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NEOCALEDONIAN REGION: CPD SITE PO2

## GRANDE TERRE New Caledonia, France

**Location:** The main island of the New Caledonian archipelago, which is situated in the South Pacific Ocean, to the north of the Tropic of Capricorn and approximately 1500 km from the east coast of Australia, between latitudes 18°00'–23°50'S and longitudes 154°45'–176°20'E.

**Area:** 16,890 km<sup>2</sup>.

**Altitude:** 0–1628 m (summit of Mont Panié).

**Vegetation:** Lowland and montane tropical evergreen rain forests (covering c. 18% of Grande Terre), sclerophyllous forest, maquis (30% of Grande Terre), mangroves.

**Flora:** 3322 vascular plant species, of which 2551 (76.8%) are endemic. 5 endemic families; 110 endemic genera. Endemic-rich gymnosperm and palm flora.

**Useful plants:** c. 20 species used as sources of wood for construction, many ornamental and medicinal species.

**Other values:** Catchment protection; endemic-rich fauna; pioneer species that are resistant to heavy metals, of potential value for revegetating mine workings; flora and vegetation of particular scientific importance for understanding processes of evolution, island colonization and adaptive mechanisms.

**Threats:** Fire clearance for agriculture, grazing pressure, over-exploitation of certain species, mining, urbanization.

**Conservation:** Protected areas on Grande Terre cover 1480 km<sup>2</sup> (9% of the land area), and include 13 designated Special Botanical Reserves. Protected area coverage is inadequate as some vegetation types and many localities of threatened endemic species are not currently protected.

The main island of Grande Terre is treated here as one CPD site; however, it is important to note that virtually every sizeable tract of native vegetation on the island contains at least some endemic plants. The account below includes summary information on some sites of outstanding botanical importance. It is hoped that further identification and documentation of important plant sites will be forthcoming in the future.

### Geography

The New Caledonian archipelago is situated in the South Pacific Ocean, just to the north of the Tropic of Capricorn and approximately 1500 km from the east coast of Australia. It is located between latitudes 18°00'–23°50'S and longitudes 154°45'–176°20'E. It consists of Grande Terre (16,890 km<sup>2</sup>, or 88% of the total land area of the archipelago), Iles Belep, d'Entrecasteaux Récifs, Ile des Pins, the Loyalty Islands (Iles Loyautés: Ouvéa, Lifou, Maré, Tiga), and a number of other scattered islands (the Chesterfields and Walpole) and active volcanoes (Matthew and Hunter). Grande Terre (the main island of New Caledonia) is floristically and ecologically the most diverse island in the group.

New Caledonia, which represents a fragment of Gondwanaland situated on the Norfolk Ridge, was separated from Australasia (Australia, New Guinea and New Zealand) in the early Cretaceous by the Rangitata Orogeny (Stevens 1977; Paris 1981). Grande Terre is mountainous, reaching 1628 m at the summit of Mont Panié, in the north, and

1618 m at Mont Humboldt, in the south. The eastern slopes of the island are more abrupt than those in the west. The oldest rocks date from the early Permian and comprise the main core of mountains running along the axis of New Caledonia (Paris 1981). At the beginning of the Tertiary (upper Eocene) a major geological event took place: the schist substrate then present was covered by a thick layer (of nearly 2000 m) of ultramafic rocks (peridotites and serpentinites). This very slow process, which first began some 39 million years ago, fundamentally modified the original flora and vegetation (Guillon 1975). Today, ultramafic substrates cover approximately 5500 km<sup>2</sup>, principally located in the south (Massif du Sud) and also occurring as isolated massifs, primarily along the west coast (see Map 21).

The climate is tropical, but somewhat moderated by the surrounding ocean, and strongly affected by the trade winds. Windward (eastern) slopes often receive more than 4000 mm of rain per annum, while leeward (western) slopes receive less than 1000 mm annual rainfall.

European discovery occurred in 1774 (by Captain James Cook on his second voyage), but traces of human occupation date from 4000 years ago. The origin of the island's first occupants remains poorly understood (Frimigacci and Maitre 1981), although it is known that New Caledonia was a centre of dispersion and migration for the early inhabitants of Oceania (probably coming from Asia) in their migration eastwards. New Caledonia became an Overseas Territory of France in 1946. The current population is approximately 167,600, with approximately 146,000 living on Grande Terre.

