A preliminary beef meat cuts typology for nineteenth-century Sydney and some methodological issues

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This paper discusses work in progress on development of new typologies for analysis of cattle bones excavated from nineteenth-century archaeological contexts in Sydney. The ultimate aim of the project is to allow archaeologists to interpret faunal remains in cultural terms (e.g. as meat cuts and meals which can be linked to aspects of history and cultural identity). Currently such archaeological materials are more usually classified using pre-existing scientific taxonomies (e.g. species, anatomical elements) which have limited interpretative value. The work described here, which uses cattle bones from the Quadrant archaeological site as a case study, demonstrates some of the complexities involved in developing such cultural typologies for Australian historical archaeology.

Extensive open-area excavations of the Quadrant site, located at the corner of Mountain Street and Broadway in Sydney, were undertaken by DMA Archaeology Pty Ltd between 2001–2004 ahead of major development work for Australand Holdings under New South Wales heritage legislation. The excavations uncovered over 3000 archaeological contexts, mostly dated from the 1830s to 1860s, and represent a mix of residential housing and industrial buildings including slaughterhouses and tanneries (Mider 2001, 2004a, b). Tens of thousands of animal bones (mammals, birds and fish) were among the million or so artefacts and other finds recovered from the site. Mammal bone data, including that related to over 5,500 fragments of cattle bone, were originally recorded by Dominic Steele using a system he developed for analysis of bones from other historical sites in New South Wales (e.g. Steele 1998, 1999a, b). Colley subsequently redesigned the coding system to facilitate data entry into a relational database system (Colley 2006).

Animal bones from the Quadrant archaeological site have significant potential to provide insight into the diet and lifestyle of people who lived in this industrial area at the edge of the growing city of Sydney from the 1830s to the 1860s. Realising such potential involves development and application of methodologies to facilitate interpretation of the archaeological collections in terms of animal husbandry practices, aspects of the meat trade, and activities including slaughtering and butchery, meat retailing and purchase, cooking and eating and rubbish disposal as well as the possible production and use of animal products (e.g. tanning, bone working, glue production). Also relevant are historical questions about social and cultural attitudes to food and eating which require consideration of archaeological, archaeo-zoological and documentary evidence in combination. An essential sub-component of this study is the development of reliable and efficient ways of interpreting animal bones in terms of meat cuts and the kinds of meals people may have eaten.

One reason why the Quadrant faunas and those from other Sydney sites (e.g. Steele 1999b; Colley 1987, 2000) have so far not been subject to a highly detailed and systematic study of meat cuts is that basic methodological research still needs to be done. Constraints on research and other outcomes arising from the heritage management context of most Australian historical archaeology are are well-known (e.g. Connah 1998; Mackay and Karskens 1999; Colley 2002; Ireland 2002; Gibbs 2005a). Such circumstances, combined with the relatively small size of the archaeology profession (Ulm et al. 2005), mean that Australia has so far been unable to match North America and Britain in the development of specialist areas of sub-disciplinary practice including archaeozoology (Fairbairn 2005).

Most historical archaeological studies of meat cuts derive from North America (e.g. Schulz and Gust 1983; Lyman 1987; Landon 1996; Milne and Crabtree 2000). These can help with the development of Australian methodologies, but as butchery practices and meat cuts change over time and are culturally variable, such work in not directly applicable to nineteenth-century Sydney. Nineteenth-century British butchery practices and eating habits are more relevant to Sydney (see below). However there are few published studies about nineteenth-century British historical archaeology (Lawrence 2003:29) and these do not discuss meat, while detailed archaeo-zoological work about meat cuts from earlier periods of British history (e.g. Coy and Hamilton–Dyer 2005) is only generally useful.

