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La Draga: Environmental Archaeology

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Introduction

La Draga (Banyoles, Girona Province) is one of the most important sites of Iberian later prehistory. It is well known for being the only lakeshore settlement that has been identified so far in Spain. The site was discovered in 1990, and, from then until today, several archaeological excavations have taken place under the scientific supervision of the Museu Arqueològic Comarcal de Banyoles and the Museu d'Arqueologia de Catalunya. A second phase is now being undertaken with the additional collaboration of the Universitat Autònoma de Barcelona and the Consejo Superior de Investigaciones Científicas (Bosch et al. 2000, 2006a, 2011).

The settlement is located at the eastern side of Lake Banyoles, 170 m. a.s.l. (Fig. 1). Nowadays, the biggest part of it is in the dry land, but part of the site is underwater. It is thought that the original settlement was around 8000 m^2, but archaeological work has focused on a smaller area, of around 3000 m^2, where the site seems to have remained better preserved. La Draga is characterized by the exceptional preservation of wood and other plant remains, which together with the charred remains of fuel consumption makes this an exceptional site to see how the landscape was in time when the site was occupied. The studies of fauna and plant remains have been one of La Draga's most consistent contributions, thanks to the huge quantity of samples, as well as their variety (Antolin et al. 2014).

Three main areas have been excavated (Fig. 2): sector A, of approximately 284 m^2; sector B, of 126 m^2; and sector C, of 310 m^2. Sector A is on the eastern part, where the water table is around 70 cm below the archaeological layer, which means that waterlogged conditions have not prevailed until the present and the organic material of the archaeological layer has disappeared. Only the tips of the wooden posts, which still are in waterlogged conditions, have been recovered. Sectors B and C have maintained the waterlogged conditions ever since the Neolithic period. Recently a new area of 58 m^2 is being excavated, sector D.

As far as the chronology is concerned, the latest information comes from a batch AMS radiocarbon dates, which consistently place the two archaeological levels of La Draga in the Neolithic

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La Draga: Environmental Archaeology, Fig. 1 Location of the settlement of La Draga

Cardial culture. The initial phase can now be situated between 5324 and 5000 cal BCE and the second between 5210 and 4980 cal BCE (Tarrús 2009; Bosch et al. 2011).

Key Issues/Current Debates/Future Directions/Examples

The Landscape and Wood Resources

The pollen data, coming from the site itself and from the sediments of the lake, show that the forests in the surrounding area were composed of oaks (*Quercus* sp. deciduous), fir (*Abies* cf. *alba*), pines (*Pinus* spp.), evergreen oak (*Quercus* sp. evergreen), linden (*Tilia* sp.), maple (*Acer* sp.), juniper bushes (cf. *Juniperus*), and wild olive/Phillyrea type (*Olea/Phillyrea*)

La Draga: Environmental Archaeology, Fig. 2 Archaeological works and overview of the Archaeological Park of La Draga. (Photo: J. Casanova)

forming a mosaic of vegetation. These records highlight also the importance of riparian vegetation, represented by species such as hazel (*Corylus* cf. *avellana*), ash (*Fraxinus* sp.), elm (*Ulmus* sp.), alder (*Alnus* cf. *glutinosa*), poplar (*Populus* spp.), willow (*Salix* spp.), and elderberry (*Sambucus* sp.). The presence of bushes, between them shrub heath (cf. *Erica*) and boxwood (cf. *Buxus sempervirens*), is poorly represented in quantitative terms. Therefore, the environment of the settlement is dominated by forest formations that have provided a variety of resources to the settlement (Burjachs 2000).

Around ca. 7250 cal BP, coinciding with the first settlement phase of La Draga, a rapid fall of the pollen values of deciduous *Quercus* sp. is observed, and a stabilization of these values is found until ca. 6000 cal BP. Climate could not have been the main cause for the decrease of broadleaf deciduous forests, and the need of gathering raw material for the construction of dwellings played a major role in this change (Rivelles et al. 2014).

The study of charcoal and wood remains shows more precisely the composition of forests and how these were exploited by the inhabitants of La Draga. The study has allowed identifying a minimum of 22 taxa (14 among charcoal and 17 among the wood remains). All of them could have grown in the vicinity of the settlement. Among the species that are well represented are those gathered in riparian forests: laurel (*Laurus nobilis*), elm, ash, hazel, willow, alder, elderberry, poplar, clematis (*Clematis clematis*), and dogwood (*Cornus sanguinea*). Also well represented are sub-Mediterranean taxa: maple (*Acer* sp.), boxwood, oaks (deciduous), linden (*Tilia* sp.), *Prunus* sp., *Pomoideae*, pine (*Pinus nigra-sylvestris*), and yew (*Taxus baccata*). Their presence at the site confirms that oak forest, growing at low altitude, was predominant in the area. Finally we have also found typical Mediterranean vegetation with evergreen oak (*Quercus* sp. evergreen) and the strawberry tree (*Arbutus unedo*); however, these species are in the minority. Both taxa may form mixed forests in sunny and dry areas. The results obtained from the analysis of wood and charcoal suggest that, during the occupation of La Draga, the regime of temperatures and humidity has enabled the development of low-altitude deciduous forests (Piqué 2000; Bosch et al. 2006b).

The study of wood charcoals scattered in the archaeological level shows that main woods used as fuel were oak (deciduous), laurel, and boxwood. About 94% of the fragments analyzed correspond to these taxa. They represent the bulk of waste identified, and therefore, we believe they are indicators of preferential use by the community. The remaining taxa were used in a more minimal way.

Among the wood used for the manufacture of tools, certainly boxwood is the best represented taxon (Fig. 3), both in terms of the number of objects and categories of object. Forty-eight percent of items and up to ten different types of objects were manufactured with this wood. Oak was also used, but with less intensity, as it only represents about 12% of the objects. However, we

La Draga: Environmental Archaeology, Fig. 3 Tools made from organic materials: *left*, sickle haft (*Buxus sempervirens*); *right*, digging stick (*Buxus sempervirens*). (Photo: Project La Draga)

point out that most of the hundreds of poles used in construction of buildings were of oak.

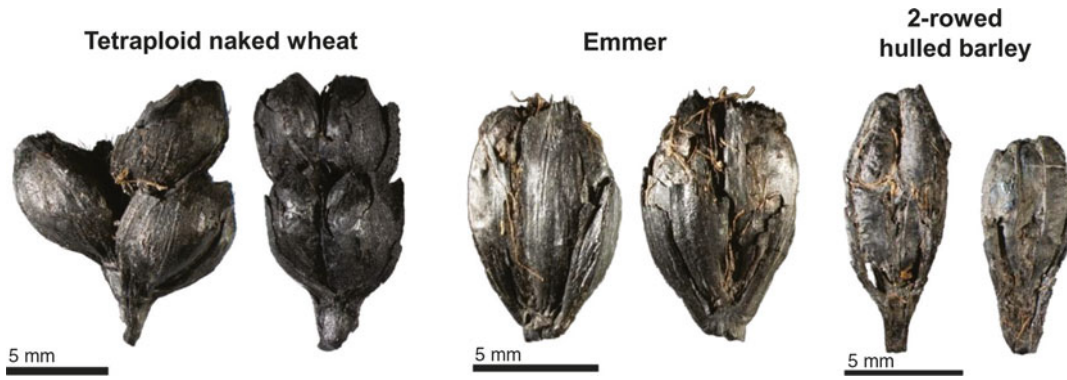
Woods were used according to their properties, and many of the objects had been partially damaged by fire. The hardwoods of *Quercus* (deciduous and evergreen), *Arbutus unedo*, *Juniperus* sp., *Pomoideae*, *Cornus* sp., *Buxus sempervirens*, and *Acer* sp. have been used to manufacture a total of 15 categories of objects. They included handles of adzes of various sizes, angled sickles with collectors, twin-pointed digging sticks, and arrows, as well as cooking utensils (bowls, ladles, scoops, spatulas), items for furniture (hooks), building (wedges), and weaving (twin-pointed spindles, combs). The flexible softwoods were used in the manufacture of a lower number of object categories. These species were used for the production of basketry (*Corylus avellana*), string (*Tilia* sp., *Clematis* sp.), and bows (*Taxus baccata*).

Agriculture and Wild Foods

The agricultural production system of La Draga's inhabitants appears to have been quite complex and varied (Antolin 2016). Huge numbers of carbonized grains were recovered during the excavations, mostly associated both with combustion structures and burned-down grain stores (Buxó et al. 2000). All remains were in waterlogged conditions when recovered. Nevertheless, the largest part of the assemblage has survived in a charred state (Fig. 4). The vast majority of these grains are thought to belong to tetraploid naked wheat, based on the morphology of chaff remains (Buxó 2007; Antolin and Buxó 2011).

Fifty-seven taxa have been identified. Five of them belong to potentially cultivated cereals and two cultivated pulses. The cereal species are naked wheat (*Triticum aestivum/durum/turgidum*), which represents the 99% of all the grains and the main crop at the site, while all the other cereal species, such as barley and naked barley (*Hordeum vulgare* and *Hordeum vulgare* var. *nudum*), and hulled wheat as emmer (*Triticum dicoccum*) and einkorn (*Triticum monococcum*) types only make up 1% of the total. Chaff remains were relatively abundant. Of these, 30% are rachis fragments which coincide with the morphology of *Triticum durum/turgidum* type (tetraploid naked wheat). Only in very few structures, cereals other than naked wheat seem to be quantitatively significant. In the majority of these cases, the second better represented cereal is hulled barley, but there is one structure where naked barley yielded more than 1000 remains (E-52).

Pulses are represented by broad bean (*Vicia faba*) and peas (*Pisum sativum*), although in small numbers. In addition, poppy (*Papaver somniferum/setigerum*) is one more taxon that may possibly have been cultivated in La Draga. It is not entirely certain whether it was a weed among the crops or a plant specifically cultivated during the Neolithic on the Iberian Peninsula, as appears to be the case in the rest of the Mediterranean Basin.



La Draga: Environmental Archaeology, Fig. 4 Carbonized cereals from the Neolithic site of La Draga: tetraploid naked wheat, emmer wheat, and two-rowed hulled barley. (Photo: F. Antolín)

Gathering of fruits and berries in the woods nearby is well documented at La Draga. There is a wealth of hazelnuts, acorns, pine nuts, blackberries, sloes, wild apples or pears, and wild grapevines. Among the wild fruits, cherry pits, some of which were perforated for use as pendants, have been found in abundance in recent excavations.

Charred remains of wild plants are very scarce and made up of several communities. Some of them are segetal and ruderal weeds, *Cerastium* sp., *Chenopodium album*, *Lolium* sp., *Papaver rhoeas/dubium*, *Polygonum lapathifolium*, *Polygonum* cf. *persicaria*, *Valerianella* cf. *dentata*, and *Verbena officinalis*; others are more related to aquatic/lakeshore vegetation, *Alisma plantago-aquatica*, *Alnus glutinosa*, *Cladium mariscus*, *Eupatorium cannabinum*, *Lycopus europaeus*, *Vitis vinifera* subsp. *sylvestris*, and *Potamogeton* sp.; a few examples may be related to deciduous woodland areas, such as a *Cornus sanguinea*, *Crataegus monogyna*, *Prunus avium*, *Quercus* sp., *Moehringia trinervia*, and *Tilia platyphyllos*, and woodland borders/ruderal areas such as *Prunus spinosa*, *Sambucus* cf. *ebulus*, *Rubus fruticosus* agg., and *Hypericum* cf. *perforatum*; and finally, some of the taxa may be found in more than one of these ecological groups: Brassicaceae, *Carex* sp., *Galium* sp., *Silene* sp., *Stachys* sp., *Ranunculus* sp., and *Rumex* sp. The presence of a few charred remains of *Galium* sp., *Lolium* sp., *Papaver somniferum/setigerum*, *Cladium mariscus*, and *Verbena officinalis* is the only evidence of clear weed plants.

Durum wheat would have been grown as a monocrop and harvested close to the ground. The most common harvesting technique for naked wheats in the Near East is reaping ears and straw together by cutting low on the straw. This type of harvesting technique is inferred for La Draga, according to the results of lithic artifact use-wear analysis (Palomo et al. 2011). Functional analysis of lithic artifacts provides a more complete understanding of cereal processing in La Draga. Around 25% of these artifacts seem to have been used on cereals, both for harvesting and for cutting straw close to the ground. Two types of blade insertion have been observed, parallel or oblique to the handle. Some of them have been used for cutting green stems of plants, which could be related to early harvesting of crops or other types of nonwoody plants (Palomo et al. 2011). Analysis has confirmed the position of the flint cutting teeth in the grooves of the wooden sickle handles. It has also highlighted the possibility that there may have been a second reaping of the cereal crops close to the ground to take advantage of the straw; this would account for the marks on the tools caused by hitting stones. The first harvesting would obviously have been to cut the spikes with the grain at the top of the plant. Straw then could be reused for other purposes such us construction material, fuel, fodder, or even basketry.

After this type of double reaping (spikes and straw), the selection of grains was carried out by hand beating without a thresher (perhaps by treading with animals), followed by winnowing and sieving. Once washed, the grain was stored in pottery vessels or baskets, which were probably placed in stone-floored granaries. Some of the grain would have been toasted in order to consume it directly, although most of it was used to make flour using small hand mills.

It is important, then, to consider consumption possibilities when only *Triticum durum/turgidum* type is identified in a site and seems to be its main crop such as in our case. Bulgur production could have taken place in La Draga, but the very few pre-charring fragments of caryopsis are not enough evidence for such a process. One possible good way to detect *frikke* production is the presence of significant quantities of non-charred grains with charred apical parts, which is a typical consequence of this practice. No such findings can be reported from La Draga, even though green stems are known to have been cut with lithic artifacts. Huge concentrations of charred grain around hearths of sector A have also raised the possibility that they represent grain roasting inside big pottery containers.

The grains of barley, emmer, and einkorn may not have been dehusked. Considering the low percentage that they represent in the assemblage and the presence of some pre-charring caryopses fragments belonging to these taxa, it is probable that they were accidentally harvested and

processed with naked wheat and survived the different processing stages.

Animal Exploitation

The faunal analysis addresses, in addition to the taxonomic determination, to approach other aspects such as the model of stockbreeding exploitation and the importance of hunting in the immediate environment of the lake or in more distant areas such as the forests or mountains that surround the site (Saña 2000, 2011). The faunal remains recovered and analyzed so far show the exploitation of at least different animal species, 46 wild and 5 domestic species.

The classification of faunal remains (N = 14,468) indicates that most are mammals followed by, in order of quantitative importance, the remains of mollusks (4.9%), birds (0.7%), chelonians (0.7%), and fish (0.09%). The exploitation of the animal biomass of aquatic environments and in particular the lake itself is a specific activity or sporadic. This feature is also evident if we consider the number of specimens of fish (eels, barbells, catfish, and roaches), turtles (*Emys orbicularis*), and freshwater mollusks acquired, with very few individuals represented for most species. The exploitation of the marine environment as a food source was not recurrent. Among the 14 species of marine mollusks documented, only rock mussel was potentially destined for consumption. A similar dynamic is documented for birds, with little more than two individuals representing each of the 14 species of birds identified. As well as the cormorant, we now have ducks (the common goldeneye and the ferruginous duck) and rails (coots or water hens), as well as cranes, woodcocks, wood pigeons, rock and red-legged partridges, quails, Passeriformes, and birds of prey, such as the osprey. Some of these animals, sometimes found quite whole, may have reached the site naturally, but in the majority of cases, their presence can be attributed to their having been hunted for their meat or feathers.

The role of hunting and obtaining of animal proteins was still of great importance in La Draga, despite the relative abundance provided in this area by domestic cattle (Fig. 5). In addition to the large mammals, such as aurochs or wild bulls, wild boar, red deer, roe deer, and wild goats, we have been able to determine the presence of rabbits and a wider range of small carnivores (fox, badger, marten, and wildcat), probably also appreciated for their skins. One is struck by evidence clearly showing that wild bulls existed in great numbers, alongside boars, rabbits, roe deer, and wild goats. These last two species tell us that what was the hinterland of La Draga, in the strict sense, began to expand considerably when hunting extended as far as the high mountains that marked the limits of the lacustrine basin.

La Draga: Environmental Archaeology, Fig. 5 Horns of domestic ox. (Photo: Project La Draga)

From hunting and gathering, cattle raising was extensively practiced for the different Neolithic occupations of La Draga. If we look at evidence concerning the domestic cattle of the period, there was a marked presence of the ox and the pig, alongside the traditional sheep and goats. These animals were exploited in two ways, to judge from the range of ages we have detected: they were kept in order to provide both meat and milk, including cream derivatives of the latter (butter, cheese).

There is also some slight but interesting evidence that dogs were kept, as was usual in other settlements of the Old Neolithic, both on the peninsular and Central Europe. The presence of the domestic dog is confirmed by the remains of two individuals, one of 3–6 months old and another more than 12 months old.

Stockbreeding was, above all, aimed at obtaining meat and milk, although there appears to be evidence that older oxen (Fig. 5) were used for agricultural tasks. From paleopathology bone, some oxen have made regular overwork, something that can be related to its use for different tasks (loading, wood transport, agricultural tasks, etc.). In these cases the repeated mechanical pressure on the hard parts of the skeleton of the animal can cause bone deformities. In La Draga it has been found that most of pathologies were found in the animal's foot, consisting in deformations and different degrees of bone spurs (Lladó et al. 2008).

The meat in all the domestic species (ox, pig, sheep, and goat) was obtained from young animals once they had reached their optimum usable body mass. The relative abundance at La Draga of the remains of animals only a few months old (calves, suckling pigs, lambs, and kid goats) or even newborns, perhaps due to the difficult conditions of the period, does not detract from the general pattern of slaughtering noted. Obviously, some males were reserved for the reproduction of each species, as well as adult females (cows, sheep, and nanny goats) for the provision of milk.

Cross-References

- ▶ Agrarian Landscapes: Environmental Archaeological Studies
- ▶ Animal Domestication and Pastoralism: Socio-environmental Contexts
- ▶ Archaeobotany of Early Agriculture: Macrobotany
- ▶ Environmental Reconstruction in Archaeological Science
- ▶ Environmental Sampling in Mediterranean Archaeology
- ▶ Plant Domestication and Cultivation in Archaeology
- ▶ Waterlogged Finds: Conservation
- ▶ Western Europe: Historical Archaeology

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Basic Biographical Information

Philippe la Hausse de la Louvière received his B.S. in Natural Sciences, specializing in African fisheries ecology. He is General Manager of Les Moulins de la Concorde Ltd, an agro-industrial enterprise, and Director of other food-producing companies in Mauritius.

Major Accomplishments

He is founding President of the Mauritius National Heritage Trust and of ICOMOS Mauritius, President of Friends of the Environment, and former President of the Société de l'Histoire de l'Ile Maurice. He has also served in various positions with the Mauritius Museums Council, the National Environmental Advisory Council, and the Aapravasi Ghat Trust. Additionally, he was Member of ICOMOS Executive Committee (2006–2008), elected Member (2008–2011), and has served as Treasurer General since 2009. He is founding Vice-President of the ICOMOS International Scientific Committee on Fortifications and Military Heritage. His primary interests and projects involve heritage site restoration, archaeological programs, cultural tourism initiatives, and historic building restoration projects.

Cross-References

▶ Fortifications, Archaeology of
▶ International Committee on Archaeological Heritage Management (ICAHM) (Conservation and Preservation)
▶ International Committee on Archaeological Heritage Management (ICAHM) (Cultural Heritage Management)
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La Riera Cave: Geography and Culture

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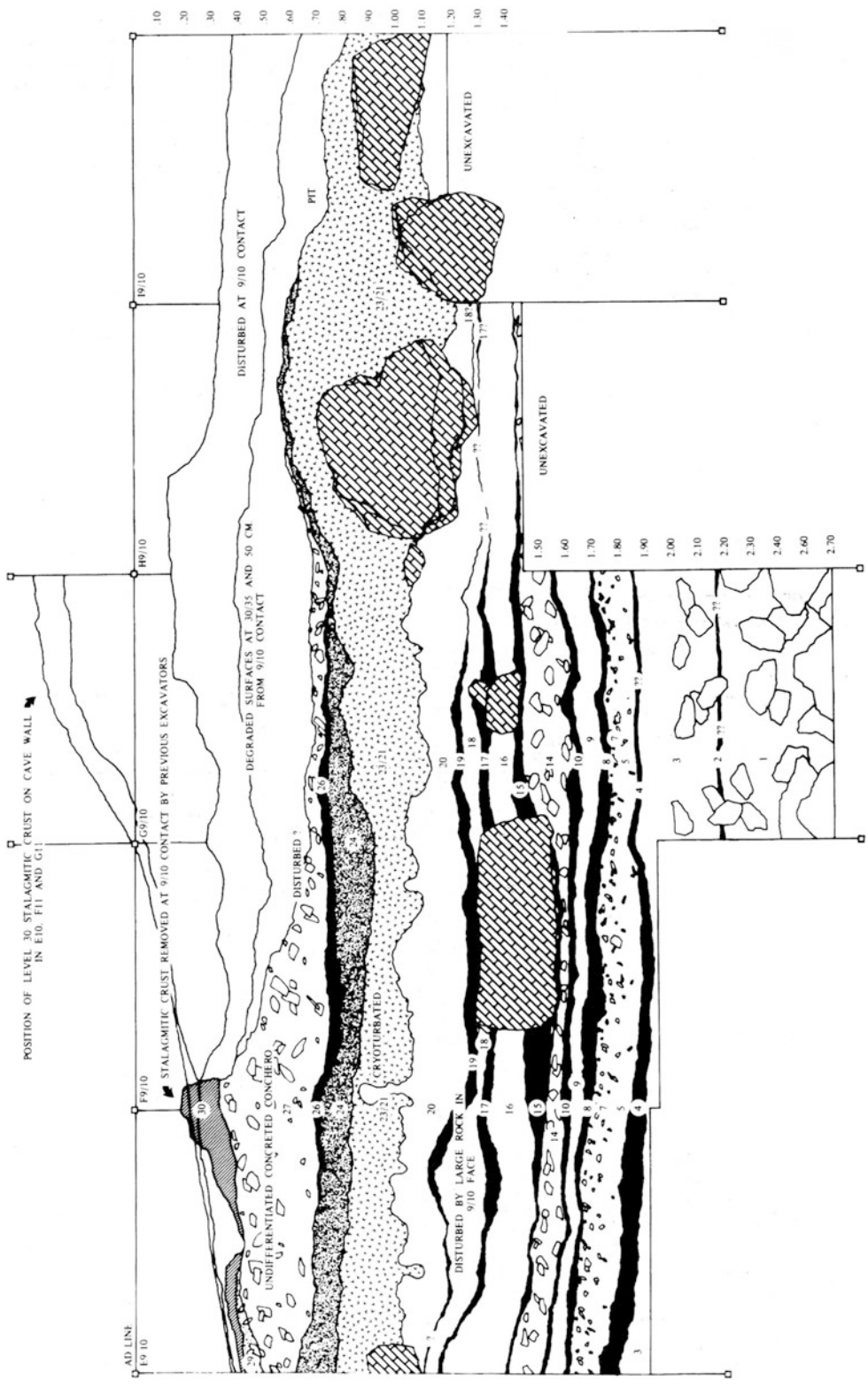
La Riera is a small cave in the karstic complex of La Llera ridge on the coastal plain of eastern Asturias, in Posada de Llanes, halfway between Santander and Oviedo (northern Spain). Other nearby Paleolithic and Mesolithic sites include Cueto de la Mina, Bricia, Coberizas, Tres Calabres, Balmori, Quintanal, Fonfria, Arnero, etc. The deposits in La Riera both overlap and complement the important culture-stratigraphic sequence in the adjacent rock-shelter of Cueto de la Mina, which spans some 18,000 years between the Gravettian and the Asturian. La Riera, Cueto de la Mina, and the other sites were discovered and excavated in the 1910s by the Conde de la Vega del Sella, whose palace is located nearby. His monographs on Cueto de la Mina, La Riera, and Balmori (Vega del Sella 1916, 1930), and Hugo Obermaier's observations thereon in *Fossil Man in Spain* (1924), provided information of extraordinary quality and value for the period. In 1917–1918, La Riera specifically yielded a series of layers pertaining to the Solutrean, Lower and Upper Magdalenian, Azilian, and Asturian. The site was heavily looted in subsequent years (and has again been recently, despite closure with iron bars). In 1969, as part of his doctoral research on the Asturian Mesolithic culture, Clark (1976) sampled the concreted shell midden (*conchero*) and excavated a small test pit in front of the cave. The site is strategically located in the center of the narrow coastal strip, 1.75 km south of the present shore (9.7 km from the Pleniglacial shore) and 1.5 km from the abrupt base of the Sierra de Cuera, a coastal hill range that rises to 1315 m above sea level to the north of the Picos de Europa (maximum elevations: 2500–2600 m). Facing south at only 30 m above sea level, the cave is sheltered by La Llera ridge from winds off the Atlantic. The resources of the coast, the coastal plain, and the steep, rocky slopes of the *sierra* were all easily accessible.

Between 1976 and 1979, Clark and L.G. Straus excavated remnant intact deposits in the interior of La Riera, uncovering the same sequence of periods as had the Conde (Fig. 1). The results of this research were fully published in a substantial interdisciplinary monograph (Straus and Clark 1986a). In an attempt to date the occupations independently of their "diagnostic" artifacts, they obtained 28 conventional radiocarbon assays. Several levels were dated by more than one assay. Despite several stratigraphic inconsistencies and a few dates that are patently too young, Solutrean levels 2–17 (defined by the presence of characteristic foliate and shouldered points) can be placed (in uncalibrated years) between ca. 20 and 17 ka BP, the Lower Magdalenian (levels 18–23) between ca. 17 and 15 ka BP, the Upper Magdalenian (levels 24–26, defined by a round-section antler harpoon) between ca. 13 and 11 ka BP, the Azilian (levels 27–28 with a flat-section harpoon) between ca. 11 and 9 ka BP, and the Asturian (with cobble picks found by Vega del Sella and Clark in the *conchero*) between ca. 9 and 6.5 ka BP. These ages were later basically confirmed by two series of reservoir-corrected dates obtained on mollusc shells by A. Craighead (1999) and by Soares et al. (2016), who also obtained an Oxford ultrafiltration-pretreated assay on an ibex molar that confirms a 20 uncal ka BP age for one of the earliest Solutrean levels. Thus the Solutrean in Cantabrian Spain began shortly before 20,000 radiocarbon years ago, as also shown by dates from Las Caldas in central Asturias and El Mirón in Eastern Cantabria. New AMS assays (commissioned by Straus) on ibex and red deer bone collagen (extracted by J.R. Jones) significantly increase the uncalibrated ages for La Riera levels 23 (15,120 ± 40 BP, UG-27526) and 24 (13,530 ± 35 BP, UG-27525), respectively, late Lower and early Upper Magdalenian. These new dates support Laville's (1986) interpretation of an erosional hiatus between levels 23 and 24.

The fundamental aims of the 1970s re-excavation of La Riera were to determine



La Riera Cave: Geography and Culture, Fig. 1 Stratigraphic section (1976–1979 excavation) (Drawn by G.A. Clark and reproduced with permission from Anthropological Research Papers No.36)

whether/to what extent there were correlations between climatic and faunal changes throughout the sequence, whether/when there were changes in the human use of the cave through time, whether or not correlations could be found among faunal and artifact assemblages and site functions, and whether or not some kind of relationship existed between traditional, normative cultural designations (e.g., Solutrean, Magdalenian, Azilian, Asturian) and major adaptive shifts in the Cantabrian region. The key focus of the research was on the investigation of change through time both in the use of this cave and in the human exploitation of the surrounding environment as the latter was changing as a consequence of widespread last glacial changes in sea level, temperature, precipitation, and vegetation. Emphasis was placed on paleoenvironmental reconstruction and on radiocarbon-informed climatic correlations with better known regional sequences in SW France as monitored through sedimentology (Laville 1986), palynology (Leroi-Gourhan 1986), and micromammals (Altuna 1986).

While these higher-order questions were mostly addressed successfully, other findings had equal or perhaps even greater significance. Notably, it was shown that the classic diagnostic artifact types of the so-called "Upper" Solutrean were found at the bottom of the dated sequence of Solutrean levels and that there was a smooth transition in terms of *hunting technologies* (the most dynamic elements of Upper Paleolithic artifact assemblages) between the Solutrean and Lower Magdalenian, with a gradual substitution of Solutrean foliate and shouldered points by Magdalenian antler projectile points sometimes barbed/edged/tipped with backed bladelets (see Straus 1983). It was also demonstrated that there was a clear trend toward subsistence intensification through both situational specialization (in red deer or ibex hunting – including the increased killing of juvenile animals) *and* overall diversification to include more dangerous or elusive ungulate prey and smaller avian (Eastham 1986) and aquatic foods (fish (Menendez et al. 1986), shellfish, echinoderms, and crustaceans (Ortea 1986)), with the beginnings of a broad-spectrum adaptation well in advance of the Holocene Mesolithic. The exploitation of marine molluscs in significant amounts in certain Solutrean (Last Glacial Maximum) levels at La Riera, when the shore was a 2-h walk from the site, pushed back the known inception of the significant use of littoral resources in the Cantabrian region by several thousand years before the Lower Magdalenian (cf. Freeman 1973; Straus 1977). Indeed, size decreases in limpet shells beginning in the late Pleistocene could be attributed to human overexploitation of this resource, probably because of (seasonal?) food stress resulting from regional demographic pressure in this very confined strip of land between the ocean and the Picos de Europa. The oxygen isotope analyses of limpets by Deith and Shackleton (1986) represented another "first" for this region and indeed for Spain as a whole. Other studies that were pioneering in the Iberian context included reconstruction of lithic raw material procurement using petrographic analysis (Straus et al. 1986) and of lithic technology (including indicators of changing systematic reduction patterns) by application of a standardized typology of cores and *débitage* and multivariate analyses for inter-assemblage comparison (Straus and Clark 1986b; Clark et al. 1986).

Although La Riera yielded an impressive array of diagnostic lithic and osseous (Gonzalez Morales 1986) artifacts (notably projectile points), the research also revealed considerable general continuity in adaptation and a degree of inter-level alternation in "substrate" (often "archaic," flake-based) artifacts (e.g., sidescrapers, denticulates, notches), contrasting with more classic Upper Paleolithic types (backed bladelets, end scrapers, burins, perforators). These artifact-type characteristics responded to variations in lithic raw material availability (e.g., quartzites are common and locally sourced, while flints and radiolarites are relatively scarce and geographically restricted in the bedrock lithology of eastern Asturias). Fluctuations in the proportional representation of "substrate" tools are not related to classic culture-stratigraphic phases. In short, a significant part of the lithic component variability in the La

Riera sequence can be related to changes in lithic procurement patterns, artifact, and site functions, and not to traditional culture-stratigraphic constructs. This finding challenged some of the fundamental tenets of Upper Paleolithic and Mesolithic archeology in Cantabrian Spain, as the site monograph included explicit syntheses for the entire region (Clark and Straus 1986; Straus and Clark 1986c).

Although subsequent restudies of La Riera by numerous doctoral students (and others) have questioned (but not disproven) specific attributions of certain levels to the Solutrean, Lower Magdalenian, or Azilian culture constructs, challenged the human population pressure explanation for limpet size decrease (but see Guttierez Zugasti 2009 for region-wide support for this idea), or rejected certain radiocarbon dates, the original research has stood the test of time in terms of documenting subsistence intensification and changes in site use while (together with the late 1960s excavations of the Middle and Early Upper Paleolithic deposits in Cueva Morín in Cantabria (Gonzalez Echegaray and Freeman 1971, 1973)) helping to launch a new level of interdisciplinary, scientific prehistoric archeology in the classic Cantabrian region, in large part because of the extensive and explicit nature of the site monograph. La Riera has thus twice risen to the status of a reference site in the Cantabrian region, first in the early and then in the late twentieth century. More importantly, perhaps, the 1970s excavations in this relatively small cave were significant for the ideas proposed, tested, and debated, as new generations of prehistorians arise to propose their differing visions of the Upper Paleolithic and Mesolithic past as registered in La Riera's iconic deposits.

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La Sena

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Introduction

The La Sena Mammoth Site is in southwest Nebraska, on the North side of the Medicine Creek Reservoir. Bureau of Reclamation archaeologists Bob Blasing and Brad Coutant discovered the site in 1987 during a routine shoreline survey (Holen 2008, 1). The La Sena site is situated in a high loess-capped terrace (Holen 2008, 1) approximately 200 ft from the former channel of Medicine Creek. The Medicine Creek Reservoir was constructed in the early 1950s and has since caused an estimated 30 m of cut bank to erode since its construction (Holen 2008, 1). Photo 1.1 below shows the La Sena site area post excavation in 2012 when reservoir water levels had dropped below the base of the berm. I carried out field work and collections studies at the La Sena site in 2011 and 2012. Much of the information contained here is based on my experiences at the La Sena site, and my study of the La Sena site publications and artifacts, for my 2015 dissertation (Steeves 2015) (Fig. 1).

