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The cemetery as symbol. The distribution of prehistoric Aboriginal burial grounds in southeastern Australia

COLIN PARDOE

Burials are a common part of the cultural remains left by previous societies and as such have a great deal of potential for archaeological study. As the last and most disruptive of the 'rites of passage' (van Gennep 1960), death is of considerable significance to any society and we stand to learn much from the examination of a society's physical response to death. For the archaeologist, especially in Australia, this means an examination of burial: customs, location, variation.

The archaeology of burial is often oriented toward individual cases, with the analysis of skeletons, graves, grave goods and social status. Meehan (1971) studied in detail the form and distribution of burials throughout Australia and remains the prime source of information on the subject. To date though, there exists no Australian study that has treated the cemetery as a discrete entity.

I propose here a definition for cemeteries in southeastern Australia and map their distribution and chronology. Known aggregrations of burials in this region are described and evaluated in terms of the definition. Some are assessed to be cemeteries; others are not.

I then examine the cultural and economic role of cemeteries and how this might be interpreted in an archaeological context. To this end I explore the proposal that cemeteries are linked to economic circumstances, as well as religious. Discussions of burial practice in Aboriginal Australia have invariably focussed on religious ideology rather than on the more pragmatic economic aspects. My observational position does not deny religious causation. Indeed, it does not make sense to separate economic and religious spheres — the relationship between environment and culture is an elaborate dialectical process.

From an archaeological perspective I am not interested in causal elements. The reconstruction is more concerned with the interaction of these differing aspects. Once religious ideas emerge from social/economic relationships (or wherever), they have an independent social life and may be manipulated in social and economic contexts. In this paper, environmental and economic aspects of burial will be demonstrated to play a major role.

Saxe (1970) links cemetery behaviour with specific resource distributions, large and dense populations, and a social organisation characterised by descent groups which are corporate, localised and unilineal. In this sense, cemeteries will be viewed as symbolic markers of group affiliation and through that, land ownership. Cemeteries are found only where large groups and permanent but finite resources coincide.

I will refer to broader social theory by placing these observations within Peterson's (1986) model of inclusion/exclusion. The River Murray populations will be seen as groups promoting exclusion and limiting their membership through descent. This contrasts with social and territorial organisation in other areas, where access to resources is maximised by extending kinship ties.

Finally I set out a diachronic reconstruction of social organisation throughout the Holocene. It is difficult to extrapolate social organisation from archaeology and this prehistory is based on archaeological features, skeletal biology and anthropology. It is an outline for an archaeological region that will bear examination from other studies and which follows Witter (1984) in his overview of 'cultural adaptive areas'. One of the consequences of this regional view is an explanation of the morphological changes evident in this part of the world in terms of social organisation and population structure rather than migration theories. I will point to an indigenous biocultural origin for the distinctive populations of Kow Swamp and Coobool Creek, rather than to the island of Java.

Defining Cemeteries

The term 'cemetery' (or graveyard) requires definitions both in structural terms and in archaeological practice. As a structural feature it remains undefined in the Australian context. Cemeteries are usually associated with sedentary, agricultural societies, not hunter-gatherers, although this is not always the case (Pardoe 1980). Many of the southeastern cemeteries I will describe are thousands of years old and betray their presence only by the graves. In contrast, cemeteries in other parts of the world are often more easily defined by some form of monument such as barrows, mounds, pits, megaliths or headstones (Bradley 1981, Chapman 1981).

I have arrived at the following criteria for defining cemeteries from the study of known sites in the region, my own research, and the need to apply archaeological techniques and methods of analysis to difficult data. These four practical criteria are: number of burials, contiguity, boundedness and exclusivity of site use.

First, there must be a significant number of burials, though the absolute number is rather difficult to pin down and is site dependent. The more graphic observation that a cemetery consists of a number of burials has generally sufficed elsewhere, but in the Southeast where there are usually no other indicators of the site and where burials are a common occurrence

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in riverine sand formations, the number of graves is not critical. This will become apparent in the site descriptions, and so these sites must be assessed in light of the other criteria.

Second, cemeteries may be defined as places where there are contiguous burials; that is, a single location where graves are adjacent. This is difficult to qualify, but depends on density of burial and boundedness of the burial site. With many burials close to one another it is possible to be reasonably sure that they are not random events. That is, the probability of one burial is dependent on the fact that other known interments are in the same place. Thus, even over a thousand years, 40 burials could take place, each based on the memory of a preceding one.

Contiguous burials may also be defined in distinction to burials that are essentially random, independent events (in a statistical sense). For example, the 103 burials at Willandra Lakes (Clark 1985) come from thousands of hectares and hundreds of kilometres of lunette and dune formations. The fact that there are many graves has to do with length and density of occupation. The graves are not, however, associated one with another. (It may well be that lunettes were known to be the final resting place for some individuals and there may have been reasons that determined burial location based on rank, grade or other status. But it is equally true that no *single* spot was considered to be preferable or necessary. Nor is any grave unequivocally related to another in time or space. That is, we cannot point to two graves and say that one might have been placed there because the other was.)

Third, graveyards are sites where the burials are bounded; either by landform or in the actual distribution of graves. The density of burials should decrease fairly quickly at the edges of the site.

Fourth, cemeteries should exhibit exclusivity. During their time of use, they should not have been occupation areas as well and so should not have the mundane material remains associated with living areas. By way of illustration, burial on the above mentioned lunettes and along water margins generally follows density of site occupation. More burials are to be found in areas of increased site density. Burials and occupation sites both cluster at outlet creeks and inter-lake stretches. It is clear that on the Willandra and Darling river systems, burial and site density are highly correlated, rather than mutually exclusive.

The idea of exclusivity as a defining feature of graveyards is implicit in most mortuary studies and accepted as given in ethnographic examples. The explicit statement of this criterion is usually unnecessary: we all know that cemeteries have one use. However, the particular situation in this study area (eroding landscape, long time spans, large variation in burial location and preservation) demands as much detail as possible in the definition of these archaeological features.

Saxe's hypothesis

Saxe (1970) brings an analytical rigour to mortuary studies that not only highlights his interest in general rules of societies, but also allows the archaeologist to operationalise his hypotheses. Both Saxe (1970) and Tainter (1978) make the point that since variation in burial distribution is attributable to social factors, then study of the same distributions may provide insights into social organisation. Saxe's idea on the use and reason for cemeteries is simple (once thought of) and succinctly put:

> To the degree that corporate group rights to use and/or control crucial but restricted resources are attained and/or legitimized by means of lineal descent from the dead (i.e., lineal ties to ancestors), such groups will maintain formal disposal areas for the exclusive disposal of their dead, and conversely. [1970:119]

In other words, cemeteries are a symbol of the rights of groups to resources that are not distributed equally, either in space or between groups.

Descent groups have existed as a form of social organisation throughout the whole of Aboriginal Australia. However, the extent to which descent groups are fluid or corporate, dispersed or localised, cognatic or unilineal varies from region to region.

Peterson, in his analysis of Aboriginal territorial organisation, distinguishes between desert groups in areas of low population density where descent patterns emphasise inclusion, and those larger social and residential groups in richer environments where 'descent becomes an indigenous model of group structure and a primary mode for the transmission of rights' (1986:153). In such corporate groups, the emphasis of the descent pattern is on exclusion. I propose that burial in cemeteries is one factor in that process of exclusion and serves to reinforce lineality.

While most of the studies deriving from Saxe's hypothesis have been at the level of intra-site variability, a few analyses, including that of Saxe himself, have been concerned with inter-site or inter-regional patterns. Goldstein (1976) applied this hypothesis ethnographically, and to Mississippian society in Illinois (AD900-1400). Her results demonstrated a general association of cemeteries, or formal disposal areas, with groups characterised by lineal descent patterns. She noted that the converse was also the case, but not as assuredly: most groups maintaining lineal descent patterns had formal graveyards.

Charles (1985) found further agreement in the same area with the evolution of cemeteries in Mid to Late Woodland (500BC - AD900) corresponding to 'territorial saturation of the lower Illinois River valley'. He also argued that the distribution of cemeteries was intimately linked to the distribution of resource territories.

On the other hand, in an analysis of prehistoric southern Ontario social organisation, Spence (1986) noted the rise of cemeteries in Terminal Archaic times (1400 - 900BC) without any seeming economic or population stimulus. He concluded that even though graveyards may have eventually become linked with resource control and intergroup competition, their origin may have been internal and religiously based.

In this discussion, Saxe's hypothesis will be considered in terms of the relationship between cemeteries, size and distribution of population,

environment and social organisation for the River Murray cultural area. This reconstruction will be relevant to current investigations of 'evolving social relations' and material and technological innovations in the mid-Holocene.

There is a potential for skeletal biological studies to test this reconstruction and the probability of the archaeological results. The implications of localised lineal descent groups, marriage patterns, inbreeding and differential burial on variation in skeletal morphology in Australia are great. Therefore our interpretations of the patterns of variation must take such implications into account. The timing and nature of the proposed social organisation is highly suggestive of a cultural origin for the distinctive Kow Swamp-Coobool Creek groups as well as later populations in the central Murray.

Archaeological data on cemeteries

To see how this proposed association between graveyards, corporate descent groups and resources applies to Australia, I have selected for study the Southeast (as defined in McBryde 1984) and in particular the Murray/Darling Basin.

The information on burial grounds is uneven in distribution, often poorly documented and varies in scientific content. The basic data come from museum records, study of the Murray Black skeletal collection[1] (Sunderland and Ray 1959) and my own archaeological investigations (Pardoe 1985a, 1985b).

One of the problems with studying this particular set of sites is that many of them were not excavated by archaeologists and the archaeological information that would be most useful is missing. However, I have studied the material itself, both the individual skeletal remains and their location. I have also talked with Professor L.J. Ray, who was involved in the original collection of the Murray Black collection at the University of Melbourne (Sunderland and Ray 1959) and local residents of the Murray valley.