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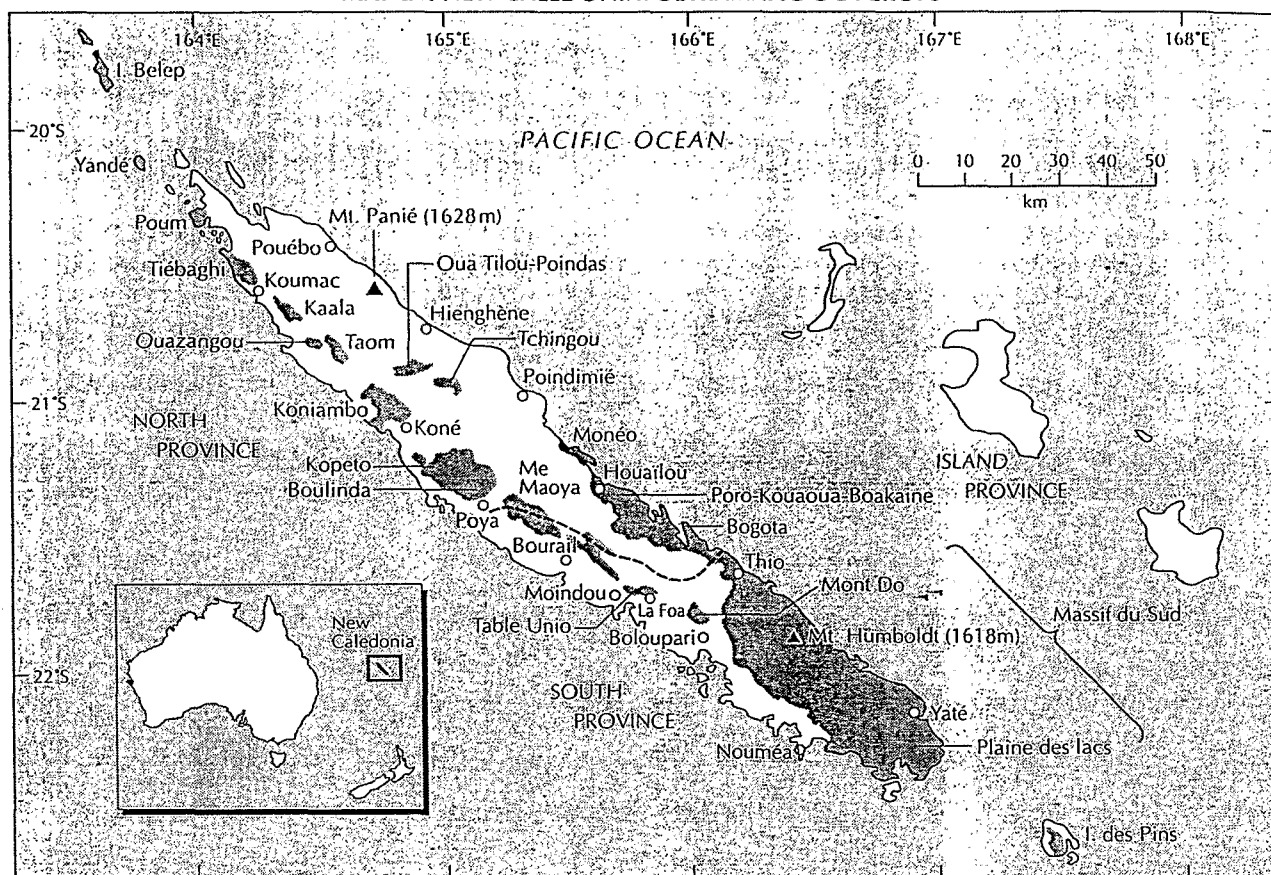


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MAP 21. NEW CALEDONIA: ULTRAMAFIC OUTCROPS



## Vegetation

As a result of its geographic isolation, the variety of geological substrates, the fragmentation of habitats, and the climatic variation resulting from its relief, New Caledonia, despite its small size, has an exceptionally rich flora with high endemism at species, genus and family levels and a diversity of vegetation types. Each of the main primary vegetation types is described briefly below. See Morat, Veillon and MacKee (1984) for more detailed descriptions.

### Evergreen rain forest

Evergreen rain forest (dense, humid evergreen forest) covers approximately 18% of Grande Terre and is scattered over the central mountain chain, and particularly well-represented in the east due to the higher rainfall. These forests occur on all types of substrate (including ultramafics) from 300 m elevation to the highest summits. Evergreen forest is poorly developed on the western slopes, where it occupies only the most favourable sites, in particular the slopes of certain isolated massifs (Koghis, Mont Mou, Mé Maoya) (Centre Technique Forestier Tropical 1974; Morat, Veillon and MacKee 1984). Evergreen forests comprise trees of moderate height (20 m on average), although in certain localities significantly taller emergents can be found (e.g. *Araucaria*, *Agathis*, *Cyrtocarpus*). Most of the important timber trees (see Useful Plants section) occur in this vegetation type.

Approximately 1500 species of flowering plants occur in evergreen forests, of which 90% are endemic; these represent 108 families, of which the most abundant are Rubiaceae, Myrtaceae, Leguminosae, Sapotaceae, Proteaceae,

Araucariaceae, Guttiferae and Araliaceae (Morat, Veillon and MacKee 1984). Of particular note is the presence of the parasitic gymnosperm *Parasitaxus ustus*. There are some gregarious species, such as *Araucaria* spp. and *Nothofagus* spp.

At higher elevations, the trees are lower in stature, and the flora is less rich, although some groups (e.g. pteridophytes, Palmae, Winteraceae, Trimeniaceae and Paracryphiaceae) are more abundant. The vegetation takes on a distinctive appearance on ultramafic rocks above 1000 m. The ground, as well as tree trunks, stems and leaves, is covered with lichens, filmy ferns and bryophytes.

Forests on calcareous substrates with highly developed karst formations (in the Koumac and Hienghène regions) are rich in Sapotaceae, Leguminosae and Euphorbiaceae. There is an abundance of *Microsorium punctatum* and *Asplenium nidus*, which colonize rock outcrops.

Monospecific stands of *Araucaria columnaris* (sometimes reaching over 40 m) occur in a few places near the coast, such as at Goro and Kuébeni. (On outlying islands, such as Loyautés and Ile des Pins, this vegetation is well-developed.)

