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INTRODUCTION

1.1 Objectives

This is the second of a series of papers which report in detail on the zoological knowledge of the Karam people of the upper Kaironk Valley Region⁽¹⁾ of the Schrader Mountains, New Guinea.⁽²⁾ It is essentially a data paper, providing evidence that may be used to check the validity of generalisations in earlier publications⁽³⁾ and to test alternative formulations.

One generalisation that has to be considered is that species-like units which contrast in multiple dimensions of morphology and behaviour are basic to zoological folk-taxonomies⁽⁴⁾. Some readers may interpret data here presented as casting doubt on this view. Thus, though our evidence on this point is not as extensive as we would wish, we note inconsistencies in Karam identifications of small mammals (Section 7.1 below). We also present Karam beliefs that creatures in certain taxa both develop and reproduce after their own kind and may also change into creatures in quite different taxa which also reproduce after their kind (Section 7.3 below).⁽⁵⁾ We argue that these data, applying to a limited number of taxa, do not contradict the generalisations based on consideration of a much wider range of evidence. More importantly, the erroneous beliefs in transformation of creatures from one taxon to another do not invalidate the status of each separate taxon as a "natural" unit in the logical sense, defined by multiple criteria.

Additional reasons for presenting this paper are that published accounts of the biology of New Guinea mammals are very limited, and some of the information related to us by Karam may be valuable to zoologists; and that, as far as we know, attempts to review systematically the total folk knowledge and classification of mammals in individual preliterate communities in any part of the world are very few.⁽⁶⁾

A pioneer publication in this field is the brief account by the biologist Denner⁽⁷⁾ of the naming of mammals by the Guarani of Argentina and Paraguay which is used by Simpson⁽⁸⁾ as evidence of the recognition of biological species by preliterate societies and by Lévi-Strauss⁽⁹⁾ as a prime example of a primitive classification which is logical and has a high degree of scientific validity. Denner's paper is valuable as a contribution to the history of chaotic and highly unscientific nineteenth century European zoological exploration of South America. It is also useful as an indication of how much zoologists can learn

1. i.e. the region from Blinford (5,000 ft) and Womk Census Village to the head of the Kaironk Valley, plus adjacent areas, especially of the upper Aunjang Valley to the north, in which people of the upper Kaironk Valley have land rights.
2. Karam knowledge and classification of frogs is described in Bulmer & Tyler (1968). A report on Karam classification of flying birds and bats has been drafted, and others on reptiles and fish, and on invertebrates, are in preparation.
3. Bulmer (1967) discusses the major taxa used by Karam in classifying animal life, and the cultural context of this taxonomy. Bulmer and Tyler (1968) and Bulmer (1970) discuss the basic species-like units in Karam taxonomy. Bulmer (1968b) attempts to account for the few recorded instances where Karam belief about reasonably familiar creatures is, or appears to be, at variance with scientific knowledge. Bulmer (1969) discusses problems of method in ethnozoological investigations.
4. Bulmer 1970: 1078 and *passim*.
5. See also Bulmer 1968b: 629-36.
6. The unpublished study by Dr Jeanette Hope of Chimbu classification of mammals, undertaken as an adjunct to her zoological collecting and study in the Mt Wilhelm area of the New Guinea Highlands, will be a most valuable addition to the literature (Hope n.d.)

7. 1939.
8. 1961: 57.
9. 1962: 60-1.

KARAM CLASSIFICATION OF MARSUPIALS AND RODENTS

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from the indigenous peoples of their regions of study, as a statement of nomenclatural principles, and as a demonstration of the wealth of information which can be extracted from etymological study of animal names. However, it has two main defects. Firstly, it gives no account of the methods by which the indigenous taxa were established, and of the extent of inconsistencies in informants' statements, beyond making the surprising assertion that "Their tribes came together from time to time in order to fix the names that best corresponded to the characteristics of the species"⁽¹⁰⁾. Secondly, it appears not to consider the total mammal list for the Guarani domain, but only those more common or conspicuous species for which the author has established equivalent Guarani taxa. The result is a reported folk taxonomy which appears to square up too well with modern zoological classification. Although it certainly supports the views of Simpson and Lévi-Strauss, shared by the present authors, of the objectivity and obviousness of discontinuities between very many species in a particular geographical region, the highly rational, or rationalised, picture of folk taxonomy it presents may not be entirely valid for the Guarani and certainly cannot be accepted as a norm for preliterate societies generally, without additional evidence. The present paper is a contribution to this kind of evidence.

1.2 Location and ethnography

Over 14,000 speakers of the Karam language dwell in the Asai, upper Simbai and upper Kaironk valleys, and adjacent areas of the Schrader Range and of the western fringe of the Bismarck Range. They live in dispersed homesteads and homestead clusters rather than nucleated villages and are horticulturalists with sweet potato as their staple crop and taro as their main crop of ceremonial and ritual importance. They keep substantial numbers of pigs. They also make fairly extensive use, for diet and technological purposes, of wild flora and fauna. They lack the complex segmentary local descent groups common to much of the New Guinea Highlands, possessing instead small named localised cognatic kin groups, each interlocking through consanguineal and affinal ties with many of its neighbours. Most individuals can, if necessary, exercise claims to reside with two or more of these groups, and to utilise garden land in widely dispersed areas. Rights to harvest the nuts of wild pandanus in the mountain forest, and to hunt certain birds of paradise in the vicinity of the pandanus groves, are, however, normally only inherited patrilineally. A man's pandanus groves are often at a considerable distance from his current homes and gardens, and he and his sons and other dependents are likely to hunt, intermittently, over quite a wide area including bush-fallow and forest near his house and current gardens and forest tracts near his pandanus.

The study here reported was conducted mainly among the people of *Kaytog*, *Gobnem* and *Skow* local kin groups, which together constitute the core of the 530 members of Kaironk census village in the upper Kaironk Valley.

The territories of these three groups range in altitude from 5,000 ft on the banks of the Kaironk River to 8,600 ft on the crest of the Kaironk-Aunjang Divide of the Schrader Range, and down again to approximately 6,500 ft in the upper Aunjang Valley to the north. Between 5,000 and 6,500 ft the Kaironk Valley is largely covered with grassland (*Themeda*, *Ischaemum* and other short grasses on the more exposed slopes; *Miscanthus* cane in wetter, recently cultivated areas, and a very little *Imperata* on the better soils), current gardens, and induced bush-fallow of cultivated *Casuarina* groves, with small patches of *Phragmites* reeds in poorly drained areas. On steep river and stream sides there

are small strips of trees and shrubs. Above about 6,500 ft gardens are of a more typical swidden type, in that they are cut into bush-fallow or forest and spontaneously revert to bush-fallow (dominated by *Homalanthus*, *Trema*, various *Piperaceae*, *Pipturus*, *Macaranga*, *Saurauia* and other mainly soft-wood species) with little need for systematic arboriculture, and provided cultivation is not prolonged for more than two garden seasons and not repeated within 10 years or so. There are some gardens in the Kaironk Valley as high as 7,800 ft, and in the upper Aunjang Valley to 8,000 ft, but, in general, the lower line of climax forest vegetation is at about 7,000 to 7,300 ft. In the Kaironk Valley there is some surviving mixed-oak (*Pasania*) forest below 7,500 ft; mixed broadleaf species dominate in less exposed areas from about 7,500 to 8,300 ft; and *Nothofagus* beech dominates the exposed ridges from 7,500 to 8,600 ft, interspersed with extensive groves of nut pandanus, especially where drainage is poor. The upper Aunjang Valley is still extensively forested within the region above 6,500 ft which is exploited by the Kaironk people, and is notable for the proportion of podocarp trees present, but about a square mile has been cleared for gardens between 8,000 and 6,900 ft.

Of the three Kaironk kin groups among whom field work was concentrated, most members of *Kaytog* speak *etp mmm* dialect, which is spoken in the Simbai Valley and in most of the upper section of the Kaironk Valley. Most members of *Gobnem* and *Skow* speak *ty mmm*, the dialect of the Asai Valley, which is also spoken by members of Womk census village in the upper Kaironk. Where there are different dialect names for animals discussed in this paper, (K) indicates *Kaytog* or *etp mmm* dialect and (G) *Gobnem* or *ty mmm* dialect. Further information on the ethnography and ecology of the upper Kaironk Valley region is provided in Bulmer⁽¹¹⁾ and Bulmer & Tyler⁽¹²⁾. The phonemic orthography we use in spelling Karam words is that of Biggs⁽¹³⁾, with minor emendations by Pawley.⁽¹⁴⁾

1.3 Field work and methods

1.3.1 *Establishing the faunal list.* We have found the folk classification of small mammals more difficult to investigate than that of other vertebrate groups. This is because many mammals are more difficult to observe and collect than are most birds, frogs or lizards. At the same time, the Karam are very interested in mammals: as with other vertebrates, there are no regularly occurring species which they do not include in one or more of their taxa. Whereas an individual may confess that he, personally, does not know the name of a particular creature, he will not say, as he would for countless invertebrates, "we do not have a name for it". Analysis of a folk taxonomy can only be adequate to the extent that it takes into account the full range of phenomena to which taxa are applied. A prerequisite for a comprehensive study of Karam classification is therefore the establishment of a comprehensive local faunal list. It is also necessary to examine and discuss live or newly killed specimens of as many species as possible with local informants.⁽¹⁵⁾

The first difficulty encountered in trying to establish the local faunal list was that Karam are, partly intentionally, very selective hunters and collectors, particularly of the smaller mammals (see Section 3 below). If we had relied solely on specimens which they brought to us, we would have been able to

11. 1967.
12. 1968.
13. 1963.
14. 1966.
15. Bulmer 1969: 12.

examine only 24 species, and note the presence of another 5 for which they provided crania or mandibles from animals killed when we were not present (see Table 3). Furthermore, of many species they obtained very few examples. We therefore decided to trap small mammals ourselves. Our results were as selective as the Karam's. We trapped 10 species, some in large numbers, and these included 4 which the Karam had not provided. However, how many species human hunters, including ourselves, had failed to get was revealed when we examined pellets and other refuse from owl roosts. In particular, the Sooty Owl (*Tyto tenebricosa*) is clearly a more exhaustive and efficient hunter than man.⁽¹⁶⁾ In spite of the fact that the largest local mammals were too big for the owl to cope with, refuse from only four roosts included remnants of 18 marsupial and rodent species, as well as 2 bats. Three of these species were not in our other collections. At the same time, at least six species obtained by human hunters which were both present in the owl's habitat and well within the size range of its prey did not appear in the pellets, including two very common small terrestrial rodents. We have to conclude that the owl is also selective.