The presence of some meat cuts at the Quadrant site has already been determined, without detailed quantitative analysis, as part of public interpretation produced for the site by Mider (2004a). Figures 1 and 2 show part of a display about butchery, meat and meals which illustrates examples of complete and near complete cattle bones (metapodials, carpals, tarsals and phalanges; caudal vertebrae) which can be unambiguously linked to lower-quality meat cuts ('trotters' or cow heel; ox-tail) and typical recipes for meals (Fried Ox-Feet and Stewed Ox-Tails) drawn from *Mrs Beeton's Book of Household Management* (Humble 2002). Steele (1999b) makes some observations about obvious meat cuts from the Cumberland/Gloucester Streets sites in Sydney's Rocks area,

Fig. 1: Fried Ox-Feet or Cow Heel recipe, cattle phalanges and artefacts. Quadrant on-site display. Photograph by Dana Mider

Fig. 2: Stewed Ox-Tails recipe, artefacts and various cattle bones. Quadrant on-site display. Photograph by Russell Workman

but otherwise discusses butchery practices in general terms and suggests that more work needs to be done in this area of Australian sites archaeozoology. Other Australian studies of meat cuts and diet are only marginally useful to nineteenth-century Sydney as they describe significantly different historical and cultural contexts, types of meat and butchery practices (e.g. English 1990; Howell–Meurs 2000; Lawrence and Tucker 2002; Howell–Meurs 2000; Steele 1999a; Gibbs 2005b).

In an unpublished Honours thesis Weaver (2003) used a combination of British and Australian published sources dating from the mid nineteenth century to the mid twentieth century, supplemented by expert advice from an Australian butcher, to develop a generalised Australian 'butchery section' typology to analyse bones from nineteenth-century archaeological sites in the Sydney region. Lawrence and Tucker (2002) and Gibbs (2005) both used a recent guide to Australian home butchery (McVicar 1993) to discuss meat cuts from nineteenth-century archaeological contexts in Western Australia and Tasmania. Lawrence and Tucker (2002:26) note that these modern Australian meat divisions were not expected to correspond directly to nineteenth-century practices, but were used as a guide only.

There are two linked issues here. We need more basic documentary research on the detailed history and development of Australian butchery practices to assist with interpretation of local archaeological bone collections. More detailed study of fragmentation patterns and cut marks on bones is needed to document the way Australian butchery methods are similar or different to those expected from documentary evidence.

In the absence of this documentary research, British sources from the nineteenth and early twentieth centuries can be used to start developing meat cut typologies applicable to the nineteenth-century bones from Sydney archaeological sites. Methodological and interpretative issues associated with the use of such British sources, and the need for further detailed archaeozoological research, will now be discussed using cattle bones and beef cuts as a case study. Further work is needed to develop similar methods for discussing other types of animal bones commonly found on Australian historical sites (e.g. sheep and pig) in terms of meat.

USING NINETEENTH AND EARLY TWENTIETH-CENTURY BRITISH BEEF CUTS

Because of Australia's colonial history at least some British butchery methods were used here in the eighteenth and nineteenth century (e.g. Symons 1982:15–54). Indeed one of Sydney's most famous historical characters from the Rocks is the butcher named George Cribb who arrived from Britain as a convict in 1808 and soon established himself as a local entrepreneur and property owner. He was involved in various ventures, including supplying meat to the colony, until he disappears from the documentary records around 1830 (Karskens 1999:39–44). Steele (1999b) provides some insights into the archaeology of butchery practices and animal-based industries during and after the 'Cribb' period (c. 1810 to c. 1833) in his analysis of animal bones from the Cumberland/Gloucester Streets sites in the Rocks. Karskens also describes how early Sydney first reflected British habits and attitudes towards food to which were added new and innovative eating patterns as the colony developed (Karskens 1999:64–6).

The exact ways animals are cut up into joints of meat for cooking and eating depends on a combination of mechanics, technology, anatomy and historical and cultural traditions. As Gerrard explains in his book *Meat Technology. A Practical Textbook for Student and Butcher*, no individual, not even an Ancient Briton, would go to the trouble of chopping through a bone if it were possible to find a convenient joint which could be severed with far less physical effort (1945:222–3).

