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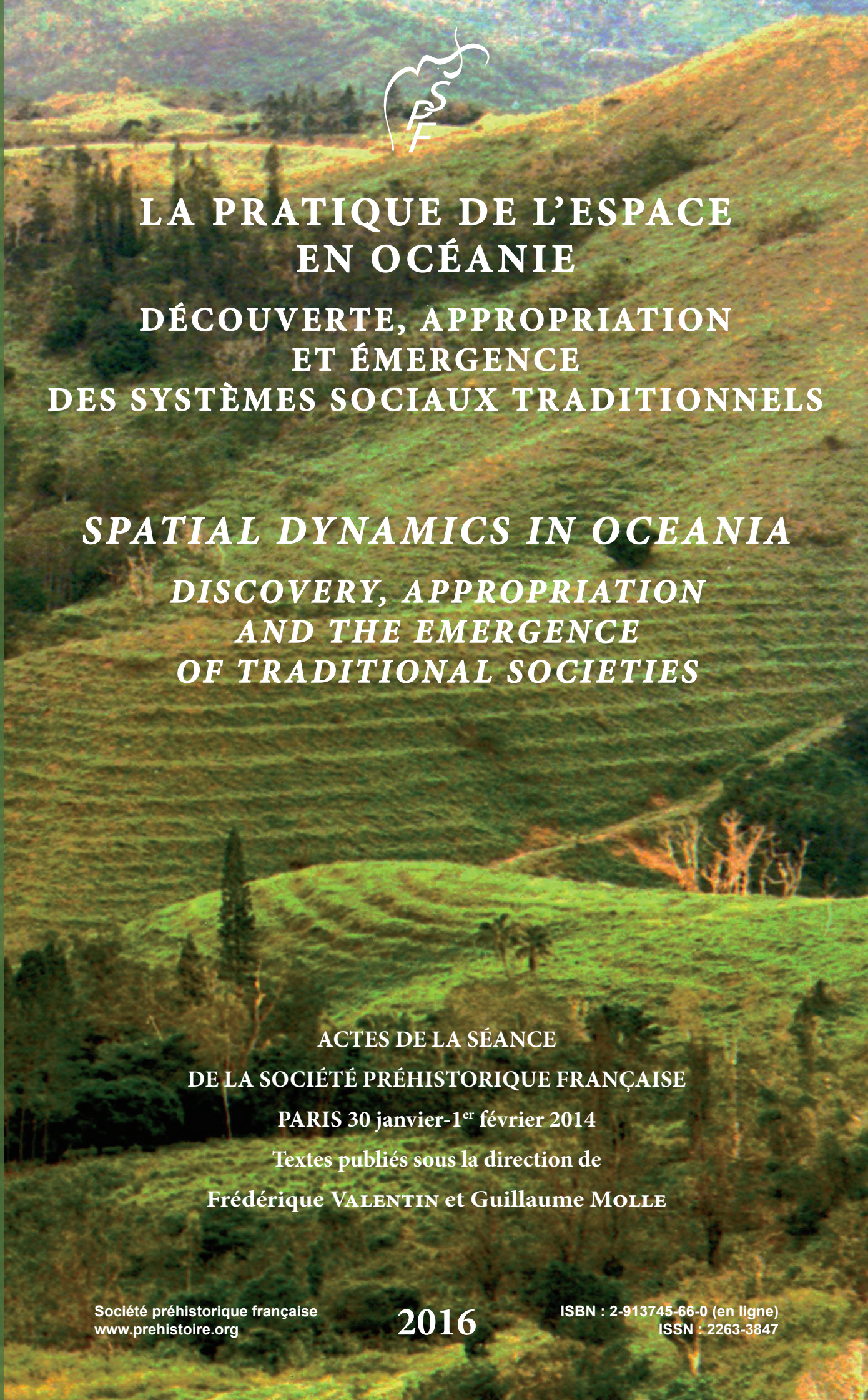

LA PRATIQUE DE L'ESPACE EN OCÉANIE

DÉCOUVERTE, APPROPRIATION ET ÉMERGENCE DES SYSTÈMES SOCIAUX TRADITIONNELS

SPATIAL DYNAMICS IN OCEANIA

DISCOVERY, APPROPRIATION AND THE EMERGENCE OF TRADITIONAL SOCIETIES

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7

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Traditional Kanak Landscapes

An Assessment of Settlement Pattern Studies in New Caledonia (Southern Melanesia)

Christophe Sand, André-John Ouétcho, Jacques Bolé, David Baret and Yves-Béalo Gony

Abstract: Settlement pattern studies of traditional Melanesian landscapes have been and still remain an under-represented research topic. This paper reviews the question for New Caledonia. The first part will highlight the near absence of mapping field-studies on traditional pre-contact Kanak landscapes until the early 1990s, before presenting the major change in this regard identifiable during the past twenty-five years. As part of a larger research program focusing explicitly on the 'Traditional Kanak Cultural Complex' from an archaeological perspective, the objectives were to highlight the type of settlement patterns still identifiable on the Grande Terre Island, the large mountainous island of the archipelago. The first focus was put on household mapping and the related horticultural features present around Kanak hamlet sites. This has shown an unexpected diversity of settlement shapes and sizes. These field projects also highlighted the dense nature of the former landscape occupation.
These first results permitted a critical assessment of the orthodox historical scenario of low Kanak population densities in New Caledonia at first European contact. In order to expand our understanding of traditional Kanak landscapes, more recent research projects have started to map the density of some of these occupations on Grande Terre on a wider scale. The recording of structures over large areas illustrates the complexity of traditional Kanak settlement patterns. Excavation on some of these sites allows us for the first time to highlight the construction chronology of these traditional Southern Melanesian landscapes, developed specifically during the second millennium AD. The analysis below discusses the main reasons that have until recently limited landscape studies in island Melanesia, one being the strong focus of three generations of Melanesianist archaeologists on ceramics and cultural chronologies. Our mappings also question the ethnographic interpretation, which relies on late nineteenth century and early twentieth century observations that were made at a time when most of the indigenous population had already disappeared owing to introduced diseases. This paper highlights the extent to which recent archaeological results challenge the orthodox model proposed by ethnographers for traditional indigenous Kanak societies. Rather than the sparsely populated island described in the late nineteenth century, archaeological surveys have revealed the massive scale of landscape use during the pre contact period. We can only conclude that landscape archaeology has much to offer for a better understanding of the diverse cultural chronologies of island Melanesia.

Keywords: Settlement patterns, island Melanesia, New Caledonia, Traditional Kanak Cultural Complex, ethnography, house mounds, horticultural features, epidemics.

Paysages traditionnels Kanak : études des modalités de l'occupation de l'espace en Nouvelle-Calédonie (Mélanésie du Sud)

Résumé : Les études des occupations de l'espace traditionnel mélanésien ont été et restent rares, en particulier au vu des nombreux travaux menés sur ce sujet en Polynésie et en Micronésie. Cet article propose d'aborder ce thème en focalisant l'attention sur la Nouvelle-Calédonie, l'archipel méridional du croissant mélanésien. La première partie souligne l'absence quasi complète, avant le début des années 1990, de cartographies de terrain ayant eu pour objectif d'inventorier les formes d'occupation de l'espace développées par les Kanak pendant la période de pré-contact. Le désintérêt pour ce sujet s'explique par la focalisation massive des études sur le volet ethnographique des sociétés traditionnelles kanak. L'article présente ensuite les grandes évolutions qui ont marqué les vingt-cinq dernières années, principalement liées à des projets de terrain développés par des équipes locales. Dans le cadre d'un programme de recherches plus large dont le but est d'étudier les différentes caractéristiques de « l'ensemble culturel traditionnel kanak » dans une perspective archéologique, l'objectif était de suivre un modèle d'étude de *settlement pattern* emprunté aux travaux menés en Polynésie. L'attention s'est principalement portée sur les traces anciennes d'occupation de l'espace encore identifiables dans les paysages de la Grande

