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The Role of Pigs in the Economy of Pakea Islet, Banks Islands, Southwest Pacific

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ABSTRACT

The Banks group comprises both high and low islands, and a significant maritime as well as terrestrial orientation to the traditional economy is evident both ethnographically and from archaeological data. However, the pig appears as a central focus of the Banks Islands no less than in other Melanesian communities. There is the suggestion from early accounts of the group that the role of the offshore islet was closely linked with the economy of adjacent high islands. An archaeological investigation of Pakea Islet provided the opportunity for an evaluation of this model. The results of a series of faunal analyses tend to confirm that the prehistoric Pakean communities developed over time a symbiotic relationship with those on an adjacent high island in which a limited age range of male pigs was exchanged for marine products.

Keywords: MELANESIA, VANUATU, BANKS ISLANDS, ETHNOGRAPHIC, PREHISTORIC, ENVIRONMENT, SPECIALIZED ECONOMY, EXCHANGE RELATIONSHIPS, ECONOMIC CHANGE, FAUNAL ANALYSIS, MINIMUM NUMBERS.

INTRODUCTION

The Banks Islands (politically part of Vanuatu) are situated in the north of the New Hebrides archipelago immediately south of the Santa Cruz group. A major archaeological investigation, including excavation on Pakea Islet off the southeastern coast of Vanua Lava (Fig. 1), was carried out in these islands during the period 1973 to 1975 (Ward 1979). This investigation involved detailed consideration of the prehistoric economy of the islands, examining both intra-group relationships and the links between the Banks Islands and their major neighbours. We examine here one aspect of that research, the role of pigs in the economy.

The main islands of the Banks group are typical manifestations of the Central Volcanic Chain which stretches the length of the New Hebrides archipelago, being large and mountainous shield volcanoes; juxtaposed with them are offshore islets formed of coral and recent alluvium. The contrast between high volcanic island and low atoll-like islet is emphasized by the low-lying and often swampy nature of the latter, its restricted range of strand vegetation and its extensive coral reefs and shallow lagoonal enclosures. On the high islands, fertile volcanic soils provide considerable areas for horticulture and arboriculture, including extensive complexes of irrigated taro gardens. Typically, islet soils are shallow and infertile, allowing little opportunity for gardening. The high islands typically exhibit narrow coastal platforms steeply sloping into offshore depths with few areas of fringing reef, but the islets and their associated reef systems surround and are surrounded by extensive areas of shallow water containing a high marine biomass.

In common with other island groups in this region, the Banks Islands exhibited an economy with both terrestrial and maritime orientations. Early accounts provide a picture of offshore fishing from large outrigger canoes – a practice said to have made the islanders more vulnerable to the predations of the early "blackbirders" –, the use of traps, nets and fish drives inshore, as well as intensive shellfish gathering on suitable littorals; carbohydrate staples were yam, taro and nuts and later manioc and sweet potato. In a region bereft of large terrestrial animals, the pig, being with dog and fowl one of the few domesticated animals present during prehistory, assumed a considerable significance to both subsistence and ceremonial aspects of the islanders' lives.

