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**L'IMPORTANCE
DE L'AGRICULTURE TRADITIONNELLE
MELANESIENNE EN NOUVELLE CALEDONIE ET LA
QUESTION DE LA REPARTITION ET DE L'IMPORTANCE
DE LA POPULATION AUTOCHTONE PRECOLONIALE**

**THE IMPORTANCE
OF TRADITIONAL MELANESIAN
AGRICULTURE IN NEW CALEDONIA AND THE QUESTION
OF THE PRE-CONTACT POPULATION DISTRIBUTION**

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THE IMPORTANCE OF TRADITIONAL MELANESIAN AGRICULTURE IN NEW CALEDONIA AND THE QUESTION OF PRE-CONTACT POPULATION DISTRIBUTION.

The study which follows is the result of extensive research carried out in 1981 and 1982 in the Territory of New Caledonia.

One of our objectives was to determine as precisely as possible on a map (to a scale of 1/25,000), and with the assistance of the most objective scientific techniques, the sites of pre-colonial Melanesian agriculture on the one hand, and the villages in existence at the time of colonization on the other.

The map base chosen was the 1/25,000 scale used by the Institut Geographic National, which allowed sufficient resolution, and totalled 135 sheets for the Grande Terre.

The following methods were utilized :

1. - Study of the earliest maps made by the Mapping Department⁽¹⁾ after 1860. These were cadastral maps, or sketch maps drawn to scales of 1/10,000 and 1/20,000, and sometimes 1/5,000. By 1900, 530 maps had been made, covering 530,000 hectares (about a third of the land surface of the Grande Terre, principally the economically useful areas). These maps give place names, the positions of Melanesian villages or the remains of villages, areas of cultivation, paths linking villages, and irrigation canals.
2. - All available documents of a historical nature were consulted, whether from public archives (at the Ministries of the Navy, the Army, of Overseas Departments and Territories, and at the National Library) or from private collections : the archives of the Marist Fathers in Rome, the Protestant archives, and the collection of Maurice Leenhardt. Contemporary newspapers (Moniteur de la Nouvelle-Calédonie, and the Journal Officiel) were systematically used.
3. - In close collaboration with a team from the Service Topographique de Nouvelle-Calédonie, a systematic analysis of aerial photographs was undertaken (the I.G.N. mission of 1976), which permitted us to verify and complete

(1) Service Topographique du Territoire de Nouvelle-Calédonie

the information we already had from old sources, and to extend our research of sites giving evidence of pre-contact Melanesian settlement in areas not covered by the old maps.

We do not claim to have read everything, nor seen everything insofar as interpretation of the aerial photographs is concerned, but it is probable that the study has helped to accumulate certain data and observations, which were then catalogued, to an unprecedented degree.

If there remain some areas concerning which we are abnormally lacking in information, although they were populated in pre-contact times, this is the result of a lack of contemporary documents, or because of the many irreparable incidences of loss or destruction in the colonial archives. All information given in the maps which are analyzed in this article has been catalogued ; there remain a few villages for which the exact site has not been determined, although their existence was absolutely certain. They have been localised to within 1 or 2 km., but their exact site could give rise to local controversy.

We hope that, following on from this general inventory, archaeological work and further research in dating the old tarodière systems (hillside terraces for taro cultivation) will give us information which will enable us to analyse changes in the population of the Grande Terre over time (1).

1

DISTRIBUTION OF THE PRE-CONTACT CANAQUE SETTLEMENT

The question of the pre-colonial Melanesian population of the Grande Terre, both in terms of numbers and settlement pattern, remains little understood.

For a long while censuses were limited, and by the time more reliable statistics were available, the decline of the Canaque population on

(1) For example, the work currently being done by M. Spriggs and D. Frimigacci.

the Grande Terre had started (1878). Similarly, the sites of native village settlements remained difficult to locate for some time.

The maps presented here mention any settlements whose existence is attested by any form of documentation whatsoever. In this manner, we obtain a total of 2,363 villages (Belep Islands and Isle of Pines not included). We must point out that this number includes in fact 1,783 villages with a known place name, and 580 villages which have been re-discovered and located by means of various documents and maps, but the names of which were not noted in contemporary chronicles, and remain unknown. To this number must be added those villages which disappeared suddenly as a result of epidemics or tribal wars, or were abandoned before the invading livestock of the colonists, or whose inhabitants were ousted (either by the authorities, or by individuals). Thus, in the Diahot region in the north of New Caledonia, a series of military operations was carried out (between 1862 and 1870) against the Ouebias, causing the disappearance of several dozen villages or hamlets whose populations re-grouped elsewhere (Pouébo, Ouégoa) or dispersed (see the Moniteurs and the colonial reports, or the reports of the Colonial Secretary, Mathieu). The same happened in Voh-Témala and in Poindimié, especially at the time of the 1878 revolt which extended from Koné to Bouloupari and Thio, when perhaps several hundred settlements disappeared (1). Thus the settlement maps we produce here at least for certain regions, probably greatly underestimate the former numbers (2).

Nevertheless, the results of this study, compared to the documents of the early colonial period known to date, which are too few and too limited in scope, allow us to understand for the first time the situation of a large part of the pre-colonial Melanesian population distribution, systematically and in its entirety.

(1) See H. Rivière - Souvenirs de la Nouvelle-Calédonie, 1879. Paris re-published in 1980, Nouméa Editions du Pacifique.

(2) 327 villages or hamlets must be added to those on the maps, but this could not be done for lack of precise information concerning their location.

The general map of the distribution of settlement leads us to note several things :

1. - Most of the land surface of the Grande Terre was settled, with the exception of the southern part of the central mountain range, and the south of the island, where regional conditions did not seem suitable for permanent settlement even in the simplest form.

2. - Settlement seems to have varied in density from region to region.

3. - It would seem too speculative to establish a scale of Melanesian village-size with any scientific rigour. Most of the information analysed says little or nothing on this subject. Some villages seem to have been quite large according to the descriptions (Koumac and its surrounding area, for example). Others, and these are numerous, such as the Central Highlands region near Koné and Hienghène, were in fact only a few huts sheltering on occasions just one family.