Published lists⁽¹⁷⁾ our present list from the Schrader Mountains and our unpublished collections from the north slopes of Mount Hagen and the Kratke Range include 29 marsupial and 32 rodent species recorded in the Highlands Districts and adjacent areas of comparable altitude. Some of these species are likely to be very local in their distribution and others to be mainly or entirely restricted to altitudes either higher or lower than those at which we were working. At the same time, the general mammal list for the Highlands is unlikely to be anywhere near complete. Thus, the 14 marsupial and 21 rodent species which we have so far collected in the Kaironk region above 5,000 ft are likely to constitute no more than 80 percent of the total number of species present. We have failed to obtain certain small dasyurid marsupials (e.g. *Murexia*) and non-aquatic hydromyine rats, at least one bandicoot and at least one giant rat, which we would expect to be locally present. We have in Section 5 guessed at the identity of certain of the larger species which we have not collected but which have been described by Karam. However, some of the Karam taxa we have recorded for small marsupials and rodents must also include not only the species we have ascribed to them but also certain others which we have failed to obtain.

1.3.2 *Field work periods and activities.* In periods of ethnographic field work totalling approximately 12 months between January 1960 and January 1968, Bulmer obtained, mainly by purchase from local hunters, 78 specimens of rodents and marsupials representing 19 species. These were preserved in alcohol and submitted to Mr Basil Marlow, Curator of Mammals at the Australian Museum, Sydney, for identification. Most of the rodents in the collection were later examined by Mr Graeme George of the T.P.N.G. Department of Agriculture, Stock and Fisheries. Hunters' trophy material (crania, mandibles and a

few other bones) was also collected and forwarded to Dr Hobart Van Deusen, Archbold Expeditions, American Museum of Natural History, New York, whose identifications added five species to the list. Bulmer obtained Karam names and details of method and place of capture for each animal together with a certain amount of commentary on the comparison of the assigned taxa with others.

In August-September 1968 we both visited the Kaironk Valley for three weeks and attempted to collect a wider range of mammals and obtain additional information as to Karam hunting, use and classification of these. Four days were spent near Kaironk Rest House, in the garden and grassland zone, at 5,700 ft; 8 days at Añban at the forest edge in the upper Ced Valley at 7,300 ft; 7 days at Kijem, 8,200 ft, in the forest above the head of the Ced stream. A party of about 10 hunters from Gobnem accompanied us to Añban and Kijem. We purchased mammals which they obtained for us, and we set break-back and live traps for small animals. Lines of break-back traps were also set, for one night each, by the Kaironk River below the Rest House at 5,200 ft, and in the reed-beds by the airstrip in the upper Simbai Valley, at 5,600 ft.

Eighty-three marsupials and rodents were collected, of which 60 were retained as specimens. They included 16 species, of which 4 had not previously been obtained by Bulmer. In addition, the pellets of a Sooty Owl (*Tyto tenebricosa*) were collected from a hollow tree in forest at 8,100 ft. These contained the remains of five mammal species, one of which does not appear elsewhere in our collections.

The August 1968 enquiry, though somewhat disappointing in the total number of species collected, produced useful information. For the first time it was possible to get informants to compare a fair range of specimens either newly captured or as prepared skins, and in this context to elicit information on the criteria they used in making identifications. However, the degree of consistency these mainly male informants demonstrated in identifications of smaller mammals seemed surprisingly low, in comparison with their performances in identifying birds or frogs. Women were only intermittently present with the hunting party, and we did not have much opportunity to consult them as to their knowledge of these creatures. As women collect small mammals to a greater extent than men, this was unfortunate. We therefore took the opportunity of a return visit to Kaironk in October 1968 by Miss Inge Riebe, who was making a study of Karam marriage and women's activities, to ask her to interview women on this topic. Miss Riebe was supplied with a comprehensive list of Karam taxa for small rodents and marsupials, and most helpfully obtained specific statements as to how each taxon on the list contrasted with the others.

In September 1971 Saem Majnep, a Karam assistant now working in Port Moresby, returned home for three weeks' leave and in that time added one more mammal species to our collections.

In December 1971-January 1972 and June 1972 Bulmer undertook another eight weeks' field work during which Menzies was able to join him for two weeks and Majnep was present for six weeks. In spite of very wet weather we obtained 58 further specimens, of which 41 were retained for university collections. These included 10 species. We also obtained refuse from three further roosts of the Sooty Owl and from three roosts of a white owl, probably the Grass Owl (*Tyto longimembris*). Together with additional hunters' trophy material, these added seven further species to our list.

Identifications of specimens collected in 1968 and 1971-2 were made by Menzies and, in the case of rodent species collected in 1968, by staff of the British Museum of Natural History, London.

16. *Sagal* (the Sooty Owl, *Tyto tenebricosa*) has the reputation among Karam of being a most ferocious bird, and, indeed, it is astonishing that it is capable of taking animals as large as the ring-tail possum *Pseudocheirus forbesi*. It is said not to leave the tall timber of the forest, but we assume that it must at least hunt in the *Miscanthus* cane and bush-fallow at stream sides near the forest edge from the evidence of *Rattus exulans* in its diet. The majority of small rodents in its pellets had very worn dentition, indicating that the owl preys largely on the elderly. — *Skayag*, the taxon applied to white owls of the grassland and garden zone, certainly includes the Grass Owl, *Tyto longimembris*, though Barn Owls, *Tyto alba* may also be present and included. Its pellets indicate that it predated heavily on the two commonest rodents in the grasslands and gardens, *Rattus exulans* and *R. ruber*.
17. Laurie 1952; Laurie and Hill 1954; Brass 1964.

1.3.3 *Informants.* A wide range of mainly male informants was used in Bulmer's enquiries from 1960 onwards. Of those consulted most frequently, and mentioned by name in this report, the following four are notable. Saem Majnep of Gobnem, now (1972) aged about 23, has worked as a field assistant since 1964, when he was spotted as the most skilled hunter and knowledgeable naturalist of the boys who hung around the camp. For the past three years he has been living in Port Moresby, latterly working as a laboratory assistant at the university, and available for consultation while Bulmer has been writing this and other papers on Karam ethno-zoology. Councillor Simon Peter Gi of Skow, now aged about 27, has worked as a field assistant, interpreter and linguistic informant for Bulmer and other research workers intermittently since 1963. In 1965, he spent six months in New Zealand, acting as a linguistic informant, and he has spent approximately another six months working in other parts of New Guinea. He is also a very knowledgeable and reliable informant on natural history. John Kivas Kas of Kaytog, now aged about 24, has worked for us, primarily as a linguistic informant, since research first commenced in the Kaironk Valley in 1960. With Gi, he spent six months in New Zealand in 1965 and for much of the past four years he has been working in Port Moresby. Although an exceptionally good linguistic informant, he is not in the same class as Majnep or Gi as a source of information on plants and animals.

The three young men so far mentioned all now speak excellent Pidgin (two are also fluent in English), have travelled extensively, and may be suspected of interacting so intensively with the ethnographer that their responses to his questions may be unduly influenced by information he has himself provided to them. In contrast to them is Wpc, the "Big Man" of Gobnem, now probably in his fifties, who was one of the three or four most prominent leaders in the upper Kaironk Valley before the establishment of Administration control in the late 1950s. He still speaks no Pidgin, let alone any English, and has never been outside the Simbai-Kaironk region. While on excellent personal terms with the research workers and enthusiastically aiding them with their enquiries, he cannot be said to have any sophisticated understanding of the point of their investigations. The fact that his statements and those of other elderly and equally unsophisticated informants are generally very consistent with those provided by Gi and Majnep leads us to believe that we can accept the young men's information as not unduly influenced by their contact experiences or by their long-term employment as research assistants.

2. MAMMAL FAUNA OF THE KAIRONK VALLEY REGION

With the exception of several species of bats (which Karam classify with birds, and which will be reported on elsewhere),⁽¹⁸⁾ domestic and feral dog, domestic pig and certain domesticated animals brought in since 1960, the only mammals recorded in the upper Kaironk Valley are marsupials and rodents. A monotreme, the Short-snouted Echidna, *Tachylossus aculeatus*, is known from nearby areas of the Jimi and lower Baiyer valleys⁽¹⁹⁾ so may also be present in the lower Kaironk region.

Of many Karam informants questioned about echidnas, only two had any knowledge of these creatures. Bysky of Kaytog said there was a *kmm* (game mammal) called *ṛṛṛṛṛṛṛṛṛṛ* (lit. "spikey") found at low altitudes in the Jimi and

Simbai valleys. At first he said it was a kind of *kabacp* "tree kangaroo", but later corrected himself and said it was different (see also 5.2.6). John Kiyas told us he had first heard of this animal in 1971 when a cousin from Pwgyo in the Upper Kaironk Valley killed one while on a hunting expedition in the Jimi Valley. We can assume that echidnas are rare in the general region and probably not present at all in the upper Kaironk Valley.

As indicated in 1.3.1 above, 14 marsupial and 21 rodent species have so far been collected by us in the upper Kaironk Valley and adjacent upper Aujiang Valley above 5,000 ft; 1 additional marsupial species may with some certainty be identified from Karam informants' accounts; and 3 more marsupials have been obtained in the region from altitudes below 5,000 ft.

A succinct general account of New Guinea mammals is provided by Van Deusen⁽²⁰⁾, while the same author⁽²¹⁾ also provides a useful statement on marsupials and Ziegler⁽²²⁾ one on rodents. Contrary to widespread European belief, rodents are more numerous than marsupials in New Guinea, both in numbers of species and, considerably so, in total populations. Both groups are, however, notable for the extent of their adaptive radiation, and though there is more diversity both in size and form among the marsupials than among the rodents, there is no clear natural division between the two in terms of size, habitat, nesting or feeding habits. There are more striking contrasts between different marsupial genera than there are between certain of these and certain rodent genera. It is thus not surprising that Karam, although they observe which of these creatures possess pouches, do not classify them in groups which correspond to "marsupial" and "rodent", but include both rodents and marsupials in each of the two main generic taxa they employ (see 4.).