Terre, l'île principale de l'archipel. La première phase de l'étude s'est attachée à caractériser les formes d'aménagements des habitats en hameaux et des types de structures horticoles réalisées autour des lieux de vie. La cartographie de nombreux sites a mis au jour une diversité insoupçonnée de formes et de tailles de hameaux, bien plus complexes dans leur organisation au sol que ce qui avait pu être déduit des études ethnographiques. Les inventaires ont également révélé la densité de ces anciens sites dans le paysage. Cette densité s'illustre dans certaines régions par des successions de regroupements de tertres de cases surélevés tous les 100-200 m de distance sur certaines lignes de crête des hautes vallées.
Ces premiers résultats de terrain ont forcé à mener une analyse critique des interprétations proposées par les travaux ethnographiques sur les anciennes sociétés kanak, censées être caractérisées par une faible démographie. Ce travail a fait apparaître un manque de relation directe avec les données issues des études archéologiques de terrain. Afin de pouvoir illustrer de façon plus claire l'importance spatiale des anciennes occupations kanak, les programmes développés récemment ont commencé à s'attacher à cartographier dans différentes régions de la Grande Terre, des ensembles d'habitat et de cultures horticoles sur de grandes surfaces. Ceci a été réalisé dans un premier temps en travaillant sur les données observables grâces aux photographies aériennes des espaces non-boisés. Dans un deuxième temps, les vestiges visibles au sol dans plusieurs sites-clé de la zone nord-est de la Grande Terre ont été cartographiés de façon extensive. Dans les vallées de la Tipindjé et de la Tiwaka, l'extension spatiale des traces d'habitat et de cultures horticoles était telle, que la cartographie des sites étudiés n'a pu être menée. Une cartographie complète a néanmoins pu être menée à son terme dans les parties planes de deux petites vallées de la tribu de Wérap, en moyenne vallée de la Hienghène.
La cartographie de structures anciennes sur des grandes étendues, permet d'illustrer la complexité des anciens modes d'occupation de l'espace kanak. Les fouilles menées sur certains sites nous permettent pour la première fois de mettre en lumière l'existence d'une chronologie d'édification de ces structures caractéristiques du sud de la Mélanésie, en démontrant que celle-ci est limitée au deuxième millénaire apr. J.-C. L'analyse des données permet d'identifier les principales raisons qui ont jusqu'à récemment limité les études archéologiques sur l'occupation de l'espace dans les îles de la Mélanésie. La première est certainement la focalisation quasi exclusive de trois générations d'archéologues travaillant dans cette région, sur des études liées à la céramique et à la définition de chronologies culturelles. De façon significative, un contexte archéologique similaire était présent en Micronésie, sans que ceci n'ait empêché le développement depuis longtemps de programmes de recherches focalisés explicitement sur les occupations traditionnelles de l'espace. Cette différence dans la définition d'axes d'études archéologiques, s'explique par la forte influence des travaux ethnographiques en Mélanésie, qui ont en particulier caractérisé les groupes kanak comme ayant toujours été peu nombreux et organisés en systèmes politiques simples.
Les cartographies de sites kanak anciens viennent aujourd'hui questionner cette interprétation, qui s'est construite sur des données obtenues à la fin du XIXe siècle et au début du XXe siècle, à une période où la majorité des groupes autochtones avaient déjà disparu, emportés lors d'épidémies engendrées par toute une série de maladies introduites par les européens. Cet article souligne à quel point les données archéologiques acquises récemment viennent remettre en question le modèle ethnographique orthodoxe caractérisant les sociétés traditionnelles kanak anciennes. Contrairement à l'image couramment acceptée de populations peu nombreuses et vivant en groupes dispersés, véhiculée par les descriptions de la fin du XIXe siècle, les inventaires archéologiques ont mis en lumière une densité massive des occupations de l'espace durant les siècles ayant précédé les premiers contacts avec les Européens. Les études ont montré que les processus d'intensification et de densification sont tout particulièrement observables pour les ensembles horticoles et les regroupements de tertres d'habitat surélevés. Ces données démontrent tout l'intérêt des études archéologiques réalisées sur les anciennes occupations traditionnelles des espaces insulaires du Pacifique sud-ouest. Le développement souhaité de cette problématique dans les années à venir devrait permettre une caractérisation des diverses chronologies culturelles de la Mélanésie insulaire plus conforme aux réalités historiques passées.

Mots-clés : occupation de l'espace, Mélanésie insulaire, Nouvelle-Calédonie, « ensemble culturel traditionnel kanak », ethnographie, tertres de cases, structures horticoles, épidémies.

Landscape archaeology has been one of the central research themes developed since the start of the discipline to better understand the ways former pre-historic and historic civilizations interacted with their environment. Large-scale mapping of former towns, forts, agricultural settings and religious sites is routine in archaeology, as essential for the understanding of the past as excavation. In the Pacific, this has led from the first period of contacts, and more professionally from the end of the nineteenth century onward, to a record of the complexity of some of the significant indigenous sites of the region. Starting with the most emblematic remains such as the Moai of Rapanui (e.g. Routledge, 1919) or the megalithic complex of Nan Madol in Pohnpei (e.g. Hambruch, 1911), the record of archaeological landscapes has grown to encompass a more diverse array of site-types, such as fortifications, shrines and traditional villages. By the middle of the twentieth century, a number of field studies permitted, at least for part of Polynesia and to a lesser degree Micronesia, the production of a first set of large-scale maps, prompting analysis of former landscape uses and comparisons with the ethnographic record.

Surprisingly, the only region in Oceania where no comparable programs were undertaken is Melanesia. Although the southwestern Pacific had been identified early on as having 'megalithic remains' (Riesenfeld, 1950)—a site-type conducive to mapping—and had in at least some archipelagoes developed impressive wooden building traditions, ethnographers and amateur archaeologists did not venture to really tackle this topic. When professional archaeology finally developed in Melanesia after World War II, the main focus was on early settlement and ceramic sequences (Golson, 1959). Until the 1990s, the Melanesian crescent did not see the boost in landscape studies (Green, 1961) that characterized Polynesia and Micronesia as well as Fiji. To draw attention to

a case where the late development of landscape archaeology in the region has produced rich results over the last two decades, this paper will present an assessment of New Caledonia, the southernmost archipelago of island Melanesia (fig. 1). After providing a general background of ethnographic data on the traditional Kanak societies of New Caledonia and their uses of landscapes, the paper will outline the results of the very few studies that dealt with Kanak landscapes before the 1990s. A second part will then detail the horticultural and house-hold/hamlet-focused research programs conducted over the last twenty years, before ending with the presentation of large-scale mapping programs undertaken in recent years.

GEOGRAPHICAL AND ETHNOGRAPHIC BACKGROUND

New Caledonia is located at the southern limit of the tropics, being crossed by the Tropic of Capricorn. Two distinct landmasses with different geological histories, positioned on a north-west/south-east axis, characterize the archipelago. The western part is a continental fragment of Gondwanaland, separated from Australia about 80 million years ago, before diving into the ocean. When it rose again, this landmass pulled with it part of the ocean floor, rich in different metals like nickel, chrome and iron. The progressive weathering of this upper acidic metamorphic crust prompted, by adaptation, the development of a unique biota that makes New Caledonia one of the main hotspots of biodiversity in the world. Today the metamorphic crust covers about 30% of Grande Terre, the 400 km-long (N–S) and 50 km-wide (E–W) main island of the archipelago, divided down its long axis by a mountain range reaching up to 1648 m above sea level, creating a wet climate on the narrow windward east coast and a dry climate on the broader leeward west coast. Grande Terre is surrounded by a 1,600 km long coral reef, protecting most of the coasts of the main island as well as its smaller satellites (e.g. Isle of Pines, Belep) from direct impact of the ocean. This is not the case of the second

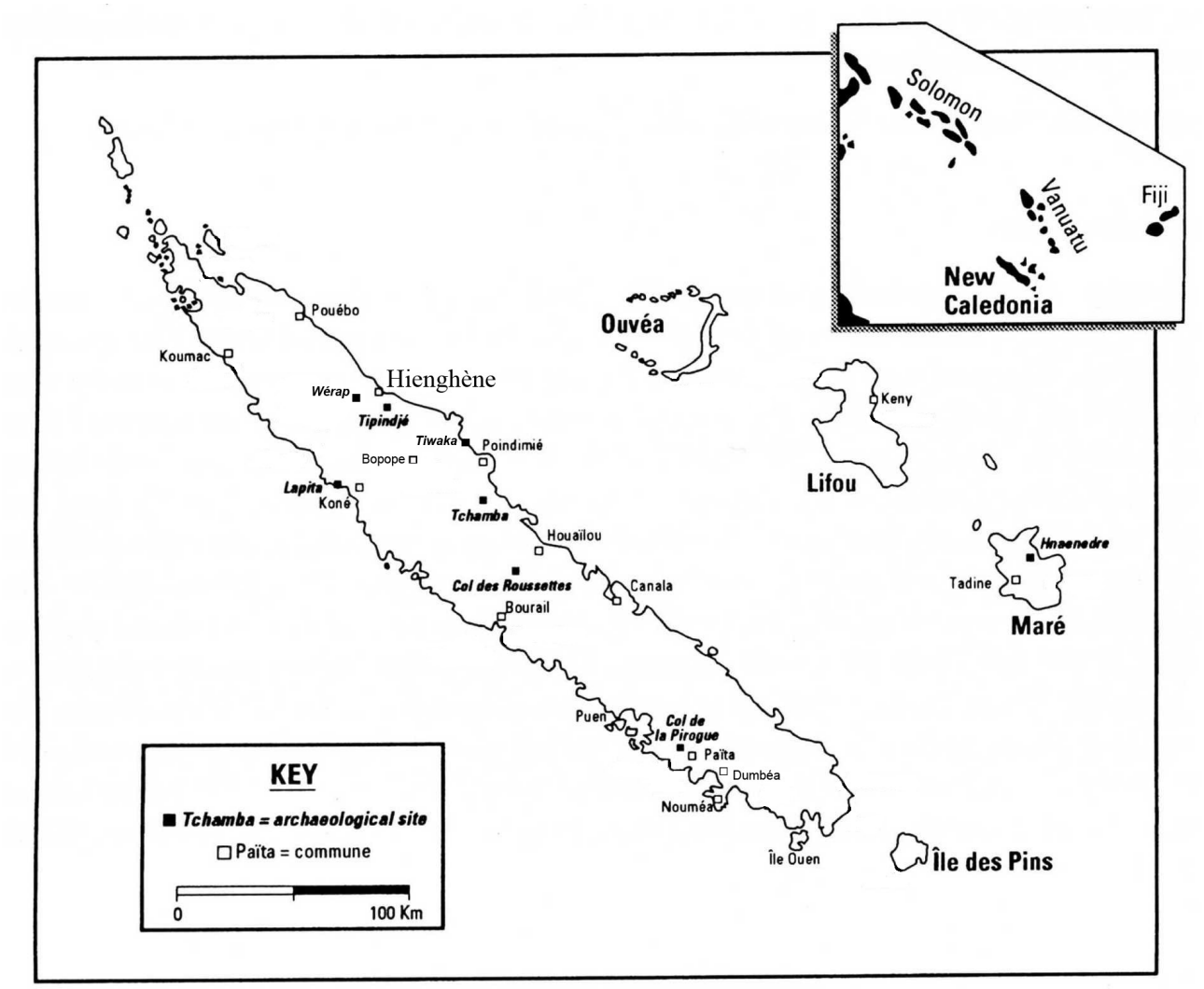

Fig. 1 – Map of New Caledonia, showing the location of the main archaeological sites discussed in the paper.
***Fig. 1** – Carte de la Nouvelle-Calédonie avec la localisation des principaux sites archéologiques discutés dans l'article.*

part of the archipelago, the Loyalty islands to the east of Grande Terre, which are terraced uplifted coral platforms built up on volcanic summits. The two largest islands, Lifou (1,200 km^2) and Maré (640 km^2), reach 104 m and 123 m above sea level respectively. Only Ouvea in the north of the Loyalties has an extensive protective lagoon, owing to its semi-atoll shape.