1. - Distribution of settlement. In 131 maps (not including the Belep Islands or Isle of Pines) we noted the following results :

Number of villages	Number of maps
1 to 5 villages	32
6 to 10 "	21
11 to 20 "	29
21 to 40 "	17
41 to 80 "	12
81 to 160 "	4
+ than 160 villages	1
	116 (1)

(1) 15 maps show no village at all.

Table 1. - Number of pre-contact villages (in sections, to a scale of 1/25,000).

Source : series of historical maps, ORSTOM 1981.

Generally speaking, this distribution seems to show several types of situations :

a) Areas which are virtually empty. No human settlement is marked. Nevertheless some of these areas are crossed by "Canaque" paths, or contain old place names indicating the role that these inhospitable places could have played in communication. In effect, these are vast areas of the interior of the peridotite plateau in the south, starting at Thio and extending to Yaté-Goro. Due to its natural conditions, this area has probably never sustained other than precarious, nomadic habitation.

b) Very sparsely populated areas. We find a significant number of maps (32) which show only 1 to 5 villages. Let us state also that 12 of these are maps of the Southern Caledonian plateau mentioned above ; which was almost devoid of habitation, so that it is not surprising that the population which was settled along the coast from Thio to Yaté and from Goro to Nouméa was sparse.

There is an exception in the Mont Dore region, for which we lack precise documentation, and cannot therefore state with any certain the original situation (although imprecise sources mention a sizeable settlement near Plum and Les Rekes).

Others areas of sparse population appear elsewhere, such as the area round the Baie de St Vincent, a dry region where water-supply was probably a problem. However, this was a good fishing area, which probably lead to coastal settlements (in the form of temporary fishing villages) which are shown on the maps. Other regions of the same ecological type are found to the south of Poya (Plaine des Gaïacs), between Pouembout and Paewa, and on the West Coast some of the map sections suggest low population density between Voh and Tiébaghi. However, Koumac and Gomen were heavily-populated, probably with a greater density that was shown on the maps, if we are to believe the first official reports.

c) Regions with a large number of villages. Here we could cite the Canala-Thio region, a notable example of high population density, with 178 villages in one section and 101 in the neighbouring section. Another heavily-settled area extends from Hienghène to Poindimié. In the Diahot region and

in the La Foa area, high population density is to be found on the maps ; the Voh-Pouembout region falls into the same category.

In the rest of the Territory, it is interesting to note that settlement is generalized throughout the highlands, even if population density varies from section to section.

Taking into account the strictures of methodology, we can postulate the following ideas :

1. - It seems clear that all of the New Caledonian territory providing a minimum of favourable conditions, was to some degree settled.
2. - Unpopulated regions (the south, and parts of the West Coast) represented a considerable percentage of the island (approximately a third).
3. - The mountain regions, and in particular the higher areas, were not in fact free of settlement as early writers concluded somewhat hastily. On contrary, a civilisation of "mountain people" lived there, although perhaps settlement was less dense than elsewhere, and villages were smaller.
4. - On the East Coast, for reasons both of climate and landform, settlements tended to be localised on the coast and at the mouths of the rivers. These latter generally extended up the river valleys, and were established on the mountain slopes. They were of high density within small areas (Hien-ghène - Touho - Poindimié).

This study of settlement patterns therefore shows that, apart from the inhospitable areas, the whole of the Grande Terre was populated in a manner that closely followed the ecological possibilities of the surroundings, and that population density varied according to the potential of each area for agriculture.

The data presented here must considering its general nature, be carefully weighed. We therefore give another series of results pertaining to the question of size of settlements and their distribution in the Grande Terre. The results are those from a study carried out by a team of

anthropologists from ORSTOM (Frimigacci, Berthoud, Pillion)(1) who, through on-site research have tried to transcribe onto maps any and all information concerning the traditional organization of Melanesian lands.

In 104 maps studied, we find the following distribution :

Number of villages	Number of maps
0 village	10
1 to 5 villages	25
6 to 10 "	18
11 to 20 "	11
21 to 40 "	13
41 to 80 "	14
81 to 160 "	10
+ than 160 "	3
	104

Table 2. - Number of pre-contact villages.

Sources : the series of maps on traditional land-tenure.
ORSTOM.

This distribution shows the same geographical tendencies as those previously given, which were taken from purely historical sources (see maps). A considerable part of the Territory was either deserted or very lightly settled (approx. 30 % of the area of the island). On the other hand, a similar pre-proportion of the island, centred on the north (Diahot), the East Coast (from Hienghène to Houaïlou), the West Coast (Sarraméa, La Foa/ Goyetta, Poum, Pouembout, Gomen/Koumac) had a relatively dense population.

According to Canaque tradition, the number of villages in existence was about a third higher than the number indicated by contemporary historical sources. Without going into a comparative analysis or a critique of the results obtained from the two sources, we can see that there are common factors between the two approaches to population measurement. We should note however, that if the paper (2) on Canaque oral traditions gives for

(1) See "Cartographie de l'espace traditionnel mélanésien" and Convention report "La parole canaque". The convention was on "The historical evolution of land tenure among the Melanesians in New Caledonia." 1981. ORSTOM-MEDETOM.

(2) Op cit. Frimigacci.

some areas, such as Bourail-La Foa-Bouloupari, lower figures than those found in the historical study, this could be explained as being the result of the disappearance of many of the old clans and the re-grouping of the villages and tribes (when Governor Feillet restructured village organization in 1897-8).

Elsewhere, very large population estimates can sometimes be explained as the exaggeration of ancestral memories, which increase the reality over a period of time, or under pressure of the current political situation.

Apart from these reservations concerning data, one fact clearly stands out : the population of the Territory at the time of colonization was distributed over a number of settlement units of varying size, and which covered more or less densely all parts of the Grande Terre where living or subsistence conditions were normal. This brings us to discuss another aspect of Melanesian life which is closely linked to the question of settlement : that of the areas which were under cultivation.

THE EXTENT OF PRE-COLONIAL MELANESIAN AGRICULTURE

Like all Oceanians, New Caledonian Melanesians had an agricultural civilization based on root crops : taros and yams. Added to these were sweet potatoes, coconuts, bananas and domesticated and wild fruits. The absence of large fauna for hunting, and of any domestic animals (the deer was introduced, as was the pig, by Europeans) meant that fishing played a major role, with the hunting of fruit bats (an edible species of bat) and birds, in providing a much-appreciated element of protein. The basic crops were taro, and yams of a number of species (1), which required a level of agricultural technicity that has impressed many observers (2)

(1) See D. BOURRET. "Les racines canaques". Collection Eveil. Nouméa. 1979.