All the Murray Black sites are likely to have been concentrations of burials. I have determined this in two instances: Lakes Victoria and Benanee. From these two sites it is apparent that Black's methods were only appropriate to large scale excavation. He was not likely to have circled a lake excavating at random, but apparently settled on large concentrations. Furthermore, from my own ongoing study (Pardoe 1985a), it is apparent that large numbers of exposed but uneroded burials could not be found by traversing vast areas. To excavate 100 burials in a field season, he would have been exposing contiguous burials. I am convinced of the burial distribution for most of these sites, while others I have surmised on the basis of Black's methods and his correspondence with the Australian Institute of Anatomy.

The following is a description of most of the burial sites known in southeastern Australia that have multiple interments (Fig.1). I have only included sites which contain information on the four criteria outlined above.

1. The name "Murray Black Collection" refers only coincidentally to prehistoric skeletons of the River Murray Aborigines and is certainly not meant in a pejorative sense. These samples were excavated by Mr. George Murray Black, of Gippsland, between the years 1929 and 1951.

1. Kow Swamp (Thorne 1975) is one of the particularly resource-rich lakes associated with rivers in the Murray-Darling basin. The lake is characteristic in having a regular ovoid shape, a sand/clay lunette along the eastern margin and one or two outlet creeks. These creeks connect the lake to the river and enable flood waters to fill the basin.

The Kow Swamp burials occur on either side of Taylor's Creek, the outlet channel that punches through the lunette about halfway down the eastern margin. The 22 to >40 burials that occur in this small area are not the only ones on the lake. The well known Cohuna cranium was found on the north shore, but the Kow Swamp burials form by far the largest portion on the lake edge. The density of burials at the main burial spot on Taylor's Creek is one grave per $11m^2$. This value, and all the other density estimates, is derived from the *in situ* evidence, in this case the 11 undisturbed graves and the minimum area that encompasses them. The density of burials could be higher, for the rest of the skeletal material comes from a disturbed layer with no certain provenance.

2, 3. Coobool Creek (Sunderland and Ray 1959; Brown 1982). The 70 carbonate-encrusted crania retrieved from 'Doherty's Hut' at Coobool Crossing on the Wakool River were dug by George Murray Black, who excavated many of the sites listed below. None of these have archaeological provenance, stratigraphy or site plans. The only information for some is the relationship between site location and year of excavation (L.J. Ray, pers. comm.).

The Coobool Creek material was dug in 1949 and 1950; the 1950 sample I accept as Pleistocene-Holocene boundary in age and contemporaneous with Kow Swamp. The 1949 sample is assuredly younger and is provisionally accepted as late Holocene in age. It is not possible to determine whether these two samples come from the same locale, or from ones slightly different.

4. Baratta/Tulla. These are two adjacent stations just north of the River Murray. From Black's notes it is apparent that many more that 60 burials were in the two areas he excavated, but 60 is the number of individuals in the collection with sure provenance. I am not sure yet whether he excavated at more than two spots to secure the majority of these burials. At least 50 skulls come from Baratta and perhaps as many as 100. From Tulla he records 70, and these apparently come from one locality.

5. Lake Poon Boon. Nothing is known of this site. I have not surveyed the area nor contacted people resident in 1947, when Black excavated here. As with many of the other areas sampled in this collection, the 139 individuals from Lake Poon Boon may come from a few locations in the area. One hint is the presence of dark mineral staining to most of the skeletons. This is characteristic of inhumation in clay rather than sand and may indicate that the burials did not come from sand deposits at the lake itself. This would not preclude burial in a prior channel or other landforms associated with the lake.

6. Robinvale/Euston. Burials abound in the Euston-Benanee-Robinvale area. Sunderland and Ray (1959:47) mention that 'nine burial grounds were

excavated in this area, all of them being in sand or a sandy loam type of soil'. These would have been dug in 1946 by Black, who also led an expedition in 1937. The more than 400 excavated individuals come from 9 graveyards, with an average of 44 graves per cemetery.

One of these locations is certainly Washpen Creek, the outlet for Lake Benanee. I surveyed the edge of the lake in 1985 and found 11 burials spaced along the lunette. There appears to be a small concentration of burials on the northernmost part (Pardoe 1985a, Clark and Hope 1985).

Bowdler (1983) excavated part of a graveyard on the south side of the River Murray at Robinvale, uncovering the remains of 11 graves. She estimates a density of one grave/0.3m², with between 245 and 1400 burials in the site. The latter estimate is based on 'the extent of relatively high, flat ground available' (p.38). This number is definitely too high given that cemeteries I have observed do not cover the available landform. I consider 245 individuals to be a maximum estimate.

The age of the Robinvale cemetery is at least 3kya. Bowdler suggests that this is an intermediate date, with some burials stratigraphically older while sediment and camping debris cap the burials.

7. Snaggy Bend. The cemetery at the Murray-Darling junction has been monitored by Peter Clark for a number of years and has been recently described (Clark and Hope 1985). Although salvage operations by the NSW National Parks and Wildlife Service have attempted to halt the erosion, it is too late for the majority of burials, which are now completely fragmented and windblown, with little opportunity for future archaeological investigation.

The number of burials recorded at Snaggy Bend is 157, with probably no more than 200 representing the sum total. These are situated in a sand dune that was originally perhaps two to three meters in height and 120m in diameter. The cemetery is located 500m north of the River Murray and five km west of the Murray-Darling junction. It is about 500m west of a billabong that was likely to have been a prior channel of the Murray. The burials are in the central section of the dune and are bounded within this landform. The density of interments is estimated by Clark and Hope (1985) to be one grave/5m².

The site contains recent burials as well as a 10kya.

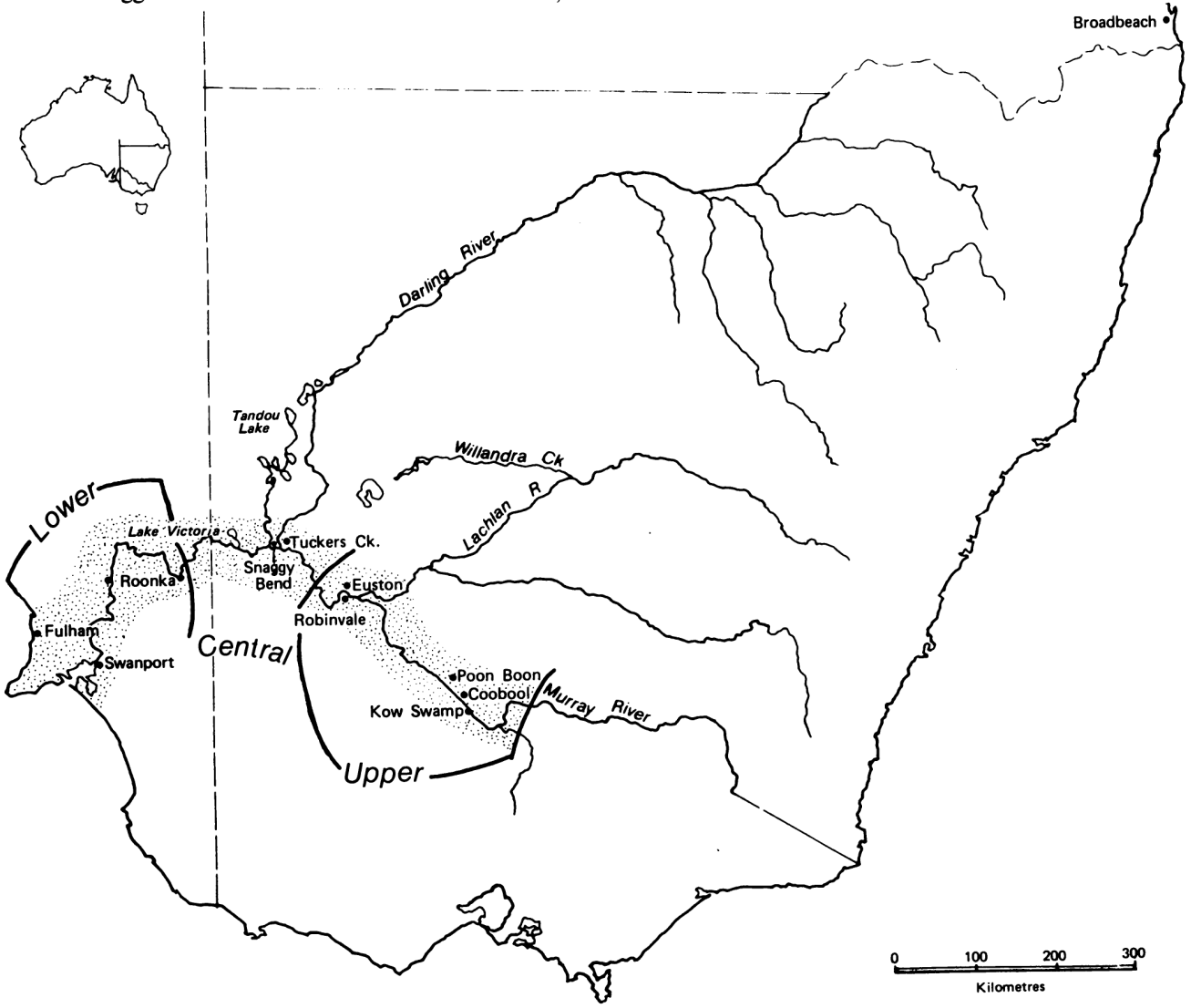

Figure 1. Cemeteries in the Southeast. The divisions of the River Murray are based on biological differentiation (Pardoe 1984), social organisation (see text for references), and archaeological and environmental data (Witter 1984).

date (on shell) associated with one burial[2]. It is probably misleading to suggest a continuous and even distribution of burials through this long lifespan. Most of the graves appear to be in an upper unit and therefore would not date beyond the younger radiocarbon date of 6890±100 yr bp. Clark and Hope suggest that many of the burials are less than 150 years old. While some are associated with European goods, their assessement is based on stratigraphic position (in the upper red-brown soil). Other burials from the lower part of the red-brown soil are partially mineralised. This is not necessarily an indication of age of the burials, but of depth of the grave.

8. Lake Victoria. The Lake Victoria-Rufus River-Lindsay Creek complex is similar to Robinvale-Euston in that many skeletons associated with a number of graveyards are present. Some part of the collections are directly attributable to restricted localities, but much is muddled by the lack of attention paid to recording site information at the time. There are over 570 individuals represented in museum collections for this general area.