The archipelago was first settled by Lapita navigators about 3000 years ago (Sand, 2010). Over the succeeding millennia, population growth and socio-cultural dynamics led to the occupation of most of the habitable environments. This gave rise, at around AD 1000, to the advent of a specific 'Traditional Kanak Cultural Complex' (Sand et al., 2003). As in every other agricultural society in the world, Kanak traditions and beliefs saw the landscape as a central element in cultural identity. The origin point of a clan is symbolized in Kanak myths by the first house-mound built by the oldest ancestor. Successions of generations are recorded in traditions not merely through genealogies, but through the clans' itinerary as materialized by the position of the different house mounds which the clan leaders settled over the centuries (Bensa and Rivierre, 1982). Around the chiefly or head house-mound were built other habitation mounds forming hamlets, habitation and cooking houses being mostly organized around a central path. This hamlet center was the main ceremonial locus for everyday or routine exchanges and encounters (Boulay, 1990; here: fig. 2). When a large meeting was called, Kanak chiefdoms organized the building of an independent hamlet for the festivities that was not permanently in use.

Exchanges centered around the presentation of traditional money and crops, with yam *(Dioscorea* sp.*)* as the male/dry symbol and taro *(Colocasia esculenta)* as the female/wet symbol. Root crops, as well as bananas and sugarcane, were planted in complex raised mound structures for dryland production and in different types of marshy land or artificially-irrigated terraces for wetland production. These extensive planting-grounds scattered in the landscape, did not have to be protected from pig *(Sus scrofa)* destruction, as pigs were not present in New Caledonia until very late in the cultural sequence. Rituals were mostly performed in isolated places, as Kanak traditions did not develop centralized religious practices (Leenhardt, 1930). Collective burial sites were restricted to the chiefly elite, with skulls aligned in rock shelters and bones piled in caves. In some regions, some individuals were mummified prior to placement in rock shelters. Commoners appear to have been simply buried in the ground (Valentin and Sand, 2001). At the margin of the settlements and planting-grounds, large forests were managed for firewood and more importantly for the access to timber for house construction, elite houses especially needing a central post that could be over 30 m long. The presence of large forests is explained by a supposed low population density in New Caledonia at first European contact, only about 40,000 Kanaks being estimated to live on Grande Terre (16,370 km^2) at the end of the eighteenth century (Kasarherou, 1992).

EARLY STUDIES ON KANAK LANDSCAPES

The diversity of cultural traditions that characterized former Kanak societies, with chiefdoms divided into about thirty languages groups and numerous dialects, specific house forms and a diversity of material culture depending on the region considered, was studied by ethnographers from the end of the nineteenth century (Glaumont, 1888; Lambert, 1900). The vast majority of these studies relied on oral traditions and recording of myths and genealogies, in a context of harsh colonial violence, despoliation of traditional lands to settle farmers or convicts, and Christianization (Terrier, 2012). This meant that by the beginning of the twentieth century, some of the old Kanak ways of occupying the landscape had vanished, forcing the French colonial administration in the 1930s to finance traditional 'memory houses' to maintain the existence of a few large Kanak chiefly buildings. The depopulation that had hit the indigenous groups of the archipelago at that time (Rallu, 1990; Kasarherou, 1992)—associated to the strongly synchronic approach of most ethnographers, mainly missionaries and pastors from Christian churches—did not allow any clear under-

Fig. 2 – Proposed reconstruction of a Kanak hamlet organized around a central path (modified from Boulay, 1990, p. 54).
***Fig. 2** – Proposition d'une reconstruction d'un village kanak organisé autour d'une allée centrale (modifié d'après Boulay, 1990, p. 54).*

standing of how Kanak landscapes would have looked and operated a century before.

It is thus unsurprising that no one during this early period ventured to map the large abandoned chiefly hamlets—easily spotted by the presence of alignments of coconut and Araucaria trees—or made detailed recordings of the huge taro terracing systems in indefinite fallow that could be observed on many hillsides. Written comments and descriptions are rare in the publications of that time (e.g. Glaumont, 1897; Leenhardt, 1930). The best sources to gain a sense of former Kanak landscapes remain the colonial maps produced during the process of settling former convicts in some of the regions of Grande Terre's west coast. The maps precisely position 'old planting grounds' or 'remains of indigenous settlements' in places that have since been transformed into modern villages or towns. Looking at the ethnographic literature, one can only conclude that while the landscape was—and is still claimed to be—at the core of Kanak identity, understanding the subtle indigenous layout and use of the environment was not a central concern of early European ethnographers. In all, only one map—discussed below—presenting a real Kanak site was published amongst all the ethnographic books and scientific papers before World War II, all the others illustrating this subject with an idealized view of a Kanak settlement (e.g. Lambert, 1900, fig. 21).

Significantly, the most emblematic early ethnographer of Kanak culture, protestant missionary Maurice Leenhardt, approached the question of Kanak landscapes not by mapping sites, but through the direct use of Kanak drawings. It appears that the very first 'scientific' drawing of the layout of a Kanak settlement, representing a feasting village in the Nindiah plain (central east coast of Grande Terre; see Guiart, 1997, p. 134), was made for the missionary by a Kanak elder named Boesou (Bwesou Eurijisi). Boesou had organized the meeting as a customary leader, probably around 1900. He presented in a sketch the position of the different house-mounds, the raised paths linking them, as well as the different types of planting grounds built around the feasting village (Leenhardt, 1930, fig. 6; here: fig. 3). Relying on the sketch, Maurice Leenhardt published an artist's rendering of the Nindiah site (Leenhardt, 1930, fig. 7). To propose artistic reconstructions of the customary scenes, Maurice Leenhardt used as a basis, representations of exchange ceremonies and dancing on central paths incised on Kanak bamboos (Leenhardt, 1930, fig. 32 to fig. 37).

After World War II, archaeological mapping of traditional indigenous sites started to become normal professional practice in Polynesia and Micronesia (Kirch, 2000, p. 12–41). Nevertheless, when preparing to leave for his six-month expedition to New Caledonia in early 1952, American archaeologist Edward Gifford did not consider adding this topic to his research goals. All in all, his survey of fifty-three archaeological sites with Richard Shutler Jr. only comprises five abandoned Kanak habitation sites, each described in only a few words (Gifford and Shutler, 1956, p. 99–100; Sand and Kirch, 2002, fig. 2.1). Eight years later, Jack Golson's team began working on Isle of Pines and produced the very first scientific archaeological map for New Caledonia, locating numerous enigmatic tumuli present on the island's central plateau. Jack Golson also mapped a small, abandoned Kanak hamlet near Moindou town, where some test-excavations were opened (Golson, pers. com. 1996). Missionary and ethnographer Marie-Joseph Dubois made a first general map of two megalithic structures on Maré Island, identified as predating the traditional Kanak period (Dubois, 1970). The ethnographer Jean Guiart offered a sketch of the former chiefdom setting of Gadji on Isle of Pines (Guiart, 1963, p. 239). Although one of his research goals was to study traditional Kanak sites as part of a general synthesis on New Caledonia's prehistory, Daniel Frimigacci only included one detailed site-map of a ritual site at the foot of Meori Mountain in his thesis manuscript (Frimigacci, 1975, fig. 101), although in the same volume he presented a large number of stratigraphic profiles. This was also the case a decade later for Jean-Christophe Galipaud's thesis, which was mainly focused on ceramic chronology, although one site map of a traditional Kanak settlement was included (Galipaud, 1988, fig. 60). In his study of Kanak houses, the ethnographer Roger Boulay only published an idealized image of a traditional Kanak hamlet, with no connection to any real site (Boulay, 1990, p. 54).

In the meantime, traditional Kanak landscapes had attracted new scientific interest, linked at least partly to a strong political claim for land-rights. Battling for the return of alienated lands back into indigenous hands, Kanak leaders promoted a structured discourse on the links between Pacific islanders and their ancestral properties (Tjibaou, 1976; Tjibaou et al., 1976; Bensa, 1981). This prompted geographers to study in more detail what could still be recorded of the traditional uses of Grande Terre's landscapes, mainly in terms of horticulture. A program of aerial photography analysis was put in place, generating a series of maps positioning the main agricultural systems that could be located in the plains and hills of Grande Terre (Bensa, 1981, map 18). The geographer François Doumenge mapped for his thesis a series of modern Kanak hamlets but only offered sketches of the traditional settings (Doumenge, 1982, fig. 22–23). An extensive phase of recording of Kanak land claims produced other maps, locating former villages and planting grounds (Frimigacci, pers. com. 1986). However none of these data were generated in a manner that facilitated detailed archaeological analysis (see Roux, 1990). For example, the aerial photography study only recorded planting surfaces, never the number of raised mounds or terraces, or their individual length and width.