La Sena, Fig. 1 La Sena site. (Photo credit Steeves)

La Sena, Table 1 La Sena excavations

Date	PI	Artifacts	Published
1987 Collection of eroded materials	Brad Coutant	Mammoth bone	US Bureau of Reclamation
	Bob Blasing	Lithic material	
1988 Collection of eroded materials. Coring 4 m north of bluff face, cut bank profiling	Steve Holen	Mammoth bone	
	David May	Lithic flakes	
1989 Excavation	Steve Holen	Spirally fractured mammoth bone	Plains Anth Conference 1989
	Bob Blasing		
	Dave May	Mammoth bone collagen	SAA 1990
	Jim Winfrey		
	Michael Fosha		
1990 Excavation interdisciplinary team	Steve Holen	Spirally fractured mammoth limb bones	
	Adrien Hannus		
	Dave May		
	Steve Bozarth		
	Cara Burres		
	Bob Blassing		
1991 Excavation	Steve Holen		
1993	Steve Holen	Spirally fractured mammoth bones	Quaternary Research 1993
	Dave May		
1994 Excavation	Steve Holen		
Salvage of eroding materials	Dan Watson		
UON, OSU			
1996 Excavation and collection, hair nets worn by all crew, and sterile excavation precautions taken	Steve Holen	Hair samples	Holen and Bonnichsen (1996)
	Robson Bonnichsen	Spirally fractured mammoth limb bones	
1997	Steve Holen	Spirally fractured mammoth limb bones	Holen and May
			Medicine Creek Conference 1997
1998	Steve Holen	Spirally fractured mammoth bones	

Compiled by Steeves from Holen (2008)

The La Sena deposition setting offers a glimpse of the past through spatial relationships among specimens (Holen 2008). The site deposition is discussed by Holen (2008) as unique in that the specimens are derived from non-fluvial sources (Burres-Jones 2008, 76). The La Sena site is found on a very weakly developed B horizon in the Peoria Loess that caps alluvial deposits of the Gilman Canyon Formation. The La Sena site has benefited from an interdisciplinary multiyear study directed by Dr. Steve Holen. Excavation at La Sena took place over 11 years, 1987–1998. The analysis of the La Sena site was supported by archaeological excavations and dating, geoarchaeological studies, micro faunal and paleoecological analyses, paleoenvironmental reconstruction based on opal phytolith analysis, and a study of fossil land snails as indicators of paleoclimate (Steeves 2015). The following Table 1 lists the excavations at the La Sena site from 1987 to 1998.

Definition

On a regional scale, there are numerous Pleistocene mammoth sites recorded within the Great Plains area. Pleistocene sites close to La Sena include but are not limited to those in Table 2 (Fig. 2).

La Sena, Table 2 Selection of La Sena Sites/ Great Plains not a complete list

Site	Dates rcybp	Artifacts	PI
Lovewell I, KS	18,250 ± 90	Spirally fractured mammoth bone	Holen (1996, 2007)
	20,430		
Lovewell II, KS	19,530	Spirally fractured mammoth bone patterned distribution of bone	Holen (1996, 2007)
	18,250		
Dutton site, CO	16,330 ± 320	Mammoth bone in situ below Clovis tool level, stone tools flakes, impact points, bone flaking	Stanford (1979)
	11,710 ± 150		
La Sena, NE	18,440 ± 145	Spirally fractured mammoth bone impact points, bone flakes	Holen (2008)
		Differential breakage	
		Patterned distribution of bone	
Shaffert, NE	16,500 ± 300	Mammoth bone, green fractured, impact points	Holen and May (2002)
Jensen, NE	14,830 ± 220	Mammoth bone impact points, bone flakes, differential breakage	Holen (1995)
	13,880 ± 90		
Selby, CO	16,630 ± 320	Mammoth bone	
		Horse, camel, bison, mammoth, impact points, bone flaking	Stanford (1979)
Hamburger site, NE	16,480 ± 60	Spirally fractured bone	Holen (2007)
		Impact notches	
		Differential breakage	
Lamb Springs, CO	11,735	Mammoth bone, impacted and flaked limb bone and stone artifacts	Stanford and Fisher (1992)
(5DA83)	26,000		
	15,000		
	21,850		
Dent Site, CO	11,200	Mammoth (12, mammoths), Clovis tools	Wormington (1957)
			Brunswig and Fisher (1993)

Compiled by Steeves

La Sena, Fig. 2 La Sena Regional Area, not a complete list or map of all regional sites (Steeves 2014). *1* La Sena: *2* Shaffert: *3* Jensen: *4* Hamburger; *5* Lovewell I Lovewell II: *6* Selby: *7* Dutton: *8* Lamb Springs: *9* Dent. Map Credit ((Steeves 2015)

The time of deposition of the mammoth remains at the La Sena site was approximately the same time as the maximum extension of the Last Glacial Maximum (LGM). During this time, the James Lobe extended just south of present-day Yankton, South Dakota (Wright et al. 1973, 160), or approximately 330 miles North of the La Sena site (Pierce 2008, 146). When the La Sena Mammoth

died, the environment would have included a cool grassland steep, river and creek areas would have supported a riverine deciduous forest and larger valleys spruce and pine forests (Holen 2008, 160).

The artifacts at the La Sena site include spirally fractured limb bones of an adult Columbian mammoth (*Mammuthus columbi*) (Holen 2006, 30). The disarticulated skeletal remains were scattered over an area of 20 × 10 m. The archaeologists found no stone tools in good contact with the bone, nor butchering marks on the bones (Holen 2006, 31). The spiral fracture of the limb bone indicated that the bones were broken relatively recently after the animal's death (Holen 2008 3) and the femur segments "exhibited impact points" (Holen 2008, 3) an indication that "humans were responsible for the bone breakage" (Holen 2008 3). The following Figs. 3 and 4 show in situ *Mammuthus* femoral segments found in undisturbed Pleistocene soils at the La Sena site during the 1989 excavation (Steeves 2015).

Dating and stratigraphic profiles were recorded throughout the 11 years of the excavation and survey of the La Sena site. The age of the mammoth bone bed level was established through radio carbon dating of the mammoth and of soil/sediment humates within, above and below the deposits to date depositional and erosional events (Holen 2006, 42).

> In addition to general loess and alluvial stratigraphy at the La Sena site, the stratigraphy of the loess deposits on which the mammoth bone rest

La Sena, Fig. 3 Large femoral segments (Photo credit Steve Holen)

La Sena, Fig. 4 Lateral segment of femur (Photo credit Steve Holen)

La Sena, Table 3 La Sena humates dating profile

Depth below datum (m)	Depth below surface (m)	Excavation unit(s)	Lab. no.	Material dated	Delta ^{13}C ($^{0}/_{00}$)	Conventional ^{14}C age (year B.P.)
0.13–0.23	0.50–0.60	N5	Tx-7005	Humates	−15.5	2,440 ± 70
1.36–1.41	2.50–2.55	Z4 and Y4	Tx-8182a	Humates	−21.8	17,930 ± 180
1.36–1.41	2.50–2.55	Z4 and Y4	Tx-8182b	Humins	−22.6	18,280 ± 200
3.45–3.50	3.70–3.75	K1	Tx-7006	Humates	−25.7	18,860 ± 360
3.68–3.78	3.76–3.86	I4	Tx-6708	Humates	−21.4	16,730 ± 490
6.42–6.52	6.79–6.89	N1	Tx-6707	Humates	−21.8	20,870 ± 1280
8.18–8.28	8.55–8.65	N1	Tx-6709	Humates	−19.2	24,830 ± 1340
8.90–9.00	9.22–9.32	L1	Tx-7370	Humates	−18.6	27,640 ± 580

Compiled by Steeves from Holen (2008)

La Sena, Table 4 La Sena site soil formations

La Sena site land-forming events	
28,000–25,000	Loamy alluvium deposited on the flood plain of Medicine Creek
25,000–21,000	Fine-grained alluvium and loess accumulated
21,000	Deposition of Peorian loess begins in Medicine Creek valley
20,870–17,930	A little more than 5 m of Peorian loess accumulates
Up to 11,000	Deposition of Peorian loess at La Sena site continued
10,500–5000	Alluvium valley fill 2 accumulated in the Medicine Creek valley

Compiled by Steeves from Holen (2008)

> and in which they are buried was studied in detail. (Holen 2008, 43)

The La Sena site soil stratigraphy and radio carbon dating "may be used to reconstruct land-forming events at the site" (Holen 2008, 45) (Tables 3 and 4).

Archaeologists are often faced with the laborious task of defining faunal collections and having to decide whether collections of animal bones are the result of natural, carnivore, or human activity. In deciphering human accumulations of animal bones from mammalian accumulations of animal bones, archaeologists have considered numerous points regarding agents of bone breakage. Behrensymer (1991) argued that bone breakage in an assemblage "can reveal information regarding the relative time of breakage, number of episodes of modification and the agent responsible." Bone that is broken when it is green or slightly fresh exhibits spiral fractures "that follow the course of collagen fibers, sawtooth fractures or flaking" (Shipman 1981). Bone that is dry or weathered "tend to fracture perpendicular to the long axis of the bone and collagen fibers producing columnar step-fractures with rectangular edges" (Burres-Jones 2008, 79). Holen and Holen (2014) listed the following traits in Table 5 for human-induced bone breakage (Fig. 5).

Key Issues/Current Debates/Future Directions/Examples

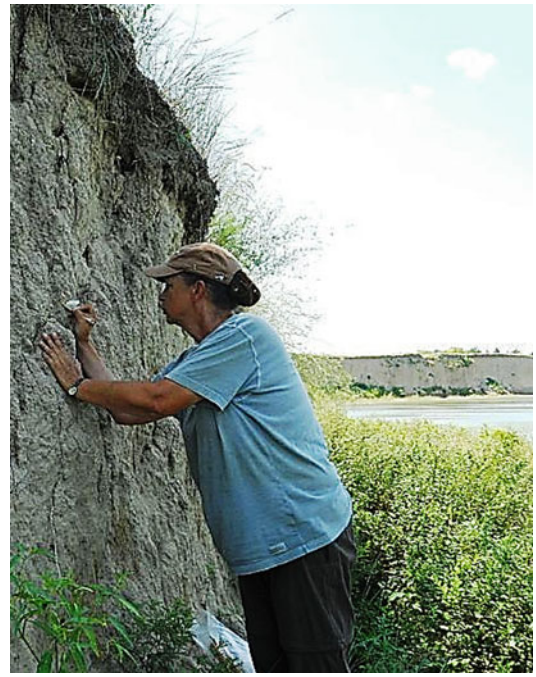
Holen (2006, 39) argued that "the presence of spirally fractured mammoth limb bone, dynamic loading points, and bone flaking from in situ deposits at both La Sena and Lovewell mammoth sites, could be representative of human modification of mammoth bone." Proboscidean bone modified by humans as a resource for tools and/or marrow is known from the archaeological record of the middle Pleistocene of the Eastern Hemisphere in the area now known as Europe (Biddittu et al. 1979, 22) and Siberia (Morlan 2003). In North America, pre-13,200 cal BP communities also utilized proboscidean bone to manufacture bifacial tools, for shafts, projectile points, and shaft wrenches (Johnson 1985, 201). The procurement of bone for tool manufacture would require

La Sena, Table 5 Holen and Holen (2014). Human-induced bone breakage

Definitions of human-induced bone modifications	(Holen 2013,433)
Impact notches	Semicircular or arcuate indentations on the fracture edge or a long bone produced by percussion
Spiral fractures	Tensile failures along a helical path produced by breaking at oblique angles to the longitudinal axis of the bone
Bone flakes	Debitage produced by bone percussion that have features characteristic of lithic flakes produced by human agency
Flake scars	Patterned indentations on bone surfaces indicating flakes have been removed
Patterned distributions of bone	Human induced arrangements of skeletal elements
Preferential breakage	The intentional breakage of thick cortical limb bones while leaving lighter bones unbroken
Modified bone tools	Skeletal evidence with evidence of modification or use wear
Chipped stone tools	Manufactured lithic artifacts exhibiting multiple flake scars
Anvils or hammer stone	Cobbles associated with bone assemblages interpreted as precursors or anvils
Lithic flakes	Utilized or waste flakes

Compiled by Steeves (2013)

the reduction of mammoth limb bone into large flakes or cores which would require striking them with a hammer stone (Holen 2006, 40). The taphonomic studies from La Sena were compared with "naturally induced fracture patterns on modern elephant bone" (Holen 2006, 40). Holen argues that both "carnivore gnawing and trampling can be eliminated as factors in mammoth limb bone fracturing and flaking at La Sena and Lovewell based on this evidence" (Holen 2006, 40). Numerous North American archaeologists have observed mammoth limb bone reduction and have argued that human action creates spirally



La Sena, Fig. 5 Paulette Steeves La Sena collection of fragmented bone extruding from adjacent cut bank area. (Photo Credit. Holen 2011)

fractured bone and resulting flaked bone (Johnson 1985; Morlan 1980).

Haynes and Krasinski (2010) stated that arguments for human breakage of proboscidean bone have not been "perfectly supported" (Haynes and Krasinski 2010, 181). They further argued that modified mammoth remains in the Americas "do not indicate a Pre-Clovis human presence" (Haynes and Krasinski 2010, 181). However, throughout the article, Haynes and Krasinski repeatedly refer to the implications for Pre-Clovis sites as their focus on rejecting humanly induced bone technologies. The author's offer no citation or reference to support some of their statements such as "crania 'may' be picked up by curious elephants and broken" (Haynes and Krasinski 2010, 185); "A single elephants foot placed upon a bone 'may' create one mark" (Haynes and Krasinski 2010, 181). The authors also suggest that in replicative experiments, impact notches and hammer stone marks should be visible. The authors state that the "fossils do not possess these marks" (Haynes and Krasinski

2010, 197), but they do not identify which fossils they are referring to. In critiquing the La Sena and Lovewell sites fossil mammoth bone collection, Haynes and Krasinski (2010, 181) state that the mammoth remains do not have visible marks from anvils or hammer stone, yet hammer stone and impact marks are recorded and photographed on mammoth limb bone from both sites (Steeves 2015).

There has not been an overall comparative analysis or an overall report on all mammoth bone breakage at mammoth fossil sites in the Americas; however, Haynes and Krasinski (2010) state that "most if not all the modifications on North American Pre-Clovis mammoth bones can be more parsimoniously attributed to non-human Taphonomic processes" (no citation given by authors). To back up this statement with scientific data would require an extensive study of all North American sites which contain fractured mammoth bone. However, as far as I know, such a study has not been published. Therefore, Haynes and Krasinski's argument failed to support their position (Steeves 2015).

There are numerous oral traditions relating to the Great Plains area which include discussion of megafauna and extinct species. The Pawnee in 1832 numbered between 10,000 and 20,000 people. Forty-two years later in 1874, their numbers had dropped to only 2,000 and after removal to Oklahoma in 1902 their numbers dropped to 500 (Mayor 2005, 169). In 1902, James R. Murie whose Pawnee name was Young Eagle began to collect stories for George Dorsey of the Field Museum of Chicago (Mayor 2005, 169). Young Eagle interviewed Young Bull (1835–1916), the last of the fossil bone doctors (Mayor 2005, 169).

> Dimly illuminated and suspended over the altar area was an old sacred bundle, about three feet long, wrapped in red ocher stained Buffalo hide. (Mayor 2005, 172)

The sacred bundle had been saved by a 5-year-old girl named Sadie, after a Pawnee hunting party of 350 people was attacked by a group of 1,000 Sioux. Sadie's father had lashed the bundle to her back as he sent her off; she was one of only a few Pawnee people who survived the attack that day (Mayor 2005, 172). The bundle was later donated by Sadie's descendants to the Pawnee Village Museum in Republican Kansas (Mayor 2005, 172). In 1855, Young Bull saw the large white carved bone on the altar, and the pictures that been carved in it (Mayor 2005, 173). The old medicine man told Young Bull the following story in 1855 (Mayor 2005, 172).

> Many years ago, when our people lived on the Republican River, we used to go hunting in the western part of what is now Kansas and Nebraska. Upon our journey, we stopped at a place where there was a big mound known as the Swimming Mound" That day one man climbed the hill and walked into the timber. "There he wandered until he became tired and lay down upon this high mound."
>
> He dreamed that a giant person was standing near him. "My son, I have come to you. Many of my people were drowned here at this place, and here our bones rest.... The people make light of our bones when they find them. I will now tell you that when you find some of their old bones they have curative powers. On the south side of the hill you will find a bone.... one of my thighs. Take it, wrap it up, and my spirit will be with that bone. I will be with you and will give you my great power". The Pawnee hunter awoke and went around the hill and found what looked like a long white rock sticking out of the cliff. He dug out the object and recognized it as the thighbone, of a giant turned to stone.
>
> "The man took the giant bone home with him and placed it in a buffalo robe and hung it up in his tipi." That winter he took the heavy fossil back to his village and placed it in his earth lodge. Over the following years, the giant reappeared in his dreams and taught him the rituals and songs about the stone bone. At last, the keeper of the fossil invited several other medicine men to learn the new healing ceremony. The bone was later wrapped in calico cloth inside a buffalo-calf hide and kept in the doctor's lodge. Only the initiates of the lodge knew that the large white stone was really a giant bone. Inscribed on the petrified femur were carvings of a woman and a man, a human skull, a bow and arrows, and stars and a moon. A sunburst design was carved around the joint. The original fossil finder became a great warrior and medicine man. He has the strength of a giant on the warpath; he could kill a buffalo with one arrow and carry all the meat home on his back. In his doctoring he "took dust from the bone" to make a tea that cured the sick. When small pox arrived on the Great Plains, recounted Young Bull, and the bone helped the Pawnees. Although the people never realized the true identity of the "wonderful stone" anyone who touched the giant bone

> did not fall sick, and those who took-sick and drank the fossil bone tea survived.
>
> As a little boy in about 1840 Young Bull heard from his grandmother about giant beings who had drowned long ago, "before we lived upon this earth." These "wonderful human beings" lived "where the swimming mound is in Kansas." There a great flood occurred, "so deep it killed these wonderful beings." She told Young Bull that the Pawnees found many giant bones "upon the sides of the hill of the swimming mound (Mayor 2005, 173–175).

We do not know for how long before Young Bull heard this story the Pawnee lived or hunted in the area close to the La Sena site. However, we do know from this story that the Pawnee were knowledgeable of megafauna fossils and histories of flooding in the area. The La Sena site is just a few miles north east of where the Pawnee camped during their last buffalo hunt. This is where the Sioux attacked them, a battle mentioned in oral traditions as the one from which Sadie fled on horseback with the sacred medicine bundle. The La Sena site along Medicine Creek is in an area of numerous sites which date into recent times, an area of power, at the closest point between two larger rivers, the Platte to the north and the Republican to the south (Steeves 2015).

Medicine Creek is fed from a spring approximately 50 miles to the northwest of the reservoir and drains south into the Republican River. Ancient landscapes are visible in stratigraphic profiles of eroded cut banks; the land was a little gentler with lower rises from the water's edge during the Pleistocene. Currently receding water levels expose the stumps of trees cut in the 1950s when the dam was built. Driving across the flat barren plains of Nebraska, it is hard to imagine that such a place exists, hidden over the slight crest of an upland terrace, in a shallow ravine just below the earth's surface. During the occupation of La Sena, this would most likely have been a very good place to live. The ravine was deep-enough to provide protection from the wind, fresh water was available from the creek, and abundant game and plant food could be harvested close to the site (Steeves 2015).

Spending time on the land at La Sena and creating a relationship with this place, offering tobacco and prayers to all my relations, brings a clarity of mind. I realize that this was a very good place for humans and for their four-legged relations. From the archaeological data and from oral traditions I am given the vision of a vibrant place where Mammoth and others lived well on the land. Oral traditions give an accounting of the numerous megafauna fossils, medicine bones that were found along Medicine Creek for many years prior to the invasion of Europeans. Archaeological records also provide an accounting of mammoths in this area over 18,000 years ago. The La Sena site is just one of many similar sites in the area, and thus one in a regional area of mammoth sites that date to the same time frames within a few thousand years. The area of southern Nebraska and central and northern Kansas and eastern Colorado have not yet given up all their archaeological secrets. There are most likely other sites to be found and the area would be a rich place for researchers to continue archaeological investigations of Pre-Clovis sites. Mammoths were abundant on the Great Plains during the Pleistocene, where grazing was lush and water sources plentiful. Where resources for sustenance and tools and daily necessities are found, there so do we often find humans. Arguments against earlier than 12,000 years before present archaeology sites have been the norm in American archaeology for over 80 years. However, the multi-year study at the La Sena site in southwestern Nebraska has produced a solid record of human interaction with mammoth bones and is dated to 18,440 ± 145 rcybp.

Cross-References

- ▶ North America (USA): Historical Archaeology
- ▶ Oral Tradition: Ancient Greece

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Labor Archaeology

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Introduction

The rise of industry transformed labor and impacted landscapes, gender roles, and living conditions. Today, in most of the Americas and across Europe, the evidence of these industrial signatures is found in the form of rusting factories, abandoned buildings, deserted mines, scarred landscapes, and decaying cities and towns.

These are all reminders of an economy that was once dominated by industrial capitalism for more than a century. While most of the factory production has moved to Asia, many communities in the Americas and in Europe debate about how to use and interpret these abandoned industrial properties. Archaeologists are involved in documenting the industrial past, and this work ranges from recording the engineering and technological feats to studying labor and working-class conditions.

Definition

Labor archaeology is about examining issues of power, resistance, and the affects of industrialization from the perspective of the laboring classes.

Historical Background

The archaeology of the industrial era has for a long time and continues to document and popularize the technological side of industrial archaeology. A major part of industrial archaeology has explained phenomena related to technological development, the economy of industry, and the industrial revolution. In many of these cases, labor is not mentioned, or it serves as a secondary thought when discussing industrial technology and landscapes at these sites (Shackel 2004).

The study of labor from an archaeological perspective has been influenced by the development of a "new" social history and the "'new' labor history" in the 1960s and 1970s, where the emphasis of study is the worker. Labor history was heightened with E. P. Thompson's (1966) groundbreaking work – *The Making of the English Working Class*. The new labor history – from the 1960s onward – focuses on the questions of class consciousness, providing a voice for the people who have been neglected, oppressed, and considered outcasts (Dubofsky 2000: 21). Thompson (1966) wrote that he wants to rescue the worker from the enormous condescension of prosperity. Included in this new labor history is the emphasis on the study of ethnicity, shop-floor history, the relationship between the work world and family life, and class as a cultural, rather than economic, construction (Brody 1979). Historical and anthropological perspectives on labor help to define issues related to the impact of changing technology on workers and their families.

Key Issues/Current Debates

Labor Archaeology: On the Domestic Front

One way to humanize working-class households is to examine workers' housing and examine how industry affected the daily lives of workers and their families. For instance, during the early industrial era, many companies provided housing for their workers. Industrialists dictated working conditions and processes and they controlled workers' behavior away from the factory by creating housing regulations. The archaeology at Lowell, Massachusetts, stands as an important study that shows how this paternalistic control operated. The early-nineteenth-century industrial town contained rows of similar-looking boardinghouses that stood close to the factory. All of the boardinghouse rooms were the same size, thereby creating an atmosphere of egalitarianism (Mrozowski et al. 1996). The control over behavior and the standardization of the built environment created individuals who were part of the larger industrial complex. The workers needed to conform to a standardized behavior in the factory as well as in the boardinghouse. While necessary for the operations of the factory system, they also became replaceable.

Not all industries operated in a fashion to create an environment that reinforced standardized behavior. For instance, at Harpers Ferry, a government-operated town that developed from the last decade of the eighteenth century, workers built their own houses and their families expressed their own personal identity within their individual homes. The domestic landscape of Harpers Ferry appeared haphazardly built, unlike the standardized boardinghouses found in the industrial Northeast. The archaeological record shows that armory workers occasionally practiced their craft at home until about 1841,

when the military took over control of the facility and made all workers abide by a standard factory discipline. After this date armory work was no longer performed in a domestic context and the federal government began to build standardized housing for its workers (Shackel 1996).

There is also an example whereby working-class families showed displeasure with the new work conditions on the domestic front. While many workers in the USA responded to industrialization by participating in a new consumer culture – a new status symbol – the armory workers' families at Harpers Ferry did not. A domestic assemblage dating to the military control of the armory contains material culture that was unfashionable for the time. It would be easy to use an economic model to say that with the industrialization of the factory, these workers lost considerable purchasing power. The households acquired out-of-date material culture as a type of silent protest. They acquired goods that were fashionable when artisans had control over their means of production (Shackel 1996: 129–43).

Community, Memory, and Politics and Power

There are costs as well as the benefits with the development of the new industrial revolution, and we should be cautious about not being too celebratory over industrial technological achievements (Hindle and Lubar 1988). Labor historian David Brody (1989: 7-18) brings to our attention that scholars studying labor need to look more closely at issues related to politics and power. It is clear that tensions between labor and capital continue to exist and these tensions play out in the everyday politics of commemoration of the working class. For instance, archaeologists, conservationists, and environmentalist are fighting to protect the memory of labor history at Blair Mountain, located in the southwestern portion of Virginia. The battle of Blair Mountain is the largest armed labor insurrection in US history. In 1921, approximately 10,000 coal miners participated in a battle against law enforcement officers and Baldwin-Felts Detectives, resulting in the intervention of the US military to suppress the uprising. The archaeology performed at the battle site located the areas of conflict on the landscape, and the information enabled archaeologists to list the place on the National Register of Historic Places. However, politicians who favor mountaintop removal successfully delisted the site from the National Register, and its delisting remains controversial. The Massey Energy Company is now planning to conduct mountaintop removal operations on Blair Mountain and destroy the archaeological signature that enabled the original listing on the National Register because of the event having national significance (Nida and Adkins 2011). It is clear that preservationists and the coal company are at odds on how to treat this landscape that is important to the labor movement. The removal of the battle field is an attempt to remove this episode of labor strife from the national public memory.

The archaeology in the Pullman community, on the south side of Chicago, is a story about how a community has embraced its working-class history and has been successful in promoting this history. Pullman was developed in the late nineteenth century to support workers and their families who were involved in the construction of rail cars on the south side of Chicago. It was dubbed "The World's Most Perfect Town" for 14 years straight, although this utopian image came to a crashing halt during the 1894 Pullman Strike. Wages were cut by Pullman during the economic depression, while he kept rents on the company-owned houses steady. The strike devastated the model community and the paternalistic relationship between Pullman and his worker deteriorated. After the Pullman Company closed in the 1950s, community activists and preservationists came together to save their community from urban renewal projects. Archaeology is helping to revive the community's working-class history, which is now found in visitor center films, tour presentations, docent training guides, and museum exhibits (Baxter and Bullen 2011).

The Hampden Community Archaeology Project is a public archaeology project in a former textile mill neighborhood in Baltimore, Maryland. Since the early 1990s, the area has been gentrifying thereby creating two distinct communities – the older, working class and a newer, upper middle class. The archaeology program created a

critical public dialog with local citizens, which created an awareness of the town's past and its relation to issues of labor, class consciousness, and community identity as the community deals with concerns about gentrification and the consequent dislocation of longtime residents (Gadsby and Chidester 2007).

Finding Workers' Resistance

The struggle for control over the work process occurs in many industries and workers continually fought to control the work process. Workers protested by work slowdowns, strikes, working on their own projects in the factory, and theft (Scott 1990; Bruno 1998: 5, 11–9). The imposition of rules, regulations, and industrial discipline often met various forms of resistance. At the John Russell Cutlery Company on the Green River near Greenfield, Massachusetts, archaeologists discovered a large quantity of inferior or imperfectly manufactured parts related to interchangeable manufacturing near the former cutting room and trip hammer shop. While it would be easy to conclude that these artifacts form a typical industrial waste pile, archaeologists looked at the larger context of nineteenth-century industrial labor relations and they concluded that this assemblage is a reflection of workers' displeasure with the new industrial work system. The higher than usual proportion of wasted materials is an indication that workers intentionally damaged goods because of their dissatisfaction with the work process (Nassaney and Abel 1993).

Another story of workers' sabotage is associated with the bottling works associated with the Harpers Ferry brewery. Archaeologists found more than 100 empty beer bottles stashed behind the wall lathing in the former bottling room and another 1,000 beer bottles in the basement of the bottling works' elevator shaft. The poor working conditions, long hours, and the higher speeding of machinery resulted in worker dissatisfaction. The archaeological evidence suggests that workers drank the owners' profits and concealed their subversive behavior by disposing the otherwise reuseable bottles in walls and dropped others down the elevator shaft. The brewery was also burned on 1897, 1906, and 1909, dates that coincide with labor unrest in the brewery industry (Shackel 2000: 104–13).

Striking is a significant form of resistance and the archaeology at the Ludlow Tent Colony Site in Colorado focuses on this form of resistance. The Colorado Coal strike ignited a yearlong cycle of violence and retribution beginning in 1913 and culminating when the militia charged the tent colony and set fire to the tents, killing 2 women and 11 children. The UMWA ran out of funds to support the workers and the strike was soon over. The workers received few concessions for their struggle. The archaeology examines the formation of temporary communities, protest labor movements, and government and military intervention. With the support of the United Mine Workers of America, the archaeology is raising the visibility of this bloody episode in labor relations and it is helping to make this incident part of the broader public memory (Walker 2003; Saitta 2007; Larkin and McGuire 2009).

In 2010 an archaeological survey was conducted at the site of a labor massacre in Lattimer, Pennsylvania. The massacre was the culmination of a monthlong strike by immigrant coal miners from eastern and southern Europe who sought better wages and safer working conditions. On September 10, 1897, a group of 400 miners marched to close all of the mines owned by the Pardee Company. On their way to Lattimer, a scuffle broke out between the sheriff and a few of the workers. The sheriff's posse then opened fire on the unarmed men. As the striking men ran from the scene, the posse continued to shoot them down. The majority of the 25 miners who died were killed by gunshot wounds to the back. This archaeology project began with a metal detector survey of the massacre site itself. Locating bullets and shell casings related to the massacre provides two things. First, the evidence furnishes information to a story that had various witness with different accounts, depending if they were sympathetic to the strikers or the sheriff. While the court transcripts are missing, the material evidence has brought attention again to the events of the massacre. Importantly, this archaeology is connecting the community to a painful past with the goal of creating some type of

reconciliation to heal the divides that have existed in the community for over a century (Shackel et al. 2011).

International Perspectives

The protection and commemoration of these industrial sites occur on the local, national, and international levels. For instance, UNESCO's World Heritage mission helps to protect significant cultural sites and encourage the nomination of sites and the development of management plans. The organization has been instrumental in recognizing important places related to work and industry throughout the world. Today there are over 800 World Heritage Sites and 33 are related to the heritage of industry. England has the more industrial-related sites listed as World Heritage Sites than any other country. The Derwent Valley, which includes 6 communities along a stretch of 15 miles, is known as the "cradle of the new factory system." UNESCO recognizes the area for the well-preserved factory buildings. It is also the place where the Arkwright water frame was first introduced. The machinery aided in the deskilling of the workforce. It allowed for the continuous spinning process and it could be operated by machine tenders rather than skilled operatives. The invention revolutionized the British economy and changed the conditions of labor. As a result, factory owners created housing for their workers and exerted a form of corporate paternalism. By the early to mid-nineteenth century, planned villages began to be constructed by the mill owners, like the UNESCO World Heritage Site – Saltaire, England. The village was developed in 1853 with mills and workers' housing built in a harmonious style of high architectural standards. Sir Titus Salt provided considerable recreation opportunities as well as a library, although he had strong paternalistic control over his workers. The town's urban plan survives intact (http://whc.unesco.org/sites/industrial.htm).

While European countries have the majority of UNESCO's industrial sites, they are also found in China, India, Bolivia, Brazil, and Mexico. None have been designated in North America. Many of these industrial sites are included on the UNESCO list because of engineering feats such as bridges, canals, irrigation systems, aqueducts, railways, mines, ironworks, and resource extraction. Many districts include the well-preserved domestic housing for workers such as the City of Potosi in Bolivia and the remarkably well-preserved example of the small-scale rural industrial settlements associated with pulp, paper, and board production at Verla Groundwood in Finland. Crespi d'Adda in Italy is an outstanding example of the nineteenth- and early-twentieth-century company towns built in Europe and North America by enlightened industrialists to meet the workers' needs. The city of Røros, Norway, is associated with the copper mining industry that developed in the seventeenth century and lasted until 1977. The city has about 80 wooden houses dating to the seventeenth century, most of them standing around courtyards, providing a medieval appearance in the town (http://whc.unesco.org/sites/industrial.htm).

While many of these sites mentioned above have been recognized as World Heritage Sites because of architecture and engineering feats, it is important to begin looking at places within the context of the new labor history. The inclusion of labor history at industrial sites can follow the development of other new radical traditions, such as the Civil Rights Movement, the feminist movement, and the American Indian Movement. The new labor history emphasizes workers and their families and it allows for the search for agency and resistance. Archaeologists working in industrial contexts can look at issues related to the impact of new innovations at the workplace and effects on the worker. The industrialization of the workplace not only affected work but also domestic lifestyles and health conditions. Studying workers and their families only humanizes the study of the industrial era, and it provides more in-depth understanding of laborers' work habits, their domestic life and interactions within the community, as well as their leisure activities. Labor archaeology is part of this tradition to humanize industrial labor and working-class life.