Both the marsupials and the rodents include groups of species which are extremely difficult to identify on superficial morphological characters, and about which very little biological information is available. There is no general handbook on New Guinea mammals, and published keys⁽²³⁾, which are still incomplete for certain genera, rely extensively on details of dentition and other skeletal features.⁽²⁴⁾ Among the marsupials present in the Highlands, particular difficulties appear in identifying the small dasyurids (*Murexia*, *Antechinus*, *Phascosorex*) in the field, not only because of the morphological similarities between different species and even different genera, but because these creatures are very elusive and difficult to collect, so that it is hard to compare a series. The ring-tail possums (*Pseudochelirus*) are also somewhat difficult, mainly because of the variation in fur-colour and markings present among individuals of the same species, which can mean that an atypically coloured member of one species may be rather easily confused with members of another.

The rodents raise even more problems of identification than the marsupials. Even among the giant rats, where one might expect fairly obvious contrasts between sympatric forms, the genera *Hyomys* and *Mallomys* are very similar in superficial features, though not in dentition, while colour-variation in the single species of *Mallomys* is an added complication. With regard to the small "typical" rats, the authors of the latest keys state that they are still unable to provide keys for the New Guinea species of *Rattus* and *Melomys*⁽²⁵⁾ and, indeed, it is very

20. 1972a.

21. Van Deusen 1972b.

22. 1972.

23. Husson 1955; Ziegler and Lidicker 1968; Lidicker and Ziegler 1968.

24. cf. Bulmer 1969: 8.

25. Lidicker and Ziegler 1968: 41-47; Menzies is currently preparing a key to the small rodent species of mainland New Guinea.

18. We have collected specimens of *Dobsonia moluccensis* (Quoy & Gaimard), *Syconycteris crassa* (Thomas) and two small and as yet unidentified insectivorous bats; and, from owl pellets only, *Nyctimene ?cyclotis* K. Andersen. All are from altitudes between 5,500 and 8,500 ft.

19. Van Deusen and George 1969: 4.

KARAM CLASSIFICATION OF MARSUPIALS & RODENTS

easy to confuse not merely different species of these genera and of *Pogonomelomys*, but to ascribe specimens to the incorrect genus. As these three genera account for 10 of the 13 species of small non-aquatic rodents so far collected in the Kaironk Valley, the field investigator's problems can be readily appreciated. There is the additional complication that small hydromyine rats, which are superficially similar to *Rattus* and *Melomys*, are likely to present and included in Karam taxa, though unrepresented in our collections.

A further fact which may well have bearing on Karam knowledge and classification of mammals and other fauna is that there has been considerable ecological change in the upper Kaironk Valley within recent decades, through the extension of garden areas. Informants say that while the exposed southern side of the Kaironk Valley has, so far as they know, always been covered with grassland, much of the northern side of the valley between 6,000 and 7,000 ft has only been cleared of forest within living memory. This change is apparently related to acquisition of new varieties of sweet potato which crop well at high altitudes and a change from taro to sweet potato as the staple crop; to a very considerable increase in the scale of pig husbandry, accompanied by a substitution of domestic pork for wild game in ceremonial feasts and exchanges between kin; and, if genealogical evidence is to be relied on, to a very considerable increase in human population of the upper valley over the last three generations.

Over the last two generations, wallabies (*Dorcopsis* and *Dorcopsulus*) have been almost eliminated in the upper Kaironk Valley (see 5.1.1). Other large mammal species which might be expected at this altitude are tree-kangaroos (*Dendrolagus*) and the Long-snouted Echidna (*Zaglossus*). The fact that there is no folk memory of the presence of these creatures suggests that they were exterminated earlier. The cranium of a tree-kangaroo was found among other mammal and cassowary bones in a rock-cleft above a former cooking shelter in the upper Aunjang Valley at 8,000 ft.

These ecological changes may also have encouraged the increase of species such as *Rattus exulans*, which are largely commensal with man or are well adapted to life in gardens and grasslands, and the decrease of forest species. Such possible recent changes in the status of animal populations may have some bearing on the apparent inconsistency with which some Karam taxa are applied.

Local informants state that there have also been changes in mammal populations over the period of our field studies (1960-71). The general view at Gobnem in 1971 was that the larger game mammals in the forest and forest-edge bush-fallow were then considerably more numerous than they had been for several years, and our own limited observations supported this view. Majnep and others attributed this apparent increase to reduced hunting for the previous three or four years through the absence of a high proportion of young men on plantation labour. The drastic reduction of the domestic dog population in 1965-6 may also have contributed to this change (see 3.4 below).

Finally, our own limited efforts in trapping suggest that there may be significant fluctuations in populations of certain of the smaller rodents. There are marked contrasts in the proportions of specimens of different *Rattus* species we obtained in August-September 1968 and in December 1971-January 1972 (see Table 1). While our figures are biased by our setting traps at different altitudes for different numbers of nights during the 1968 and 1971-2 collecting periods, it still seems curious that in 1968 we obtained only one example of *Rattus verecundus*, whereas in 1972 we obtained from five different locations a total of 20 specimens. If indeed populations of some of the smaller rodents do fluctuate considerably, this could also contribute to the degree of inconsistency in Karam identifications of them.

R. N. H. BULMER & J. I. MENZIES

TABLE 1: NUMBERS OF RATTUS AND MELOMYS TRAPPED IN 1968 AND 1971

Species	Aug.-Sept. 1968					Dec. 1971-Jan. 1972				
	I	II	III	Total	I	II	III	Total	III	Total
No. of trap-nights	8	9	4	21	0	10	16	16	16	26
<i>Rattus exulans</i>	0	0	2	2	—	0	19	19		
<i>Rattus ruber</i>	0	6	0	6	—	0	1	1		
<i>Rattus verecundus</i>	0	1	0	1	—	16	4	20		
<i>Rattus nitobe</i>	30	2	6	38	—	0	2	2		
<i>Melomys levipes</i>	8	0	0	8	—	1	0	1		
<i>Melomys platyops</i>	7	1	0	8	—	7	0	7		
<i>Melomys rufescens</i>	0	1	0	1	—	0	2	2		
TOTALS:	45	11	8	64	—	24	28	52		

Notes:

1. Zone I = Forest 7,500 - 8,600 ft.
- Zone II = Forest, forest-edge gardens and bush-fallow, 6,500-7,500 ft.
- Zone III = Habitations, grassland, gardens, fallow and stream-sides, 5,000-6,500 ft.

TABLE 2: CHECK-LIST OF MARSUPIALS AND RODENTS IN KAIRONK VALLEY REGION¹

Species ²	Zones ³				Karam Taxa ⁴
	I	II	III	IV	
MARSUPIALIA					
DASYURIDAE					
<i>Antechinus melanurus</i> (Thomas)	+	—	—	—	as <i>aln</i> (5.10.2)
(shrew-like marsupial)					
<i>Phascosorex dorsalis</i> (Peters & Doria) (shrew-like marsupial)	+	—	—	—	as <i>aln</i> (5.10.2)
%					
* <i>Satanellus albopunctatus</i> (Schlegel) (Native Cat)	?	+	?	?	<i>kmm swatg</i> (5.7.1)
PERAMELIDAE					
<i>Peroryctes longicauda</i> (Peters & Doria) (Long-tailed Bandicoot)	+	+	+	—	<i>kmm wgy</i> (5.6.1)
* <i>Peroryctes raffrayanus</i> (Milne-Edwards) (large bandicoot)	?	?	—	?	? <i>kmm ?pakam</i> (5.6.2)
<i>Echymipera clara</i> (Stein) (large bandicoot)	—	—	—	..	? (5.6.3)
PHALANGERIDAE					
<i>Phalanger orientalis</i> (Pallas) (cuscus)	—	—	—	..	? (5.2.4, 5.2.6)
<i>Phalanger maculatus</i> (Desmarest) (Spotted Cuscus)	—	—	—	+	<i>kmm takp</i> (5.2.4), <i>kmm aklay</i> , (5.2.5)
<i>Phalanger gymnotis</i> (Peters & Doria) (terrestrial cuscus)	+	+	—	—	<i>kmm madau</i> (5.2.1)