THE FIRST PHASE OF KANAK LANDSCAPES ARCHAEOLOGY

One of the main ideas behind the creation of a local Department of Archaeology at the New Caledonia

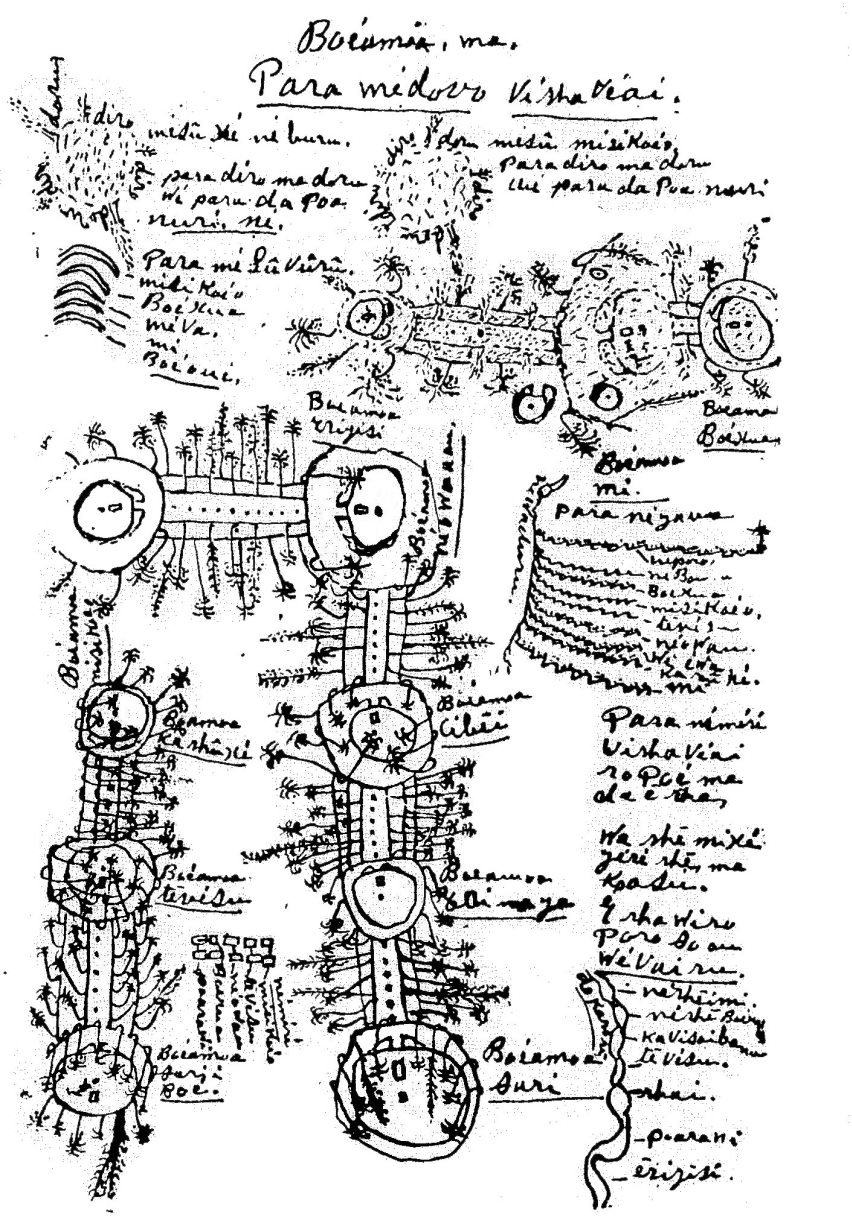

Fig. 3 – The sketch of the Nindiah feasting village drawn by Bwesou Eurijisi (from Leenhardt, 1930, fig. 6).
***Fig. 3** – Plan du village dans la plaine de Nindiah à l'occasion d'un grand pilou dessiné par Bwesou Eurijisi (d'après Leenhardt, 1930, fig. 6).*

Museum at the beginning of the 1990s was to build the first firm basis upon which the multiple potential aspects of traditional Kanak societies could be studied through archaeology. Strongly influenced by Polynesian archaeology as a general model, the team focused mainly on field surveys, on Grande Terre as well as in the Loyalty Islands (cf. Sand, 1995). In the south of Grande Terre, where colonial impact has been strongest and where extensive Kanak settlements are difficult to find (but see Sand and Ouétcho, 1992, fig. 1), the focus was set on detailed recording and mapping of former planting grounds. This was especially the case in Païta and Dumbea (fig. 4), just north of the capital Noumea, where over 1,000 hectares of abandoned taro-terraces were recorded and partly mapped (Sand, 1994). Over half of these structures were not visible on aerial photographs, showing the imperative for pedestrian surveys under the forest cover but also in open environments. The study revealed a complex and painstaking building-process on often steep hillsides, entailing robust retaining walls as well as the excavation of deep water-channels sometimes several kilometers long, to bring water to higher-altitude platforms. The dating of some of these terraces in favorable locations showed the start of the horticultural intensification process in the second half of the first millennium AD. The highest and most remote terraces, built artificially by bringing fertile soil directly on bare rock, were only dated to the last three centuries before European

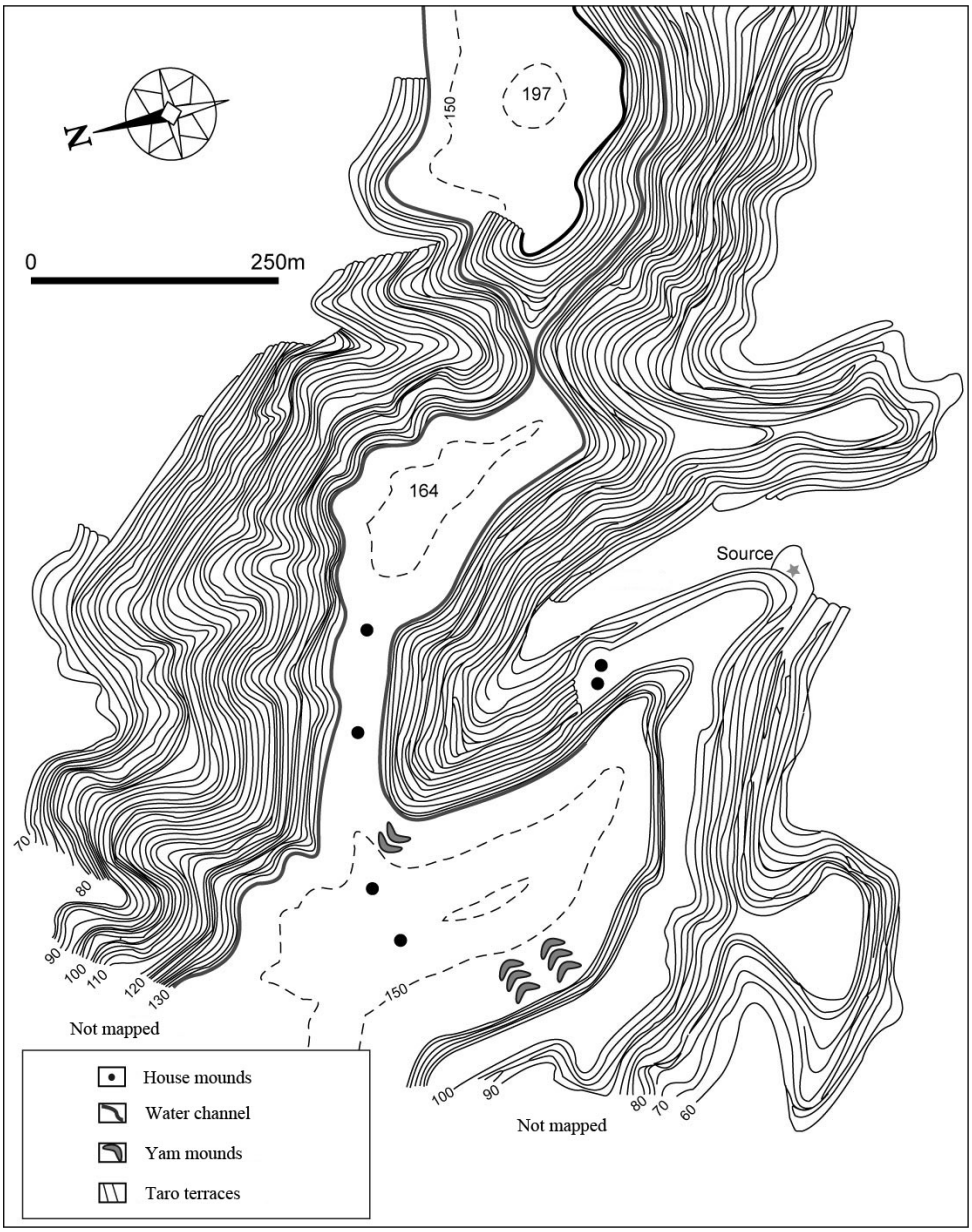

Fig. 4 – Example of abandoned terraced taro-planting area at Mont Koghi (Dumbea).
Fig. 4 *– Exemple d'une tarodière en terrasses abandonnées au Mont Koghi (Dumbéa).*

contact (Sand, 1994, p. 59–63; Sand, 2012). Spatial analysis showed that the planting grounds surveyed and some of their associated old settlements and burial sites were all located on hillsides difficult of access for machinery, thus protecting them from modern destruction. This observation raised questions about the extent of Kanak planting-grounds present in the past in the large alluvial plains of Dumbea, Païta and Tontouta, destroyed by the use of these flatlands for over 150 years for colonial farming and cattle-raising. This archaeological study was the first to use field maps and landscape analysis to question the supposed low Kanak population density at the time of first European contact (Sand, 1995, p. 218–231).