Future Directions

The study of industrial slavery is poorly documented in history as well as in archaeology. While there are documented cases of industrial slavery in the past, this phenomenon continues in many countries today, in developed as well as developing nations. Enslaving people to work in factories continues today, mainly because of the lack of labor laws and/or the enforcement of labor laws. There are about 27 million people in the world who are enslaved – in the sense that they are physically confined or restrained and forced to work. In the twenty-first century, slavery is far from over. In the United States, the Department of the State estimates that 20,000 people are illegally trafficked into the USA every year, and the total number of people enslaved in America is estimated at about 100,000 people, many who work in sweatshops. These workers are cut off from any support system and they live in fear of deportation (Shackel 2007). Perhaps an archaeology of industrial slavery can highlight this social injustice and make it part of the dialog to change working conditions among the working class.

Labor archaeology should examine the health conditions at industrial sites and towns. For instance, many mining sites endangered the health and life of workers. Work sites were often unstable, machinery often malfunctioned, pollution and harmful fumes contaminated the air, and workers often put in exhaustive work hours. Until about the mid-twentieth century, industrialists paid little attention to the impact that factories had on the surrounding environment until workers, scientists, and environmentalists brought these issues to the public's attention.

Archaeologists have demonstrated the effectiveness of using soil samples from the area in and around factories and dwellings to search for toxins to examine general health conditions. Privy samples at workplaces may reveal the presence of parasites and other toxins, indications of poor health and resistance to paternalism. Pollen and macrofloral samples may also supply some indication of the changing landscape and its relationship to changing ideals related to industrialization. The impact of industrial pollution has had a devastating impact on human populations and it is important that these issues are made part of the story of industry and labor (Shackel 2007).

Conclusion

There is a growing call by scholars to focus on issues related to labor. For instance, A. Bernard Knapp (1998: 2) wrote that it is important to recognize that technology in an industrial context must also take into consideration labor and understand how people could negotiate social, political, and economic relationships. Eleanor Casella and James Symonds (2005) also note that as archaeologists we should look at the larger implications of the industrial era and start thinking about people and how they worked and lived in industrial society.

Performing an archaeology that celebrates labor does not come easy. A labor archaeology will, most probably, unveil a history that has been buried all too long. Tensions exist between labor and capital regarding how to represent the past. However, community programs that focus on labor can also develop a form of reconciliation within and between communities. Initiatives to create an inclusive history are at times difficult, at best.

Cross-References

- ▶ Capitalism: Historical Archaeology
- ▶ Critical Historical Archaeology
- ▶ Industrial Archaeology
- ▶ Interpretation (Including Historic Reenactments): Current Approaches
- ▶ Modern World: Historical Archaeology

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Laboratory for Archaeological Chemistry (University of Wisconsin)

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Basic Information

The Laboratory for Archaeological Chemistry (LARCH) at the University of Wisconsin-Madison was established by Dr. T. Douglas Price (director of the laboratory until 2009) with a grant from the National Science Foundation in 1987. He was soon joined by Dr. James H. Burton as

associate director. Burton is the current director of the laboratory.

Major Impact

In the quarter century since its establishment, LARCH has played a significant role in advancing archaeological and archaeometric research, developing new techniques of investigation, and training both graduate and undergraduate students.

Much of the work done at LARCH has focused on the use of inductively coupled plasma (ICP) atomic emission spectroscopy, ICP-optical emission spectroscopy, and ICP-mass spectroscopy, but they also have worked collaboratively with other laboratories to explore other analytical modalities including neutron activation analysis (with the University of Wisconsin Nuclear Reactor Laboratory); X-ray diffraction (with the Bailey X-Ray Diffraction Lab at the University of Wisconsin); stable isotope ratios such as ^{13}C, ^{15}N, and ^{18}O (with the University of South Florida Archaeological Science Laboratory, the University of Arizona Environmental Isotope Laboratory, and the Department of Geology at the University of Illinois-Urbana-Champaign); and heavy element isotope ratios (with the Department of Geological Sciences, University of North Carolina-Chapel Hill, the Department of Geology at the University of Illinois-Urbana-Champaign, and the Institute of Geology at the University of Copenhagen) to name a few.

Early research at LARCH focused on paleodietary studies of human bone, examining relationships between alkaline earth elements and trophic level. Along with archaeological studies of human burial populations on several continents, LARCH staff conducted extensive studies of contemporary natural environments and food chains to better elucidate the relationships between environmental factors, soil-plant interactions, and diet on alkaline earth ratios and trophic level. In addition they also conducted extensive studies of diagenetic factors and their implications for bone chemistry and paleodietary reconstruction. Both of these later studies had significant implications for our understanding of paleodietary analysis and human bone chemistry. Compositional analysis of ceramics for the identification of compositionally similar groups of ceramics derived from the same production loci was another early project at LARCH.

In the early and mid-1990s, LARCH added isotopic studies to their repertoire. Their early efforts included the use of strontium isotope ratios in cortical bone and tooth enamel to study residential mobility. These studies spanned the globe and resulted in significant insights into past population movements, both in the distant past (e.g., European Bell Beaker, Teotihuacan) and the more recent past (e.g., Colonial Period Mexico). Studies of residential mobility continue to be an important focus of research at LARCH.

Many of the studies undertaken at LARCH were based on protocols developed or improved by LARCH staff. The previously mentioned ceramic compositional studies were based on a weak-acid extraction technique that was rapid, inexpensive, and very sensitive to producer-based variables that made it possible to identify actual production groups as opposed to geological sources of clays. LARCH also developed protocols for the characterization of anthropogenic chemical activity residues on house floors and exterior surfaces for the identification of patterns of organization of activities (this also used a weak-acid extraction technique).

The research done at LARCH over the years has generated a considerable scholarly output, much of it by collaborators with the laboratory as well as laboratory staff, in professional journals, conferences, edited volumes, books, theses, and dissertations. At least as important as the scholarly work done at the laboratory is its impact on the education of both graduate and undergraduate students. Several dozen graduate students at the University of Wisconsin have done all or part of their dissertation research at LARCH, and most of these have gone on to productive careers in academia (including the author of this article). Many more graduate students from other institutions have done key work for their dissertations at the laboratory through collaborative arrangements or grants issued by LARCH. Finally, an undergraduate course on "Archaeology in the

Laboratory" has served as a model for teaching archaeological science at many other institutions.

Cross-References

- ▶ Anthropogenic Sediments and Soils: Geoarchaeology
- ▶ Bone Chemistry and Ancient Diet
- ▶ Ceramics: Scientific Analysis
- ▶ Inductively Coupled Plasma-Mass Spectrometry (ICP-MS): Applications in Archaeology

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Lafone Quevedo, Samuel Alejandro

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Basic Biographical Information

Samuel Alejandro Lafone Quevedo, archaeologist, ethnographer, mining industrialist, educator, and linguist, was born in Montevideo, Uruguay, on February 28, 1835. His father, Samuel Fisher Lafone, was an English merchant and businessman, and his mother, Maria Pietro de Quevedo Alsina, was part of one of the richest families of the Buenos Aires elite. At age 13, he travelled to England to study. At St. John's College at the University of Cambridge, he graduated with the title of "Magister Artium." He returned from England to Montevideo in 1857. In 1859, he accompanied his father to the copper smelters he had in Santa Maria, a town north of the province of Catamarca in the Argentine Republic. A few years later, he assumed the management of his father's large-scale copper mines, where silver and gold were also obtained. Lafone Quevedo sold these establishments and bought in Andalgalá an immense carob forest where, in 1860, he launched Pilciao, a metal mill.

Major Accomplishments

Pilciao was a transit center for travelling scientists. Lafone Quevedo collaborated with Francisco P. Moreno, director of the La Plata Museum, and "is considered as one of the initiators of anthropological studies in Argentina in a series of works directly connected with the emergence of the discipline in the country and the process of formation of indigenous skulls collections, with 'the construction of the nation'" (Farro 2009: 63). Moreno visited Pilciao, and Lafone Quevedo assisted him in the provision of supplies, packaging, and transportation of the pieces and facilitated him his own network of relationships with the locals and even his laborers. Thus, he was appointed honorary curator of the antiquity collections from the Calchaquí Valleys in the La Plata Museum. He directed the expedition of the naturalist Adolf Methfessel, and between 1880 and 1893, he accompanied the anthropologist Herman F.C. ten Kate to study and document the indigenous remains of the region and collaborated with the inventories that they sent to the La Plata Museum. He published his first works in the form of letters in the newspaper *La Nación*, and in 1888 they were printed in book format with the title *Londres y Catamarca*. In 1890, he

published the expeditions of the scientists of the La Plata Museum and, in 1894, *Tesoro de Catamarqueñismos*, a dictionary with etymologies and ethnography of Aboriginal community's life built with the testimonies he had recorded. In 1881, Lafone Quevedo bought a metal disc that would change profoundly indigenous metallurgy history; in 1890, he published "Archaeological Notes about an object of indigenous art" in the Annals of the La Plata Museum about his investigation. The disc presents on its front face a "complex ornamentation that was achieved combining detailed lines in relief and sunken spaces. Indeed, the rich ornamental elements made it possible, afterwards, to attach the well-known La Aguada sociocultural entity to the object and to estimate that its antiquity went back to 600 or 700 years of the Christian era (González 2004: 18). The disc is in the La Plata Museum and a replica in the Shinkal Museum of Londres, Belén.

In Julio Argentino Roca's first presidency of the country (1880–1886) and due to the policies of the emerging nation state, the economy of the mill is destroyed, and the company closes definitively. Lafone Quevedo moves to Buenos Aires and is in charge of the chair of Ethnography at the University of Buenos Aires. In 1890, he was awarded the title "Honoris Causa" at the Philosophy and Letters Faculty. In 1906, he was appointed director of the La Plata Museum while he was dean of the Faculty of Natural Sciences of the La Plata University. He was also a member of the American History and Numismatic Board, the Buenos Aires Institute of Numismatics and Antiquities, the Historical-Geographical Institute of the Rio de la Plata (1854–1859), the Association of Friends of the Natural History of Plata (1854–1856), and the Paleontological Society.

He is appointed honorary officer of the Linguistics Section and writes "Instructions of the Museum of La Plata for collectors of indigenous vocabularies," and he is also in charge of the Journal and the Annals of the Museum. From 1893, Lafone Quevedo published articles on the cultural characteristics and languages of the different Argentine aboriginal groups in "the Bulletin of the Argentine Geographical Institute." In 1907, the "La Plata Museum's Library of Scientific Promotion" began its publications, under the direction of Félix Outes. volume 1 is dedicated precisely to the problem of classification in an anthropological museum, publishing translations of works such as "Methods and Purposes in Archaeology" and "The Successions of Prehistoric Remains" by WM Flinders Petrie and "Classification and Arrangement of Exhibitions of an anthropological museum" by William H. Holmes. Lafone Quevedo translates the last two. Before leaving Pilciao, Lafone Quevedo had ceded his archaeological collections under custody to the La Plata Museum, and he, who had lived with the inhabitants of the indigenous peoples of Catamarca, who had been part of their education, their histories, and their lives, found himself in the La Plata Museum, where indigenous life had been taken by assault, natives massacred by the "Desert Campaign," their bones exposed in showcases, and survivors enslaved as free labor in the Museum. Decapitated, dismembered, torn apart bodies were studied in the country or sent to museums abroad. This was the scenario where Lafone Quevedo witnessed there. The violence of the conquest of the so-called desert populated the symbolic environment of the museum and its exhibits. In the imaginary of General Roca's ruling elites, the "Indian menace" was on the scene, and the better place for them was in the display cases, or in the photographs of men and women that were circulating, in positions of forensic photographs, stripped of all humanity, the Argentine Republic had become a vast necropolis of lost races, in the words of F. Moreno.

Lafone Quevedo died in La Plata on July 18, 1920.

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Lake Mungo, Archaeology of

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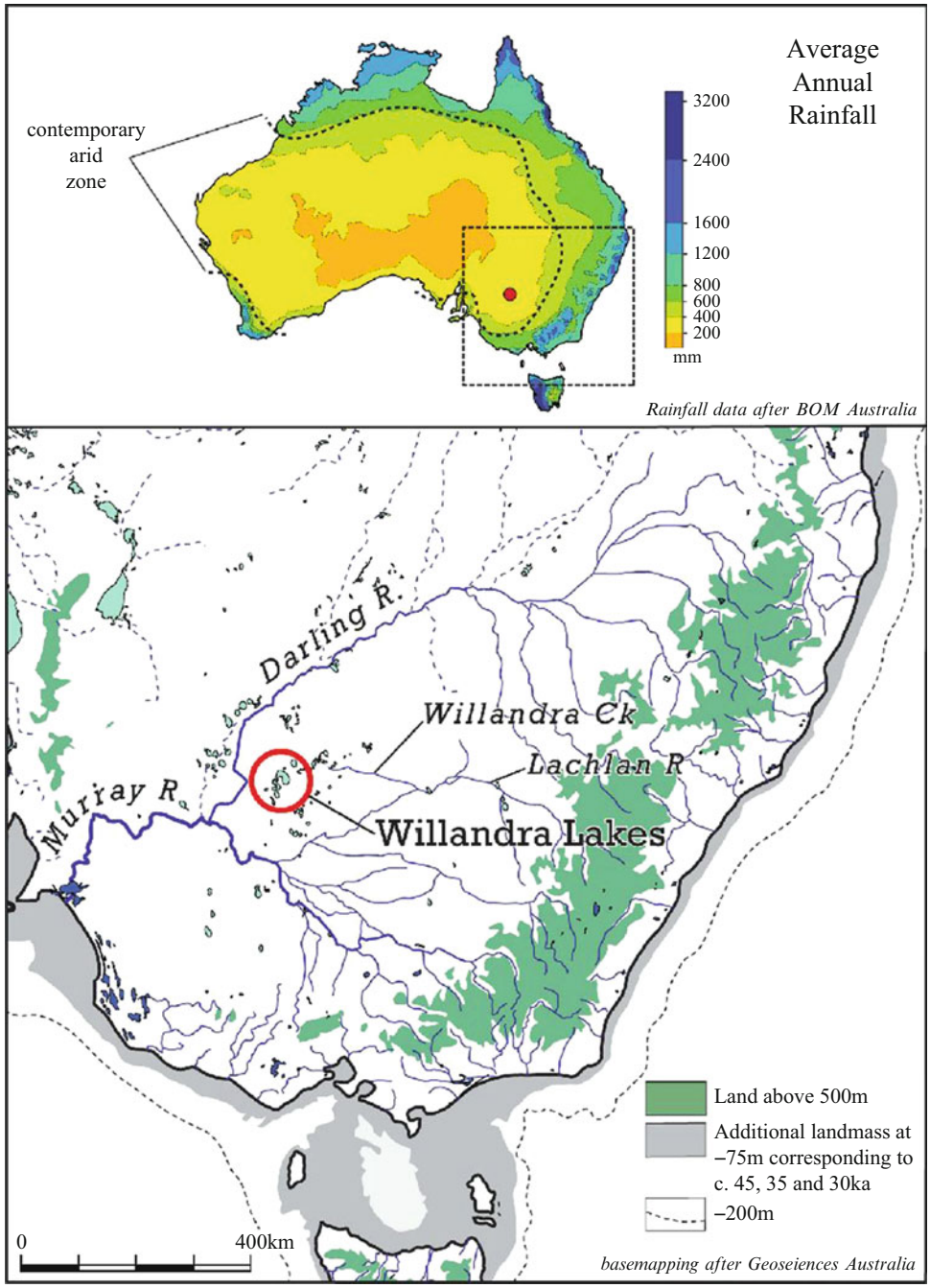
Introduction

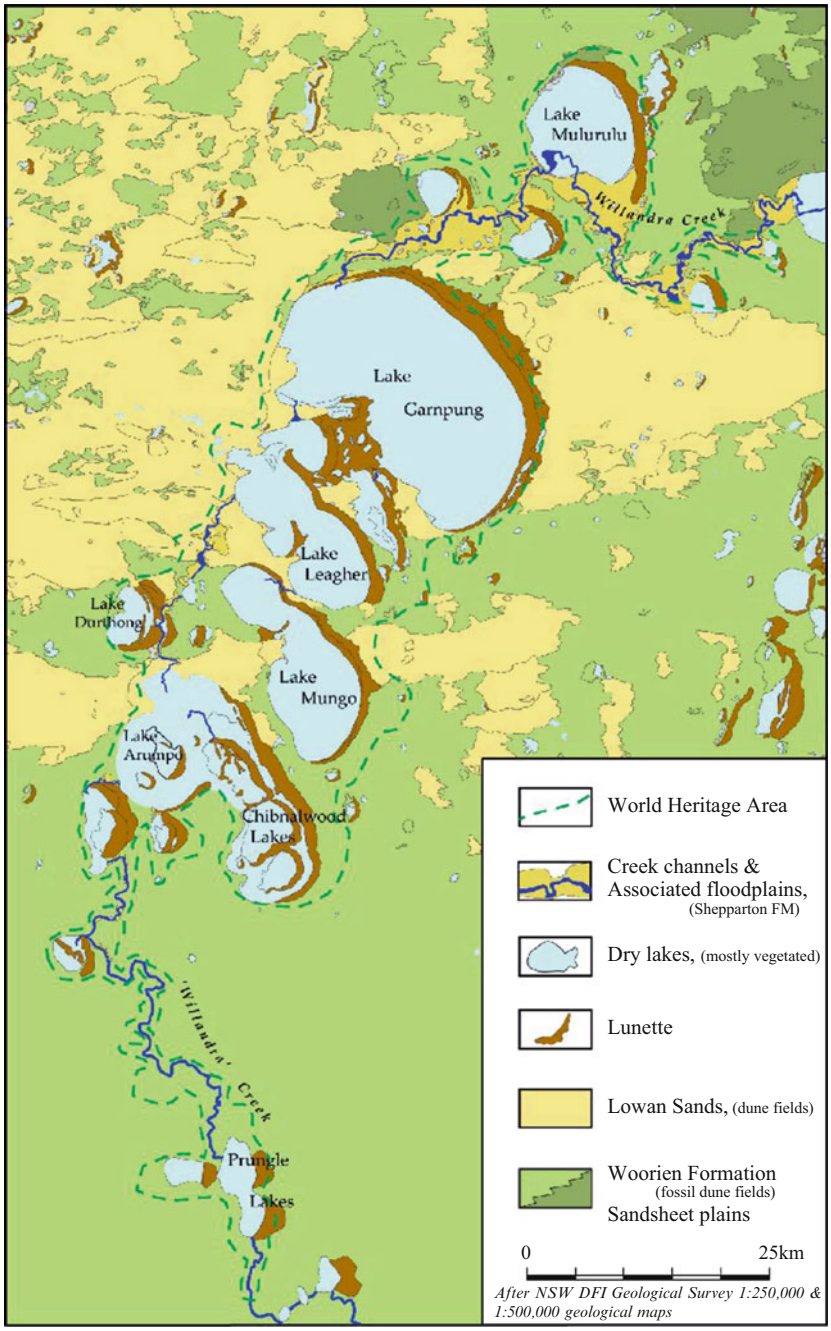
Lake Mungo came to the attention of the international paleoanthropological community during the early 1970s following the widely publicized discovery of what were then the oldest, well-dated traces of human activity on the Australian continent, including the oldest-known ritual human burials (Bowler et al. 1970, 2003; Barbetti and Allen 1972; Bowler and Thorne 1976). However, these are only a few of the thousands of activity traces preserved in the 33 km-long transverse, crescentic dune (lunette) that bounds the eastern margin of Lake Mungo; and Lake Mungo is only one of 17 large and numerous smaller overflow lakes that together cover an area of approximately 2,400 km^2 on the southeast margin of the continent's arid core (Fig. 1). These lakes are now dry, but at times in the past when temperatures and evaporation were reduced, they were filled via a former channel of the Lachlan River, which flows westward from the Australian Alps. During the Pleistocene, the Lachlan periodically brought large volumes of water into this cascading lake system, filling the basins from north to south and creating vast expanses of freshwater in an otherwise xerophytic landscape (Fig. 2).

The Willandra Lakes are widely regarded as Australia's foremost Pleistocene archive, a potential treasure trove of information about the settlement of an initially unpeopled and unfamiliar landscape and about the strategies people developed in response to the dramatic changes in landscape and environment that were initiated within a few thousand years of their arrival. The perceived research potential of this area is based, in part, on the long time span of its record, which extends from ca. 45,000 years ago until the establishment of the pastoral frontier during the 1860s, and in part on the characteristics of the archaeological record itself. It is an unusual record, made up primarily of small, discrete clusters of debris that arguably represent single events, like the cooking of an emu egg (Fig. 3) or fashioning a few stone tools and lighting a fire to cook a small marsupial (Fig. 4). The vivid images these evoke of the distant past fire the public imagination, although they present archaeologists with all the interpretive conundrums inherent in studying "landscape palimpsests" (Bailey 2007). Those activity traces are preserved in sediments that record prevailing conditions in the adjacent lake, which, in turn, reflect the impact of regional and global climates, thus establishing a direct link between the record of past environmental change and the record of human activity.

The tools, burials, and fireplaces preserved in the Mungo lunette first came to the attention of the scientific community at the end of the 1960s through Jim Bowler's investigation into what the lake's depositional history could reveal about regional and global climate change (Bowler 1970). In 1968 he discovered what were then some of the world's earliest evidence for systematic exploitation of inland aquatic resources, as well as the cremated remains of Mungo Lady (Bowler et al. 1970) and, in 1974, the ochre-stained burial of Mungo Man (Bowler and Thorne 1976). Initial archaeological work focused on activity traces preserved in the vicinity of Mungo Lady (Bowler et al. 1970) (Fig. 2). The in situ and surface stone artifacts collected from the same sedimentary horizon were a springboard for presenting the first formal description of the types of stone tools made and used in Australia during the Pleistocene (Bowler et al. 1970). The studies made of the food remains recovered from hearths in Lower Mungo sediments at the southern end of Lake Mungo (Bowler et al. 1970), together with a dozen hearths and middens of



Lake Mungo, Archaeology of, Fig. 1 The Willandra Lakes lie on the southern margin of Australia's arid core, in the southwest corner of the Murray-Darling Basin, which drains more than a million square miles of country in the southeast of the continent. At times of reduced temperatures and evapotranspiration, water flowed westward from the southeast highlands and into these overflow lakes via a former channel of the Lachlan River, known as the Willandra Creek



Lake Mungo, Archaeology of, Fig. 2 The Willandra Lakes are nestled within vast sand plains made up of east/west trending and irregular dunes fields that were initially formed about 400,000 years ago under dry, windy conditions. During periods of more effective precipitation, five major and at least a dozen smaller lake basins were filled via waters carried by the Willandra Creek; the exception to this was Lake Mungo, which filled via an overflow channel from Lake Leaghur. This map shows the names of the major lake basins, the location of the Willandra Creek, and the boundary of the Willandra Lakes Region World Heritage Area

Lake Mungo, Archaeology of, Fig. 3 A baked sediment hearth containing the burned bones of a bettong (rat kangaroo), a cobble of silcrete, and the scatter of stone artefacts struck from that cobble. The hearth is bracketed by OSL age estimates indicating that it was lit during the Last Glacial Maximum. The clean quartz sands in which it is embedded show that the lake was full at the time it was lit, resulting from a pulse of fresh water moving down the overflow system. (Photo: Rudy Frank, Mungo Archaeology Project)

varying age from all across the Willandra (Allen 1972), established the idea of long-term continuity in diet and foraging activities (Allen 1974, 1998), not just in the Willandra but across the continent's arid core (Allen and Holdaway 2009). It also contributed to the perception that settlement of the Willandra was more intense when the lakes were full of freshwater and that people shifted to the river systems when the lakes dried out (e.g., Allen and Holdaway 2009).

Lingering doubts about the origin and age of the surface artifacts, together with the desire to uncover intact living surfaces, subsequently led to the excavation of broad, deep trenches through undisturbed lunette sediments (Shawcross and Kaye 1980; Shawcross 1998). These excavations uncovered stone artifacts and hearths from undisturbed strata, and these remain among the oldest, well-dated archaeological traces in the Willandra (Bowler et al. 2003).

The initial flurry of research in the Willandra established its potential for generating a detailed record of past climate change on the sensitive, arid margin of the world's driest inhabited continent, as well as its potential for illuminating the long history of human settlement in the area. This potential underpinned the inscription of the Willandra Lakes on the world heritage register in 1981, the first such area to be nominated on the basis of both cultural and natural values (Mulvaney and Bowler 1981).

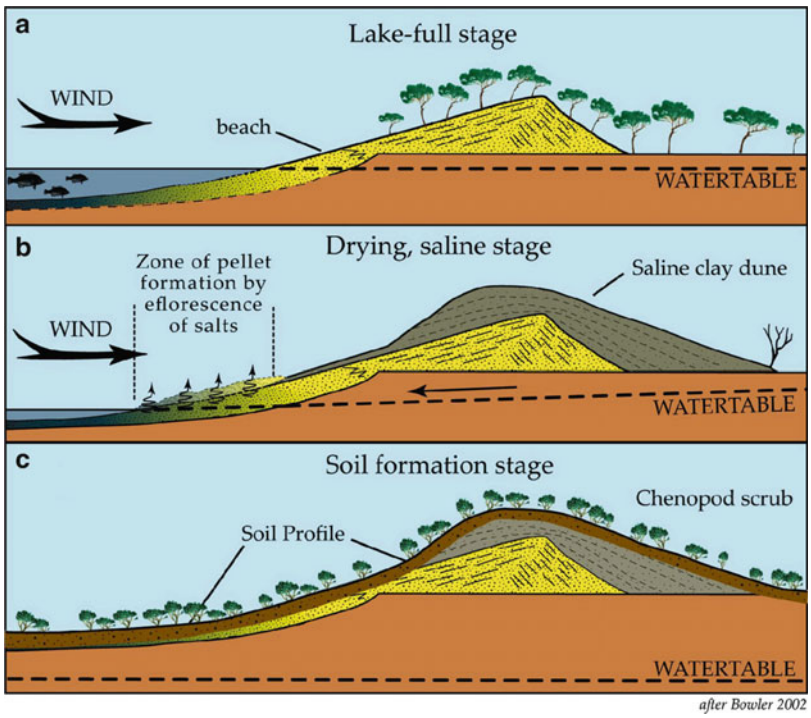
In the decades that followed, research in the Willandra focused primarily on stratigraphy, dating, and burials (Johnston and Clark 1998). As a result, present understanding of the changing pattern of people's lives in this area is limited, despite the dramatic changes in landscape and environment that have been documented (Bowler 1998; Bowler et al. 2012).

Depositional History and Paleoenvironments

Each lake in the overflow system has a unique history that is recorded in the lunette bounding its eastern margin, the sediments that accrued on its floor, and the desert dunes that built up downwind (Bowler 1976, 1998). The lunettes are particularly rich archives of past environmental change

because their formation was controlled primarily by the hydrologic conditions prevailing in the adjacent lake, and the lakes were extremely responsive to changes in effective precipitation in the catchment area. After the Lachlan shifted course and the lakes dried out, the lunettes responded to changes in local conditions, and extensive erosion of some has exposed their internal stratigraphy, opening a window into their past (Bowler 1998; Bowler et al. 2012; Fitzsimmons et al. 2014, 2015).

When the lakes were full, waves driven by the prevailing southwesterly winds washed sandy sediments to the lake edges to form quartz-rich sandy beaches that were backed by low, vegetated, transverse crescentic dunes, known as lunettes (Fig. 4a). During periods of low but fluctuating lake levels, salts precipitated from saline groundwater effloresced on the exposed lake floors, breaking up the sediments and forming sand-sized clay pellets. These were blown across the adjacent quartz dune to form pelletal clay lunettes (Fig. 4b; Bowler 1971, 1998). As a result, beach gravels and quartz sands record lake-full conditions, while pelletal clays indicate low lake levels and saline waters. Alternating horizons of pelletal clay and quartz-rich sand record fluctuations from low water levels and evaporative conditions to high lake levels, following influxes of freshwater from floodwaters that recharged the system. Soils formed when the landscape was stable, either as a result of regional drying or when there was a temporary cutoff in sediment supply following the refilling of a lake (Bowler 1998; Bowler et al. 2012). After the overflow system dried out, older lunette sediments were reworked as local conditions fluctuated from relatively more arid to relatively more moist.



Lake Mungo, Archaeology of, Fig. 4 Lunettes built up around the eastern margins of the Willandra Lakes under the influence of the prevailing south-westerly winds. (**a**) When the lakes were full, sands were washed to the eastern shoreline and blown up into quartz-rich lunettes. (**b**) When lake levels were low, efflorescence of salts broke up the clays on the exposed lake floor creating pellets that were draped across the surrounding landscape to form low angle, clay lunettes. (**c**) Soils formed when the accumulation of sediment was interrupted. This happened when the lakes first refilled and there was no immediate sediment supply or when they were dry and the landscape was vegetated

Bowler (1998), Bowler et al. (2012) identified four stratigraphic units, the base of each defined by evidence for a major lake transgression and the top by a soil representing a period of landscape stability. Each of these is made up of lake margin, beach, and lunette deposits that represent three cycles of lake filling, fluctuating and drying over the past 55,000 years, as well as a much older (>120,000 years) and less well-defined lacustrine episode (Table 1). These units provide a framework for linking changes in lake hydrology to regional and global shifts in climate. However, they are variable in their expression along the length of the lunette, partly as a result of shifts in wind direction over time, which resulted in lateral variations in the volume of sediment accumulated, as well as by past erosion (Fitzsimmons et al. 2014; Fitzsimmons 2017).

Traces of past human activity were incorporated into the lunettes as they built up, including burials, hearths, food remains, and the debris from toolmaking and food preparation (e.g. Bowler et al. 1970; Stern 2015; Stern et al. 2013). The oldest well-documented archaeological traces lie in the upper levels of the Lower Mungo unit (i.e., from ca. 50 ka), but they are most abundant in sediments deposited immediately prior to, during, and immediately following the Last Glacial Maximum (Stern 2015). Current research is focusing on the small-scale depositional and erosional events that also left their mark on the lunette sequence because these provide the paleotopographic and paleoenvironmental context for each hearth, cluster of animal bones, or tools.

After the lakes dried out, traces of past human activity were incorporated into the reworked sands that built up on the crest and lee of the lunette and in the alluvial fans that built up at the toe of the lunette (Fitzsimmons et al. 2014). Hearths, chipped stone tools, and grinding stones are also found in sediments that accumulated around seasonal soaks on the lake floor. In the broader landscape, archaeological remains dating to the post-lake period are found in the banks of creeks and billabongs and around the margins of pans (Johnston and Clark 1998). These have the potential to extend the history of human settlement in the Willandra from 50,000 years ago until the establishment of the pastoral frontier during the 1860s.

The Human Burials

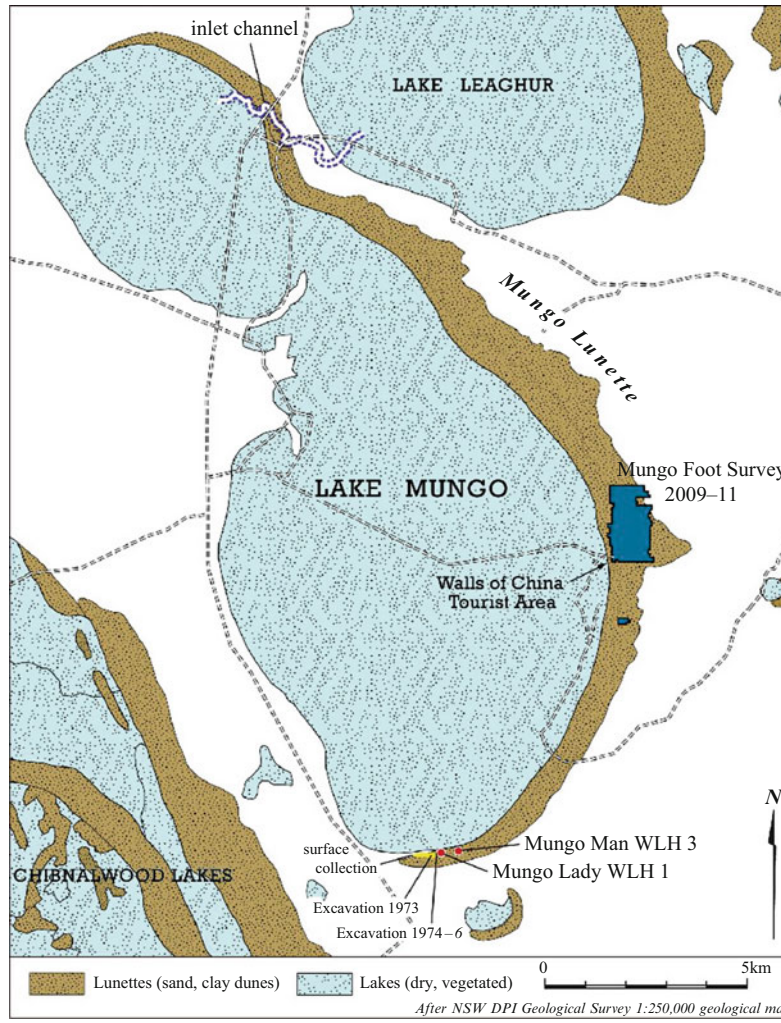
Lake Mungo is renowned as the site of the earliest "Australians," but it is salutary to remember that Indigenous Australians and scientists have quite different worldviews that influence their respective approaches to the study of burials. The "Dreaming," an interwoven tapestry of knowledge, beliefs, and rituals that includes explication of how the world came into being, shapes the worldviews of Indigenous Australians. However, it is not simply a story of origins: the Ancestral Beings who inhabit the Dreaming and carried out the deeds that created the country are now embedded within it, and each generation experiences the Dreaming anew through ritual and ceremony (Stanner 1953/1987). It is, therefore, a timeless concept that establishes the enduring presence of people in the country (Fig. 5).