KARAM CLASSIFICATION OF MARSUPIALS & RODENTS

Species ²	Zones ³			Karam Taxa ⁴
	I	II	III	
<i>Phalanger vestitus</i> (Milne-Edwards) (silky cuscus)	+	+	-	<i>kmm atwak</i> (5.2.2.)
<i>Cercartetus caudatus</i> (Milne-Edwards) (pygmy possum)	+	+	+	<i>kmm maygot</i> (5.2.3)
* <i>Dactylopsila trivirgata</i> (Gray) (striped possum)	-	-	?	<i>kmm blc</i> (5.4.1)
<i>Dactyloanax palpator</i> (Milne-Edwards) (striped possum)	+	-	-	<i>kmm blc</i> (5.4.1)
<i>Petaurus breviceps</i> (Waterhouse) (Sugar Glider)	+	+	+	<i>kmm/as aymows</i> (5.5.1)
<i>Pseudocheirus forbesi</i> (Thomas) (ringtail possum)	+	+	-	<i>kmm skoyd</i> (5.3.3)
<i>Pseudocheirus ?meyeri</i> (Rothschild & Dollman) (ringtail possum)	+	?	-	<i>kmm skoyd</i> (5.3.3.1)
<i>Pseudocheirus corinnae</i> (Thomas) (ringtail possum)	+	+	-	<i>kmm wcm</i> (5.3.2)
<i>Pseudocheirus cupreus</i> (Thomas) (ringtail possum)	+	-	-	<i>kmm ymdy</i> (5.3.1)
MACROPODIDAE				
<i>Dorcopsis ?hogeni</i> (Heller) (forest wallaby)	?	+	-	<i>kmm sgaw</i> (5.1.1)
<i>Dorcopsulus vanheurni</i> (Thomas) (small forest wallaby)	?	?	-	<i>kmm sgaw</i> (5.1.1)
<i>Dendrolagus ?goodfellowi</i> (Thomas) (tree kangaroo)	-	-	+	<i>kmm kabcp</i> (5.1.3)
<i>Thylogale bruijini</i> (Schreber) (scrub wallaby or Pademelon)	-	-	+	<i>kmm klwal</i> (5.1.2)
RODENTIA				
MURIDAE				
Murinae:				
<i>Macrurromys major</i> (Rümmler) (large rat)	+	-	-	? <i>kmm kejh</i> (5.9.5)
<i>Anisomys imitator</i> (Thomas) (giant rat)	+	+	-	<i>kmm gdl-ws</i> (5.9.6)
<i>Pogonomys sylvestris</i> (Thomas) (small prehensile-tailed rat)	+	+	-	<i>as gikep</i> (5.11.6)
<i>Pogonomys mollipilosus</i> (Peters & Doria) (prehensile-tailed rat)	+	+	-	<i>as ymgenm</i> (5.11.5)
<i>Hyomys goliath</i> (Milne-Edwards) (giant rat)	+	+	+	<i>kmm mwmk</i> (5.9.2)
<i>Lorentzimus nouhuysi</i> (Jentinck) (arboreal mouse)	+	+	-	<i>as twm-kas</i> (5.11.9)
<i>Mallomys rothschildi</i> (Thomas) (giant rat)	+	+	-	<i>kmm mosak</i> (5.9.1)
<i>Rattus exulans</i> (Peale)	-	-	+	<i>kopyak</i> (5.11.1)

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Species ²	Zones ³			Karam Taxa ⁴
	I	II	III	
(Pacific Rat, Polynesian Rat)				
<i>Rattus ruber</i> (Jentinck) (garden rat)	-	+	+	<i>kopyak walcozon</i> (5.11.1.3)
<i>Rattus verecundus</i> (Thomas) (long-snouted rat)	-	+	-	<i>kopyak</i> (5.11.1), <i>kopyak gwibodw</i> (5.11.1.2)
<i>Rattus niobe</i> (Thomas) (small mountain rat)	+	+	+	<i>as katgn</i> (5.11.2)
<i>Melomys lorentzi</i> (Jentinck) (bush rat)	+	+	-	<i>kopyak</i> (5.11.1) <i>as mwg</i> (5.11.4)
<i>Melomys platyops</i> ⁵ (Thomas) (small bush rat)	+	+	-	<i>as gikep</i> (5.11.6)
<i>Melomys rufescens</i> (Alston) (small bush rat)	-	+	+	<i>as moys</i> (5.11.7)
<i>Melomys ?lutillus</i> (Thomas) (small bush rat)	?	-	-	? <i>as alks</i> (5.11.8)
<i>Pogonomelomys sevia</i> (Tate & Archbold) (prehensile-tailed rat)	?	+	-	? <i>as ymgenm</i> (5.11.5)
<i>Pogonomelomys ?mayeri</i> (Rothschild & Dollman) (prehensile-tailed rat)	?	?	?	?(5.11.5)
* <i>Uromys caudimaculatus</i> (Kreff) (giant rat)	-	-	?	? <i>kmm maklek</i> (5.9.4)
<i>Uromys anak</i> (Thomas) (giant rat)	?	?	-	? <i>kmm abpen</i> (5.9.3)
Hydromyinae:				
<i>Hydromys habbena</i> (Tate & Archbold) (water-rat)	?	+	?	<i>kmm kwypep</i> (5.8.1)
<i>Parahydromys asper</i> (Thomas) (water-side rat)	+	?	-	? <i>kmm godmwg</i> (5.9.7)
<i>Crossomys moncktoni</i> (Thomas) (Ear-less Water-rat)	?	+	+	<i>kmm kwypep</i> (5.8.1)

Notes:

1. Species marked with an asterisk have not been observed or collected by the authors but are tentatively included in this list on the basis of Karam descriptions.
2. Initial letters of English names are capitalised in the few cases where these are standardly accepted as applying only to the single species concerned. Where no capital letters are used, names apply to genera, or are descriptive terms only.
3. Zones I-III defined as in Table I. Zone IV includes those areas outside the upper Kaironk Valley but within approximately one day's walk which are either below 5,000 ft. or, if between 5,000 and 6,500 ft, have forest vegetation no longer characteristic of the upper Kaironk Valley at these altitudes.
4. Karam taxa should not be assumed to equate precisely with species. See Section 5 below.
5. Specimens of this rat have been referred to the subspecies *Melomys platyops arfakensis* the type locality of which is in the Arfak Mountains of West Irian at 2000m asl. This race differs from all other *M. platyops* in that it is smaller, has woollier fur and has a tail longer than the head + body. In these respects it resembles *Melomys ruber* and further study may indicate that *arfakensis* should be aligned with that species rather than with *platyops*.

3. HUNTING OF MARSUPIALS AND RODENTS

3.0 A distinction may be drawn between hunting and trapping, which are male activities, and the collecting of animals, mainly by digging up burrows and pulling out nests, which is largely but not entirely a female activity. Hunting in this restricted sense applies to the use of bow and arrow or spear, the use of dogs, and extensive tree-climbing, at which Karam men and boys are extremely skilled. None of these is an appropriate activity for females.

A second distinction which cross-cuts the first is that between systematic, planned pursuit of animals, and casual, unsystematic hunting and collecting which are undertaken as opportunity occurs and co-incidentally with other activities.

3.1 In the upper Kaironk Valley systematic hunting and trapping are restricted to the larger and mainly arboreal mammals which occur in forest areas, i.e. cuscus, ring-tail possums and certain of the giant rats, and to some limited hunting of giant rats (*Hymys*) and bandicoots through fire-drives in cane-grass. In contrast to systematic bird-hunting, most of which is by ambush from blinds set at food-trees, and which occurs at all seasons dependent on the flowering or fruiting of trees and vines, mammal hunting is largely seasonal. Most takes place in the dry season, from approximately May to August, when forest vegetation is not sodden, movement is easy, and clear moonlight nights give good opportunities for spotting, stalking and shooting nocturnal animals as they feed. In particular, the early part of the dry season, May and June, when the *althaw* Pandanus nuts of the mountain forest are being harvested, is the time when family parties camp out near the Pandanus groves and men and boys hunt extensively. Unfortunately, we have not been present in the Kaironk during the Pandanus harvest, so have had no opportunity to observe these activities and record the kinds and numbers of animals obtained. This fact must be taken into account in interpreting our records of species captured (Table 3).

The concentration of mammal hunting in the dry season was formerly related to the necessity for obtaining game for the *smv* initiation ceremonies, held after the taro harvest, in the early wet season, from August to November. Game obtained up to three months in advance was smoked for use at these ceremonies, though newly killed and live animals were also used when available. In the last two generations, it is said, domestic pigs have come to be substituted for game to the extent that we have only seen one or two smoked bandicoots included in any one *smv* food distribution.

Dry season hunting also fits logically into the annual cycle of horticultural activities. It takes place at the time when the taro crop is nearing ripeness and requires little attention, and before new gardens are being cleared or planted. The opposition between taro-gardening on the one hand and forest hunting and nut-collecting on the other is emphasised by the prohibition on entering taro gardens for one month after eating Pandanus nuts, cassowary, terrestrial cuscus (*Phalanger gymnotis*) and striped possum (*Dactylopsax*)⁽²⁶⁾.

Outside the dry season, hunting for larger mammals is mainly casual. If men encounter them in forest or bush-fallow they are certainly pursued, and if lairs or runs are discovered, traps may be set for them.

Apart from stalking, the main strategy used in hunting arboreal mammals appears to be the discovery of lairs, where either they are beset⁽²⁷⁾ or springes are set. The general location of an animal is normally noticed first from evidence of food-remnants (browsed foliage, chewed or nibbled fruit or nuts) or from dung, which hunters can in most cases assign with confidence to a particular

26. Bulmer 1967: 15.
27. cf. Bulmer 1968a: 310.

species. A systematic search is then made for the lair. Where appropriate, trees are climbed and in some cases even felled, and epiphytic vines are tugged and clattered against the tree-trunks in attempts to disturb the quarry. Entrances to holes in trees or under tree-roots, or to rock-clefts, are examined minutely for scratching from claws or for traces of fur. Dogs are also used to discover lairs. If a run rather than a lair is discovered (e.g. along a fallen tree-trunk over a creek) a springe may be set on it. Springes are also set at the entrances of lairs under the roots of trees or in rock-clefts.

3.2 Karam contrast with other Highlands groups known to the authors in the limited use they make of traps. Although they know how to construct pit-falls, dead-falls and springes, they only use springes on a limited scale and the other types hardly at all. We have recorded no instance of a springe or any other kind of traditional trap being set for mammals smaller than the Long-tailed Bandicoot (*Peroryctes longicauda*), and the only bandicoot recorded as caught in this way was one obtained by a trapper who was almost blind and incapable for this reason of undertaking garden work, but, aided by small boys, could still make and set traps.

Most Highlanders use springes and snares extensively to catch small rodents. The relative lack of interest in trapping on the part of Karam may be explained by the fact that men and initiated boys do not normally eat most kinds of small mammals, and those few species that they do eat (small dasyurids and the arboreal mouse, *Lorentzimys*) are not readily trapped. It is also the case that game caught in traps on or near the ground seems as often as not to be taken by dogs or pigs before it is retrieved by the human hunter. One method by which men and boys do take small terrestrial rodents (*Rattus* spp., *Melomys* spp.) is by a luring strategy. When these are known to be frequenting a garden hut or forest camp at night, a piece of sweet potato is impaled on the point of an arrow and laid in such a way that if the bait is nibbled the arrow-shaft jigs. The hunter sits in darkness with bow and arrow at the ready, waiting to shoot the animal that he cannot see but can locate from the position of the baited shaft.