### Sclerophyllous forest

This formation was once widespread along the west coast of Grande Terre, from sea-level to 300 m altitude. It occurs in dry areas (rainfall <1000 mm and with a long dry season) and on various geological substrates (sandstone, calcareous substrates, chert), but has become very degraded to woody savanna, dominated by *Melaleuca quinquevernia* and woodlands of *Acacia spirorbis* and *Leucaena leucocephala*, or cleared for cultivation. Remnant stands are dominated by

species in the genera *Terminalia*, *Diospyros* and *Cupaniopsis*, accompanied by evergreen sclerophyllous species belonging to the genera *Psydrax*, *Codiaeum*, *Gardenia*, *Pittosporum*, *Austromyrtus* and *Eugenia*. The discontinuous herb layer comprises a mixture of Cyperaceae and Gramineae. Near the ocean shore, this forest type becomes a dense woodland rich in *Cycas* spp.

The flora comprising the sclerophyllous forests, while not as rich as that of the humid, evergreen forest or the maquis, nevertheless contains numerous endemic species, belonging to genera such as *Terminalia*, *Diospyros* and *Captaincookia*, as well as species that are more widely distributed but whose occurrence in New Caledonia is limited to this formation.

#### Maquis

Maquis is a specialized, edaphic formation covering more than 30% of the land area of Grande Terre. It forms a distinctive vegetation type associated mostly with ultramafic substrates. The soils on which maquis occurs are generally nutrient-poor and have high concentrations of magnesium, nickel, manganese and chromium (Jaffré 1976).

Maquis occurs from sea-level to the highest summits, and in areas with annual rainfall ranging between 900 mm to 4000 mm (Morat *et al.* 1986). It includes sclerophyllous, dwarf, evergreen formations, generally less than 2.5 m tall, but it is sometimes dominated by trees or shrubs, or it may comprise a mixture of woody and herbaceous species, with

CPD Site PO2: New Caledonia. Tree fern (*Cyathea novae-caledoniae*) in dense forest on Mont Koghi.  
Photo: P. Morat.



a dense layer of Cyperaceae. The vegetation is occasionally dominated by an open woody stratum comprising *Araucaria* spp. or *Agathis ovalis*, and species with thick and often shiny leaves, arranged in rosettes at the tips of branches (e.g. *Dracophyllum*, *Styphelia*, *Hibbertia*, *Pancheria*, *Xanthostemon* and *Pittosporum*). The herbaceous layer includes species of Cyperaceae (*Costularia* spp.), Orchidaceae, Droseraceae and lichens.

Speciose families represented in maquis include Myrtaceae, Cunoniaceae, Dilleniaceae, Epacridaceae, Proteaceae and Casuarinaceae. Many of the species are endemic and restricted entirely to these formations, and many have spectacular flowers (e.g. *Xanthostemon*, *Bikkia*, *Hibbertia*). In some areas, single species may dominate (e.g. *Tristaniopsis guillainii*, *Gymnostoma deplancheanum*, *G. chamaecyparis*, *Dacrydium araucarioides*, *Neocallitropsis pancheri*).

Maquis occurring at higher altitudes is similar in structure to lowland maquis, but differs floristically. Noteworthy species at higher altitudes include *Metrosideros tetrastricha*, *Xeronema moorei*, *Hibbertia nana* and *Logania imbricata*. Maquis on siliceous schists and chert at low and mid-altitudes on northern New Caledonia also has a distinct floristic composition, although somewhat poorer in species than maquis on ultramafic substrates. Two woody species (a dwarf form of *Melaleuca quinquenervia* and *Codia montana*) and one herbaceous species (*Costularia arundinacea*) are dominant on schists and chert (Morat *et al.* 1981).

#### Mangroves

Mangroves cover approximately 200 km<sup>2</sup>, mostly along the western coastline where the estuaries of the main rivers are wider and deeper than on the east coast. This vegetation comprises about 20 species, all of which occur throughout the Indo-Pacific region. However, *Rhizophora lamarckii* is only known from the east coast of New Caledonia and on the north-eastern coast of Australia.

#### Other vegetation types

Littoral vegetation comprises common Indo-Pacific species; open halophytic vegetation comprises species of *Suaeda* and *Salicornia*. Marsh vegetation is poorly represented in New Caledonia. The most interesting areas of marshland occur at the southern end of the main ultramafic massif, where there is a complex of small lakes linked by streams (the Plaine des Lacs). A large number of wetland species occurs here, all of which are New Caledonian endemics. They include *Lepidosperma perteres*, *Chorizandra cymbaria*, *Cloëzia aquarum*, *Baëckea leratii* and *Pancheria communis*. The endemic gymnosperms *Decussocarpus minor* and *Dacrydium guillauminii* are restricted entirely to this area. Marshy niaouli forest (*Melaleuca quinquenervia*) occurs in depressions along the west coast and in the north. This is the native habitat of this now widespread species.

Early human settlement resulted in changes to the vegetation long before the arrival of Europeans, as a result of the use of fire and the clearance of forest for agriculture. Plants were introduced for food, medicine, rituals and ornamental purposes. Among the early introductions were species of *Dioscorea*, *Alocasia*, *Colocasia*, *Artocarpus*, *Musa*, *Hibiscus*, *Codiaeum* and *Pueraria* (Barrau 1962; Bourret 1981). Today, over half of the primary vegetation has been cleared or severely degraded (see Threats section, below).



CPD Site PO2: New Caledonia. Maquis with *Araucaria rulei* at Massif du Boulinda. Photo: P. Morat.