In contrast, scientists employ a linear concept of time and trace the origin of the First Australians using data that describes variation in the morphological characteristics of skeletal remains and/or variation in the mtDNA or Y chromosomes of living populations. The Willandra figures prominently in these discussions because it preserves the largest known sample of Pleistocene burials on the continent: more than 130 burials have been documented in sediments that built up between circa 45,000 and 15,000 years ago (Webb 1989, 2006). The burials vary in form, completeness, state of preservation, and the precision with which they can be placed in time (Webb 1989, 2006; Bowler et al. 2003; Westaway and Groves 2009; Grün et al. 2010). The best dated are the burials of Mungo Lady (WLH 1) and Mungo Man (WLH 3); bracketing OSL dates place both in the time range between 38 and 42 ka (Bowler et al. 2003), which is consistent with OSL dates of 41 $\pm$ 4 ka on the sands filling the grave of Mungo Man (Olley et al. 2006).

Phylogenetic analysis of the morphological characteristics exhibited by 26 individuals from

Lake Mungo, Archaeology of, Table 1 Summary of the sedimentary characteristics of the stratigraphic units described by Bowler (1998) and the archaeological traces they contain (Bowler 1998; Allen and Holdaway 2009; Clark 1987; Stern et al. 2013, 2015)

Stratigraphic unit		Age in ka	Sediment characteristics	Palaeoenvironment	Archaeological traces
Fitzsimmons et al. (2014, 2015)	Bowler (1998)				
G		5.5–3.5		Lake dry, reworking of lunette sediments under locally more moist conditions	Termite & stone heat retainer hearths, chipped stone tools
F		<14 >8	Unconsolidated sands interspersed with some weakly developed, laterally discontinuous brown soils	Lake dry, reworking of lunette sediments under locally more arid conditions	Termite & carbonate heat-retainer hearths, clusters of tool-making debris, isolated in situ grindstones, manuports & shell tools
E	Zanci	~ 15	Brown soil on unconsolidated laminar sands, erosional surface	Final drying of lake	Heat retainer and baked sediments hearths, some associated with terrestrial and lacustrine resources, rare lenses of bivalves and/or fish bone, clusters of tool-making debris, isolated in situ grindstones, bone tools, ochre
		~19–15	Greyish yellow, unconsolidated laminar sands	Oscillating lake, but on a drying trend	
E	Arumpo	~ 21–20	Weak brown soil with secondary carbonates; erosional surface	Brief return of high water levels, erosion	Abundant archaeological traces include heat retainer and baked sediments hearths with terrestrial and lacustrine resources, clusters of burned faunal remains, clusters of stone tool-making debris, isolated in situ grindstones, shell tools, ochre
		~ 24–20	Greyish yellow laminar sands, dominant, some alternating sands and pelletal clays	Fluctuating lake levels	
D		*25–24*	Red sands and associated shoreline gravels	High lake stand, Lake Mungo joined to Lake Leaghur	Baked sediment hearths, some clusters of stone tool-making debris
C	Upper Mungo	<30	Thin sandy soil	Brief return to high water levels	Termite & carbonate retainer and baked sediment hearths, some containing terrestrial &/or lacustrine faunal remains, discrete scatters of burned bone or eggshell, clusters of debris from stone-tool making, isolated shell tools
		~40–30	Olive to greenish-grey pelletal clays and clayey sands	Fluctuating lake levels	
B	Lower Mungo	~ 40	Dark brown to dark grey with organics and secondary carbonates	Landscape stable and densely vegetated; onset of continental aridity	From ~ 45 ka: Termite & carbonate heat retainer and baked sediment hearths, some containing terrestrial and lacustrine faunal remains, clusters of stone tool-making debris 50 & 46 ka: a few stone tools
		~ 55–40	Beach gravels and well sorted clean quartz sands	Lake filled, sustained high lake levels	
A	Golgol	>140	Strong red calcareous soil with massive crystalline calcrete boulders	Stable, vegetated landscape	No archaeological traces
			Pelletal clays with prismatic jointing	Fluctuating lake	
			Quartz sands	High lake levels	



Lake Mungo, Archaeology of, Fig. 5 A map of Lake Mungo, showing the locations of Mungo Lady and Mungo Man; the trenches excavated by Mulvaney in 1973, by Shawcross in 1974–1976; the surface grid area that was collected repeatedly over the same time period; and the Barbetti "hearth site," and the "Walls of China" tourist site. It also shows the areas in which the first systematic surveys of archaeological traces preserved in the Mungo lunette were undertaken by the author between 2009 and 2011

the Willandra and 19 specimens of early modern humans from SW Asia and Africa suggests a close resemblance (Westaway and Groves 2009). This is consistent with mtDNA and Y chromosome data indicating that Sahul, the Pleistocene landmass made up of Australia, Tasmania, and New Guinea, was settled by descendants of the one of the founder groups of modern humans, early in their dispersal (Hudjashov et al. 2007; Riech et al. 2011). Recent mtDNA studies indicate settlement by a single population that dispersed rapidly along the north of the continent and then south along its eastern and western seaboards, between ~ 49 and 45 ka, followed by marked regional differentiation (Tobler et al. 2017). This is consistent with earlier studies suggesting a single founding population that subsequently diversified and remained relatively isolated, with any later migrations having limited impact on population genetics (McEvoy et al. 2010).

The documented burials provide insights into some of the ritual practices of the Willandra's Pleistocene inhabitants, although these insights are limited by the fragmentary nature of burials exposed through erosion. Tooth avulsion, a ritual usually associated with the attainment of specific age or social status, has been identified on some individuals (Webb 1989, 2006). Although individuals of all ages were cremated, internment in the ground was more common.

Footprints

Perhaps the most captivating traces of past human activity in the Willandra are the hundreds of footprints preserved on the surface of a hardpan that lies between modern, shifting sands in the low-lying country between Lake Garnpung and Lake Leaghur. Bracketing OSL dates show that the footprints were impressed into the muddy surface of a low-lying depression, some time between 21 and 19 kya (Webb et al. 2006).

More than 700 prints are preserved in a thin horizon of clay, and together Elders, researchers, and Pintubi trackers identified 23 individual track ways, including 12 that may have been left by a single group who crossed the muddy depression together. However, not all the prints result from a single afternoon's activities, and some are preserved on different bedding planes. They include the tracks of six men who ran across the muddy depression in the same direction, apparently in pursuit of prey as the surface also preserves a groove left by a spear that bounced across the ground when it was thrown underarm. Most of the trackways lie at right angles to those of the hunters and include the prints of a one-legged man who hopped across the mud with the aid of a pole, the imprints of blunted spears made when the men who carried them paused to rest, the prints of an adult who was accompanied by four children, as well as those of two women accompanied by a young child who circled away from the adults before rejoining them (Webb et al. 2006; Webb 2007).

Archaeological Traces

Until recently, only a few of the myriad of archaeological traces preserved in the Willandra had been documented in any detail, reflecting the difficulties of studying archaeological remains scattered through vast landforms with complex depositional and erosional histories but which are also part of an active landscape. Those landforms are made up of sediments representing successive paleolandscapes, and each paleolandscape is made up of interlocking, three-dimensional sedimentary bodies that represent a variety of paleo-topographic settings. Lateral variation in the timing, rate, and amount of sediment that accumulated along the lunette, and in the amount of sediment removed by subsequent erosion, means that the stratigraphic and paleo-topographic context of archaeological traces can only be established by mapping exposures and three-dimensional sedimentary relationships at a much finer scale than is the usual geological practice.

The scatters of archaeological debris strewn across the surfaces of the eroding Mungo lunette are the outcome of two processes that sometimes act in concert: the removal of encasing sediment to create lag deposits and the displacement of material down the rill and gully systems to create transported assemblages. The complex relationships that exist between stratigraphic boundaries, paleo-topography and modern topography, mean that these surface scatters don't always derive from the sedimentary envelope on which they lie and, in some settings, could be derived from any of the sediments that accumulated since the lakes last filled, ca. 55,000 years ago.

However, the record also includes thousands of archaeological features and isolated finds whose precise stratigraphic and paleo-topographic origin can be documented either because they are still partly embedded in sediment or because they lie in a discrete cluster on the surface indicating that they have been exposed only recently. The pace of ongoing erosion is such that most features weather, disperse, and disintegrate within 12–36 months of exposure.

These activity traces include a variety of cooking hearths, the debris from making chipped stone tools, clusters of burned food remains, grindstones, and shell and bone tools. Most of these arguably result from a single activity, like the preparation and cooking of a meal or the striking of a few tools from a core. These provide remarkable insights into individual meals and knapping episodes, but to build an understanding of the food-gathering strategies or technological systems that prevailed during particular time intervals, and correspondingly different paleoenvironmental conditions, archaeologists must aggregate the

activity traces found in the sediments making up the corresponding paleolandscape. Thus, the significance of this record lies not with one particularly spectacular or ancient occurrence but with the information that can be generated from thousands of activity traces with well-defined paleo-topographic and paleoenvironmental context.

History of Human Settlement

Systematic documentation of the archaeological traces preserved in the central Mungo lunette shows that they are not distributed homogeneously through the stratigraphic sequence (Table 1). Activity traces are far more abundant in sediments representing fluctuating lake levels than they are in sediments representing sustained lake-full conditions. This runs counter to the long-standing, popular perception that people were attracted to the Willandra lakes when they were full of freshwater and that they went there to catch fish and crayfish and to gather shellfish (e.g., Mulvaney and Kamminga 1999: 197). Instead, it appears that people were attracted to the shore of Lake Mungo in larger numbers and/or more often and/or for longer, when flood pulses frequently recharged the biological productivity of the overflow system and when standing water was less abundant on the surrounding plains (Stern et al. 2013; Stern 2015). After Lake Mungo dried out, activity traces did accumulate in sediments on the crest and lee of the lunette and in the alluvial fans at its base, but these are much less abundant and varied than when the lake contained water, suggesting a significant shift after ~ 15 ka in the way peopled moved around the landscape and the time spent in different places.

Fireplaces and Food Remains

Studies of faunal assemblages undertaken during the first phase of research in the Willandra suggested long-term continuity in diet, at least until the final drying of the lakes (Bowler et al. 1970; Allen 1972, 1974). This inference was based on the similarities noted between the food remains recovered from hearths and middens of widely scattered age and location and ethnohistoric records of the foods eaten by the Barkindji who lived along the Darling River (100 km to the west of Lake Mungo) during the late nineteenth century (Bowler et al. 1970; Allen 1972, 1974). The only significant shift in diet was thought to have taken place around 15,000 years ago, when seed processing was introduced to compensate for the loss of lake resources after the overflow system ceased to function as such (Allen 1974). The proposed long-term continuity in diet relied on ethnohistorical observations to flesh out the remote past, with limited consideration given to their applicability (Allen and Holdaway 2009). Such consideration is critical given that many of the recorded taxa have broad biogeographic distributions, the significant paleo-environmental changes that took place over the past 50,000 years, and the small number of hearths studied compared to the scale of the landscape and the time depth of its history. It is not surprising that this interpretation has been subject to critical reevaluation by its original proponent (Allen 1998; Allen and Holdaway 2009).

Long-term continuity in diet is unlikely, but given the time span of human settlement, the remains of hundreds of "individual meals" need to be studied in order to build a picture of how the "menu" has changed over time, including shifts in the relative importance of different prey species and the strategies employed to acquire and process those prey. Approximately 30% of the hearths documented during systematic surveys have associated food remains, and these remains suggest that much of the time dietary protein was being obtained from small mammals, eggs and reptiles, and sometimes from large macropods and birds.

The shell middens preserved in the lunettes bounding the Willandra Lakes are not common and are generally small (Johnston 1993) and, like the hearths lit primarily to cook fish (Stern 2015), are restricted to the onset of continental aridity (ca. 40 ka $\pm$ 2) and the Last Glacial Maximum (Bowler et al. 2012). Although this may seem

counterintuitive, when the lakes were full of freshwater, every creek and billabong on the open plains would also have held water, lifting a critical constraint on where and how far people could go to gather food and other resources and to meet up with other social groups. Nor is it counterintuitive if the amount of time and energy required to harvest shellfish is compared to the returns obtained (Allen and Holdaway 2009). Thus it could be argued that lake resources were fallback foods.

Recent research also reveals that seed grinding was introduced in the lead up to the Last Glacial Maximum, not after the final drying of the lakes. A study designed to establish whether grindstones exposed on the surface of the lunette preserve interpretable wear traces and/or residues shows that they were used primarily to grind seeds (Fullagar et al. 2015). Ongoing research aims to identify the seeds that were being harvested and to assess their significance in the overall diet.

Changing Technologies

Most of the chipped stone tools found on the Mungo lunette were fashioned from silcrete, numerous outcrops of which occur in the immediate region; most of the rest were made from quartzite, small outcrops of which are found 40 km to the west or 70 km to the north of Lake Mungo, and only a few were made from materials exotic to the region. The silcrete varies considerably in color and texture, even at a single source, but generally exhibits poor flaking quality compared to the quartzite. Changes in the relative abundance of silcrete and quartzite in an assemblage, combined with measures of how intensively each of these materials was worked, thus provide a basis for interpreting changes in assemblage characteristics in terms of shifts in relative mobility, which, in turn, reflect responses to changing paleoenvironmental circumstances (Stern et al. 2013).

For example, assemblages from the Arumpo unit (~24–21 ka) originating from alternating layers of clay and sand that reflect fluctuating lake levels contain relatively more quartzite artifacts, and the characteristics of both the silcrete and quartzite artifacts show little evidence for attempts to conserve the use-life of cores or tools; this suggests relatively higher levels of mobility. In contrast, the quartzite and silcrete artifacts originating from pelletal clays that reflect low lake levels are smaller and exhibit features indicative of attempts to extend the use-life of both cores and tools; this suggests relatively lower levels of mobility (Stern et al. 2013: 44–6).

Artifacts made from freshwater bivalves provide rare insights into a type of tool that may once have been in common use. Four shell tools, from sediments deposited between ~50 and 30 ka, were recovered from the surface of the lunette following unusually heavy rains. The shell tools described in the historical records from this region were unmodified or minimally modified valves used to scrape possum hides, scale fish, and prepare the twine used in net making. In contrast, the Pleistocene tools have deep notches incised into their working edges. Experimental studies suggest that they were used to work a soft-textured material and that individual tools were used in a scraping or slicing and/or cutting actions (Weston et al. 2017).

Long-Distance Movement of Material and Social Networks

Exotic materials that originated outside the Willandra Lakes region provide some measure of the extent of past social networks (e.g., Veth et al. 2011), although it should be noted that current data are limited. Two pieces of evidence suggest that social networks may have been quite extensive during the earliest phase of human settlement in the Willandra. One is the ochre that covered the body of Mungo Man, which is thought to have originated in the Barrier Range, some 250 km to the northwest (Bowler et al. 1970; Johnston and Clark 1998), although it should be noted that the source of this ochre has not yet been established through trace element analysis. The

other is the presence of *Turbo undulata* shells in Lower Mungo sands (personal observation). This is a marine species, commonly encountered on rock platforms along the southeast Australian coast, the nearest portion of which lies 400 km to the south.

Although the raw materials used to make the chipped stone tools and grinding stones found on the Mungo lunette had to be carried there, most could have been obtained from outcrops within 70 km of the Lake Mungo. A single edge-ground axe collected from the surface of the Mungo lunette during the 1970s was made from an amphibole hornfels that may have originated near Mt. Camel, >600 km to the southeast (Clark 1987). All the edge-ground axes recovered from dated contexts in southern Australia fall within the late Holocene (e.g., Mulvaney and Kamminga 1999: 221), so it has long been assumed that this one is of similar antiquity.

Current Work

Current interdisciplinary research in the Willandra is designed to identify the shifts in diet, food-gathering strategies, technologies, and social networks that took place over time and to investigate the relationship, if any, that these have to the dramatic changes in environment that have been documented for this climatically sensitive region. Electronic data recording systems solve many of the practical difficulties of studying scattered traces of past human activity dispersed through vast, stratigraphically complex and eroding landforms, which proved such a constraint to earlier research (Shawcross 1998). This work is being undertaken in close collaboration with members of the three traditional tribal groups of the Willandra Lakes Region World Heritage Area, the Barkindji/Paakantyi, Mutthi Mutthi, and Ngiyaampaa, who share the researchers' goal of enhancing the flow of information from this iconic Australian site.

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Laming-Emperaire, Annette

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Basic Biographical Information

Annette Laming-Emperaire (1917–1977) was born in Russia in 1917. She grew up in France, where she lived all her life and developed a fruitful career at the *Centre National de la Recherche Scientifique* (CNRS), later becoming director of the *École Pratique des Hautes Études*, in Paris. She started her research career with rock art, becoming an influential member of the group of structuralist Paleolithic art scholars led by André Leroi-Gourhan. Her doctoral thesis (Laming-Emperaire 1962) was a major contribution towards the development of structuralism in rock art. Later, she became involved with South American prehistory, initially by following her husband, Joseph Emperaire, who was sent by Paul Rivet to the outskirts of the South American continent in the search of the early peopling of the New World. In South America Annette Laming-Emperaire soon found her own vein, and she became deeply involved with local research interests, working mostly in Chile and Brazil. She died in Brazil in 1977.

Major Accomplishments

Annette Laming-Emperaire was an eclectic investigator, full of curiosity about several domains of prehistoric archaeology. With a solid humanistic formation, her research interests were wide, from rock art to lithic analysis and her large fieldwork experience based on a very open mind towards interdisciplinarity, especially as regards Quaternary geology and cultural anthropology.

It is in the sphere of the beginnings of Brazilian archaeology, throughout the 1950s to the 1970s, that Mme. Emperaire (as she was fondly called by her Brazilian friends) became a decisive actor. At that time several academic scholars were starting to turn their attention to archaeology, but there was no academic research or schooling established in the country. Annette Laming-Emperaire became a regular visiting researcher, studying a broad range of material from ceramic Tupi-Guarani sites in the hinterland to *sambaquis* (shell mounds) on the coast, from rock art in hilly remote places to lithic analysis from Paleo-Indian sites at Minas Gerais. In doing this work, she was never alone but encouraged local disciples to learn, by practice, every different activity in which she was involved. Her teaching talents were matched by a strong leadership quality (she took part on the French *Résistance* during the Second World War) and the rigorous field methodology developed by French archaeologists around that time. Even more, she taught extensively at Brazilian universities and organized seminars on rock art and lithic analysis methods. In this sense, she was of paramount importance to a whole first generation of Brazilian archaeologists, leaving as heritage establishment of the basis for an academic archaeological tradition in Brazil that bears from her both a strong reliance on stratigraphic excavations and a meticulous structuralist analysis of artifacts and parietal representations.

Her insights towards the archaeological significance of her study subjects reveal the accuracy of her perspicacious mind. She was the first person to correlate rock art from different regions of the country, suggesting relationships that had not been suspected before but which were proven true by later studies. As regards coastal archaeology, she produced the first reflections on shell mound construction (on what we would call today "site formation processes"), describing accurately these as *sites à accumulation rapide*, or fast accumulating deposits, despite their very long chronology (Laming-Emperaire 1975; refer also to Gaspar's entry on coastal shell mounds in Brazil in this encyclopedia). One of her last works, about which she was really enthusiastic,

was an expedition to study a recently contacted Indian group, the Xetá, who lived in the backlands of Paraná and who still chipped stone implements. This study was published posthumously (Laming-Emperaire et al. 1978).

Her tragic death in an accident, in Curitiba (southern Brazil), left several disciples and friends who became prominent archaeologists in the next decades and prompted many mournful obituaries to be written by friends and colleagues, both in Brazil and in France (Leroi-Gourhan 1978; Pallestrini 1978; Lavallée 1978), from which this entry has drawn deeply. A bibliography of her publications can be found in the *Journal de la Société des Américanistes*, listed below.

Cross-References

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- ▶ Prous, André
- ▶ Sambaquis Shell Mounds, Archaeology of
- ▶ South American Rock Art
- ▶ Structural Archaeology

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Lanciani, Rodolfo

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Basic Biographical Information

Rodolfo Amedeo Lanciani (Rome, 02.01.1845–21.05.1929) was one of the greatest figures of Italian archaeology of the late nineteenth and early twentieth centuries. His contributions are so significant that his teaching and his extraordinary scientific output still affect, both in method and in substance, the studies of the historical topography of Rome and Lazio.

After a technical degree, Lanciani's archaeological training took place in Rome and Ostia in the wake of the great scholars of the period (Giovanni Battista de Rossi, Pietro Ercole Visconti, Carlo Ludovico Visconti, Pietro Rosa, and John Henry Parker), who facilitated his early inclusion in the Archeologica Commissione Comunale di Roma of which Lanciani was Secretary from 1872 to 1890; the assumption in the Direzione Generale Antichità e Belle Arti (1876) is also due to the support of Giuseppe Fiorelli.

The presence of Lanciani in local and national archaeological institutions occurs in the years of the radical urban transformation of Rome itself; his long stay in the University (Professor of Ancient Topography at "La Sapienza" of Rome, 1878–1922) coincides with the modern disciplinary definition of archaeological teaching; his political action is exercised during the difficult period of World War I (Senator from 1911; City Councilor, Head of the Department of Antiquities and Fine Arts, vice-Mayor of Rome, 1914–1920).

Major Impact

Overall, the scientific, academic, institutional and political activities of Lanciani fall in the

crucial half-century between Roma Capitale (1871) and the affirmation of the Fascist regime (1922). This was the period of the greatest enhancement of the urban monuments of Rome under a nationalist perspective; and of the elaboration of legislation concerning the protection of Italy's historical-cultural heritage.

The double training, technical and philological, allowed Lanciani to deal with every aspect and period of history and archaeology of Rome and Lazio, with particular efforts in the reconstruction of the topography of ancient Rome and in the study of its millenary urban history, from the Archaic period to the Renaissance.

The bibliography of Lanciani includes over 630 titles (see Ashby 1928): manuals on Roman archaeology; reports of excavations and discoveries in urban and suburban areas; studies of individual monuments; topography of Rome, suburbs and Campagna Romana; studies on ancient literary and iconographic sources (with particular reference to the Severan marble plan or *Forma Urbis Romae*); epigraphy; sculpture; collections; museography; studies on the medieval and the renaissance history, topography and documents; biographies; reviews; articles of scientific dissemination.

In this multifaceted scientific production stand out the monumental *Forma Urbis Romae* (Milan 1893–1901) and the *Storia degli scavi di Roma e notizie intorno alle collezioni romane di antichità* (4 vols., Rome 1902–1913). Lanciani's voluminous output in English is also fortunate; he published 10 monographs between 1888 and 1925, on the archaeology and history of ancient, medieval and modern Rome, an extraordinary and innovative experiment in scientific communication addressed to the international cultivated audience.

Lanciani's unpublished archive is deposited in the Vatican Library (Cod. Vat Lat. 13,031–13,047 and 15,216–15,229) and the "Appunti Lanciani" in the Library of the Istituto Nazionale di Archeologia e Storia dell'Arte in Rome (for further documents: Palombi 2006, 2008, 2009).

Cross-References

- ▶ Ashby, Thomas
- ▶ Topography of Rome
- ▶ Urban Planning, Roman

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Landmarks Foundation: Protecting Sacred Sites Globally

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Basic Information

Landmarks Foundation is operated as a 501(c)(3) in New York, 1997–2011. It relocated from New York to Massachusetts, following death of its founder, Sam Green, in 2011. The website is at http://www.LandmarksFoundation.org.

Major Impact

Because we believe that religious intolerance causes so much grief in the world, Landmarks Foundation celebrates all religious beliefs, past and present. We believe that the tolerance of religious differences is fundamental to human existence, as all religions are an attempt at communication with the divine. The Landmarks Foundation identifies, protects, and preserves sacred sites and landscapes around the world which are tangible focal points for the beliefs, rituals, and religions that define human societies. Landmarks Foundation directs funding and technical expertise to local groups that cannot protect their sacred cultural heritage without assistance. Selection of specific projects is based on cultural significance and degree of jeopardy.

Identified and/or Protected and/or Restored and/or Preserved

- The Moai of Easter Island
- Santa Catarina Church, Sierra Madré, Mexico
- Temple at Patara, Turkey
- Ani, Turkey
- Sajama Lines, Bolivia
- Stone Spheres of Costa Rica
- Huichol Sacred Sites and Landscapes, Mexico
- Baneshwar Temple, Indore, India
- Kaleshwar Temple Complex, Indore, India
- Akhtamar Church, Lake Van, Eastern Turkey
- Gangteng Monastery, Bhutan
- Balyan Church, Istanbul, Turkey
- Slat al Qahal synagogue, Essaouira, Morocco

Cross-References

► Sacred Site Conservation and Preservation
► Sacred Sites in Indigenous Archaeology

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Landscape and Plants Use in Brazilian Shell Mounds

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State of Knowledge and Current Debates

Brazilian shell mounds, locally named *sambaquis*, were first recognized back in the nineteenth century. They remain to this day among the best studied sites in the country. Issues, such as diet/subsistence, environment/landscape, and, nowadays, ceremonial activities, have always been central to most research agendas. However, the importance of plant use and consumption remained, until recently, largely underestimated.

To a great extent, this is due to differential preservation, since animal remains tend to be overestimated compared to plant remains. Archaeological preservation of botanical remains is uncertain and depends on aleatory events and conditions that vary for each plant and plant organ. However, plants were extremely important for most past populations. They were certainly used in many ways in the daily life of *sambaqui* people, both in domestic and in ceremonial activities, for food, fuel, medicine, dyes, soap, tools, raw materials, construction, boats, and others.

Analyses of these remains pertain to archaeobotany. They were virtually inexistent in Brazil until the end of the 1990s, except for few plant macroremains identified at the request of archaeologists. The first studies, precisely in shell mounds, employed anthracology (e.g., Scheel-Ybert 2000, 2001) and soon were followed by microarchaeobotanical analyses (Wesolowski

2007; Boyadjian 2012). Studies on carporemains and underground organs, however, remain as yet rare and asystematic, for preservation of non-carbonized plant macroremains is particularly rare in *sambaquis* – exceptions include a few sites presenting waterlogged material in their lower layers.

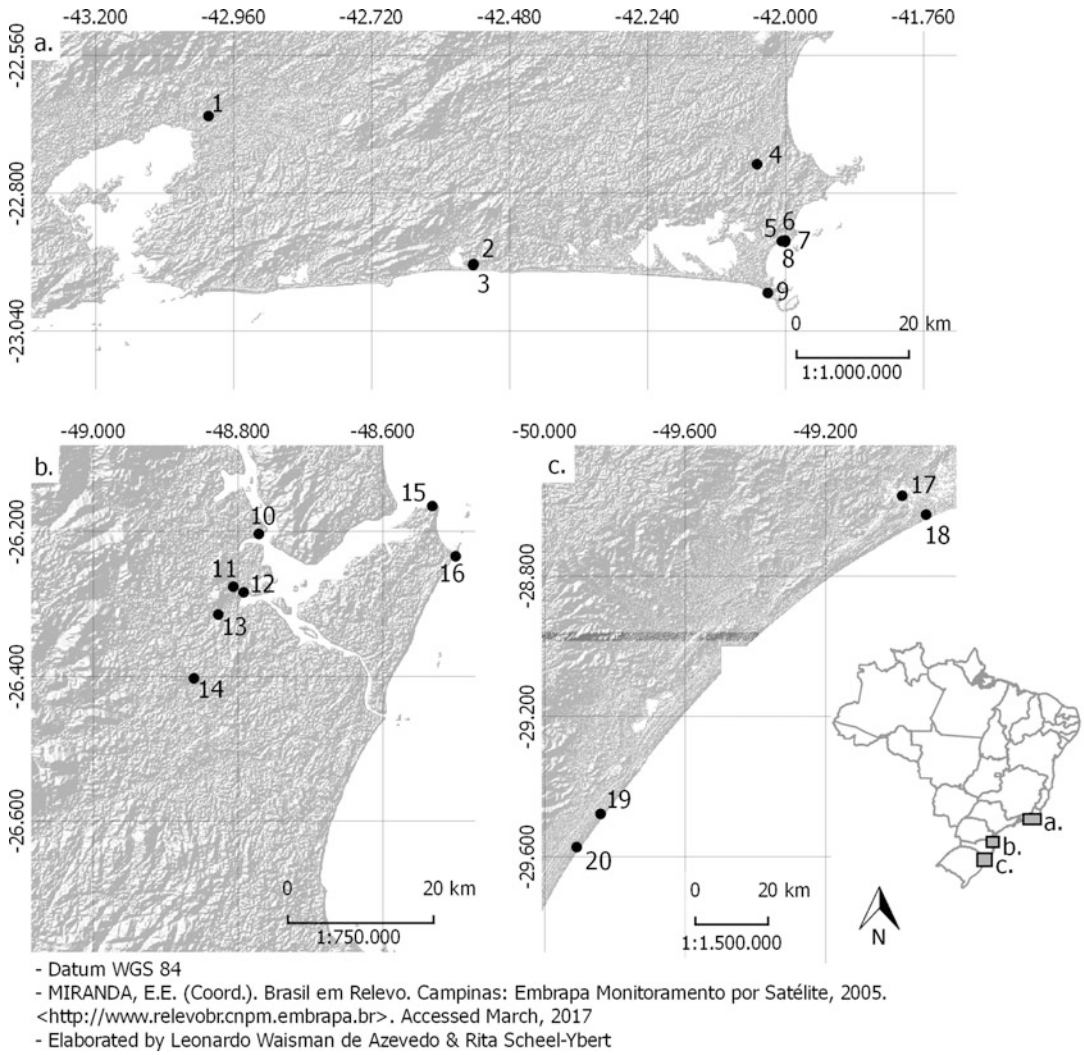
Anthracology (i.e., charcoal analysis and identification based on wood anatomy criteria) provides both paleoenvironmental/landscape reconstitutions and paleoethnobotanical information on the use of plants. This discipline allows reliable reconstructions of local woody vegetation, since the confrontation with phytosociological data (vegetation structure) is rather direct, and carbonized macroremains are usually abundant in all archaeological sediments (Scheel-Ybert 2000). Charred macroremains of fruits, seeds, and tubers, frequently preserved along with wood charcoal remains, may inform about plant foods (Scheel-Ybert 2001, 2013). Microarchaeobotany (i.e., the study of phytoliths, starch grains, and other plant microremains found in archaeological context) is most useful for both subsistence and paleoethnobotanical information but can also contribute to paleoenvironment and landscape reconstitutions. These remains can be preserved in dental calculus, artifacts, and even sediments. The complementary information acquired from both approaches discloses important information on diet, plants use, landscape, and ultimately on these shell mound builders' way of life.

Landscape

Anthracological studies have already been performed for ten *sambaquis* from the Southeastern and Southern Brazilian coasts, providing landscape and paleoenvironmental information. Eight sites are situated in Rio de Janeiro State (Forte, Boca da Barra, Salinas Peroano, Meio, Ponta da Cabeça, Corondó, Pontinha, Beirada – Scheel-Ybert 2000; Scheel-Ybert and Dias 2007) and two in Santa Catarina State (Jabuticabeira-II, Encantada-III – Scheel-Ybert et al. 2009a; Bianchini et al. 2011) (Fig. 1). Their chronology ranges between 5270 ± 80 and 1430 ± 55 years BP (Table 1). Two sites present evidence of short occupations (Meio, Encantada-III), but most of them attest to long-standing sedentary settlements. The occupation periods vary from about 500 (Pontinha, Beirada) or 1000 (Ponta da Cabeça, Corondó, Jabuticabeira-II), to even more than 2000 (Boca da Barra, Salinas Peroano) or 3000 years (Forte).