Some of the smaller rodents of the high-altitude forest are extremely numerous and apparently so unused to human presence that they are said to be very easy to capture at night. Wpc described an occasion when he and his wife were camping at the base of a large *Nothofagus* tree and so many *katgn* (in this case probably *Rattus niobe* — see 5.11.2) came to steal sweet potato from his wife's net-bag that he killed 23 by sitting in wait and hitting them with a piece of fire-wood. (Twenty-three may be a slight exaggeration, as this is the base number of the Karam body-parts system of counting, and in a context of this kind used much as we might use "a score").

3.3 To some extent women and girls go out and systematically search for nests and burrows of small mammals in bush-fallow and forest, pulling animals out of nests and excavating burrows with digging-sticks. Such expeditions are, however, seldom aimed exclusively at capture of mammals, but are general foraging and collecting forays, in which edible fungi and other wild plants are gathered, and frogs as well as mammals are collected. As with other forms of edible wildlife, mammals are captured on many occasions through an animal being spotted or nest or burrow noticed while people are in gardens or forest for some quite other purposes. In particular, small mammals are frequently captured by both men and women as a by-product of garden-making activities.

Women do not climb trees or use bows and arrows and thus seldom, if ever, capture larger arboreal game. Of the larger terrestrial mammals, the one that appears to be captured at least as often by women as by men is the Long-tailed Bandicoot (*Peroryctes longicauda*), presumably because women are as likely as

men to find its lair, in the course of collecting expeditions or garden clearing. Women also capture the occasional water-rat while collecting frogs or tadpoles in the streams.

Table 3 indicates that the overwhelming majority of mammals captured by Karam is taken by hand, either by seizing them in their arboreal nests or lairs (sometimes with the aid of a hooked stick to extract them) or by digging up their burrows.

3.4 The importance of dogs in Karam hunting is not fully reflected in Table 3, for reasons given in Footnote 2 to that table. From hunters' narratives it is clear that a good dog is a great asset to his master.

Karam domestic dogs appear to be fairly typical of pre-European Highlands dogs, except that most of them are in much better physical condition than the domestic dogs kept in many parts of the region. They are said to interbreed with feral stock, and it is also said that pups of feral bitches are sometimes captured and kept as domestic animals. Their staple diet at home is sweet potato, though they are sometimes also given bones and scraps of meat from game killed.

In 1965-6, when deliberate efforts were made to develop poultry-keeping in the Kaironk, nearly all dogs in the upper valley were killed off. Most of our data on the use of dogs refers to a single animal, a dog called Lawn owned by Ytben of Gobnem, which survived this purge. Lawn was a puppy in 1966 when his mother was disposed of after local disputes over poultry killing. Ytben concealed and fostered the puppy, carrying it around with him for a considerable period in a bag. As an adult, the unfortunate animal spends much of its time hobbled, with either one or both of its fore-legs bound up in a flexed position. As a consequence, it has learned to run and leap using its hind legs only, like a circus dog. Ytben's house is about 300 yards from the nearest bush-fallow and three-quarters of a mile from the nearest forest. Periodically the dog escapes and hunts on its own account; perhaps more often it is taken hunting by its master, but eludes him when the time comes to return home and continues to hunt by itself. We have been brought specimens of the giant rat *Hyomys goliath*, the cuscus *Phalanger gymnotis* (half a carcass, the remainder having been eaten by the dog), the large ring-tail possum *Pseudocheirus cupreus* (bones only) and the giant rat *Mallomys rothschildi* (bones only) which were killed by Lawn. He was also responsible for killing what informants described as the only example of a wallaby (our *Dorcopsis* specimen) obtained within the last generation or so in the upper Ced Valley. His master reported that he had also been known to kill silky cuscus (*Phalanger vestitus*) and the large bandicoot *pakam* (?*Peroryctes raffrayanus*). Ytben also described occasions when he himself had killed examples of *Phalanger gymnotis*, *Pseudocheirus cupreus* and *Mallomys rothschildi* with Lawn's aid, the dog scenting and pursuing these animals and either treeing them or holding them at bay in lairs in rocks or under tree-roots until Ytben could extract them.

Ytben said that before hunting expeditions he sometimes mixed the juice of the scented herb *adp* with that of sugar-cane and inserted drops in the dog's nostrils, to make his sense of smell keen. There are spells that can be used when the drops are inserted, to make them more efficacious.

By late 1971, dogs were once again evident in the upper Kaironk Valley but, ironically, the majority of these were wholly or partly of European-introduced stock. It remains to be seen if they will be as resourceful either as hunters or as poultry-slayers as their indigenous predecessors.

3.5 Consequences of the introduction of steel tools

Although a few steel axe blades are said to have been traded into the Kaironk

Valley from the 1920s onwards, the effective change-over from stone to steel took place in about 1956, after work on the airstrip at Simbai had commenced and many labourers received bushknives or axes in payment. These tools have affected hunting in some obvious ways, facilitating the clearing of tracks through undergrowth, the felling or lopping of trees, bushes and vines to capture arboreal mammals or recover arrows, and the construction of climbing-poles, ladders and other apparatus for moving into and between tree-tops. We have seen forest clearings of at least a quarter of an acre which have allegedly been created by tree-felling to obtain a single large arboreal mammal. A further use of steel tools is in hacking through roots of trees under which cuscus *Phalanger gymnotis* or giant rat *Mallomys rothschildi* have gone to earth.

We have no evidence that the very small number of shot-guns introduced into the Kaironk have been used at all in hunting marsupials and rodents.

4. UTILISATION OF MARSUPIALS AND RODENTS AND THE MAJOR TAXA:

KMN, AS AND KOPYAK

4.1 All marsupials and rodents fall into one or other of the three Karam "major" or "primary" taxa, *kmm*, *as* and *kopyak*, which cannot be subsumed in any wider taxon we have recorded except *tap* "thing". These three taxa are largely but not completely mutually exclusive, but individually and collectively they are mutually exclusive with all other Karam taxa applied to living creatures, e.g. *yakt* "flying birds and bats", *koby* "cassowaries", *kaj* "pigs", *kayn* "dogs", *soyr* "certain snakes", *yn* "skinks" etc. (28)

When Karam wish to speak of *kmm* and *as* together, they do so merely by conjoining the two terms, "*kmm-as*". Instances of this we have recorded in natural discourse, as also *kmm-koby* "game mammals and cassowaries" — a grouping significant in terms of ritual status —, *kaj-koby* "pigs and cassowaries", *kmm-kaj-koby* "game mammals, pigs and cassowaries" — i.e. those animals which collectively provide ceremonially and ritually valued meat, in contrast to the ritually unvalued meat of birds, small mammals, frogs, etc.), and *kaj-kayn* "pigs and dogs".

Nomenclature is discussed in 6. below. Here it may merely be noted that, in referring to any secondary taxon within *kmm* or *as*, the inclusion of the primary taxon name is optional. Thus the cuscus *Phalanger vestitus* may be referred to as either *kmm madaw* or *madaw*.

4.1.1 *Kmm* may be glossed "game mammals", though this is not an entirely adequate definition as this taxon is marked off less well by hunting techniques employed in its members' capture than by the ritual status these enjoy as food. We have recorded 28 secondary taxa within *kmm*, of which 26 are terminal taxa while the remaining 2 are each divided into 2 tertiary terminal taxa. (29) We have so far identified 28 species which are included in these 30 terminal taxa. For the 22 terminal taxa applied by our informants to mammals occurring within their own domain, we have so far identified 22 species. However, it must be stressed that these are not all one-to-one correspondences. In two cases their taxa split zoological species. In at least three others they lump zoological species. But in any case our species list is unlikely to be complete.

Kmm include all marsupials larger than the Sugar-Glider (*Petaurus*), all giant rats (*Mallomys*, *Hyomys*, *Uromys* and *Anisomys*) and other non-aquatic rodents growing to more than approximately 200 mm in head and body length, and the

28. cf. Bulmer 1967: Table 1.

29. This and the statements on *kopyak* and *as* mammal taxa in Sections 4.1.2 and 4.1.3 correct information in Bulmer 1967: Table 1 and 1970: 1074-5, and in Bulmer and Tyler 1968: 351.

two locally recorded aquatic rats (*Crossomys* and *Hydromys*). In some contexts some informants also include two smaller arboreal marsupials, the Sugar-Glider and the Pygmy Possum (*Cercartetus*), but the small dasyurid marsupials (*Antechinus*, *Phascologale*) are not apparently ever included in this taxon.

Kmm thus include all the larger terrestrial and arboreal marsupials and rodents which are hunted exclusively by men, plus the terrestrial bandicoots, the water-rats and some small marsupials taken in low vegetation, which are at least equally frequently obtained by women. With the partial exception of *maḏaw*, the terrestrial cuscus (*Phalanger gymnotis*) and *bic*, the striped possum (*Dactylopsax*), which enjoy special ritual status³⁰, all *kmm* can be eaten by men, women, and children at any time. This quality alone does not mark this taxon off definitively, as certain small creatures in the *as* taxon can also be eaten freely by both sexes. However, what does appear to mark this taxon off precisely is that all *kmm* can be ritually cooked in propitiation of the dead and of the nature-demons (*kceky*), and normally are prepared in this way, whereas other marsupials and rodents never are. Typically *kmm* are cooked in the forest, in raised ovens (*bd*) which consist of a small circular platform of sticks and leaves supported, one to three feet above the ground, on a number of diagonally criss-crossing stakes. On the platform, game, fern leaves and other edible forest leaves and, sometimes, root vegetables are cooked with heated stones, covered over by pandanus and other foliage. Cordyline leaves are used to line the oven and wrap the food, and after the cooking these leaves are draped on cordyline and other shrubs by the cooking place to propitiate the nature-demons. It is said that nature-demons husband game mammals (*kceky kmm mokop*) in the same way as humans husband pigs.

Together with eels, *kmm* mammals are also cooked in raised ovens in propitiation of the dead, both while corpses are decomposing in the open graves near homesteads in the first stage of mortuary disposal, and at the shrines in groves of trees or at the forest edge where the cleaned bones of men are kept in the second stage of disposal, before their final deposition in tree-hollows and epiphytic clumps of fern.