This is because so much work is involved in cutting through bones, even with mechanical saws. Butchers prefer to disjoint carcases in convenient areas depending on the skeletal and muscular anatomy of the animal. However different cultural traditions and butchering technologies usually result in at least some bones being cut into or cut through. For example, Gerrard explains how in nineteenth and twentieth-century British butchery practice most vertebrae have to be severed to divide the carcase into sides (i.e. the left and right half of the animal) and further butchery portions (e.g. the hindquarter and forequarter) which are then divided into meat cuts. The hard 'long bones' (e.g. femur, tibia, radius, ulna,

metapodials) are usually removed in one piece if possible. There are exceptions to this rule however.

Gerrard names and describes regional variations in butchery practices from six areas of Britain in the 1940s: West of England, Midlands, London and Home Counties, Edinburgh, North East England and Liverpool. While there are general similarities in meat joints there are also some significant variations which impact on the way the skeletal elements either remain whole, are cut into or cut right through and which skeletal elements remain with each separately named and sold meat cut. For example the 'hough' of beef is a cut traditional only to Scotland and which consists of shank meat (lower rear leg) sliced through into small sections (i.e. cutting across and through the length of the tibia and fibula). The greatest variety is apparent in the way butchers cut and name the mid-section of the animal (mid back bone and ribs).

Table 1 lists the names of beef meat cuts described in a variety of British sources dated from 1816 to 1911 which seem to be equivalent (based on close readings and comparisons of each text) and 1940s London and Home-Counties beef cuts described by Gerrard (1945). Also included are Gerrard's names for British regional variations of the London and Home-Counties beef-cutting method. Table 1 shows some continuity and also some differences in separately named British beef cuts described by these five sources. Other than Gerrard (1945) which provides a high degree of anatomical detail, these sources are popular cookbooks and guides to household management which name and describe common British retail beef cuts, rank their quality, explain common cooking methods and present recipes. However none of the illustrations or text in these sources provides any detail about exactly which cattle bones are associated with which beef

Table 1: Comparison of British nomenclature for joints and cuts of beef from nineteenth and early twentieth-century sources.

Section	British 1816 (Rixson 2000)	Murray (1850)	Beeton (1861)	Jack & Jack (1911)	Gerrard London & Home-Counties (1945)	Gerrard (1945) UK regional variations
Hindquarter	sirloin	sirloin	sirloin	sirloin	sirloin	wing end, loin, hip, rib roast, sirloin roast
Hindquarter	rump	rump	rump	rump	rump	stakepiece, rump & izal bone, hip bone
Hindquarter	edge bone, ridge bone, each bone, aitchbone or round	aitchbone	aitchbone	aitchbone	aitchbone	hip, rump & aitchbone, tag, rump end, rump & izal bone, heuk bone
Hindquarter	buttock	buttock	buttock	buttock	topside & silverside	round
Hindquarter	mouse buttock, bed	mouse buttock	mouse-round	mouse buttock	topside & silverside	hough
Hindquarter	veiny piece	veiny piece	(not named – part of the thick flank)	veiny parts	not named	not named
Hindquarter	thick flank	thick flank	thick flank	thick flank	thick flank, top rump	bed, splitpiece, first cutting, fleshy end
Hindquarter	thin flank	thin flank	thin flank	thin flank	thin flank	flank
Hindquarter	leg	leg, shin	hock	shin	leg	shin, hind shin, hind nap
Forequarter	fore-rib	fore-ribs	fore-rib	fore ribs	fore-rib	chine & flat rib; fore-rib & thin tops; ribs; rib & thin ribs; fine end and thin ribs; rib roast & thin runner
Forequarter	middle-rib	middle-ribs	middle-rib	middle ribs	back ribs & top ribs	chuck & shoulder; back ribs & thick tops; chuck & leg-of-mutton cut; shoulder piece & top rib; thick chine & neck & thick rib)
Forequarter	chuck	chuck	chuck-rib	chuck ribs	chuck & bladebone	chuck blade
Forequarter	shoulder, leg-of-mutton piece	shoulder, leg-of-mutton piece	leg-of-mutton piece	leg-of-mutton piece	leg-of-mutton piece	top rib
Forequarter	brisket	brisket	brisket, breast	brisket	coast (comprising brisket and flank)	brisket & nine holes; brisket & plate; brisket & sweet rib; brisket & flank
Forequarter	clod	clod	neck, clod and sticking piece (together)	clod	clod	thick chine & neck, sloat, lyre
Forequarter	neck, crop, sticking piece	neck, sticking piece	neck, clod and sticking piece (together)	neck	sticking	neck end, stickings
Forequarter	shin	shin	shin	shin	shin	hough, fore nap
Forequarter	cheek	cheek	n/a	cheek	n/a	n/a
Extremity	n/a	n/a	n/a	cow heel	n/a	n/a
Extremity	n/a	n/a	n/a	tail	n/a	n/a