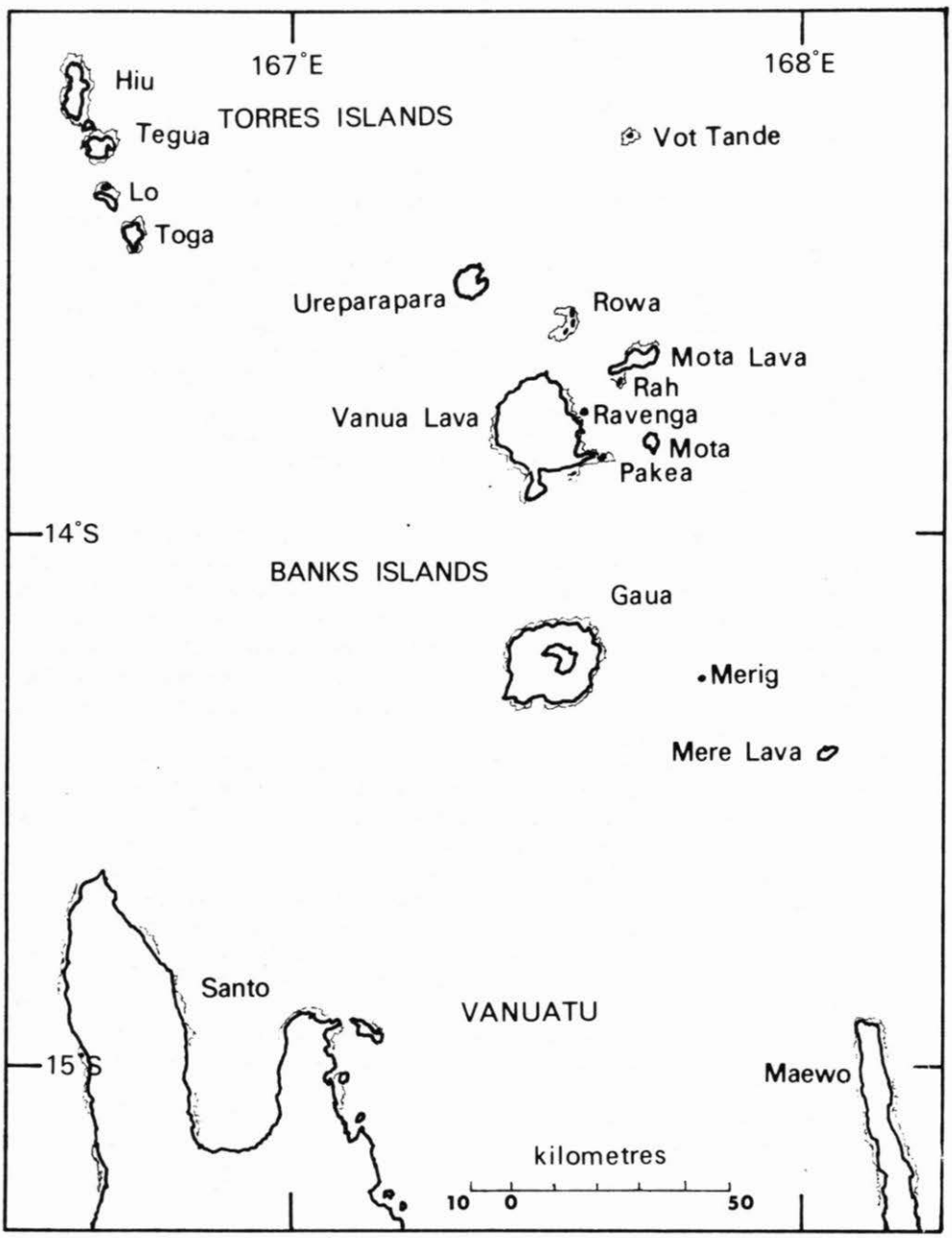

Figure 1: Location map – The Banks Islands, South-west Pacific

Quiros, the earliest recorded European visitor to the group, was given a pig after returning a hostage at Santa Maria (Gaua) in the southern Banks Islands one day in April, 1606 (Kelly 1966:200). Codrington noted the economic importance of pigs in this region with reference to the chants and associated magical paraphernalia such as special stones used to ensure their abundance (Codrington 1891:79). Pigs were considered to have souls, of which a man would take care after disposing of his animals, even though they did not leave ghosts (Codrington 1891:249, 269). Pigs were essential prerequisites for the holding of the *sukwe* ceremony by which men exhibited and gained power and status in the Banks Islands communities. Their central place is reflected in the traditional architecture, still to be seen in many areas today, where a dwelling house had an enclosure in which a man might feed and protect his most precious possession.[1]

The central place of pigs in the lives of the inhabitants of the region was graphically described by Harrisson (1937, 1936) for Malekula and Santo. He illustrated their importance in peace-making rites, at adoption, birth and death ceremonies, canoe launchings, in exchanges for women and in atonement for adultery and desertion (Harrisson 1937:41 ff.); pigs were essential in the exchange between Malo and northern Malekula of shell ornaments and various other items where a large tusker pig would purchase a fathom of "shell money" (Harrisson 1937:50).