Black dug at Rufus River in 1938 whence he sent 200 crania to the Australian Institute of Anatomy. In 1940 he dug at Ned's Corner and Lindsay Creek, these collections also going to the Institute of Anatomy. In 1941 to 1943 he was again in Victoria digging at Lindsay Creek and Lake Wallawalla (the Chowilla area mentioned by Sunderland and Ray 1959:46-47). He was also at Rufus River and Lake Victoria in 1944 and 1945. The skeletons exhumed in these years went to the University of Melbourne.

There is no way of knowing how many excavation sites there were, nor where the burials came from. I spent a short time at Lake Victoria in 1984 and 1985 recording some burials and have found two spots where a large number of skeletons were dug out (many remain). One of these is in the extreme south end of the lake and the other is in a small isolated dune bordering Rufus River. Clearly Black dug major sites at Lake Victoria (south end), Ned's corner on Lindsay Creek, Rufus River itself and Lake Wallawalla.

Near the junction of Lindsay Creek and the River Murray, Blackwood and Simpson (1973) found six and 16 skeletons less than 500m apart in a one km long north-south tending dune of loose yellow sand. The larger group of burials (site 19c at Lindsay Creek) covered an area of about 12m² with a density of one grave/0.75m².

Blackwood and Simpson (1973) recorded a concentration of 14 burials from the northeast corner of Lake Victoria, coming from a red sand unit in the lunette (site 8). Even though the palaeosol was clearly Pleistocene, a radiocarbon date for the burials was less than 600 years. The 14 burials come from an area of very roughly 240m², yielding a density of one grave/17m². Wallpolla Creek was the site of 24 skeletons being found (site 16B). The density of burials at this location I have estimated at one grave/47m² (from their Fig.2.).

Although I have identified a number of areas that had graveyards, I am in the unenviable position of not being able to state how many there were, nor how many burials were in each. The more than 370 individuals recovered from this area must have come from no less than three areas (Lake Victoria, Rufus River and the River Murray-Lindsay Creek anabranch system) and anywhere up to a dozen cemeteries.

9. Roonka. Roonka Flat is a low, wide, sandy expanse on the river's edge in the cliffed region of the Murray. The dune proper is next to the river and is about 400m in length. It is bordered by the river and by floodplain and swamp. Most of the 142 burials have been found here, with few coming from the river margins for some distance to the north and south. The burials are about as dense here as at Snaggy Bend, with one grave/6.4m² in the excavated area. The site has been used as early as ca. 18 kya, but it seems that the bulk of burials come from a more restricted period of time. Pretty (1977:297) suggests that the main period of cemetery use spans the last 7000 years. He further elaborates the cultural sequence with two points of immediate interest.

First, the chronology points to an early occupation phase of ca. 18 kya without burials. This is Roonka I. Roonka II was used exclusively as a cemetery from between 7 and 4 kya and Roonka III appears to have not only burials but considerable occupation debris as well. This latter phase spans the 4 kya to the present. I should note that this sequence is based on burial form tied to a very few radiocarbon dates and very difficult stratigraphy. Most of the burials are not assigned to a phase.

The second point is that burials increase sevenfold in an undeflated section of the dune from six (Roonka II) to 41 (Roonka III). Pretty has subdivided phase III into earlier and later components based on burial features and their form. While this is an uncertain procedure given the diversity of burial

2. The burial from the buff yellow dune core (B.79) is said by the authors to be 'more heavily built than other human remains on the site, and is extensively mineralised. Of the exposed burials at Snaggy Bend this individual may be the most ancient'. (1985:75)

Morphological dating is not intrinsically a poor method of determining the age of a specimen, but when dealing with geologically modern, intra-specific variation, we must be careful to avoid the self-fulfilling classificatory exercise that lumps all the 'robust' crania from all over the continent and through a considerable time span, into one morphotype.

As an illustration, I had the opportunity to examine a humeral fragment from B.79 in the field. It was carbonate encrusted and mineralised, and lay to the side of the (now reburied) cranium. This portion of the right upper arm bone measures 15mm and 20mm in minimum and maximum midshaft diameters. By comparison, two clearly male individuals on the same site measure 16 and 24mm (B.3); and 19 and 24mm (B.33, left humerus). B.79 is not significantly different from South Australian male or female means for either measurement: 16.2 and 20.7mm for males, 12.9 and 17.3mm for females (Van Dongen 1963). This sample is from Swanport mainly and is thought to be later Holocene in age. In further contrast, a mid-Holocene sample made up of Robinvale IV, Snaggy Bend 3 and 33, Mossgiel and Nitchie averages 18.7mm in minor diameter and 23.6mm in the major axis.

Finally, of the published older material, Tandou (Freedman and Lofgren 1983) measures 16 and 21 in minor and major axes. This specimen is probably on the order of five thousand years older than Snaggy Bend B.79.

While the skull may have appeared rugged or robust, some minimal quantitative evidence from the post cranial skeleton suggests the opposite: Snaggy Bend B. 79 is smaller than both older and later individuals from the same region. In fact, it does not significantly exceed a more recent female sample from the lower tracts of the River Murray. This sortie into skeletal measurement does not attempt to address rugosity or robusticity in prehistoric populations. It is simply important to be explicit in our criteria for determining the age of any archaeological specimen.

patterns in the Southeast (Meehan 1971), it is worth noting that the presumably later component (IIIb) has 33 burials compared to eight in the earlier (IIIa).

10. Swanport. The site of Swanport seems to have generated a great deal of misunderstanding in the archaeological literature. It was one of the early victims of sand quarrying, yet the original publication (Stirling 1911) gives an adequate summary description of the site. It has also been called an epidemic graveyard (presumably by those who have read no more than the title).

The site was on a dune made up of three layers. The upper sand is dark from organic midden deposit with apparently a weak carbonate development, although these small nodules could have been the result of soil reworking by digging/burrowing. The lower sand is red with thin layers of broken river mussel shells and is underlain by a dense carbonate horizon ('a layer of imperfectly consolidated travertine limestone about 2ft. in thickness' p.8). The burials were dug through the red soil from the black and generally lay just above or on the carbonate layer. The bones have no carbonate encrustation, nor are they mineralised. Although it is not safe to overgeneralise, they are certainly less than 9000 yr old on this basis, as dense carbonate formation is likely to predate this time. In fact the burials are likely to be much younger than this. There has never been a radiocarbon date for this site, a somewhat surprising fact in light of its importance in skeletal studies in prehistory (as well as anatomy and dentistry). Swanport was not a 'plague pit' resulting from a smallpox epidemic as it is clearly pre-contact.

Most of the burials were found in a 50 x 30ft. (135m^2) area (Strirling 1911:9). A minimum number of 90 individuals was recovered, although Stirling estimated there would be as many as 160 in the total. The latter estimate is probably more accurate, since the incomplete, broken and disarticulated remains have not been recorded. In any event, the density of graves in this cemetery would have been no less than 1/1.5m^2 (n=90) and as high as 1/0.8m^2 (n=160).

11. Fulham. The suburb of Fulham is on the banks of the River Torrens in Adelaide. The site was salvaged in the 1950's by members of the University Faculties when land reclamation was underway (Prof. T. Brown, pers. comm.). Apparently on low sandy ground, the burials have no chronological or archaeological provenance. The bones are well preserved and free from carbonate encrustation or mineralisation. It is now impossible to determine if all or only part of the cemetery was saved, however the bulk of the burials did come from a single restricted area. Further work on the provenance of burials from Fulham will be necessary to get a better view of this particular site, especially for the number of burials.

12. Broadbeach. This is one of the only graveyards recorded for the east coast. While Haglund (1976:80) suggests that there are others in the immediate area, such as that at Bundalla, she also says that single burials are the rule further south. This is supported by McBryde (1974).

The site of Broadbeach is on a narrow sand ridge about 1.5km from the coast. It rises about 1 to 1.5m above the surrounding marshy areas. Streams bound the ridge to north, east and northwest. The top of the dune was the only place where burials were found and in the 225m^2 excavated, 140 graves were found, some being multiple interments. This yields a density of one grave/0.6m^2. Broadbeach differs from the rest not only in location, but in age. It seems to span a little more than a thousand years, although the construction of a detailed chronology has not been possible.

13. Lake Tandou. The Tandou lunette site (TL I; Allen 1972:232-4) is one of the few Darling River sites that has been considered as a cemetery by virtue of burial density and circumscription. Unfortunately, it is also the one part of the lake margin to be completely destroyed by irrigation earth-works. Thus, in my survey of the lake as part of a larger archaeological project (Pardoe 1985a), I was not able to examine this area of the lunette.

The site is described by Allen: 'Numerous scattered human bones on the site are evidence of a large number of burials which have eroded out of place along the ridge of the lunette.' (1972:232)

As with many of these sites, Tandou Creek cuts through the lunette at this point. There are problems with interpreting this spot as a graveyard and the first of these is the number. There are ten plus an indeterminate number of individuals. These are located along the exposed ridge, so presumably more are there. The size of the site is difficult to determine, but then that is an ongoing problem of archaeology in the western region of NSW. I estimate it to be roughly 70m in diameter and covering most of the transverse distance of the lunette. The burials are not restricted to this spot however, as was noted for Kow Swamp. I found 39 burials along the 28km length of the lunette, and another survey in 1981 by Jane Balme and Jeanette Hope recorded a further 21 not evident in 1985. Tandou Lunette I (TL I) is a local concentration among burials that encompass the whole lunette.

Summary data on cemeteries

Figure 1 maps the cemeteries known in the southeast as well as a few areas of above average burial density that have been referred to as graveyards. It is clear that true cemeteries are restricted mainly to the River Murray. What might be thought to be possible exceptions, around Willandra Lakes and Tandou Lake on the Darling River, do not fulfil the criteria for cemeteries and as will be elaborated below, should not be classed as such.

The Broadbeach burial ground on the east coast is the only clear exception to be found outside of the River Murray corridor.

There are some other records of burial grounds in the southeast, but these are generally incompletely described. Poor as our information is for the ones listed above, it is worse for others such as Nap Nap, Koonadan, one in the Macquarie Marsh region, and so on.