Aside from extensive planting-grounds, another major type of site of the 'Traditional Kanak Cultural Complex' is composed of former settlements, marked on the ground by alignments of raised house mounds of a rounded form (fig. 5). Although being one of the central symbols in Kanak discourse, it was only in 1992 that the first archaeological program concerned exclusively with detailed mapping of some of these former hamlets was pursued (Sand and Ouétcho, 1993; Sand, 1997 and 2002a). Concentrated in the isolated central mountain region of the Bopope tribe in the northern part of Grande Terre, the program allowed us in a few weeks to map over thirty individual sites, with hamlets comprising from five up to thirty individual house-mounds, often surrounded by large horticultural structures (fig. 6). In some areas, a new nexus of habitations was present every 100–200 m, illustrating a significant density of sites, especially for a

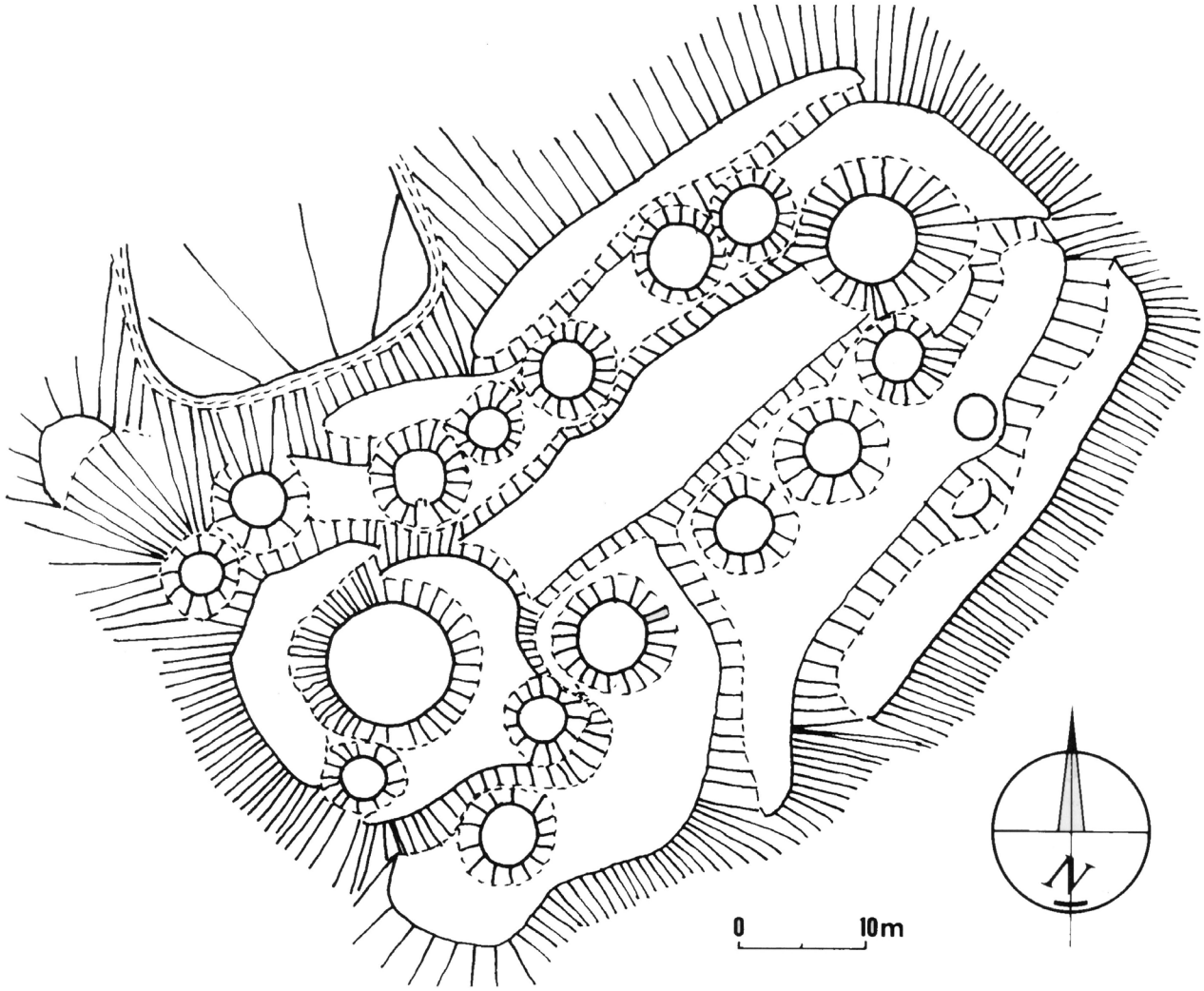

Fig. 5 – Example of site ETO018 of Tipalèt, featuring the classic ethnographic Kanak hamlet pattern around a central path (upper Bopope region).
***Fig. 5** – Exemple du site ETO018 de Tipalèt, présentant le modèle d'un village classique kanak d'après les données ethnographiques, organisé autour d'une allée centrale (partie supérieure de la région de Bopope).*

mountainous region. The mapping process identified a large diversity of individual site-plans, intricately linked to the local topography. This demonstrated that the typical ethnographic hamlet model reconstructed through Kanak oral traditions, with a clearly marked straight central path and neatly positioned house-mounds on each side, was only an idealized image of a far more diverse traditional settlement pattern, something that could only be identified through *in situ* mapping of real hamlets (Sand, 2002a, fig. 8).

Expanding on this first inland study, a series of maps was produced through the detailed recording of individual features visible on aerial photographs of some still well-preserved large alluvial plains. They highlighted a high density of agricultural features developed on fertile soils, completely surrounding large hamlets. This is for example the case in part of the river plain of Tiwaka Valley, on the northeast coast of Grande Terre, where the mapping of about 35 hectares revealed a complex array of long, raised yam fields (Sand and Ouétcho, 1993, fig. 48; Sand, 1995, p. 184–185; here: fig. 7). Put end to end, these planting structures—about 5–8 m wide and 1 m high—would total 17 km in length. Similar densities of planting mounds can be observed under the forest cover of a number of alluvial plains that have not been flattened by modern agriculture (Sand, 2012; Sand et al., 2008; Sand and Baret, in press). Large horticultural landscapes and associated hamlets are also still present in some of tribal Kanak reservations on the west coast, such as the floodplains of Koumac on the northwest coast (Guillaud and Forestier, 1996). All these data strongly attest to the existence of a marked intensification of landscape use during the 'Traditional Kanak Cultural Complex'. Indigenous population collapse during the 19th century was so devastating and colonial land dispossession so rapid that this dense pre-contact type of settlement pattern had mostly vanished when early ethnographers started to give attention to Kanak traditions.

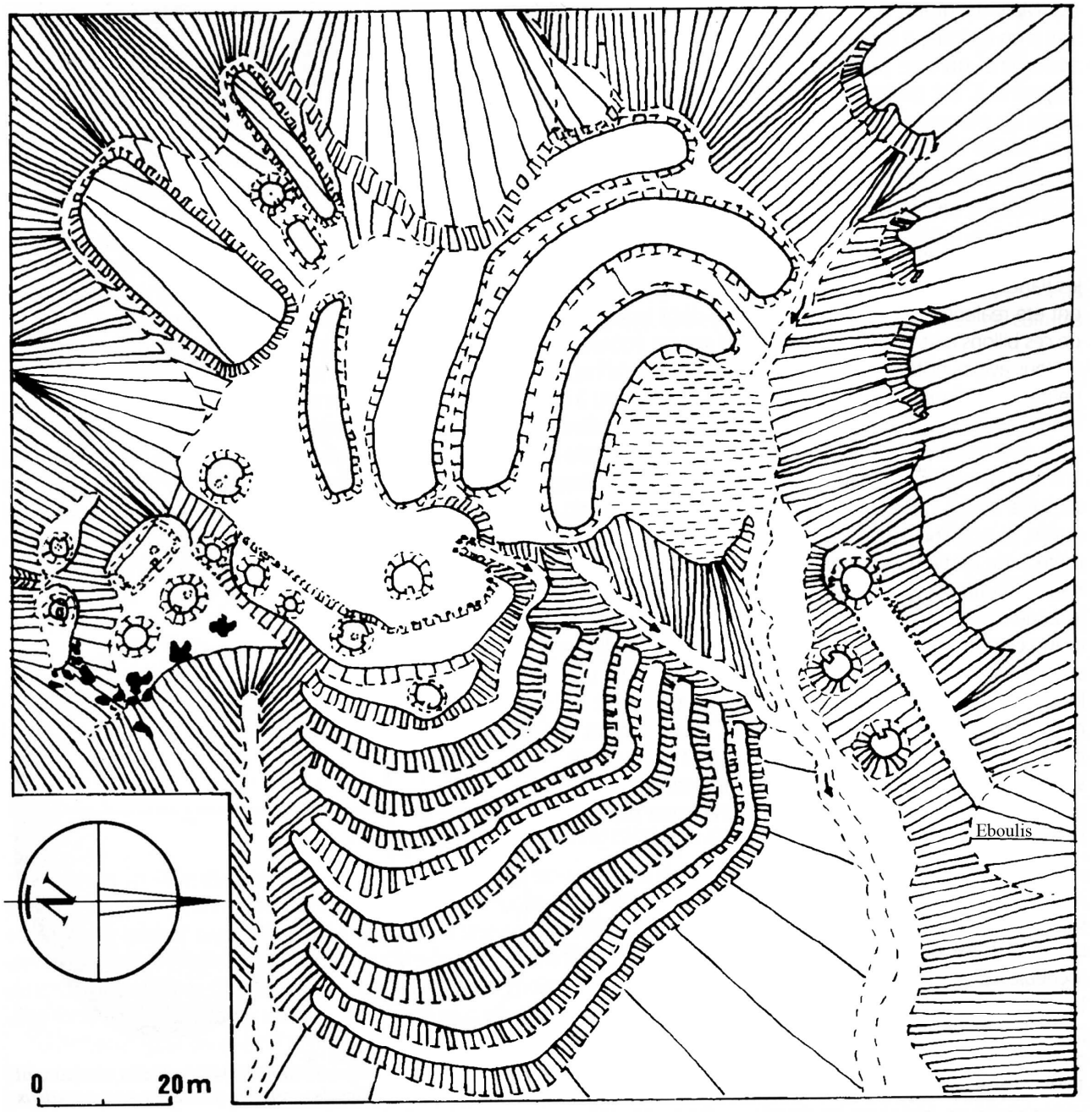

Fig. 6 – A typical settlement pattern in the upper mountainous Bopope region, with house-mounds, taro terraces and long raised yam mounds (site ETO045 of Kadèn).
***Fig. 6** – Modèle d'un village typique dans la partie supérieure montagneuse de Bopope, avec des tertres d'habitat, des terrasses destinées à la culture du taro et de longs billons aménagés pour la culture de l'igname (site ETO045 de Kadèn).*