joint. Only Gerrard presents detailed anatomical descriptions and some diagrams of cattle slaughtering and butchery process applicable to different regions of the UK in the 1940s, including a table (1945:243) which lists cattle skeletal elements associated with common retail beef joints (London and the Home-Counties butchery method) part of which has been reproduced here (Table 2). Gerrard's description excludes lower quality beef cuts (cheek, cow heel and ox-tail) which are included in some earlier sources (e.g. Jack and Jack 1911).

Table 2: Cattle bones associated with named common retail beef joints of the 1940s London and Home-Counties (UK) cutting method (after Gerrard 1945:243).

Beef joint	Cattle bones	Total No. of Bones (all types)
thin flank	3 ribs (part of)	3
fat and skirt	not applicable	0
rump	ilium & 5 sacral vertebrae (halves)	6
loin & wing end	6 lumbar vertebrae (halves), 3.5 dorsal vertebrae (halves), 3 ribs (part of)	13
thick flank	patella	1
leg of beef	tibia-fibula and some tarsals	?
aitchbone	pubic bone, part of femur	2
topside	not applicable	0
silverside	femur	1
shin	radius & ulna, some carpal bones	?
flank	4 ribs (part of) and cartilages	?
brisket	6 ribs (part of), sternum (7 segments)	8–13
clod	humerus	1
sticking	7 cervical vertebrae (halves)	7
fore-rib	4 ribs (part of), 4 dorsal vertebrae (halves), some cartilage of scapula	8?
back ribs	4 ribs (part of), 4 dorsal vertebrae (halves), scapula (part of)	9
top ribs	4 ribs (part of), scapula (part of)	5
leg-of-mutton cut	2 ribs (part of)	2
chuck	2 dorsal vertebrae (halves), 2 ribs (small part of)	4
bladebone	scapula (part of)	1

APPLICATION TO SOME QUADRANT CATTLE BONE DATA

Table 3 lists 53 individually named skeletal elements or skeletal parts of cattle recorded for the Quadrant collection by Steele et al. (Colley 2006). Using a relational database these data can be used to link skeletal elements to the further anatomical and cultural categories shown.

'Gross Body Part' groups individually named skeletal parts into common-name categories for larger areas of the mammal skeleton. The 'Butchery Section' category (Extremity, Cranial, Trunk, Forequarter, Hindquarter) was originally devised by Steele for his work on cattle, sheep and pig bones from Orange Court House (1999a) and elsewhere. This is a simple and extremely efficient way of extracting an approximate but meaningful interpretation of the 'value' (edibility and cost) of meat represented by animal bones from Australian historic sites (see Table 4).

As discussed above, information from Gerrard (1945) has been used to link the cattle skeletal elements to beef cuts named in *Mrs Beeton's Book of Household Management* published in 1861 (Humble 2000), supplemented by additional beef cuts from Jack and Jack (1911). However this is not an exact process. Some interpretation has been involved in translating Gerrard's 1945 London and Home-Counties information about cattle bones to the named nineteenth-century beef cuts because beef cutting methods, and names, are not identical in each source. Information about relative beef quality and the recipes in Table 3 are derived from Beeton and Jack and Jack.