(2) See G. GLAUMONT. "La culture de l'igname et du taro en Nouvelle-Calédonie". Etudes mélanésiennes n° 7. Nouméa. 1953.

with the extensiveness of the terraces and the complexity of the hydraulic engineering.

Taro is cultivated on hillsides, with a system of artificial terraces or steps irrigated with water which was often brought over several hundred metres. At that time this was done with "pipes" made of the trunks of coconut trees split in half lengthwise. These "tarodières" (taro terraces) can still be seen today. Yam cultivation was practised more in the plains and at the base of the hillsides. It required the construction of yam ridges (or addos) which, like tarodières, had to be regularly maintained.

Thus, as we mentioned previously, many vestiges of old forms of cultivation remain visible to the naked eye, or in aerial photographs, despite the fact that they have long been abandoned. Others were found on the numerous Topographic Department maps. These can therefore be seen on the maps reproduced here, and they constitute an essential part of our approach to pre-colonial human settlement in the Grande Terre. The reconstruction of population density using planimetric methods is one of the main methods confirming the results shown above on the subject of pre-colonial settlement patterns.

The adjoining maps help us to understand, for the Territory as a whole as well as for each of the IGN sections, the extent in hectares of the pre-colonial cultivation of taro and yams, for which the terraces or ridges are still visible. The results of the survey show that 56,982 hectares were under cultivation in the Grande Terre alone. This figure is interesting in itself, if we take into account the fact that today the total land surface under cultivation is something less than 10,000 hectares for all cultivation ! (1). This figure indicates the existence of previously large-scale Canaque agriculture (*mutatis mutandis*), and therefore direct implications for the situation of the pre-colonial population

(1) See D. BOURRET. "L'agriculture vivrière mélanésienne en 1976". Service de l'Agriculture. Nouméa. 1976.

become obvious.

A rapid cartographical survey (see below, map n°4) of the distribution and size of these agricultural zones, which are now abandoned for the most part, allows us to come to the following conclusions :

1°) Nearly one-third of the island (16 maps) shows no trace of pre-colonial agriculture. This is mainly in the south (a peridotite mineral outcrop) and in a few parts of the West Coast where there is little arable land and where it is otherwise unsuitable for permanent human settlement.

2°) On 28 maps the pre-colonial cultivation was less than 50 hectares. These mainly concern the discontinuous coastal plain on the West Coast, which extends from Dumbea to Poum. The inhospitable nature of the terrain is clearly shown by the low figures for the area under cultivation, although there are small areas of richer land in valleys and irrigated plains.

Similarly, the norther region from Paagoumène to Boat-Pass does not seem to have been very much used for cultivation, apart from Baaba and Arama. In this same category we find some areas of the East Coast, between Oubatche and Hienghène, and from the Bogota Peninsula to Yate. Finally, some maps of the eastern slopes of the highlands show few traces of pre-colonial agriculture.

3°) Those map sections showing 50 to 100 hectares of cultivated land also suggest that Man was settled on the land to a limited extent, and in this category we find only 15 maps. The category of 100 to 200 hectares is perhaps more significant, but only concerns 14 maps.

4°) In the category of 200 to 500 hectares under cultivation we find greater representivity with a geographical distribution over 24 maps.

5°) The group of maps (16) showing 500 to 1,000 hectares of cultivated land cover the regions of intense pre-colonial agriculture.

6°) Finally, the map sections 1,000 to 5,000 hectares under cultivation represent what we could call the "Canaque granaries" of the Grande Terre. Note that map 21.111 (the Azareu-Pothé region) had 5,000 hectares under cultivation, and the neighbouring area (map 25.111) had 3,440 hectares.

Land surface cultivated (in hectares)	0	1 to 50	51 to 100	101 to 200	201 to 500	501 to 1000	1001 to 2000	2001 to 3000	3001 to 5019	Total
Number of maps	16	28	15	14	26	14	12	3	2	131
Total land surface in hectares per category	0	715	1134	2080	8432	11738	16565	7559	8459	59980

Table 3. - Distribution of pre-colonial cultivated land per map.
Source : ORSTOM (historical maps).

This table leads us to two conclusions :

On a total of 17 maps we find 32,883 hectares of cultivated land, which shows a marked concentration of cultivation in a limited area, often at higher altitudes (sections of 1,000 to 5,000 hectares).

On the other hand, in a total of 59 maps we find only 1,849 hectares of cultivated land (sections from 0 to 100 hectares). It should be noted that we find the same geographical distribution of extremes on both the historical maps of settlement and the maps of cultivation. This is shown in the comparative table which follows.

Cultivated land surface (in hectares) \ Number of villages	0	1 to 50	51 to 100	101 to 200	201 to 500	501 to 1000	1001 to 2000	2001 to 3000	3001 to 5019
0 villages	14	2							
1 to 5 villages	1	17	6	5	3		1+		
6 to 10 "	1-	5	4	2	5	2+			1+
11 to 20 "		5-	5-	4	9	2	1+	3+	
21 to 40 "				2-	5	6	4		
41 to 80 "				1-	2-	5	5		
+ than 80 "					2-	1	1		1
Total	16	28	15	14	26	14	12	3	1

Table 4. - Land surface under cultivation and the number of villages per map.
Source : ORSTOM.

In this table, + and - signs next to certain categories indicate anomalies in the correspondence of numbers. Thus, for example, for the maps in the 3,001 to 5,019 hectares category with 6 to 10 villages, we must assume that the number of existing villages has been minimised by our sources (unless they were particularly large villages ! ?).

Furthermore, where we have 11 to 20 villages in maps where only 1 to 50 hectares of cultivated land are shown, we must suppose that the land surface under cultivation has been scaled down from what it really was.

