representing three ancient seed plant families, are restricted today to New Zealand and New Caledonia, as are also the phasmatid *Clitarchus* (Nakata, 1961), longicorn Enicodini (Gressitt, 1961), and other animal groups. The more temperate New Caledonian highland biota shows strong affinities with the present New Zealand biota (and highland New Guinea biota as well). Excellent examples of this relationship are afforded by such seed plant genera as *Agathis*, *Podocarpus*, *Dacrydium*, *Libocedrus*, *Uncinia*, *Astelia*, *Cordyline*, *Ascarina*, *Knightia*, *Muehlenbeckia*, *Hedycharia*, *Quintinia*, *Pittosporum*, *Weinmannia*, *Nothofagus*, *Corynocarpus*, *Metrosideros*, *Cyathodes*, *Meryta*, *Schefflera*, *Dracophyllum*, and *Geniostoma*, and by such animal groups as

the snails (Solem, 1958, 1959), spiders (Berland, 1928), cerambycids (Gressitt, 1956), phasmatids (Nakata, 1961), caddis flies (Ross, 1956), tabanids (Mackerras, 1961), and other Diptera (Paramonov, 1955). Gressitt (1958) observed that "There appear to be relationships between New Guinea and New Zealand, through New Caledonia, which do not involve Australia." Probably in the Tertiary there were even stronger relationships with the New Zealand biota. New Caledonian groups now missing from the New Zealand flora were then prominent in New Zealand: *Araucaria*, the "brassii" group of *Nothofagus*, and several protead genera.

In general the affinities of the archaic New Caledonian biota are strongest with that of the Papuan Subregion, now represented in New Guinea and the other Melanesian islands and the rain forest areas of coastal Queensland. As mentioned above, at least seventeen angiospermous genera, mostly of old families, are shared only by New Caledonia and the Melanesian islands from New Guinea to Fiji and Samoa. Relatively few woody angiospermous families common to Papua and Queensland have failed to reach and establish themselves in New Caledonia. Among them are Himantandraceae, Eupomatiaceae, Myristicaceae, Hamamelidaceae, Actinidiaceae, Theaceae, Ochnaceae, Cochlospermaceae, and Eleagnaceae, mostly represented by only one or two species in Australia.

In addition to the absence of marsupials, monotremes, and the other animal groups previously mentioned, the absence or near absence in New Caledonia of characteristic Australian plant genera and families makes very unlikely any continuous land connection of New Caledonia with the Australian mainland. Among woody plants prominent in Australia but lacking in New Caledonia are: *Macrozamia*; *Laccospadix* and *Archontophoenix* of the Arecaceae; *Drimys*; *Hakea* and *Banksia* of the Proteaceae; Gyrostemonaceae; Podalyriaceae of the Fabaceae; *Cryptandra* and *Pomaderris* of the Rhamnaceae; *Leptospermum* and Chamelaucoideae of the Myrtaceae; *Ricinocarpus*; *Anthocercis*; and Prostantheroideae of the Lamiaceae, to mention but a few. Significantly, no species of *Eucalyptus* and only two species of the equally huge Australian group of phyllodial acacias are found on New Caledonia. Relatively few Australian woody genera that have reached New Caledonia have apparently failed to become established in New Guinea. Only *Callitris*, *Monococcus*, *Argophyllum*, *Castanospermum*, *Zieria*, *Eriostemon*, *Boronia*, *Bauerella*, *Fontainea*, *Longetia*, *Emmenosperma*, *Callistemon*, *Olea*, *Duboisia*, and *Macadamia* are as yet unreported from New Guinea.

Good (1950) has remarked on the affinities of New Caledonia with Madagascar, another continental island with a long history of isolation and a resulting disharmonic biota. Among the several angiospermous genera that terminate their ranges to the southeast in New Caledonia (or Fiji) and to the southwest in Madagascar or the adjacent Seychelles or Mascarenes are *Bubbia*, *Hibbertia*, *Macadamia*, *Nepenthes*, *Tristellateia*, *Soulamea*, *Cossignia*, *Apluda*, *Lophoschoenus*, and *Ficus* sect. *Pharmacosyceae*. In most of these genera one or more species are found over all or part of the intervening island areas. Those few plant and animal taxa with disjunct ranges between the New Caledonian and Malagasy Subregions are obviously relicts of groups which once possessed wider ranges over the Melanesian-Malesian-Indian-Malagasy dispersal route but later lost their footholds in intervening areas. Little significance can thus be accorded those taxa restricted to New Caledonia and the Malagasy region beyond their relict status in ancient islands long protected by isolation from the invasion of more specialized competitors, predators, or parasites.

The more recent angiosperm families, i.e., those specialized families, particularly the herbaceous ones, that did not appear in the fossil record until the Tertiary, form a definitely disharmonic oceanic element in the flora of New Caledonia. Herbaceous species form only about 20 per cent of the indigenous New Caledonian flora (Guillaumin, 1953). Herbaceous families heavily represented in or otherwise characteristic of Australia, such as the Scheuchzeriaceae, Restionaceae, Centrolepidaceae, Phylodraceae, Brassicaceae, Caryophyllaceae, Byblidaceae, Geraniaceae, Tremandraceae, Polygalaceae, Stackhousiaceae, and Stylidiaceae are absent from New Caledonia. Fifty Australian and fifty-five New Guinean seed-plant families, comprising a total of seventy from Australia and New Guinea, are not known from the indigenous New Caledonian flora. Other prominent herbaceous Australian families are represented in New Caledonia by only one or a few scattered indigenous species, among them being the Araceae, Xyridaceae, Commelinaceae, Juncaceae, Amaranthaceae, Ranunculaceae, Droseraceae, Elatinaceae, Lythraceae, Melastomataceae, Onagraceae, Apiaceae, Plumbaginaceae, Gentianaceae, Boraginaceae, Lentibulariaceae, Cucurbitaceae, and Campanulaceae. Very large families with numerous herbs in the present world flora, Rosaceae, Fabaceae, Lamiaceae, Scrophulariaceae, Asteraceae, and Poaceae, are represented in New Caledonia by a few woody genera or by a scattering of widely distributed waifs, one or two to a genus. The more recent and specialized herbaceous flora, therefore, is obviously a waif flora that has arrived

in New Caledonia over wide sea gaps. This disharmonic element in the flora speaks strongly against any continuous or even relatively close connections with large land masses since the early Tertiary. More recently evolved, specialized invertebrate animals tell the same story by their absence or poor representation (Solem, 1958, 1959; Gressitt, 1961; Darlington, 1957; Ross, 1956). Solem (1958, 1959) and Corner (1958), on the basis of geologic evidence and the distribution of land snails and figs, have denied that there could have been direct land connections between the New Hebrides and New Caledonia, at least during the Tertiary. Being on separate island arcs, New Caledonia and the New Hebrides probably never have had direct land connections.

Briefly, New Caledonia has no modern, i.e., no Cenozoic, biotic elements that could not have been dispersed over wide water gaps. Its isolation from all large land areas certainly has existed since the Eocene or even the late Cretaceous. Land links, even with the adjacent Loyalty Islands, seem unlikely at any time. A comparable situation exists for New Zealand (Oliver, 1925, 1953; Fleming, 1949, 1962; Thorne, 1963).

AUSTRALIA

The island continent of Australia has at times and on a much larger scale paralleled the situation in New Caledonia and New Zealand. For much of its history it has been isolated from all the other continents, although intermittently it has been joined to the fluctuating Papuan archipelago on the same continental shelf. However, unlike New Caledonia and New Zealand, the Australo-Papuan (Sahul) continental mass has actually once been joined to the Asiatic (Sunda) continental mass at the end of Cretaceous time when, as concluded by Glaessner (1962), a wide-open land connection existed between southeastern Asia and Australia. This connection possibly accounts for the arrival of the marsupials and monotremes, the two primitive, primary-division fresh-water fishes *Scleropages* and *Neoceratodus*, other Australo-Papuan animals of low vagility, and the many angiospermous genera of Asiatic origin that appear to require terrestrial connections.

Although this relatively short-lived land connection between the Sunda and Sahul shelves did have considerable impact upon the present biotas of Australia and New Guinea, the long isolation that Australia has enjoyed is abundantly evidenced by the absence of the Tertiary placental mammals, except for the vagile rodents and bats and introduced dingo, and the absence of numerous other large eastern Asiatic plant and animal groups. Despite these biotic lacunae, Aus-

tralia has evolved, through the effects of its long isolation, sandy soils, and arid climate, a specialized and peculiar but relatively harmonic biota. Recognizable oceanic features of its biota have thus largely been overwhelmed by the radiation of some of its late Cretaceous continental invaders and such scattered waifs as had arrived over water during its long and varied geological history. There is, incidentally, no more valid evidence in the known biogeographic history of Australia to indicate continental drift or shifting geographic poles than there is solid geologic evidence in Australia (Glaessner, 1962) for these currently popular hypotheses.

BIOGEOGRAPHICAL SUBDIVISIONS

The difficulty and artificiality of attempting to set up a biogeographical subdivision of the Pacific islands and border lands is particularly evident in the Papuan-Australian-New Caledonian-New Zealand sectors. Perhaps little value can accrue from attempting to subdivide these islands biogeographically, though I have attempted it elsewhere (Thorne, 1963). Plant and animal groups mostly have quite different dispersal capacities and biogeographical histories. Hence, whether or not a particular subdivision is acceptable to a biologist will depend to a large extent upon the group in which he specializes.

The tropical and sub-tropical rain forest (vine forest of Webb, 1959) areas of coastal eastern Queensland and the adjacent north-eastern corner of New South Wales have been classified with the Torres Strait islands as the Torresian Province of the Papuan Subregion of the Oriental Region though the province is best considered a zone of heavy overlap with the Australian Region. As indicated above, the biota of New Caledonia has its closest affinities with the rain forest biotas of New Guinea, coastal Queensland, and the Melanesian islands to the north and east. Like them, it surely belongs to the Oriental Region, but it deserves recognition as a separate Neocaledonian Subregion on the basis of its highly relict, distinctive, endemic, and disharmonic biota.

The placement of temperate New Zealand in the Australian Region is indicated by the large percentage of genera of plants and animals shared with Australia and Tasmania. However, since New Zealand lacks some of the largest and most characteristic groups of Australian vascular plants and vertebrate animals and shares many genera with South America and with New Caledonia, it certainly merits treatment, along with its adjacent islands and Lord Howe and Norfolk Islands, in its own distinct Neozeylandic Subregion. This classification un-

fortunately tends to obscure the close ties between the New Zealand and montane New Caledonian biotas. Elevation of the Neozeylandic Subregion to regional status equivalent to the Australian Region would probably emphasize too strongly the Subantarctic-Neotropical and Neo-caledonian-Papuan elements in its biota. These difficulties of classification point out all too clearly the arbitrariness and doubtful worth of biogeographical subdivisions.

ACKNOWLEDGMENTS

This paper was made possible through the support of my collecting trip to New Caledonia in October and November of 1959 by the Old Gold Fund of The University of Iowa and by the National Science Foundation (Grant No. 6484). The United States Educational Foundation in Australia generously permitted me to make the trip during my Fulbright Scholarship tenure at the University of Queensland. Professor Sherwin Carlquist, my colleague at the Rancho Santa Ana Botanic Garden, has offered much encouragement and many helpful suggestions.

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VASCULAR PLANTS COLLECTED BY R. F. THORNE
IN NEW CALEDONIA IN 1959

A. Guillaumin[°], *R. F. Thorne*^{°°}, and *R. Viro*[°]

CXXIIIth Contribution to the Flora of New Caledonia

INTRODUCTION

While doing research as a Fulbright Scholar at the University of Queensland, Brisbane, Australia, R. F. Thorne visited the French island of New Caledonia in October and November of 1959. Assisted by his wife, he traveled extensively over the island and collected intensively for three weeks. One of his primary aims was to study in the field and collect as many of the primitively vesselless Winteraceae and other angiospermous relicts as he could find in the limited time available. Other aims were to gain acquaintance with the vegetation and flora of the island, collect as many of the island endemics as possible, and study the relationship of the flora with the floras of Australia, New Guinea, and other southwestern Pacific islands.

Resulting from the general collecting were 750 collection numbers and more than 2,500 specimen sheets of about 520 species in 270 genera and 107 families. Aside from the preliminary field identifications and some determinations made in the herbaria of the Queensland State Herbarium at Brisbane and the Museum National d'Histoire Naturelle at Paris by R. F. Thorne, most of the final determinations have been made by A. Guillaumin and R. Viro at the Paris Museum. S. T. Blake has identified the Cyperaceae; C. V. Morton and D. B. Lellinger checked or corrected our determinations of most of the pteridophytes, R. Holttum the Cyatheaceae, L. A. S. Johnson the Casuarinaceae, H. Stauffer the Santalaceae, Peter Green the Oleaceae, and R. Viro the Proteaceae and *Dubouzetia*. Fifteen of the collected species were apparently previously undescribed. Nine of these have been named and described by A. Guillaumin and one fern by C. V. Morton, and all ten are here being published along with an annotated list of the other species collected. Most of the holotypes and nearly a complete set of the other numbers have been deposited at the Museum National

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d'Histoire Naturelle, Paris. Other sets in decreasing order of completeness have been deposited at the Rancho Santa Ana Botanic Garden, Claremont, California; The University of Iowa, Iowa City; Queensland State Herbarium, Brisbane, Australia; Rijksherbarium, Leiden, Holland; Arnold Arboretum of Harvard University, Cambridge, Massachusetts; and University of Michigan, Ann Arbor.

ACKNOWLEDGMENTS

The New Caledonian travels and collections by R. F. Thorne were made possible by generous support from the Old Gold Alumni Fund of The University of Iowa and from the National Science Foundation (Grant No. 6484). Grateful acknowledgment is due the United States Educational Foundation in Australia for permitting him to make the trip to New Caledonia during his Fulbright tenure. The authors also thank the above-mentioned experts for their determinations and the directors of the Queensland State Herbarium and the Muséum d'Histoire Naturelle for the use of their herbaria. H. S. McKee of Canberra, Australia, was most helpful with suggested itinerary, advice, and contacts. In New Caledonia Luc Chevalier, Director of the Musée Néocalédonien, M. Corbasson, Chief of Eaux et Forêts, Pierre Déméné of Voyageage, all of Nouméa, M. Bonnard of Sarraméa, and many other residents of the island were most helpful in every way. Without their support little would have been accomplished.

EXPLANATION OF ANNOTATED CATALOGUE

The following list contains the pteridophytes, conifers, angiosperms, and one sphagnum moss collected by R. F. Thorne in the period October 18 to November 9, 1959, on the main island, la Grande-Terre, of New Caledonia. The delimitation and arrangement of fern families and genera are largely according to E. B. Copeland's *Genera Filicum* (1947). The phanerogams are arranged approximately in the order of A. Guillaumin's *Flore Analytique et Synoptique de la Nouvelle-Calédonie: Phanérogames* (1948), although family concepts and realignments of genera are largely those of R. F. Thorne. The map of New Caledonia, Figure 1, indicates the locations of the various collection stations on the island listed below and throughout the Catalogue. The other figures, from kodachromes taken by R. F. Thorne during the trip, illustrate these collection stations and some of the collected plants.

With few exceptions only fertile material was collected. Introduced plants and widely distributed species, especially those of disturbed places, grassy areas, coastal beaches, and mangrove swamps, were de-

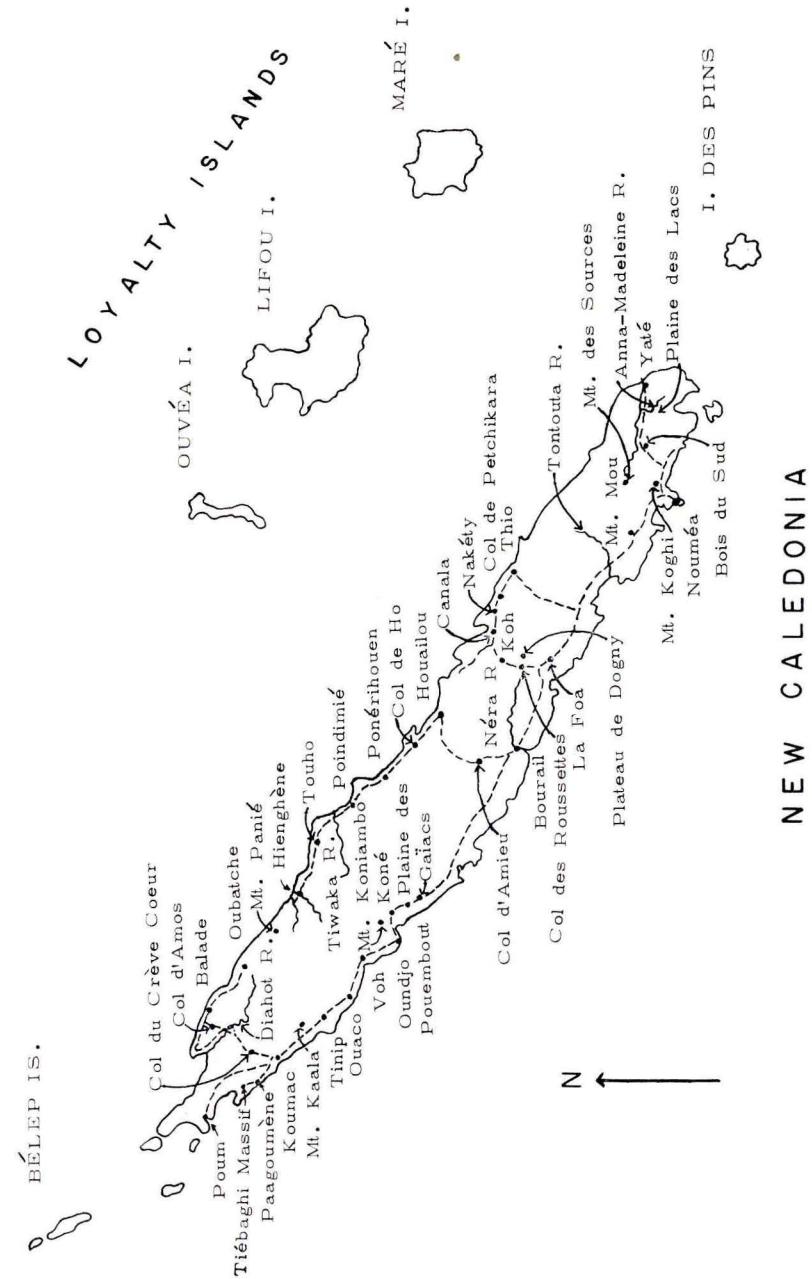


Figure 1—Map of New Caledonia, including the Grande-Terre and adjacent islands, showing principal towns, rivers, highways, and collection stations.

liberately avoided. Each of the very few non-indigenous species collected is indicated by an asterisk. To obtain as many of the endemic taxa as possible, the collections were largely restricted to the sclerophyllous scrub (maquis) in serpentine areas and the rain forests of the mountain tops, slopes, and gullies and along the streams. The following list of collection stations gives information abbreviated in or omitted from the catalogue. Combined with the map, catalogue, and illustrations, it should make possible the ready recollection of the listed species.