On the River Murray, cemeteries seem to be clumped in at least three main areas. In the Upper Murray region there are perhaps six or more. In the Euston area the collections are likely to come from ten, while further downstream at Lake Victoria there might have been as many, or more.

Table 1 lists the burial sites and an estimate of the chronology, which more than anything highlights the urgent need for a detailed dating program.

In Table 2 I have listed the density of burials for those with sufficient data. For true cemeteries the density ranges from a low of about one grave/11m² to a high of 1/0.3m². Tandou Lunette I, Wallpolla Creek and the site at the northeastern edge of Lake Victoria could all be discounted as cemeteries. Their density is very much lower and given the large number of burials at lunettes, local concentrations might be expected. This is so because considering each interment as a random, independent event would yield exactly such a pattern for these lunettes. Each burial would be determined by camping location, season and a host of other factors. It is possible that, given the amount of time available, each burial could also be chronologically independent of all others, however this is perhaps less likely.

Discussion

Using the four variables of number, contiguity, boundedness and exclusivity, it has been possible to extract a large amount of information from burial locations. The main result has been in deciding which sites constitute cemeteries and which do not. In the first part of the discussion I will address both the definition, with applications to resource management, and the distribution, with applications to predictive modelling. The second part will be an analysis of the cemetery data in concert with their chronology, skeletal biology and Saxe's hypothesis to present a reconstruction of prehistoric social organisation. I believe all this material taken together is sufficient to define an archaeological region, the River Murray Corridor.

Cemetery	Number of individuals	date (kya)	Reference
Kow Swamp	40	13-9	Thorne 1975
Coobool	70	13-9	Brown 1982
Coobool	90	6?-2?	Sunderland and Ray 1959
Baratta/Tulla	120	?	Sunderland and Ray 1959
Lake Poon Boon	139	?	Sunderland and Ray 1959
Robinvale/ Euston/ Lake Benanee	$\bar{x}$=44	6-2?	Bowdler 1983, Sunderland and Ray 1959, Pardoe 1985a
Snaggy Bend	150-200	10-modern	Clark and Hope 1985
Lake Victoria/ Rufus River/ Lindsay Creek		5.3-0.8	Sunderland and Ray 1959, Blackwood and Simpson 1973
Roonka	142	7-modern	Pretty 1977
Swanport	90-160	?	Stirling 1911
Fulham	60+	?	
Broadbeach	200	1.3-mod.	Haglund 1976
Locality			
Tandou	15+?	?	Allen 1972
Lake Victoria	14	0.75	Blackwood and Simpson 1973
Wallpolla Ck.	24	5.4-4.2	Blackwood and Simpson 1973

Table 1. Cemeteries and localities with numerous burials in southeastern Australia (mainly River Murray). Burial numbers are estimated from museum skeletal samples and should be considered as minima. The sites of Roonka and Broadbeach are more accurately counted. Dates with question marks are estimated, others are based on available radiocarbon dates.

Definition of cemeteries and resource management

The number of burials in a given area does not vary randomly. If burials were distributed randomly over the landscape, that is without regard to the presence or absence of other burials, then the probability of observing two burials in an area of given size would be less than that of observing one. The probability of observing three burials together would be less than that for two, and so on until the probability of observing more than ten together becomes negligible. In fact, the distribution of burials in a given area would follow a *truncated Poisson distribution*. From my own observations and a review of the literature, this distribution holds only partially. Most of the areas with more than one burial do not have two or three, but dozens. The form of this distribution indicates clumping, a phenomenon well known in sampling theory. It indicates that non-random factors are affecting the spatial distribution of the observations: that the presence of a grave is, in part, determined by the presence of other graves in the immediate area. This is mainly common sense, concurring with our implicit understanding of what a cemetery looks like.

However we need to be able to decide if all the interments in an area (which might be very large) were made with the understanding that the spot was indeed a cemetery. Contiguity and boundedness are variables that may be measured archaeologically and so may help to decide whether the burials were placed with reference to other graves and a known locale. Even accounting for vagaries of preservation, the difference in burial density between cemeteries and other localities is striking (Table 2).

Exclusivity as a criterion for defining a cemetery is only superficially easy to apply. With stratigraphic control, it is simple to image a cemetery, or any feature, as being spatially and temporally distinct from any other feature. However, in the western region of NSW, most features, graveyards included, are on erosional surfaces: deflating features confound the stratigraphy. We are forced to relative measures of density of site occupation. I will contrast the material remains in those localities where burials are

Site	Density	Reference
Kow Swamp	11.0	Thorne 1975
Robinvale	0.3	Bowdler 1983
Snaggy Bend	5.0	Clark and Hope 1985
Lindsay Creek	0.8	Blackwood and Simpson 1973 (site 19c)
Roonka	6.4	Pretty 1977
Swanport	1.5 (0.8)	Stirling 1911
Broadbeach	0.6	Haglund 1976
Lake Victoria	17.0	Blackwood and Simpson 1973 (site 8)
Wallpolla Ck.	47.0	Blackwood and Simpson 1973 (site 16b)
Lake Tandou	40.0	Allen 1972 (site TL I)

Table 2. Density of burials in cemeteries (upper) and localities with numerous burials (lower). Density is estimated as the number of square meters occupied by one grave: 1 grave/x.xm². The figure in brackets is an upper estimate.

independent and reflect site usage with what I consider to be true cemeteries.

TL I on Lake Tandou not only has more than 11 burials spread over a large area with an older cremation and a number of younger burials, it is also characterised by nine stone implements, an *in situ* grindstone, a small shell midden and presumably a large quantity of stone debris. Allen (1972:234) makes it clear that much of this is chronologically as well as spatially associated.

Site 8 on the northeast corner of the lunette at Lake Victoria (Blackwood and Simpson 1973:102) has a number of 'concentrations of dispersed mussel shells' but otherwise no artefacts. Site 16b at Wallpolla Creek displays an even larger midden nearby, but also had 'small scattered areas of shell and burnt clay in the area surrounding the site' (p.101).

My own observation on the Darling River is that burials are part of the overall scatter of material remains. In any deflated area burials are surrounded by hearth remnants, faunal remains, stone tools and their debris and grinding implements. Clearly, these are now chronologically muddled, but just as clearly an area with a number of burials (distributed through time) also contains a large number of artefacts, also distributed through time. From the *in situ* evidence and the disturbed material that has deflated (that is, later material) burials are neither spatially nor temporally separate from the rest. Any given area has been used through time for different sporadic events; a burial, a tool workshop, a seed grinding station, an overnight camp.

The cemeteries on the other hand have had really only one function through the ages: burial of the dead. Most stone tools associated with the dead are grave goods. Evidence of fire is not found so much in hearthstones as in crematory or votive functions. Shell and faunal remains take the form of small ritual offerings, not middens. Haglund (1976) reiterates through her text the lack of material remains not *directly* associated with burial.

This is all well and good, except that there is evidence of tool-making (flaking debris) at Roonka and Kow Swamp. There are hearths and food remains, mainly in the form of shell middens, at Snaggy Bend, Kow Swamp, Roonka and Swanport. There is soil alteration, the development of a humic layer indicating an occupation horizon at Swanport, Roonka and perhaps Snaggy Bend.

It appears that exclusivity, like boundedness, density and number, is not an immutable quality of cemeteries. Exclusivity needs to be considered in the context of other local occupation areas and with the knowledge that all events in these sites are telescoped into a very thin layer with poor stratigraphy. Furthermore, we need to consider the grey zone of what constitutes religious, ritual behaviour in the material remains and what constitutes the mundane. Are a small hearth and shell midden part of an overnight camp, the inhabitants of which, blissfully unaware of their ancestors lying beneath them, have made on a sandy rise? Or are they the remnants of a graveside ritual, the sharing of a last meal with the deceased family member? There is no archaeological test to distinguish the two sets of behaviour, so I will simply state as opinion, my view that the material remains at these cemeteries are insufficient to be construed as 'occupation'. Twelve hearths and three shell middens (one dating to pre-cemetery times) at Snaggy Bend do not constitute even minimal evidence for behaviour unassociated with the cemetery. The hearths, shell middens and stone tools at Roonka are far more prevalent in the immediately surrounding areas than in the cemetery proper. In the latter, many of the artefacts are considered to be grave goods.

It is unlikely that these cemeteries represent nothing more than random inhumations over a very long time span (circa 13 kya) in very densely populated areas. This may certainly be the case for some spots such as the Willandra Lakes, Menindee and others that we know very little about archaeologically. However, burials are not distributed over huge stretches of the rivers in this fashion. These graveyards stand out well above the background distribution of single interments to be found in most sand deposits.

From a practical viewpoint, it might be argued that these burials in cemeteries are a matter of convenience in times of flood. This is plausible given that primary burials are the main form of interment in most of these graveyards. However, it does not explain the lack of burials in other similarly high structures (including mounds). While cemeteries have a function in containing pollution where land is restricted, there are many cases here where actual living space is not encroached upon by floodwaters. The argument that cemeteries exist in areas of high population density and less mobility for the purpose of tidying the landscape cannot be denied. Few complex behaviours serve only one purpose.

How many burials in a group constitutes a burial ground or cemetery? This seems important in considering the problems in Cultural Resource Management with sand quarrying of potential cemeteries. As with many quantitative questions it is difficult to answer finitely. But it is possible to answer that question with reference to known data and to Saxe's more theoretical approach. The dividing line is with orders of magnitude. All the cemeteries seem to be large, probably with hundreds of burials. Furthermore, the answer cannot be based solely on number, but it must include the other criteria of contiguity of graves, their boundedness and the use of the site. We should not consider nine burials in a rockshelter a cemetery, nor 103 dispersed through the lunettes and source bordering dunes of the Willandra Lakes. I reiterate that the greveyard itself is a tangible entity of symbolic value different from the interred graves. Perhaps, like all symbols, cemeteries have a value beyond that of their constituent parts.

Distribution of cemeteries and predictive modelling

Clearly, burial grounds are tied to the River Murray. Future investigation may prove them to be associated with tributaries of the system, although in the case of the Darling River this has not proven so (Pardoe 1985a).