This brings us to another, more general observation : the question of how reliable is the figure we put forward, 56,982 hectares. Considering the methods used to obtain this figure, we can only take it to be approximate. Reservation is necessary, insofar as we only included the areas to be seen on the old maps, and those visible through photo-interpretation, which showed much more (with aerial and ground checks). However, it is obvious that these totals are far from exhaustive. For instance, observation of visible traces of cultivation does not take account of cultivated areas which have since been completely hidden by the natural vegetation. In some regions such as Thio, mining activity has probably contributed to the obliteration of cultivated areas. Colonization in parts of the East Coast (with coffee growing in particularly) and the West Coast, destroyed or covered

the old Canaque landscape with agriculture, extensive cattle-raising and other land uses. Thus it is possible that areas which today show little evidence of extensive pre-colonial cultivation, were widely cultivated in former times.

Under the conditions mentioned above, and taking into account the limitations of research, a loss of at least 20 % seems quite reasonable when measuring land-surface previously under cultivation. This only serves to highlight the extent of the Melanesian horticultural civilization of former times, and the possibilities it suggests in terms of population.

We shall not deal with the types of Canaque agrarian landscapes here ; this question has recently been well developed, and is now widely understood (1).

It should be pointed out that the organization of land-use depended on the geographical situations, the main types being the coastal areas, the river plains and mouths of river valleys, the sheltered lands of the narrow valleys in the middle-level to high mountain areas.

1. - Coastal landscape

Different economic combinations were found in these regions, notably groups of fishing villages near rich maritime zones, which offered easy access for outrigger canoes. There was then the possibility of a combination of agricultural activity and fishing (generally on the East Coast). Elsewhere, the problem of water supply was of prime importance, and villages tended to be rather small and dependent on fishing and shell-collecting. Agricultural produce was either obtained by bartering, or was cultivated in inland fields (eg. Oundjo), which required a temporary change of residence. This latter system seems to have been quite widespread on the Grande Terre.

2. - Villages in the plains and at the mouths of river-valleys

These were very common. Often people in such areas practised

(1) See J.P. Doumenge. "Les Mélanésien et leur espace en Nouvelle-Calédonie". Thèse de doctorat d'Etat. Octobre. 1979. Bordeaux III. 1000 pages. 3 tomes.

cultivation. The river valleys (the Iouanga Valley, the lower Diahot, the Tchamba Valley, the La Foa Valley, Nakety, etc...) were probably the most heavily-populated, and it was these areas that were the most disrupted by the different phases of colonization, in particular by the introduction of cattle-raising.

3. - Settlement and cultivation in the highlands

Today, there is no Melanesian settlement higher than 600 metres above sea level, but it would seem that this was not necessarily the case in pre-colonial times. Even some of the highest mountains sustained a regular population, if we are to believe the different sources. This is shown by the extent of taro cultivation in some areas that were a sort of "root crop granary". It is obvious that the landform limited settlement to hamlets, which were situated in small cultivated valleys. However, there were also some larger villages (Diahot, Koné, Bourail), which led to some degree of centralization.

POPULATION DENSITY, AND THE QUESTION OF PRE-COLONIAL MELANESIAN DEMOGRAPHY

1. - The complexity of the problem

The questions discussed above have the implicit consequence of a far-reaching revision of the population estimates which were more or less accepted by most authors until now. The estimates ranged from 60,000 to 100,000 Melanesians for the whole of the Caledonian archipelago. It must be noted that these authors used only the localised estimates (Pouébo-Balade) of the first explorers, and that the generalization of these figures for the whole of New Caledonia is more hypothetical than an approach based on existing documents. Nor must we forget that the question was soon further complicated by a policy of colonization by settlement, and that, as a result, some authors felt the need to justify a small Canaque population. Furthermore, some writers based their estimates on the level of population between 1880 and 1890, to conclude that the initial Melanesian population had been small. Nevertheless, tales of voyages and of exploration by missionaries and the military showed at least locally, the size of population and the extent of rural activities in certain areas (1). With the early military expeditions

(1) See the articles by : Ratte in "Sentiers Canaques" (for the north). Moniteur n°99 in 1878).

and the creation of the first reservations, some attempts at counting the population were made.

Thus the population of the Manongoes (the coastal region of Païta) who were settled in the villages of Ennedé, Naniouni', Oé, Tiaré, Téré, Tongouin, Mati and Tanongoe consisted of 87 men, 74 women and 71 children, a total of 232 people. This was in 1866, before territorial limits were defined (1).

In 1869, military operations in the north led to the dispersal of some groups, which later regrouped in designated areas. In this manner we have some population figures (2) ; for example, the Tendianous (Ouébias) numbered 122 men, 67 women, and 37 children (only 11 of whom were girls), a total of 226 people.

In the same year (order of the 28/2/1869 in the Journal Officiel), the Maloumes (Ouégua, Pouébo region) were composed of 4 groups, with a total of 579 people : 227 men, 155 women, 147 children (only 58 of whom were girls). The villages of the Païacs (Upper Diahot) had a population of 154 men, 105 women and 116 children (50 girls), a total of 375 people. Finally, in the same region (Pouébo), the Mouélébés tribe was "constituted" by the authorities (order in the Journal Officiel of 28/2/1870) ; it was composed of 768 persons of whom 217 were men, 226 women, and 305 children. But this new tribe included some heterogeneous elements : there were ex-Ouveans, ex-Païacs and ex-Maloumes, which distorts the demographic data. As far as the Diaué tribe, which was an ally of the French, it was "reformed" in 1869 (3) with 93 men, 86 women, and 49 children (25 girls). But remnants of other tribes (Taboubaches, Ouimanis) were added, and here too the figure of 227 persons is not very significant. Similarly, in the north-east sector, the total of several localized censuses indicates that at one time there were 2,177 people living there. But these figures do not include part of the areas of Pouébo-Balade, Arama, and the lower Diahot, all well-populated regions. Its main interest is in showing that Melanesian hamlets could have populations of up to 100 persons in mountain regions.

(1) Moniteur n° 440 in 1868

(2) Moniteur n° 489/490 in 1869

(3) Moniteur n° 520 in 1869

In another census of six hamlets near Thio (1) organized by the Marist Brothers before 1878, there was a total of 211 persons. We note that in this count there was a great difference in population size in the Thio hamlets : 14 persons in the smallest, and 62 in the largest.

Apart from these few actual counts, we do not have any exact account giving a systematic inventory of the Melanesian population until the first census in 1887 (2). This census showed that there were 42,515 Melanesians in the Caledonian Archipelago, a figure that dropped to 30,304 in the 1897 census (18,295 of this population was on the Grande Terre).