Ambiguity and identifiability

Areas of ambiguity are apparent in the Table 3 data. For example some named skeletal elements (e.g. thoracic vertebra, femur) could equally derive from different beefs cuts of different quality which were also commonly used in quite different recipes. Rackham (1995:8) notes that a cattle skeleton, in common with other mammals, consists of approximately 200 named parts, yet only 53 such categories were recorded in the original Quadrant data. These missing bones were either not present on site, not recovered by the excavation, not recognised by the archaeologists or have not been individually recorded. For example, some loose teeth are listed under the general category of 'tooth' while others are further sub-divided (e.g. incisor, canine, premolar, molar, deciduous tooth). Similar comments apply to other areas of the skeleton. Some such ambiguity is inevitable when

Table 3: Individual cattle skeletal elements recorded for Quadrant interpreted as beef cuts of various quality.

Skeletal Element	Gross Body Part	Butchery Section (Steele 1999a)	Beef Cut(s)	Beef Quality	Beef Recipes
Horn Core	Horn Core	Head	non-food	Various	Not applicable
Vertebra	Spine	Trunk	unknown	Various	Various
Rib	Rib Cage	Trunk	various	Various	Various
Pelvis	Pelvis	Hindquarter	aitch-bone and/or rump	Various	Various
Acetabulum	Pelvis	Hindquarter	aitch-bone and/or rump	Various	Various
Long Bone Fragment	Limb	Unknown	unknown	Various	Various
Unidentifiable	Unknown	Unknown	unknown	Various	Various
Articular Cartilage	Unknown	Unknown	unknown	Various	Various
Lumbar Vertebra	Spine	Trunk	sirloin	First Class	Roasted baron of beef; roast fillet of beef (larded)

Table 3: Individual cattle skeletal elements recorded for Quadrant interpreted as beef cuts of various quality *(continued)*.