There are a number of reasons to explain this distribution. However, I find only one compelling,

the rest being ancillary factors. It would seem reasonable to suggest that here is one of the few places in the world with extreme variations in resources over a very small area. In other words, one could walk from a river stocked with unimaginable wealth in fish, fowl and invertebrates to a parched, drought-stricken plain in a matter of minutes. In those drought times when the river became the only reliable lifeline for food and water, access to such resources would be controlled by the resident groups.

The Saxe hypothesis would suggest that legitimation of this control of the river lay in the claim to ownership as handed down from ancestral groups. The cemetery would be proof of unilineal ties and no doubt would have been highly visible and maintained over very long periods of time. Similarly, in resource-rich areas of northern coastal Australia the ethnographic literature shows localised unilineal descent patterns to be a predominant feature of social organisation; in this area also, elaborate burial practices emphasize lineal ties to specific tracts of land. A more detailed comparison with these areas will be included in a future paper.

Looking to the coast we might ask why cemeteries do not seem to exist (keeping in mind the exception of Broadbeach) in an area at least as densely populated and resource-rich. Perhaps the resources are not as crucial, in terms of survival or access. Access to marine resources in coastal areas may be less restricted or perhaps mediated in different ways. Burial grounds have been found or were known about in the Moreton Bay region (Haglund 1976:80), but to the south single burials were the rule (McBryde 1974).

> Apparently, the distribution of burials as located by archeologists is not simply a matter of 'luck' or preservation; the spacial distribution and density of the dead is plausibly linked to the operation of that society's ecological system. (Saxe 1970:234)

A very general predictive case can be made from the location of cemeteries as opposed to single burials. This follows Saxe directly in assuming that graveyards will be closely associated with restricted resources such as riverine systems in a dry environment or perhaps particular marine resources along the coast, stone deposits in stone-poor areas, labour intensive fish-traps. The list should be long but not endless. Thus, one should not expect cemeteries to be associated with quarries in a region of abundant stone sources, but they might be found in regions where stone is rare.

Our regional distribution of cemeteries in the Southeast is probably very accurate: we are not likely to find *any* away from rivers. Where they occur *on* rivers is presently under investigation in my own study (Darling River) and the National Park and Wildlife Service (NSW) study headed by Jeannette Hope and Terri Bonhomme (Riverina). I doubt there are taphonomic reasons for any purported non-preservation in non-riverine environments. All those trudging surveys over the hinterland are recording an accurate reconstruction of mortuary practice.

I find it surprising that cemeteries have not been recorded on coastal regions (excepting perhaps the Coorong, which as I suggested for the Adelaide region is biologically part of the River Murray Corridor). It is not yet possible without more information to decide whether the proposed attendant social organisation was not in place (as suggested theoretically by Saxe and ethnographically by Goldstein (1976)) or whether cemetery behaviour was not appropriate or took a form that is not archaeologically visible.

Chronology

Reconstructing a chronology for these cemeteries is difficult. The extremely small number of dates makes a general overview tenuous and a detailed within-site chronology out of the question. In order to look at the development of burial grounds as a cultural system my analysis depends on subjective assessment of some of the sites as well as on the few radiocarbon dates.

First, the earliest dated cemeteries are Kow Swamp and by analogy Coobool Creek. Thus, we may be sure that by 13 kya, burial grounds and all they represent are in place in the Upper Murray. Any data earlier than this are exceedingly rare, but perhaps the early dates at Roonka (18 kya) and Snaggy Bend (10 kya) in advance of fully developed cemeteries might be taken to indicate that they did not arise much, if any earlier than 13 kya. None are known earlier than this time, and conversely, all earlier dates are associated with single burials.

Second, in each of these sites we are faced with an internal chronology, a multi-generational time depth. In the few cases with enough information, it appears that site usage increases with time: the 18 kya date at Roonka (unassociated with a burial) and the 10 kya date at Snaggy Bend are rare, isolated events, stratigraphically remote from the rest. Most burials from these two sites should probably be assigned to the last 7 kya. At Roonka, Pretty (1977) suggested increasing usage within this time period. In fact, the earliest burial phase (Roonka II) is probably on a par with Kow Swamp in terms of density, while a tremendous increase occurs in the latter part of Roonka III, after 4 kya. This would split Roonka in Figure 2, producing a greater dichotomy between older (>7 kya) and later (<4 kya) cemeteries.

Coobool Creek, across the River Murray from Kow Swamp, is divided into two components; an early group dated by association with Kow Swamp to between 13 and 9 kya and a later undated group, perhaps from a different cemetery — we don't know. At any rate, the later sample is the larger one and this might be an indication of greater cemetery behaviour.

Third, a regional chronology can be based on a dichotomy between the early sites of Kow Swamp and Coobool Creek and the rest of the River Murray cemeteries clustered at between 7 and 2 kya. At face value, this suggests that cemeteries arise in the Upper Murray at the end of the Pleistocene and from here spread throughout the corridor to become common by 6 kya at the latest. The anomalous Broadbeach burial ground is established late by comparison. Considering the evidence for Pleistocene occupation in the Moreton Bay region it is surprising that

Broadbeach is not older: another time-lag?

Fourth is the relationship between date and density of burials (Figure 2). From their first development at ca. 13 kya burial grounds undergo a tremendous increase in density; not only intra-site, but throughout the region. It is very tempting to view this as evidence of population increase and I would take both cemetery behaviour and increasing density to indicate just that. On the other hand, it is just as possible to imagine a static population that produces increasingly dense cemeteries through time for the trivial reason that more and more bodies end up there. Also, the development of localised corporate unilineal descent groups does not necessarily result from population increase (see Stockton 1983 on demographic adaptation; Lourandos 1983). While the analysis presented here cannot resolve the debate over the primacy of population increase vs intensification, my impression is that any population increase preceded cemetery behaviour. The cemeteries themselves arise as the symbols of a new age responding to more densely packed populations lining the River Murray corridor. Those populations are evolving a new order to cope with the increasing difficulties of resource exploitation, ownership and control.

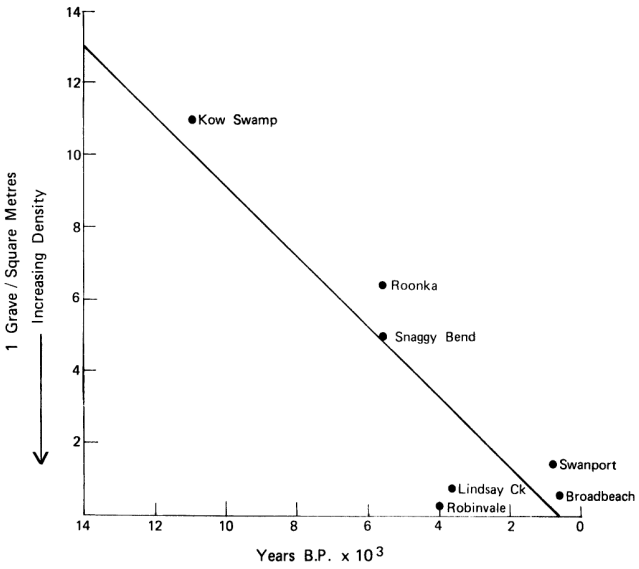

Figure 2. Plot showing the increase in grave density through time. Note that density is calculated as grave per square metres, and so density increases in the direction of the arrow. The regression line is calculated from least squares and is of the form density = −1.0 + .001 (years). The regression coefficient, r = 0.90. Variation over time 'explains' 82% of the variation in burial density (that is, r^2 = 0.82).

Resources, population and social organisation: outlining the model

Saxe relates formally circumscribed areas for the exclusive disposal of the dead to an environment containing crucial but restricted resources. Access to these resources is controlled by corporate groups which legitimize their rights by means of lineal descent from the dead, their ancestors. His model, which appears to be applicable world-wide, has three generalised (or undefined) variables and one specific. These are resources, population, social organisation and cemeteries. I will summarise each of these.

1. The Murray Valley Corridor is a rich and relatively stable environment offering permanent water and a variety of resources throughout at least nine months of the year. In the Central Murray area (Fig.1), the rich river resources bordered for huge distances on either side by arid country not only permit, but enforce, a strong river focus. In the upper reaches of the Murray these resources become less restricted as they are more evenly distributed over the countryside.

Radcliffe Brown describes the narrow strip of country on each side of the Murray River, from its mouth to a point some distance above the Murrumbidgee Junction as 'the most favoured area of Australia, for a people obtaining their sustenance as the Australian aborigines do' (Brown 1918:231). Allen's excellent work on the Darling and Willandra regions to the north of the River Murray (especially 1980, 1983, 1986) describes resource availability. The applicability of this reconstruction to the Murray is based on the historical documents used by Allen (see references in the above and 1972) which often are observations of the River Murray itself.

Allen's work details many of the food resources available in the region, with the normal archaeological emphasis on animals rather than plants. The two contrasting environments are a lush river, supporting fish, yabbies, mussels and waterfowl, with a margin of river red gum and black box trees that would house possums, other small mammals and goannas. Vegetable foods, for which the evidence is minimal, include grass seed, nardoo and small tubers: there was certainly much more. Set against this narrow corridor is the arid scrubland of mallee or perhaps saltbush. This latter environment is in fact highly productive, with a large range of land mammals from 40kg kangaroos down to rabbit-sized hare wallabies, bandicoots and rat kangaroos. Ranging alongside these are emu with their eggs, lizards and presumably a number of tuberous plants and other vegetable sources now mostly vanished.

This mallee or scrubland away from the River is however, unpredictable. The uncertainty of resources is underscored by an even more arid phase between 5500 and 2000 years ago (Ross 1985). Resources are not restricted, but widely scattered over the land. They are not critical because there are episodic periods of abundance and scarcity.

It is also worthwhile to remind ourselves that humans are tropical animals and one of the few mammals in this area not adapted biologically to semi-arid conditions. People are tied to water and notwithstanding the potential sources in the surrounding plains (for instance mallee roots, Cairns 1859), it is to the permanence of the rivers that they must retreat for much of the summer and in times of drought.