The tardiness of this census in relation to the beginning of the French settlement is one of the major difficulties in the demographic question.

In fact, by 1887 the impact of colonization : epidemics, alcohol, the increase in tribal wars with firearms, and a fall in the birth-rate (often voluntary), had had a great effect on most Melanesian groups on the Grande Terre. Some sources imply that it is from the very beginnings of contact with Europeans that consequences for the Melanesian population appear, consequences which have been called "The fatal impact" (3) of the encounter between Oceanians and Europeans, with the devastating effect of the introduction of certain European maladies. From 1825 onwards, New Caledonia was a rest area for the European whalers who hunted the hump-backed whale in the north of the Coral Sea, and spent winters in several places in the Territory (4). After 1840 came the sandalwood period which, according to available literature, implied a close relationship between the sandalwood-traders and the native tribes, as semi-permanent settlements were established by European traders on the Isle of Pines, the East Coast, the Bay of Poum, and in Nouville, where James Paddon set up his trading post and village (first

(1) See the Marist Archives in Rome. A document from the Thio Mission - correspondance.

(2) See Métais P. "Démographie des néo-caléodniens" in Journal de la Sté des Océanistes 9/9/1953. Paris.

(3) See Moorehead A. The fatal impact : an account of the invasion of the South Pacific 1767-1840. Middlesex. England , 1966.

(4) See Doumenge F. "L'homme dans le Pacifique Sud." 1966. Paris.

settlement in the Nouméa area) (1). Towards the end of this period we find the first attempts by Catholic missionaries to gain a foothold in Balade (1844), and in Yaté by the Protestant "teachers" from the London Missionary Society (L.M.S.).

As early as 1843-45 an old tale (2) bears witness to the introduction of epidemics which decimated the native population in the south of New Caledonia, and led the Melanesians to flee or to repulse strangers, or else to make them submit to purification rites before contact. Later, in 1860, an account of a military exploratory trip (3) notes that the Ahoui tribe had been devastated by an epidemic, which had led the natives to refuse to carry the mail between the Canala outpost and Nouméa. Other reports elsewhere mention similar occurrences.

The demographic destabilisation of the Melanesians probably appears very early (4) after the fragile island balance had been damaged. Rural colonization became more and more extensive, and only served to aggravate a process which had already started. It was further accelerated by other factors, such as alcohol, firearms, capture of the women (5), voluntary infanticide, intermarriage, and punitive expeditions.

Below is a table comparing the results of three censuses of that period, and showing the evolution of the Melanesian population towards the end of the 19th century. The censuses were divided according to the contemporary administration sectors or "arrondissements", with the first census

(1) See Person Y. "La Nouvelle-Calédonie et l'Europe". in *Revue d'histoire des colonies* t. XL 1953, and Shineberg D. "Ils venaient chercher du santal". Nouméa. 1974. S.E.H.N.C.

(2) See. "Les travaux de Ta Unga". 1980. Nouméa. S.E.H.N.C.

(3) See *Moniteur* n° 367. 1860. p. 179.

(4) See Dr. Nicolas in "Les causes de la disparition progressive d'une intéressante race indigène". *Bulletin de la Société de Pathologie exotique*. Vol. XXI, p. 493.

(5) See the reactions of the missionaries following the capture of women and children, and that of Pastor Maurice Leenhardt after the 1917 revolt. See also R. Dousset-Leenhardt.

being in 1887, the second in 1891, and the third probably in 1899. The results were set out on the Agricultural Union map, on a scale of approximately 1:102,000, by Engler who was head of the Topographical Department (see the map of the Union Agricole de N.C.).

	1887			Total	1897	1899	+ ou - 1887/1899
	Men	Women	Children				
1er Arr.	5.035	5.260	9.208	19.503	17.365	15.843	- 3.660 (- 18,77 %)
2ème Arr.	1.426	1.255	1.410	4.001	3.550	3.008	- 993 (- 24,82 %)
3ème Arr.	2.787	2.140	2.270	7.197	6.520	5.041	- 2.156 (-29,96 %)
4ème Arr.	2.805	1.982	1.858	6.645	4.520	5.704	- 941 (- 15,57 %)
5ème Arr.	1.871	1.332	1.235	4.438	4.233	4.622	+ 184 (+ 4,15 %)
Total	13.924	11.956	15.981	41.784	36.198	34.218	- 7.566 (- 18,11 %)

Table 5. - Evolution of the Melanesian population (1887-1899). (Including the Loyalty Islands in the 1st arrondissement).
Source : Censuses of the Melanesian population, 1887-1899.

We are given the sex-ratio of the Melanesian population only in the 1887 census. In some arrondissements we note a large difference between the numbers of adult males and females (the 3rd, 4th and 5th arrondissements). Over a period of twelve years, the data from these three censuses illustrate the rapidity of the decline in population, with a general total of 18.11 % in population decline, with some arrondissements losing up to 29.96 % of their numbers.

2. - Some demographic considerations

a) the question of the settlement factor.

The data concerning settlement (2,368 villages) as well as for food crops (56,982 hectares) are interesting in that they represent a serious re-

search effort in the public and private archives, and an attempt at cartographic reconstruction which had not previously been undertaken, and could only be improved upon by further discovery of hypothetical unedited documents. It therefore seems to us, in all modesty and with the respect due to the scientific caution so necessary in this field, that we have redefined the terms of the question, at least in so much as to improve the approach, which had thus far been hazardous.

For the whole of the Grande Terre we found a total of 2,695 pre-contact villages (1,788 situated on maps, 580 situated but nameless, 327 unsited for lack of sufficiently precise information). Even if a large number of them were no more than small hamlets, or even seasonal settlements in the fields, this figure is important. To this we must of course add a number of unknown villages which disappeared without a trace, but a number which may not be negligible according to military sources. (see Rivière and Mathieu). There were perhaps several dozen, or maybe even several hundred. Let us assume, with all methodological reservation, that there were 3,000 villages and hamlets; if we also accept a figure of 20 as the minimum average population per unit (1), we would have a total of 60,000 Melanesians in the Grande Terre (2). This gives us, in a first minimal estimate, the maximum number suggested by most authors in estimates of the pre-colonial Melanesian population. If we increase the average per unit to 30 inhabitants, which seems to us, quite plausible, we come to 90,000 inhabitants. We shall not carry these calculations any further...