If the upper canine was removed from a male at about the end of its first year, the lower tooth lacked any check to its growth. It could continue to curve up, back and down toward the mandible, outside or through which it might pass to form one or more circles, each said to take several years to form. Harrisson observed that "The value of the pig . . . is the stage of growth of the tusk." A single circle tusker might be had for forty male yearlings; "a double circle tusker could not be bought for any usual exchange. A three circle . . . is surcharged with power, its tusk is the coiling snake and the spirit of earth; you must pay a pig even to see it" (Harrisson 1937:25). Codrington also noted the phenomenon of the "intersex pig", which was subsequently the subject of a study by Baker (1928, 1929); ". . . there occur individual females which simulate the male sex. These are in the Banks' Islands *rawe*; they furnish the finest tusks " (Codrington 1891:57 fn.) Circular tusks used as bracelets are still found in the Banks Islands.

Although there are extant no direct observations of the protohistoric economy of Pakea and its relationships with the adjacent higher islands, such observations were made of the nearby Rowa group (Fig. 1). One of its islets, Aro ("Rowa"), had a "symbiotic" relationship with Mota Lava, of a similar kind to that which could be envisaged operating between Pakea and Vanua Lava or Mota. Codrington wrote of ". . . the little reef island of Rowa [which] supplies common [shell] money, and also the finer sort, which is used only as ornament . . ." and observed that "Rowa . . . has but a tiny population on one of the islets of its reef. They still mainly obtain their food from Saddle Island [Mota Lava] and Vanua Lava, carrying over in exchange fish and the money they make at home. Not many years ago it was believed that if food were grown at Rowa there would be a famine in Vanua Lava, and also that if a sow were taken there it would devour the people" (Codrington 1891:327, 298).

The model suggested here as typifying prehistoric Banks Islands' economy involves a dichotomy between the small islands, infertile but with rich marine environments, and large islands with the opposite combination of characteristics. Trade between these two types of islands would have provided a balanced economy for the group as a whole; in any such trade, the pig must, in all likelihood, have been central. For this model, it is possible to postulate that, were there in operation during the prehistoric occupation of an offshore islet a different pattern to that described by Codrington for Aro, neither the proportion of male and female pigs nor the age range of all individuals would differ significantly from that of a normal domestic population. On the other hand, should there occur an emphasis upon relatively youthful males, this would tend to confirm a pattern of intra-group exchange as hypothesized above and as suggested by Codrington's description.

Pakea Islet, because of its limited area and generally infertile sandy soils, is incapable of supporting a viable population by horticulture. This factor, together with its close proximity to the rich volcanic islands of Vanua Lava and Mota (Fig. 1), makes it an ideal venue for evaluating these postulates. We present here an analysis of the pig remains excavated from a site on Pakea Islet and suggest that the data provide a good fit for the model described above.

THE PAKEAN SITE, BN-PK-1, AREA A

Although most of Pakea Islet is very flat and low lying (much of the interior being below high tide), there is a conspicuous broad ridge of overlapping circular mounds extending for about a kilometre through the centre of the island. Test excavations by Groube (n.d.) in 1972 showed that these mounds had a cultural origin, containing ovenstone, shell, bone and ceramics. Their alignment along the edge of a swamp which lacks ancient sites on its southern margin suggests that they may originally have formed on the beach of what was then a lagoon. Further survey work carried out in 1973 (by GKW) confirmed Groube's impression that this mound complex provided the most promising site for excavation and several sondages in 1974 showed a basic similarity of form and content. Detailed results of this investigation will be published separately; this section attempts merely to provide a framework for the interpretation of the pig remains.

The excavated mound contained five primary stratigraphic divisions within which eight cultural levels were defined (Table 1). Layers 1 (Levels VII to IV) and 2 (Level III) constituted the mound proper and both were essentially shell middens. Less shell occurred in Layer 3 (Level II) and it was grouped in discrete clusters. Layer 4 was non-cultural in origin, consisting of coarse beach sand and blocks of coral. In one area, cultural remains were found in a stratigraphically earlier context than Layer 4; this Layer 5 (Level I) was similar in character to Level II.

Interpretation of the radiocarbon estimates and of the cultural debris from the site suggests that the area was occupied (Level I), on a casual basis, nearly three millennia ago. The hiatus in occupation was then followed by another series of temporary habitations (Level II) centred about two millennia ago. Permanent occupation of the excavated area, as manifest in Levels IV to VII, began approximately five hundred years later and lasted for perhaps another half millennium.