## Flora

New Caledonia has more than 3320 native species of vascular plants (of which 77% are endemic). There are 863 genera of vascular plants, 110 of which (13%) are endemic (see Table 78). Five families (Amborellaceae, Oncothecaceae, Paracryphiaceae, Phellinaceae and Strasburgiaceae) are also endemic.

Evergreen rain forests of New Caledonia have an exceptional concentration of genera and species considering the restricted area they occupy. For example, 11 genera of *Palmae* have been found on the 25 km<sup>2</sup> area which comprises the eastern slope of Mont Panié, and 131 species of woody plants with a dbh >10 cm have been recorded were found in 1.25 ha of forest on a slope near the Rivière Bleue (as many as in some Amazonian forest plots of similar size) (Jaffré and Veillon 1990).

1200 species are strictly limited to ultramafic rocks, while 1300 species are restricted to a variety of substrates (Morat

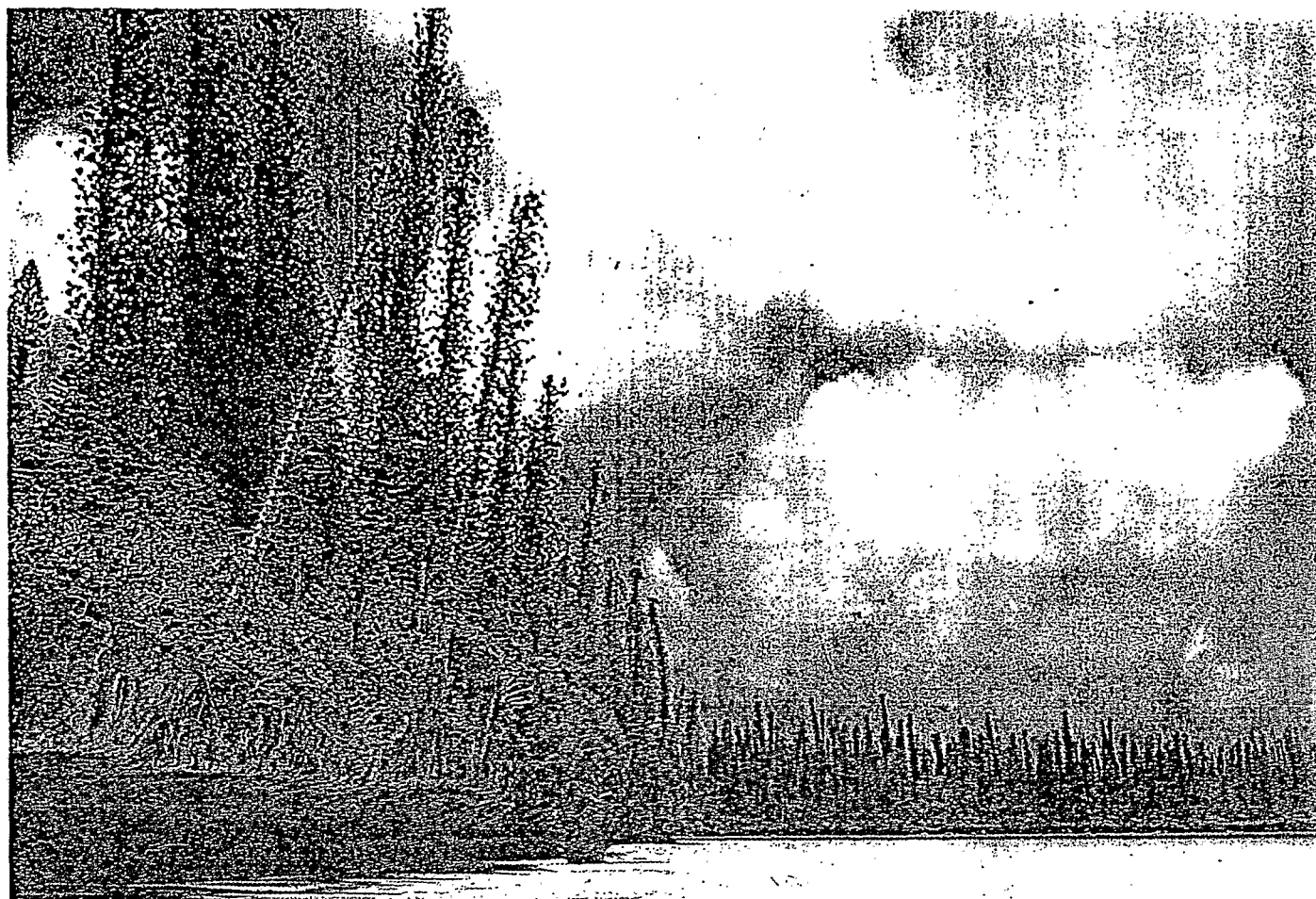
*et al.* 1986; Jaffré 1987; Lowry 1990). Species endemism on ultramafic substrates exceeds 98%. At the generic level, 38 of 108 endemic genera present in New Caledonia are found only on ultramafic rocks.

Seven families (including Myrtaceae and Xanthorrhoeaceae) and two endemic families of strictly forest species (Oncothecaceae and Strasburgiaceae) are restricted to ultramafics. The majority of species in other families, including the best represented (Sapotaceae, Proteaceae, Cunoniaceae and Rutaceae) are also restricted to ultramafic substrates (Jaffré *et al.* 1987).