Settlement pattern analyses demonstrated that *sambaquis* were always established in the vicinity of coastal lagoons, which were at the center of their builders' social life (DeBlasis et al. 2007). Anthracological results confirmed the close association of these sites to coastal lagoonal environments, indicating a very steady *restinga* environment, always neighboring other plant communities, such as humid coastal forests and sometimes mangroves (Fig. 2) (Scheel-Ybert 2000, 2001; Scheel-Ybert and Dias 2007; Scheel-Ybert et al. 2009a; Bianchini et al. 2011). *Restinga*, a typical Brazilian coastal vegetation, is a mosaic of plant associations with diverse physiognomies that occupies the sandy beach ridges. It varies from sparse open plant communities, such as herbaceous and shrub formations ("open *restinga*") to dense evergreen forest ("*restinga* forest"). Mangroves and saltwater marshes frequently occur at the land-sea interface, especially the edges of rivers and lagoons. Along the coast, inland low mountains and hills support the Atlantic Rain Forest.

As anthracological spectra reflect the local vegetation, one or another of these vegetation types prevails in each site, depending on its geographical location. Open *restinga* formations dominate in *sambaquis* Beirada and Pontinha, both situated between the sea and a coastal lagoon; their occupants were probably using mainly the vegetation closer to the ocean. Open *restinga* and *restinga* forest dominate in Forte, Ponta da Cabeça, and Jabuticabeira-II; the first two sites are presently near the sea; although the latter is situated farther inland, the sea level was higher in the period it was occupied – it is therefore probable that all of them were established in the *restinga* and had equal access to both open and forest formations. Anthracological spectra of Salinas Peroano, Boca da Barra, and Corondó, situated farther inland (Corondó) or upon coastal crystalline hills (the other two), present a significant contribution of *restinga* forest and Atlantic



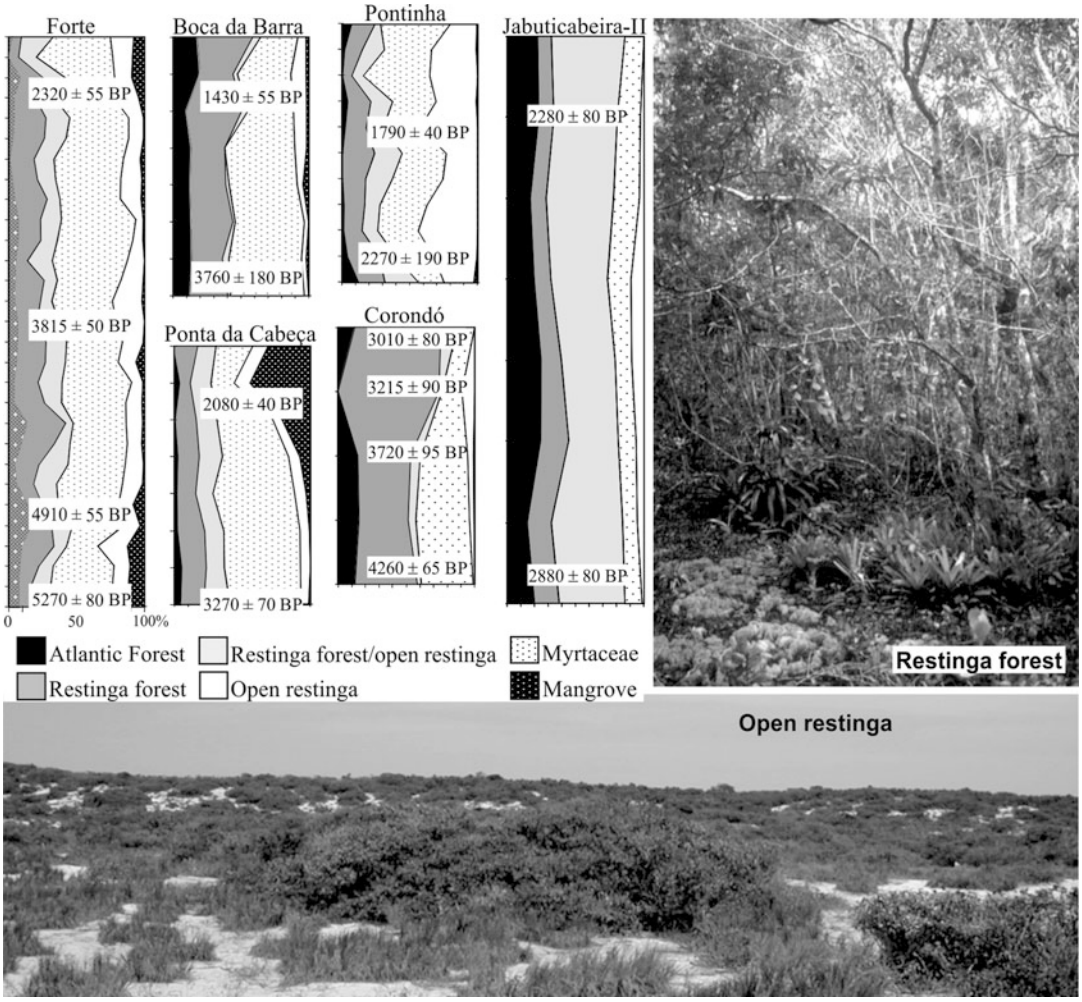
Landscape and Plants Use in Brazilian Shell Mounds, Fig. 1 Geographical location of studied sites. (**a**) Southeastern Rio de Janeiro State, showing the region of Guanabara Bay (to the left) and the "Lakes Region," dominated by the Araruama Lagoon (to the right): (**1**) Sernambetiba, (**2**) Pontinha, (**3**) Beirada, (**4**) Corondó, (**5**) Forte, (**6**) Salinas Peroano, (**7**) Meio, (**8**) Boca da Barra, (**9**) Ponta da Cabeça. (**b**) Northern Santa Catarina State, showing the region of Babitonga Bay: (**10**) Cubatão-I, (**11**) Espinheiros-II, (**12**) Rio Comprido, (**13**) Morro do Ouro, (**14**) Itacoara, (**15**) Forte Marechal Luz, (**16**) Enseada. (**c**) Southern Santa Catarina and Northern Rio Grande do Sul States: (**17**) Jabuticabeira-II, (**18**) Encantada-III, (**19**) Figueira-II, (**20**) Marambaia-I

forest taxa – corroborating their preference for gathering firewood near the sites and the presence of Atlantic forest inland and upon the hills. The few charcoal micro-fragments retrieved from *sambaquis* Meio and Encantada-III only allowed to demonstrate that a *restinga*-type vegetation existed near these sites during the occupation period. Mangrove elements appeared in Forte, Salinas Peroano, Boca da Barra, Ponta da Cabeça, Beirada, and Encantada-III. *Avicennia* and *Laguncularia*-dominated mangroves suggest they occurred mainly in the borders of salty or hypersaline lagoons, rather than along coastal rivers (Scheel-Ybert 2000; Scheel-Ybert and Dias 2007; Scheel-Ybert et al. 2009a; Bianchini et al. 2011; Bianchini and Scheel-Ybert 2012).

Landscape and Plants Use in Brazilian Shell Mounds, Table 1 Geographical location of studied sites, earlier and most recent radiocarbon dates for each site (and datings of layers or features mentioned in the text, when applicable), corresponding calibrated ages, and dated material (*RJ* Rio de Janeiro State, *SC* Santa Catarina State, *RS* Rio Grande do Sul State). Calibrations performed with OxCal 4.2, using the curves SHCal13: Southern Hemisphere (Hogg et al. 2013) for charcoal and seeds, Marine13-modelled ocean average (Reimer et al. 2013) for shells ($R = 220 \pm 20$ years, Estoe et al. 2002), and mixed marine 50:50% SHCal13/Marine13 for human bones

Site	Location	Level/feature	Conventional age	Calibrated age	Dated material
Forte	Cabo Frio, RJ	270–320 cm	5270 ± 80	6265–5755	Charcoal
		Level I	2240 ± 70	2276–1886	Shell
Meio		70 cm	5180 ± 80	5901–5575	Shell
		130–140 cm	4340 ± 70	5259–4585	Charcoal
Salinas Peroano		100–110 cm	4490 ± 40	5288–4878	Charcoal
		20–30 cm	1830 ± 45	1825–1592	Charcoal
Boca da Barra		90–100 cm	3760 ± 180	4574–3586	Charcoal
		20–30 cm	1430 ± 55	1399–1183	Charcoal
Corondó	São Pedro d'Aldeia, RJ	Layer IV	4260 ± 65	4953–4528	Charcoal
		Layer II	3010 ± 80	3360–2894	Charcoal
Ponta da Cabeça	Arraial do Cabo, RJ	160–170 cm	3270 ± 70	3635–3255	Charcoal
		70–80 cm	2080 ± 40	2143–1897	Charcoal
Beirada	Saquarema, RJ	Level IV	4520 ± 190	5446–4450	Shell
		Level I	3800 ± 190	4510–3500	Shell
Pontinha		Level IV	2270 ± 190	2742–1832	Charcoal
		Level II	1790 ± 40	1783–1545	Charcoal
Sernambetiba	Guapimirim, RJ	80–90 cm	1800 ± 40	1807–1571	Charcoal
		500 cm	1920 ± 70	2000–1616	Seed
Rio Comprido	Joinville, SC	(Ancient series)	> 4490	?	?
		(Recent series)	< 4170	?	?
Morro do Ouro		(Ancient series)	4030 ± 40	4509–4245	Collagen, human bone
Cubatão-I		Base	3110 ± 70	3446–3069	Charcoal
Espinheiros-II		Base	2970 ± 60	3119–2773	Shell
Enseada		?	1390 ± 40	1282–1097	Collagen, human bone
Forte Marechal Luz		?	1110 ± 100	1259–766	Charred seeds
		?	850 ± 100	925–564	Charcoal
Itacoara		?	550 ± 55	–	TL, pottery
Encantada-III	Jaguaruna, SC	30–40 cm	4320 ± 40	4971–4651	Charcoal
Jabuticabeira-II		L.5, T13, lev. 7	2890 ± 55	2993–2726	Shell
		L.1, T18	2880 ± 80	3059–2690	Shell
		L.1, T18, lev. 10	2280 ± 80	2427–2011	Charcoal
		L.1, burial 12	2170 ± 45	2111–1852	Shell
		L.3, T11, upper dark layer	1805 ± 65	1833–1536	Charcoal
Figueira-II	Arroio do Sal, RS	Base	3660 ± 40	4085–3830	?
Marambaia-I		Level 13/base	3050 ± 40	3350–3063	?

The only microarchaeobotanical study aiming landscape reconstruction in Brazilian shell mounds, performed in two sites from Southern Brazil dated at 3660 ± 40 and 3050 ± 40 years BP (Figueira-II, Marambaia-I – Pereira 2013), corroborates these findings. This analysis, relying



Landscape and Plants Use in Brazilian Shell Mounds, Fig. 2 Summary charcoal diagrams for *sambaquis* Forte, Boca da Barra, Ponta da Cabeça, Pontinha, Corondó, and Jabuticabeira-II. Aspects of the open scrubby *restinga* (below) and of the *restinga* forest (right) (diagrams Scheel-Ybert 2000; Scheel-Ybert and Dias 2007; Scheel-Ybert et al. 2009b; pictures Rita Scheel-Ybert)

especially on phytoliths and pollen grains, suggested that the sites were established upon soils in process of stabilization, where a humid coastal lacustrine environment rich in Poaceae and Cyperaceae plants gave place to *restinga*.

It is noteworthy that the charcoal assemblage of each anthracologically studied site did not change significantly over the several centuries of occupation, even if climatic oscillations were recorded, in the Southeastern coast, by variations in the mangrove vegetation. These variations corroborate other paleoenvironmental studies in the area, pointing to the alternation of two more humid phases and two episodes of increased dryness with increased lagoon salinity between 5270 ± 80 and 1430 ± 55 years BP (Scheel-Ybert 2000).

The apparent stability of the vegetation, however, was not associated to a stationary or immutable landscape. Multiple phytosociological, climatic, geomorphological, and anthropogenic processes must be taken into account here, and none of them are mutually contradictory: (1) the anthracological record shows that the mainland vegetation types

around the sites were practically the same during all the occupation periods; (2) the vegetation on the sea-land interface (mangrove), conversely, did vary; (3) small-scale climatic oscillations are recorded by these mangrove variations and corroborated by other paleoenvironmental studies; (4) significant sea-level variations, recorded by several studies, attestedly changed the coastal outline and the local lagoons conformation; and (5) (large) sedentary human groups dwelled along the coast for thousands of years.

Although it is expected that climatic changes produce vegetation change, this is not what happened regarding the coastal mainland vegetation, neither in the Southeastern nor in the Southern Brazilian coast. The *restinga* ecosystem being essentially an edaphic formation, that is to say, related to sandy soils and to the geomorphologic nature of sandy beach ridges, is highly resilient and therefore much less sensitive to climatic change (Scheel-Ybert 2000). On the other hand, Holocene sea-level variations are key to understand the coastal landscape during the *sambaquis* occupation. In the Southern-Southeastern coast, it is now well admitted that sea level, which was much lower during the Pleistocene, crossed the present level around 7000 years BP, reached its highest level (c. 2.5 m above the present) around 5500/5000 years BP, and then gradually fell to its present level (Angulo et al. 2006; Castro et al. 2014). When the sea level was higher, the coastline was much farther inland, and a large system of paleolagoons existed. During its retreat, these lagoons were gradually dried. Through a period of changing landscape including processes of partial isolation of water bodies by deposition of sandy barriers or drowning of preexisting dissection valleys, finally a new lagoonal system was established closer to the present sea line.

The coastal vegetation, however, remained the same throughout this process. Drying paleolagoons were gradually occupied by marsh herbaceous vegetation, adapted to humid brackish soils in process of stabilization. This was followed by the establishment of open *restinga* formations and later probably by different kinds of *restinga* physiognomies and by the *restinga* forest. This scenario is supported by both microarchaeobotanical and anthracological results, as presented above (Scheel-Ybert 2000; Pereira 2013).

It is important to keep in mind that all these processes were gradual and rather slow. Therefore, from the viewpoint of the people living there, the coastal landscape was dynamic, but still it was conservative. In other words, although this environment changed all the time, the landscape remained the same.

Another important point to consider is that quite large sedentary human groups (cf. Fish et al. 2013) have probably dwelled along the coast for thousands of years. These people constructed impressive mounds, lived in organized settlements, produced various artifacts, fished, hunted, made large fires, used plants to a variety of purposes, and maybe even managed or cultivated plant foods. They certainly interfered with the landscape and modified it in several ways. In spite of that, no anthropogenic degradation was perceived.

But that doesn't mean that the plant environment remained unaffected by human interference. There is little doubt that plants management was customary. Plant cultivation, possibly horticulture, might also have been practiced, as discussed later. Cultivation leads to the creation of anthropogenic environments, stimulating the introduction of foreign plants and management of native ones.

There seems to exist evidence of plants management in the Southeastern coast. For instance, for a sort of bully tree (*Sideroxylon obtusifolium*, a Sapotaceae), which charcoal was particularly frequent in the archaeological record. These trees and shrubs are quite common in the extant *restinga* vegetation, but they occur remarkably often in the site's vicinity and frequently over the mounds – to the point of being considered a "mound marker." Even if this is a fragile indication, the systematic association of these plants with archaeological sites might be an indication of their ancient use, representing the relict of past human activities. Their present utilities include edible fruits, several medicinal properties, and a good quality wood that is used in the present days to build specific boat parts (Scheel-Ybert 2001).

An interesting hypothesis, still untested, suggests that *sambaqui* people encouraged the dispersion of Myrtaceae plants, therefore contributing to the landscape construction (Bianchini 2008). One possible reason is that many Myrtaceae species produce edible fruits. A number of them, presently domesticated or semidomesticated, are important food items in tropical regions, such as several species of *Psidium*, *Eugenia*, *Myrciaria*, *Campomanesia*, *Syzygium*, and many others. The prominence of Myrtaceae remains in Southeastern and Southern shell mounds demonstrates that *sambaqui* builders largely used these plants both as firewood and as food. The strong contribution of Myrtaceae charcoal in all *sambaquis* anthracological records is striking. The presence of Myrtaceae seeds (as well as wood) associated with the funerary ritual in *sambaqui* Jabuticabeira-II, as it will be presented later, points to a high social value of these plants.

Although common in different communities of Brazilian vegetation, Myrtaceae are typical to *restinga* formations, particularly in Rio de Janeiro State (Araujo and Henriques 1984). The extant *restinga* flora typically presents high species diversity and a great number of individuals from this family, which frequently assumes a strong dominance in this vegetation physiognomy – could it be an evidence of landscape domestication?

Clement (1999) defines landscape domestication as a conscious process by which human manipulation results in changes in landscape ecology and in the demographics of its plant (and animal) populations, resulting in a landscape more productive and congenial for humans. Indeed, it is likely that *sambaqui* builders may have behaved as dispersal agents for these plants – transporting seeds along their paths, exchanging fruits from their "gardens," or in any way managing them, even if incipiently. These activities would tend to increase these plants importance in the environment (both in terms of species diversity as in number of individuals). If that is true, the high frequencies of Myrtaceae and the relative stability of the *restinga* environment would have persisted over such a long time not *in spite of* the human occupation but most likely *because of it* (Scheel-Ybert 2014).

It is nowadays largely accepted that human intervention has had significant consequences on the structuration of the present vegetation (e.g., Denevan 1992; Balée and Erickson 2006; Clement and Junqueira 2010). Human activity does not necessarily lead to degradation and extinction of species, due to the resilience of natural ecosystems. On the contrary, it may actually increase natural biodiversity by forest management, planting, encouraging the growth of an assemblage of useful plants in certain forest spots, and/or introducing new species (e.g., Balée 1994; Rival 1998; Politis 2001), or even, as it might have been the case in coastal Brazil, by modeling the landscape in a large scale and durably altering its structure through the deliberate or unintended encouragement of the prevalence of a whole group of plants.

Plants Use: Food

Currently, it is largely accepted that *sambaqui* builders were fisher-gatherers. For many Brazilian archaeologists, however, the notion of "mollusk gatherers" is still implicit in the second part of this expression. But studies on plants macro- and microremains have been demonstrating that plant consumption, even if secondary, certainly played a pivotal part in their diet and way of life.

Microarchaeobotanical studies in dental calculus have provided essential direct evidence of *sambaqui* people's diet. All studies up to now have been performed in Southern Brazilian sites (Fig. 1, Table 1). In 53 individuals from *sambaquis* Morro do Ouro (4030 ± 40 years BP), Forte Marechal Luz (1110 ± 100–850 ± 100 years BP), Enseada (1390 ± 40 years BP), and Itacoara (550 ± 55 years BP), Wesolowski (2007) identified a great diversity of phytoliths and starch grains, some of the latter modified (which points to cooking or processing). Sweet potatoes (*Ipomoea batatas*), Araceae (the taro family), and Poaceae (grasses) remains are present in all series; yams (*Dioscorea* spp.), palms (Arecaceae), and *Araucaria* pine nuts in most of them; and possibly Marantaceae (the arrowroot/leren family) and bromeliads in some. Possible maize remains were found in the more recent sites, Enseada and

Itacoara. Besides demonstrating that a large variety of plant foods was ingested by *sambaqui* people, this work also suggested that earth ovens were used for cooking and that contact with more inland plateau groups might have happened – the latter due to the presence of *Araucaria* pine nuts, which does not thrive on the coast.

Boyadjian (2012) found very similar results in the Jabuticabeira-II shell mound, which was continuously occupied from at least 2890 ± 55 to 1781 ± 65 years BP. The results from the 19 studied individuals attested a very diversified diet. Among the more than 30 starch grains and phytoliths morphotypes found and identified were sweet potatoes, yams, leren, Myrtaceae (possibly Surinam cherry), Araceae (taro family), palms, and maize. Damaged starches pointed to food processing. The presence of grass phytoliths might suggest the use of grass leaves in the fires. Microcharcoal remains were associated to the roasting of tubers in open hearths or earth ovens. The presence of lacustrine diatoms reasserted the use of lagoonal resources. The diversity of plant microremains and the evidence of consumption of both domesticated and wild plants allowed to suggest that the group lived in a system of mixed economy, where fishing and gathering were associated with horticulture (Boyadjian et al. 2016).

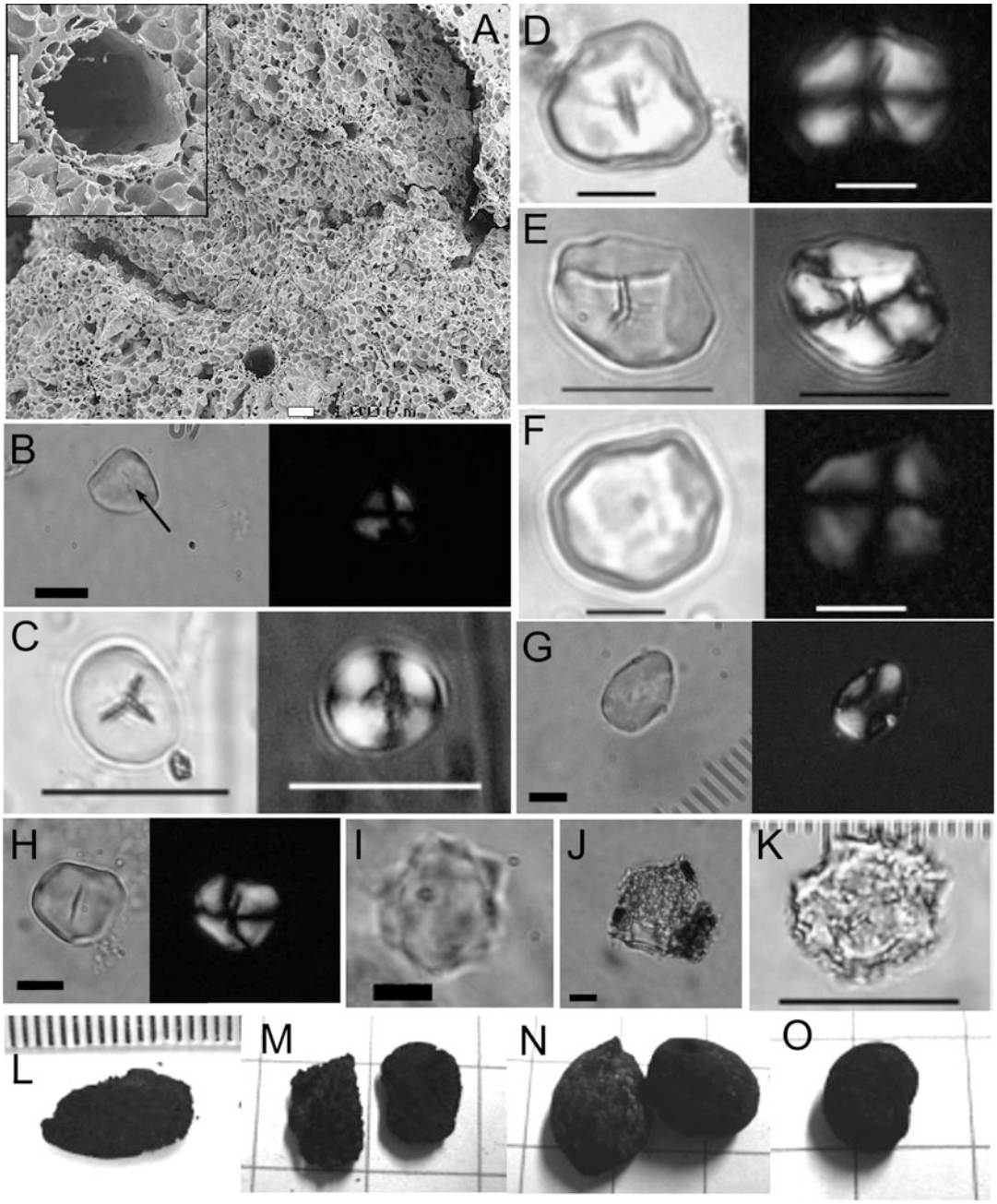
Macroremains analysis also attested the use of plant foods. Sambaquis Forte (5270 ± 80 to 2240 ± 70 years BP), Salinas Peroano (4490 ± 40 to 1830 ± 45 years BP), Boca da Barra (3760 ± 180 to 1430 ± 55 years BP), Ponta da Cabeça (3270 ± 70 to 2080 ± 40 years BP), Beirada (4520 ± 190 to 3800 ± 190 years BP), and Pontinha (2270 ± 190 to 1790 ± 40 years BP), in Southeastern Brazil (Fig. 1, Table 1), presented charred vestiges of edible plants within most of their archaeological levels, starting at the beginning of the occupation. Although never abundant, they are a significant part of the archaeological record, and their preservation attests that (1) they were widely used by these groups and (2) plant gathering greatly contributed to their diet (Scheel-Ybert 2001). Palm nuts, mostly from *Syagrus* sp., are largely the most abundant remain. Some yam (*Dioscorea* spp.) tubers were also identified, along with a Poaceae/Cyperaceae and other monocotyledonous tubers and several seeds that remain as yet unidentified.

Several charred plant food remains were found at a funerary area in *sambaqui* Jabuticabeira-II (2880 ± 80 years BP) (Fig. 1, Table 1). Among them, Bianchini and Scheel-Ybert (2012) identified *Cucurbita* (squash), Myrtaceae (the Surinam cherry family), and Annonaceae (the custard apple family) seeds, as well as palm nuts (*Syagrus* sp., *Butia* sp.).

Occasional uncharred plant remains identifications in different sites also point to the importance of a large diversity of edible plants for these groups. The waterlogged base of *sambaqui* Sernambetiba, dated at 1920 ± 70 years BP (Fig. 1, Table 1), preserved several fruit remains. Heredia and Beltrão (1980) reported identifications of Myrtaceae (cf. *Psidium*/guajava), Lecythidaceae (cf. *Lecythis pisonis*/monkey pot), and two palm species (*Acrocomia* sp. and another). Farias and Scheel-Ybert (2012) identified *Sacoglottis* sp. (axuá), a Chrysobalanaceae, and four palm genera (*Attalea* sp., *Bactris* spp., *Euterpe* sp., *Syagrus* sp.). In site Corondó (4260 ± 65 to 3010 ± 80 years BP/4865–4529 to 3346–2921 cal years BP) (Fig. 1, Table 1), Carvalho (1984) reported the findings of desiccated Myrtaceae (*Psidium* sp., *Eugenia* sp.) and palm (*Astrocaryum* sp., *Bactris* sp.) charred fruits/seeds.

Waterlogged palm remains are rare, having been reported only for *sambaquis* Sernambetiba (Heredia and Beltrão 1980) and Cubatão-I (Santos 2010). Charred palm nuts, however, are extremely frequent in *sambaquis*. Besides the findings cited above, they are recurringly mentioned by archaeologists and are common in most of the sites (e.g., Kneip 1994; Gaspar 1998; Lima 1999, 2000; Scheel-Ybert et al. 2009b).

Besides a large diversity of still unidentified micro- and macroremains, there are multiple indicatives of a number of wild and domesticated food plants (Fig. 3). Annonaceae (the custard apple family), Araceae (the taro family), Chrysobalanaceae (the coco-plum family), Humiriaceae (*Sacoglottis*/axuá), Lecythidaceae (cf. *Lecythis pisonis*/monkey pot), Myrtaceae



Landscape and Plants Use in Brazilian Shell Mounds, Fig. 3 Dietary macro- and microremains found in Southeastern and Southern Brazilian *sambaquis*: (**a**) *Dioscorea* tuber – Forte; (**b**) *Dioscorea* starch grain, Jabuticabeira-II; (**c**) *Zea mays*/maize, Enseada; (**d**) *Ipomoea batatas*/sweet potato starch grain, Forte Marechal Luz; (**e**) *Araucaria* pine nuts starch grain, Enseada; (**f**) Araceae (taro family) starch grain, Forte Marechal Luz; (**g**) *Eugenia*/Surinam cherry seed starch grain, Jabuticabeira-II; (**h**) Poaceae starch grain, Jabuticabeira-II; (**i**) Arecaceae/palm phytolith, Jabuticabeira-II; (**j**) *Calathea* rhizome phytolith, Jabuticabeira-II; (**k**) Marantaceae phytolith, Forte Marechal Luz; (**l**) Cucurbitaceae seed; (**m**) Annonaceae (cf. *Rollinia* sp.) seeds; (**n**) *Syagrus* sp. (Palmae) endocarp; (**o**) Myrtaceae seed. (**a**: Scheel-Ybert 2001; **b**, **g**–**j**, Boyadjian 2012; **c**–**f**, **k**, Wesolowski 2007; **l**–**o**, Bianchini and Scheel-Ybert 2012)

(mostly *Psidium*/guajava and *Eugenia*/Surinam cherry), and palms (*Acrocomia*, *Astrocaryum*, *Attalea*, *Bactris*, *Butia*, *Euterpe*, *Syagrus*) are probably wild plants. Convolvulaceae (*Ipomoea batatas*/sweet potato), Cucurbitaceae (*Cucurbita*/squash), Dioscoreaceae (*Dioscorea*/yam), and Marantaceae (*Calathea*/leren) may include domesticated species, while maize (Poaceae – *Zea mays*) is certainly domesticated. The diversity of plant foods associated to the finding of both domesticated and wild plants in the same contexts suggests the practice of both plant gathering and horticulture. Horticultural systems associate different wild and domesticated plants that are cultivated in the same space, in this case, probably, in house gardens.

Considering maize, it could be a part of this horticultural system, and as such, cultivated in a small scale, or its presence in the sites might be a result of exchanges with inland agriculturalist populations, along with *Araucaria* pine nuts.

The mere idea of cultivation among *sambaqui* builders, however, is most controversial. Low caries prevalence, traditionally found among these people, has always been related to low carbohydrates consumption and therefore to foraging (Mendonça de Souza 1995). However, some series from some sites present higher caries rates, compatible with horticulture (Wesolowski 2007). Besides, we must keep in mind that caries is a multifactorial infectious disease and that the association between caries prevalence and diet is indirect. Many factors may contribute to a lesser caries incidence even in the presence of cariogenic food, as amylaceous seeds and tubers, such as individual/population susceptibility, intense tooth wear (typical of these populations), and the presence of minerals in the diet, especially fluoride, which is known to be a caries inhibitor. Particularly, it is well accepted that a high reliance on aquatic resources, as it is the case for *sambaqui* builders, leads to a protection against caries (Wesolowski 2007; Scheel-Ybert et al. 2009b).

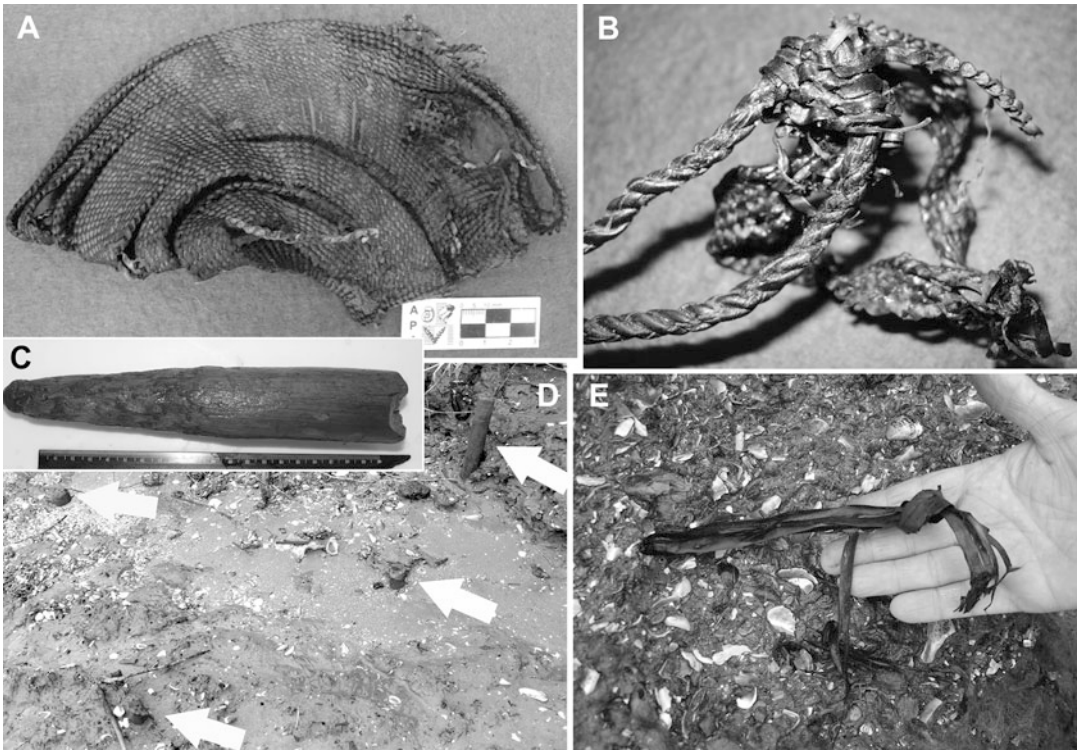
The accumulated evidence, however, is eloquent. Vestiges of wild and (possibly) domesticated plants have been evidenced in different sites, in different contexts, and from different proxies. The importance of a variety of tuberous species (yams, sweet potatoes, leren/arrowroot, some taro-related species, and several as yet unidentified tubers) is demonstrated since the earlier studied contexts (5270 ± 80 BP/6190–5760 cal years BP). Although most of the archaeobotanical evidence remains still unidentified, it is clear that fruits (such as guajava, Surinam cherry, and possibly other Myrtaceae, besides Annonaceae, Chrysobalanaceae, and Humiriaceae), seeds (cf. monkey pot), and other vegetables (such as squash) were also regularly consumed. Maize was certainly not a staple food for these people, but it might be cultivated and/or obtained through exchange to meet special usages.