TABLE 1

STRATIGRAPHY AND CHRONOLOGY OF THE ARCHAEOLOGICAL DEPOSIT AT BN-PK-1, AREA A

Layer	Composition	Level	Approximate age
1	shell midden	VII VI V IV	second half of first millennium AD
2	shell midden	III	first quarter of first millennium AD
3	occupation debris	II	second half of first millennium BC
4	non-cultural	–	–
5	occupation debris	I	first half of first millennium BC

FAUNAL REMAINS

A very large amount of faunal material, both shell and bone, was recovered from the site. The analysis of most of this material will be described elsewhere but, in brief,

molluscs and fish account for some eighty percent of the total calorific value of food remains throughout the site, while pigs account for only twenty percent overall. As discussed below, however, these proportions change through time. Also present in the site, although accounting for very little food, are sea turtles, rats and crabs.

1. Analysis of Pig Remains – as a total assemblage

In this analysis we have taken the attitude that the more information we can obtain relating to a single problem, the better will be our interpretation. The difficulties inherent in faunal analysis, such as differential distribution and destruction of evidence, are too well known for this attitude to require much justification. A single hypothetical example illustrates the kind of mistake we have sought to avoid. If pigs were being brought to a site to be consumed, differential weights could bias the archaeological evidence. Small pigs, being light, could be brought in as whole carcasses, while only joints of larger pigs could be carried. An analysis which concerned itself only with jaws would present a very inaccurate picture of the activity at such a site. For reasons such as this we have examined post-cranial bones as well as jaws, isolated teeth as well as those present in jaws.

We consider first the total composition of the pig sample in terms of age and sex, dealing with post-cranial remains and then teeth and jaws. We will later examine the way in which this composition changes through time.

Ages have been assigned to individual pigs on the basis of the standard parameters calculated for domestic pigs (Silver 1969). This process is clearly subject to error because, as Silver points out, "pigs have been selected into a great many breeds whose maturation varies considerably. Only very general reliance can be placed on eruption dates as indicators of age" (Silver 1969:298). This problem is even more acute when comparing Banks Islands pigs with European pigs. We have therefore placed only "general reliance" on the age data, and have, in effect, simply classified the pigs into age groups of six-monthly intervals. The size of this gap should minimize the degree of error in our age estimates.

(a) Post-Cranial Bones

These were considered first because, since the data were relatively limited, the conclusions were relatively simple. Five elements have been examined in detail – humerus, ulna, radius, femur and tibia. Metacarpals and metatarsals have been used only to check for the presence of older animals, because these bones in young animals were difficult to use to ascertain minimum numbers.

The general problem with the post-cranial bones was the breakage which had removed the articular ends from most specimens. The result of this was that exact aging (which is based on epiphysial fusion) was possible on few of the bones and sexing was consequently also impossible. The approach we adopted was to measure a chosen point (obviously different for each element) on each specimen and then to order the sample according to size. Ages at death were calculated for the one or two bones with intact ends in each sequence and the relative ages of the others could then be assessed.

Table 2 shows the results of this analysis for the four most common bones. In addition, there was a small number of ulnae; all were less than three years old, confirming the pattern in the other four bones, but the presence of adult metacarpals and metatarsals suggest that at least three individuals greater than two years old were present. This latter evidence is not necessarily inconsistent with the other data.

The greatest minimum number of individuals present was eleven (determined for the humerus). One of these animals may be female (represented by a relatively small radius with a fused epiphysis). All of them were probably less than 3.5 years old at death but at least three were greater than two years old and at least two were less than one year old. The remaining six were probably between one and two years old.