Species-rich flowering plant families include Myrtaceae, Cunoniaceae, Cyperaceae, Pandanaceae and *Palmae* (which includes 32 species in 17 genera, of which 16 are endemic) (Laubenfels 1972; Moore and Uhl 1984; MacKee, Morat and Veillon 1985). For gymnosperms, 43 out of 44 native species are endemic (the exception being *Cycas circinalis*, which is found throughout the Old World tropics). Primitive

TABLE 78. NATIVE VASCULAR PLANTS OF NEW CALEDONIA.

	Pteridophytes	Gymnosperms	Angiosperms	Total
Families	26	5	160	191
Total genera	75	15	773	863
Endemic genera	2	2	106	110
Total species	261	44	3017	3322
Endemic species	103 (39.5%)	43 (97.7%)	2405 (79.7%)	2551 (76.8%)



CPD Site PO2: New Caledonia. *Araucaria columnaris* on the Ile des Pins. Photo: P. Morat.

angiosperms with archaic or vessel-less wood are represented by several families (Amborellaceae, Annonaceae, Atherospermataceae, Chloranthaceae, Menispermaceae, Piperaceae and Trimeniaceae).

Floristic affinities are strongest with Australia and New Guinea, and then (in decreasing order) with Malaysia, Fiji, Vanuatu, the Solomon Islands and New Zealand (Thorne 1965; Morat, Veillon and MacKee 1984; Morat *et al.* 1986).

The floristic richness and high level of plant endemism can be explained largely by the isolation of New Caledonia (a Gondwanan fragment) since the early Cretaceous. The relatively stable climate has enabled intense speciation of the primitive flora, which has been enriched by elements that reached the island by long-distance dispersal. In addition, at the beginning of the Tertiary, the slow overthrust of all (or part of) the island by ultramafic substrates was largely responsible for the evolution of New Caledonia's very distinctive flora (the flora of the "terrains miniers"), adapted to the specialized edaphic conditions. Pre-Eocene relicts which adapted to ultramafic substrates did not have to face competition from species arriving from outside of New Caledonia, as the new arrivals were unable to colonize these specialized substrates. Subsequent isolation of populations due to the fragmentation of ultramafic outcrops favoured the development of micro-endemism (i.e. the very localized occurrence of endemic species) and the phenomenon of vicariance.

## Useful plants

Only a small proportion of the flora has been utilized to date. The main timber species, which occur in evergreen rain forest at low and mid-altitudes, include *Agathis* spp., *Kermadecia* spp., *Macadamia* spp., *Sleumerodendron* spp., *Hernandia cordigera*, *Calophyllum caledonicum*, *Montrouziera cauliflora*, *Archidendropsis granulosa*, *Neoguillauminia cleopatra*, *Santalum austrocaledonicum* and numerous species of Myrtaceae (Sarlin 1954). The wood of *Acacia spirorbis* and *Arillastrum gummiferum* is frequently used as fence posts, exterior carpentry and flooring (Centre Technique Forestier Tropical 1983). Native species supply 13% of New Caledonia's timber needs (21,000 m<sup>3</sup> of timber from native species being produced in 1979, but only 7000 m<sup>3</sup> produced in 1989) (Service Forêts et du Patrimoine National archives). This represents less than 5% of New Caledonia's total revenues.

Numerous distillates used in the production of scents and pharmaceuticals are extracted from aromatic species, such as *Melaleuca quinquenervia*, *Santalum austrocaledonicum* and *Neocallitropsis pancheri*; the latter, which has a very limited distribution in "maquis minier", deserves special protection. A number of species, including *Ochrosia elliptica* and *Duboisia myoporoidesare*, are used locally as medicines and for industrial purposes (Rageau 1973).

Some species of Araliaceae and of gymnosperms (*Araucaria* spp., in particular) are now widely grown outside New Caledonia as ornamental plants (Guillaumin 1952).

## Social and environmental values

The native flora of New Caledonia is an important resource for scientific research in numerous fields, such as the study of evolution, adaptations to serpentine soils, and mechanisms of resistance to heavy metals, including the hyper-accumulation of nickel and manganese in species such as *Macadamia neurophylla* and *Sebertia acuminata* (Jaffré 1976).

New Caledonia's native forests and maquis provide habitats for many endemic animal species. There is a high degree of endemism in arthropods, reptiles and birds (Solem 1961; Holloway 1979; Sadlier 1986; Bauer and Vindum 1990; Raven 1991). New Caledonia and the Loyalty Islands are rich in restricted-range land bird species, with 30 species present, of which 20 are endemic. The majority of the endemics (13 species) are found only in New Caledonia. Most species occur in forest and several are (today) confined to higher altitudes. One species of particular note is the kagu (*Rhynochetus jubata*), the sole representative of its family. It is a wingless bird that is of special scientific interest and a tourist attraction (Hannecart and Letocart 1980, 1983), and is also the emblem of New Caledonia. A recent census shows that this bird has a patchy, mostly inland distribution in the less disturbed, mountainous areas. Its total population is estimated at 500–600 individuals.

Although international tourism is poorly developed (with approximately 75,000 overseas visitors in 1991), many New Caledonians visit the reserves near Nouméa. At the Parc provincial de Rivière Bleue, the number of visitors increased from 7800 in 1989 to 18,500 in 1991, while at the Parc Corbasson, the number of visitors increased from 45,000 to 55,000 over the same period. There is great potential for developing international ecotourism based on the remarkable scenery and vegetation.