Palm remains stand out as the most frequent and the most diverse plant item up to now. Palm nuts occur in *sambaquis* from all along the Brazilian coast since the earlier known occupations. Several species of at least seven genera were already identified. Palms are widely known for providing edible fruits and seeds, which are savory and rich in oils and carbohydrates, as well as nutritious buds (hearts of palm). They also provide useful fibers, leaves, and wood. Due to the multiplicity of important resources they offer, palms are high-value plants for most neotropical traditional populations and indigenous groups. There is no doubt they were extremely important for *sambaqui* people as well, being used both in domestic and ritual contexts.

Although a much greater investment in archaeobotanical studies is still needed, these ecofacts certainly are a significant part of the archaeological record. Their preservation attests that they were widely used by these populations and demonstrates that economic and subsistence spectra are much larger than formerly believed and that plant foods were making a substantial contribution to their diet.

Plants Use: Artifacts, Construction Material, and Others

Shell mound builders probably handcrafted a large variety of artifacts in wood, fibers, seeds, and other plant parts. However, very few remains have subsisted, due to preservation issues.



Landscape and Plants Use in Brazilian Shell Mounds, Fig. 4 Waterlogged artifacts from *sambaqui* Cubatão-I: (**a**) basketry, (**b**) rope with braided fibers, (**c**) wooden post, (**d**) wooden posts in situ (see arrows), (**e**) knotted fibers in situ (**a**–**c**, **e**: pictures courtesy of Museu Arqueológico de Sambaqui de Joinville; **d**, picture Rita Scheel-Ybert)

Archaeologists found waterlogged plant remains in the lower layers of *sambaqui* Cubatão-I (Southern Brazil), dated at 3480 ± 60 BP (Fig. 1, Table 1), which are permanently inundated by a river (Fig. 4). Wood posts and fibers, the latter frequently worked in basketry and ropes, compose an impressive collection. Santos (2010) describes fragments of baskets of different sizes, ropes twisted from long fibers, with or without knots, artifacts combining basketry and ropes, and many knotted fiber fragments, worked and twisted in different ways. Peixe et al. (2007) analyzed some of these fragments, all of them being identified as produced from adventitious roots of *Philodendron* (Araceae).

A great number of aligned posts remains were found in this site's base, some positioned perpendicularly and some parallel to the soil surface (Fig. 4c, d). They were interpreted as the remains of a platform projected to sustain the site over the mangrove muddy sediment upon which it was established. Melo et al. (2016) analyzed 30 of this site's posts and identified a large variety of wood types, including several mangrove species, some Fabaceae, besides species of Bignoniaceae, Lauraceae, Anacardiaceae, and Annonaceae. They interpreted the wood choice as based on the availability of woody plants in the surrounding environments (meaning there was not a particular wood selection) but also in the physical and mechanical wood properties. Most of the identified wood types are characterized by medium to high density, suggesting those woods were very resistant to decay and therefore well adapted to construction and structural frames.

The waterlogged base of *sambaqui* Espinheiros-II (Southern Brazil), dated at 2970 ± 60 BP (Fig. 1, Table 1), also revealed fibers, probably of grasses or palms, frequently tressed and twisted (Figuti and Klokler 1996).

The remains of a charred post associated with a funerary context dated at 2170 ± 45 years BP in

site Jabuticabeira-II were identified as a Lauraceae species – a plant from the cinnamon family (Bianchini et al. 2007). Another sample from this site, coming from a feature in another funerary area with several postholes, dated at 2880 ± 80 years BP, presented a particularly high frequency of Lauraceae charcoal pieces. It is possible, although not proven, that this charcoal also comes from carbonized posts. More studies are still necessary in order to investigate the possibility of wood selection. Yet, it is interesting that this particular wood was used, as these species are known for their resistance, durability, and essence contents and thus modernly considered high-quality woods.

On the other hand, an overrepresentation of *Condalia* sp. (a sort of snakewood, of the Rhamnaceae family), in several sites from Southeastern Brazil (Forte, Boca da Barra, Salinas Peroano, and Ponta da Cabeça), dated from 5270 ± 80 to 1430 ± 55 years BP, allowed to demonstrate a cultural selection of this species. A possible utilization of this taxon in rituals was proposed. However, economic uses for this species cannot be discarded, for its wood produces a blue pigment, besides being considered excellent firewood; the root bark of some species is used as soap or medicine, and the plants bears edible fruits. This plant is very rare in the present vegetation of the region, which might be a consequence of its overexploitation in the past (Scheel-Ybert 2000, 2014).

In addition to that, fruits of a Bombacaceae (cf. *Ceiba/Bombax*), which produces very useful fibers, were identified from the waterlogged base of *sambaqui* Sernambetiba (Heredia and Beltrão 1980).

Palms, as mentioned in the previous section, are extremely frequent in Brazilian shell mounds. Although almost all vestiges consist of fruits and seeds, some charred wood remains were also identified at Ponta da Cabeça (3270 ± 70–2080 ± 40 BP) and Corondó (4260 ± 65–3010 ± 80 BP) sites, in the Southeastern coast, and at Jabuticabeira-II (2880 ± 80 years BP) and Encantada-III (4320 ± 40 BP), in the Southern coast. As palm stems are usually poor or impractical firewood, it is conceivable that at least some of these remains could stand for artifacts, construction material, the debris of their handicraft, or else for special firewood. Indeed, palms are extremely useful plants that, besides food, provide fibers (for basketry and ropes), leaves (for artifacts and shelter covering), and wood (for artifacts and construction).

However, the preservation of artifacts produced from plant material is even more hazardous than food, at the same level that is the preservation of medicine, dyes, soaps, and so many plant uses. That is so because archaeological preservation depends both on the characteristics of the plant tissues that were used (hard parts tend to preserve much easier than fleshy parts) and on preservation conditions. Waterlogging and desiccation are rare, and carbonization depends on whether or not the plant material is directly exposed to fire, intentionally or accidentally, in the process of preparation, use, or discard. The unlikeliness of preservation of each one of the abovementioned items, therefore, is what makes their retrieval so significant, as they represent invaluable clues to the *sambaqui* builders' ways of life.

Even if these priceless clues are still scarce, they come to strengthen the views of *sambaqui* builders as skillful artisans, who produced elaborated artifacts from different materials such as rocks, bones, shells, and also plants. They also highlight the variety of complex choices that were made in different aspects of their daily life, regarding practical and economic issues but also ceremonial and symbolic matters.

Plants Use: Firewood

Fire was a central element in the life of *sambaqui* people. In domestic context, cooking, roasting, lighting, and other activities are central to daily life. In funerary spaces there are countless fireplaces, many of which were maintained for long periods to honor the dead.

Both in domestic and in ceremonial contexts, gathering of deadwood was the main source of firewood (e.g., Scheel-Ybert 2000). The high floristic diversity of all already studied charcoal assemblages points to nonselective wood

gathering. The prevalence of decay and xylophage stigmas, besides demonstrating the collection of necromass, is evidence of nonselective firewood supplying.

It is remarkable that the floristic diversity of anthracological assemblages from both possible domestic contexts (non-funerary constructive layers) as ritual features (funerary layers) is comparable and extremely high (e.g., Scheel-Ybert 2000; Bianchini et al. 2011). This suggests that charcoal remains were both associated with extended temporal activities and corresponded to wood collection in a relatively large area around the sites. Those are essential premises for reliable paleoecological interpretation based on archaeological charcoal. Besides, it supports the claims for sedentarism and long-term occupation of shell mound sites.

Notice that, although *sambaquis* are considered to be funerary and ceremonial sites, remains of domestic firewood may be retrieved from non-funerary constructive layers. These are believed to represent secondary deposits. Micromorphological (Villagran et al. 2010) and anthracological evidence (Scheel-Ybert 2014) suggest that domestic residues (essentially shells, fish bones, and dispersed charcoal) were accumulated in dumping areas or in domestic context aiming to become construction material and were latter employed as construction material to cover the funerary areas.

Numerous and frequently very large hearths occur in the funerary layers. Anthracological analysis of some of these features in *sambaqui* Jabuticabeira-II also demonstrated particularly high wood species diversity (Bianchini and Scheel-Ybert 2012). This result, while corroborating interpretations based on dispersed charcoal, points simultaneously to nonselective gathering and to long-lasting activities. Hearths presenting a high taxonomic diversity correspond to fires that were repeatedly lit at the same place or else that were maintained and continuously fed for a long time. This means Jabuticabeira-II funerary hearths represent long-lasting events, suggesting the mortuary rites of *sambaqui* people might persist at least for several days. It also implies a large investment of work and effort of this social group in collecting firewood and in fire maintenance.

These results suggest that the mortuary rites of sambaqui people might be very important long-duration events. They also highlight the importance of fire as a central element in sambaqui life, another connection between the living and the dead. By these means, besides being monumental buildings erected as landmarks, the mounds became even more visible by the continuously burning flames upon them.

Plants Use: Ritual

Sambaquis are thought to be funerary monuments and ceremonial spaces. The magnitude of the sites themselves, the complex constructive process, rich funerary offerings, and features that reflect an elaborated mortuary ritual point to the importance of passage rites in this society (Gaspar 2004; Klokler 2008). In these circumstances, we may expect considerable investments of time, effort, and resources. We may also expect the material integrating the funerary ritual to have been carefully selected, according to the ideological/symbolical universe of the group.

Sambaqui Jabuticabeira-II, presently one of the best excavated and understood sites in Brazil, is the first one for which the practice of funerary feastings was proposed. Klokler (2012) describes the mortuary ritual as follows: each funerary area would receive a few or several burials. The bodies were laid over the ground or in shallow graves. Hearths, always associated with the burials, were an integral part of the rites. Posts placed around the graves and hearths suggest fences or structures that protected the body until the area was covered. Eventually, funerary areas were covered with shell-rich sediments ("covering" or "constructive" layers), and a new funerary area was established above it or in another area of the site. During the rites, funerary offerings and ritual feastings occurred. Entire fishes (suggested by articulated fish bones) were placed inside the graves. Mammals and bird parts were also probably placed as offerings, although they might as well be consumed in the feastings. Food preparation and feasting were conducted nearby but probably not

over the funerary area itself, as suggested by shells integrity, pointing to little trampling. In these areas, fishes were roasted or smoked and ritually consumed. The residues were then transported and deposited over the funerary area. These residues suggest that fishes were the main food in those feastings and that more than one ton of fish meat might be available per feasting. The fish species used (mainly croakers and catfishes) were common in the paleolagoon and ordinarily used in domestic context as well, but mammals and bird remains appear exclusively in funerary context.

Meat was not the only food consumed in rituals, though. Archaeobotanical analyses in this site attested that plants were also an important part of mortuary rituals (Bianchini and Scheel-Ybert 2012). Analyses of a funerary area (i.e., ritually deposited material) and of constructive material from its covering layers (i.e., possible domestic deposited material) demonstrated that edible plant parts (fruits, seeds, and tubers) are strictly associated to funerary features. These food remains are prevalent in specific features of the mortuary layers, especially hearths. It is likely that fruits were placed as offerings or consumed as part of the funerary rituals or feasting ceremonies.

There is no evidence of these fruits being consumed in domestic contexts (as their remains do not appear in the covering layers), but it is quite probable that they were. Different ways of consumption in each context might result in a differential preservation of remains. During funerary rituals, where fire is an essential element, they might be regularly charred – and in consequence more probably preserved. Charring is likely to happen in this context either if plant parts represent an offering or if they are ritually consumed, as in both cases the whole fruit or its remains (seeds) might be set to the fire. In domestic contexts, however, fleshy fruits such as Myrtaceae and Annonaceae are consumed fresh and therefore have very little chance of entering in contact with fire, thus being uncommonly preserved as archaeological vestiges (Scheel-Ybert 2013).

It is not possible, at the present stage of knowledge, to ascertain if those plant foods were consumed in funerary feastings or if they were part of mortuary offerings or both. Actually, it is very hard to differentiate feastings from offerings. However, the evidence strengthens the hypothesis of ritually consumed food while demonstrating that not only animal food was used in these ceremonies but plant food as well.

Major Accomplishments and Future Directions

Archaeobotanical studies are still young in the country, and many questions subsist concerning plant-related issues in Brazilian shell mounds. However, although still fragmentary and incomplete, important results have already been achieved concerning subsistence, plant use, landscape reconstruction, and firewood use in domestic and ritualistic contexts, as summarized below.

Anthracological results converge in demonstrating that *sambaqui* people settled in the *restinga* ecosystem. Their firewood and plant catchment area included the open *restinga*, the *restinga* forest, and, less frequently, the Atlantic forest, as well as mangroves, when these existed. Holocene climatic and sea-level variations induced changes in the mangrove vegetation, in the lagoons conformation, and in the spatial distribution of *restinga* physiognomies, but the *restinga* vegetation types maintained floristic composition and general structure all along. We suggest that although this dynamic environment changed all the time, the landscape remained the same.

Landscape domestication is suggested. Horticulture and plant management probably increased the frequencies of certain species; the possibility of overexploitation of other species has also been raised. The long-term human interference on the landscape might have deliberately or unintendedly modeled the coastal vegetation in a large scale, leaving durable phytosociological alterations which extent is as yet impossible to ascertain.

The importance of plants to *sambaqui* people's subsistence is clearly demonstrated. The large variety of wild and domesticated plant foods suggests that *sambaqui* people lived in a system of

mixed economy, where fishing and gathering were associated with horticulture. At the same time, these plants played an important role in ritualistic activities, as they were offered in funerary rituals and/or consumed during mortuary feastings.

The exceptional preservation of a few botanical artifacts and some specially selected plant materials strengthens the views of *sambaqui* builders as skillful artisans, who produced elaborated artifacts not only from rocks, bones, and shells but also from plants. They also highlight the variety of complex choices that were made in different aspects of their daily life, regarding practical and economic issues but also ceremonial and symbolic matters.

It was demonstrated that opportunistic gathering of deadwood was the main source of firewood both in domestic and in ceremonial contexts. Mortuary rites integrated many activities of special care to the dead, each one of them using plants for different purposes. These rites, certainly very important events, persisted at least for several days and were accompanied by long-lasting fires that were continuously fed over a long time.

Those results corroborate the interpretations of these shell mounds adopted in more recent research in Brazilian archeology, that is to say, that of *sambaquis* as funerary structures, monumental landscape markers, and social congregation sites, built from a strong organized labor investment.

The sheer magnitude of these sites and its complex construction processes and funerary features reflect elaborated mortuary rituals. As spaces of ritualized offerings and feasts, these mounds represent a connection between the world of the living and the world of the dead. All these aspects attest of the central role of death in the cosmology of *sambaqui* groups while also attesting of the central role of plants in their life.

Plants have been essential for humankind at all times. Plants are food, heat, light, clothing, shelter, tool, medicine, material, protection, transport, and much more. Plants may be reference, landscape markers, house of spirits, vehicle to the spiritual world, or even people. Plants are vital for human survival. In spite of that, plants are frequently considered second-rate provisions, most especially in the case of non-agriculturalist populations. Their seemingly easy availability leads to undervalue and underestimation. Besides, their omnipresence in everyday life as in ceremonial events contrasts with their quasi-invisibility in the archaeological record. Retracing their importance is a task doomed to imperfection that demands retrieving small and fragmentary evidence. Nevertheless, it is worth the effort, for it helps provide a much more complete and faithful picture of past population's way of life.

It is therefore of the utmost importance that archaeobotanical studies be pursued and that field research aimed at maximizing the recovery of plant remains through flotation and careful microarchaeobotanical sampling be multiplied. The scenario perceived through the analyses already done in Brazilian shell mounds proves the effort worthy. The available data allowed good landscape reconstructions while pointing to a great diversity of plant uses and corroborating the importance of plants for *sambaqui* people. Yet, much remains to be done, and understanding of the use of plant resources by *sambaqui* builders is far from complete.

Cross-References

- ▶ Anthropogenic Environments, Archaeology of
- ▶ Archaeobotany
- ▶ Archaeobotany of Early Agriculture: Macrobotany
- ▶ Archaeobotany of Early Agriculture: Microbotanical Analysis
- ▶ Historical Ecology and Environmental Archaeology
- ▶ Historical Ecology in Archaeology
- ▶ Landscape Archaeology
- ▶ Landscape Domestication and Archaeology
- ▶ Maize: Origins and Development
- ▶ Maritime Landscapes
- ▶ Paleoethnobotany
- ▶ People as Agents of Environmental Change
- ▶ Phytolith Studies in Archaeology
- ▶ Plant Domestication and Cultivation in Archaeology

- ▶ Sambaquis Shell Mounds, Archaeology of
- ▶ Shell Middens and Coastal Archaeology in Southern South America
- ▶ Taphonomy of Plant Micro-remains in Environmental Archaeology
- ▶ Yams: Origins and Development

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Landscape Archaeology

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Introduction

An ever-present characteristic in any definition of landscape archaeology is that it refers to a varied and somewhat heterogeneous field of archaeological research. A number of approaches to the archaeological record may be included under this label, which in essence share one common interest: the analysis, through material culture, of the spatial dimension of human activity; in other

words, exploring how human communities have related to a geographic space through time in terms of how they appropriated this space and/or transformed its appearance through work and its significance through cultural practices.

There are two main reasons that explain why landscape archaeology is a wide-ranging concept today – firstly, the general changes in the theoretical foundations of the archaeological discourse that have occurred through time, especially since the middle of the twentieth century, and secondly, the different theoretical perspectives, both past and present, regarding the central concept of landscape that have been developed not only within the archaeological literature but in other fields such as geography or anthropology.

Definition

While running the risk of oversimplification, it can be said that the use of landscape in archaeology has been understood in three different ways, which sometimes have been complementary to each other and at other times mutually exclusive:

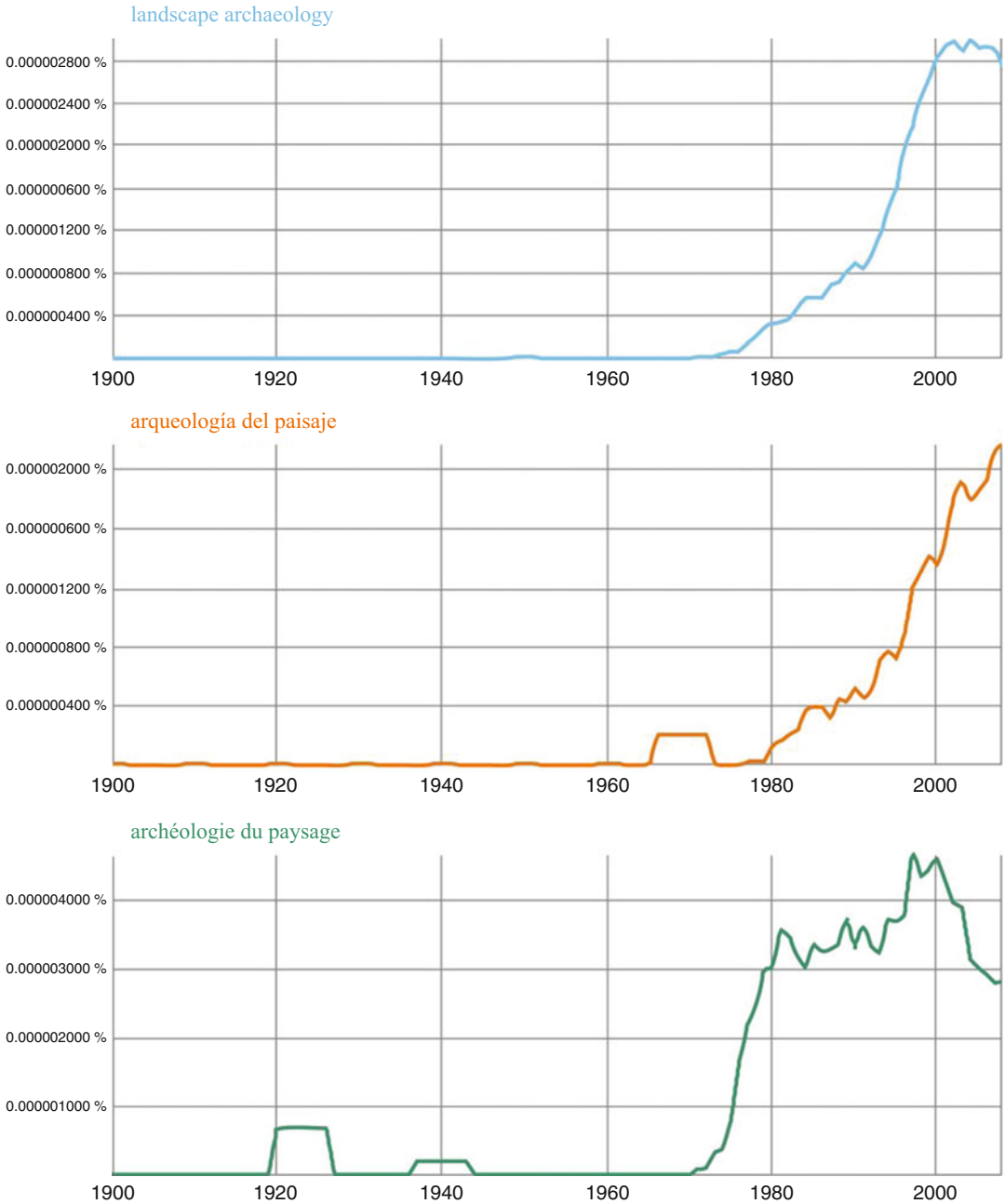
- As a context to better signify and understand the material record (for instance, by analyzing settlement patterns or off-site archaeology).
- As an objective, as something that archaeological research aims to positively reconstruct, by creating images of how ancient landscapes would have looked at any specific moment in the past (for instance, through environmental reconstruction).
- As a research object, considering that the landscapes we see today should themselves be considered as an archaeological record as a whole. Current landscapes would be the more obvious "artifacts" produced by human groups through time.

Historical Background

From a historiographical point of view, the origin of most of the concepts and proposals upon which landscape archaeology has been built are to be found in geography. Since the end of the nineteenth century, geographers such as Ratzel, Hettner, Slütter, or Vidal de la Blache began to stress the importance of analyzing the interaction between humans and their environments. Although from different (and even conflicting) backgrounds, they paved the way for the first schools of regional geography. It is true to say that at this stage, their direct influence on archaeology was by no means significant. However, they are important because two traditions that would have a major impact on archaeological interest in the landscape were developed after them: on the one hand, the incorporation of the proposals of Vidal de la Blanche into the theoretical framework of the French Annales School and, on the other, the development of the so-called cultural geography, in particular the remarkable work of Carl O. Sauer (Berkeley School) in the United States (Fig. 1).

The first, the Annales School, would have a major impact in the Mediterranean area, especially in France, where a significant and long-lasting archaeological tradition developed. This is a type of archaeology mainly focused on analyzing the formation of rural landscapes, identifying the forms of ancient agrarian landscapes and reconstructing of the social processes behind their formation. The study of ancient cadastres is among their most widespread manifestations. This archaeological tradition is based on the detailed reconnaissance and documentation of ancient structures currently visible in the landscape, with an intensive use of information sources such as aerial photography, whose popularization in archaeology is closely related to the development of this tradition. Quite often, this is complemented with the use of documentary sources, such as historical cadastres. A large amount of archaeological research has been carried out within this framework, making it possible to reconstruct the forms of ancient agrarian spaces, especially for historical periods such as Roman or Medieval times, for which complementary written sources are abundant.

In turn and rooted in cultural geography, the first proposals concerning the relevance of the



Landscape Archaeology, Fig. 1 Relative occurrence of the expression "landscape archaeology" in books published throughout the twentieth and start of the twenty-first centuries in English, Spanish, and French. (Data obtained from Google Ngram Viewer (accessed 2 September 2011)). Vertical scales are different in each case

spatial dimension for a comprehensive understanding of the archaeological record developed in British and American contexts. The book by Aston and Rowley (1974) is typically mentioned as the first to refer to the concept of landscape archaeology as something specific, different to the study of rural landscapes that had been carried out by geographers or historians (with the work of

W. Hoskins being especially influential in the British context).

From the 1960s and especially the 1970s, interest in the spatial dimension of the archaeological record flourished, in close contact with the development of the new archaeology and the environmental archaeology. This processual movement, with its strong emphasis on methodology, opened the door for the incorporation into archaeology of methods and techniques developed in other disciplines, notably Geography (such as locational analysis and site catchment analysis). Also, concepts such as space or the environment became central to archaeological research at that time. All of these innovations were aimed at analyzing the relationship between human groups and their environments in a widely adaptive, economic perspective.

From the 1990s onwards and in relation with the emergence of post-processual approaches, the concept of space, as used in previous years, was challenged for being deterministic, modern, and aculturally rational. As a result, it was argued that applying it straightforwardly to cultural contexts other than the contemporary Western world does not make any sense, which applies to most of the contexts in which archaeological research is interested. As an alternative, authors mainly from the British context argued for a reformulation of the concept of landscape: as opposed to an external environment, prior to humans, it is argued that it should be understood as a social and cultural construction, something shaped, handled, appropriated, and ordered in both material and conceptual terms. Despite a large number of publications on the subject, C. Tilley's A Phenomenology of Landscape is considered the landmark, where these ideas were developed in detail for the first time from an archaeological perspective. This is well in line with conceptual trends that emerged quite earlier in time in other fields of the social sciences, such as perception studies in Geography or Planning (for instance, Lynch 1960) that also challenged the positivist paradigm. The relationship between humans and the landscape was no longer described in terms of adaptation or exploitation but using different notions such as perception, experience, or engagement. And, in so doing, an opposition between the concepts of space and landscape was developed, with the former being something neutral, alien to human experience, and the latter something appropriated, experienced, and perceived (Fig. 2).

Those proposals achieved a degree of success during the 1990s and onwards, although they have also been widely accused of being too speculative

Landscape Archaeology, Fig. 2 *Cerritos de indios* in the Uruguayan region of Rocha. Landscape archaeology has been especially interested in the analysis of landscapes defined by different types of artificial features, such as funerary monuments. (Photography by Camila Gianotti. Reproduced with permission)

at times, negligent with data and evidence, or lacking a solid methodology. In any case, although they had a substantial impact in some areas, they had little influence in others, where alternate theoretical traditions held sway. This is the case of France, where the main trends in landscape archaeology remained aligned with tradition that was based on or inspired by the Annales School, which remains alive elsewhere (for instance, Bintliff et al. 2007). This is not the case in either Italy or Spain where, within quite varied and heterogeneous traditions, it is interesting to note the influence of historical materialism in the development of a socially oriented landscape archaeology, a tradition that has been also successful in Latin America.

Key Issues/Current Debates

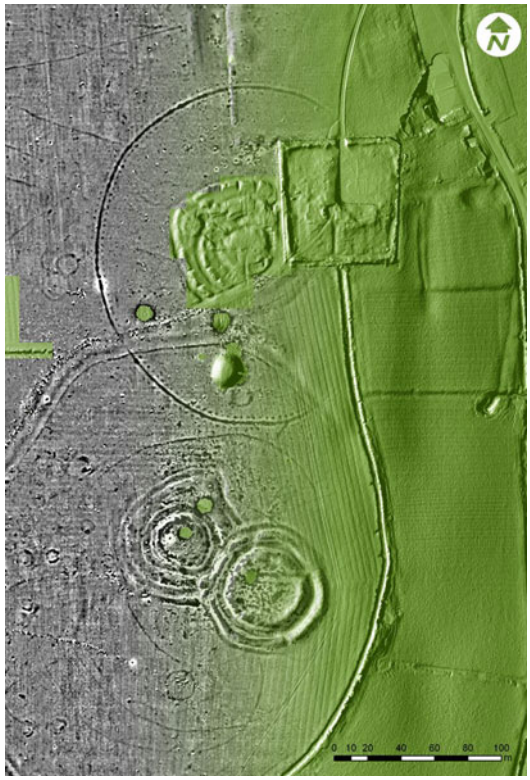
A few issues can be highlighted in the current practice of landscape archaeology. The first concerns theoretical and conceptual questions. As mentioned above, the 1990s were arguably the period when landscape archaeology reached the zenith of its success and popularity. To a great extent, this was associated with the coexistence of a range of different approaches and, consequently, a boom in the number of publications. A good part of the academic literature (especially the most influential) gravitated around the possibilities for the development of a phenomenology-inspired approach to landscape. A major field for discussion has developed around the actual viability of these approaches. Among others, special mention should be made of Fleming's criticism (2006) due to its impact. This field of discussion is still alive and kicking today and affects the theoretical foundations of landscape archaeology and the very concept of landscape that is, or may be, behind it (for instance, a recent contribution is Barrett and Ko 2009).

In close connection with this, some approaches have been made to a significant question that post-processual archaeologies somehow left unattended: the development of original methodologies and fieldwork procedures, suited for the kind of theoretical proposals and research objectives that were being produced. Although no claims for maturity and solid advances have been made so far, it has constituted an interesting field of activity in recent years (for instance, Hamilton et al. 2006).

In a totally different direction, recent years have seen a boom in scientific approaches to environmental analysis, such as geoarchaeology. As an example, in the recent volume edited by B. David and J. Thomas (2008), 24 out of a total of 65 contributions are included in the section "Characterising Landscapes," broadly falling within this scope. To some extent, this has been boosted by some technological improvements: a significant increase in the availability of more numerous and refined tools, techniques, and analytical procedures to assist archaeological research and to extract information from the material and environmental record (for instance, Reindel and Wagner 2009). The possibility to gather much more information on a larger scale and at the same time with increasing levels of detail and accuracy pose challenging problems for data management and processing. But at the same time, this means that the possibilities of overcoming the limited analytical scale of the single site and carrying out comprehensive research at the landscape scale are multiplying (Fig. 3).

However, we have not just witnessed a leap forward in technological terms. It is also important to take into account the inclusion of archaeologists in long-range discussions, such as those concerning global change. The natural disposition of archaeology for analyzing change in the long term and its intimacy with the study of human impact on the environment have returned the analysis of environmental change to the forefront for some practitioners of a landscape-related archaeology (for instance, Redman et al. 2004). This has made it possible to incorporate archaeological perspectives into wider debates, where a vision of the landscape in socio-ecological terms prevails, and to complement it with more culturally balanced views (for instance, McAnny and Yoffee 2009) (Fig. 4).

The incorporation of archaeology into the environmental debate has had an additional



Landscape Archaeology, Fig. 3 The development of geo-spatial technologies is enabling the highly detailed documentation of large-scale landscapes like never before. Integration of geophysical survey and high-resolution Lidar of the Hill of Tara, Ireland. (© The Discovery Programme, 2011. Reproduced with permission (many thanks to Anthony Corns))

dimension in terms of practical applicability. In the last few decades, environmental management policies have increasingly taken into consideration human effects as something that is difficult to be limited in space and more complex than a simple question of physical impact. Archaeology, as long as it is involved with cultural resource management, has had an increasingly visible role within this field (for instance, Jones and Slinn 2006). More specifically, the use by landscape archaeology of some relevant concepts and categories has allowed it to have a visible influence in the development of dominant paradigms.

Beyond environmental management, this influence is visible in the major relevance recently acquired by the concept of cultural landscapes (although the concept itself was originally coined by Carl O. Sauer back in 1925). Two parallel roads have helped to spread the concept. On the one hand, UNESCO defined it as a key concept for the management and protection of the Cultural Heritage in the Operational Guidelines for the Implementation of the World Heritage Convention (1992). On the other hand, the approval by the Council of Europe of the European Landscape Convention (ELC) in 2000 laid the foundations for the incorporation of the landscape as a legal figure throughout Europe and beyond. The ELC uses a self-sufficient concept of landscape, without any additions: it is something holistic that integrates the natural and the cultural, the environmental, and the social. This is well in line with what landscape archaeology had been discussing and makes it possible to understand why it has become increasingly involved in the fields of practical characterization and management (Fig. 5).