2. The second generalised variable in Saxe's model is population and it is implicit. Resources are critical and/or restricted only in the context of the numbers of people using them. Furthermore, the differential in number between riverine groups and those in more arid or otherwise less favourable areas is important. One of the first anthropologists to discuss population size was Radcliffe Brown and he describes the strip of country along the River Murray as

having been 'the most densely populated part of Australia before the days of white settlement' (Brown 1918:231). For the Lower Murray he estimates a maximum population density of two to the square mile, with 'hordes' of an average 60 people ranging over an 'estate' of not more than 50 square miles (but see Peterson 1986 on horde, clan and band definitions).

Ecological evidence presented by Birdsell (1953) demonstrates the relationship between rainfall, size of group area and size of group. The expected size of group area decreases with increasing rainfall. He further detailed the Murray-Darling tribes, showing that their tribal-area ratio was greater than expected and that this density (and therefore population) was an order of magnitude greater than arid, non-riverine groups; in fact 20 to 40 times greater (1953:184-188).

Biological evidence favours large populations for riverine groups. Webb's useful study of disease patterns (1984), in concert with demographic analysis (Butlin 1983), points directly to large, densely packed populations. Estimates of riverine population have skyrocketed to the point that the rivers appear to have been saturated, with hinterland populations orders of magnitude smaller. Differentiation and gene flow networks are also only interpretable in this scenario, with much smaller populations away from the rivers (Pardoe 1984).

Other archaeological studies of stone tools and faunal remains as economic indicators have focussed more on the question of population increase rather than population size (Ross 1985). In fact, Ross has stated that from such material evidence 'reconstructions of absolute prehistoric population size are virtually impossible' (1985:81). This assessement has also been very general in that specific cases such as southwestern Victoria (Lourandos 1983), northwestern Victoria (Ross 1981) and the Darling River (Allen 1972) have been generalised to an undifferentiated 'Southeast'. At this point we might benefit from more regional perspectives; as is apparent in this paper, I do not believe any archaeological knowledge we may have of the River Murray Corridor can be generalised to the Southeast. This corridor forms a distinct archaeological region and a cultural area. Although the evidence all points to an extremely dense population for the River Murray Corridor, and I relate cemetery behaviour to population pressure on resources, the proposed chronology outlined above would suggest that in this area the impact of population stress began to occur as early as the late Pleistocene.

It is of interest that the mythology and oral history of River Murray groups contain many references to population pressure and to people moving down the river corridor (see Tindale's (1974) discussion of Crow and Eaglehawk legends). We could probably also learn from a legend recounted by the Yaralde tribe at the mouth of the River Murray:

> The origin of this name [Yaralde] and that of the neighbouring tribe (the Tanganalun) is explained by a legend. The ancestors of the two tribes are believed to have come down the Murray River. When the Yaralde reached the present country of the tribe they came upon the sea and they said, in their dialect, *Yarawalangan*?, 'Where shall we go now?' (Brown 1918:226).

3. So far, two of the variables in the Saxe hypothesis, abundant resources and population pressure, have been shown to exist in the study area. The third, the existence of cemeteries has been the major focus of this paper. If then the Saxe model is valid we should expect the cultural stimulus for cemetery behaviour to derive from corporate groups who legitimise their territorial rights by means of lineal descent from the dead.

4. Local group organisation and the relationship of groups to territory has been the major focus of anthropological studies since contact. Long before land rights legislation in the 1970's made such studies imperative, the relationship between social organisation and land use and ownership had been firmly established, with religious belief and ritual serving to reinforce this relationship.

An Australia-wide modelling of this relationship between social groups and territory has always been problematic, particularly because of the variable impact of contact throughout the continent. Broad generalisations have emerged however, and these are addressed by Peterson in his recent monograph on territorial organisation (1986).

A relationship between environment and form of social organisation is clear. In resource-rich areas such as coastal Arnhem Land, tropical woodlands and the Southeast, where the environment can support a significantly larger population density than the arid zones, groups are larger, their territories are smaller and more clearly defined, a greater degree of boundary maintenance is practised, and the groups are corporate in nature.

Peterson's inclusion/exclusion model of social organisation is environmentally based. In arid zones where resources can be unpredictable and precarious, a form of local organisation which extends social and territorial networks over a wide area and facilitates easy movement across more fluid boundaries is crucial to survival.

In rich areas, and particularly those which abut poor environments, social organisation tends to exclusivity. In these areas are found those indicators of corporate social organisation: unilineality (predominantly patrilineal); localised exogamous groups who are more likely to reside within clan territory and to have clearly defined boundaries and elaborate procedures for crossing them; shorter marriage distances and more prescribed patterns of exchanging marriage partners between neighbouring clans; and other structures most commonly associated with corporate groups such as patriarchy, polygyny, hereditary transference of power, intergroup competition and warfare.

The River Murray corridor, already shown to be a rich environment, was inhabited by a large number of groups. Pre-contact social organisation can only be hinted at from a small number of specific studies.

The social organisation of the Yaralde and adjacent tribes of the Lower River Murray were described by Radcliffe Brown (1918:225-241). These groups were comprised of exogamous patrilineal local clans, each permanently occupying a certain area of country over which it had exclusive rights of ownership: 'No one might hunt over the country of a horde other than his own, or fish in its waters, except on the

invitation or with the permission of the owners' (p.228).

Elsewhere (1930:451-454), Radcliffe Brown relates the unique kinship system in the area to the solidarity and autonomy of the local clans. Although the system ensures solidarity with six related clans, 'the absence of moieties and sections means that the relation in which a man stands to distant clans, or to those with which he has no near genealogical connection, is indeterminate' (p.454). Thus the kinship system promotes exclusivity. These observations stand in direct opposition to what has been seen as a generalised Australian Aboriginal situation, which is imported from the Centre and North, where social organisation has been extensively studied. Unlike the Centre, people here are *not* related to everyone else through a moiety or section system. They maintained very close ties with the clans of father, mother, wife and so on, but the rest were strangers. Furthermore, there are other implications, both social and biological, stemming from the close binding of clans and clan exogamy. From an individual viewpoint, relatives would be in a small cluster of clans. From a lineage perspective, clans would be linked into clusters through descent.

Greater population density in the area and the larger number of individuals in each clan are suggested by Radcliffe Brown to relate to these special characteristics of Yaralde kinship. Drawing on ethnographic evidence from Radcliffe Brown and Howitt (1904), Elkin (1938) defines a small area on both sides of the Lower Murray from about the New South Wales border to its mouth which is characterised by 'an absence of moieties and sections, and the operation of strongly accented exogamous localized patrilineal clans' (p.422).

Berndt and Berndt (1985:33) contrast local group territories in central Australia where game and vegetable foods were not concentrated or plentiful with those in the Lower Murray: 'On the Lower River Murray ... such areas were smaller, but richer, and boundaries consequently firmer'.

Boundary maintenance was an important aspect of Murray social behaviour. It is significant that many tribal names along the river comprise the reduplicated terms for 'no', as noted by both Tindale (1974:131) and Radcliffe Brown (1930). Tindale also noted that river people strictly controlled access by people from the mallee scrubland to the river, allowing them to drink only at specific places (p.134). Warfare is another, perhaps more extreme form of boundary maintenance and is recorded by early explorers in meetings with river people and also by Le Souef (see Tindale 1974: plates 43 and 44).

There existed among the Jaraldi (Yaralde) of the Lower Murray an elaborately formalised system of 'courts' which operated at both the patriclan and interclan level (Berndt 1965:177-181). Berndt sees this as one of the few examples of centralised authority in Aboriginal Australia.

Skeletal biology: assessing the model

The Saxe hypothesis has been shown to provide us with both a useful tool for approaching the study of cemeteries and a model for a regional prehistory. A relationship between population, resources, social organisation and cemeteries exists in the River Murray corridor. However it is the skeletal biology of the people buried in the cemeteries which can provide further information for assessing the validity of the regional model. Genetic information encoded in the bones of these prehistoric inhabitants can tell us something more about the prehistory of this region.

I have already referred to Webb's study of palaeopathology in the Southeast (1984) which shows that population density and strain on resources on the River Murray is evidenced in the skeletal record by such indicators as Harris lines, enamel defects, trauma and arthritis. The potential of physical anthropology to elucidate prehistoric social organisation is also considerable. We need not accept that this 'invisible baggage' (Bowdler 1981) is outside the province of prehistory.

A few studies relating genetic variation and social organisation have been made within Australia and are relevant to the theme of this paper. White (1979) studied this relationship in contemporary Arnhem Land, emphasising

> the relationship between genetic diversity and ecologic features in aboriginal Australia. [I]nter- and intratribal marriage patterns appear to be strongly associated with habitat type at both the tribal and local group level. These patterns in turn, are governed by demographic factors such as population density and tribal size, both of which are also influenced by the physical environment. In Arnhem Land for instance, coastal territories provide a more favorable food economy for hunter-gatherers, with considerable resource diversity in space and stability through time. These coastal tribes tend to be smaller, with higher population densities and shorter marriage distance than those tribes living inland, particularly those in the arid interior. (1979:451)

Genetic heterogeneity, or relatively greater differences between groups compared to variation within them, is related to corporate social organisation, particularly localised patrilineal clans, polygyny and shortened marriage distances. It is also related to an environmental substrate of relatively richer coastal resources.

My own study (Pardoe 1984) of genetically based variation in prehistoric skeletal morphology throughout Aboriginal Australia shows Southeastern populations to be distinguishable from those in the rest of the country. Furthermore, the River Murray samples were linked by an absolute similarity and by clinal variation running the length of the river and cross-cutting other regional similarities. Even so, the range of variation is considerable and paradoxically, the River Murray samples exhibit some of the greatest diversity in the continent while still maintaining a regional similarity. This range of variation is explicable by reference to a model of corporate social organisation as discussed above and a particular gene flow pattern based on territorial organisation.

To the extent that these groups bury their own in cemeteries, the individuals should be closely related. That is, lineal ties through time and higher inbreeding coefficients in the larger endogamous group should lead to a greater relatedness for contemporaneous individuals and for the lineage. At this point it is probably not possible to discern matrilineal versus

patrilineal descent archaeologically (but see Lane and Sublett 1972) and I will assume that the manner of reckoning descent is immaterial to this investigation.