- | <i>Thorne Collection Numbers</i> | <i>Collection Stations</i> |
|----------------------------------|---|
| 28001-3 | —Beach at Anse Vata, Nouméa, Oct. 18-19. |
| 28004-18 | —Shrubby and grassy serpentine hillside, Oundjo, about 15 km W of Koné, Oct. 20. See Figure 6. |
| 28019-31 | —Shrubby, thickety growth on serpentine, Plaine des Gaïacs, about 7 km S of Pouembout, Oct. 20. |
| 28032-35 | —Shallow bay just S of Koumac, Oct. 21. |
| 28036-38 | —Niaouli flat and thickety hillside about 10 km NNW of Koumac, Oct. 21. |
| 28039-47 | —Maquis on serpentine hillside about 2 km SSE of Paagoumène, Oct. 21. See Figures 12 and 13. |
| 28048-113 | —Maquis on lateritic summit (586 m) and W slopes of Tiébaghi Massif, Oct. 21. See Figures 10 and 11. |
| 28114-6, | —Fringing forest along small stream, 6 km W of Col d'Amos toward 126-137 Diahot R., Oct. 22. |
| 28117-125 | —Fringing forest along small streams, 10-16 km NNE of Koumac along Route 7, Oct. 22. |
| 28138-167 | —Fringing rain forest in gullies along stream bed W of Col d'Amos toward Diahot R., Oct. 22. See Figures 14 and 15. |
| 28168-177 | —Metamorphic mountain ridge N of Col d'Amos and W of Amos, Oct. 22. See Figures 8, 14, and 16. |
| 28178-238 | —Laterized, serpentine SW slopes and S summit (1083 m) of Mt. Kaala, Oct. 23. See Figures 18 and 19. |
| 28239-258 | —Maquis on serpentine, lower NW slopes of Mt. Koniambo (summit 937 m), Oct. 24. |
| 28259-60 | —Maquis on serpentine, Timip, 8 km N of Ouaco, Oct. 24. |
| 28261-68 | —Shrubby fringing forest along dry stream bed on Plaine des Gaïacs, 10 km S of Pouembout, Oct. 25. |
| 28269-76 | —Scattered stations N of Bourail to Houailou and Hienghène, Oct. 26-90-94 27. See Figures 2, 4, 9. |
| 28277-89 | —Maquis, Col de Ho, Oct. 28. |
| 28295-307 | —Moist tree-fern gully, Col des Roussettes, about 350 m and about 25 km N of Bourail, Oct. 28. |
| 28308-12 | —Shallow water of Néra R. at Bourail, Oct. 28. |
| 28313-88 | —Forested W slope, open summit (1010 m), and forested W and E rim of Plateau de Dogny, Oct. 29. See Figure 17. |
| 28389-409 | —Maquis on serpentine, Col de Petchikara between Dothio and Nakety, Oct. 30. |

- 28410-49 —Gully rain forests, Col d'Amieu (425 m), mostly about 10 km W of Koh, Oct. 31.
- 28450-89 —Fringing forest and maquis on slopes along Tontouta R., Mostly 6-10 km up the Tontouta valley from Route 1, Nov. 3. See Figure 20.
- 28490-554—Rain forest on W slopes (about 500-800 m) and central ridge about 900-1000 m) of Mt. Koghi, Nov. 4.
- 28555-621—Route de Yaté, 27 km E of Nouméa to Yaté, but mostly along the Anna-Madeleine R., Plaine des Lacs, and Bois du Sud, Nov. 5. See Figures 21-23.
- 28622-96 —Rocky, open or forested slopes (500-600 m), open, rocky plateau (750 m), and gully forests (750-800 m) of Montagne des Sources (1006 m), Nov. 6. See Figures 27-33.
- 28697-740—Rocky, open slopes (450-1100 m) and S summit forest (1100-1220 m) of Mt. Mou, Nov. 8. See Figures 7, 24-26.

ANNOTATED CATALOGUE

PSILOTAE

TMESIPTERIDACEAE

- Tmesipteris tannensis* Bernh.—Epiphytic on tree-fern trunk, forested upper W slope of Plateau de Dogny (28359); on rocks and trees, central ridge of Mt. Koghi (28550).

LYCOPODIAE

LYCOPODIACEAE

- Lycopodium cernuum* L.—Open summit of Plateau de Dogny (28338).
- Lycopodium clavatum* L.—Upper, open E edge of Plateau de Dogny (28322).
- Lycopodium deuterodensum* Herter (*L. densum* Labill. 1806, non Lam.)—Open summit of Mt. Kaala (28187); central ridge of Mt. Koghi (28548); open slope, about 450 m, Mt. Mou (28736).
- Lycopodium phlegmaria* L.—Pendulous from crest of rocky bank, gully forest W of Col d'Amos (28161); epiphytic on tree trunks, tree-fern gully, Col des Roussettes (28307).
- Lycopodium scariosum* Forst.—Open summit of Plateau de Dogny (28313).
- Lycopodium squarrosus* Forst.—Central ridge of Mt. Koghi (28537).

SELAGINELLACEAE

- Selaginella hordeiformis* Bak.—Tree-fern gully, Col des Roussettes (28298); upper forested W slope of Plateau de Dogny (28366).
- Selaginella usta* Vicill.—Crevices, Mt. Kaala (28199).

FILICAE

MARATTIACEAE

- Angiopteris evecta* Hoffm.—Tree-fern gully, Col des Roussettes (28296).
- Marattia attenuata* Labill.—Tree-fern gully, Col des Roussettes (28300); forested slopes, about 600 m, Mt. Koghi (28497).

SCHIZAEACEAE

- Lygodium reticulatum* Schkuhr—Fringing forest along Tontouta R. (28483).
- Schizaea dichotoma* (L.) Sm.—Summit of Tiébaghi Massif (28077); Mt. Kaala (28211); lower forested W slopes of Plateau de Dogny (28355).
- Schizaea fistulosa* Labill.—Open summit of Mt. Kaala (28207).

Schizaea laevigata Mett.—Bank of gully along stream W of Col d'Amos (28144); Mt. Kaala (28186).

GLEICHENIACEAE

Gleichenia dicarpa R. Br.—Open summit of Plateau de Dogny (28314).

Sticherus flabellatus (R. Br.) St. John—Open summit of Plateau de Dogny (28328).

Stromatopteris moniliformis Mett.—Rocky plateau, about 800 m, Montagne des Sources (28646).

HYMENOPHYLLACEAE

Crepidomanes bipunctatum (Poir.) Copel. (*Trichomanes bipunctatum* Poir.)—On boulder in gully forest, Col d'Amieu (28421).

Crepidophyllum vieillardii (v.d.Bosch) Copel. (*Trichomanes vieillardii* v.d.Bosch)—On tree-fern trunks, about 700 m, Mt. Koghi (28506); on tree trunks, about 800 m, Mt. Koghi (28514).

Crepidophyllum vieillardii (v.d.Bosch) Copel. var. (?)—On bases of tree ferns, gully, Col des Roussettes (28306).

Hemicyathea deplanchei (Mett.) Copel. (*Hymenophyllum deplanchei* Mett.)—On log over steep, moist gully, forested upper W slopes of Plateau de Dogny (28369); on tree fern trunks, about 700 and 800 m, Mt. Koghi (28501, 28503); on tree trunks in mossy summit forest, Mt. Mou (28700).

Hymenophyllum sp. nov. (?)—On tree trunks in mossy summit forest, Mt. Mou (28703).

Macroglena flavo-fuscum (v.d. Bosch) Copel. (*Trichomanes flavo-fuscum* v.d. Bosch)—On tree-fern trunk, forested upper W slope of Plateau de Dogny (28367); on tree-fern trunks, about 600 m, Mt. Koghi (28494, 28517).

Macroglena laetum (v.d.Bosch) Copel. (*Trichomanes laetum* v.d.Bosch)—On tree trunks in mossy summit forest, Mt. Mou (28702).

Mecodium sp. (*Trichomanes* sp.)—On tree trunks in mossy summit forest, Mt. Mou (28703).

Pleuromanens album Copel. (*Trichomanes pallidum* Blume)—On tree trunks in mossy summit forest, Mt. Mou (28701).

Selenodesmium dentatum (v.d.Bosch) Copel. (*Trichomanes dentatum* v.d.Bosch)—Terrestrial fern, forested upper W slopes of Plateau de Dogny (28368); rain forest, about 600 m, Mt. Koghi (28495); gully forest, about 800 m, Montagne des Sources (28645).

Selenodesmium longicollum (v.d.Bosch) Copel. (*Trichomanes longicollum* v.d. Bosch)—Terrestrial fern, tree-fern gully, Col des Roussettes (28305, 28305a).

Trichomanes spp.—On tree-fern trunk, forested upper W slopes, Plateau de Dogny (28358); on tree trunks, mossy summit forest of Mt. Mou (28701a).

PTERIDACEAE

Adiantum longipes Rosenst.—Mt. Kaala (28201).

Adiantum thornei Morton, sp. nov.

Rhizoma deest; stipites ca. 40 cm. longi, subteretes, basi ca. 3 mm. diam., apice ca. 1.5 mm. diam. atrapurpurei, sursum laevi, basi fibrilloso-paleacei, paleis pallide brunneis, concoloribus, lineari-subulatis, 4-6 mm. longis, 0.5-0.8 mm. basi latis, apice longe attenuatis sed non filiformibus, integris, basi ca. 10-cellulis latis, cellulis elongatis, 300-350 μ longis, 30-40 μ latis, apicibus acutis, parietibus tenuibus; laminae ambitu late ovatae, ca. 28 cm. longae et

24 cm. latae, quadripinnato-pinnatifidae, basicopicae et subflabellatae, ubique anadromae, rhachi atrapurpurea nitida subtus laevi et glabra, supra leviter pilosa et paleacea; pinnae primariae 5-jugae cum impari, inaequales, basalibus ca. 14 cm. longis et 15 cm. latis, multo majoribus quam alteris, pinnula secundaria basali infima superiore bipinnato-pinnatifida (pinnulis 2 tertiariis basalibus subaequalibus ca. 2 cm. longis et 1 cm. latis, pinnulis ultimis ca. 5-jugis bilobis vel pinnatifidis, pinnula unica terminali ca. 7 cm. longa et 1.7 cm. lata, segmentis ultimis ca. 15-jugis cum impari), pinnula secundaria basali infima inferiore ca. 13 cm. longa et 8.5 cm. lata, multo majore quam superiore, (pinnulis 2 tertiariis basalibus valde inaequalibus basicopica elongata et ca. 6.5 cm. longa et 1.4 cm. lata, segmentis ultimis ca. 15-jugis cum impari, acroscopica ca. 2.5 cm. longa et 0.9 cm. lata, segmentis ultimis ca. 5-jugis); pinnae II ca. 15 cm. longae et 9 cm. latae, apice acuminatae pinnatifidae, minus divisae, bipinnato-pinnatifidae, vix basicopicae, pinnulis secundariis basalibus divisae ca. 1-vel 2-jugis (segmentis ultimis ca. 11-jugis), alteris simplicibus, numerosissimis ca. 25-jugis, confertis, subimbricatis, pinnatifidis; pinnae III ca. 13 cm. longae et 6 cm. latae, pinnulis basalibus pinnatis 1-jugis, alteris simplicibus numerosis ca. 25-jugis; pinnae IV et V simpliciter pinnatae, pinnulis 19-25-jugis; apex laminae simpliciter pinnatus, ca. 13 cm. longus et 3 cm. latus, pinnulis ca. 28-jugis infra apicem acuminatum pinnatifidum; rhachillae atrapurpureae vel ultimae castaneae, infra glabrae, supra pilosae; segmenta ultima papyracea glabra, valde dimidiata, anguste oblonga, plerumque 12-16 mm. longa et 4-5 mm. lata, obtusa, pinnatifida, lobis in latere superiore 4 vel 5 in margine superiore in apice loborum; indusia albida medio fusca, reniformia vel suborbicularia, ca. 2.2 mm. lata; sporae bene evolutae, sphaerico-tetrahedralibus, triletis, ambitu triangulares vel interdum circulares, laesuris prominentibus, lateribus rectis angulis rotundatis, laeves, modice parvae, 33-39 μ diam.

Type in the herbarium of the Rancho Santa Ana Botanic Garden, no. 156, 979, collected on Mount Koghi, above l'Auberge, New Caledonia, at ca. 700 meters elevation, November 4, 1959, by Robert F. Thorne (no. 28505). See Figure 34.

The type specimen was first identified as *A. fulvum* Raoul, a New Zealand species that has been reported from New Caledonia, e.g. by Fournier¹, but it can hardly be that species, which has the fronds merely tripinnate, with the pinnules larger and relatively much broader and not so deeply cleft. The pinnules in *A. fulvum* are notably fewer, being usually 12 pairs or fewer in the upper pinnae (and correspondingly fewer in the secondary pinnae of the lower pinnae), whereas there are mostly 20 to 25 pairs in *A. thornei*. The greater dissection of the ultimate segments places the sori on definite marginal lobes in *A. thornei*, which is not the case in the less-lobed segments of *A. fulvum*. The spores of *A. thornei* are definitely smaller than those of *A. fulvum*, which have a median size of 40-49 μ , according to Harris².

I have been in correspondence with Mr. G. Brownlie in connection with the New Caledonian species of *Adiantum*. He agrees that *A. fulvum* is probably not found in New Caledonia, writing: "On my trips to New Caledonia I have made

¹ Ann. Sci. Nat. Paris, Bot. V, 18: 328. 1873.

² Harris, W. F. A Manual of the Spores of New Zealand Pteridophyta 140. 1955.

several collections of this species, and I found nothing which in the field would ever be confused with the New Zealand *A. fulcum*. The dried specimens are much more difficult to distinguish clearly. The ecological conditions of the two are very different, the New Zealand species being predominantly found in coastal forest, usually exposed near the coast itself, while the New Caledonian plant is predominantly found in rain-forest in almost complete shade and most abundantly at altitudes of from 500 feet upwards. It will persist for some time in scrub where forest has been cut out and there the type with the very attenuated segments figured by Keyserling is common. Eventually if the forest does not reoccupy the site the species apparently disappears. In addition to this the colouring of the two is distinct, the New Caledonian forest form being a soft, delicate green, while the New Zealand plant is a dark brownish green. The relative width of the fronds in the two is also commonly different, but the distribution of hairs on the fresh specimens (not always on the dried) is most distinctive. Occasionally the New Zealand plant appears to be more glaucous and softer than usual but these forms may be due to hybridisation with the local *A. cunninghamii*, since both these New Zealand species are cytologically the same in chromosome complement and overlap in distribution."

Mr. Brownlie suggests that *A. thornei* (the type of which he has not seen) may be closer to *A. novae-caledoniae* Keys., and this is doubtless true. The latter is an endemic species of New Caledonia, and apparently quite variable. The usual form (in herbaria at least) can be readily distinguished by having long-acuminate pinnules or ultimate segments, and caudate pinnae. However, there are variants with obtusish ultimate segments, but this may be an inconstant and essentially insignificant character in this species, for some collections (e.g. *Franc* 362) have both forms intermixed (although not on the same frond). From these variants with obtusish ultimate segments or pinnules, *A. thornei* may be distinguished as follows:

Blades tripinnate only; basal superior pinnule once-pinnate, with 2-5 pairs of simple segments; ultimate segments rather broad, usually 6 mm. wide or more, shallowly lobed, usually much less than halfway to the costa, thinnish, not glaucescent beneath..... *A. novae-caledoniae*

Blades quadripinnate; basal superior pinnule bipinnate, with a pair of pinnate basal pinnules and ca. 15 pairs of simple segments; ultimate segments narrowly oblong, usually only 4 mm. wide, deeply lobed, usually over halfway to the costa at the base, thickish, subglaucescent beneath. . . *A. thornei*
Another related species is *A. aneitense* Carr., which is like *A. novae-caledoniae* in being only tripinnate. The segments of *A. aneitense* (apparently glaucous beneath according to Brownlie, *Pacific Sci.* 14: 245. 1960) are truly obtuse, and are even broader and less lobed than those of *A. novae-caledoniae*.
—C. V. Morton, Smithsonian Institution, Washington, D.C.

Lindsaea nervosa Mett.—Open forest, about 600 m, Montagne des Sources (28667).

Saccoloma firmum (Kuhn) C. Chr. (*Ithycaulon minus* C. Chr., *Orthiopteris kingii* (Bedd.) Holtt.)—Small tree fern, gully, Col des Roussettes (28303); forested upper W slopes of Plateau de Dogny (28351, 28365).

Tapeinidium flavicans (Mett.) Hieron.—Open summit of Mt. Kaala (28209).

DAVALLIACEAE

Davallia pyxidata Cav.—Crevices, heights above Col d'Amos (28173).

CYATHEACEAE

Cyathea novae-caledoniae (Mett.) Copel. (*Alsophila francii* Rosenst.)—Moist gully on forested upper W slopes of Plateau de Dogny (28373).

Dicksonia deplanchei Vieill.—Moist gully in forested upper W slopes of Plateau de Dogny (28371).

Dicksonia thyrsopteroides Mett.—Forested upper W slopes of Plateau de Dogny (28363).

ASPIDIACEAE

Cyclosorus parasiticus (L.) Farwell (*Thelypteris parasitica* (L.) Iwatsuki)—Tree-fern gully, Col des Roussettes (28297).

Tectaria milnei Copel.—Forested upper W slopes of Plateau de Dogny (28360).

Tectaria seemannii Copel.—Tree-fern gully, Col des Roussettes (28299).

BLECHNACEAE

Blechnum gibbum Mett.—Along small stream 6 km W of Col d'Amos (28136); on wet rocks in gully, Col d'Amieu (28438).

Blechnum obtusatum Labill.—Rocky slope along Tontouta R. (28465).

ASPLENIACEAE

Asplenopsis decipiens Mett.—Terrestrial fern, about 600 m, Mt. Koghi (28519).

Asplenium cuneatum Lam.—Tree-fern gully, Col des Roussettes (28301).

Asplenium polyodon Forst. var. (*A. falcatum auct.*)—Terrestrial fern, about 600 m, Mt. Koghi (28518).

Asplenium polyphyleticum Compt.—Epiphytic in tree-fern gully, Col des Roussettes (28304).

Asplenium praemorsum Sw.—On boulder in gully, Col d'Amieu (28445).

Diplazium sororium (Mett.) Carruthers—Tree-fern gully, Col des Roussettes (28295).

DIPTERIDACEAE

Dipteris conjugata Reinw.—Terrestrial fern in niaouli clearing, about 600 m, Mt. Koghi (28493).

POLYPODIACEAE

Microsorium vieillardii (Mett.) Copel. (*Polypodium vieillardii* Mett.)—Mt. Kaala (28202); gully, Col d'Amieu (28447).

Prosaptia contigua (Forst.) Presl—On tree trunk, Col d'Amieu (28444).

VITTARIACEAE

Antrophyum novae-caledoniae Hieron. (*ex char.*)—Epiphytic in rain forest, about 700 m, Mt. Koghi (28504).

Vittaria confusa Fourm.—Pendulous from top of rocky bank, gully W of Col d'Amos (28160).

CONIFERAE

PODOCARPACEAE

Acmopyle alba Buchh.—Forest near summit, Mt. Mou (28704).

Dacrydium araucarioides Brongn. et Gris—Maquis near bridge over Madeleine R., Route de Yaté (28568).

- Dacrydium lycopodioides* Brongn. et Gris—Forest, about 1050 m, Mt. Mou (28734), juvenile form.
- Dacrydium taxoides* Brongn. et Gris—Forested gully, about 800 m, Montagne des Sources (28644); forest near summit, Mt. Mou (28705).
- Podocarpus comptonii* Buchh.—Forest near summit, Mt. Mou (28740).
- Podocarpus gnidioides* Carr.—Prostrate shrub on central ridge, Mt. Koghi (28552).
- Podocarpus novae-caledoniae* Vieill. ex Brongn. et Gris—Near Yaté, Route de Yaté (28576).
- Podocarpus palustris* Buchh.—Near bridge over Madeleine R., Route de Yaté (28565); A mutilated branch has developed a shoot in the juvenile form: leaves distichous, slender, linear (3-4 cm.), acute at the apex, basal angle resembling very much that of *P. comptonii*.
- Podocarpus sylvestris* Buchh.—Forest on upper W slope of Plateau de Dogny (28346); forest near summit, Mt. Mou (28706).