Skeletal Element	Gross Body Part	Butchery Section (Steele 1999a)	Beef Cut(s)	Beef Quality	Beef Recipes
Sacrum	Spine	Trunk	rump	First Class	Beef-steak and kidney pudding; fried rump steak
Ilium	Pelvis	Hindquarter	rump	First Class	Beef-steak and kidney pudding; fried rump steak
Patella	Lower Hindlimb	Hindquarter	thick-flank	Second Class	Beef a la Mode
Thoracic Vertebra	Spine	Trunk	fore–rib and/or middle-rib	First and/or Second Class	Various
Sternum	Rib Cage	Trunk	brisket	Third Class	Boiled or stewed beef; excellent salted, boiled & eaten cold
Scapula	Upper Forelimb	Forequarter	chuck-ribs	Third Class	Roast beef with bone or rolled
Ischium	Pelvis	Hindquarter	aitch-bone	Third Class	Beef stew; salted beef; poorer quality roast beef
Pubis	Pelvis	Hindquarter	aitch-bone	Third Class	Beef stew; salted beef; poorer quality roast beef
Costal Cartilage	Rib Cage	Trunk	thin flank and/or thick flank	Second and/or Third Class	Various
Femur	Upper Hindlimb	Hindquarter	aitch-bone and/or buttock	Second and/or Third Class	Various
Atlas	Spine	Trunk	sticking piece	Fourth Class	Beef soup or a cheap beef stew
Axis	Spine	Trunk	sticking piece	Fourth Class	Beef soup or a cheap beef stew
Cervical Vertebra	Spine	Trunk	sticking piece	Fourth Class	Beef soup or a cheap beef stew
Humerus	Upper Forelimb	Forequarter	clod	Fourth Class	Beef soup or a cheap beef stew
Radius	Lower Forelimb	Forequarter	shin	Fifth Class	Excellent beef stock or soup; top of shin beef stew
Ulna	Lower Forelimb	Forequarter	shin	Fifth Class	Excellent beef stock or soup; top of shin beef stew
Radius and Ulna	Lower Forelimb	Forequarter	shin	Fifth Class	Excellent beef stock or soup; top of shin beef stew
Tibia	Lower Hindlimb	Hindquarter	hock (shin, leg)	Fifth Class	Excellent beef stock or soup; top of shin beef stew
Fibula	Lower Hindlimb	Hindquarter	hock (shin, leg)	Fifth Class	Excellent beef stock or soup; top of shin beef stew
Astragalus	Lower Hindlimb	Extremity	hock (shin, leg)	Fifth Class	Excellent beef stock or soup; top of shin beef stew
Calcaneus	Lower Hindlimb	Extremity	hock (shin, leg)	Fifth Class	Excellent beef stock or soup; top of shin beef stew
Centroquartal	Lower Hindlimb	Extremity	hock (shin, leg)	Fifth Class	Fried ox-feet or cow-heel
Skull Fragment	Cranium	Head	cheek and/or tongue	Sixth Class	Beef stews and soups
Maxilla	Cranium	Head	cheek and/or tongue	Sixth Class	Beef stews and soups
Hyoid	Cranium	Head	cheek and/or tongue	Sixth Class	Beef stews and soups
Mandible	Jaw	Head	cheek and/or tongue	Sixth Class	Beef stews and soups
Tooth	Teeth	Head	cheek and/or tongue	Sixth Class	Beef stews and soups
Incisor	Teeth	Head	cheek and/or tongue	Sixth Class	Beef stews and soups
Canine	Teeth	Head	cheek and/or tongue	Sixth Class	Beef stews and soups
Premolar	Teeth	Head	cheek and/or tongue	Sixth Class	Beef stews and soups
Molar	Teeth	Head	cheek and/or tongue	Sixth Class	Beef stews and soups
Deciduous Tooth	Teeth	Head	cheek and/or tongue	Sixth Class	Beef stews and soups
Caudal Vertebra	Spine	Trunk	ox-tail	Sixth Class	Stewed ox-tails; cow heel jelly; beef stock for stew
Carpal	Lower Forelimb	Extremity	cow heel (trotters)	Sixth Class	Fried ox-feet or cow-heel
Metacarpus	Lower Forelimb	Extremity	marrow bones	Sixth Class	Boiled marrow bones
Tarsal	Lower Hindlimb	Extremity	cow heel (trotters)	Sixth Class	Fried ox-feet or cow-heel
Metatarsus	Lower Hindlimb	Extremity	marrow bones	Sixth Class	Boiled marrow bones
Sesamoid	Foot	Extremity	cow heel (trotters)	Sixth Class	Fried ox-feet or cow-heel
First Phalanx	Foot	Extremity	cow heel (trotters)	Sixth Class	Fried ox-feet or cow-heel
Second Phalanx	Foot	Extremity	cow heel (trotters)	Sixth Class	Fried ox-feet or cow-heel
Third Phalanx	Foot	Extremity	cow heel (trotters)	Sixth Class	Fried ox-feet or cow-heel
Metapodial	Lower Hindlimb	Extremity	marrow bones	Sixth Class	Boiled marrow bones
Phalanx	Foot	Extremity	cow heel (trotters)	Sixth Class	Fried ox-feet or cow-heel
Carpal or Tarsal	Foot	Extremity	cow heel (trotters)	Sixth Class	Fried ox-feet or cow-heel

Table 4: A summary of the Steele's (1999a) body part system.

Body Part	Skeletal elements or parts	'Value'
Extremity	metapodials, carpals, tarsals, sesamoids, astragalus, calcaneus, phalanges	Limited dietary value. Primarily 'butchery waste'
Cranial	skull fragments, horn cores, mandible, maxillae, loose teeth, hyoid	Low dietary value. Primarily 'butchery waste'
Trunk	vertebrae, ribs and costal cartilage	Medium to high dietary value
Forequarter	scapula, humerus, radius and ulna	High dietary value
Hindquarter	pelvis, femur, patella, tibia	High dietary value

recording archaeological bones which are often too fragmented to allow identification to a very detailed anatomical level. 'Identifiability' of archaeological bones (e.g. Reitz 1987; Hesse and Wapnish 1985:54–5) varies with the physical state of the bones, the sample sizes, the working methods and expertise of those making the identifications. Items which are initially unidentifiable or hard to identify can become increasingly identifiable as the work unfolds and the expertise of the researcher increases. Variation in the material becomes more familiar and identifiability is often enhanced by examination of larger sample sizes and/or working methods which make is easier to look at a lot of material together and directly compare like with like. Such practical issues limit the value of developing meat cut typologies based solely on individually named skeletal elements.