GETTING TO THE BIG PICTURE: MAPPING VALLEYS

Over the last decade, opportunities have been taken to expand from mapping projects restricted to site-specific sizes, to fulfill for the first time extensive (or near-complete) valley-scale recordings. Time constraints mean the first attempts at large scale mapping were dissatisfying, as the unexpectedly huge extent of the sites under study meant full recording of the landscape was not possible. This was for example the case for a series of sites of Pombei in the upper Tiwaka Valley (northeast coast), where only a portion of the extensive habitation and cultivation areas was mapped as part of a multi-topic project (Sand, 2007; Dotte, 2010; here: fig. 8). Another case was in the upper valley of the Hienghene River (northeast coast) around the Tendo tribal area, where we had planned to map a complex terrace-system associated with important traditional hamlets at the request of the tribe (Sand et al., 2005; Bolé et al., 2005). The survey by foot undertaken on the terrace complex showed that it extended without

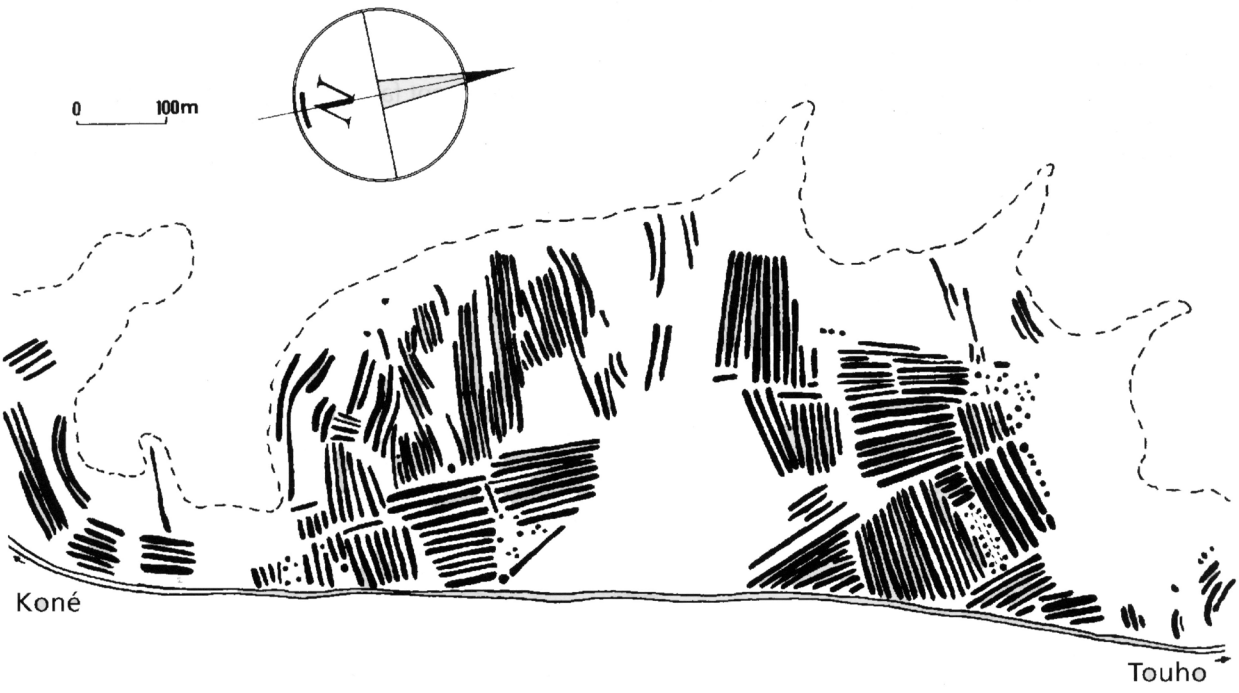

Fig. 7 – Map of the lower Tiwaka valley from aerial photography, showing the density of features.
***Fig. 7** – Carte de la basse vallée de Tiwaka d'après une photo aérienne montrant la densité des structures.*

any clear break for over half a day's walk under the forest cover, and would have needed months to map completely. The partial mapping of some of the sites showed the existence of a complex building process of terraces on steep slopes, some walls measuring over 2 m high for a planting space less than 1 m wide. A set of large mounds, associated in oral traditions with high chiefly lines, was mapped, with some mounds reaching 20 m in diameter and over 4 m high, in hamlets comprising from ten to fifteen individual house mounds (Sand et al., 2005).

A more successful project of the same kind has been finalized in one of the flood-plains of the abandoned central part of the valley of Tipindje river, on the north-east coast of Grande Terre. This region was occupied by Kanak clans until 1917, when the entire population was removed from the valley at the end of an indigenous revolt (Gony et al., 2011). The structure-by-structure recording over a surface of 240,000 m^2 has identified the presence of 113 individual raised yam-mounds, alongside 165 house mounds, mainly organized in hamlet clusters (fig. 9). The mapping has stopped at the foot of the valley sides, but surface surveys have shown the presence of a dense network of features (mounds, terraces etc.) all along the hill-slopes up to the ridge, itself being densely marked by successions of house mounds. This intensified landscape use is also visible on the other side of the riverbank, spreading over long distances. In the small valley system of the Werap tribal area, opening towards the Hienghene River just north of Tipindje, the presence of steep hillsides created a clear natural limit to expansion and therefore constrained human occupation to a sizable surface in terms of archaeological mapping. About 500,000 m^2 of the two parallel valley floors of Werap have been completely mapped, showing the presence of a complex settlement pattern under the forest cover (Gony et al., 2012; here: fig. 10). What is probably the most impressive characteristic is the discovery that the whole length of all the streambanks and small creeks was walled, extending for kilometers.

Similar walling has been observed during surveys along a number of streams and riverbanks on the north-east coast of Grande Terre (fig. 11), but the Werap features are the first to be mapped. Unsurprisingly, the alluvial flatlands were mostly used as planting grounds, with the presence of long raised yam fields. Territorial divisions between families were still marked by long flat stones planted in the ground. It appears that as soon as the terrain became steeper, Kanaks constructed different sorts of artificial platforms bound by retaining stone walls. It is on these platforms that most of the raised house mounds have been identified. At the back of the two valleys, the hillsides were completely worked into artificial terraces for wet taro plantations. Some terraces are over 2 m high and less than 1 m wide, indicating a significant collective labor input to obtain relatively small cultivation surfaces. Artificial basins to retain and manage the flow of stream water have also been identified during mapping, as well as a few unique sites that have been recognized by local inhabitants as ceremonial locations, some still being used. The first results of an extensive dating project underway in this area shows major occupation during the last few centuries before European contact.