ARAUCARIACEAE

- Agathis ovata* Warb.—Rocky slope, about 650 m, Montagne des Sources (28689).
- Araucaria cookii* R. Br.—Roadside near mouth of Tanghène R. (28294). See Figures 2 and 3.
- Araucaria humboldtensis* Buchh.—Forested gully, about 800 m, Montagne des Sources (28660).
- Araucaria montana* Brongn. et Gris—Open summit of Mt. Kaala (28208). See Figure 19.
- Araucaria muelleri* Brongn. et Gris—Maquis near bridge over Madeleine R., Route de Yaté (28559). See Figure 29.

CUPRESSACEAE

- Neocallitropsis araucarioides* (Compt.) Florin—Maquis 3 km E of bridge over Madeleine R., Route de Yaté (28569).

TAXACEAE

- Austrotaxus spicata* Compt.—Edge of forest, W margin of Plateau de Dogny (28383).

ANGIOSPERMAE

MONOCOTYLEDONEAE

PANDANACEAE

- Freycinetia sulcata* Warb.—Forest, about 600 m, Montagne des Sources (28668).

POTAMOGETONACEAE

- Potamogeton fluitans* L.—Shallow water of Néra R. at Bourail (28310).
- Potamogeton pectinatus* L.—Shallow water of Néra R. at Bourail (28311).
- Potamogeton tricarinatus* Kunth—Shallow water of Néra R. at Bourail (28309).

ZANNICHELLIACEAE

- Cymodocea serrulata* (R. Br.) A. & M.—Washed up on beach at Anse Vata, Nouméa (28002); shallow water of bay just S of Koumac (28035).
- Halodule uninervis* (Forst.) Aschers. Washed up on beach at Anse Vata, Nouméa (28001); shallow water of bay just S of Koumac (28032).
- Syringodium isoetifolium* (Aschers.) Dandy (*Cymodocea isoetifolia* Aschers.)—Washed up on beach at Anse Vata, Nouméa (28003); shallow water of bay just S of Koumac (28034).

HYDROCHARITACEAE

- Halophila ovalis* Hook. f.—Shallow water of bay just S of Koumac (28033), with *Halodule uninervis*, *Syringodium isoetifolium*, and *Cymodocea serrulata*.

NAJADACEAE

- Najas graminea* Delile—Shallow water of Néra R. at Bourail (28312).

CYPERACEAE

- Carex brunnea* Thumb.—Moist forested gully near stream, Col d'Amieu (28416).
- Carex dietrichiae* Boeckl.—Bottom of gully in fringing rain forest along stream bed W of Col d'Amos (28145).
- Chorisandra cymbaria* R. Br.—Open marshy place on Plateau de Dogny (28342); small marsh a few km from bridge over Madeleine R., Route de Yaté (28621), with *Xyris neo-caledonica*, *X. pancheri*, *Eriocaulon neo-caledonicum*, and *Drosera neo-caledonica*.
- Cladium articulatum* R. Br.—Open, marshy place on Plateau de Dogny (28343).
- Cladium deplanchei* (Boeckl.) D. B. Clarke—Gully, W slopes of Tiebaghi Massif (28060); upper slopes of Mt. Kaala (28185, 28203).
- Cladium glomeratum* R. Br.—Open, marshy places on Plateau de Dogny (28344), with *Sphagnum le-ratianum*, *Cladium articulatum*, *Chorisandra cymbaria*, and *Costularia arundinacea*. See Figure 17 for habitat.
- Cladium junceum* R. Br.—Gravelly valley of Tontouta R. (28489).
- Costularia arundinacea* (Soland. ex Forst. f.) Kükent. (*Schoenus arundinaceus* Soland. ex Forst. f., *Lophoschoenus arundinaceus* Stapf.)—Open, marshy place on Plateau de Dogny (28341).
- Costularia fragilis* (Dänik.) Kükent. (*Lophoschoenus fragilis* Dänik.)—Seepage slope, about 650 m, Montagne des Sources (28693).
- Fimbristylis complanata* Link—Along small stream, 6 km. W of Col d'Amos (28135).
- Fimbristylis dichotoma* (L.) Vahl—Lower W slopes of Mt. Koniambo (28251).
- Fimbristylis monostachya* (L.) Hassk.—Niaouli flats dominated by *Melaleuca quinquenervia*, 10 km NNW of Koumac (28036).
- Gahnia aspera* Spreng.—Thickety hillside about 2 km SSE of Paagoumène (28039).
- Gahnia sp. nov.* (?)—Forested upper W slope of Plateau de Dogny (28374).

ARECACEAE

- Basselinia gracilis* Vieill.—Small palm about 3 m tall, along wooded margin of creek on Plateau de Dogny (28329). See Figure 17 for habitat.

FLAGELLARIACEAE

- Flagellaria indica* L. var. *minor* Hook. f.—Maquis on top of Tiebaghi Massif (28103); fringing forest along Tontouta R. (28476).
- Joinvillea elegans* Gaud.—Gully on W slopes of Tiebaghi Massif (20870); forested gully, Col d'Amieu (28443).

XYRIDACEAE

- Xyris neo-caledonica* Rendle—Small marsh a few km from bridge over Madeleine R., Route de Yaté (28616); open slopes, from about 600-1100 m, Mt. Mou (28737), with large yellow petals, and gelatin-like substance in abundance around base of plants.

Xyris pancheri Rendle—Small marsh a few km from bridge over Madeleine R., Route de Yaté (28617), with *X. neo-caledonica*, *Eriocaulon neo-caledonicum*, and *Drosera neo-caledonica*.

ERIOCAULACEAE

Eriocaulon neo-caledonicum Schltr.—Small marsh a few km from bridge over Madeleine R., Route de Yaté (28618), with the two species of *Xyris* listed above.

LILIACEAE (including Amaryllidaceae)

Astelia neo-caledonica Schltr.—Central ridge, Mt. Koghi (28540).

Campynemanthe viridiflora Baill.—Forested gully, about 800 m, Montagne des Sources (28659), with green flowers and only 2 stamens apparently fully developed.

Cordyline neo-caledonica Linden—Along Route de Yaté, about 27 km. from Nouméa (28590).

Dianella javanica Kunth (*D. austro-caledonica* Seem.)—Upper forested W slope of Plateau de Dogny (28377).

Geitonoplesium cymosum A. Cunn.—Rain forest, Col d'Amieu (28427).

Lomandra banksii (R. Br.) Ewart forma *neo-caledonica* (Schltr.) Guillaum.—Maquis on top of Tiebaghi Massif (28092); Bois du Sud (28609). See Figure 11.

Smilax ligustrifolia A. DC.—Thickety upper slopes of Mt. Kaala (28192); forested gully, about 800 m, Montagne des Sources (28638).

Smilax purpurata Willd.—Thickety lower W slopes of Mt. Koniambo (28255); slopes along Tontouta R. (28482).

Xeronema moorei Brongn. et Gris—Rocky, open places on plateau, about 750 m, Montagne des Sources (28622); rocky slopes, about 800 m, Mt. Mou (28727).

ORCHIDACEAE

Dendrobium vandaefolium Finet—Tall terrestrial orchid, top of Tiebaghi Massif (28079). It had been found only on Art Island and not previously on the Grande-Terre.

Epistephium smilacifolium Reichb. f.—Liana in forest near W margin of Plateau de Dogny (28347).

Eriaxis rigida Reichb. f.—Thickety gully, W slope of Tiebaghi Massif (28054).

Goodyera discoidea Schltr.—Forested lower W slope of Plateau de Dogny (28354).

Goodyera finetiana Kranzl.—Forested upper W slope of Plateau de Dogny (28370, 28376).

Goodyera subregularis Schltr.—In humus on boulders in gully near stream, Col d'Amieu (28422).

Lyperanthus glandulosus Schltr.—Forested slopes, about 800 m, Mt. Koghi (28509).

Microstylis taurina Reichb. f.—Forested upper W slope of Plateau de Dogny (28375).

Microtis aemula Schltr.—Forested E edge of Plateau de Dogny (28316).

Thelymitra longifolia Forst.—Upper edge of forest on W margin of Plateau de Dogny (28388).

DICOTYLEDONEAE

CASUARINACEAE

Casuarina chamaecyparis J. Poiss.—Thickety gully on W slopes of Tiebaghi Massif (28056); maquis on lower slopes of Mt. Kaala (28236). See Figure 19.

Casuarina collina J. Poiss. ex Panch. et Seb.—Fringing rain forest in gullies along stream bed W of Col d'Amos (28138).

Casuarina deplancheana Miq.—Maquis, Route de Yaté, 44 km from Nouméa (28556).

Casuarina leucodon J. Poiss.—Maquis on rocky slopes along Tontouta R. (28459).

Casuarina poissoniana Schlecht.—Maquis on rocky slopes along Tontouta R. (28474).

PIPERACEAE

Peperomia baueriana Miq.—On rocks and trees, forested lower W slope of Plateau de Dogny (28361); on small trees, central ridge, Mt. Koghi (28538).

Peperomia sarasinii C. DC. (?)—Humus on boulders in gully forest near stream, Col d'Amieu (28423a).

Piper austro-caledonicum C. DC.—Fringing forest along small stream, 6 km. W of Col d'Amos (28127); forested gully near stream, Col d'Amieu (28423).

Piper austro-caledonicum C. DC. (?)—Gully rain forest, 29 km. E of Bourail (28272).

Piper paitense (C. DC.) Schltr. (*P. austro-caledonicum* var. *paitense* C. DC.)—Forested gully, about 600 m, Montagne des Sources, (28629).

CHLORANTHACEAE

Ascarina rubricaulis Solms—Forested gully along stream, about 600 m, Montagne des Sources (28677).

MORACEAE

Ficus edulis Bur.—Forested slope, about 600 m, Montagne des Sources (28694).

Ficus fraseri Miq. (*Ficus proteus* Bur.)—Fringing forest along small stream, 16 km NNE of Koumac (28122); forested gully near stream, Col d'Amieu (28414).

Ficus trachyleia Bur.—Near Yaté, along Route de Yaté (28577).

URTICACEAE

Pipturus incanus Wedd.—Forest, about 4 km. W of Koh, Col d'Amieu (28440).

FAGACEAE

Nothofagus baumanniae (Baum-Bodenh.) van Steenis (?)—Summit forest, Mt. Mou (28720). See Figure 25.

Nothofagus codonandra (Baill.) van Steenis—Forested gully, about 600 m, Montagne des Sources (28685).

PROTEACEAE

Beauprea asplenioides Schltr.—Forested gully on E side of Plateau de Dogny (28326).

Beauprea montis-fontium Guillaum.—Forested gully, about 800 m, Montagne des Sources (28639).

Beauprea spathulaefolia Brongn. et Gris—Central ridge, Mt. Koghi (28534).

Beauprea sp. nov.—Maquis on lower slopes of Mt. Kaala (28237).

Cenarrhenes paniculata (Brongn. et Gris ex S. Moore) Brongn. et Gris (*Beauprea*

- paniculata* Brongn. et Gris ex S. Moore)—Rocky plateau, about 800 m, Montagne des Sources (28653); open slopes, about 600 m, Mt. Mou (28735).
- Grevillea exul* Lindl.—Thickety slopes of Mt. Kaala (28197); gravelly valley of Tontouta R. (28485).
- Grevillea gillivrayi* Hook. f.—Thickety slopes near Dothio (28389); gravelly valley of Tontouta R. (28488); along Route de Yaté near Coulée (28606).
- Grevillea meisneri* Montr.—Thickety growth on serpentine, Plaine des Gaïacs, 7 km S of Pouembout (28030).
- Grevillea rhododesmia* Schltr.—Thickety serpentine hillside near Ound'jo (28013); thickety hillside, about 2 km SSE of Paagoumène (28043). See Figure 12.
- Grevillea rubiginosa* Brongn. et Gris—Central ridge, Mt. Koghi (28531).
- Stenocarpus intermedius* Brongn. et Gris—Thickety slopes toward Makoué, Col de Petchikara (28393).
- Stenocarpus milnei* Meissn. in DC.—Maquis on lower W slopes of Mt. Koniambo (28245); near top of Col de Petchikara toward Makoué (28408).
- Stenocarpus trinervis* (Montr.) Guillaum.—Maquis on serpentine, near bridge over Madeleine R., Route de Yaté (28611).
- Stenocarpus umbelliferus* Druce (*S. umbellatus* (Forst.) Schltr.)—Thickety gully on W slopes of Tiébaghi Massif (28067); low shrubby vegetation on heights above Col d'Amos (28174).

SANTALACEAE

- Amphorogyne* sp. nov. (?)—Shrub in forested gully, about 800 m, Montagne des Sources (28637). See Figure 30 for habitat.
- Exocarpus phyllanthoides* Endl. var. *phyllanthoides*—Lower slopes of Mt. Kaala (28229).
- Exocarpus phyllanthoides* Endl. var. *brachystachys* Stauffer—Forested gully, about 800 m, Montagne des Sources (28640).

ICACINACEAE

- Anisomallon clusiaefolium* Baill.—Forested gully, near top of Col d'Amieu (28411), flowers fragrant and most attractive to bees.
- Sarcanthidion sarmentosum* Baill.—Open summit of Mt. Kaala (28206).

LORANTHACEAE

- Amyema artensis* (Montr.) Danser—Parasitic on small tree along wooded margin of creek on Plateau de Dogny (28331).
- Korthelsella dichotoma* (van Tiegh.) Engl.—Parasitic on shrub, maquis on top of Tiébaghi Massif (28081).
- Korthelsella striata* Danser—Parasitic on *Cerberiopsis comptonii*, in maquis on lower slopes of Mt. Kaala (28181); parasitic on small tree, about 800 m, Mt. Koghi (28500).

NYCTAGINACEAE

- Calpidia gigantocarpa* Heimerl—Lower forested W slopes of Plateau de Dogny (28349); summit of Col d'Amieu along small stream (28425); forest, about 800 m, Mt. Koghi (28508). The first and last of these collections have fruits deformed in a globular mass 1 cm in diameter, a rather frequent gall.

PHYTOLACCACEAE

- Monococcus echinophorus* F. Muell.—Calcareous bluff along small stream 10 km. NNE of Koumac (28123).

CERATOPHYLLACEAE

- Ceratophyllum submersum* L.—Shallow water of Néra River at Bourail (28308), with *Najas graminea* and three species of *Potamogeton*.

WINTERACEAE

- Bubbia pauciflora* Dandy—Forested gully with tree ferns, Col des Roussettes (28302).
- Exospermum stipitatum* v. Tiegh. (?)—Upper forested W slope of Plateau de Dogny (28364).
- Zygogynum bicolor* v. Tiegh.—Upper edge of forest on W margin of Plateau de Dogny (28387); forested gully, about 800 m, Montagne des Sources (28642).
- Zygogynum vieillardii* Baill.—Forested gullies, about 600 and 750 m, Montagne des Sources (28630, 28676, 28666); summit forest, Mt. Mou (28719). See Figures 30 and 31.

ANONNACEAE

- Xylopija pancheri* Baill.—Maquis on slopes along Tontouta R. (28484).

LAURACEAE

- Endiandra lecardii* Guillaum—Upper forested edge of Plateau de Dogny (28321).

MONIMIACEAE

- Hedyocarya parvifolia* Perk. et Schltr.—Open slope about 1050 m, Mt. Mou (28730).

AMBORELLACEAE

- Amborella trichopoda* Baill.—Upper part of forested W slope of Plateau de Dogny (28348).

CAPPARIDACEAE

- Oceanopapaver neo-caledonicum* Guillaum.—Thickety and grassy serpentine hillside near Ound'jo (28004). See Figure 6.

NEPENTHACEAE

- Nepenthes vieillardii* Hook. f.—Upper open slopes of Mt. Kaala (28194).

DROSERACEAE

- Drosera neo-caledonica* R. Hamet—Open, moist places on summit of Plateau de Dogny (28340).

SAXIFRAGACEAE

- Argophyllum brevistylum* Guillaum.—Maquis on upper slopes of Mt. Kaala (28193).
- Argophyllum montanum* Schltr.—Maquis, along Route de Yaté, about 27 km from Nouméa (28589).
- Argophyllum nitidum* Forst.—Fringing rain forest in gully along stream bed W of Col d'Amos (28159); low shrubby vegetation on height above Col d'Amos (28169).
- Argophyllum vernicosum* Danik, var. *obovatum* Guillaum.—Maquis near bridge over Madeleine R., Route de Yaté (28613). Listed by error as *A. verrucosum* in the *Flore*, p. 133.
- Polyosma spicata* Baill.—Upper forested W slope of Plateau de Dogny (28378).
- Quintinia major* (Baill.) Schltr.—Forested gully, about 750 m, Montagne des Sources (28665).

PITTOSPORACEAE

- Pittosporum gracile* Panch. ex Brongn. et Gris—Maquis on summit of Tiébaghi Massif (28084); wooded margin of creek on Plateau de Dogny (28333).
Pittosporum koghiense Guillaum.—Central ridge, Mt. Koghi (28546).
Pittosporum poumense Guillaum.—Maquis on serpentine, Plaine des Caïacs, 7 km S of Pouembout (28026).
Pittosporum pronyense Guillaum.—Rocky slopes, about 650 to 900 m, Montagne des Sources (28650, 28683).
Pittosporum sp. cf. *P. echinatum* Brongn. et Gris—Maquis on summit of Tiébaghi Massif (28085).

CUNONIACEAE

- Acsmithia densiflora* (Brongn. et Gris) Hoogl. (*Spiracanthemum densiflorum* Brongn. et Gris)—Forested gully, about 800 m, Montagne des Sources (28649).
Codia albifrons Vieill. ex Guillaum.—Rocky places on plateau, about 750 m, Montagne des Sources (28623).
Codia discolor Guillaum.—Shrubby vegetation in gullies, Col de Ho (28278).
Codia montana Forst.—Thickety gully on W slopes of Tiébaghi Massif (28078); fringing rain forest in gullies along stream bed W of Col d'Amos (28140); low shrubby vegetation on height above Col d'Amos (28171).
Cunonia atrorubens Schltr.—Seepage area on slope, about 650 m, Montagne des Sources (28690); open, shrubby slope, about 800 m, Mt. Mou (28729). See Figure 26.

Cunonia balansae Brongn. et Gris—Bois du Sud (28598).

Cunonia? *cardioptera* Guillaum., *sp. nov.*

Arbor parva, ramis griseo fulvis, primum sordide rufo lanuginosis, deinde glabrescentibus; foliis 1-3-5 foliolatis, stipulis ovatis, 1 cm. longis, dense rufo lanuginosis, petiolo 1-2.5 cm. longo, sordide rufo lanuginoso, apice saepius 1 cm. cardioptero, foliolis supra sparse hirsutis, subtus costa et nervorum 4-6 jugis dense rubiginose lanuginosis, pagina sparse lanuginosa, leviter bullata, sessilibus, margine leviter undulatis, lateralibus ellipticis (1.5-2.5 cm x 1-1.5 cm), apice basique rotundatis, terminale majore (4-6 cm. x 2.5-3 cm.), apice obtuso, base rotundato vel acuto, margine leviter undulato. Spicae ad ramulorum apicem saepius 2-nae, 4-6 cm. longae, pedunculo dense rufo lanuginoso, floribus albis, sessilibus, calycis segmentis ovatis, extra rufo lanuginosis, petalis ovato-rotundatis, glabris, 2-plo longioribus, staminibus erectis, 3 mm longis, filamentis filiformibus, glabris, antheris subquadratis, nigris, ovario conico, dense piloso, stylis subulatis, glabris. Fructus

Type—Small tree with white flowers, forested gully, about 800 m, Montagne des Sources, 6 Nov. 1959 (28664). See Figure 30 for type locality. This approaches *C. bullata* Brongn. et Gris closely except that the leaves are only lightly bullate, sometimes 1- sometimes 3-, sometimes 5-foliolate, and the petiole almost always has a cordate wing at the base of the terminal leaflet.—A. Guillaumin. Holotype at P; isotype at RSA.