Pioneer species that are able to colonize soils rich in heavy metals could be useful for revegetating mine spoil elsewhere.

A total area of 940 km<sup>2</sup> of natural vegetation has been set aside to protect catchments supplying drinking water.

## Threats

The principal threats to the New Caledonian flora are fire, over-exploitation of certain species, mining activities and, with respect to sclerophyllous forest, agriculture and extensive livestock production.

Fires are sometimes set to regenerate grazing lands or during hunting, and can spread into "maquis miniers" and the edges of forests.

Some species are over-exploited. Among them are *Agathis lanceolata*, *Santalum austrocaledonicum*, *Arillastrum gummiferum*, *Neocallitropsis pancheri*, *Cyathea* spp. (used as a support for growing orchids), and ornamental species such as Orchidaceae.

About 3–5% of the area of evergreen rain forests has been cleared during the last 20 years. The few remnants of sclerophyllous forests are mostly located on private land and their future depends entirely on the goodwill of the land owners. Sclerophyllous forests are not represented in the existing reserve system, with the exception of a few hectares of very degraded forest in Nouméa and its immediate environs.

Opencast nickel mining, New Caledonia's primary economic activity, destroys the most luxuriant vegetation occurring in the upper parts of certain massifs, and results in bare slopes and spoil heaps which are vulnerable to erosion. Attempts to recolonize mine spoil with native species have had encouraging results (Jaffré, Latham and Schmid 1987). Until 1970 mining was practically unregulated, but today there are strict controls on prospecting, road building and the siting of spoil heaps. New Caledonia, according to recent estimates, still contains more than 50% of the world's nickel reserves. An increase in the world price of nickel could mean that more mining activity is allowed and environmental regulations slackened, especially if the economy is in recession.

There are more than 1500 introduced plant species, many of which have become naturalized and now form part of the botanical landscape (MacKee 1985). Most introduced species are unable to colonize ultramafic substrates, and thus far the majority of introductions do not constitute a major threat to intact or slightly disturbed vegetation. However, several species rapidly invade secondary vegetation types and impede the regeneration of native vegetation. Among the species concerned are *Lantana camara*, *Psidium guajava*, *Furcraea foetida*, *Mimosa invisa* and *Leucaena leucocephala*. *Graptophyllum pictum* has penetrated forested areas in some places, but is not a serious threat (MacKee 1985).

Introduced Java deer (*Cervus timorensis*) prevent the regeneration of native species in some places.

The vegetation of some frequently visited localities (e.g. Chutes de la Madeleine) is suffering localized damage from tourism.

Numerous species in the New Caledonian flora are only known from a single locality or even a single population (e.g. *Dacrydium guillauminii*). This considerably increases the risk of their extinction, either from man-made or natural causes.

## Conservation

Since 1950, several Special Botanical Reserves (IUCN Management Category: IV) have been created. Today, there are 13 such reserves, including Mont Panié (50 km<sup>2</sup>), Mont Humboldt (32 km<sup>2</sup>), Pic du Pin (14 km<sup>2</sup>) and Forêt de Sailles (11 km<sup>2</sup>) and 9 smaller reserves. The statute creating the Massif des Lèvres reserve has never been enforced.

Montagne des Sources (58.7 km<sup>2</sup>) became New Caledonia's only terrestrial Strict Nature Reserve ("Réserve Naturelle intégrale") (IUCN Management Category: I) in 1950.

Eight Territorial Parks have been established, covering 113 km<sup>2</sup>. Nearly 1000 km<sup>2</sup> are included in reserves established at 148 sites for the protection of certain watersheds that provide drinking water to inhabited areas. In addition, there are 5 Special Fauna Reserves protecting, in particular, the avifauna, and specifically the kagu, and 2 Special Fauna and Flora Reserves. Hunting and plant collecting is controlled within the reserves. With the exception of the Montagne des Sources Strict Nature Reserve, all protected areas have statutes that permit prospecting for minerals.

Altogether, about 9% of the land area of New Caledonia is currently included within protected areas. Although there are representative samples of dense forests on schist

and ultramafic rocks, "maquis miniers" and several other distinct vegetation types, the reserve coverage is inadequate to protect the flora of New Caledonia. Mangroves, sclerophyllous forests and forests on calcareous substrates,

as well as a large number of localities containing micro-endemic species, are not currently protected. The sites listed in Table 79, and shown on Map 22, which are protected are of particular note.

**TABLE 79. EXAMPLES OF PROTECTED SITES WITH IMPORTANT VEGETATION TYPES AND NOTEWORTHY TAXA**  
The numbers in bracket refer to localities on Map 22

**A. Water supply reserves (North and South Provinces)**  
148 separate areas.

**B. Strict Nature Reserve (South Province)**

**Montagne des Sources (1).**

Protected: evergreen rain forest; maquis: population of *Neocallitropsis pancheri*; mountain forest dominated by *Araucaria humboldtensis*.

Notable species: *Platyspermatum crassifolium*, *Basselinia porphyrea*, *Canacomyrica monticola*.

**C. Special Botanical Reserves (South Province)**

**Chutes de la Madeleine (2).**

Protected: populations of *Neocallitropsis pancheri*, *Dacrydium guillauminii*, *Nageia minor*; swamp and riverine associations.

**Plaine des Lacs (3), (7 separate areas).**

Protected: evergreen rain forest, *Agathis lanceolata*; populations of *Arillastrum gummiferum*; shrub-herb maquis.