As already noted, *kmm* are smoked for future ritual cooking and distribution at *smv* initiation ceremonies. We have no record of *kmm* being unceremoniously cooked by roasting in an open fire.

4.1.2 The taxon *kopyak*, which contains three terminal taxa, is applied to rats (all of genus *Rattus*) found in or near homesteads, graves, latrine areas and other unclean places; and to some extent to morphologically similar creatures found in other locations (see 5.11.1 below). Two zoological species are mainly involved though examples of other species may occasionally be included. These are categorically unclean, though old women and small children are said to eat them occasionally if they are captured far enough away from human habitations.

4.1.3 The taxon *as*, which also includes all frogs, applies to the residue of small marsupials and rodents which are neither *kmm* nor *kopyak*, and with ritual and culinary status intermediate between *kmm* and *kopyak*. We have recorded 11 secondary taxa applied to small mammals normally considered as *as*. Of these, 10 are terminal taxa while one contains 2 tertiary terminal taxa. We have so far recorded 3 marsupial and 11 rodent species which are assigned to these 12 terminal taxa. As with frogs, most kinds are captured mainly but not exclusively by women. Certain arboreal forms found exclusively in the forest (*aln*, the small dasyurids; and *twm-kas*, the arboreal mouse, *Lorentzimys*) can be eaten by men and boys, but other kinds are eaten only by women and children and, occasionally, old men. They may be roasted in the fire, wrapped in the bark of the *Trema*

sp. tree and thus cooked in the fire, or cooked in earth-ovens, but are not normally cooked in raised ovens. Their cooking and eating appear to involve no form of propitiation of nature-demons or of the dead.

Informants state explicitly that the taxon *as* applies equally to frogs and to small mammals, and if one elicits a list of *as* one is provided with the names for intermediate and terminal taxa applied to both groups of creatures. Context normally makes it clear whether frogs or mammals or both are being referred to, but where necessary they can be distinguished as *as ŋg-keṭ* "water-haunting *as*" (i.e. frogs) and *as lwm-keṭ* "ground-haunting *as*" (i.e. small marsupials and rodents). We have also recorded the "extended" or "informal" use of the term *kmm* in reference to small *as* rodents, e.g. when it was necessary to distinguish a collection of these from a collection of frogs which had been obtained at the same time.³¹

The extent of overlap of the taxa *kmm*, *as* and *kopyak*, and also Karam belief that certain kinds of *as* can grow into certain kinds of *kmm*, are discussed in Section 7 below, after the individual intermediate and terminal taxa have been described in Section 5.

4.2. Technological uses of mammal parts

Compared with many Highlands groups, Karam make little use of pelts in dress or ornament. The upper Kaironk people seldom use any of the mammals in their own domain for this purpose, with the exception of small pieces of cuscus (*Phalanger vestitus*) fur from the white undersurface which may be used as wig-adornments and ear-pendants, and tails of the striped possum (*Dactylopsax*) which are set on a sliver of cane as a head-dress ornament. Imported pelts of the Spotted Cuscus (*Phalanger maculatus*), especially of the white form, are, however, valued for head-dress ornaments, either worn in large pieces or cut into strips which are attached diagonally across wigs. Tree-kangaroo (*Dendrolagus goodfellowi*) tails are also seen occasionally as breast-ornaments.

Skins of ring-tail possums, especially *Pseudocheirus forbesi*, are used for hour-glass drum skins.

The incisors of giant rats, especially *Mallomys*, were formerly used as graters, for decorating arrow-shafts. Bones of wallaby were occasionally used to fashion spatulae, or small spatulate scrapers for removing taro-skins. It is said that the incisors of several species were formerly used in tooth-necklaces.

Technological factors do not appear to be relevant to the three major taxa applied to marsupials and rodents, except in so far as there are no recorded technological uses for any mammals in the *kopyak* or *as* taxa. However, this is equally true of certain mammals in the *kmm* class, e.g. bandicoots, water-rats and the Sugar-Glider.

5. INTERMEDIATE AND TERMINAL TAXA APPLIED TO MARSUPIALS AND RODENTS

While it would be logical to discuss the lower-order taxa falling within *kmm*, *as* and *kopyak* in separate sections, the marginal overlap of *kmm* and *as* and the very close morphological similarities between *kopyak* and certain *as* would make this an unsatisfactory procedure. We have instead treated the taxa in 11 groups, which, although somewhat arbitrarily defined, are in most cases marked off from all other groups by very obvious morphological and other characters. Eight of these are unambiguously *kmm*; two contain members which are treated sometimes as *kmm*, sometimes as *as*; and one includes *kopyak* and the majority of *as* kinds including some which are occasionally described as *kmm*.

31. Bulmer 1969: 6; Bulmer and Tyler 1968:353.

5.0.1. *Dualism and the status of terminal taxa.* A discussion of Karam nomenclature and taxonomy as applied to marsupials, rodents and other smaller vertebrates follows in Section 6. However, one feature of Karam classification requires mention at this point. This is the tendency of many informants to think in terms of paired taxa, at the terminal (usually, tertiary) level, which are distinguished in the first place by relative size. In some cases, these paired terminal taxa have generally accepted names, and in these instances they often correspond to groups which have taxonomic validity to the zoologist. The best examples of this may be found in Karam classification of birds where, for example, the intermediate (secondary) taxon *kwwt* applies to cuckoo-doves, genus *Macropygia*, and the two terminal (tertiary) taxa *kwwt twn* "ashy *kwwt*" and *kwwt sapot-kod* "kwwt of the *Macaranga* tree branches" apply to the species *Macropygia amboinensis* and *M. nigrirostris*, which contrast noticeably in size as well as in many other details of appearance and ecology. Among mammals, a parallel case is the pair *skoyd (yb)* and (*skoyd*) *modaybū*, applied, it seems, to different species of the smaller ring-tail possums (*Pseudochelirus*) (5.3).

However, individual informants also use this principle of paired opposition, larger: smaller, both to account for particular animals they have seen only once or twice which do not in some respect correspond neatly with some well-recognised taxon, and also apparently to account quite simply for size variation within a single species. Some informants have elaborated this to use as an explicit principle. For example, Wpc and Bysky, the Big Men of Gobnem and Kaytog respectively, generalised that "of all animals and birds (*kmm*, *as*, *yakt*) there are two kinds, a larger and a smaller", and then went on to cite a number of illustrations of cases where this applied. These included the *kwwt* and *skoyd* examples given above, where each kind possesses a standard name, and some cases where the alleged pairs do not enjoy standard names (e.g. *sgaw* wallabies, 5.1.1 and *kwy-pep* water-rats, 5.8). They also gave one example of paired taxa where each individual taxon enjoys separate nomenclatural status but there is no named taxon which embraces both members of the pair, the silky cuscuses *māygot* and *atwak* (5.2.2, 5.2.3).

Other cases where individual informants have distinguished contrasting forms, larger and smaller, without providing standard names for these include *aymows* "sugar-gliders" (5.5) and *swatg* "native cats" (5.7). A marginal case where we are not sure if the terms we were given should be regarded as purely descriptive or as having any standard nomenclatural status is that of the "ground-haunting" and "above-haunting" forms of *ymgenm* rodents (5.11.5).

It is interesting that whereas to the European it is equally natural to use either a tripartite (large-medium-small; upper-middle-lower; etc.) or a dual division as a fundamental principle of classification, this seems not to be the case with Karam. Thus, even where their categories do involve a tripartite division, the natural expression of this is likely to be in terms of two separate dual oppositions. An example is their classification of "dirty" rats *kopyak*, (5.11.1). During the very first weeks of Bulmer's research among the Karam, he was told that there were two kinds or *kopyak*, ordinary ones and smaller ones known as *walcogon* or "squeakers". Twelve years (and 15 months of field research) later, in the context of examination of trapped specimens, we were told that there were two kinds of *kopyak*, large ones known as *gwibodw* and ordinary ones. Knowledge of the term *gwibodw* was rapidly checked with as many of our informants as possible, and it was established that this was indeed a generally accepted taxon. However, at no point did anyone say to us spontaneously, "there are three kinds of *kopyak*: *gwibodw*, ordinary ones, and *walcogon*", though when we phrased direct questions in these terms, this was unhesitatingly agreed to be the case.

The larger: smaller dualism of Karam thinking may perhaps be related in the first place to the fact that the simpler of their two methods of counting is a two-base system, where the term for three is *omjalnokom*, i.e. "two-one" and that for four *omjal-omjal*, i.e. "two-two". Secondly, it may relate to the older sibling-younger sibling opposition which is, as in many societies, important in family relationships and is very much emphasised in Karam myth and folk-tales.

We would not wish to make too much of the "blinking" effect of Karam concern with dual rather than tripartite divisions. It probably prejudices Karam perceptions of the natural universe no more and no less than Western European tripartite thinking which has had such obvious consequences in fields as different as the conceptualisation of social class and the reconstruction of human pre-history. In spite of initial predispositions, individual Karam are quite capable of distinguishing three or more taxa in a contrast set, where they are thoroughly familiar with the phenomena concerned and where the context of discussion encourages them to do this. An example may be found in Wpc's statement on frog classification which is presented verbatim in an earlier paper by Bulmer and Tyler.³²

5.1 *Wallabies and Tree-kangaroos*

Three Karam taxa applied to wallabies and tree-kangaroos were recorded. All are *kmm*.

5.1.1. *Sgaw* (the name is also applied to a variety of the semi-cultivated green vegetable *bep* (*Rungia klossii*, the leaves of which are said to resemble the ears of this wallaby in shape)³³) are forest-dwelling wallabies. Alone of our informants, Wpc states that there are two kinds of *sgaw*, one smaller than the other. His statement is borne out by our sole two specimens, one the mandible and toes of a *Dorcopsis* (*D. ? lageni*) from the Ced Valley and the other the skull and limb bones of a *Dorcopsulus vanheurni* from the Upper Aunjang Valley. Although the *Dorcopsis* mandible is of a juvenile animal with M₃ not yet erupted, it is much larger than that of the *Dorcopsulus*, an adult with very worn teeth. *Dorcopsulus* is reported from forest at similar altitudes in some other parts of the Highlands, including, from the evidence of hunters' trophy material collected by C. J. Healey³⁴, the nearby Simbai — Jimi Divide of the Bismark Range. It is thus probable that this is the commoner of the two species in the Kaironk region.