Cunonia lenormandii Vieill. ex Pampan.—Open summit of Mt. Kaala (28191).

Cunonia macrophylla Brongn. et Gris—Gully forests, 500 to 600 m, Montagne des Sources (28675).

Cunonia montana Schltr.—Forested E edge of Plateau de Dogny (28323); forested upper W slope of Plateau de Dogny (28384); summit of Mt. Mou (28707).

Vascular Plants Collected in New Caledonia

- Cunonia pterophylla* Schltr.—Central ridge of Mt. Koghi (28547).
Cunonia purpurea Brongn. et Gris—Along Route de Montagne des Sources, about 50 m, Boulari Valley (28682).
Cunonia vieillardii Brongn. et Gris—Summit forest, Mt. Mou (28714).
Geissois pruinoso Brongn. et Gris—Fringing forest along Tontouta R. (28475).
Geissois pruinoso Brongn. et Gris var. *macrantha* Brongn. et Gris—Shrubby vegetation in gullies, Col de Ho (28279).
Pancheria alaternoides Brongn. et Gris var. *alaternoides*—Shrubby vegetation in gullies, Col de Ho (28289); maquis, along Route de Yaté, 29 km from Nouméa (28592); rocky slope, about 600 m, Montagne des Sources (28692); about 450 m, Mt. Mou (28698).
Pancheria alaternoides Brongn. et Gris var. *lanceolata* Pampan. ex Guillaum.—Maquis on W slopes of Tiébaghi Massif (28057).
Pancheria brunhesii Pampan.—Open ridge, about 600 m, Mt. Koghi (28516).
Pancheria communis Bak. f.—Small marsh, few km from bridge over Madeleine R., Route de Yaté (28620).
Pancheria confusa Guillaum.—Open summit of Mt. Kaala (28205).
Pancheria elegans Brongn. et Gris—Along stream at base of Mt. Kaala (28178); shrubby vegetation in gullies, Col de Ho (28288); seepage slopes along Tontouta R. (28477).
Pancheria engleriana Schltr.—Central ridge of Mt. Koghi (28532); summit forest, Mt. Mou (28717).
Pancheria gatopensis Vieill. ex Guillaum.—Thickety gully on W slope of Tiébaghi Massif (28064); forested gully, Mt. Kaala (28233); shrubby vegetation in gullies, Col de Ho (28277).
Pancheria insignis Schltr.—Open slopes, about 700 m, Mt. Mou (28725).
Pancheria obovata Brongn. et Gris—Low shrubby vegetation on height above Col d'Amos (28176).
Pancheria robusta Guillaum.—Rocky slope, about 650 m, Montagne des Sources (28696).
Pancheria sebertyi Guillaum.—Forest about 11 km W of Koh, Col d'Amieu (28430).
Weinmannia? *thornei* Guillaum., *sp. nov.*

Arbor parva, ramis dichotome furcatis, gracilibus, glabris, rubris, foliis simplicibus, stipulis , petiolo 1 cm longo, glabro, lamina ovata (8-9 cm x 4-4.5 cm), apice basique acuta, margine serrato-undulata, coriacea, nervis 8-10 jugis, venis dense reticulatis, supra conspicuis, subtus prominulis. Spicae ramulorum apice singulae vel 2-nae, foliis breviores vel subaequilongae, furcatae, pedunculo 1.5 cm longo, glabro, ramis minute puberulis, floribus brevissime pedicellatis, pedicello minutissime puberulo, calycis segmentis ovatis, glabris, petalis elliptico ovatis, 2-plo longioribus, staminibus erectis, 3 mm longis, filamentis filiformibus, antheris subquadratis, luteis, ovario ovoideo, argenteo piloso, stylis linearibus, glabris. Fructus

Type—Small tree in forest, about 1050 m, Mt. Mou, 8 Nov. 1959 (28733).

This resembles *Weinmannia paitensis* Schltr. (whose seeds are also unknown and which perhaps also belongs to the genus *Cunonia*) but the leaves are different.—A. Guillaumin. Holotype at P; isotype at RSA.

ROSACEAE

Licania gerontogea Schltr.—Shrubby fringing forest along dry stream bed,

Plaine des Gaïacs, 10 km S of Pouembout (28262).

Licania rhamnoides Guillaum.—Fringing forest along Tontouta R. (28455).

FABACEAE

Acacia spirorbis Labill.—Maquis on summit of Tiébaghi Massif (28059).

Albizzia callistemon (Montr.) Guillaum. et Beauvis.—Thickety hillside about 2 km SSE of Paagoumène (28044). See Figure 13.

Albizzia streptocarpa Fourn.—Rain forest, near top of Col d'Amieu (28437).

Arthroclianthus angustifolius Hochr.—Rain forest along small stream at summit of Col d'Amieu (28424).

Derris uliginosa Benth.—Mangrove swamp along tidal stretch of river, few km S of Hienghène (28291).

Storckiella pancheri Baill.—Maquis along Route de Yaté, 36 km from Nouméa (28555).

OXALIDACEAE

Oxalis neo-caledonica Guillaum.—Small shrub in maquis half way up Mt. Kaala (28212).

LINACEAE

Hugonia neo-caledonica Vieill. ex Guillaum.—Gully in rain forest near stream, Col d'Amieu (28418).

Hugonia penicillanthemum Baill. ex Panch. et Seb.—Fringing forest along Tontouta R. (28467); Bois du Sud (28607).

ERYTHROXYLACEAE

Erythroxylon novo-caledonicum O. T. Schultz.—Thickety hillside, about 2 km SSE of Paagoumène (28040).

RUTACEAE

Acronychia laevis Forst.—Maquis on summit of Tiébaghi Massif (28102); fringing rain forest in gullies along stream bed W of Col d'Amos (28142).

Boronella pancheri Baill.—Maquis near bridge over Madeleine R., Route de Yaté (28566).

Boronella verticillata (Panch.) Baill. ex Guillaum.—Maquis on upper slopes of Mt. Kaala (28196); maquis, 3 km E of bridge over Madeleine R., Route de Yaté (28572).

Comptonella albiflora Bak. f.—Forested gully, upper slopes of Mt. Kaala (28218).

Comptonella drupacea (Labill.) Guillaum.—Forested gully, upper slopes of Mt. Kaala (28225); maquis along Tontouta R. (28478).

Dutailleya poissonii Guillaum.—Forest, about 600 m, Montagne des Sources (28671); summit forest, Mt. Mou (28709).

Eriostemon pallidus Schltr.—Seepage slope, about 650 m, Montagne des Sources (28686).

Evodia oreophila Guillaum.—Summit forest, Mt. Mou (28715).

Halfordia kendack (Montr.) Guillaum.—Maquis on summit of Tiébaghi Massif (28097); thickety slopes toward Makoué, Col de Petchikara (28392).

Melicope triphylla (Lam.) Merrill—Fringing rain forest in gullies along stream bed W of Col d'Amos (28151).

Myrtopsis deplanchei (Baill.) Guillaum.—Rocky open places on plateau, about 750 m, Montagne des Sources (28625a).

Myrtopsis macrocarpa Schltr.—Fringing forest along Tontouta R. (28456); maquis, 3 km E of bridge over Madeleine R., Route de Yaté (28570).

Myrtopsis novae-caledoniae (Vieill.) Engl.—Maquis on lower slopes of Mt. Kaala (28230).

Myrtopsis selligii Guillaum.—Rocky places on plateau, about 750 m, Montagne des Sources (28625).

Zieria chevalieri R. Virot—Open summit of Mt. Kaala (28188).

SIMARUBACEAE

Soulamea cardioptera Baill.—Maquis near bridge over Madeleine R., Route de Yaté (28561).

Soulamea cycloptera Guillaum., *sp. nov.*—Frutex magnus, ramis primum cinereis, puberulis laevibusque, deinde nigris, glabris et valde rugosis. Folia ad ramulorum apicem dense congesta, simplicia, rigida vel leviter coriacea, ovata (usque ad 10 cm x 4 cm), apice rotundata, base cuneata, supra sparse puberula, subtus calamistrato lanuginosa, in sicco supra brunnea, subtus cinereo-glaucua, nervis 10-12 jugis haud vel parvum conspicuis, venis subtus dense reticulatis, petiolo gracili, usque ad 6 cm longo, cinereo-puberulo. Inflorescentiae (m.) foliis aequilongae, cinereo-puberulae, tantum suprema parte floriferae, floribus glomeratis, sessilibus, sepalis 4, triangularibus, extra sparse puberulis, petalis 4, ellipticis, 2-plo longioribus, glabris, staminibus 8, petalis aequilongis. Florae (f.) Infrutescentia—foliis breviores (5 cm), pedunculo puberulo, penicellis 1-2 mm longis, puberulis, perianthii reliquiis apice munito, fructibus discoideis (1 cm diam.), sparse puberulis, basi anguste cuneatis ala discoidea, apice rotundatis, nullo modo truncatis vel emarginatis.

Types—Tall shrub in thickety growth on serpentine, Plaine des Gaïacs, 7 km S of Pouembout, 20 Oct. 1959 (28024 type, 28031 cotype), flowers whitish.—A. Guillaumin. Holotype at P; isotype at RSA.

Soulamea fraxinifolia Brongn. et Gris—Fringing forest along Tontouta R. (28450).

Soulamea muelleri Brongn. et Gris—Thickety gully on W slopes of Tiébaghi Massif (28061, 28075); maquis on lower W slopes of Mt. Koniambo (28243).

Soulamea pancheri Brongn. et Gris—Maquis on rocky slopes along Tontouta R. (28464).

MELIACEAE

Didymocheton nitidum (C. DC.) Harms—Thickety gully on W slopes of Tiébaghi Massif (28069).

Dysoxylum lessertianum (A. Juss.) Benth.—Maquis near top of Col de Petchikara on side toward Makoué (28406).

MALPHIGHIACEAE

Acridocarpus austro-caledonicus Baill.—Maquis on summit of Tiébaghi Massif (28087); shrubby fringing forest along dry stream bed, Plaine des Gaïacs, 10 km S of Pouembout (28268).

EUPHORBIACEAE

Acalypha grandis Benth.—Near mouth of large grotto, 7 km ESE of Hienghène (28292).

Baloghia balansae (Baill.) Pax—Gully forest, Col d'Amieu (28442).

Baloghia bureavii (Baill.) Schltr.—Maquis on summit of Tiébaghi Massif (28088); forested gully, about 800 m, Montagne des Sources (28656).

- Baloghia drimiflora* (Baill.) Schltr.—Maquis on serpentine, Plaine des Gaïacs, 7 km S of Pouembout (28021).
- Bocquillonina castaneaeifolia* Guillaum. var.—Maquis on summit of Tiébaghi Massif (28105).
- Bocquillonina spicata* Baill.—Bois du Sud (28601).
- Bureavia carunculata* Baill.—Maquis on summit of Tiébaghi Massif (28098); shrubby fringing forest along dry stream bed, Plaine des Gaïacs, 10 km S of Pouembout (28265a); maquis near top of Col de Petchikara toward Makoué (28398); gravelly valley of Tontouta R. (28486); central ridge, Mt. Koghi (28543); edge of summit forest, Mt. Mou (28722).
- Bureavia rubiginosa* Guillaum.—Maquis near bridge over Madeleine R., Route de Yaté (28558).
- Cleidion angustifolium* Pax et K. Hoffm.—Fringing forest along Tontouta R. (28452).
- Cleidion lasiophyllum* Pax et K. Hoffm.—Bois du Sud (28608, 28615).
- Cleistanthus stipitatus* (Baill.) Müll.-Arg. var. *stipitatus*—Dry thickety hillside about 2 km SSE of Paagoumène (28045); forested gully, Col d'Amieu (28448a).
- Cleistanthus stipitatus* (Baill.) Müll.-Arg. var. *laurinus* Müll. Arg.—Along embayment of Yaté R. (28579).
- Codiaeum inophyllum* (Forst.) Müll.-Arg.—Fringing forest along small stream, 6 km W of Col d'Amos (28134).
- Croton insularis* Baill.—Maquis on summit of Tiébaghi Massif (28113).
- Fontainea pancheri* (Baill.) Heck.—Fringing forest along small stream, 10 km NNE of Koumac (28124).
- Glochidion billardieri* Baill.—Fringing rain forest in gullies along stream bed W of Col d'Amos (28139).
- Glochidion caledonicum* Müll.-Arg.—Fringing rain forest in gullies along stream bed W of Col d'Amos (28155).
- Longetia buxoides* Baill. (?)—Maquis on rocky slope along Tontouta R. (28462).
- Macaranga fulvescens* Schltr.—Gully forest, Col d'Amieu (28434); rain forest, about 800 m, Mt. Koghi (28502).
- Neoguillauminia cleopatra* (Baill.) Croiz.—Bois du Sud (28599).
- Phyllanthus baladensis* Baill.—Gully forests, Col d'Amieu (28448).
- Phyllanthus buxoides* Guillaum.—Thickety gully on W slopes of Tiébaghi Massif (28068).
- Phyllanthus chrysanthus* Baill.—Maquis on lower W slopes of Mt. Koniambo (28254).
- Phyllanthus induratus* S. Moore—Maquis on summit of Tiébaghi Massif (28108).
- Phyllanthus kaalaensis* Guillaum., *sp. nov.*—Arbor parva, ramis compresso alatis, denique cylindricis; foliis ovato-ellipticis (4-10 cm x 2-4 cm), apice obtuse rotundatis, basi rotundato-truncatis vel etiam brevissime cordatis, rigidis, subtus nervis tenuibus a venis reticulatis parvum distinctis, petiolo sat robusto, fere. Flores (m.) dense fasciculati, bracteis lanceolatis, pedicello gracillimo, usque ad 5 mm longo, sepalis 6, ovatis, exterioribus 1 mm longis, interioribus leviter longioribus, apice luteo-rubris, reflexisque, disci glandulis 3, bene evolutis, staminibus 3, filamentis brevissimis, liberis, antheris longitudinaliter dehiscentibus; (f.) singuli, pedicello fructifero 1.5-2 cm longo, sepalis fere aequalibus, disci glandulis bene distinctis, ovario 3-cocco.

- Type—Small tree in gully forest about half way up Mt. Kaala, near Gomen, 23 Oct. 1959 (28224). Seems to belong to the § *Gomphidium* although it has no disk in the female flower.—A. Guillaumin. Holotype at P; isotype at RSA.
- Phyllanthus koumacensis* Guillaum., *sp. nov.*—Frutex parvus, ramulis compresso alatis, deinde angulatis denique fere carnosis; foliis distichis, imbricatis, discoides (1.5-2 cm), primum rubescentibus, deinde glaucis, rigidis, nervis immersis, petiolo gracili, 3 mm longo. Flores. . . Fructus 5 mm pedicellati, tepalis 6, rubris, 3 majoribus late ovatis, 4 mm longis, 3 minoribus, ellipticis, 2-plo brevioribus.
- Type—Maquis on the lower slope of hill, 10 km NNW of Koumac, 21 Oct. 1959 (28038).—A. Guillaumin. Holotype at P; isotype at RSA.
- Phyllanthus pancherianus* Baill. var. *cornutus* Baill. (= *P. cornutus* S. Moore)—Bois du Sud (28603).
- Phyllanthus peltatus* Guillaum.—Marquis on hillside about 2 km SSE of Paagoumène (28046).
- Phyllanthus serpentinus* S. Moore (?)—Gully forest, Mt. Kaala (28227).
- Phyllanthus sp. nov.* (?)—Gully forest about 800 m, Montagne des Sources (28656).

ANACARDIACEAE

- Euroschinus verrucosus* Engl.—Bois du Sud (28594, 28602).
- Semecarpus neo-caledonica* Engl.—Fringing forest along Tontouta R. (28451).

AQUIFOLIACEAE

- Ilex sebertii* Panch. et Seb.—Gully forest on lower slopes of Mt. Kaala (28226); shrub-filled gully about 15 km W of Houailou bridge (28276); Col de Ho (28286); about 650 m, Mt. Koghi (28491).
- Phelline brachyphylla* H. Baill.—Lower forested W slopes of Plateau de Dogny (28362).
- Phelline comosa* Labill. var. *comosa*.—Forest, about 650 m, Mt. Koghi (28492); Bois du Sud (28610).
- Phelline comosa* Labill. var. *robusta* Loesn.—Upper forested W slopes of Plateau de Dogny (28379); maquis, 3 km E of bridge over Madeleine R., Route de Yaté (28572a).
- Phelline lucida* Vieill. ex Panch. et Seb.—Summit forest, Mt. Mou (28718).

CELASTRACEAE (incl. Hippocrateaceae)

- Maytenis bureaviana* (Loes.) Loes.—Maquis on lower W slopes of Mt. Koniambo (28247).
- Maytenis pancheriana* (Loes.) Guillaum.—Gully forest, Mt. Kaala (28231).
- Maytenis sebertiana* (Loes.) Loes.—Thickety slope along Tontouta R. (28479).
- Peripterygia marginata* (Baill.) Loes.—Maquis on lower W slopes of Mt. Koniambo (28253); maquis on rocky slopes along Tontouta R. (28463).
- Salacia dognyensis* Guillaum., *sp. nov.*—Arbor parva, ramis divaricatis griseis; foliis alternis, obovatis (3-7 cm x 2-5 cm), apice rotundatis vel leviter emarginatis, basi in petiolum brevem (2-5 mm), parvum distinctum cuneatis, coriaceis, in sicco subtus pallide brunneis, marginibus integris, costa nervisque 4-jugis subtus conspicuis. Inflorescentiae in foliorum axillis singulae, circa 1 cm longae, brevissime cymoso racemosae, pedunculo 1 mm longo, dense imbricate bracteato, pedicellis 2 mm longis, basi bracteatis, sepalis 5, rotundatis, disco cupuliformis,

staminibus 3, antheris rhomboideis, connectivo producto, ovario libero, late conico, 2-loculari, ovulis erectis, stylo capitellato. Fructus obovoideo clavatus, 1 cm longus, apice apiculatus.

Type—Small tree, wooded margin of small stream on top of Plateau de Dogny, 29 Oct. 1959 (28332). See Figure 17 for habitat. In respect to the floral bracts placed at the base of the pedicel, this species approaches *S. poissoniana* Loes. but the leaves are very different.—A. Guillaumin. Holotype at P; isotype at RSA.

Salacia pancheri Baill.—Lower forested W slopes of Plateau de Dogny (28350, 28352).

SAPINDACEAE

Cupaniopsis apiocarpa Radlk.—Fringing rain forest in gullies along stream bed W of Col d'Amos (28165).

Dodonaea viscosa (L.) Jacq.—Maquis on serpentine hillside near Oundjo (28016); maquis on serpentine, Plaine des Gaiacs, 7 km S of Pouembout (28027).

Gongrodiscus parvifolius Radlk.—Central ridge of Mt. Koghi (28533).

Guioa crenulata Radlk.—Maquis on summit of Tiébaghi Massif (28050), leaves not at all or very little toothed.

Guioa glauca (Labill.) Radlk.—Bois du Sud (28600).

Guioa glauca (Labill.) Radlk. (?)—Fringing rain forest in gullies along stream bed W of Col d'Amos (28167).

Guioa gracilis (Panch. et Seb.) Radlk.—Maquis near top of Col de Petchikara on side toward Makoué (28396).

Guioa villosa Radlk. forma *villosa*—Fringing rain forest in gullies along stream bed W of Col d'Amos (28131, 28152).

Guioa villosa Radlk. forma *subsericea* Radlk.—Maquis, Col de Petchikara (28401).