Notable species: *Nothofagus* spp., *Kermadecia pronyensis*, *Xanthostemon aurantiacum*, *Gymnostoma deplancheanum*.

**Mont Mou (500–1200 m) (4).**

Protected: montane forest and scrub; associations rich in bryophytes and filmy ferns.

Notable species: *Nothofagus baumanniae*, *Metrosideros porphyrea*, *Strasburgeria robusta*.

**Mont Humboldt (1000–1618 m) (5).**

Protected: evergreen rain forest; montane maquis.

Notable species: *Araucaria humboldtensis*, *Paracryphia alticola*, *Logania imbricata*, *Libocedrus chevalieri*, *Metrosideros tetrasticha*, *Creslania montana*.

**Forêt de Saille (6), Mont Ninga (7), Mont Do (8).**

Protected: evergreen rain forest with *Agathis lanceolata*; dense *Araucaria-Nothofagus* forest; *Creslania circinnata* association in shrub-herb maquis.

Notable species: *Pseudosciadium balansae*, *Oxera* spp., *Casearia coriifolia*.

**Special Botanical Reserves (North Province)**

**Mont Panié (200–1630 m) (9).**

Protected: dense forest rich in palms at mid- to high altitudes; montane scrub.

Notable species: *Araucaria schmidii*, *Agathis montana*, *Lavoixia macrocarpa*, various *Cunoniaceae* and *Winteraceae*.

**D. Special Faunal Reserves**

**South Province: Upper Yaté (10), Le Prédour Island (11).**

**North Province: Mont Aoupinié (12), Pam Island (13).**

Protected: birds only, particularly the kagu, in evergreen rain forest.

**E. Territorial Parks**

Mainly reserved for public recreation. Protected: evergreen rain forest: *Rivière Bleue* (14), *Thy* (15); sclerophyll forest: *Parc Corbasson* (16), *Ouen-Toro* (17).

**F. Tourist Site (South Province)**

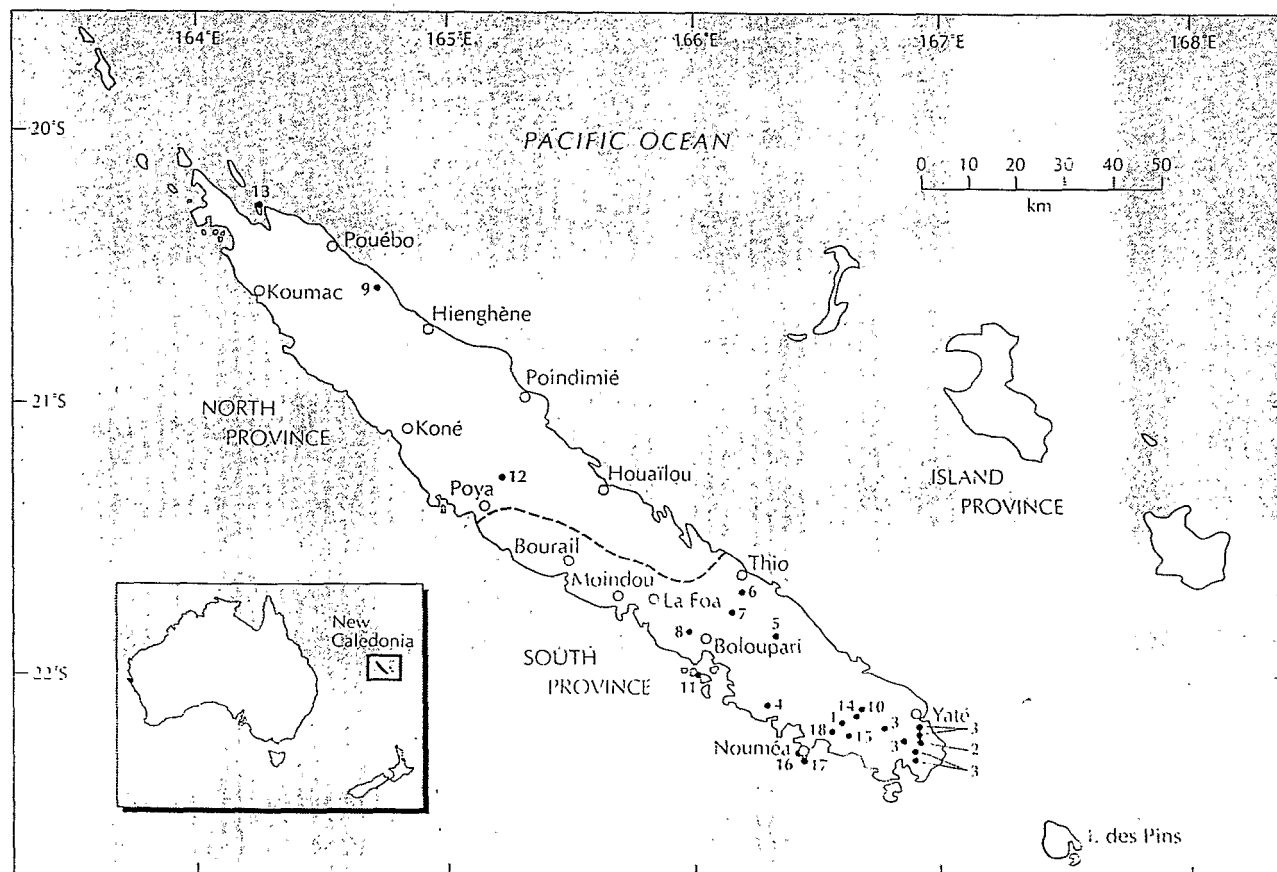
**Mont Koghi forest (100–1080 m) (18).**

Protected: evergreen rain forest at middle altitudes, and montane scrub with *Araucaria* and *Nothofagus*.