Sgaw are said formerly to have been plentiful in the upper Kaironk Valley, but to have been almost eliminated there within the last two generations, though still present in the upper Aunjang Valley. Wpc said that domestic dogs had hunted it out, though when Bulmer suggested that recent forest clearing might also be relevant he agreed that this could be the case. Wpc himself has killed four *sgaw* in his lifetime, and his younger brother Tbs only one, all in the upper Aunjang Valley and with bow and arrows. Another method of hunting was to dig pits in the animals' runs. These were bell shaped, 4 ft or more deep, with a circular opening about 2 ft 6 in diameter. The opening was covered with leaves. Two men had to collaborate in the construction of a pit, one to excavate and the other to carry away the spoil and dispose of it in a stream. Stakes were not placed in these pits. Many of these pits can still be seen in surviving areas of forest in the upper Kaironk Valley up to about 7,500 ft, i.e. in the mixed-oak

32. 1968: 382-3.

33. For each secondary and tertiary taxon, we provide any information we have on etymology, folk-etymology or homonyms for the names concerned in brackets after the name. Where no bracketed information is given, this means that we have recorded none, though in all cases we asked informants if names could be explained or had homonyms.

34. Personal communication.

forest zone. We have also seen a few at altitudes up to 8,000 ft in the *Nothofagus* forest. *Sgaw* were also hunted with dogs. In this case a barrier of tree-fern foliage about 3 ft high was erected across the wallaby track and waiting hunters shot the animals when the dogs had driven them to the barrier. Although the barriers were not substantial, it was said that the wallabies would not attempt to break through or leap over them if they came upon them unexpectedly. It is said that springes (*gon*) were not used for *sgaw*.

The green vegetable *bep* (*Rungia klossii*) is said to be a favoured food of *sgaw*. 5.1.2 *Klwal* is said to be similar to *sgaw* but considerably larger, and with differently shaped ears. It is said not to be present in the upper Kaironk or upper Aunjang valleys, but to be in the Asai Valley, presumably at lower altitudes. If *sgaw* includes *Dorcopsulus* and *Dorcopsis*, *klwal* would perhaps be *Thylogale bruijini* (Schreber), of which we obtained a mandible of unknown provenance in the possession of a Kaironk hunter.⁽³⁵⁾ Unlike *sgaw*, *klwal* are said to be captured in springes (*gon*). They are said to feed on weeds and edible greens growing at the edges of gardens, especially *Rungia klossii*, but not to do damage to garden fences.

5.1.3 *Kabacp* is, on the evidence of tail skins used as personal ornaments, the tree-kangaroo, *Dendrolagus goodfellowi*. *Dendrolagus dorianus* was obtained by Burgers on the Schraderberg⁽³⁶⁾, but our informants appear to have no knowledge of this species, which is very different from *D. goodfellowi*. *Kabacp* is said not to be present in the upper Kaironk or upper Aunjang Valley forests, but to be in the forests of the Asai and Jimi valleys. Councillor Jobtd of Kandum in the Asai Valley, who acted as our interpreter in 1960, said that this animal is attracted to saline pools and is sometimes captured when it visits them.

5.2 *Cuscuses*

All cuscuses (*Phalanger* spp.) are *kmm*. Together with the ring-tail possums (*Pseudocheirus* spp.) and certain of the giant rats, these are the largest and most important game mammals commonly present in the upper Kaironk Valley, and are the only mammals present at that altitude which are systematically hunted. Three taxa are applied to the local cuscus species; certainly two and probably three taxa to other species found at lower altitudes.

Karam do not place cuscuses and ring-tails respectively in separate intermediate taxa, but they are aware of certain of the more obvious anatomical features which mark off the genera (terminal half of tail entirely naked and larger size of jaws and dentition of cuscuses), and in comparing taxa applied to species of the same genus they speak of these as "brothers".

For both cuscuses and ring-tails, hunters provide detailed information on habitat, lairs and feeding habits of all the locally present taxa, and also claim to be able to locate them by evidence of browsed foliage, fur traces at entrances to lairs, and by being able to identify their dung. A wide range of hunting strategies is used in their capture—besetting at lairs, ambush at feeding-places, stalking by moon-light, chase (with or without dogs) and trapping with springes.

5.2.1 *Madaw* or *kmm* is the cuscus, *Phalanger gymnotis*, of which we have obtained 14 crania or mandibles kept as hunters' trophies. It thus appears to be not uncommon in the forests of the upper Kaironk Valley, and we have also been shown a lair in bush-fallow at 6,500 ft, about a mile from the forest edge. However, we have seen only one newly killed example and the scattered remains of another, both killed and consumed by dogs. It is said to be the largest game

mammal normally present in the local forest, and to be distinguished from the other local cuscuses (*atwak*, *maygot*) and ring-tail possums (*ymdy*, *wcm*, *skoyd*) by its greater size, its particularly large head ("like a pussy-cat" said one informant) and its *mosh* (dark grey) fur, which is said in old animals to become streaked with light grey or even almost white, like the hair of an old man.

Madaw is also said to contrast in its habits with *maygot* and with the ring-tail possums. In particular, its lair is said to be in rock-clefts or under the roots of forest trees, whereas, with the partial exception of *ymdy*, the largest ringtail possum (5.3.1), the other local Phalangeridae are all said to have arboreal lairs or nests, or to rest in the branches of trees. *Madaw* is also said to spend more time on the ground than these other creatures. It is said to feed on the fruit of forest trees and shrubs (*kwbap* (*Ficus* sp.), *kodoip* (*Elaeocarpus* sp.), *lokai* (*Pipturus* sp.), *galkai* (*Pipturus* sp.) and the Pandanus palms *aiyaw*, *jjak*, *kwny* and *ytem*), and on the foliage of various shrubs and herbs, including the semi-cultivated *kwip* (*Oenantho javanica*), and *bep* (*Rungia klossii*), and also to steal bananas from forest-edge gardens. It is very generally believed to carry fruit in its pouch (we have heard this said of no other marsupial), and Gi, usually a very reliable informant, says that he has found fruit in the pouch of a *madaw* he himself killed.⁽³⁷⁾

Madaw are taken with springes at the entrances of their lairs, killed in their lairs with a spear or sharpened stick, or captured by hand, the technique in this case being to grasp the creature by the tail and quickly swing it round and strike its head against a tree-trunk or other hard surface. Dogs are used in striking out *madaw* lairs, and also sometimes in capturing them in the open. Straying dogs not infrequently kill *madaw* on their own account.

Madaw are very closely associated with *kceky*, the nature-demons; one informant described them, in Pidgin, as "namba-wan pig blong *kceky*". There is a myth in which *madaw*'s lair figures as the entrance to the underworld, and the animals themselves are transformed underworld beings, variously identified by informants as the dead and as nature-demons. *Madaw* and *bic* (Striped Possum—5.4.1) are the only two *kmm* which, like cassowary, cannot be eaten freely at all times and by all people. To eat these animals renders one ritually dangerous (*awf*) and thus unable to approach growing taro for one month. Killing a *madaw* involves the hunter in a much briefer period of restriction. A man who kills one at a time when he needs to work in taro gardens is likely to smokoe the carcass and then give or sell it to other people who are not currently concerned with growing taro.

Madaw bones are used in two forms of magic. In both cases dog bones are also used. One is magic to trace and pursue the witch who has caused a person's death, or the man responsible for contracting with the witch to cause the death. *Madaw* bones are inserted at one end of a bamboo tube and dog bones at the other. Between the two lots of bones are placed live ants, hornets and other stinging insects, and bitter-tasting plant substances. With appropriate spells the tube is heated at the edge of a fire until the insects are buzzing furiously and eventually make their escape, setting out in pursuit of the witch or his employer. The principle involved is that as dog chases *madaw* the dog bone below the *madaw* bone will help speed the hornets and other insects on their way.

In the other form of magic, *madaw* bones are buried in the upper part of an enemy's garden and dog bones in the lower. This will ruin the growing crop, as dog chases *madaw* (which is, as noted above, particularly dangerous to taro) through the garden.

35. Crania of this species were obtained by Clarke (1971: 243) in the lower Simbai Valley.

36. Laurie and Hill 1954: 26.

37. cf. Bulmer 1968b: 636.

5.2.2 *Atwak* or *atj* is, on the evidence of two specimens obtained, applied to the silky cuscus *Phalanger vestitus*, which appears to be fairly common in the Kaironk forests (approximately equal numbers of mandibles of this species and of *P. gymnotis* were obtained from hunters). Some informants say there is no difference between *atawak* and *maygot* (5.2.3), others that there are differences in size and habitat between them. *Atwak* contrast with *madaw* in their rather smaller habits, their lairs being in holes in trees or under epiphytic foliage. *Atwak* is said to eat the nuts of *aljayw* Pandanus and also the young shoots of this plant, and the fruit of a small and very common epiphytic orchid of the forest, *jib ayak*.

According to Majnep, the sexes sleep apart in separate lairs, but call to each other before going out together on foraging expeditions. He describes the call as extremely like the cry of a young human infant, and says that the cuscuses are sometimes attracted by a crying baby: he himself shot one attracted by the cry of his father's younger brother's infant.

Of the two specimens obtained, one had been caught in a trap set in a *gikep* tree (*Timonina* sp.) where it was known to feed; the other was found through its dung being seen at the foot of a *kogolok* tree, disturbed from its hole 40 ft above the ground by shaking of vines, and when it ran down the tree it was grabbed. In spite of its quality, the pelt is not normally used by Karam for personal adornment or any other purpose.

5.2.3 *Maygot* or *ying-twd* "tail-white" is represented in our collections by a single specimen of *Phalanger vestitus*, this supporting the view of those informants who say that there is no difference between this taxon and *atawak*. Those who claim that there is a difference say that *maygot* do not grow as large as *atawak* and are not found at as high altitudes in the forest. Majnep says *atawak* lacks the distinctive white tail of *maygot*.