Loxodiscus coriaceus Hook. f.—Central ridge of Mt. Koghi (28535).

Podonephelium homei (Seem.) Radlk.—Maquis on summit of Tiébaghi Massif (28104).

Storthocalyx chryseus Radlk.—Thicket slopes of Mt. Kaala (28184).

RHAMNACEAE

Alphitonia neo-caledonica (Schltr.) Guillaum.—Maquis on serpentine, Plaine des Gaiacs, 7 km S of Pouembout (28020); lower W slopes of Mt. Koniambo (28248); gully, Col de Ho (28284).

Rhamnella vitiensis (Benth.) A. C. Sm.—Fringing forest along small stream, 6 km W of Col d'Amos (28133); Bois du Sud (28596).

ELAEOCARPACEAE

Dubouzetia acuminata Sprague—Gully forest about 800 m, Montagne des Sources (28643).

Dubouzetia caudiculata Sprague—Thicket gully, Tiébaghi Massif (28073).

Dubouzetia confusa Guillaum. et Viot.—Maquis 3 km E of bridge over Madeleine R., Route de Yaté (28575). See Figure 22.

Dubouzetia elegans Brongn. et Gris—Gully forest, about 4 km W of Koh (28439).

Elaeocarpus geminiflorus Brongn. et Gris—Upper edge of forest on W side Plateau de Dogny (28385).

Elaeocarpus le-ratii Schltr.—Upper forested W slopes of Plateau de Dogny (28372); Route de Yaté, 35 km from Nouméa (28587).

Vascular Plants Collected in New Caledonia

Elaeocarpus ovigerus Brongn. et Gris—Wooded margin of creek on Plateau de Dogny (28336).

Elaeocarpus persicaefolius Brongn. et Gris—Fringing forest along small stream 10 km NNE of Koumac (28125).

Elaeocarpus rotundifolius Brongn. et Gris—Gully forests, Col d'Amieu (28432).

Elaeocarpus seringei Montr.—Shrubby fringing forest along dry stream bed, Plaine des Gaiacs, 10 km S. of Pouembout (28263).

Elaeocarpus cf. *E. vieillardii* Brongn. et Gris—Thicket gully on slope of Tiébaghi Massif (28066).

Elaeocarpus sp.—Wooded margin of creek on Plateau de Dogny (28337). See Figure 17 for habitat.

Sloanea montana (Labill.) A. C. Sm. (*Antholoma montana* Labill.)—Maquis on summit of Tiébaghi Massif. (28169).

THYMELAEACEAE (incl. Gonystylaceae)

Microsemma salicifolia Labill.—Maquis near top of Col de Petchikara on side toward Makoué (28409).

Microsemma (§ *Eu-Microsemma*) *thornei* Guillaum., *sp. nov.*—Frutex, ramis primum appresse rubiginose pilosis, deinde glabris; foliis densis, coriaceis, ellipticis (3-5 cm x 1.5-3 cm), apice rotundatis leviterque emarginatis, basi cuneatis, in sicco marginibus revolutis, costa tantum conspicua, supra subtusque glabris, petiolo circa 1 cm longo. Flores paupere fasciculati, penduli, pedicello circa 5 mm longo, dense appresse rubiginose piloso, perianthio crasso, labis ovatis, apice leviter cucullatis, extra dense intus sparsius appresse rubiginose pilosis, squamis minutis, apice breviter 2 lobulatis vel tantum emarginatis inter perianthium et androeceum interpositis staminibus ∞ , tubo fere O, glabro, ovario hirsuto, stylo brevi. Types—Shrub, maquis on summit of Tiébaghi Massif, 21 Oct. 1959 (28086, type, 28094 cotype). See Figure 11 for habitat. Close to *Microsemma microphylla* Guillaum. but distinct through the extrastaminal scales with 2 small lobes at most as long as wide or only emarginate and not 2-3 lacinate.—A. Guillaumin. Holotype at P; isotype at RSA.

Solmsia calophylla Baill. var. *chrysophylla* (Baill.) Guillaum.—Maquis along Route de Yaté, 44 km from Nouméa (28584).

Wickstroemia indica (L.) C. A. Mey. (*W. viridiflora* Meissn.)—Maquis on summit of Tiébaghi Massif (28093).

BOMBACACEAE

Maxwellia lepidota Baill.—Maquis on serpentine, Plaine des Gaiacs, 7 km S of Pouembout (28022).

STERCULIACEAE

Melochia odorata L. f.—Fringing rain forest in gullies along stream bed W of Col d'Amos (28148).

DILLENIACEAE

Hibbertia altigena Schltr.—Maquis on dry slopes along Tontouta R. (28480); about 650 m, Montagne des Sources, (28687); open slopes, about 700 m, Mt. Mou (28726).

Hibbertia baudouinii Brongn. et Gris—Rocky slope, about 600 m, Montagne des Sources (28691).

Hibbertia brongniartii Gilg—Maquis on summit of Tiébaghi Massif (28106);

- fringing rain forest in gullies along stream bed W of Col d'Amos (28163); maquis on lower W slopes of Mt. Koniambo (28240); along embayment of Yaté R. (28580).
- Hibbertia coriacea* (Hook. f.) Gilg var. *pancheri* (Panch. et Seb.) Schltr.—Maquis, along Route de Yaté, 44 km from Nouméa (28585); forest, about 600 m, Montagne des Sources (28674).
- Hibbertia deplancheana* Bur. ex. Guillaum.—Maquis on serpentine hillside near Oundjo (28007); lower slopes of Mt. Kaala (28232).
- Hibbertia patula* Guillaum.—Rocky slopes, about 600 m, Montagne des Sources (28684).
- Hibbertia podocarpifolia* Schltr.—Gully forest, Col d'Amieu (28433); gravelly valley of Tontouta River (28487).
- Hibbertia scabra* Brongn. et Gris—Central ridge of Mt. Koghi (28545); forest about 600 m, Montagne des Sources (28673).
- Hibbertia vieillardii* (Brongn. et Gris) Gilg—Maquis on serpentine, Plaine des Gaïacs, 7 km S of Pouembout (28028); maquis on slopes of Col de Petchikara toward Makoué (28395).
- Hibbertia virotii* Guillaum.—Rocky plateau, about 750 m, Montagne des Sources (28635).
- Hibbertia wagapii* Gilg (name), Guillaum. (description)—Maquis on lower W slopes of Mt. Koniambo (28250); shrubby fringing forest along dry stream bed, Plaine des Gaïacs, 10 km S of Pouembout (28266).
- Tetracera scandens* (L.) Merr.—Fringing forest along small stream, 16 km NNE of Koumac (28121); along small stream 6 km W of Col d'Amos (28129); maquis on slopes about 15 km W of Houailou bridge (28275).

STRASBURGERIACEAE

- Strasburgeria robusta* (Vieill. ex Panch. et Seb.) Guillaum.—Summit forest of Mt. Mou (28721).

CLUSIACEAE

- Garcinia amplexicaulis* Vieill. ex Pierre—Maquis on serpentine, near bridge over Madeleine R., Route des Yaté (28567).
- Garcinia hennecartii* Pierre ex Schltr.—Shrubby fringing forest on serpentine along dry stream bed, Plaine des Gaïacs, 10 km S of Pouembout (28265); gully on W slopes of Tiébaghi Massif (28065).
- Garcinia neglecta* Vieill.—Maquis near summit of Mt. Kaala (28217).
- Garcinia puat* (Montr.) Guillaum.—Fringing rain forest in gullies along stream bed W of Col d'Amos (28154).
- Montrouziera gabriellae* Baill. (?)—Fringing rain forest in gullies along stream bed W of Col d'Amos (28147); upper forested W slopes of Plateau de Dogny (28379a).
- Montrouziera sphaeroidea* Panch. ex Planch. & Triana—Open slopes, about 450 m, Mt. Mou (28697).
- Montrouziera rhodoneura* Schltr. in Engl.—Maquis on slopes along Tontouta River (28481); forest, about 600 m, Montagne des Sources (28670).

VIOLACEAE

- Agatea longipedicellata* (Bak. f.) Guillaum. et Thorne, *comb. nov.* (*Agation longipedicellatum* Bak. f.)—Maquis on rocky slopes along Tontouta River (28469).

Vascular Plants Collected in New Caledonia

- Agatea pancheri* (Brongn.) Schum.—Maquis on summit of Tiébaghi Massif (28110); fringing forest along small stream 16 km NNE of Koumac (28120).
- Hybanthus caledonicus* (Turcz.) Cretz. forma *linearifolia* Guillaum.—Maquis on serpentine hillside near Oundjo (28011).
- Hybanthus caledonicus* (Turcz.) Cretz var. (?)—Gully forest, Mt. Kaala (28219).

FLACOURTIACEAE (incl. Homaliaceae and Samydaceae)

- Casearia melistaurum* Spreng. var. *melistaurum*—Maquis on lower W slopes of Mt. Koniambo (28239); fringing forest along Tontouta River (28457).
- Casearia melistaurum* Spreng. var. *minor* Briq.—Maquis on summit of Tiébaghi Massif (28083).
- Homalium deplanchei* Warb.—Shrubby fringing forest along dry stream bed, Plaine des Gaïacs, 10 km S of Pouembout (28267).
- Homalium sylvicolum* Bak. f.—Fringing forest along Tontouta River (28466).

LECYTHIDACEAE (incl. Barringtoniaceae)

- Barringtonia neo-caledonica* Vieill.—Fringing rain forest in gullies along stream beds W of Col d'Amos (28132, 28149).

RHIZOPHORACEAE

- Crossostylis grandiflora* Brongn. et Gris—Fringing rain forest in gullies along stream bed W of Col d'Amos (28156).

MYRTACEAE

- Arillastrum gummiferum* (Brongn. et Gris) Panch. ex Baill.—Along Route de Yaté near Yaté (28578).
- Baeckea ericoides* Brongn. et Gris—Maquis near top of Col de Petchikara on side toward Makoué (28404); Niaouli clearing, about 600 m, Mt. Koghi (28520).
- Baeckea pinifolia* DC.—Thickety slope about 15 km W of Houailou bridge (28273).
- Baeckea virgata* (Forst.) Andr.—Low shrubby vegetation on height above Col d'Amos (28172); maquis, Tinip (28259).
- Callistemon buseanus* Guillaum.—Rocky, open plateau, about 750 m, Montagne des Sources (28626).
- Callistemon suberosus* Panch. ex Brongn. et Gris—Rocky, open plateau, about 750 m - 800 m, Montagne des Sources (28624, 28651).
- Caryophyllus balansae* Guillaum.—Fringing forest along small stream 6 km W of Col d'Amos (28130).
- Caryophyllus deplanchei* Guillaum.—Wooded margin of creek on Plateau de Dogny (28330); forested upper W side of Plateau de Dogny (28386).
- Caryophyllus multipetalus* (Panch. ex Brongn. et Gris) Guillaum.—Fringing forest along Tontouta River (28471).
- Caryophyllus* sp. cf. *C. multipetalus* (Panch. ex Brongn. et Gris) Guillaum.—Maquis on serpentine near bridge over Madeleine R., Route de Yaté (28564).
- Cloëzia angustifolia* Bak. f.—Maquis on rocky slope along Tontouta R. (28460).
- Cloëzia artensis* (Montr.) Thorne, *comb. nov.* (*Moorea artensis* Montr.)—Maquis along Route de Yaté near Coulée (28605).
- Cloëzia canescens* Brongn. et Gris—Maquis on hillside near Oundjo (28018); hillside about 2 km SSE of Paagoumène (28041); lower W slopes of Mt. Koniambo (28246); Col de Ho (28280). See Figure 19.

- Eugenia stricta* Panch. ex Brongn. et Gris—Maquis on summit of Tiébaghi Massif (28048).
- Eugenia vieillardii* Panch. ex Brongn. et Gris—Fringing rain forest in gullies along stream bed W of Col d'Amos (28143).
- Jambosa pseudo-malaccensis* Vieill. ex. Brongn. et Gris—Gully forest, Col d'Amieu (28441).
- Melaleuca brongniartii* Dänik.—Maquis near bridge over Madeleine R., Route de Yaté (28562).
- Melaleuca gnidioides* Brongn. et Gris—Small marsh a few km from bridge over Madeleine R., Route de Yaté (28619).
- Melaleuca quinquerivaria* S. T. Blake (*M. leucadendron* of many authors, not L.)—Niaouli flat, 10 km NNW of Koumac (28037); top of Tiébaghi Massif (28080); height above Col d'Amos (28170); Plateau de Dogny (28345). See Figures 8 and 9.
- Metrosideros demonstrans* Tison—Central ridge of Mt. Koghi (28513); summit of Mt. Mou (28713).
- Metrosideros engleriana* Schltr. var. *engleriana*—summit of Mt. Kaala (28210); central ridge of Mt. Koghi (28510); edge of summit forest on Mt. Mou (28723).
- Metrosideros engleriana* Schltr. var. *microphylla* Schltr.—Central ridge of Mt. Koghi (28551); summit forest on Mt. Mou (28711).
- Metrosideros operculata* Labill. var. *operculata*—Fringing forest along small stream 6 km W of Col d'Amos (28126); forested W edge of Plateau de Dogny (28315).
- Metrosideros operculata* Labill. var. *francii* (Schltr.) Guillaum.—Thickety gully on W slope of Tiébaghi Massif (28063); forest at W edge of Plateau de Dogny (28381).
- Myrtus baladensis* Brongn. et Gris—Gully forest, Col d'Amieu (28428).
- Myrtus rufo-punctata* Panch. ex Brongn. et Gris—Central ridge of Mt. Koghi (28511); about 800 m, Mt. Mou (28728).
- Ptilocalyx baudouinii* Brongn. et Gris—Maquis near top of Col de Petchikara on side toward Makoué (28399).
- Ptilocalyx francii* Guillaum.—Upper forested E slope of Plateau de Dogny (28318).
- Pleurocalyptus deplanchei* Brongn. et Gris—Bois du Sud (28614).
- Purpureostemon ciliatus* Gugerli—Heights above Col d'Amos (28168).
- Rhodamnia andromedoides* Guillaum.—Maquis along Route de Yaté, 44 km from Nouméa (28581).
- Syzygium austro-caledonicum* (Secm.) Guillaum.—Gully forest, Mt. Kaala (28226); maquis on lower W slopes of Mt. Koniambo (28257).
- Syzygium lateriflorum* Brongn. et Gris—Fringing rain forest in gullies along stream bed W of Col d'Amos (28150).
- Syzygium pancheri* Brongn. et Gris—Maquis near bridge over Madeleine R., Route de Yaté (28563); gully forests, about 800 m, Montagne des Sources (28641, 28654).
- Tristania callobuxus* (Brongn. et Gris) Ndzu.—Maquis on top of Tiébaghi Massif (28100); Col de Ho (28285); dry slopes near Dothio, Col de Petchikara (28390); 3 km E of bridge over Madeleine R., Route de Yaté (28573); rocky plateau about 750 m, Montagne des Sources (28627, 28633).
- Tristania glauca* Panch. ex Brongn. et Gris—Maquis along Route de Yaté, 44 km from Nouméa (28582).

Vascular Plants Collected in New Caledonia

- Tristania guillaumii* Vieill.—Maquis on summit of Tiébaghi Massif (28051).
- Xanthostemon aurantiacus* (Brongn. et Gris) Heck.—Maquis along Route de Yaté, 44 km from Nouméa (28583).
- Xanthostemon laurinus* (Vieill. et Pampan.) Guillaum.—Maquis on hillside about 2 km SSE of Paagoumène (28042); near summit of Mt. Kaala (28214); maquis, Tinip (28260).
- Xanthostemon longipes* Guillaum.—Maquis on rocky slope along Tontouta R. (28458).
- Xanthostemon macrophyllus* Pampan.—Maquis, dry slopes of Col de Petchikara toward Makoué (28394).
- Xanthostemon* sp. aff. *X. myrtifolius* (Brongn. et Gris) Pampan. ex Pampal.—Maquis on serpentine hillside near Oundo (28009).
- Myrtaceae—genus ?—Forest, about 1050 m, Mt. Mou (28731).

MELASTOMATACEAE

- Melastoma denticulatum* Labill.—Fringing forest along small stream 6 km W of Col d'Amos (28128).

ARALIACEAE

- Apiopetalum velutinum* Baill.—Gully forest, about 800 m, Montagne des Sources (28661); open slopes, about 550 m, Mt. Mou (28699a). See Figure 27.
- Delarbrea collina* Vieill. (?)—Maquis, near top of Col de Petchikara on side toward Makoué (28407).
- Dyzygotheca elegantissima* (Veitch) R. Vig. et Guillaum.—Maquis on top of Tiébaghi Massif (28089).
- Meryta coriacea* Baill.—Central ridge of Mt. Koghi (28536).
- Myodocarpus fraxinifolius* Brongn. et Gris—Maquis, along Route de Yaté, 44 km from Nouméa (28586); about 600 m, Montagne des Sources (28672).
- Myodocarpus involucratus* Dub. et R. Vig.—Summit of Mt. Kaala (28216); exposed rocky slope, about 650 m, Montagne des Sources (28628); open slope, about 550 m, Mt. Mou (28699).
- Myodocarpus simplicifolius* Brongn. et Gris—Thickety gully on W slopes of Tiébaghi Massif (28072).
- Schefflera candelabrum* Baill.—Gully forest near top of Col d'Amieu (28436).
- Schefflera cussoniae* Baill.—Forest, about 1050 m, Mt. Mou (28732).
- Schefflera* sp.—Above coast just N of Poindimié (28271).
- Tieghemopanax austro-caledonicus* (Baill.) R. Vig.—Maquis on lower W slopes of Mt. Koniambo (28252).
- Tieghemopanax botryophorus* Harms—Bois du Sud (28604).
- Tieghemopanax calophyllum* Guillaum.—Maquis on Mt. Kaala (28183); lower W slopes of Mt. Koniambo (28244).
- Tieghemopanax dioicus* (Vieill.) R. Vig.—Maquis, Tiébaghi Massif (28052, 28090); lower W slopes of Mt. Koniambo (28242).
- Tieghemopanax pulchellus* (Baill.) R. Vig.—Maquis, Col de Ho (28282); gully forest, Col d'Amieu (28431).
- Tieghemopanax schlechteri* Harms—Maquis on rocky slope along Tontouta R. (28472).

APIACEAE

- **Apium tenuifolium* Thell. (*A. ammi* Urb.)—Weed in cultivated ground, about 300 m, on Mt. Mou (28738).