Notable species: *Neisosperma thiollieri*, *Sloanea koghiensis*, *Acropogon megaphyllus*.

**MAP 22. NEW CALEDONIA: PROTECTED AREAS**

Numbers refer to localities mentioned in Table 79



As a consequence of the massive degradation that resulted from mining exploitation, an Environmental Committee was set up in 1970 to develop measures to regulate mining activities in New Caledonia.

A number of rare or threatened species have been propagated successfully in *ex situ* collections. For example, the palm *Pritchardiopsis jeanneneyi*, which was thought to be extinct since the beginning of the century, was relocated in 1981 in two or three small populations. Only one fruiting adult individual is known in the wild (Morat 1986; Jaffré and Veillon 1989). Seeds have been distributed within New Caledonia, and to botanic gardens throughout the world, and have been found to germinate easily. The species is therefore no longer in danger of extinction. The survival of a second species of palm, *Lavoixia macrocarpa*, which is known from only four adult individuals, is more in question. There is no natural regeneration *in situ* and all attempts to germinate seeds of this species have so far failed. Fortunately, the remaining populations of these two species of palms are located in reserves.

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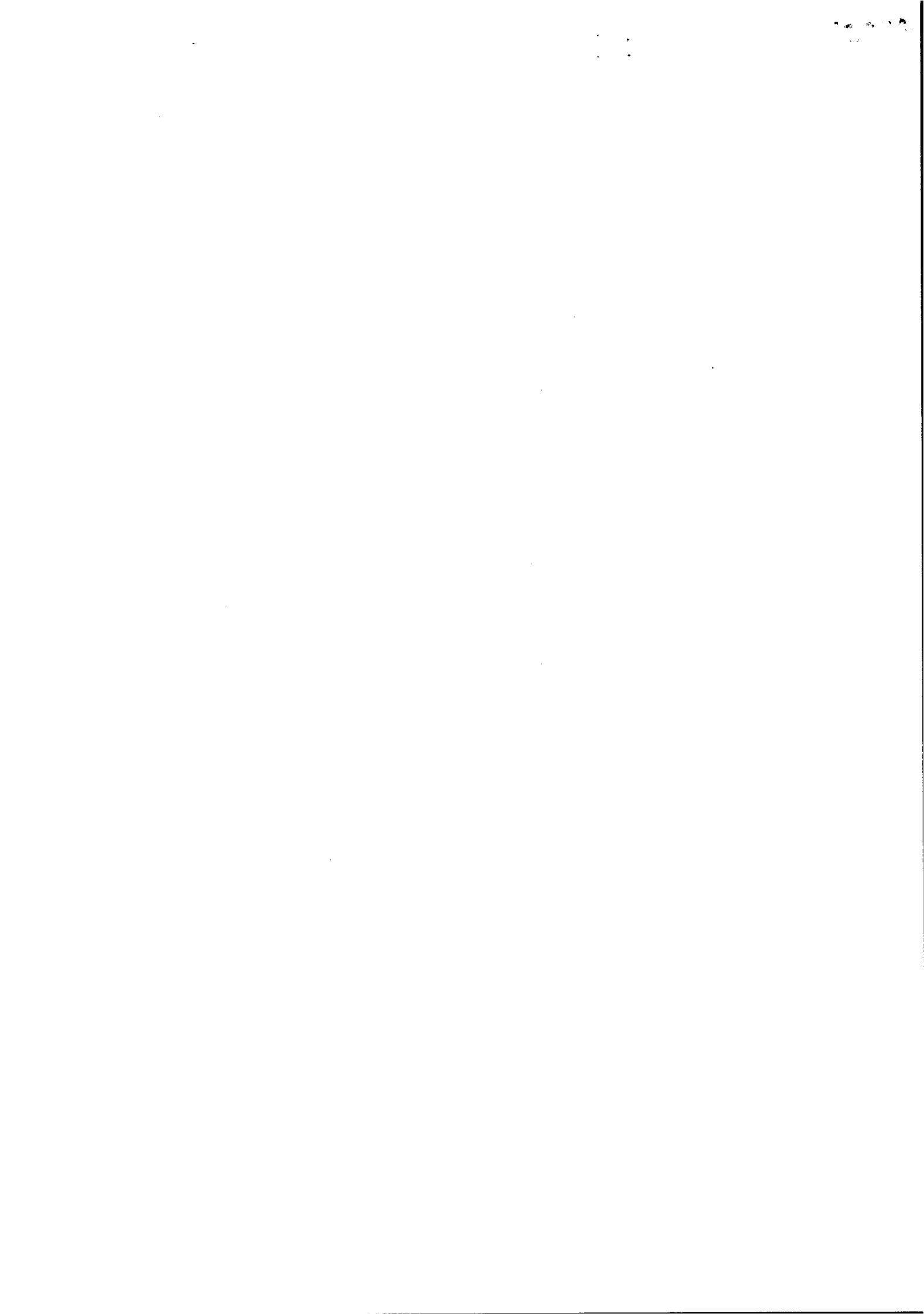
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Project Director: V.H. HEYWOOD  
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