We believe this study shows that the lowest estimate of the initial population corresponds to the highest estimates of the early colonial period. This would mean a minimum of 80,000 to 100,000 Melanesians living on the Grande Terre at the time of the first contacts with Europeans (from about 1825).

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- (1) See Veillard and Depland in "Essais sur la Nouvelle-Calédonie." Paris. 1869. They estimated in 1862 that there was a total population of 42,480 Melanesians in the Territory, of whom 16,600 were in the islands. But these naval doctors had not visited the interior, and gave figures only for the coastal populations.
 - (2) Note that Birdsell in Sunda and Sahul (1977 - Great Britain. Academic Press) states that in Australia the basic population unit is five families, or a minimum of 25 people. This is an ecologically more rigorous region than N.C.

b) Population estimates based on cultivation systems.

Another interesting factor which could serve to strengthen the theory of a high level of population is provided by the evaluation of cultivation systems. If we are to believe the early writers and agriculturists of that time, the tarodière systems required a large labour force both for construction and for maintenance. Relating a visit to the old village of Téné (7 km from Bourail) Glaumont (op cit.) wrote : "We went there together and counted the sites, today empty, of more than twenty villages and a thousand huts or homes. Immense tarodières furrowed the mountains all round the valley, which could be estimated to be at least 100 km, with the tarodières going from the mountain tops and scoring them to their base, following all the contours of the hills."

By the methods described above, we found 56,982 hectares of pre-contact cultivated land, associating taro (in the majority) and yams (the latter probably predominating on the East Coast). This figure is, of course, incomplete, and we can probably increase it by 15 to 20 % without risk of exaggeration. However, we also know that the tarodière terraces needed fallow periods of up to nine years (because of parasites). Custom pertaining to sacred rites or traditional forms of authority were also factors regulating crop-rotation (1). So it seems difficult to extrapolate from the surface under cultivation, to speak of the cycles of rotation or the intensity of cultivation. But we can suppose that the number of man-hours necessary for terrace-cultivation and maintenance (2) was not the result of social practices for prestige, and that a considerable part of the land was generally productive. Spriggs, after studying the tarodières at the Col de la Pirogue near Païta, showed that a hectare of irrigated taro required a minimum of 4,816 man-hours of work per year, and up to 5,926 man-hours on difficult terrain. These figures indicate, if we accept a minimum of ten hours labour on each of 300 days, that between one and a half and two workers (working full-time) would be necessary per hectare. If we further accept that for about 60,000 hectares of pre-contact cultivated land found (to which we should add an adjustment of 20 %) there was only one hectare out of a potential six under

(1) See Curry L. "La culture de taro en Nouvelle-Calédonie". in Etudes Mélanésiennes 14-17. 1959-62.

(2) See Spriggs M. in "Col de la Piroque, New Caledonia : Preliminary report on taro irrigation". A.N.U. Canberra. 1979. Ronéo.

cultivation at any one time (1), a total of 10,000 hectares, the number of workers required would have been about 20,000 (1.5 to 2 workers per hectare).

Yet we are still speaking of a minimum intensity of cultivation. The number of 20,000 active workers, which is a quite plausible figure, indicates that counting women, children old people, regular fishermen, and people dispensed from horticultural work by customary law, there was a population of 80,000 to 100,000 people (2).

We believe that these tentative conclusions lend further support to the population estimates suggested by the number of pre-contact Melanesian settlements, and that a higher level of Melanesian population probably existed at the time of colonization than was then thought.

J.C. ROUX

(Translated by Mrs. JOOP).
Nouméa
Centre ORSTOM.
Décembre 1982.

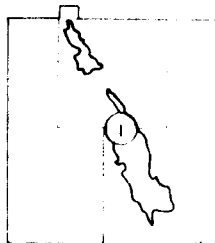
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- (1) Note that one hectare of irrigated taro can yield an annual harvest of 12 tonnes, and 20-40 tonnes par hectare for yams. See G. Barrau, "Les plantes alimentaires de l'Océanie". 1962. Doctoral thesis. Faculté des Sciences Marseille.
- (2) R. Crocombe in The New South Pacific (1974. Canberra gives this definition of the cultivation/population equation in the average Pacific situation : 3 hectares of land, with 1/2 a hectare under cultivation, is sufficient to sustain a family of 5 people, and requires between 40 and 50 days of agricultural labour by the father and mother of the family. Using Crocombe's ratio, we can postulate that 11,000 hectares of cultivated land would have provided sufficient food for 100,000 people in New Caledonia.