Finally, the landscape, like any other central concept in archaeology, has been challenged from the series of theoretical positions that can broadly be defined as postcolonial. Once again, this is a field of discussion that is not only archaeological but has strong links with other disciplines, especially anthropology. Criticism has been levelled against most dimensions of archaeology as a Western-driven and Western-oriented form of knowledge and a discourse of power, which includes the concepts and practices of most of landscape archaeology. What is demanded is "to visualize the archaeological practice and landscape studies as an open arena in which different actors, interests and themes could be achieved and worked in a collaborative performance accounting also for the geopolitics of knowledge production" (Curtoni 2009: 15). A concept that comprehensively expresses and summarizes these visions is that of contested landscapes (Bender and Winer 2001). Debates within this arena affect Landscape Archaeology

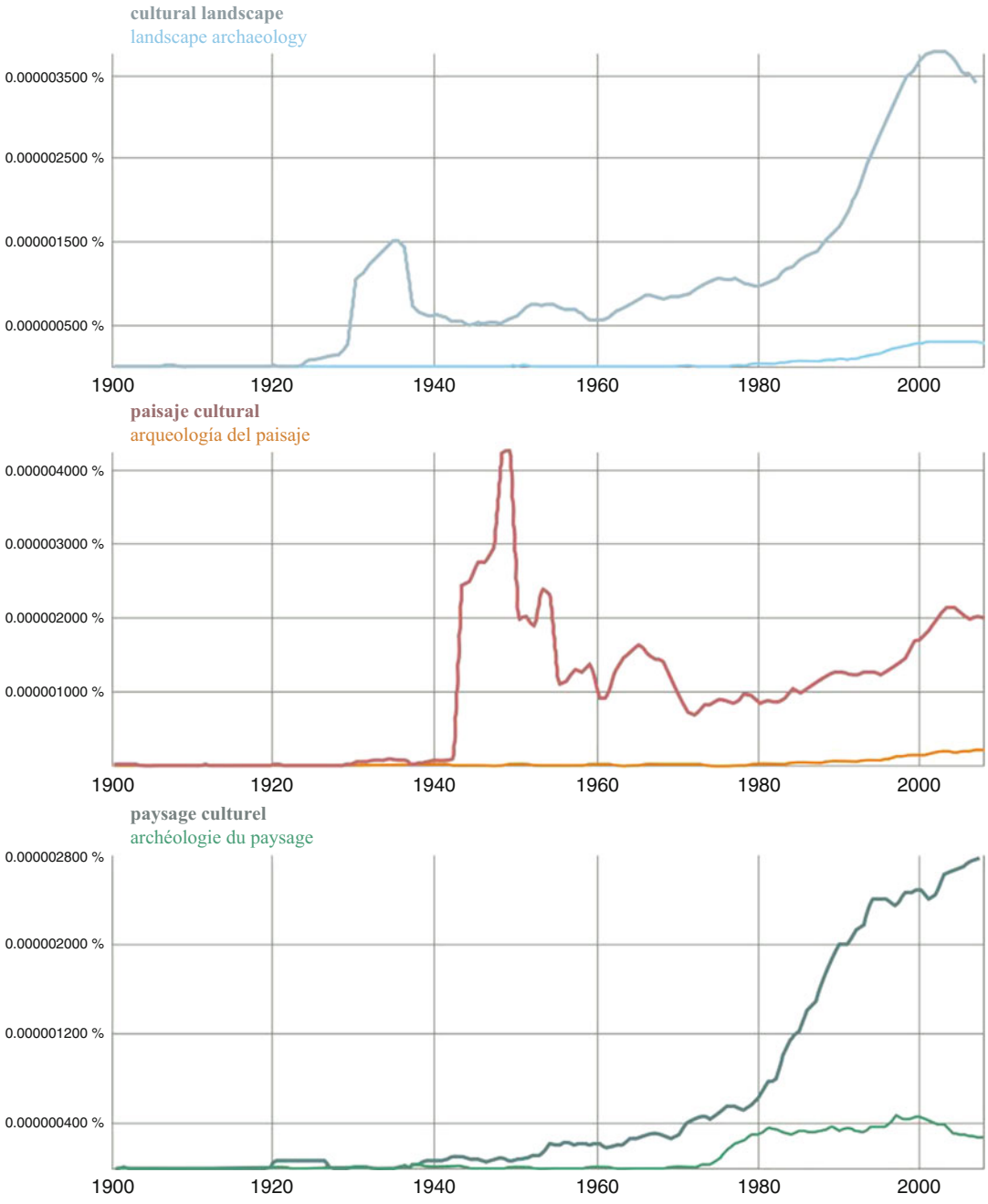
Landscape Archaeology, Fig. 4 Pre-Hispanic irrigation channels in the extremely dry landscape of the Alto Loa region, in the margins of the Atacama Desert (Chile). Geoarchaeological approaches to landscape have gained new impetus in recent years, focusing on the analysis of environmental change and human impact

not only as a discipline for the study of the past but also, and remarkably, as a discourse related to the construction of Cultural Heritage in the present (for instance, Schofield 2009).

International Perspectives

Landscape, as a word, has been in and around archaeology for a long time. But not every use of landscape, as a word, implies the use of landscape, as a concept. For a landscape Archaeology to properly exist as a field of research and practice on its own, it should fulfil a series of basic conditions: to have a delimited object of study, a series of shared theoretical concepts, and its own (though not exclusive) set of well-defined methods and techniques. In the authors' opinion, what gives landscape archaeology its essence is neither the consideration of the archaeological record on a wide spatial scale nor adherence to a specific theoretical paradigm but the existence of an explicit, underlying concept of landscape. And this concept implies that landscape, in the words of David and Thomas, is not considered "simply a unit of analysis over and above the "site" [. . .] (but) an object of investigation in its own right" (2008: 27). Landscape, as an object of investigation, could be defined as the materialization of the social practices in spatial terms. Landscape archaeology would then be concerned with analyzing the processes of construction, function, signification, and valorization of that material medium through time. Boundaries with other disciplines dealing with the landscape can be sometimes diffused, but, in that respect, the specificity of landscape archaeology is the fact that it is archaeology, i.e., it is concerned with the material.

It is not by chance that the consolidation of a concept of landscape as a holistic category, integrating the environmental, the social, and the symbolic, as currently understood by many landscape archaeology practitioners, coincides with the consolidation of the landscape as a legal entity (and, consequently, a political entity). Landscape archaeology can aspire to play a relevant role in the politics of sustainability. This means that archaeological landscapes should also be considered as cultural resources, something that cannot only be studied but also managed and signified. In turn, archaeology can be enriched with the perspective provided by other disciplines that also



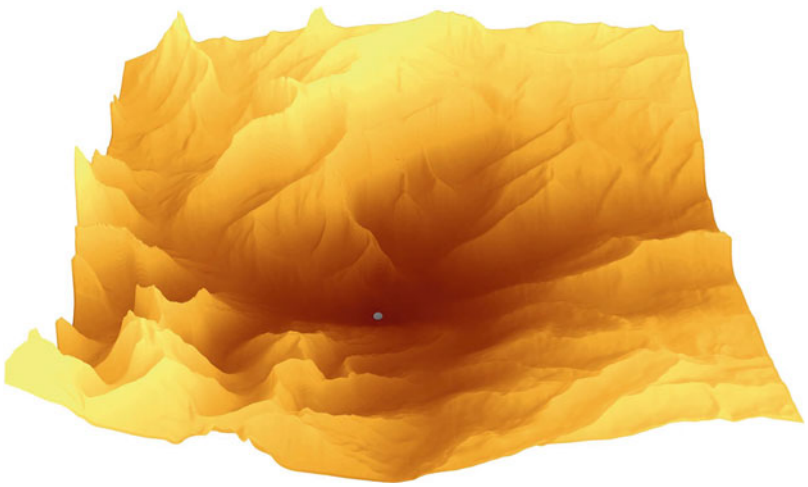
Landscape Archaeology, Fig. 5 Relative occurrence of the expressions "landscape archaeology" and "cultural landscape" in books published throughout the twentieth and early twenty-first centuries in English, Spanish, and French. (Data obtained from Google Ngram Viewer (accessed 2 September 2011)). Vertical scales are different in each case

deal with the landscape, such as geography, anthropology, or ethnography, making it possible to go beyond materiality to contribute towards a participative construction and management of landscapes as cultural heritage.

Future Directions

Although somewhat diminished after a period of significant activity some years ago, debates on the concept of landscape and the very idea of what landscape archaeology should be are sure to continue. In an overtly simplified way, we would say that on the one hand, although solid and alive, processual approaches towards the landscape have arguably shown themselves to be incapable of comprehensively accounting for the full dimensions of the construction of landscapes in the past. On the other hand, phenomenology-inspired proposals have developed a strong theoretical corpus, although they have failed to attract many followers due to being considered as an interesting proposal that is barely applicable to the archaeological record. To what extent both approaches remain incompatible and mutually exclusive, or can converge in novel ways, is something that deserves attention in the future.

At a slightly different level, the debate concerning the relationship between academic archaeology and alternate voices and actors will continue to affect the ways in which landscapes, their sense and meaning, should be constructed. How can archaeology deal with the current and flowing construction of meanings and values over past landscapes? Are "scholarly archaeology" and "popular claims over the past" compatible to any extent? Are differences and oppositions ethical, theoretical, or even ontological? A number of scholars have successfully argued about "the historically contingent nature of the Western concept of landscape and, in particular, its complicity with colonialism" (Lydon 2008: 654). If that is to be agreed, the only possible solution will be to account for ideas of landscape that overcome this "historical contingency" and make way for alternate visions and voices, agents, and interests. However, the question remains as to how and especially to what extent this is possible. Some of these challenges are quite similar to those faced by phenomenological or hermeneutics-oriented perspectives, as they imply going beyond



Landscape Archaeology, Fig. 6 Digital landscapes are not just a way of reproducing previously existing ways of working. They can provide a new framework of reference to approach and understand archaeological landscapes. The figure represents movement as a "2.5D" topography: valleys represent least-cost areas for movement towards the destination point pictured as the *gray dot* located at the "steam of the funnel," see Llobera et al. (2011)

traditional, processual views of the landscape, both at theoretical and practical level. But even beyond this, what would happen if we consider that the concept of "Western landscape" is itself a tautology? Will the concept of landscape be still valid to describe those multiple community contexts where there is no formal, conceptual separation between people, things, and the land?

Elsewhere, another direction points towards the relationship between landscape archaeology and geographic information science or, more extensively, the wider field of computing. The increasing incorporation of these fields within the archaeological agenda has led to a number of well-known and fruitful improvements, such as in the fields of mapping or prospecting. However, this can lead to a misleading impression:

> There is no denying that the use of information systems is allowing us to obtain new insights, but these remain far in between, marginal in scope, and seldom championed by archaeologists themselves. This is because the use of information systems is still reduced to a desirable technical skill that some archaeologists manage to "add-on" to their bag of tricks. There is little recognition that the intersection of information systems (computers primarily) and archaeology provides new paradigms and/or research venues. (Llobera 2011: 25)

So far, computers and information technologies have been conceived as external tools that can sometimes be applied to working processes in archaeology that are already well established. A possible direction for future developments lies in dealing with the implications of all of these in conceptual and theoretical terms, in exploring how the construction of digital landscapes is not only a way of reproducing the real world but also a new framework of reference for approaching and exploring it in different, novel ways (Fig. 6).

Cross-References

- ▶ Anthropogenic Environments, Archaeology of
- ▶ Geoarchaeology
- ▶ Phenomenology in Archaeology
- ▶ Spatial Analysis in Field Archaeology
- ▶ Urban Landscapes: Environmental Archaeology

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Landscape Domestication and Archaeology

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Introduction

The term "domesticated landscape" was introduced by Douglas Yen (1989), and a decade later "landscape domestication" was defined as a process of human-mediated landscape transformation (Clement 1999), which fits comfortably into the increasingly popular conceptual framework of human or cultural niche construction (Laland and O'Brien 2010; Smith 2011). During the last decade or so the term "landscape domestication" has become increasingly visible in archaeology and historical ecology, in parallel with the increasing visibility of cultural niche construction. Some find this use of "domestication" to be

inappropriate, however, as domestication is often associated with Charles Darwin and his theory of evolution. A glance at a dictionary dispels confusion, as there are no mentions of evolution or selection or genetics in the definitions. The term comes from the Latin *domesticäre* to dwell in a house, to accustom (Harlan 1992). A house is a built environment and has been part of our experience since people started constructing their own shelters from the elements. The house in the countryside is surrounded by a garden, which also has a dump heap, both of which are intimately involved in the domestication of plants (Smith 2007). Hence, there is a strong relationship between landscape domestication and plant or animal domestication, as pointed out by (Rindos 1984), although he preferred the "developing agroecology" to landscape domestication. Cultural niche construction combines these domestications to explain how humans became so successful (Laland and O'Brien 2010; Smith 2011).

There is a relationship with evolution. Both domestication and evolution are processes. In evolution, natural selection is the primary agent, while in landscape domestication, culture is the primary agent, as it is in cultural niche construction (Laland and O'Brien 2010). As geographer Carl Sauer (1925) wrote, "The cultural landscape is fashioned from the natural landscape by a culture group. Culture is the agent, the natural area is the medium, the cultural landscape the result." Hence, "Human actions over time are manifested in landscapes that retain physical evidence of cultural practices, decisions, and ideas" (Crumley 1994: 9). These domesticated landscapes are part of the "ecological inheritance" of cultural niche construction (Laland and O'Brien 2010). It is now well accepted that forager societies consciously and unconsciously manage individual plants and plant populations in the landscape, as well as managing groups of animals and taming individuals (Harlan 1992; Terrell et al. 2003; Smith 2011; Harris 2012). These actions leave traces that can be read in the landscape, the physical evidence mentioned by Carole Crumley. As food production became more important during the Holocene in many parts of the world, the degree and tempo of landscape domestication increased, generating a strong positive feedback loop with human population expansion (Rindos 1984). These actions leave even more traces, which landscape and other archaeologists use to study the origins, development, and spread of food-producing societies (Zeder et al. 2006; Pearsall 2015; David and Thomas 2016), as well as all other manifestations of cultural niche construction (Laland and O'Brien 2010).

When local societies expanded, pristine nature contracted; when local societies contracted, nature returned, but landscapes maintained the imprint of previous human domesticatory actions, making them more attractive for the next local expansion. It follows that "Landscapes are the infrastructural legacies of past human action and contain cultural or social 'capital' to be exploited by succeeding human populations" (Erickson 2003: 456). These legacies are of two types: landscape legacies, which may not have been intentionally created, and landesque capital, which was intentionally created to leave capital for succeeding generations (Arroyo-Kalin 2016). As our species spread across the planet, we preferentially occupied the richest landscapes and then continually more marginal ones, domesticating and redomesticating landscapes to greater or lesser extent as time went on. It follows that landscape domestication has much to teach us about the human endeavor since the appearance of *Homo sapiens*.

Definition

Landscape domestication is a process in which human intervention in the landscape and manipulation of landscape components result in changes in landscape ecology and in the demographics of its plant and animal populations, resulting in a landscape more productive and congenial for humans (Clement 1999: 191–192). Human intervention is initially unconscious, mere presence being an intervention, but becomes increasingly conscious when humans remain in a landscape and start to manipulate its components (Rindos 1984). It is important to recognize that humans do not set out to domesticate their landscapes; rather, they concentrate on opening space for themselves,

for example, camps and settlements, and enhancing the spaces of their plants and animals, both native to the landscape and introduced from elsewhere (Rindos 1984; Terrell et al. 2003).

Since domestication is a process and the intensity of intervention and manipulation may vary considerably, there is a continuum of change from pristine to a city. It is worthwhile to identify some sections of the continuum for analytical convenience. See Clement (1999) for supporting references.

Pristine – a landscape in which humans have not intervened or manipulated plant or animal populations.

Promoted – a landscape in which desirable plant populations and individuals are encouraged through seed dispersal; minimal ecosystem clearance, for example, around campsites and along trails; and expansion of the edges between ecosystems, as ecotones tend to be more productive. Fire may be an important tool for these activities. Even though there may have been a low level of human manipulation, the biotic components of this landscape may remain modified long after humans have abandoned the area, for example, when humans introduce new species or expand populations of useful species. Promoted landscapes differ mostly in their biotic composition and may be difficult for archaeologists to identify without the aid of botanists and ecologists. It is in this category of landscape domestication that Rindos (1984: 154–158) hypothesized that the incidental domestication of plant populations begins.

Managed – a landscape in which the abundance and diversity of food and other useful plant populations is further encouraged through partial ecosystem clearance by burning, expansion of ecotones, transplanting of desirable individual plants or planting of individual seeds, addition of amendments to enhance plant growth, reduction of competition from non-useful plants, and management of water via irrigation. Again, the biotic components of this landscape may remain long after humans have abandoned the area. The difference between promoted and managed is one of degree, with more conscious application of some practices, while other practices may continue to be unconscious. Managed landscapes are becoming increasingly studied in the context of pre-domestication cultivation in Southwest Asia (Harris 2012) and forest management in the Neotropics (Peters 2000; Levis et al. 2018) and Southeast Asia (Michon 2005). It is in this category of landscape domestication that Rindos (1984: 158–164) hypothesized that the specialized domestication of plant populations begins. Although direct archaeological evidence of promoted and managed landscapes may be difficult to find (Peters 2000), phytolith, pollen, and macrobotanical remains may shed light on past foraging activities and are increasingly recognized as a major source of information about past landscape management strategies (Pearsall 2015). These assemblages may reflect the exploitation of wood as an energy source (Picornell Gelabert et al. 2011), and the use of palms and trees as food (Watling et al. 2017), thus providing good means to infer environmental management.

Cultivated – a manipulation that involves the complete transformation of the biotic landscape to favor the growth of one or a few selected food plants, both domesticated and not, and other useful plant and animal populations, through ecosystem clearance and burning, localized or extensive tillage, seedbed preparation, weeding, pruning, manuring, mulching, fencing, and irrigation in any combination. These dramatic manipulations create a landscape that has little relationship with the surrounding ecosystem, so that it may be called an artificial construct. The biotic components of this very artificial landscape do not survive long after human abandonment because the changes that favor the growth of the human selected populations also favor the growth of weeds and the invasion of other pioneer species; however, it takes a long time to return to a natural state. The abiotic transformations practiced in this landscape often survive for long periods, for example, earthworks for irrigation or planting, such as mounds and furrows. Other activities may also leave clear evidence for archaeologists, such as charcoal from the clearing and burning of the original ecosystem, soil modifications due to tillage, long-term management, including creation of anthropogenic soils

(Glaser and Birk 2012), and phytoliths from cultivated plants (Pearsall 2015).

Swidden/Fallow – this analytical construct is the combination of cultivation and management, in that order. The swidden is a cultivated landscape, which yields well for a few years but becomes progressively more difficult to weed and tend as soil fertility declines. Useful weeds and volunteer or transplanted shrubs and trees are managed at progressively lower intensities until a managed secondary forest results (the fallow) (Denevan and Padoch 1988). This is the most visible sequence of traditional landscape domestication in the tropics today. The managed fallow remains long after humans have abandoned it and is easily identified by the abundance of useful tree species. Archaeologists can also easily identify these domesticated landscapes, as charcoal and phytoliths of useful plants tend to be abundant.

Settlements – as in the cultivated landscape, this manipulation involves the elimination of a section of a preexisting ecosystem, followed by the construction of the settlement, be it a camp or a city. This landscape may be constructed from locally available materials, including wood, earth, and stone, and often involves considerable reworking of the local relief. It also includes gardens and dump heaps. This type of landscape has been intensively studied by archaeologists since the birth of the discipline, thus needing little explanation here.

Historical Background

The domestication of landscapes has attracted a wide range of scholars for a long time, although with widely varying terminology. Cultural landscapes have been studied since before Sauer's (1925) classic article on the morphology of landscapes. Harlan (1992), Denevan (2001, 2011), Terrell et al. (2003), and Harris (2012) provide good reviews. Both Jack Harlan and David Harris examine the topic as a component of the origins of food-producing systems, while William Denevan and John Terrell and colleagues argue that the process has been under way so long that it is difficult to identify pristine landscapes in any part of the world where humans have lived for any appreciable time, even the Neotropics where our species arrived only 20–15,000 yBP. Rindos (1984) would have agreed with Denevan and Terrell et al.

Key Issues/Current Debates

For many years, perhaps the most important debate has been the extent of landscape domestication in different biomes. Denevan's (2011) argument about the myth of the pristine has been questioned in Amazonia, for example, where some ecologists and archaeologists argue that preconquest human manipulation of Amazonian landscapes was variable across the biome, with negligible modification of interfluvial forests (Bush and Silman 2007), hence of the basin in general. The definitions provided above help explain why archaeologists have difficulty finding evidence of landscape domestication away from the settlements. However, when Clement et al. (2015) integrated archaeological evidence with evidence of plant domestications and dispersals, human population estimates, and language diversity and dispersals, a mosaic of different degrees of landscape domestication across the biome became clear. When Levis et al. (2017) integrated domesticated tree and palm richness and abundance in forests across the biome, the mosaic became even clearer. This integration of approaches allows more robust inferences, even for areas where there is, as yet, no archaeological evidence. For example, Levis et al. (2017) observed that the richness and abundance of domesticated trees and palms was greatest near known archaeological sites, but was often great along major and tributary rivers without known archaeological sites, strongly suggesting that when archaeologists look along those rivers they will find sites. In Amazonia, this debate is essentially over and the biome can be considered an anthrome, like most other biomes on the planet (Ellis and Ramankutty 2008). Now the focus is shifting to the degree and types of human transformations of landscape, since the great diversity of preconquest and current indigenous societies

and traditional communities had and have different impacts.

An ongoing debate is about the nature of progress in human history and, by extension, in analysis of domesticated landscapes. The sequence of categories of landscape domestication defined above has been read by many theorists as progress from social systems with simple food procurement strategies to more complex social systems with sophisticated food production systems, requiring more knowledge, more energy, larger populations to supply the energy, and producing more food to fuel population growth. The same is true of the sequence of plant population domestication (Rindos 1984; Clement 1999), as plants become continually more coevolved with their human mutualists. As Rindos (1984) was careful to point out, however, evolution and domestication are not about progress but about change for better adaptation to shifting environments, including landscapes that humans have domesticated to any degree, the cultural niches with both landscape legacies and landesque capital (Arroyo-Kalin 2016).

Modern food-producing societies, such as those that support academics, view the sequence of landscape domestication presented here and concomitant plant and animal population domestication as progress. Is this necessarily true of all human societies? Rival (2007) argues convincingly that this is not true, that some human societies prefer different lifestyles. Many of the examples of foragers cited by Harlan (1992) and Harris (2012) support Laura Rival's analysis. Members of modern food-producing societies look down upon members of societies that mainly promote or manage landscapes, while members of these landscape managing societies wonder why the food producers want to be slaves to their domesticated plants, animals, and landscapes. A closer look shows that both foraging and farming strategies are present in many – if not most – societies and that foraging activities are effective forms of niche construction, as complex and sophisticated as farming techniques (Terrell et al. 2003; Rowley-Conwy and Layton 2011). It thus appears obvious that a mosaic of landscapes with different degrees of domestication should be expected (Rindos 1984; Terrell et al. 2003). In fact, this is what is found on all continents with human societies (Ellis and Ramankutty 2008; Terrell and Hart 2008).

What does this mean for archaeology? It means that, since the boundaries between forager and farmer strategies are much more fluid than scholars have assumed in the past, archaeologists should not focus their investigations only on cultivated landscapes and settlements and the identification of the transition from forager to farming societies (Terrell and Hart 2008). Rather, they need to expend more effort to read the signatures of promoted and managed landscapes. A clue to find these signatures may be in settlements themselves. Since both forager and farming populations are likely to discard residues outside of their procurement and use areas (Schiffer 2016), centralized deposits, such as dump heaps, concentrate the remains of different forms of resource appropriation, including those from landscape promotion and management. These can be inferred by the combined analysis of archaeobotanical proxies with ethnoarchaeological and ethnobiological data, which are good tools to infer the cultural and ecological factors that generated the distribution of archaeological remains (Picornell Gelabert et al. 2011).

International Perspectives

Although the terminology varies, landscape domestication is being intensively studied on all habitable continents, although emphasis is placed on cultivated landscapes, since these came to support modern food-producing societies. Australia provides an emblematic contrasting case study, since Native Australians extensively domesticated their landscapes without domesticating plants or animals (Harlan 1992; Harris 2012), and provides the examples that justify distinguishing conceptually between landscape domestication and plant population domestication, even though native peoples do not recognize the distinction (Clement 1999). Harris (2012) provides an up-to-date introduction to this Australian literature.

The humid forests of Southeast Asia and near Oceania are also the subject of increasing investigation, parts of which are also analyzed by Harris (2012). In this region, two intertwined traditions exist: a tradition that developed efficient open-field food production systems and a tradition that developed complex forest food production systems. Michon (2005) provides an introduction to these two traditions, concentrating on the forest systems, rather than the open-field systems, which provides a welcome difference in focus. While the open-field systems came to dominate world food production (Harlan 1992; Harris 2012), numerous less-dominant societies throughout the world humid tropics developed more complex systems, similar to the intertwined systems of Borneo and adjacent areas of Southeast Asia and near Oceania. The large number of fruit trees and palms domesticated in Amazonia (Levis et al. 2017, 2018) suggests that something similar occurred there. Worldwide, there are an increasing number of studies examining tree crops and this trend will certainly continue.

This short entry is not the place to review the growing worldwide literature on landscape domestication, so the reader is directed to Harlan (1992), Denevan (2001, 2011), and Harris (2012), references therein, and Further Reading (below).

Future Directions

The study of landscape domestication by existing and prehistorical societies worldwide is expanding. It is clear that research in landscape archaeology requires an interdisciplinary approach (Knitter et al. 2017). Recent cases of the integration of multiscale and multidisciplinary datasets and GIS-based approaches are contributing to the understanding of landscapes as holistic entities (Knitter et al. 2017). Given the definitions presented here, it seems self-evident that archaeologists need to expand their collaborations even more than has been the case recently (e.g., Zeder et al. 2006). Landscape archaeologists recognize that human manipulation of the landscape does not cease at the edges of settled and cultivated landscapes (David and Thomas 2016), but continues through managed landscapes into promoted landscapes. Other archaeologists need to recognize this also. Since many of the legacies of promotion and management can be read in plant species composition, ecologists and ethnobiologists working under the framework of historical ecology provide valuable data for the interpretation of archaeobotanical and paleoecological records, which in turn inform the time depth of these legacies (Arroyo-Kalin 2016). With increased attention to subtler modifications, the extent of landscape domestication practiced by prehistoric societies will be clearer and may push back the beginning of the Anthropocene from 1750 CE to much earlier.

Cross-References

- ▶ Agrarian Landscapes: Environmental Archaeological Studies
- ▶ Agricultural and Social Earthworks in the Guianas
- ▶ Agroforestry: Environmental Archaeological Approaches
- ▶ Amazonian Dark Earths: Geoarchaeology
- ▶ Animal Domestication and Pastoralism: Socio-environmental Contexts
- ▶ Anthropogenic Environments, Archaeology of
- ▶ Anthropogenic Sediments and Soils: Geoarchaeology
- ▶ Archaeobotany
- ▶ Archaeobotany of Agricultural Intensification
- ▶ Archaeobotany of Early Agriculture: Macrobotany
- ▶ Archaeobotany of Early Agriculture: Microbotanical Analysis
- ▶ Complex Hunter-Gatherers
- ▶ Cultural Landscapes: Conservation and Preservation
- ▶ Ethnoarchaeology: Approaches to Fieldwork
- ▶ Ethnoarchaeology: Building Frames of Reference for Research
- ▶ Harris, David Russell
- ▶ Historical Ecology and Environmental Archaeology
- ▶ Historical Ecology in Archaeology
- ▶ Human Evolution: Use of Fire

- ▶ Hunter-Gatherer Subsistence Variation and Intensification
- ▶ Hunter-Gatherers, Archaeology of
- ▶ Landscape Archaeology
- ▶ Maya Forest Garden
- ▶ Midden Cultivation
- ▶ Near East (Including Anatolia): Origins and Development of Agriculture
- ▶ Northern Asia: Origins and Development of Agriculture
- ▶ Paleoethnobotany
- ▶ People as Agents of Environmental Change
- ▶ Plant Domestication and Cultivation in Archaeology
- ▶ Southern Africa: Origins and Development of Agriculture

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Landscape Iconoclasm

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Brief Definition of the Topic

The concepts of landscape and iconoclasm compose the term "landscape iconoclasm." "Landscape" varies from discipline to discipline, but it is widely regarded as the construction of cultural and natural aspects through time at different space scales and how people perceive them. Iconoclasm is, literally, the destruction or breaking of religious pictures for political and religious purposes, where pictures are icons that represent "the appearance of the immaterial image in a material medium" (Mitchell 2005: 85). Metaphorically speaking, iconoclasm refers to the destruction of ideas, beliefs, and traditions. For example, the removal of a monument that represents Francisco Franco and symbolizes fascism at the same time is a case of a literal and metaphorical iconoclasm. Contrary to vandalism, iconoclasm is a deliberate destruction, rather than a meaningless act.

Iconoclasm is associated with iconic pictures, not landscapes. However, certain communities consider their landscapes that bear culturally significant marks such as rock art, traditional stories, and natural features (trees, water holes) as cultural landscapes and sacred sites. These landscapes are meaningful because these marks provide meaning to a range of people attached to the place. As a result, sacred landscapes share some of the characteristics that some images possess in that they also arouse emotions, people use them in rituals, and they are part of a group's identity. Thus, the destruction of landscapes possessing sacred images or sites can be considered a genuine act of iconoclasm. The destruction of landscapes that are regarded by the local community as sacred can amount to a landscape iconoclasm because the landscape is not only the place where sacred pictures exist but also the images, beliefs, and traditions that together make up the landscape. The landscape not only exists because of the pictures – images engraved onto the landscape – and the ideas about them, as well as the traditions and stories that provide meaning to the place, but the pictures, images, ideas, traditions, and stories exist because they are embedded in the landscape. Attacking pictures or images is an iconoclasm; attacking a landscape that contains significant cultural markers in the form of pictures or images is a landscape iconoclasm. In the case of landscapes that do not bear images, the definition of landscape iconoclasm can be problematic. However, if the landscape is culturally significant for a social group because it is the place where the bodies of their ancestors are buried, or they are represented within the landscape (as natural features of the landscape), targeting the landscape amounts to a landscape iconoclasm. Due to its ritual, mythical, and social significance, the landscape, regardless if it possess iconic images or not, becomes itself an icon to the group associated with it. For example, the parliamentarian destruction of Royalist gardens after the 17th Civil War in the United Kingdom was motivated because the gardens were associated with the established power, not because they contained images. Destroying them amounted to destroy the royals.

One example of landscape iconoclasm is the destruction of Murujuga in Western Australia (the Burrup Peninsula) – the largest known archaeological site in the world. Comprising one million petroglyphs, Murujuga has been desecrated by the establishment of extractive industries since the 1960s, which have profoundly impacted the landscape as well as altered the preservation of traditional beliefs within site. The destruction, in this case, was the result of poor archaeological advice, the neglect of Indigenous rock art, and the mismanagement of cultural heritage (González Zarandona 2015). However, there are other instances such as the Huichol people in Central Mexico who have been witnessing the destruction

of their landscape as a result of extractive industries in the Wirikuta region and the petroglyphs in the Altai Mountains, Russia.

Any sacred landscape that is experimenting destruction of its natural and cultural features, whether as a result of military, political, or religious motives (Chapman and Gearey 2013; Walsham 2011) or economic motives due to the establishment of transnational extractive industries (Bednarik 2002; Mulvaney 2011; Plets 2016), is a landscape iconoclasm. Although many buildings and landmarks in rural or urban landscapes have been destroyed due to its religious or political significance, such as the Buddhas of Bamiyan in Afghanistan in 2001, landscape iconoclasm may only apply to the razing of entire landscapes, as opposed to a particular unique feature within the landscape.

Two important points raised by landscape iconoclasm are firstly how the destruction creates a limitation for local populations to access their landscape. Limited access to the place derives in the destruction not only of tangible heritage but also the intangible heritage associated with the area, as well as the natural features that bear cultural markers of significance. Secondly, in light of the high unemployment that exists in rural areas in countries like Australia, Russia, South Africa, Canada, and Mexico, the establishment of extractive industries in the landscape, where they operate freely, triggers the destruction. This situation is also problematic since the industries employ members of the local community in the extraction and management of the natural resources of which they are also entitled and, at the same time, in the destruction and mismanagement of the cultural heritage of which they are owners.

Regarding destruction of material culture also entails speaking about the intentions of the perpetrator. In the case of landscape iconoclasm, one should distinguish between the intentional destruction of the landscape that targets landscapes as part of the aim to destroy its material existence and the entire social structure of the group that is associated with the landscape and unintended landscape iconoclasm. The latter can be defined as the action that indirectly destroys landscapes by directly operating in the landscape as a result of practices such as the extraction of mineral resources. In both cases, the intention or the lack of it generates similar results; the difference lies in the intention to destroy not only the landscape but the social group associated with it.

Studying the destruction of landscapes through the lens of iconoclasm provides a more holistic view of landscape destruction, as opposed to a simplification of the act by proposing vandalism as the primary motive for the destruction. Iconoclasm, due to the religious and political implications that the term implies, provides a deeper analysis of the motives behind the destruction.