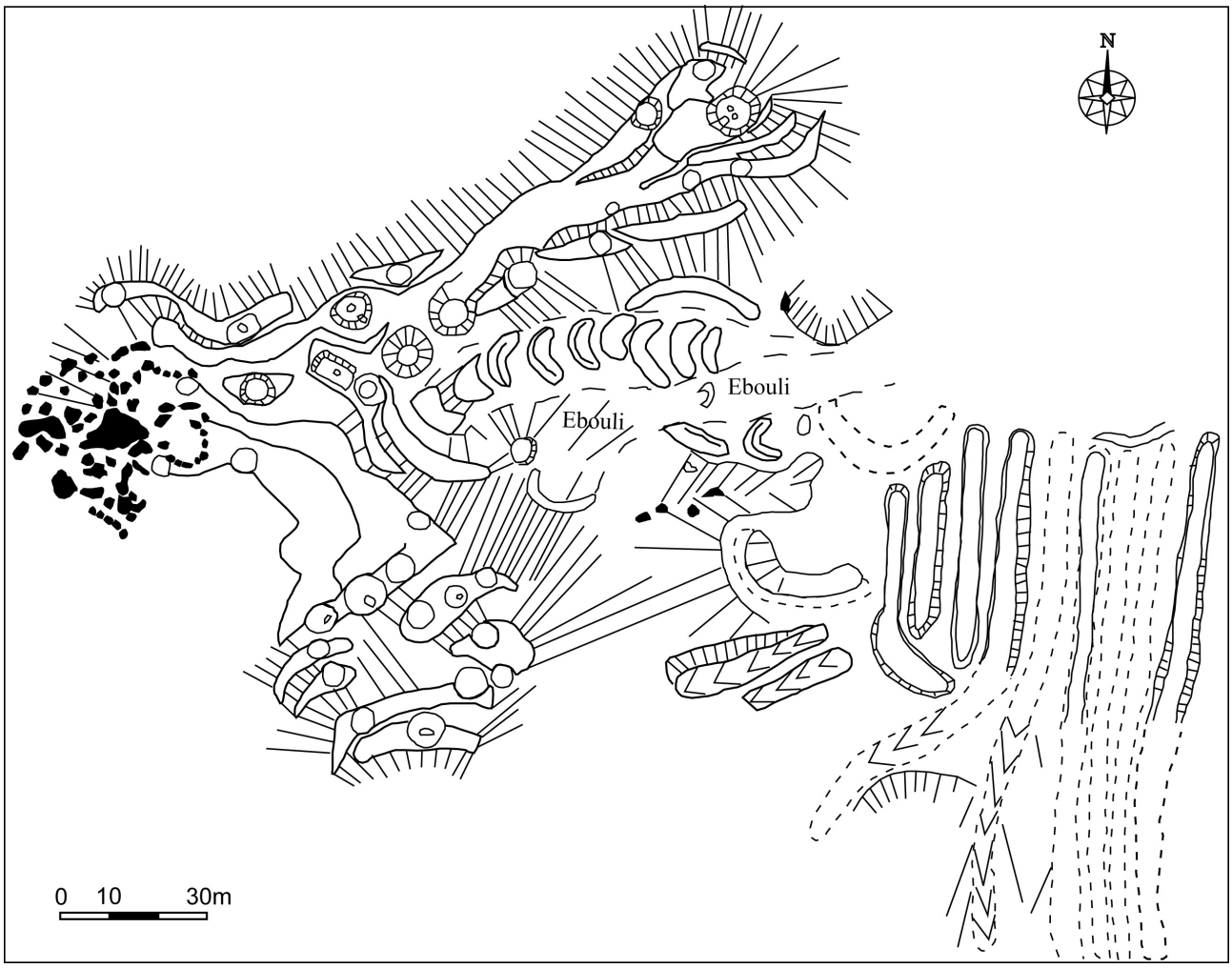

Fig. 8 – Partial mapping of the Pwadaunu site in the upper Pombei region.
Fig. 8 *– Cartographie partielle du site de Pwadaunu dans la partie supérieure de la région de Pombei.*

ANALYSIS

In New Caledonia, as in the rest of the Melanesian crescent, landscape archaeology is a recent research topic. Most of the few site-maps published by early archaeologists, ethnographers and geographers were not made with detailed settlement pattern studies in mind. Indeed, compared to Micronesia and especially Polynesia, the southwestern Pacific (with the exception of Fiji) has still seen only a handful of projects dedicated explicitly to landscape archaeology (see Terrell, 1976; Spriggs, 1981; Walter and Sheppard, 2000). Two main reasons can be put forward to explain this evident discrepancy. The first is that for a long time (and still in some respects today), most research programs in Melanesia—be they large institutional projects or more modest PhD studies—continue to focus by and large on ceramics and cultural chronologies (Bedford, 2006; Felgate, 2003; Garling, 2007). Lapita studies and early settlement issues form a large part of this pottery-focused interest, at the expense of the more recent past.

However, restricting the explanation solely to this reason appears too limited, as a similar long history with pottery chronologies—although without Pleistocene and early Holocene occupations, such as in Near Oceania—is present in the northwestern Pacific, where extensive settlement pattern studies have been conducted for decades (Spoehr, 1957; Osborne, 1966; Cordy, 1993; Liston, 2013). We believe that for island Melanesia, a second reason explaining the recent development of settlement pattern studies is the belief strongly imbedded in the 19th and 20th century anthropological community, that traditional Melanesian societies in the past were demographically less numerous than Polynesian and Micronesian chiefdoms (McArthur, 1968; Rallu, 1990). As a supposed consequence, these groups were characterized by traditions of scattered occupations and only weak political hierarchies (see Sahlins, 1963), with settlements isolated from each other and no centralized political authority.

This vision of dispersed Melanesian settlements is explained by the widespread reliance of previous generations of Pacific historians on missionary and early ethnographic sources created at a time when no-one was really

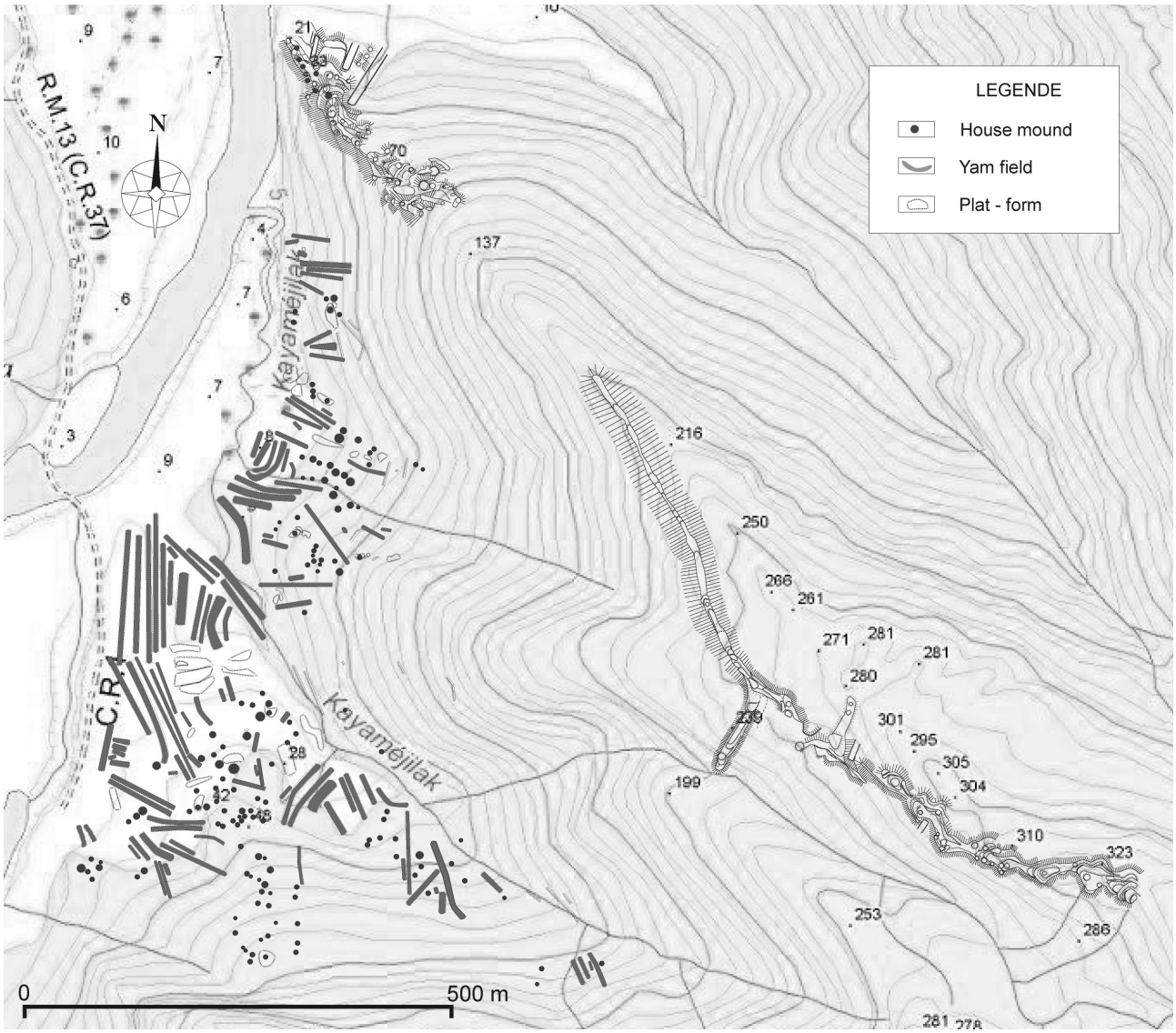

Fig. 9 – Map of the flat areas of the Thehaat site, in the central part of Tipindje valley (the slopes remain to be mapped).
Fig. 9 *– Carte des zones planes du site de Thehaat dans la partie centrale de la vallée de Tipindjé (les pentes restent à cartographier).*

aware of the deadly impact on Melanesian demography of the contact-period introduction of European diseases. Missionary diaries are full of references to episodes of epidemics witnessed on a regular basis during their sojourns in the islands. However, the social consequences of a century of catastrophic population decline were not really taken into consideration in ethnographic studies. Ethnographers concluded that the dispersed habitats and weakly-hierarchical political traditions that they observed and recorded were accurate reflections of centuries-old customs (Sand, 2000 and 2002b). In this theoretical frame, there was no room for densely-populated landscapes, complex pre-contact political systems based on marked hierarchical differences, or large-scale processes of economic intensification over time (see Guiart, 1992 for an example, and Saussol, 1979, fig. 3 for an illustration of sparse mid-nineteenth century Kanak landscape densities).