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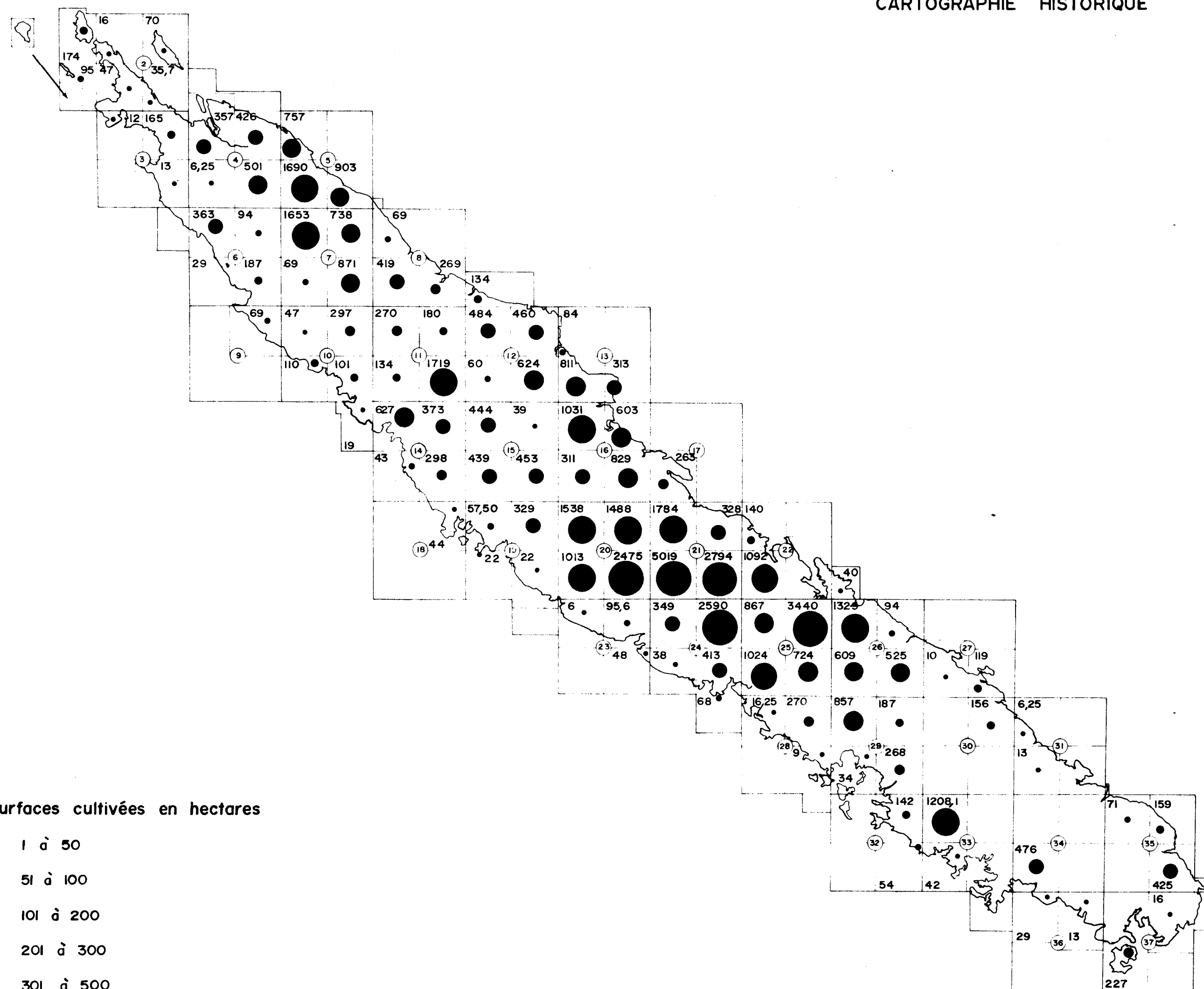


SURFACES DES ANCIENNES CULTURES MELANESIENNES

(pour la grande terre) en fonction des coupures IGN au 1/25000^e

SOURCES : ORSTOM 1980

CARTOGRAPHIE HISTORIQUE

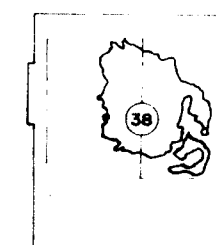


Surfaces cultivées en hectares

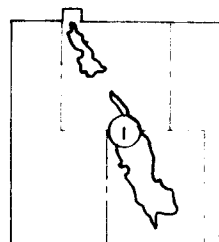
- 1 à 50
- 51 à 100
- 101 à 200
- 201 à 300
- 301 à 500
- 501 à 1000
- 1001 à 2000
- 2001 à 5000

444 nombre exacte d'hectares retrouvés par coupures

56 992 nombre total d'hectares



éch: 1/1000 000^e

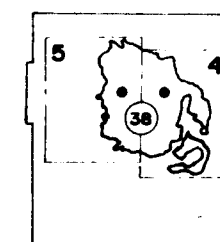
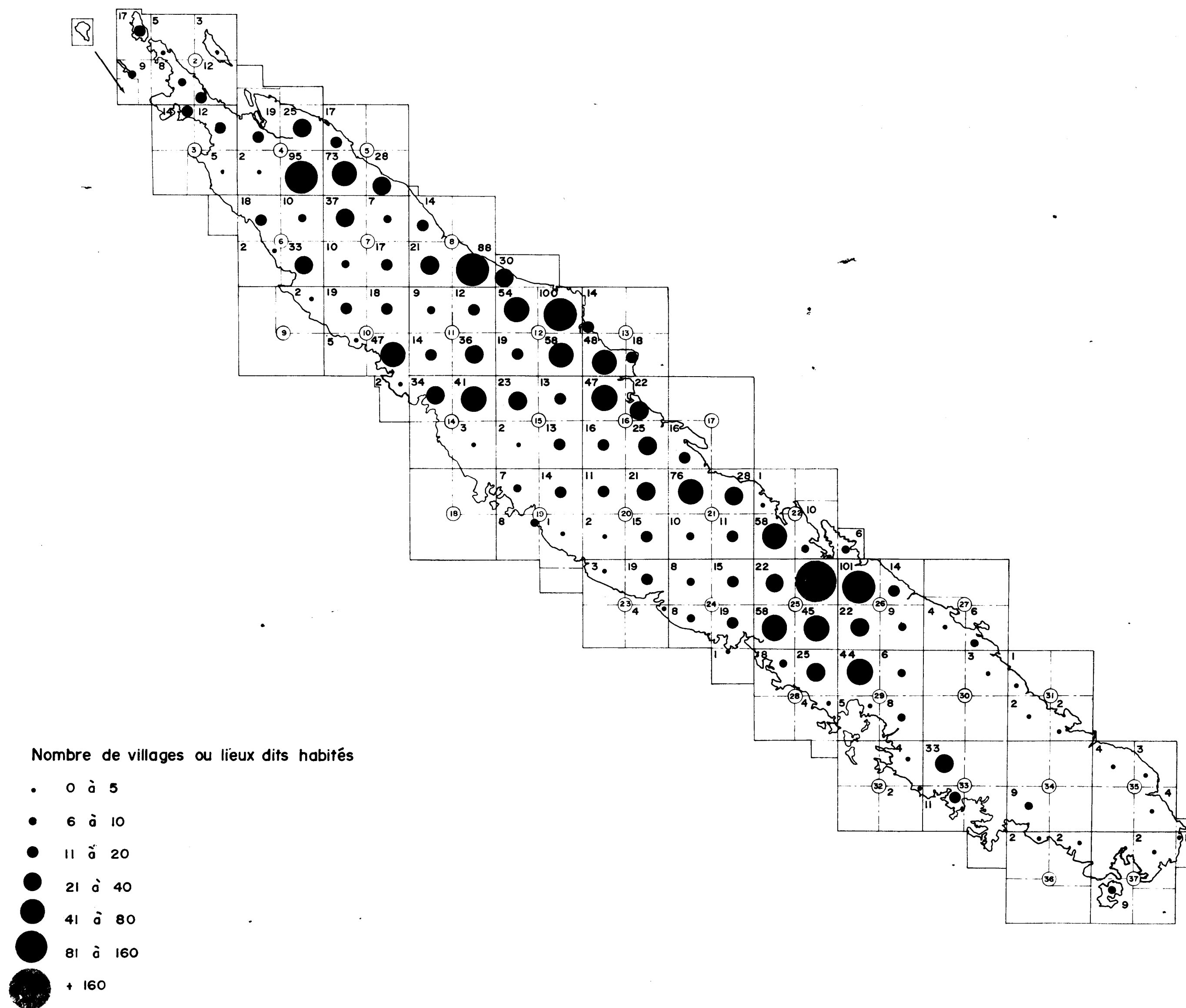