The problem of identifying the group of interest as a biological unit is well known in population biology (Harpending 1974, Cadien *et al.* 1976, Fix 1979). Our samples of populations (that is, the skeletal remains) may reflect lineages within populations rather than the populations themselves and therefore could be biased. The problem is compounded by the knowledge that we are dealing with small groups. If these cemetery samples are indeed lineages, or subsets of related people within the population, than we should expect different patterns of variation from samples constructed in other ways. In concrete terms, samples such as Swanport, Coobool or any of the defined cemetery groups should be considered as large samples of extremely finite and well defined populations. On the other hand, samples made up of aggregations of individuals from a large area may be contrasted as smaller samples of larger, less well defined populations.

Variation of any genetically based features should be less *within* and greater *between* these cemetery samples. Furthermore, samples derived from individual burials should be more variable than those samples that might be lineages. Sinclair (1977) noted that the River Murray cranial samples exhibited greater heterogeneity, or between group variation, than Victorian ones and I have demonstrated the great variability along the River Murray (Pardoe 1984). In fact, this region shows some of the highest diversity in the continent. Unfortunately, that study did not compare within-group variability. Thorne (1975, 1977) found representatives of older populations to be far different from more recent groups, but did not address group variability. Brown (1982) demonstrated that within-group variation was as large in the Pleistocene Coobool Creek sample as in more recent groups. However, these too were samples from cemeteries. As will be amplified below. I would suggest that Kow Swamp and Coobool Creek are different because they are representatives of distinct descent groups. The differentiation results from *in situ* development.

Although the complexities of morphological differentiation are great, the pattern seen on the River Murray would be explicable within the cultural framework proposed here. Although I have suggested elsewhere that differentiation could be the result of unilineal gene flow and the attendant possibilities for extreme differentiation, it is also possible that such differences are exacerbated by a cultural system favouring endogamy[3] and lineally inherited rights to resources along the River Murray. Less marriage with groups in arid areas or away from the river reinforces the notion of exclusivity concerning river rights. At the same time, heterogeneity along the river can be explained in terms of increased reproductive isolation and shorter marriage distance which was seen by Sinclair and White (1984) as associated with resource rich habitats.

The hazy line between culture and biology would seem to have evaporated in this instance where a cultural hypothesis of group endogamy based on mortuary practices can be tested by operationalising the genetic corollaries. In this case it is the assessemt of within and between group variation of the people who invested their river rights in their ancestors' graves.

Evidence from skeletal biology has been used recently in an archaeological analysis of social evolution and I will discuss this in some detail. Lourandos (1983) offers us a model for southwestern Victoria, which he extends to the wider Southeast. He proposes intensification of economic and settlement patterns throughout the late Holocene which derive from increasingly complex and competitive social networks.

Lourandos tests his models using a range of data drawn from ethnohistory, archaeology and physical anthropology. I have used a similar range of data to examine a hypothesis which also relates economic, demographic and social patterns of prehistoric life. While I would caution against the application of a regional study to the whole southeast, let alone (as Lourandos does) to the whole of Australia, my results for the Murray River Corridor fit into an overall picture of high population density, increasing pressure on resources and complex corporate social organisation. There is nothing in my data, however, which would support the primacy of the role of social relations in Holocene changes, nor indeed do I consider it useful to attempt to isolate one variable from the complex interaction of humans with their environment. Furthermore, the chronology which I have suggested for cemetery use and its social and economic role would suggest that the patterns of behaviour which Lourandos attributes to the late Holocene are to be found as early as the late Pleistocene in this region.

Lourandos' use of data from physical anthropology to support his model does require comment, particularly since he makes reference to information from River Murray skeletal samples. Drawing on Thorne (1976, 1977), Lourandos discusses a dichotomy between Pleistocene populations in the Southeast which 'appear to have had a wide range of morphological variation' and Holocene populations which 'were more homogeneous overall, showing a narrower range of variation' (1983:91). Thus skeletal information is used to reinforce his theory of evolving social relations. Further, by indentifying the first half of the Holocene as the period when morphological homogeneity was developing (in the Murray corridor), Lourandos uses skeletal evidence to support his view of the primacy of social relations over economic and environmental factors in the explanation of cultural change, since the economic aspects did not appear until later in the Holocene (in southwestern Victoria).

Evidence for Pleistocene variation in Australia is based on a dichotomy between the Kow Swamp — Coobool Creek complex and (two skulls from) Mungo. Recent nonmetric analysis has shown the Coobool Creek sample to fit within the ranges of morphological variation in the Southeast, and more specifically in the Upper Murray. While, as I have stated above, the Southeast can be distinguished

3. Just as *population* can only be defined operationally, endogamy and exogamy are subjective terms. I have assumed that the postulated lineal descent groups — lineages or clans — are exogamous. Aggregations of these lineages, organised as bands, tribes, linguistic groups or in some other way, are the groups I am suggesting were endogamous.

morphologically from the rest of the country, it is highly misleading to conflate this into Southeastern morphological homogeneity. River Murray populations exhibit a very high range of variation throughout the Holocene and my own non-metric study shows the Pleistocene Coobool Creek sample to fit with the other southeastern material, despite the considerable time difference.

This new biological evidence does not contradict Lourandos' theories on the complexity of social relations in the Southeast. It does encourage a rather different interpretation of how these social relations work. Lourandos (1983:91) has suggested that 'evolving social relations' caused widening of marriage patterns and biological 'homogenisation' of later Holocene Aboriginal populations. While I fully agree that social organisation has a profound impact on biological structure of populations and vice versa, it should be evident that 'evolving social relations' — intensification, settlement, population increase — all part of Lourandos' model, would decrease marriage and migration distances. He wrongly assumes that 'evolving social relations in Australia included the widening of marriage systems leading to multiple marriages with partners drawn from far flung regions' (p.91). Therefore he errs in assuming 'that early (Pleistocene) marriage systems were more restricted with increasingly widening networks developing in the later (Holocene) stages. In the former case gene flow would be restricted and in the latter increased' (p.91). In fact it is the reverse that is most likely the case: marriage systems were increasingly restricted. Exclusivity and group (tribal) endogamy would restrict gene flow and promote differentiation.

I have suggested that social relations in the Murray Corridor were characterised by exclusion rather than by inclusion, that this process of exclusion is related to resource control, that gene flow becomes restricted and leads to differentiated populations. This is supported by what we know of Murray River local group organisation and kinship systems at contact. The elaboration of social organisation is related to boundary maintenance, to formalised marriage exchange patterns, to methods of regulating inter-group tensions and competition, and to maintaining the integrity and strength of the localised lineages or clans. Cemeteries are an important expression of this.

If we accept this model, then the dichotomy between Pleistocene and Holocene southeastern populations disappears. Instead, the known Pleistocene population (Mungo) should be seen as a generalised Aboriginal precursor of a system which became increasingly established in the Murray corridor throughout the Holocene.

The Kow Swamp — Coobool Creek complex is the first of these corporate groups and is highly differentiated. The people of Kow Swamp and Coobool Creek were culturally, biologically and visually distinct. They heightened, or accentuated this distinctiveness by pronouncing the sweep of the forehead (Brown 1981, but see also Thorne 1975). Later groups along the River Murray continue to exhibit extreme differentiation (Sinclair 1977, Pardoe 1984).

Conclusions

Cemeteries are distinct entities in Aboriginal prehistory. Their presence is defined by numbers, density, boundedness of the site and its relation to living areas. Numbers are in terms of tens or hundreds. Density should be greater than one grave/10m^2 in order to demonstrate contiguity and the attendant probability that knowledge of other graves in the area is likely to have been an important if not the main factor of burial location. The sites are highly bounded such that density decreases markedly at the edges. This would support the idea of systematic burial. Camp sites, middens, hearths and stone tool working areas do not figure heavily in these graveyards. By contrast, areas like Willandra Lakes, the Lower Anabranch Lakes or the Menindee Lakes show increased numbers of burials in areas of greater occupation: single burials are single unrelated events occurring more frequently in areas of more frequent habitation.

Our current knowledge of cemeteries is sketchy, but the distribution is a main cultural feature of the River Murray Corridor which spills over to the Adelaide region (in keeping with biological connections; see Pardoe 1984:167,187). The definition of archaeological regions or 'cultural adaptive areas' has been made by Witter (1984) for the Southeast. He includes the River Murray corridor, divided into upper and lower segments, as one such sample. I believe the present study supports this regional interpretation.

Other cemeteries probably exist in the Riverina, such as perhaps Koonadan near Leeton and up in the Macquarie Marshes region where anacdotal information is suggestive (Gresser 1966). Cemeteries do not seem to have been a feature of the Darling River system: Lakes Tandou and Menindee do not qualify as such. This raises the possibility that the Murray-Darling junction, represented by Snaggy Bend and Tucker's Creek, was not within the Paakantji (Barkindji) sphere of influence.

The particular trait of establishing graveyards is first known to us from the terminal Pleistocene, perhaps 13,000 years ago. Although the data necessary to establish this will be scarce, it is perhaps instructive to note that Roonka reaches cemetery status over 10 kya after its first occupation. I think these graveyards arose, probably in the Upper Murray, by 10 to 13 kya and spread subsequently throughout the corridor, possibly around 6 to 7 kya, to become well defined and numerous in the last 4 kya (Fig.2).

The social organisation of the River Murray people, perhaps as far back as 13 kya, was clearly designed at least partly around some form of corporate descent group — an established group reckoning kinship and membership through common ancestry, and one which acted as an individual in social and political affairs. Whether these are lineages or clans is beyond this analysis, but in the terms of Saxe, we should probably view these groups as territorially based and their burial grounds as one of the symbols validating corporate ownership of that territory.

In contrast, whatever the land-based organisation of coastal groups to the south and east and of arid zone groups to the north and west, they did not use

the cemetery as evidence of group affiliation and resource control. In the arid zone, it is unlikely that efficient use of resources can be made by restricting them, while on the coast resources may not have been scarce. On the other hand, different forms of organisation may have precluded the establishment of the localised unilineal descent group and its symbol.