TABLE 2
RESULTS OF THE ANALYSIS OF THE FOUR MOST COMMON BONES, DEFINING AGE GROUPS OF PIGS IN ALL LEVELS OF THE DEPOSIT AT BN-PK-1, AREA A

HUMERUS			FEMUR			TIBIA			RADIUS			ESTIMATED AGES
Size Class	Number*	Age**	Size Class	Number	Age	Size Class	Number	Age	Size Class	Number	Age	
1	2		1	2		1	1		1	3		< 1 year
2	2		2	3		2	4		2	1	< 1	
3	6		3	3		3	2	< 2	3	3	1–3½	1–2 years
4	4		4	3		4	1		4	2		
			5	3								
5	2	< 3½	7	2	< 3½	5	2	> 2	6	1		2–3½ years
6	1					6	1					

* Total bones
** Calculated for those specimens with epiphyses – ages in years

(b) Teeth

It was not possible to provide age estimates for the canine teeth of any greater accuracy than for the post-cranial bones. However, it was possible, because of the marked size dimorphism, to determine accurately the sex of these teeth. There were fifteen upper canines which represent at least ten (probably eleven) individuals of which nine (or ten) were male and one was female. There were ten lower canines representing at least five (possibly six) individuals of which three (or four) were male and two were female. In summary, there were probably twelve individuals represented – ten male and two female. None of these canines showed much wear and the conclusion drawn from the post-cranial analysis (that is, that all animals were under 3.5 years old) is probably also appropriate here.

The molar teeth (Table 3) presented two problems in analysis. To obtain minimum numbers for mandibles, or any element for that matter, we needed to count comparable parts. If this was not done we could have run the risk of, for example, counting the anterior and posterior parts of a single broken jaw as two individuals. We avoided this by calculating minimum numbers for jaws in two different ways. At a given tooth position (for example M_1) we added the number of jaws with teeth *in situ* plus number with empty sockets, or number with teeth *in situ* plus number of isolated teeth. This was done for both left and right sides and the highest of these four numbers gave the minimum number of individuals.

TABLE 3

RESULTS OF THE ANALYSIS OF MOLAR TEETH, DEFINING THE AGE GROUPS OF PIGS IN ALL LEVELS OF THE DEPOSIT AT BN-PK-1, AREA A

	Lower Molars				Upper Molars	
	M_1		M_2		M^1	M^2
Approx. Ages	Mandibles	Loose Teeth	Mandibles	Loose Teeth	(Large majority are loose teeth)	
6 months	3(3)*	1**	3(3)	1	4(2)	0(0)
12 months	2(1)	1	2(1)	2	0(0)	1(1)
18 months	8(7)	4	8(6)	ca 4	13(7)	8(5)

* total specimens (minimum numbers are given in parentheses)
** total specimens

The second problem was that of aging the isolated teeth, because the technique for aging jaws (by eruption stage) was inappropriate. The amount of tooth wear was assessed by taking an average of the enamel height at various points on each tooth. The measurements for isolated teeth were then compared with those for whole jaws to estimate approximate ages. These estimates could only be approximate because rate of wear was likely to be more variable than rate of eruption (mainly because of diet variation).

Only the first and second molars were in sufficient numbers to be included in Table 3. In addition to those listed there was one molar fragment which could not be identified with certainty. If it is an M_1, however, it is extremely worn and would represent a much older animal than the others.

The minimum numbers could not be calculated in the same way for premolars as for molars, because they were derived (except P^1) from both deciduous and permanent sets (one replacing the other at about one year of age). The greater minimum number calculated for the deciduous set (both dP^3 and dP^4) was five, all of which would be animals less than one year old. The permanent premolars were also derived from at least five animals (P^3). This gave a total number of ten individuals, although it could be slightly inflated if some of the permanent premolars were present in the jaw at the same time as the deciduous teeth.

A comparison of the results of post-cranial and jaw analyses revealed no serious inconsistencies and we are satisfied that there are no hidden anomalies producing bias. Combining these results suggests that the remains of male pigs from the excavation have the age composition shown in Figure 2. The age of the female pigs is uncertain but they were probably around 1.5 – 2 years old (one was older than the other since the canine was more worn).

An additional observation of interest was that one mandible (from an eighteen-month-old male) showed pathology consistent with a canine having formed a circle and grown into the jaw at the position of the lower second molar.

The two most notable features of the age and sex composition of the sample were the low numbers of females and the predominance of males around eighteen months old. We must now see whether this composition changes through time.