The example collected was an adult male weighing about 5 lb, pulled by a hunter out of a hole in a forest tree, at about 7,500 ft. Some informants say that *skoyd* ring-tail possums can turn into *maygot*, or that male *maygot* mate with female *skoyd* (see 5.3.3).

In the light of most Karam opinions that *atawak* and *maygot* are contrasting taxa, it is interesting to learn from Mr Graeme George⁽⁴⁰⁾ that he suspects strongly, on anatomical evidence, that *P. vestitus* includes two species. 5.2.4 *Takp* or *magey* are white cuscuses, presumably white examples of *Phalanger maculatus* and possibly also of *P. orientalis*. A captive white *P. maculatus* in Port Moresby was identified by Majnep as *magey*. *Takp* are not present in the upper Kaironk Valley, but only at lower altitudes in the Asai and Jimi valleys. The white pelts are highly valued, being used in thin strips for wig decorations and in large pieces as head-ornaments, especially for new initiates in the *smj* rites of passage.

5.2.5 *Aklaj* or *gaby* (no folk-etymologies are recorded, but *aklaj* could also be glossed "up there") is probably, from the evidence of fur examined and from informants' accounts, applied to examples of the cuscus *Phalanger maculatus*, other than those which are pure white. It is also possible that the much rarer species *Phalanger atrimaculatus* is present in the Schrader region and included in this taxon. Fur of *P. maculatus* examined in the Kaironk was golden yellow (*wari*), but according to Gi these animals also have mottled red, black and white pelts. Another informant described the fur as *gs* "brown". There was disagreement.

38. Wpc denies this, saying *madaw* and *atawak* grow equally large.

39. In specimens collected, fur was of very smooth quality, dark chocolate-coloured above and white below, whereas *madaw* fur is grey and rabbit.

40. Personal communication.

ment between Majnep and Kiyas as to the identification of two prepared pelts of *P. maculatus* examined in Port Moresby, one a fairly uniform yellowish-white, the other mottled. The white pelt was identified by Majnep as *gaby* and by Kiyas as *magey*. Majnep identified the mottled pelt as *aklaj* or *aklaj mosb* "dark *aklaj*", while Kiyas identified it as *gaby*, saying at the same time that though *aklaj* and *gaby* were similar, *gaby* was smaller than *aklaj*. If both *P. maculatus* and *P. atrimaculatus* are present in the region, this would help account for the disagreement.

Aklaj is not present in the upper Kaironk Valley, but is found at lower altitudes in the same areas as *takp*. The fur is valued for ornaments, though not as highly as that of *takp*.

5.2.6 *Sby*⁽⁴¹⁾ is described by Kan, who claimed to have killed one at Pajel in the Asai Valley, as very like *atawak* but with *gs* "dull brown or grey" fur like that of *madaw*. If this account is representative, it would seem likely that *sby* is applied to the brown or grey furred examples of *Phalanger orientalis*. The creature is said not to be present in the upper Kaironk Valley.

The fact that a homonym of this creature's name is applied to a prickly-stemmed plant leads to the slight suspicion that originally this term was applied to an Echidna, *Zaglossus* sp. or *Tachyglottis* sp., now no longer known or remembered in the region (see 2). The Kyaka Enga (Baiyer Valley) name for the Echidna is *sa rakiya*, "the spiny *kapul*".

5.3 Ring-tail possums

Karam place ring-tail possums (*Pseudocheirus* spp.) in four *kam* taxa which are distinguished by relative size, markings, habits and habitat. We have collected whole specimens of three species and a half mandible of a fourth⁽⁴²⁾. It is possible that additional species are also present. Two Karam secondary taxa appear to correspond well with the two large species, *Pseudocheirus cupreus* and *P. corinnae*. The third Karam secondary taxon appears to correspond to the two or more locally present small species, of which we have obtained only *P. forbesi*, though the half-mandible obtained from an owl pellet may represent *P. mayeri*. This secondary taxon is subdivided into two Karam tertiary taxa, and one of these in turn is described as variable in terms of certain superficial morphological features.

5.3.1 *Yndj* (the name is also applied to a tree, *?Trimenia myricoides*) or *kagn* are said to grow as large as *atawak* and *maygot* cuscuses, and to be restricted to high-altitude forest. Six specimens obtained were all *Pseudocheirus cupreus*, from altitudes above 7,800 ft. Two were pulled out of holes in trees, two together (adult male and female) were disturbed from under thick epiphytes 50 ft up in a tree, and two were shot while feeding at night, one by electric torch light, the other by moonlight.

For morphological contrasts with *wcm*, the most similar taxon, see 5.3.2.

Yndj is said to eat leaves of various kinds of forest trees including those of *wak* (*Ficus* sp.) and the shoots of *aljayw* Pandanus, and fruit including those of *gog* (*Saurauia* spp.). Dung, observation of which is a prime guide to the hunter, is said to consist of small pellets. The animal is said not to make a nest or drey but to use lairs, not lined with leaves, both in holes and under epiphytes high up in trees, and also in holes under the roots of trees. Informants add that in the

41. The same term is applied to a yam (*ped*) taxon, which has a prickly stem and is said to grow wild at lower altitudes in the Asai Valley, presumably a variety of *Dioscorea esculenta*.

42. This corrects the erroneous statement in Bulmer 1970: 1080, which was written before our 1968 field work.

dry season it walks about on the ground and sleeps under the base of trees. In its partly terrestrial habits it contrasts with all related taxa except the *madaw* cuscus. 5.3.2 *Wcm*, *pyl-mdp* "in-a-fixed-position it-stops" or *wlpog* is a taxon applied to medium-sized arboreal possums which are said by some informants to grow in some cases into *atwak* and *maygot* (*Phalanger vestitus*). Described as a "brother" of *ymdtj*, it is said to contrast with this in rather smaller size, lighter coloured fur (*gs* "brown", rather than *gs* and *mosb* "brown and dark"), lower altitudinal range, being regularly found in bush-fallow at 6,500 ft. or so and seldom at high altitudes, differences in foods selected, dung, odour, and especially, in what is regarded as its most remarkable habit, its failure to make or use a nest or lair, but to sleep motionless during the day-time out in the branches of trees (hence its second name).⁽⁴³⁾ Its foods are said to include fruit and leaves of *gagn* (*Ficus dammaropsis*) which grows plentifully in cultivation areas and bush-fallow below about 7,000 ft, other kinds of *Ficus* fruit, many other kinds of leaves, and bamboo-shoots. In contrast to *ymdtj*, it excretes large turds, not pellets.

Though mainly arboreal, *wcm* are occasionally caught in traps on the ground, as well as in trees. The main method of capture seems to be to search for them following discovery of dung, or scenting of urine and then to shoot or chase them when their diurnal roosts are discovered.

Of five specimens collected which were ascribed to this taxon, three were female *Pseudocheirus corinnae*, one of which was accompanied by a half-grown young. All four were sleeping out in the branches of trees, at altitudes between 6,800 and about 7,800 ft. One was captured in our presence after its urine had been scented by a forest track. The animal was found sleeping in a tangle of dead hanging vines about 30 yards away. Majnep, who scented it, said that though *ymdtj* and *wcm* have similar odours, that of *wcm* is more penetrating, and it is only *wcm* that is frequently discovered by men recognising its presence from its smell.

The fifth specimen was a female *P. forbesi* from a nest in a Pandanus palm: there was a lot of argument about this creature, some informants insisting it was not *wcm* but *skoyd*. Those who said it was *wcm* did so because it lacked the distinctive facial markings normally present in *skoyd*.

5.3.3 *Skoyd* or *boñay* are medium- and small-sized ring-tail possums identified by prominent dark markings on the face, especially around the eyes, (*k/kl* — the term used for dappling and other colour-contrasts, especially in human facial tattooing), and by absence of the dark stripe down the back normally present in *wcm* and sometimes in *ymdtj*. They sometimes have white bellies and in some cases white-tipped tails, the latter being said by Majnep to result from impregnations of female *skoyd* by male *maygot* cuscuses. Apart from these morphological characters in which they differ from *ymdtj* and *wcm*, they are generally found at lower altitudes than *ymdtj*, and, unlike both other taxa, they are said to make dreys of leaves, out in the foliage or in the epiphytes of trees and in Pandanus palms. One nest pointed out to Bulmer was in a *Homalanthus* shrub in bush-fallow at about 6,500 ft, and was approximately 18" in diameter. *Skoyd* are said to eat leaves, and their dung is said to consist of very small pellets. Two out of three examples of *Pseudocheirus forbesi* obtained were identified as *skoyd*:

a third was identified as *wcm* (see 5.3.2 above), though some informants insisted that this creature was not *wcm* but *skoyd*.

5.3.3.1 *Modaybn* (*moday* = "hearth"; *bn* is a magical substance put in neck-pendants by warriors before a fight) or *skoyd modaybn* is a sub-taxon of *skoyd* distinguished by smaller size and, according to Gi, by yellow marks on upper face and by the fact that, in spite of smaller size, it makes a larger nest than ordinary *skoyd*. It is said also to be distinguished from ordinary *skoyd* and other ring-tails by its screaming call. The only other game mammal said to be equally noisy is the Sugar-Glider (*aymows*, 5.5.1). Some informants say that it is only found at high altitudes, above the range of normal *skoyd*, but others say that it is present both in the higher-altitude forest and lower down in bush-fallow. One *Pseudocheirus forbesi* collected was identified by its captor as *modaybn*, but it seems likely that the "proper" application of this taxon is to *P. mayveri*, the small high-altitude ring-tail, a half-mandible possibly attributable to which was included in the owl pellets we examined.

(to be concluded in the March 1973 issue)

43. Zoologists, using morphological characters, divide the genus *Pseudocheirus* into the sub-genera *Pseudocheirus* and *Pseudocheirus*. It is interesting that *P. cupreus* and *P. corinnae*, both of which fall in *Pseudocheirus*, are said by Karam never to make dreys. In contrast, *P. forbesi* and the smaller species placed by Karam in the *skoyd* taxon fall in the sub-genus *Pseudocheirus* and do make dreys. It is clear from the Australian literature that members of sub-genus *Pseudocheirus* generally make dreys, but we have found no reference to drey-building for any species of *Pseudocheirus*.