This very economic view of social behaviour is only attractive because of our restrictions in the archaeological record. When we ask why cemeteries exist it may not be possible to answer in structural or religious terms, even if we include these same terms in our reconstuction of prehistoric society/social structure. These wider issues will be taken up elsewhere.

Both the biological evidence and the limited ethnographic and historical evidence support the concept of localised corporate groups which define themselves by the process of exclusivity. I have suggested that this process is revelant to an analysis of the 'robusticity debate': Kow Swamp is not an archaic Pleistocene relict population, but the forerunner of a modern, socially complex, dynamic system that promotes endogamy, one-dimensional gene flow and enhanced diversity.

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References

Allen, H. 1972. Where the Crow flies backwards: Man and land in the Darling Basin. Unpublished PhD thesis, Australian National University.

Allen, H. 1980. Aborigines of the western plains of New South Wales. In C. Haigh and W. Goldstein (eds), *The Aborigines of New South Wales*, pp. 33-43. National Parks and Wildlife Service (NSW).

Allen H. 1983. 19th Century Faunal Change in Western NSW and NW Victoria. *Working Papers in Anthropology, Archaeology, Linguistics and Maori Studies* no.64. Dept of Anthropology, University of Auckland.

Allen, H. 1986. Environmental history in southwestern New South Wales and northwestern Victoria during the late Pleistocene. Paper presented at the World Archaeology Congress, Southampton, England, September 1986.

Berndt, R.M. 1965. Law and order in Aboriginal Australia. In R.M. and C.H. Berndt (eds), *Aboriginal Man in Australia*, pp. 167-206. Angus and Robertson, Sydney.

Berndt, R.M. and C.H. Berndt. 1985. *The World of the First Australians*. Rigby, Adelaide.

Birdsell, J.B. 1953. Some environmental and cultural factors influencing the structuring of Australian Aboriginal populations. *American Naturalist* 87:171-207.

Blackwood, R. and K.N.G. Simpson. 1973. Attitudes of aboriginal skeletons excavated in the Murray Valley region between Mildura and Renmark, Australia. *Mem. Nat. Museum of Victoria* 34:99-150.

Bowdler, S. 1981. Hunters in the highlands: aboriginal adaptation in the eastern Australian uplands. *Archaeology in Oceania* 16:99-111.

Bowdler, S. 1983. Archaeological investigation of a threatened Aboriginal burial site near Robinvale, on the Murray River, Victoria. Report to the Victorian Archaeological Survey.

Bradley, R. 1981. 'Various styles of urn' — cemeteries and settlement in southern England c. 1400-1100 bc. In R. Chapman, I. Kinnes and K. Randborg (eds) *The Archaeology of Death*, pp. 93-104. Cambridge University Press, Cambridge.

Brown, A.R. Radcliffe. 1918 and 1923. Notes on the social organisation of Australian Tribes. *J. Royal Anthropological Institute*. 48:222-253 (Part I, 1918), 53:424-447 (Part II, 1923).

Brown, P. 1981. Artificial Cranial Deformation: a component in the variation in Pleistocene Australian Aboriginal crania. *Archaeology in Oceania* 16:156-167.

Brown, P. 1982. Coobool Creek: A Prehistoric Australian Hominid Population. Unpublished PhD thesis, Australian National University.

Butlin, N. 1983. *Our Original Aggression*. Australian National University Press, Canberra.

Cadien. J.D., E.F. Harris, W.P. Jones and L.J. Mandarino. 1976. Biological lineages, skeletal populations and microevolution. *Yearbook of Physical Anthropology* 18:194-201.

Cairns, J. 1859. On the Weir Mallee, a water yielding tree. *Trans. Philosophical Inst. Vic.* 3:33.

Chapman, R. 1981. The emergence of formal disposal areas and the 'problem' of megalithic tombs in prehistoric Europe. In R. Chapman, I. Kinnes and K. Randborg, (eds), *The Archaeology of Death*, pp. 71-81. Cambridge University Press, Cambridge.

Charles, D.K. 1985. Corporate Symbols: an interpretive prehistory of Indian burial mounds in westcentral Illinois. Unpublished PhD thesis, Northwestern University.

Clark, P. 1985. Willandra Lakes human skeletal inventory. Unpublished ms.

Clark, P. and J. Hope. 1985. Aboriginal burials and shell middens at Snaggy Bend and other sites on the central Murray River. *Australian Archaeology* 20:68-89.

Elkin, A.P. 1938. Kinship in South Australia. *Oceania* 8:419-452.

Fix, A.G. 1979. Anthropological genetics of small populations. *Annual Review of Anthropology* 8:207-230.

Freedman, L. and M. Lofgren. 1983. Human skeletal remains from Lake Tandou, New South Wales. *Archaeology in Oceania* 18:98-105.

Goldstein, L.G. 1976. Spatial structure and social organisation: regional manifestations of Mississippian society. Unpublished PhD thesis, Northwestern University.

Gresser, P.J. 1966. Aborigine cemeteries and graves disturbed whilst digging out rabbit burrows. *Victorian Naturalist* 83:10-12.

Haglund, L. 1976. *An Archaeological Analysis of the Broadbeach Aboriginal Burial Ground*. University of Queensland Press, St. Lucia.

Harpending, H.C. 1974. Genetic structure of small populations. *Annual Review of Anthropology* 3:229-243.

Howitt, A.W. 1904. *Native Tribes of South East Australia*. Macmillan, London.

Lane, R. and A. Sublett. 1972. Osteology of social organization: residence pattern. *American Antiquity* 37:186-201.

Lourandos, H. 1983. Intensification: a late Pleistocene-Holocene archaeological sequence from Southwestern Victoria. *Archaeology in Oceania* 18:81-94.
McBryde, I. 1974. *Aboriginal Prehistory in New England.* Sydney University Press, Sydney.
McBryde, I. 1984. Aboriginal Society in southeastern Australia. *Aboriginal History*, volume 8.
Meehan, B. 1971. The form, distribution and antiquity of Australian Aboriginal mortuary practices. Unpublished MA thesis, University of Sydney.
Pardoe, C. 1980. Selected non-metric morphology of an Archaic Plains Cemetery: The Grey Site. Unpublished MA thesis, University of Manitoba.
Pardoe, C. 1984. Prehistoric Human morphological variation in Australia. Unpublished PhD thesis, Australian National University.
Pardoe, C. 1985a Variation in Mortuary Patterning along the Darling River. Unpublished report to the Australian Institute of Aboriginal Studies, Canberra.
Pardoe, C. 1985b. Cross-cultural attitudes to skeletal research in the Murray-Darling region. *Australian Aboriginal Studies* 2:63-67.
Peterson, N. (in collaboration with J. Long). 1986. Australian Territorial Organisation. *Oceania Monograph*, 30. University of Sydney.
Pretty, G.L. 1977. The cultural chronology of the Roonka Flat. A preliminary consideration. In R.V.S. Wright (ed.) *Stone Tools as Cultural Markers*, pp. 288-331. Australian Institute of Aboriginal Studies, Canberra.
Radcliffe-Brown, A.R. (see also Brown, A.R.).
Radcliffe-Brown A.R. 1930. The social organisation of Australian tribes. *Oceania* 1:34-63 (Part I) :206-246, 322-341 (Part II) :426-456 (Part III).
Ross, A. 1981. Holocene environments and prehistoric site patterning in the Victorian Mallee. *Archaeology in Oceania* 16:145-154.
Ross, A. 1985. Archaeological evidence for population change in the middle to late Holocene in southeastern Australia. *Archaeology in Oceania* 20:81-89.
Saxe, A.A. 1970. Social Dimensions of Mortuary Practices. Unpublished PhD thesis, University of Michigan.
Sinclair, S. 1977. A study of biological variation in Victorian Aborigines. Unpublished BSc thesis, La Trobe University.
Sinclair, S. and N.G. White. 1984. The Mallacoota burials in a regional context: a craniometric analysis. *Records of the Victorian Archaeological Survey* 14:322-337.
Spence, M. 1986. Band structure and interaction in early southern Ontario. *Canadian Review of Physical Anthropology* 5:83-95.
Stirling, E.C. 1911. Preliminary report on the discovery of native remains at Swanport, River Murray: with an inquiry into the alleged occurrence of a pandemic among the Australian Aboriginals. *Trans. Royal Society of South Australia* 35:4-46.
Stockton, J. 1983. The prehistoric population of northwest Tasmania. *Australian Archaeology* 17:67-78.
Sunderland, S. and L.J. Ray. 1959. A note on the Murray Black collection of Australian Aboriginal skeletons. *Proc. Royal Society of Victoria* 71:45-48.
Tainter, J.A. 1978. Mortuary practices and the study of prehistoric social systems. *Advances in Archaeological Method and Theory* 1:105-141.
Thorne, A.G. 1975. Kow Swamp and Lake Mungo. Unpublished PhD thesis, University of Sydney.
Thorne, A.G. 1976. Morphological contrasts in Pleistocene Australia. In R.L. Kirk and A.G. Thorne (eds), *The Origin of the Australians*, pp. 95-112. Australian Institute of Aboriginal Studies, Canberra.
Thorne, A.G. 1977. Separation or Reconciliation? Biological clues to the development of Australian society. In J. Allen, J. Golson and R. Jones (eds), *Sunda and Sahul*, pp. 187-204. Academic Press, London.
Tindale, N.B. 1974. *Aboriginal Tribes of Australia.* Australian National University Press, Canberra.
van Dongen, R. 1963. The shoulder girdle and humerus of the Australian Aborigine. *American Journal of Physical Anthropology* 21:469-488.
van Gennep, A. 1960. *The Rites of Passage*, translated from the 1917 Masson, Paris edition. University of Chicago Press, Chicago.
Webb, S.G. 1984. Intensification, Population and social change in southeastern Australia: the skeletal evidence. *Aboriginal History* 8:154-172.
White, N.G. 1979. The use of digital dermatoglyphics in assessing population relationships in Aboriginal Australia. *Birth Defects:original article series* 15:437-454.
Witter, D. 1984. Providing a regional context for management archaeology. In S. Sullivan and S. Bowdler (eds), *Site Surveys and Significance Assessement in Australian Archaeology*, pp. 48-54. Prehistory Department, Research School of Pacific Studies, Australian National University, Canberra.