More accurate and less ambiguous interpretation of meat cuts from animal bones requires a high degree of systematic recording of skeletal parts. This may also need to be combined with other data about bone fragmentation patterns, possible articulations or conjoins, and cut and chop marks. Weaver (2003) identified and discussed some of these issues in her research on meat cuts in nineteenth-century Sydney. As noted above she developed a generalised Australian beef cuts typology for interpretation of archaeological animals bones. In common with the North American studies cited above, Weaver's system requires a very detailed level of recording for some anatomical elements including the side of the body (left and right) and, for example, the exact type of vertebra (cervical, thoracic, lumbar, sacral, caudal) and the numbered position of each along the length of the vertebral column. A similar level of detail is needed for ribs and other key bones. For some bones the system also requires incorporation of fragmentation information (e.g. proximal or distal ends of long bones and ribs). Only some of these data are currently available for Quadrant. Given the very large size of the samples, and the large-scale of the Quadrant project as a whole, the cost of recording all bones to this level of detail was prohibitively expensive at this stage in the work.

Quantification and other issues

Even if every cattle bone at Quadrant was to be further identified and recorded in great anatomical detail it is still necessary to consider the numbers and types of bones linked to individual meat cuts to make meaningful statements about their relative dietary or economic contribution. Such a study is well described by Milne and Crabtree (2000:130–132) in their work on faunal remains from excavations at Five Points, New York, dated from c. 1800 to c. 1860. Based on previous research into meat cuts represented by mammal bones from other North American historic sites (Schulz and Gust 1983; Lyman 1984) they developed a table linking cattle, sheep and pig bones to cuts of beef, mutton and pork (Milne and Crabtree 2000, Table 33). For each named meat cut the total number and proportion (where relevant) of each type of skeletal element is included. For example, Milne and Crabtree's 'beef hindshank' joint includes 1 distal femur, 1 astragalus, 1 calcaneus, 1 tibia, 1 fibula and 4 tarsals of cattle. To discuss relative proportions of differently priced meat cuts in samples from different contexts they calculated values for the Minimum Number of Meat Cuts (MNMC). For each meat cut they calculated a standard number of bones per cut (e.g. 9 bones for each beef hindshank as listed above). For each archaeological sample they calculated a total number of bones attributable to each cut and divided this by the standard number to calculate the MNMC for each archaeological context.

In their method counts of the different skeletal elements associated with a meat cut are combined, rather than calculating MNMC estimates based on counts of each different type of skeletal element separately which would produce slightly different results. Different results again could be expected if MNMC estimates also took into account evidence that some bones originated from the same individual meat cut (and animal) such as size and age information, matching articulations (conjoins) and cut marks. In common with calculations of Minimum Numbers of Individuals (MNI) such methods are highly dependent on the way they are calculated and also, as discussed by Milne and Crabtree for MNI estimates, on the way archaeological contexts are combined into analytical units.

Weaver (2003) made similar calculations for Australian butchery sections (MNBS) and compared these with NISP (Number of Identified Specimen) counts for two contexts from historical sites in the Sydney region (a cistern from the Sydney Conservatorium of Music excavated by Casey & Lowe and a midden from the Regentville site excavated by Birmingham and Wilson). As might be expected the two methods produced different results for the relative abundance of different meat cuts in each sample. These are comparable to the differences encountered when calculating relative species abundance by NISP, weight and MNI estimated in different ways as well-reported in standard archaeozoological literature (e.g. Lyman 1994). There is no simple resolution to such methodological issues. All estimates of the relative importance or abundance of different meat cuts (or species) are precisely that—estimates—which vary according to the way they are calculated and other factors related to taphonomy, site formation and the identifiability of the bones themselves.