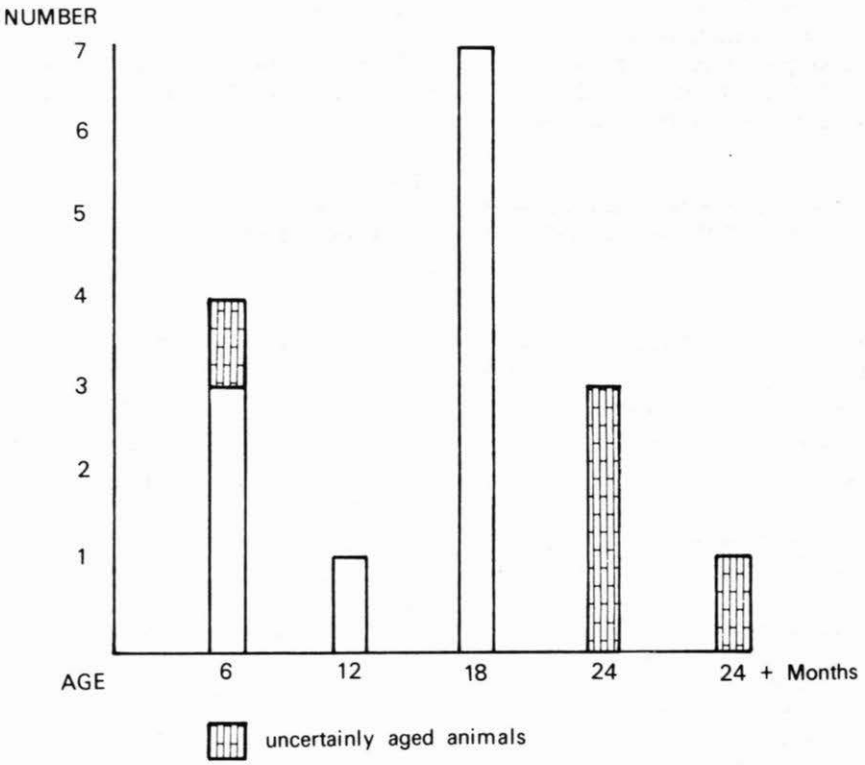

Figure 2: Age composition of pigs from all levels BN-PK-1, Area A

2. Analysis of Pig Remains – within levels

Table 4a lists the pig remains according to the levels from which they were recovered within the site. The fragments from Level I were given an arbitrary minimum number of one. Table 4b divides the remains for each level according to age and sex. We have not listed the doubtful older animals (that is, those based on metacarpals and on the worn molar) but these all came from Levels VI to VII.

The difficulty in combining the age and sex determinations was that sex could only be accurately determined from canine teeth, age from molar teeth. The pattern, however, was reasonably clear – the considerable increase in numbers of animals seen

TABLE 4a

MINIMUM NUMBERS OF INDIVIDUALS REPRESENTED IN SIX LEVELS OF BN-PK-1, AREA A

Level	VII	VI	V	IV	III	II	I
canines	2	4	3	4	1	1	
M_1	0	1	1	2	3	1	
M_2	1	2	1	3	0	1	
M^1	3	2	1	1	2	2	
M^2	2	1	1	1	0	1	
humerus	1	0	1	5	3	2	
femur	1	2	2	5	1	0	
tibia	2	3	0	1	2	0	
radius	0	1	1	3	2	0	
ulna	1	1	1	1	1	0	
greatest minimum number	3	4	3	5	3	2	1

TABLE 4b

ESTIMATION OF PROPORTIONS OF INDIVIDUALS BY AGE AND SEX IN SIX LEVELS OF BN-PK-1, AREA A

Level	VII	VI	V	IV	III	II	I
Sex							
male	2	2	3	3	1	–	–
female	–	2	–	1	–	1	–
unknown	1	–	–	1	2	2	1
Age							
6 months	1	–	–	1	2	1	–
12 months	–	–	1	1	–	–	–
18 months	2	2	1	2	1	2	–

in Levels IV to VII as compared to the earlier levels, was due to an increase in the number of eighteen-month-old males. One of these individuals was the one with pathology associated with the canine forming a circle.

Additional evidence bolsters these data. The most important factor is the relative proportion of pigs to other sources of protein. Figure 3 shows the changing pattern of food contribution over time, comparing pigs with marine resources (that is, molluscs and fish). The consistency of the relationships there has allowed the summary of the data for the upper levels in order to simplify the diagram. Details of the calculations which produced these figures are provided in the account by Ward (1979). While the figures for Level I may be biased by small sample size, the relationships among the other levels are clear. Pig is of greatest importance in Level II, marine resources in the mid and upper levels.