Although the question of demographic numbers in Melanesian populations during the entire period of human settlement—and especially at first contact—remains to be better studied, archaeological data everywhere in the southwestern Pacific today point to the need for a significant re-evaluation of figures (Kirch and Rallu, 2007). In New Caledonia, this was started in the 1990s, pushed by the unexpected first results of our settlement pattern studies, which showed the existence of dramatically intensified landscape uses (Sand, 1995; Sand et al., 2000). Two decades later, a proposition that initially was only hypothetical has for archaeologists become a certainty: at the time of the first encounter with the crew of Captain James Cook in 1774, the Kanak population as a whole was far more numerous than the 50,000 or so people historically accepted (Sand et al., 2007). Starting from this general point, field surveys have above all shown the composite nature of Kanak settlement patterns, adapted in each case to the rich

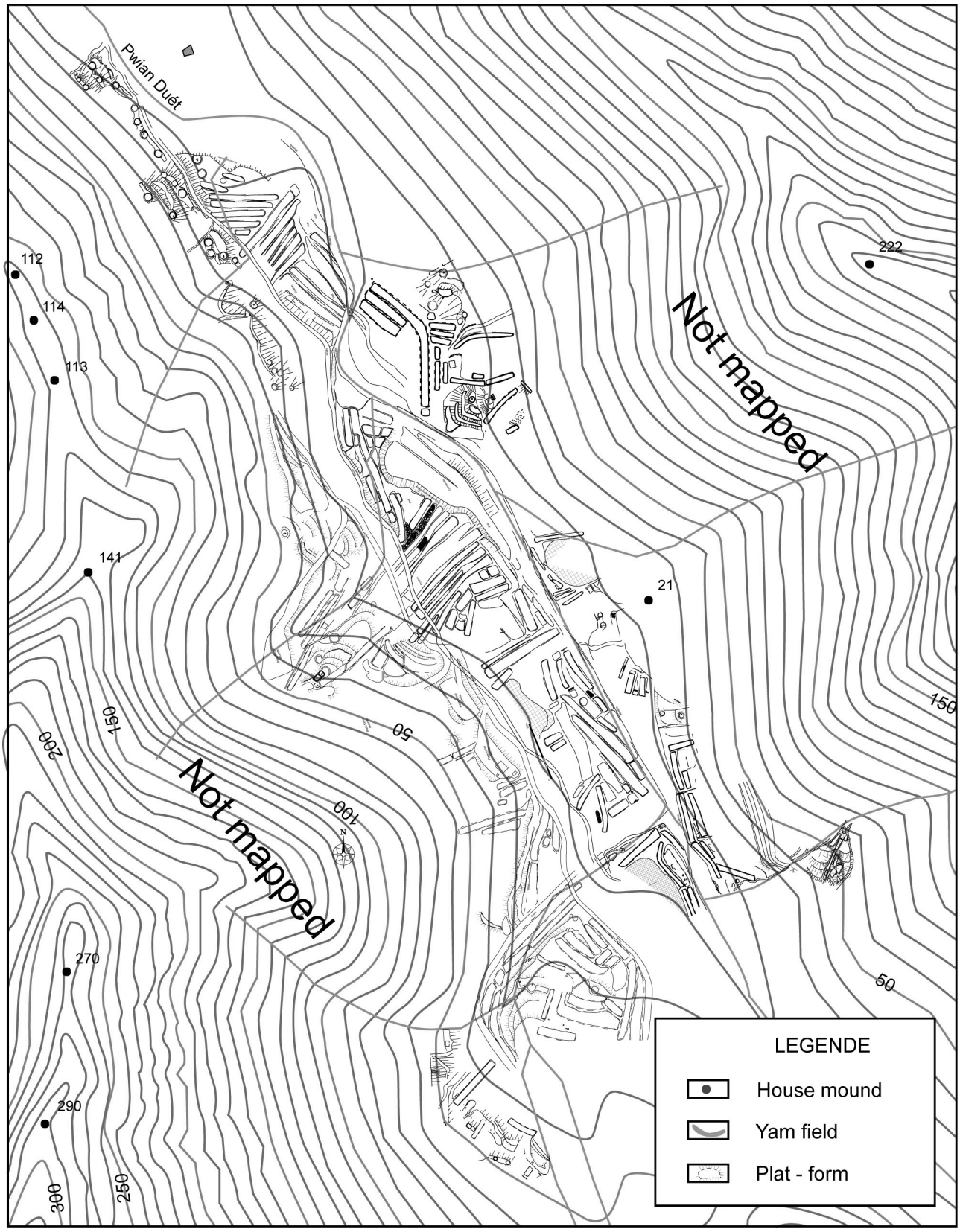

Fig. 10 – Map of the lower parts of one of the valleys of Werap tribe, illustrating the diversity of remains.
Fig. 10 *– Carte des parties basses d'une des deux vallées de la tribu Wérap, illustrant la diversité des vestiges.*

Fig. 11 – Example of retaining wall of a river bank, Hienghene region.
Fig. 11 *– Exemple d'un mur de soutènement de bord de rivière, région de Hienghène.*

environmental diversity of the archipelago. Aside from the evident differences between the wet east coast and the dryer but more extensive west coast of the main island, the geological specificities of Grande Terre and the Loyalty Islands as well as variation between regions forced the indigenous settlers to adapt their settlement strategies to local constraints. The most evident achievement in this field is certainly the understanding by the Kanaks that the porous metamorphic crust which topped about 30% of the mountains of Grande Terre, allowed the creation of a unique type of natural water-storage reserve (Maurizot and Vendé-Leclerc, 2013). In an archipelago experiencing regular drought cycles (Dotte et al., 2010), the possibility of relying on permanent water flow at the foot of the geological crust allowed the Kanaks to develop on sometimes very steep mountain sides what is considered "certainly the most technically complex pondfield irrigation within Melanesia" (Kirch and Lepofsky, 1993). It is essential to take into account the Kanak adaptation of a pan-Pacific horticultural tradition to this environmental specificity if we are to understand the apparent discontinuous distribution of terraced taro fields on Grande Terre (Sand, 2012).

Traditional Kanak habitat diversity has also been greatly highlighted through archaeological settlement pattern studies. The idealized ethnographic model of a standardized hamlet with a long narrow central path surrounded by rounded house mounds, has not withstood the test of field data. Even in the central part of Grande Terre where hamlets with a straight central path are the most frequent, they are not the majority of settlements identified through mapping (Sand, 2002a). In the northern part of the island, the straight path disappears altogether, being mostly replaced by a curved U-shaped plaza. Interestingly, questions about the form and size of the traditional hamlets remain open for the south of Grande Terre, where at this stage no extensive sets of structured Kanak hamlets have been found during the surveys.

While progress has been made on characterizing former landscape uses in New Caledonia, a lot remains to be done in terms of archaeological studies to get a better understanding of the diversity of the traditional Kanak settlement patterns. Evidently, there is a need for more mapping. But aside from this central topic and when comparing the situation to recent research completed in Polynesia and Micronesia (Kirch, 2000, p. 246–301), it is clear that most questions surrounding the chronology of these dense occupations still await answers. Preliminary studies have shown that the first raised house-mounds appear at the beginning of the second millennium AD (Sand, 1997, p. 58). A process of progressive expansion in settlement size and growth of some of the house mounds through refilling has been documented (Sand et al., 2009). In unfavorable environments such as the dry hills of Deva, facing the central west coast, large settlements appear only in the

middle of the second millennium AD (Sand et al., 2013). By the time of first European contact, some house mounds had reached massive proportions, some being over 20 m wide and 2.5 m high, and collective working effort had allowed the terracing of a large part of the creek banks and taro patches with stone retaining walls. Even the barren unfertile peridotite plateaus were used, mainly for ritual and exchange purposes, leading to the building of sometimes massive stone cairns comprising hundreds or thousands of individual mounds depending on the location (see Sand et al., 2012; Wadrawane et al., 2014).

Even without more detailed data, it appears that such settlement pattern studies, tied to a better understanding of the chronological processes at play in the creation of intensified landscapes, should allow archaeologists to start reconsidering our models of traditional Melanesian political systems and hierarchy over time. It remains clear that ethnographic accounts from the late 19th and 20th centuries give the essential socio-cultural canvas of traditional ways of life. But with respect to the fundamental research topic just outlined, it is now apparent that without the input of archaeology, ethnographic data alone cannot produce a realistic picture of the complexity of organizations that existed on the densely-populated large and smaller islands of Melanesia at the eve of Western contact. This should foster support for a global multi-disciplinary think tank focused on the concept of 'archaeology of tradition' and what that might mean in the western Pacific.

CONCLUSION

For a long time, Melanesian archaeology has mainly concentrated on the study of ceramics, especially Lapita, and the creation of cultural chronologies. Until recently, a number of factors, detailed in this paper, have prevented the development of research projects concerned primarily with the study of traditional indigenous settlement patterns in a wider landscape approach. Yet traditional landscapes are at the core of Melanesian identity, and remain the real—and often the only—subject of interest of local groups when they have to deal with an archaeological research project on their land. It is not surprising in this context that, amongst other examples, the proposal of a New Zealand team wishing to research Lapita in the northern Solomons, was accepted by the local community if a parallel effort was concentrated on the late chronological phase (Sheppard, pers. com. 2000). This forced archaeologists to work on a recent time-period that was not part of their original project, but ended-up in a multi-purpose research program on the rise of a highly-hierarchical Melanesian chiefdom (Walter and Sheppard, 2000 and 2006), associating oral traditions, archaeology, mapping, ethnography and history.

Examples such as this highlight the need to take into account the interests of local communities, who expect archaeologists to work on what they define as 'their history', related to their immediate ancestors and the oral traditions related to them. But this must not conceal the fact that working on the recent past in Melanesia can be problematic, as archaeologists may become embroiled in questions of land ownership, customary prerogatives and local conflicts. It must also not overshadow the reality that environmental constraints as well as specific traditional ways of life can render in some islands the study of former settlement patterns difficult, especially when no extensive remains are present on the ground. This is for example the case of the former habitation areas on the Loyalty Islands, where the porous karstic substratum did not necessitate the building of raised mounds, leaving archaeologists with no visible evidence on the surface during surveys. Landscape studies in this context become less effective, creating an archaeological bias towards more readily visible traditional settlement patterns that might become, if we are not cautious, the new Melanesian 'model'. Nonetheless, looking overall at the large islands in our region compared with most archipelagoes of Micronesia to the north and Polynesia to the east, and at the complexity of some of the settlement pattern studies published to date, the Melanesian crescent as a cultural area clearly holds a huge and still dramatically underexplored potential in the field of landscape archaeology.

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