EPACRIDACEAE

- Cyathopsis floribunda* Brongn. et Gris—Maquis on upper slopes of Mt. Kaala (28190).
- Dracophyllum ramosum* Panch. ex Brongn. et Gris—Maquis on summit of Tiébaghi Massif (28058); upper slopes of Mt. Kaala (28195); slope about 15 km W of Haouaïlou bridge (28274); Col de Ho (28281).
- Dracophyllum verticillatum* Labill.—Maquis on top of Tiébaghi Massif (28091); height above Col d'Amos (28175); open ridge, about 600 m, Mt. Koghi (28515). See Figures 11, 16, and 24.
- Leucopogon albicans* Brongn. et Gris—Maquis on rocky slope along Tontouta R. (28468); along Route de Yaté, 29 km from Nouméa (28591).
- Leucopogon cymbulae* Labill. var. *angustifolia* Brongn. et Gris—Maquis on serpentine, Plaine des Gaïacs, 7 km S of Pouembout (28019); fringing rain forest in gullies along stream bed W of Col d'Amos (28164).
- Leucopogon cymbulae* Labill. var. *major* Brongn. et Gris—Maquis on summit of Tiébaghi Massif (28096).
- Leucopogon dammarifolius* Brongn. et Gris—Rocky slope, about 500 m, Montagne des Sources (28688).
- Leucopogon enervis* Guillaum. Maquis on rocky slope along Tontouta R. (28461).
- Leucopogon macrocarpus* Schltr.—Near gully forest, about 800 m, Montagne des Sources (28636); summit forest on Mt. Mou (28724).
- Leucopogon pancheri* Brongn. et Gris—Maquis on summit of Tiébaghi Massif (28053); about 650 m, Mt. Koghi (28490); Bois du Sud (28597).
- Leucopogon violaceo-spicatus* Guillaum., *sp. nov.*—Frutex parvus, ramis densis, primum breviter papillois et violaceis, mox glabris griseisque. Folia supra viridia, subtus albido-glaucia, infima ovata (2 cm x 1 cm), apice obtusa, basi in petiolum fere indistinctum cuneata, media lanceolata (2-2.5 cm x 0.5 - 0.8 cm), superiora angustius lanceolata (1.5 - 1.8 cm x 0.4 cm), apice subacuta, floralia lineari lanceolata (1 cm x 0.2 - 0.3 cm), apice acuta. Spica terminales, usque ad 3 cm longae, multiflorae, breviter puberulae, violaceae, bracteis concavis, ovatis, carinatis, nervis prominentibus, apice, rotundatis, margine ciliolulatis, violaceis floribus (tantum alabastris junioribus) . . . Fructus globosi, 5 mm diam., stylo 2 mm longo, sepalis persistentibus, bracteis similibus sed haud carinatis et apice subacutis. Type—small shrub on loose scree about halfway up Mt. Kaala, 23 Oct. 1959 (28213). See Figure 19 for habitat. This approaches *L. macrocarpus* Schltr. but is very distinct on the basis of the elongated, many flowered spikes and the much smaller fruits; the leaves resemble those of *L. coryphilus* Guillaum.—A. Guillaumin. Holotype at P; isotype at RSA.

MYRSINACEAE

- Rapanea lecardii* Mez (?)—Maquis on lower slopes of Mt. Kaala (28238).
- Rapanea macrophylla* (Panch. & Seb.) Mez—Summit forest, Mt. Mou (28716).
- Rapanea modesta* Mez—Gully forest on Mt. Kaala (28223); summit forest, Mt. Mou (28712).
- Rapanea novo-caledonica* Mez—Upper edge of forest on W side of Plateau de Dogny (28382).
- Tapeinosperma grandiflorum* Guillaum.—Rocky slope, about 650 m, Montagne des Sources (28695).
- Tapeinosperma lecardii* Mez—Lower forested W slope of Plateau de Dogny (28357).

Vascular Plants Collected in New Caledonia

- Tapeinosperma oblongifolium* Mez—Gully forest, Col d'Amieu (28417).
- Tapeinosperma salignum* Mez—Wooded margin of creek on Plateau de Dogny (28334); about 800 m, Mt. Koghi (28499).
- Tapeinosperma vieillardii* Hook. f.—Rain forest, Col d'Amieu (28410).
- Tapeinosperma* sp. aff. *T. nectandroides* Mez—Gully forest, Col d'Amieu (28449).

SAPOTACEAE

- Madhuca* (?)—Small tree in maquis near bridge over Madeleine R., Route de Yaté (28560). Sheet with only a single fruit, identical with 2 sterile and unnumbered sheets collected by Godefroy (old herbarium of Alleizette now at Paris) and by Mr. and Mrs. Le Rat.
- Planchonella crebrifolia* Pierre—Maquis on summit of Tiébaghi Massif (28107).
- Planchonella dictyoneura* Pierre—Gully forest, about 750 m, Montagne des Sources (28662).
- Planchonella rubicunda* Dub.—Forested upper E slope of Plateau de Dogny (28320).
- Planchonella sebertii* Dub.—Maquis along Route de Yaté, 44 km from Nouméa (28557).
- Planchonella* sp. aff. *P. crassinervia* Dub.—Thickety gully on W slopes of Tiébaghi Massif (28071); gully forest half way to summit of Mt. Koghi (28220).
- Sapotaceae (?)—Small tree in gully forest half way to summit of Mt. Koghi (28222).

EBENACEAE

- Maba glauca* Montr.—Forested gully, Col de Ho (28283).
- Maba rosea* Montr. (?)—Small tree in maquis on lower slopes of Mt. Kaala (28234).
- Maba rufa* Labill.—Fringing rain forest in gullies along stream bed W of Col d'Amos (28157).

SYMPLOCACEAE

- Symplocos nitida* Brongn. et Gris, non Brand—Gully forest, E side of Plateau de Dogny (28327).

OLEACEAE

- Jasminum artense* Montr.—Maquis on slopes of Mt. Kaala (28200).
- Jasminum elatum* Panch. ex Guillaum.—Rain forest, Col d'Amieu (28413), vine with fragrant white flowers.
- Jasminum leratii* Schltr.—Maquis on summit of Tiébaghi Massif (28095).
- Olea paniculata* R. Br. (*O. thozetii* Panch. et Seb.)—Maquis near top of Col de Petchikara on side toward Makoué (28397).
- Osmanthus austro-caledonica* Guillaum. (including *O. badula* (Vieill.) Hutchins. ex S. Moore, *O. vaccinioides* (Schltr.) Hochr.—Maquis on serpentine hillside near Oundjo (28014); gully on W slopes Tiébaghi Massif (28074); shrubby fringing woodland along dry stream bed, Plaine des Gaïacs, 10 km S of Pouembout (28264); rocky slope along Tontouta R. (28470); central ridge, Mt. Koghi, about 900 m (28554).

BUDDLEIACEAE

- **Buddleia madagascariensis* Lamk.—Near top of Col d'Amieu (28412), sprawling, climbing viny shrub with orange flowers. The pubescence is white whereas, in the sheets of *Buddleia* in the Herbarium of the Paris Museum, the pubescence is reddish.

LOGANIACEAE

- Couthovia corynocarpa* A. Gray.—Gully forest near top of Col d'Amieu (28435).
Fagraea schlechteri Gilg et Ben.—Fringing forest along stream W of Col d'Amos (28114). See Figure 15.
Geniostoma balansacianum Baill.—Central ridge of Mt. Koghi (28553).
Geniostoma densiflorum Baill.—Maquis on slopes of Mt. Kaala (28204).
Geniostoma deplanchei Vieill.—Thickety gully on W slopes of Tiébaghi Massif (28076); lower slopes of Mt. Kaala (28235).
Geniostoma novae-caledoniae Vieill.—Gully forest, Col d'Amieu (28446).
Geniostoma oleifolium S. Moore.—Maquis near bridge over Madeleine R., Route de Yaté (28612).
Geniostoma rupestre Forst.—Fringing rain forest in gullies along stream bed W of Col d'Amos (28153).

GENTIANACEAE

- Erythraea australis* R. Br.—Weed on roadside a few km W of Touho (28290).

APOCYNACEAE

- Alstonia balansae* Guillaum.—Maquis near top of Col de Petchikara on side toward Makoué (28405).
Alstonia coriacea Panch. ex Guillaum.—Upper edge of forest on W side Plateau de Dogny (28385a).
Alstonia deplanchei v. Heurck et Müll.-Arg.—Maquis on slopes of Mt. Kaala (28198).
Alstonia legouixiae v. Heurck et Müll.-Arg.—Central ridge of Mt. Koghi (28512); about 600 m, Montagne des Sources (28669).
Alstonia plumosa Labill.—Fringing rain forest in gullies along stream bed W of Col d'Amos (28158); fringing forest along Tontouta R. (28453).
Alyxia caletoides (Baill.) Guillaum.—Maquis on summit of Tiébaghi Massif (28099).
Alyxia disphaerocarpa v. Heurck et Müll.-Arg.—Maquis near top of Col de Petchikara on side toward Makoué (28402).
Alyxia dolioliflora Guillaum.—Maquis on serpentine hillside near Oundjo (28017).
Alyxia leucogyne v. Heurck et Müll.-Arg.—Central ridge of Mt. Koghi (28544).
Alyxia myrtooides Schltr. (?)—Summit forest of Mt. Mou (28708).
Alyxia sp. aff. *A. sarasinii* Guillaum.—Maquis on serpentine, Plaine des Gaïacs, 7 km S of Pouembout (28025).
Artia sp. nov.—Vine without milky sap, maquis on lower slopes of Mt. Kaala (28180).
Cerbera manghas L.—Fringing forest along stream W of Col d'Amos (28115).
Cerberiopsis comptonii S. Moore.—Fringing forest along stream W of Col d'Amos (28116); maquis on lower slopes of Mt. Kaala (28182).
Melodinus balansae Baill.—Fringing forest along Tontouta R. (28454).
Melodinus ———— *sp. nov.*—Small shrub, much branched with branches very slender, slightly swollen at the insertion of the leaves, black, leaves opposite, elliptic (1-2 cm x 0.5-1 cm), rounded at the two ends, coriaceous, yellow when dry, very shortly petiolate (1 mm at most); flowers unknown; fruit (1 only) globular (1 cm), pedicel slender, equal to fruit in length, 2-bracteolate at the middle, sepals very small, triangular, seeds ovoid (3 mm). Maquis on serpentine hillside near Oundjo, about 15 km W of Koné, 20 Oct. 1959 (28015).—A. Guillaumin.

Vascular Plants Collected in New Caledonia

- Pagiantha cerifera* (Panch. et Seb.) Mrgf.—Fringing forest along small stream 16 km NNE of Koumac (28118).
Parsonsia carnea Panch. et Baill.—Maquis on W slopes of Tiébaghi Massif (28049).
Parsonsia catalpaecarpa Baill.—Forested E edge of Plateau de Dogny (28325).
Rauwolfia semperflorens (Panch.) Schltr.—Maquis near top of Col de Petchikara on side toward Makoué (28400); rocky slope along Tontouta R. (28473).
Rauwolfia viridis Guillaum.—Serpentine hillside near Oundjo (28012); maquis on serpentine, Plaine des Gaïacs, 7 km S of Pouembout (28029); lower W slopes of Mt. Koniambo (28241).

ASCLEPIADACEAE

- Marsdenia billardieri* Dcne.—Gully forest on slopes of Mt. Kaala (28221); shrubby fringing forest along dry stream bed, Plaine des Gaïacs, 10 km S of Pouembout (28261).
Marsdenia ericoides Schltr.—Open, rocky slopes, about 650 and 750 m, Montagne des Sources (28634).

AVICENNIACEAE

- Avicennia officinalis* L.—Mangrove swamp along Tiwaka R., S of Touho (28269).

VERBENACEAE

- **Clerodendron speciosissimum* van Gaert.—Near mouth of large grotto, 7 km ESE of Hienghène (28293).
Oxera candelabrum Beauvis. ex Guillaum.—Lower forested W slope of Plateau de Dogny (28353).
Oxera nuda R. Viro.—Fringing rain forest in gullies along stream bed of Col d'Amos (28166).
Oxera palmatinervia Dub.—In gully along Route de Yaté about 33 km from Nouméa (28593). See Figure 22.
Oxera sulfurea Dub.—Gully forest, Col d'Amieu (28429).
Vitex rapinii (Montr.) Beauvis.—Central ridge of Mt. Koghi (28541).

SOLANACEAE

- **Datura suaveolens* Humb. et Bonpl.—Disturbed rain forest along roadside, Col d'Amieu (28426).
Duboisia myoporoides R. Br.—Maquis on summit of Tiébaghi Massif (28112); forested E edge of Plateau de Dogny (28324).
Solanum le-ratii Schltr.—Open grassy area on serpentine near Oundjo (28006).

GESNERIACEAE (incl. Cyrtandraceae)

- Coronanthera pulchra* C. B. Clarke (?)—Gully forest, about 600 m, along Route de Montagne des Sources (28632).
Coronanthera squamata R. Viro.—Rocky slope, about 600 m, on Montagne des Sources (28679).

ACANTHACEAE

- Acanthus ilicifolius* L.—Mangrove swamp along Tiwaka R., S of Touho (28260).
Justicia amieuensis Guillaum., *sp. nov.*—Frutex ramis gracilibus, striolatis, primum glabris vel sparsissime pilosis deinde glaberrimis; foliis lanceolatis (2.5 cm x 1-2 cm), basi cuneatis, apicem versus longe attenuatis et imo apice rotundatis, marginibus ± irregulariter undulatis, membranaceis, glabris, petiolo 0.5-1 cm longo, glabro vel subtiliter piloso. Inflorescentiae axillares, paupere cymosae,

1-2 cm longae, bracteis bracteolisque minimis, triangularibus, ramis usque ad 5 mm longis, breviter pilosis, floribus sessilibus vel sub sessilibus, sepalis 5, angustissime lanceolatis, 3 mm longis, minute papillois, corolla 7-9 mm longa, alba fauce purpureo punctata, extra sparse pilosa, 2-labiata, lobis rotundatis, extra apicem versus breviter pilosis, labia spueriore integra, intus longitudinaliter 2-costata, inferiore 3-lobata, tubo intus ad medium 4 penicillatim ciliato, staminibus 2, corolla aequilongis, leviter supra tubi medium insertis, antherarum loculis parallelis, \pm superpositis, inferiore lamina hyalina apice emarginata infra producta, ovario ovoideo, glabro, stylo subulato, antherarum filamentis aequilongis. Type—Shrub with bilabiate corolla white with purple spots in throat, in gully forest near stream, Col d'Amieu, about 10 km W of Voh, 31 Oct. 1959 (28420). Until now there has been noted from New Caledonia only *Justicia pinensis* S. Moore, of which the stamens are still unknown; for what Lemire (*La Colonisation française en Nouvelle Calédonie et dépendances*, p. 344.1878) has indicated as *J. purpurea* is only a *nomen nudum*, without any sheet to support it, probably not even a *Justicia*.—A. Guillaumin. Holotype at P; isotype at RSA.

Pseuderanthemum tuberculatum (Hook. f.) Radlk.—Gully forest near stream, Col d'Amieu (28419).

RUBIACEAE

Bikkia campanulata (A. Br.) Schltr.—Rocky slope, about 600 m, Montagne des Sources (28678). See Figure 32.

Coclospermum monticolum Baill. ex Guillaumin.—Maquis on summit of Tiébaghi Massif (28082).

Eremocarpus rupicolus (Baill.) Brem. (= *Psychotria rupicola* (Baill.) Schltr.)—Forested upper W slope of Plateau de Dogny (28380); maquis, 3 km E of bridge over Madeleine R., Route de Yaté (28571).

Gardenia oudiepe Vicill.—Maquis on dry slopes of Col de Petchikara near Dothio (28391).

Gardenia urvillei Montr.—Maquis on serpentine, Plaine des Gaïacs, 7 km S of Pouembout (28023); along stream at base of Mt. Kaala (28179).

Guettarda platycarpa (Montr.) Guillaumin.—Thickety gully on slopes of Tiébaghi Massif (28062).

Guettarda sp. aff. *G. glabrescens* (Schltr.) Schltr.—Gully forest, about 800 m, Montagne des Sources (28657).

Ixora collina (Montr.) Beauvis.—Forested gully, about 600 m, Montagne des Sources (28631).

Lindenia vitiensis Seem.—Fringing forest along small stream, 16 km NNE of Koumac (28117).

Morinda candollei (Montr.) Beauvis. var. *candollei*—Rocky slope, about 600 m, Montagne des Sources (28681).

Morinda candollei (Montr.) Beauvis. var. *villosa* Guillaumin.—Maquis on lower W slopes of Mt. Koniambo (28258).

Morinda choriophylla Baill.—Gully forest, Col d'Amieu (28415).

Morinda collina Schltr.—Central ridge of Mt. Koghi (28539).

Morinda deplanchei (Hook.) Baill. ex K. Schum.—Serpentine hillside near Oundjo (28010); maquis on hillside about 2 km SSE of Paagoumène (28047).

Morinda fallax Schltr.—Along wooded margin of creek on Plateau de Dogny (28335).

Morinda forsteri Seem.—Fringing forest along small stream 16 km NNE of Koumac (28119); fringing rain forest in gullies along stream bed W of Col d'Amos (28141).

Morinda glaucescens Schltr.—Rocky plateau, about 800 m, Montagne des Sources (28652).

Morinda neo-caledonica (S. Moore) Guillaumin.—Maquis on summit of Tiébaghi Massif (28101).

Normandia neo-caledonica Hook. f.—Summit of Mt. Kaala (28189); central ridge of Mt. Koghi (28542).

Psychotria balansae (Baill.) Guillaumin.—Summit forest of Mt. Mou (28710).

Psychotria calorhammus (Baill.) Guillaumin. ex S. Moore—Maquis on serpentine hillside near Oundjo (28008).

Psychotria collina Labill.—Maquis on lower W slopes of Mt. Koniambo (28249); gully forest, about 800 m, Montagne des Sources (28658).

Psychotria deplanchei (Beauvis.) Guillaumin.—Rain forest, about 800 m, Mt. Koghi (28507).

Psychotria deplanchei (Beauvis.) Guillaumin. (?)—Rain forest, about 600 m, Mt. Koghi (28496).

Psychotria le-ratii Guillaumin.—Bois du Sud (28595).

Psychotria microglossa (Baill.) Guillaumin. ex S. Moore—Lower forested W slope of Plateau de Dogny (28356); rain forest, Mt. Koghi, about 600 m (28498).

Psychotria oleoides (Baill.) Schltr.—Gully forest, about 800 m, Montagne des Sources (28648).

Psychotria phyllanthoides (Baill.) Schltr.—Maquis on serpentine, Plaine des Gaïacs, 7 km S of Pouembout (28025).

Psychotria poissoniana (Baill.) Guillaumin.—Forested upper E slope of Plateau de Dogny (28317).

Randia artensis (Montr.) Guillaumin.—Fringing forest along small stream 6 km W of Col d'Amos (28137).

Randia baladica (Montr.) Guillaumin.—Fringing rain forest in gullies along stream bed W of Col d'Amos (28146).

**Spermacoce tenuior* L.—Weed in roadway, Mt. Mou, about 300 m (28739). A tropical American weed whose introduction to New Caledonia had not previously been noted.

GOODENIACEAE

Scaevola beckii Zahlbr. var. *beckii*—Maquis, 3 km E of bridge over Madeleine R., Route de Yaté (28574).

Scaevola beckii Zahlbr. var. *robusta* Krause—Maquis along Route de Yaté, about 27 km from Nouméa (28588).

Scaevola cylindrica Schltr. et Krause—Maquis on W slopes of Tiébaghi Massif (28055); top of Tiébaghi Massif (28111); near E edge of Plateau de Dogny (28319).

Scaevola montana Labill.—Gully on serpentine hillside near Oundjo (28005); gully on W slopes of Tiébaghi Massif (28055a); gullies W of Col d'Amos (28177); near summit of Mt. Kaala (28215); lower W slopes of Mt. Koniambo (28256).

ASTERACEAE

Helichrysum cinereum F. Muell. ex Benth. (*H. neo-caledonicum* Schltr.)—Thick-

ety open areas between gully forests, W of Col d'Amos (28162); maquis near top of Col de Petchikara on side toward Makoué (28403).

FAMILIES UNKNOWN

Oncotheca balansae Baill.—Small tree on rocky slope, about 600 m, Montagne des Sources (28680).

Sphenostemon pachycladus Baill.—Small tree in gully forest, about 750 m, Montagne des Sources (28663), flowers yellow with fleshy parts, leaves yellowish green on lower surface. See Figure 30 for habitat.

MUSCI

Sphagnum le-ratianum Par. et Warnst.—Low, moist places in basin on summit of Plateau de Dogny (28339), determined by Mrs. Jovet-Ast. See Figure 17 for habitat.