CONCLUSION

The results presented here tend to confirm the hypothesis concerning the role of pigs in the economy of Pakea Islet. They also suggest that this role has changed through time.

If the breeding of swine was "banned" on Pakea, as was indicated in ethnographic records for Aro, then the incidence of females would be expected to be very low (note Codrington's phrase – "if a sow were taken there it would devour the people"). On the other hand, if there was no similar reason to prevent the taking of sows on to the island during earlier times then the proportion of males and females should be

approximately equal. Similarly, if there was an optimum age at which to dispose of pigs in some form of exchange, and the data for highland New Guinea provided by Rappaport (1967), for example, suggest that this might be between one and two years, then the age range of pigs found later in the sequence might reflect such a selection process.

There does indeed seem to be a confirmation of this pattern in the data presented here; the proportion of male, eighteen-month-old pigs is much higher in the upper levels than in the lower levels (Fig. 3). Pigs of this age would have been an ideal medium of exchange and at least one of them may have had a value greater than that of just its carcass weight. The presence of the damaged lower jaw in Level IV may be interpreted as evidence for the practice of tooth evulsion in young pigs having dated from at least the mid-eighth century AD in the Banks Islands. As noted earlier, pigs with circular tusks were considered to have had their value greatly enhanced (for examples, Baker 1928, Harrisson 1937). Archaeologically, similar bracelets are best known from the extensive burial site dated to the thirteenth century AD at Retoka in the Central Islands of Vanuatu (Garanger 1972:77).

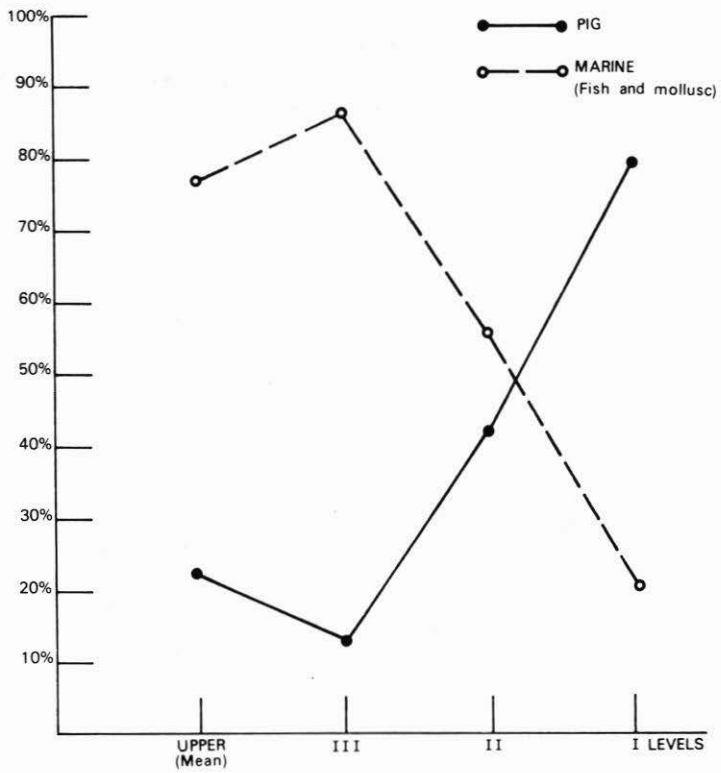

Figure 3: Total animal food value (percent kilocalories)

If the people of Pakea were obtaining pigs from elsewhere (that is, Vanua Lava or Mota), what were they offering in exchange? The increased use over time of marine resources provides a clue. It is probable that Pakea, with access to a productive reef area, was providing marine resources (not only food but also shell artefacts) to some larger islands in the group. Details of this economic strategy and its development will be examined elsewhere.

1. There is some evidence from a study of the languages of this region that the pig has elevated status. The languages of the Banks Islands and of northern Vanuatu are characterized by a special possession class designating prized possessions which is applied especially to swine. It takes the form *pula* plus a possessive adjectival suffix; for example, in the Mota *pula-n kwoe* ("his pig"). (D. T. Tryon, pers. comm. 1980.)

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