A table listing all bone elements and relevant bone proportion data (e.g. whether whole, cut or disarticulated into portions, or comprising proximal or distal ends) for the nineteenth-century British meat cuts listed in Table 1 has not yet been produced. Research presented here goes some way towards achieving this aim while also demonstrating some of the difficulties. For example, Table 2 includes figures for the total number of bones of different types associated with each 1940s London and Home-Counties named beef joint using Gerrard's original data. Despite the very high level of anatomical details provided by Gerrard there are still instances where an exact count of bones cannot be provided without further clarification (e.g. exactly which and how many carpals and tarsals are associated with some joints; whether the sternum as part of the brisket should be counted as one articulated bone or its seven disarticulated elements).

DISCUSSION AND CONCLUSIONS

Better understanding of British, Australian and other national and regional butchery practices relevant to nineteenth-century Sydney requires further documentary research. Also relevant are the exact ways butchers disarticulate and cut through bones which result in repeating patterns of fragmentation and visible cut and saw marks on some bones. Data about the presence, type, position and angle of visible cut and saw marks has also been recorded for Quadrant mammal bones, but has yet to be analysed. These data are coded in alpha-numeric form in the database, rather than using a visual system of illustrating the position and direction of visible cut and saw marks using standardised drawings of each bone element. This visual system has been used to good effect to record butchery marks observed on domestic mammal bones from four historic sites in Boston dated between c. 1630–1835 by Landon (1996:58–95).

Even if some butchers in early colonial and nineteenth-century Sydney typically cut beef into named joints based on particular British traditions, and for which exact numbers and types of cattle skeletal elements can be established through documentary research, this does not mean that all meat was butchered in this way. Direct observation and analysis of cuts marks and linked fragmentation and portion data is necessary to document the way people actually butchered animals into meat joint and cuts. As for other areas of historical archaeology the value of this research is in identifying similarities, contrasts and contradictions between what we might expect from documentary research (e.g. standardised nineteenth-century British beef cuts of the type described by Mrs Beeton for some archaeological contexts) with patterns of people's actual behaviour revealed through archaeological evidence. For example, distinctive cut marks have been associated with Chinese butchery and cooking methods on some sites in North America which may be relevant to Chinese occupants of Sydney's Rocks area in the nineteenth-century (Lydon 1999). Previous study of cut marks and articulations on bones from Sydney's First Government House site (Colley 1987:12–13) revealed a distinctly North American style of mutton butchery.

Relevant here is Landon's very detailed analysis of cut marks and other data recorded about animal bones from colonial Boston which demonstrated a wide variety of approaches to butchery. While some repeated and generalised butchery patterns were apparent the data also revealed many variations from the norm. As Landon discusses, interpretation also needed to account for variability arising from the nature of the archaeological samples themselves (1996:91–5).

Documentary evidence is essential not only to assist with the process of identifying and naming meat cuts as described above, but also to understanding something of their possible wider meaning within the historical context of nineteenth-century Sydney. For example Mrs Beeton writing in 1861 places different beef cuts and meals into a wider social and historical context which still resonates in the writings of Stephanie Alexander who is one of Australia's leading contemporary cookery writers:

'1. Sirloin.—The two sirloins, cut together in one joint, form a baron; this, when roasted, is the famous national dish of Englishmen, at entertainments, on occasion of rejoicing.' Isabella Beeton *Mrs Beeton's Book of Household Management* (Humble 2000:160).

'For memorable roast beef that evokes Empire and largesse one cannot do better than splurge on a wing-rib sirloin from the hindquarter or a standing-rib roast from the forequarter. These magnificent cuts are expensive, but the flavour is incomparable.' Stephanie Alexander *The Cook's Companion. The complete book of ingredients and recipes for the Australian kitchen* (2004:150).

Such approaches have potential to link interpretation of bones from historic sites in Sydney to questions of wider interest to archaeologists and historians about economy, ethnicity and 'Empire' for example (Karskens and Lawrence 2003). They are also more likely to appeal to the public and to those who pay for archaeological excavations than dry tables which present lists and counts of cattle bone skeletal elements, even though production of such lists and tables is an essential part of the interpretative process.

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