REPARTITION DES ANCIENS VILLAGES MELANESIENS

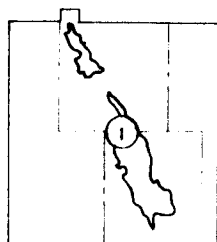
(en fonction des coupures IGN au 1/25000^e)

SOURCES : CARTES HISTORIQUES

ORSTOM 1980



éch : 1/1 000 000^e

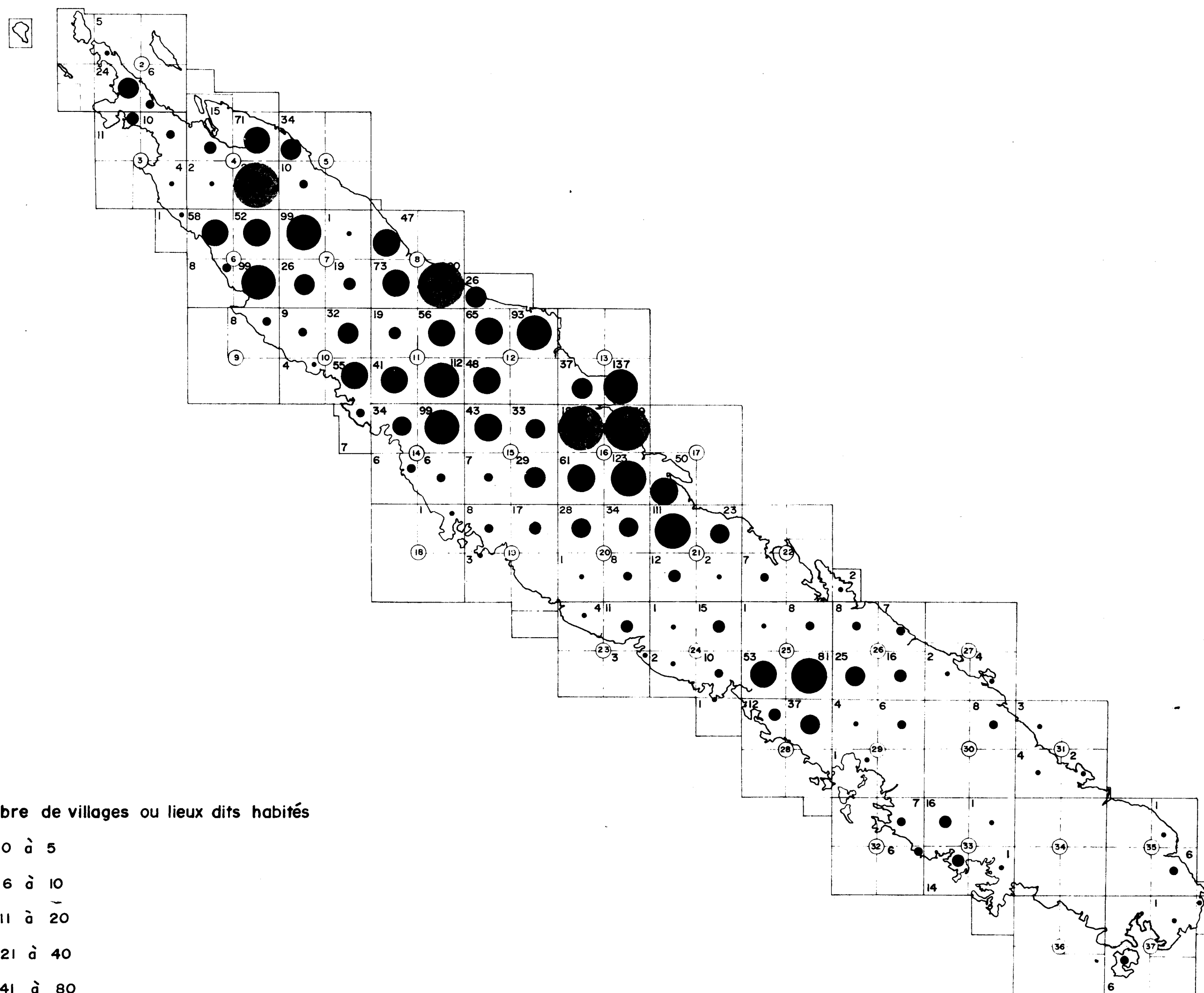


RÉPARTITION DES ANCIENS VILLAGES MÉLANÉSIENS

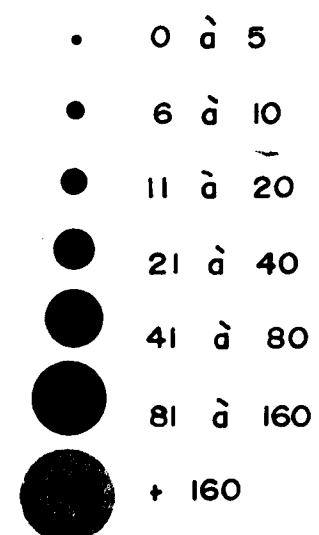
(en fonction des coupures IGN au 1/25000^e)

SOURCES : ENQUÊTES ORSTOM 1980

CARTOGRAPHIE TRADITION ORALE

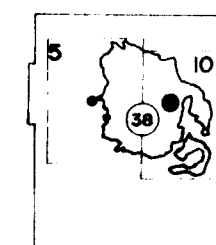


Nombre de villages ou lieux dits habités



28 nombre exact de villages retrouvés par coupure

3423 nombre total de villages



éch : 1/1 000 000^e