LIST OF FIGURES

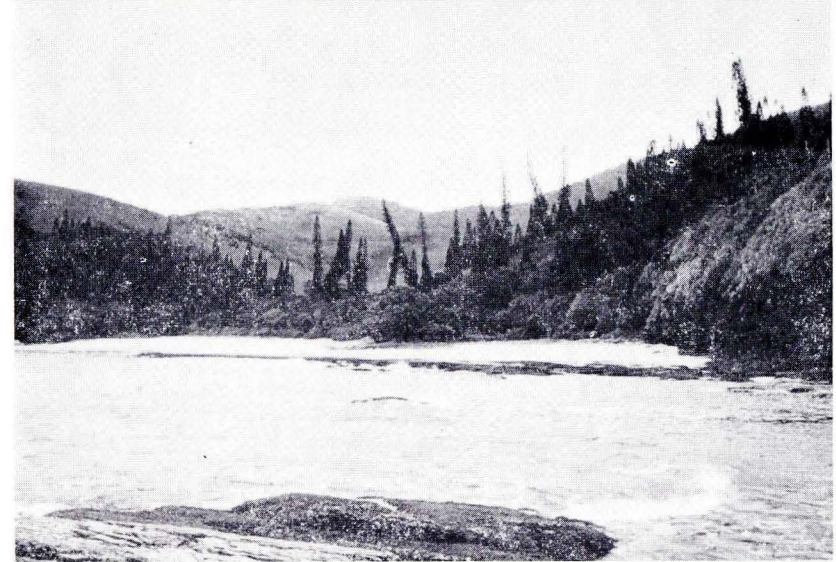
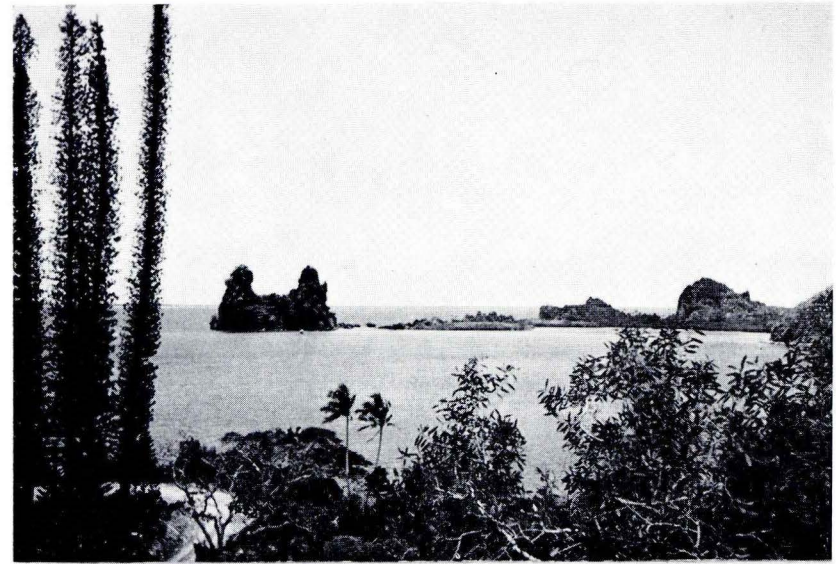


Figure 2—*Araucaria cookii* and Tours de Notre Dame, an eroded limestone ridge, at Hienghène on the northeastern coast of New Caledonia.

Figure 3—*Araucaria cookii* and coastal vegetation behind a small beach north of the Roche Percée near Bourail on the central west coast.

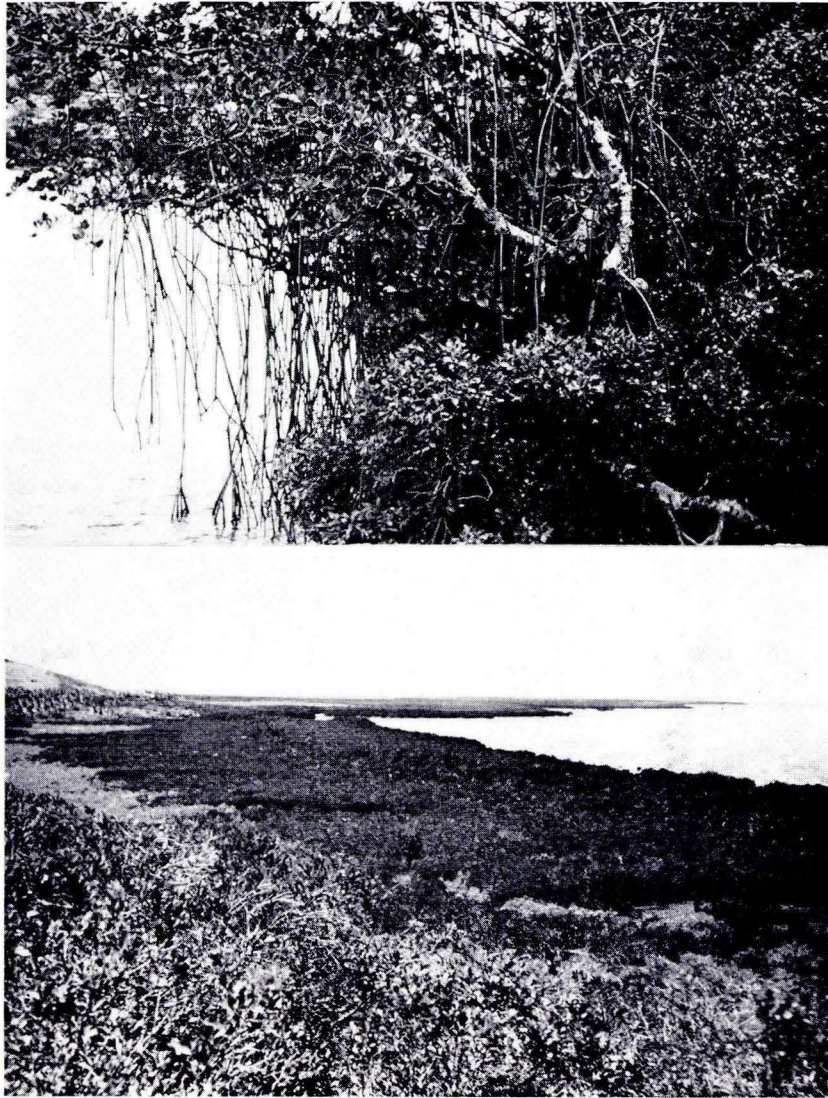


Figure 4—*Rhizophora mangle*, with aerial roots, at the mouth of the Hienghène River.

Figure 5—Extensive mangrove swamps southeast of Oundjo and about 15 km west of Koné on the northwestern coast.

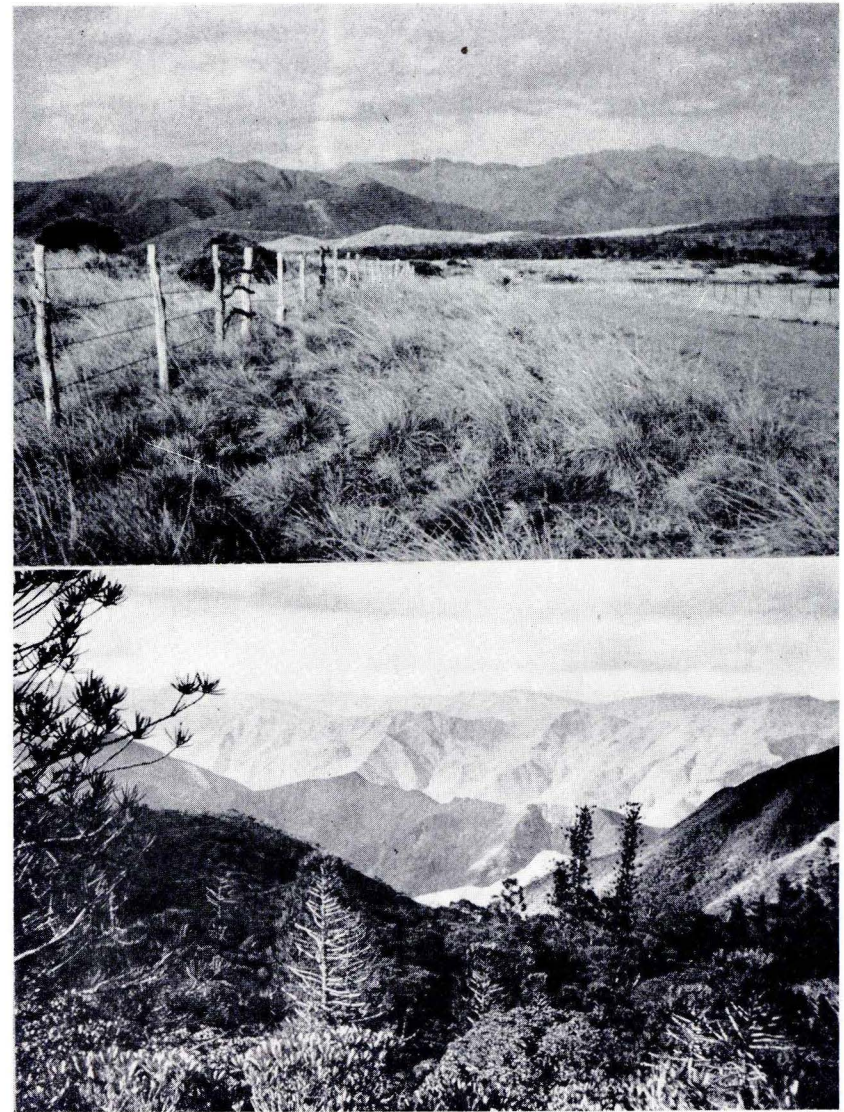


Figure 6—Dry grassy roadside near Oundjo, where *Oceanopapaver neo-caledonicum*, Capparidaceae, was collected. In the background to the northeast is the mountainous interior of the island.

Figure 7—Mountainous interior of New Caledonia from the south peak of Mt. Mou, 1220 m, Araucaria vine woodland in foreground is dominated by *Araucaria rulei*.

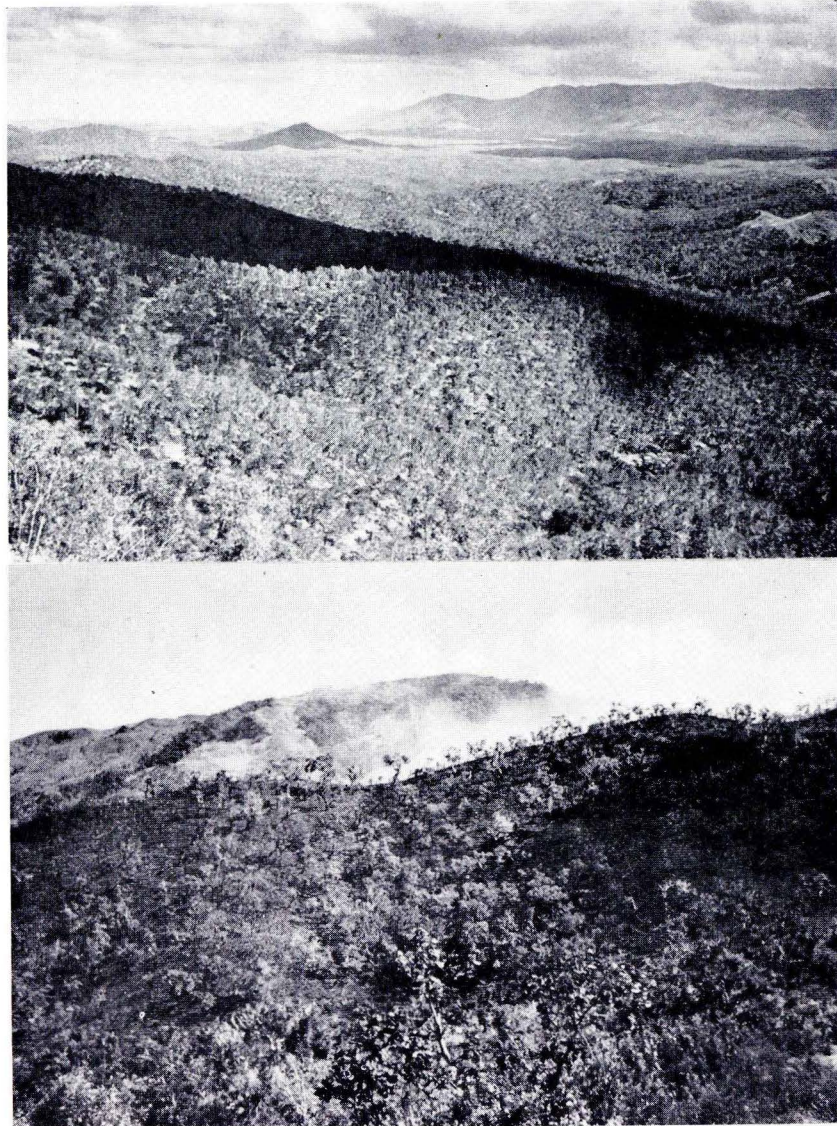


Figure 8—Extensive stands of niaouli, *Melaleuca quinquenervia*, Myrtaceae, on hilly terrain northeast from Col du Crève Coeur toward the Diahot River and metamorphic mountains behind Balade and Amos on the northeast end of the island.

Figure 9—A bush fire west of Touho on the northeast coast which had burned over some 17 km at that time. This frequent burning maintains the enormous area of fire-resistant niaouli on the lowlands and hills.

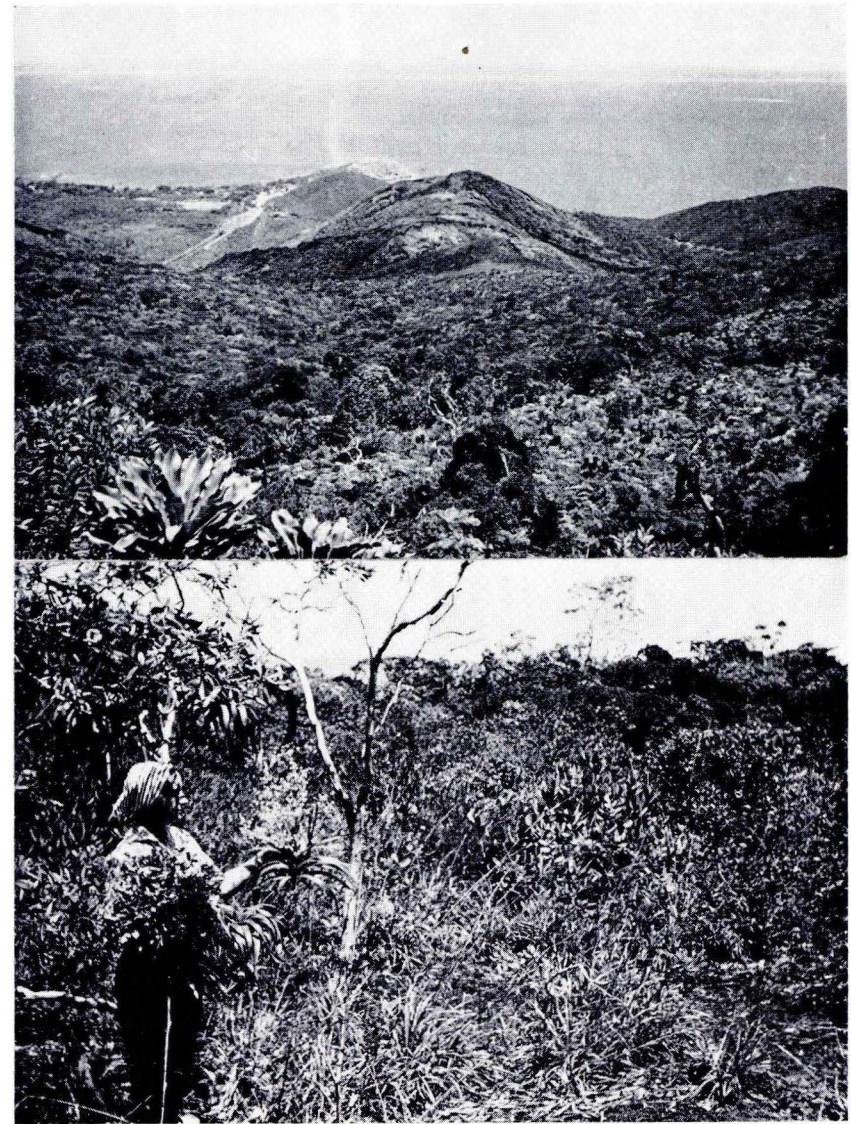


Figure 10—View from the top of the Massif de Tiébaghi southwest to Paagoumène and the fringing barrier reef (white line). Covering the laterized serpentine slopes of this great deposit of chrome ore is the peculiar, open sclerophyllous scrub, or maquis.

Figure 11—Maquis vegetation on the Massif de Tiébaghi. Mrs. R. F. Thorne is holding fruiting *Dracophyllum verticillatum*, Epacridaceae, in her right and *Lomandra banksii*, Liliaceae, in her left hand.

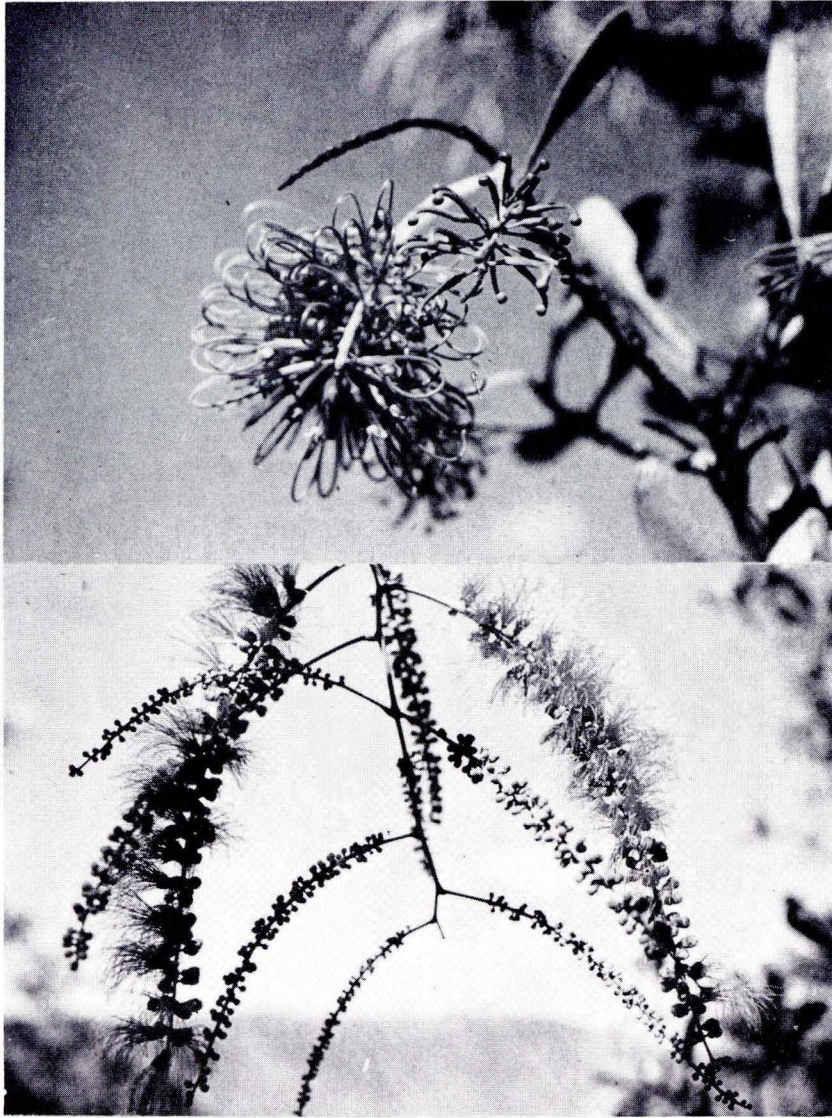


Figure 12—The inflorescence of *Grevillea rhododesmia*, Proteaceae, a common shrub in maquis near Paagoumène.

Figure 13—The inflorescence of *Albizzia callistemon*, Fabaceae, also common in the maquis near Paagoumène.

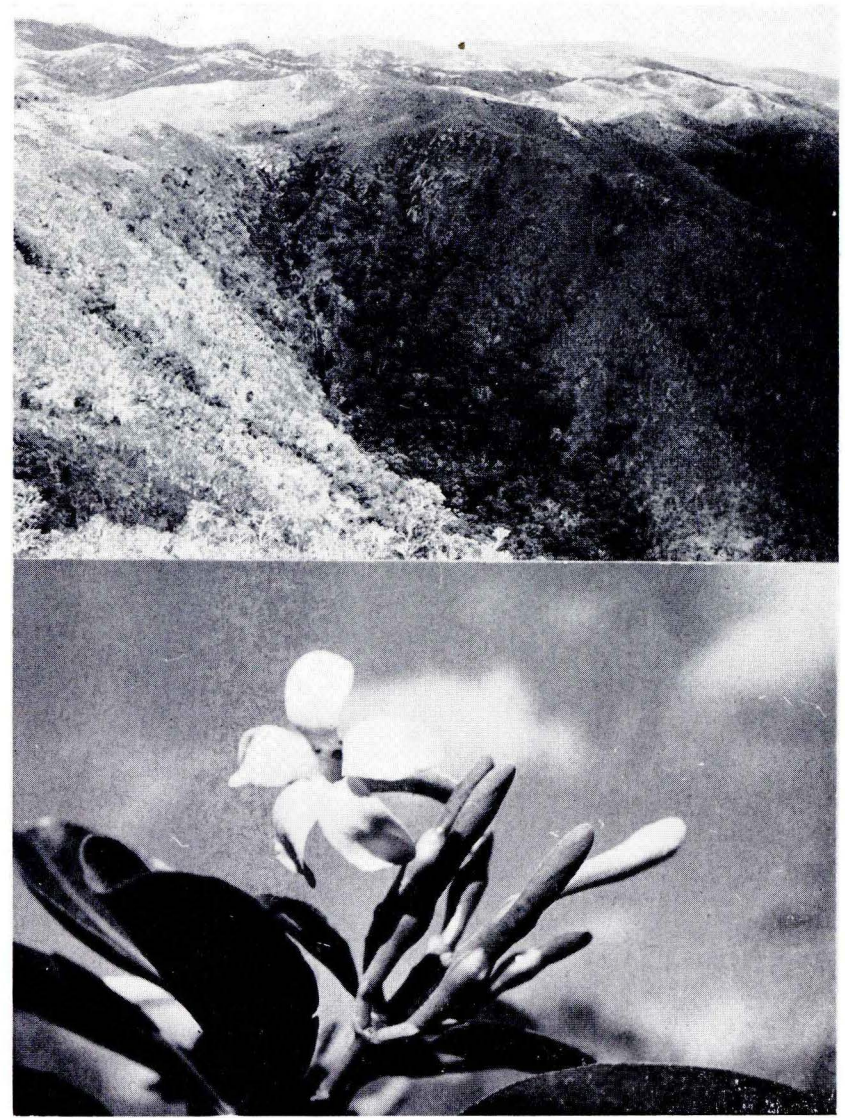


Figure 14—Rain forest in gullies on west-facing mountain slopes of the metamorphic mountains near the Col d'Amos.

Figure 15—The yellow flower of *Fagraea schlechteri*, Loganiaceae, a small tree in fringing rain forest west of the Col d'Amos toward the Diahot River.

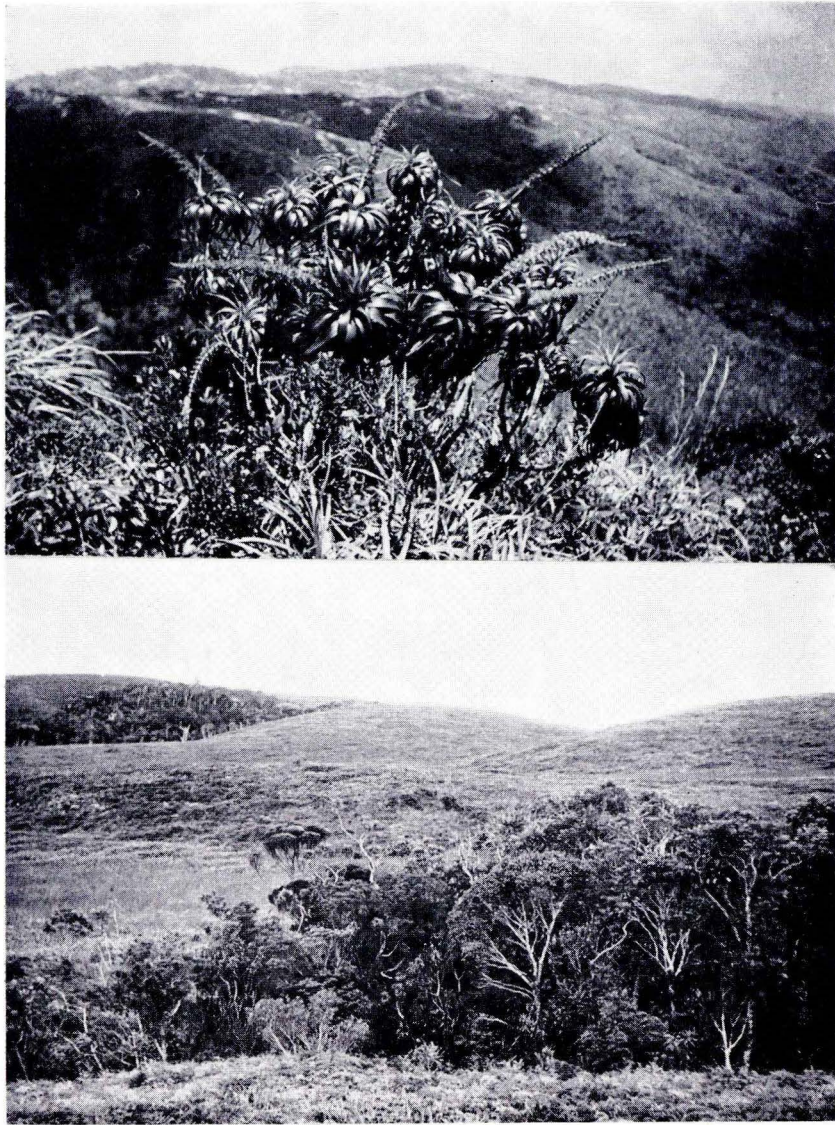


Figure 16—*Dracophyllum verticillatum* on a rounded summit of the metamorphic mountains above the Col d'Amos.

Figure 17—The basin-like summit of the Plateau de Dogny, looking northeast across a boggy area and a "petit forêt," or dwarf forest fringing a small stream, the type locality for *Salacia dognyensis* sp. nov.



Figure 18—Mt. Kaala, 1083 m, with its peak hidden in clouds.

Figure 19—The upper maquis-clad slopes of Mt. Kaala with *Araucaria montana* in the gullies in the background. In the foreground the maquis contains an abundance of *Casuarina chamaecyparis* and *Cloëzia canescens*, Myrtaceae.

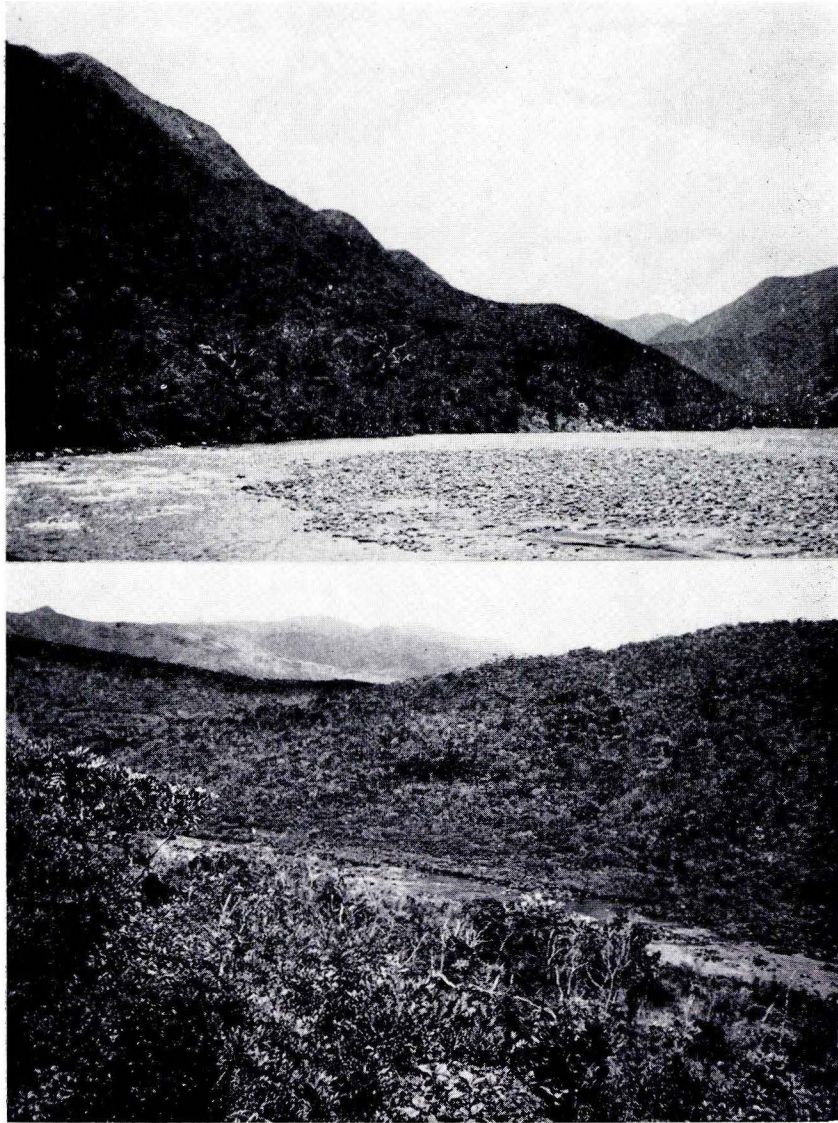


Figure 20—Serpentine slopes along the Tontouta River covered with sparse, xerophytic, sclerophyllous scrub, maquis.

Figure 21—Serpentine maquis vegetation along the Anna-Madeleine River, Plaine des Lacs, where crossed by the Route de Yaté.



Figure 22—Orange flowers of the lianous shrub *Oxera palmatinervia*, Verbenaceae, collected on serpentine in a gully along the Route de Yaté about 33 km from Nouméa.

Figure 23—Lemon-yellow flowers of the shrubby *Dubouzetia confusa*, Elaeocarpaceae, from the Plaine de Lacs along the Anna-Madeleine River.



Figure 24—View of the western coast looking northwest from Mt. Mou. The flowering panicle in the foreground belongs to the shrubby *Dracophyllum verticillatum*.

Figure 25—The north peak of Mt. Mou with *Nothofagus*-conifer forest in the wet saddle between the north and south peaks.

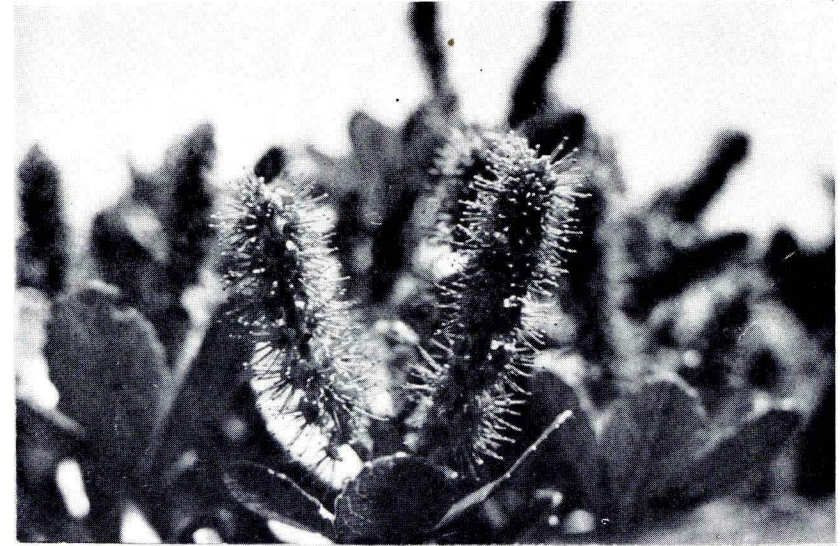


Figure 26—The inflorescence of *Cunonia atrorubens* on the south peak of Mt. Mou. The showy flowers are a deep reddish purple.

Figure 27—R. F. Thorne, left, and M. Luc Chevalier, Director of the Musée Néo-Calédonien and ardent naturalist, with pachycaulous, thick-leaved shrub of *Apiopetalum velutinum*, Araliaceae, on Montagne des Sources.

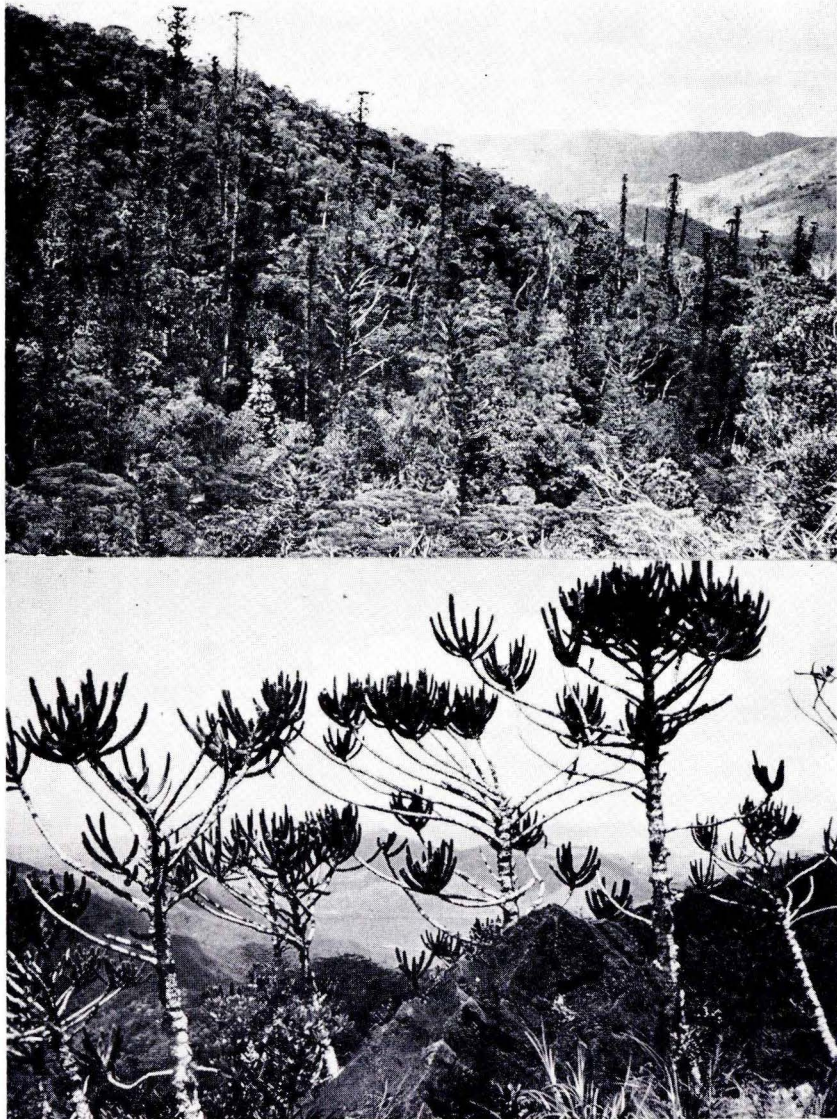


Figure 28—*Araucaria bernieri* forest at about 600 m along Route de Montagne des Sources.

Figure 29—Small trees of *Araucaria muelleri* at about 750 m on Montagne des Sources.



Figure 30—A “petit forêt” or dwarf fringing forest along a gully at about 750 m on Montagne des Sources.

Figure 31—A flowering branch of the shrubby, vesselless *Zygogynum vieillardii*, Winteraceae, found in the dwarf gully forest of Figure 30.

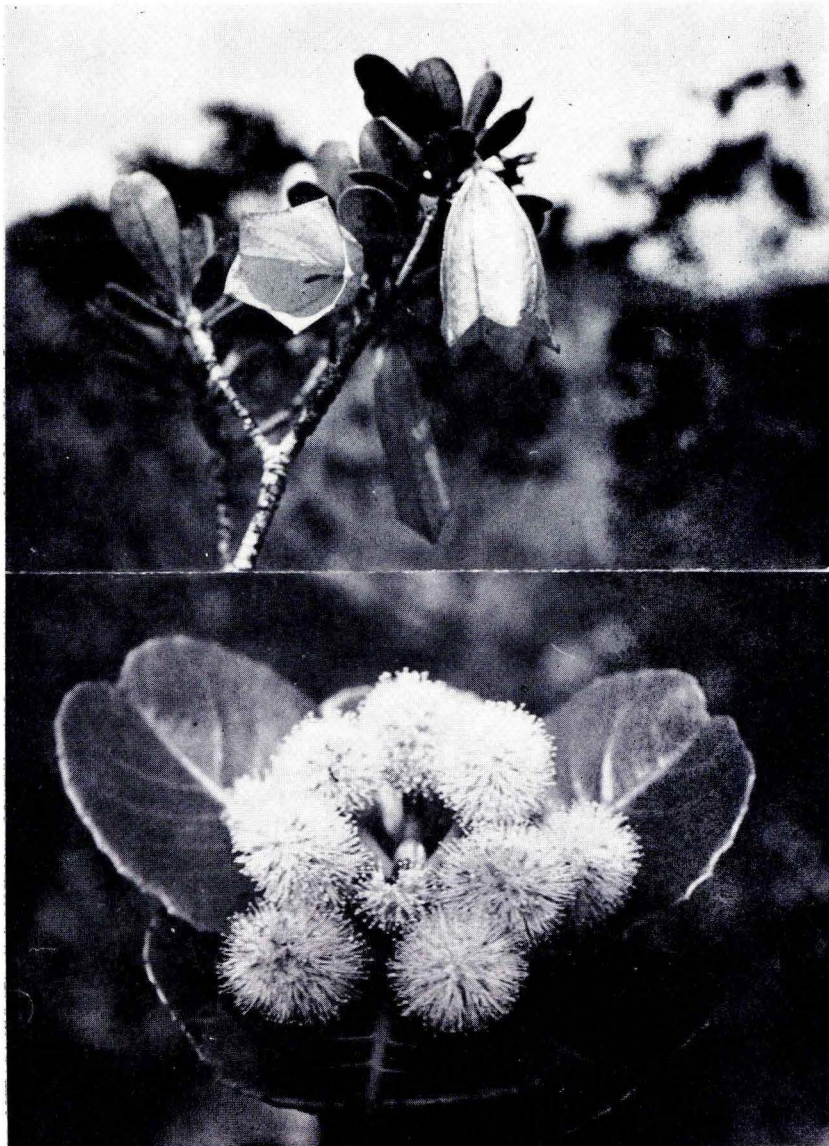


Figure 32—Salmon-colored flowers of *Bikkia campanulata*, Rubiaceae, from the Montagne des Sources.

Figure 33—A flowering branch of the thick-leaved *Pancheria robusta*, Cunoniaceae, also from the Montagne des Sources.



Figure 34—Photograph of the holotype of *Adiantum thornei* Morton, sp. nov., Thorne 28505 at Rancho Santa Ana Botanic Garden. Photograph Distribution No. 6074 of the United States National Herbarium.

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