Cross-References

- ▶ Australia's Archaeological Heritage
- ▶ Burrup Peninsula
- ▶ Cultural Landscapes: Conservation and Preservation
- ▶ Dampier Archipelago Petroglyphs
- ▶ Heritage and Archaeology
- ▶ Heritage Landscapes
- ▶ Landscape archaeology
- ▶ Looting and Vandalism (Cultural Heritage Management)
- ▶ Sacred Sites in Indigenous Archaeology

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Landscape Mapping at West Heslerton

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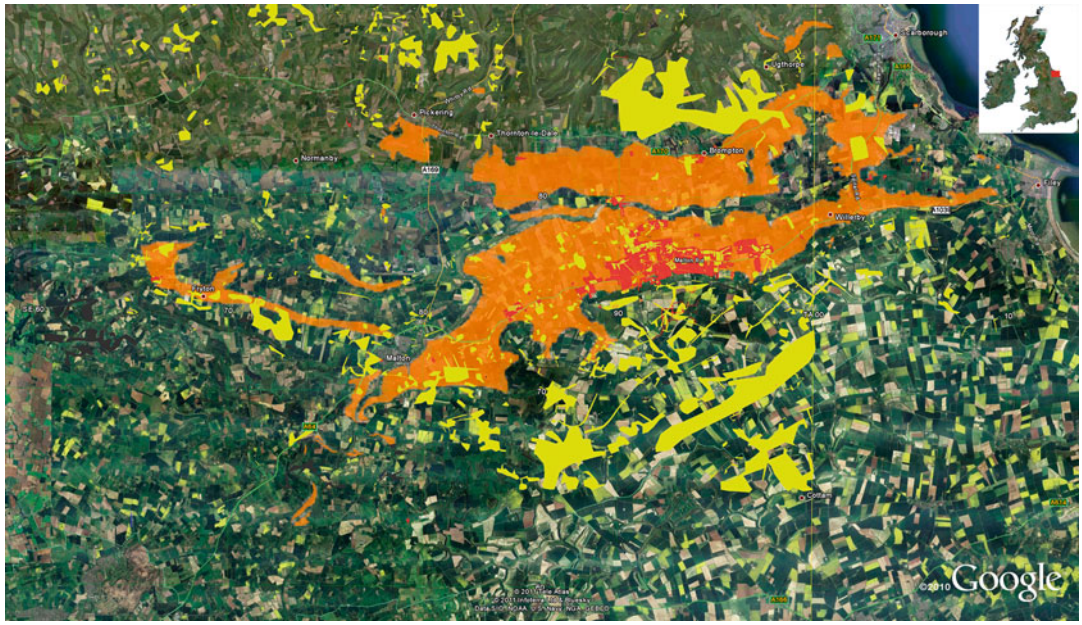
Introduction

Archaeological research at West Heslerton, Yorkshire, England, began in 1978, following the chance discovery of Early Anglo-Saxon burials during sand quarrying (Powlesland et al. 1986). Subsequent excavations in advance of quarrying and plowing covered some 35 ha of the Vale of Pickering, exposing prehistoric, Roman and Anglo-Saxon settlements and cemeteries (Figs. 1 and 2). Revealing a portion of ancient landscape at such a large scale emphasized that the narrative of human occupation was expressed by a continuum of activity rather than by a number of dispersed sites of different ages. It also raised the question of the wider context of the excavated area and the nature of the landscape of which it formed a part. The Landscape Research Centre (LRC) was created to map the total archaeology of the Vale of Pickering, testing and developing methods of remote mapping and analysis. Now in action for more than the 30 years, the LRC has recorded over 1,000 ha of contiguous settlement in unprecedented detail.

Key Issues/Current Debates/Future Directions/Examples

The 1980 research design argued that a proactive campaign of archaeological survey was necessary both to provide a context for the excavations and to identify the scale, complexity, variability, and levels of preservation of the archaeological resource. The preliminary area to be examined was a transect 1-km wide and 10-km long laid at right angles across the varied terrain of the valley. Two packages of remote mapping methods were applied, the first from the air, the second on the ground.

Crop-marks are sensitive to conditions that vary with the seasons and from year to year, so that most discoveries in England are made by chance. To improve the viability of total coverage, LRC initiated a program of intensive and repeated aerial survey flying over the same fields again and again, and documenting crop-marks that were only visible from the air for a few days at a time. New technology in the form of airborne multispectral imaging offered the potential to record crop-marks in wavelengths beyond the visible parts of spectrum, particularly from infrared and thermal wavelengths. A research experiment funded by the Natural Environment Research Council (NERC) in 1994 provided an opportunity to test the viability of multispectral imaging for landscape scale crop-mark mapping, to test the potential for identifying crop-marks in nonvisible wavelengths in fields under permanent pasture and in fields that had no prior crop-mark record. The 1994 NERC flight combined conventional large format vertical color photography with digital imaging using the Deadelus 12 band multispectral scanner; by chance, the flight was undertaken at a perfect time when a very large number of crop-marks were visible (Fig. 3). The vertical photographs from this single survey included a large percentage of the features identified over many years of ad-hoc air photography. The scientific test to identify features using wavelengths beyond the visible part of the spectrum was confirmed, but the limited resolution of the



Landscape Mapping at West Heslerton, Fig. 1 The Vale of Pickering viewed in Google Earth with overlays showing the distribution of sands and gravels in *orange*, areas with crop-marks in *yellow* and areas covered by geophysical survey in *red*

Deadelus scanner generating images with a ground resolution of 2.0 m rather than the .08 m per pixel resolution of the photographs meant that the returns from the multispectral imaging were diminished (Powlesland et al. 1997).

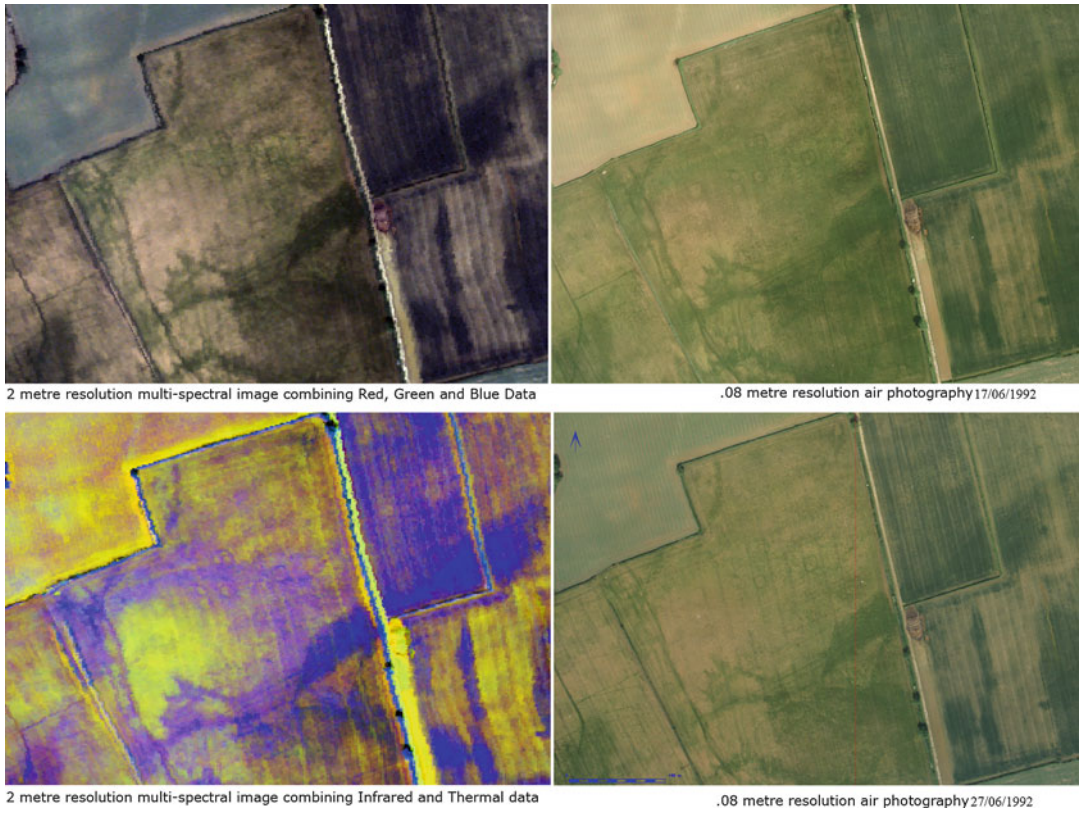
Another NERC supported flight undertaken in 2005 collected LiDAR data. The LiDAR survey, despite its relatively low ground resolution of 2.0 m per pixel, provided an accurate surface model covering c. 80 km^2 around West Heslerton Village. It was quickly realized that the LiDAR surface model was imperfect in that it represented the current rather than ancient topography. The current landform has been radically altered by desiccation of the extensive peat deposits in the center of the Vale as a consequence of climate change, man-made drainage, and agricultural effects.

Attempts to identify buried archaeology using ground-based remote sensing in the early 1980s initially produced poor results, a consequence both of the available hardware and local conditions. With the support of English Heritage, a program of large scale and contiguous geophysical surveys designed to cover multiple adjacent fields was begun in 2001 and continued for nearly a decade; these completely transformed the picture of past activity in the area (Fig. 4). Survey was first targeted on an area of c. 350 h a between the villages of Sherburn and East Heslerton; work began using a single Geoscan FM16 fluxgate gradiometer, collecting data over thirty meter squares walked at 1-m intervals, recording points at .25-m intervals on a north-south axis with a field team of two. The sandy soils of the southern side of the Vale of Pickering both to the east and west of West Heslerton proved to be exceptionally responsive to geomagnetic prospection in particular. The initial 350 h a target area was sufficient to expose an extraordinary number of archaeological features but was insufficiently large to give an understanding of the underlying structure of the prehistoric and later landscape or develop a long-term management strategy.

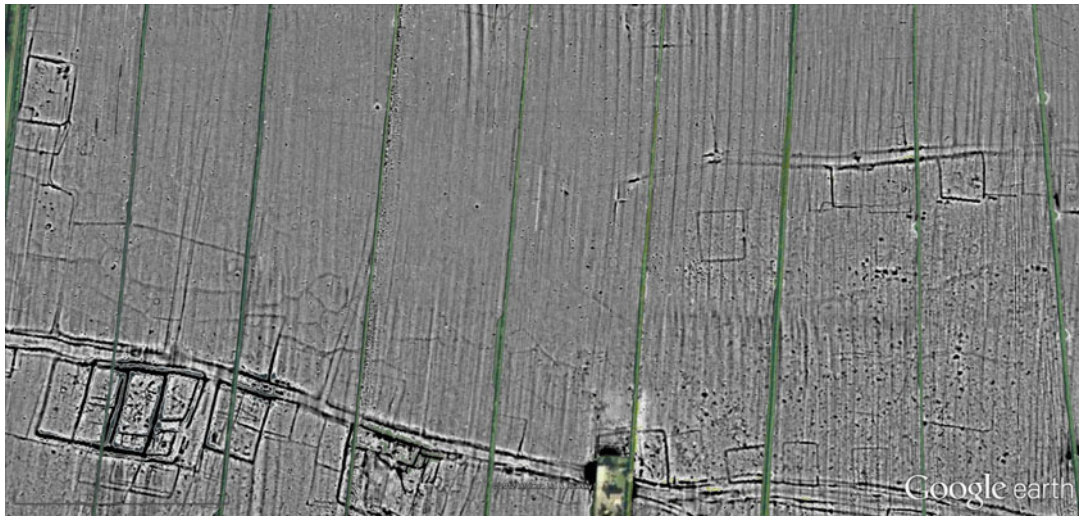
In order to increase the rate of area coverage, a Bartington 601 dual gradiometer, with two probes set 1 m apart, was purchased; this significantly reduced the amount of walking required to cover each area. The limitations in single or dual probe survey employing manually established 30 m

Landscape Mapping at West Heslerton,
Fig. 2 Plan showing the excavated Anglian Settlement and associated cemetery at West Heslerton

grids were recognized at an early stage of the large area surveys; it was difficult to secure high quality and uniform results at a rate of more than 2 h a per day. By the mid-2000s, new instruments employing multiple probes mounted on carts were developed by English Heritage in the UK and a number of geophysicists in Europe. In 2007, we began to use a Foerster Kartograph which



Landscape Mapping at West Heslerton, Fig. 3 *Four views* covering an area of crop-marks derived from multi-spectral and high resolution airborne imaging. Showing the limitations imposed by resolution and the difference in crop-marks only a few days apart



Landscape Mapping at West Heslerton, Fig. 4 A section of the LRC landscape scale geophysical survey covering a 1-km strip on the southern side of the Vale of Pickering revealing evidence of prehistoric, Roman and Anglo-Saxon domestic activity in addition to major trackways and probable cemeteries

carried four probes with a .5 m separation between them and collected magnetic values at .1 m intervals in the direction of travel; a Real Time Kinematic GPS mounted on the cart meant that each point collected was precisely positioned with an accuracy of less than 5 cm. The increased density of the collected data greatly improved the resolution of the mapped magnetic anomalies, revealing features that would not have been observed in lower resolution data, and made interpretation of the results more reliable. The use of the onboard GPS meant that there was no need to manually lay out a traditional survey grid and, by using a 2 m wide cart, larger areas could be covered in a day.

The integration of the geophysical and airborne remote sensing results within the LRC's geographic data management system employed the same approach as was applied in the excavations. Each identified feature is individually identified, documented in a database, and digitized as a filled polygon to produce an interactive map which can be viewed and interrogated at any scale. Conventional GIS software, while well suited to multiscalar data, rarely supports the sort of 3D imaging needed to appreciate the landscape setting of the evidence and, more significantly, the fourth dimension, time. This challenge was addressed using Google Earth as the platform for a digital atlas incorporating the results; this resolved the three primary issues – the delivery of the integrated results of the research using the Internet to nonspecialist and specialist audiences, the delivery of the interpreted data within an interactive 3D landscape, and the facility to scroll and animate the results through time. This represented a significant breakthrough in terms of the publication of a landscape dataset; the time depth of the data was addressed through the design of the underlying database, which indicates the active period for each identified feature (Powlesland 2012).

The detailed feature dataset now comprises over 30,000 features ranging from individual small pits to trackways running for many kilometers. This densely utilized landscape has challenged established models of population density and land use from the Neolithic to Medieval periods in England. It has also brought home the character of the archaeological resource as a continuous historic environment.

Cross-References

- ▶ Landscape Archaeology
- ▶ Medieval Archaeology

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Langebaek, Carl

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Basic Biographical Information

Carl Henrik Langebaek Rueda is a Colombian anthropologist. He was born in Bogotá in 1961, the son of a Danish father and a Colombian mother. He completed his undergraduate studies

in anthropology in 1985 at the Universidad de los Andes in Bogotá. Between 1985 and 1993 Langebaek concentrated on graduate studies in anthropology at the University of Pittsburgh, USA, obtaining his PhD in 1993. On this occasion, his PhD dissertation, formulated from archaeology, was based on a regional recognition in two valleys located to the east of Colombia, which made it possible to evaluate hypotheses related to the political control exercised by Indigenous elites (Langebaek 1995). It could be said that this research inaugurated the agenda of a scientific archaeology in Colombia at a time when the agendas of historical cultural archaeology predominated (Gnecco 1996).

Carl Langebaek, like many other Colombians born from European immigrants who had arrived in Colombia at the beginning and in the middle of the twentieth century, became impassioned by the social sciences and especially about anthropology since it was a discipline much appreciated in Europe by the end of the nineteenth century and beginning of the twentieth century (Arocha et al. 1984).

For most of his professional life, Langebaek has worked at the Universidad de los Andes where he has excelled as a professor, researcher, and administrator of several positions such as the Dean's office of the Faculty of Social Sciences and the Academic Vice-Chancellorship. Langebaek also has had important positions of trade union and professional representation such as at the now nonexistent Colombian Anthropological Society.

Major Accomplishments

Among Carl Langebaek's major achievements, we can mention his hypotheses about centralization models in the Colombian Andes, as well as the comparison of various pre-Hispanic *cacicazgos* (chieftain's territories) trajectories in Colombia and Venezuela (Langebaek 2004). In addition, Langebaek has made substantial contributions to the knowledge about Indigenous communities of Colombia in historical times, through the revision and study of colonial documents (Langebaek 1996). Unlike previous researchers, Langebaek has pointed out the need to build archaeological models that should be evaluated in the field through regional surveys and deduction from empirical indicators. In that sense, and together with other Colombian academics, he is one of those anthropologists who generated epistemological revolutions in scientific archaeology practice in South America.

As mentioned above, Langebaek is outstanding not only for his work at the University of the Andes but also in a national sphere. He is part of the National Accreditation Council of Colombia, an entity that is responsible for ensuring the quality of university education in Colombia. In addition, Carl Langebaek has made substantial contributions to the history of social sciences in Colombia, in the historiography of science in Colombia, especially archaeology, anthropology, and history (Langebaek 2003).

In 2009, Carl Langebaek won the Alejandro Ángel Escobar prize, the most important prize in Colombia for scientific publications, for his book *Heirs of the Past* (Langebaek 2008). This work synthesizes almost a decade of archival research. It demonstrates how early reflections on Indigenous peoples, made by intellectuals and travelers, Latin Americans, and Europeans, laid the foundations for the construction of a Colombian identity, at the same time that they generated the basic premises by which the project of the nation would generate mechanisms that exclude Indigenous peoples. A problem not yet solved in Colombia.

Without question, Langebaek's work is essential to understand the long-term trajectories at the north of South America, as well as the development of social sciences in Colombia, in particular, and Latin America, in general.

Cross-References

- ▶ Andes: Prehistoric Period
- ▶ Colonial Expansion and Nation-State Building: Influences on Archaeology

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Langford, Rosalind, Fig. 1 Rosalind Langford

Langford, Rosalind

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Basic Biographical Information

Rosalind (or Ros) Langford (Fig. 1) was born Rosalind Atkinson on September 18, 1946, in Leeton, a Riverina town in New South Wales, spending her early years on the Flats in Mooroopna, Victoria. Her mother was a Yorta Yorta woman, born on Cummeragunja mission. Rosalind moved to Tasmania when she married in the early 1970s and has raised four children in the Tasmanian Aboriginal community. She died suddenly of a heart attack on August 8, 2012.

Major Accomplishments

Rosalind Langford was instrumental in starting the Aboriginal Information Service (AIS), the first Aboriginal organization in Tasmania, and was elected as its first State Secretary from 1972–1975. This was at a time when the state of Tasmania accepted Commonwealth money for Aborigines but denied their existence. From that base Ros worked to raise the profile of Aborigines in Tasmania. One of her earliest initiatives was to attend the first Aboriginal Legal Services conference in Canberra in 1973 and successfully put the case for a grant to operate a proper Aboriginal Legal Service in Tasmania. In 1977 the AIS became the Tasmanian Aboriginal Centre. Rosalind was elected its State Secretary several times over the next 20 years and most memorably in 1982 – the year of the Franklin River Campaign – during which simmering tensions between

Aborigines and archaeologists over the control of Aboriginal heritage came to a head.

With respect to the Australian archaeological community, Rosalind's major impact was an intervention contained in an address to the Australian Archaeological Association's 1982 Hobart Conference with the seminal work *Our Heritage – Your Playground* (Langford 1983). This presentation, delivered on behalf of the Tasmanian Aboriginal community, confronted archaeologists, who relied on an unquestioning acceptance of their scientific prerogative to freely dig up, remove, and pronounce on Aboriginal heritage, with the fact that this was the culture and heritage of a living people. The presentation strongly asserted that scientific professions were underpinned by the cultural values of white supremacist imperialism and maintained by the self-serving denial of the rights over heritage, and even the continuing existence, of indigenous people. Aborigines required archaeologists to take practical steps to acknowledge Aboriginal ownership and control of their past as a precondition for any future working relationship. In response, the AAA voted at its annual general meeting following the conference to acknowledge Aboriginal ownership of their heritage and to build consultation with Aborigines into all research funding projects.

Perhaps the most widely quoted passage is this:

> From our point of view, we say – you have come as invaders, you have tried to destroy our culture, you have built your fortunes upon the lands and bodies of our people, and now... want a share in picking out the bones of what you regard as a dead past. We say it is our past, our culture and heritage and forms part of our present life. As such it is ours to share on our terms. (Langford 1983: 2)

This entry of 1983 has been, and continues to be, widely cited by archaeologists and scholars in other areas such as general heritage studies (Creamer 1990: 137), indigenous heritage studies (Rigney 2006: 37), and law (Harris 1996: 32). It has influenced not only archaeologists and other white researchers but also Aboriginal people and not just in Tasmania (e.g., McNiven and Russell 2005: 188). Russell (2001: 50) refers to the entry as "an important milestone in Australian Aboriginal Studies."

Rosalind later worked as State Area Manager for the Aboriginal Development Commission and also chaired the Tasmanian Aboriginal Education Unit. She has lectured on Aboriginal Culture and Aboriginal Political issues at the University of Tasmania, in Adult Education and in schools throughout Tasmania.

Ros is also a celebrated artist, using symbols and motifs in a contemporary style and medium. In 2010 she graduated from the University of Tasmania with a Fine Arts Degree, with a double major in Print Making and Painting. The Tasmanian Museum and Art Gallery purchased one of her major pieces of work, a blanket screen printed with ochre depicting her Yorta Yorta heritage and her connection to Tasmanian Aboriginal people.

Cross-References

- ▶ Archaeological Stewardship
- ▶ Archaeology and Politics
- ▶ Australian Archaeological Association Inc. (AAA)
- ▶ Australia's Archaeological Heritage
- ▶ Ethics and Human Remains
- ▶ Ethics in Archaeology
- ▶ Ethnic Identity and Archaeology
- ▶ Indigenous Archaeologies
- ▶ Indigenous Archaeologies: Australian Perspective
- ▶ Indigenous Intellectual Property Issues in Archaeology
- ▶ Indigenous Peoples, Working with and for

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Laos: Cultural Heritage Management

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Introduction

Cultural heritage management in Laos is largely concerned with the management of monumental archaeological sites, historical architecture, and more recent sites and objects related to the communist regime. Lao heritage management has its roots in the time when Laos was part of French Indochina and is characterized by its colonial legacy, with additions from Buddhism, communism, and a currently growing business of alternative tourism.

Definition

The definition of national heritage in the Lao PDR Law on National Heritage established in November 2005 says,

> National Heritage refers to items produced by mankind or formed by nature that have outstanding cultural, historical or natural value, thereby becoming precious assets and property of the Lao national community, some of which are adopted as regional and world heritage. National heritage consists of cultural, historical and natural heritage existing in the form of tangible objects, intangible items, moveable or immoveable property, and living or non-living organisms, reflecting the history of the Lao nation and the Lao people in each different era. National heritage includes items existing in the country and abroad. (Law on National Heritage 2005, article 2)

It is a standard modern definition of national heritage, which links objects and sites that are considered to be of outstanding value to the essence of the Lao people and the creation of the Lao People's Democratic Republic.

The cultural heritage of Laos is defined by law as both tangible and intangible. Some efforts have lately discussed and encouraged the preservation of intangible heritage, but apart from those discussions, it is mainly tangible historical sites and artifacts that are subject for cultural heritage management in Laos. Two sites are inscribed on the UNESCO World Heritage List: the former royal *town of Luang Prabang* (inscribed 1995) and the ancient temple complex of *Vat Phou and Associated Ancient Settlements within the Champasak Cultural Landscape* (inscribed 2001). These two sites attract a major part of the attention and resources for cultural heritage management in Laos, along with the Plain of Jars (Fig. 1) where

Laos: Cultural Heritage Management, Fig. 1 Plain of Jars visited by a group of ecotourists in November 2007

investigations are being done by UNESCO and Lao archaeologists in preparation for an application to have the site inscribed as world heritage.

There are other prehistoric sites that are also recognized as important national heritage. These include sites with ancient standing stones (Hintang) in two northern provinces and a very limited number of excavated sites that have no monuments above ground, like cave sites dated to the Paleolithic and all through the Stone Age, and the prehistoric ritual site Lao Pako (Källén 2004). Over the last decade, development works for infrastructure, dams, and mining have led to a series of development-led archaeology projects across the middle and southern part of the country, where new prehistoric and historic sites have been found and investigated.

The prehistoric archaeological heritage is, however, but a minor part of Laos' cultural heritage. The main focus and national attention is on the built historical heritage and particularly ancient temple structures and monuments connected to early forms of Hinduism and Buddhism and early political entities such as Dvaravati, Khmer, and the first Lao kingdom of Lane Xang. Colonial architecture from French Indochina is also considered part of the built historical heritage.

A third category of national heritage in Laos is the sites and artifacts from the early days of communism. These sites and artifacts often have a strong personal connection to communist heroes such as the leader of the revolution Kaysone Phomvihane and "The Red Prince" Souphanouvong. The heritage objects in this category are defined by their genealogical connections to heroism. They consist mainly of museum artifacts and war-related sites like the caves in Viengxay (Fig. 2) that worked as strategic center and shelter for the Pathet Lao leaders in the war against the US-supported Royal Lao Army, more widely known as the Vietnam War.

More recent objects such as textiles and weaving patterns, instruments such as the *khean*, and food such as sticky rice are also defined as cultural heritage by law.

Laos: Cultural Heritage Management, Fig. 2 The caves in Viengxay, Hua Phan Province, where the Pathet Lao leaders took shelter and built the strategic center of the 1970s revolution, have recently been opened to visitors

Legislation

Since 2005, heritage sites and objects in Laos are protected by the Law on National Heritage. Compared with other areas of cultural politics in Laos, heritage has a remarkably clear definition and a strong protection by law. The first article says that the law "determines the principles, regulations and measures for the administration, use, protection, conservation, restoration, and rehabilitation of the national heritage, and also determines the rights and duties of the State, social organisations and individuals to preserve the value of the national cultural, historical and natural heritage, with the aims of educating citizens with a conscious love for their nation and fine national traditions that is deeply embedded in their hearts and of assuring the elements for prosper sustainability of the nation"(Law on National Heritage 2005, article 1). The outlines and contents of this law, consisting of 73 articles, have great similarities to

heritage legislation in most other countries. It defines cultural heritage sites in Laos and objects that originate from the Lao territory, as the property of the Lao people and nation, and decides that it is an obligation for the state, its citizens, and visitors to protect the Lao heritage, and it sets the rules for who do what when such sites and objects are moved or altered with. What sets it apart from legal documents for cultural heritage in Western democracies is the outspoken aims to use it for education of the citizens to "love their nation, to be unified and proud of historical efforts, to be creative, to bravely struggle, and to be united as one. . ." (Law on National Heritage 2005, article 40) that it forbids the creation of new monuments and religious places without permission from the Ministry of Information, Culture and Tourism (article 31) and the definition of Buddha figures as an extraordinary category of heritage object, surrounded by specific rules and regulations.

Government Offices for Cultural Heritage Management

The government office responsible for cultural heritage management is the Ministry of Information, Culture and Tourism (MICT) and there, in particular, the Department of National Heritage. Most of the official responsibilities regarding heritage protection, conservation, display, and knowledge production lie with the Department of National Heritage. It is a comparatively small office with only a few permanent members of staff. The registration of new heritage objects and the granting of all permits for research, excavation, analysis and display, and equally for artifact sales and exchanges is therefore in the hands of only a couple of individuals, which is unusual in a current global perspective. Other government offices such as the Ministry of Education and the Lao National Tourism Administration (LNTA) are occasionally involved in heritage-related issues, but the responsibilities for key operations lie with the MICT Department of National Heritage. The MICT also has provincial, regional, and local offices with the delegation to control the practical heritage work on a regional and local level.

Archives

There are no national archives for heritage management in Laos, nor is there any national database for heritage sites. Information about sites and heritage objects can only be found in publications and reports or by contact with the MICT Department of National Heritage.

Museums

There are a number of museums with national importance in Laos. The Lao National Museum in Vientiane has displays of objects and narratives of the national past, from dinosaurs to post-revolution times. It was established in 1980 as a Revolutionary Exhibit Hall, in the former premises of the French *Hôtel du commissariat*, and changed name to the Lao Revolutionary Museum in 1985. In the year 2000, its name was changed once again to the Lao National Museum, but the displays of heroic struggles against imperialists remain more or less intact on a large part of the first floor and half of the ground floor. The remaining half of the ground floor has displays of prehistoric and early historic archaeology, and in a smaller part of the first floor are displays of the customs and crafts of ethnic minorities. The National Museum also houses some smaller collections of excavated prehistoric and early historic material. In addition to the National Museum, there is in Vientiane a big memorial museum over the national hero Kaysone and a number of historically important temples, in particular Wat Ho Phra Keo and Wat Sisakhet (Fig. 3), that have displays and function partly as museums. In addition to these, there are several smaller museums and private showrooms for display of the Lao textile craft and tradition. On a regional level, the two World Heritage Sites in Vat Phu Champassak and Luang Prabang have several larger museums of local character. There are also smaller museums on a regional and local level with particular local displays of, for instance, a dinosaur fossil, an ancient temple site, or a cave used for shelter that was bombed during the war.

Conservation

Conservation has no particular unit in the national heritage administration. It is involved in most

Laos: Cultural Heritage Management, Fig. 3 Collection of Buddha figures in Wat Sisakhet in Vientiane

practical work on prehistoric and historic sites and buildings and is typically done by foreign experts hired by larger projects with international funding.

Training

There has until very recently not been any basic professional training in cultural heritage management available in Laos. The heritage management staff at the MICT and other heritage institutions therefore had their training by scholarships abroad. Among the older generation, many were trained in the Soviet Union or other Eastern European countries and a few in France, India, Japan, or Australia. In the younger generation, most have their training from Thailand or Vietnam. Only recently, the National University of Laos, Faculty of Architecture, has started an education program involving archaeology and heritage management.

Research

Research on cultural heritage in Laos is generally controlled by the MICT. It is often done practically by the Department of National Heritage staff, in larger projects with international funding and in cooperation with international experts. There is also the National Academy of Social Sciences, the Institute of Cultural Research, and the Urban Research Institute, which are separate research institutes in collaboration with the MICT.

International Actors

Although all heritage management is controlled by the MICT, international organizations and international cooperations in research or practical heritage projects are key to the field of cultural heritage management in Laos. The MICT has virtually no funding resources of its own and is entirely depending on foreign funding. Major international actors are UNESCO, the French École française d'Extrême-Orient, the Japanese MOFA, and the Asian Development Bank. There are also a number of smaller international research funds involved in heritage projects and international companies for development-led archaeology working with road and mining projects.

Historical Background

While the objects for cultural heritage management in Laos date from all between the Paleolithic and the twentieth century, the history of heritage management itself begins with the French incorporation of Laos in French Indochina in 1893. The three kingdoms that preceded French Indochina had complex administrations based on a system of *mandalas*. But the basic administrative structure of Laos as a centralized modern nation state was invented and implemented by the French in collaboration with Lao civil servants (Stuart-Fox 1997; Evans 2002). The definition of heritage as connected to national essence and a teleological historical narrative is characteristic for nineteenth-century European discourse. It was applied to Laos by the French and later adopted in

postcolonial nation building along with the general definition and administration of Laos as a modern centralized nation state. The concept of cultural heritage, such as it is defined today in Laos by law and official practice, is thus rooted in European discourse from the nineteenth and early twentieth century.

The first systematic documentation and research of Laos' cultural heritage was done by archaeologists from the French École française d'Extrême-Orient (EFEO) based in Hanoi, who made surveys and documented (mainly monumental) prehistoric and historic sites. Two of EFEOs most renowned archaeologists, Henri Parmentier and Madeleine Colani, both worked with and published extensively on the cultural heritage of Laos (Colani 1935; Parmentier 1954). Parmentier, who was a trained architect, represented the principal line of archaeological research at EFEO and was oriented toward art history and epigraphy, focusing on historic architecture, monuments, and art. Colani, who was a trained geologist, represented a minor branch of archaeology at EFEO with her interest in prehistoric archaeology and her orientation toward ethnography and craniology (Clémentin-Ojha and Manguin 2001). Both these branches of archaeological research are still present in the practice and narratives of cultural heritage management in Laos.

The first two decades of independence, after the dissolution of Indochina in 1954 and up until the revolution and victory of the communist Pathet Lao in 1975, were characterized by political instability and war. Heritage management was not a priority, but one of the key texts defining Lao history and heritage was produced during this time. Maha Sila Viravong's classic *History of Laos* (in English translation, Viravong 1964) is an interesting combination of a modern Western type of narrative focused on origin and racial essence, with a characteristic Lao narrative based on stories of mythical heroes and their connections to places, objects, and groups of people, often involving spiritual elements. Viravong's *History of Laos* is still found in school curricula and is without competition the most influential domestic source of history knowledge in postcolonial times.

In the years immediately after the revolution and victory of the Pathet Lao in 1975, a new category of cultural heritage was defined; very recent sites and objects related to communist heroes or the people's struggle against the imperialists. For almost two decades following the revolution, Laos diminished the contacts with the Western world and nurtured the relations with other communist and socialist states. During this time, the pre-communist heritage was of no official concern. The relevant history started at the revolution (Pholsena 2006).

Around the mid-1990s, there was a turn toward a softer communist politics, and Laos began to open up for political relations and visitors from the West. At about the same time, there was also a turn in the politics of heritage. In 1997 came an important presidential decree on the preservation of a national heritage, and a year earlier, one of the archaeologists at the Ministry of Information and Culture, which has recently been renamed Ministry of Information, Culture and Tourism produced a booklet with the title "The Prehistory of Laos" (Sayavongkhamdy 1996). Both used the basic definition of cultural heritage that had been introduced by the French administration but emphasized the ideals and objects of Buddhism and communism to create a unique definition of cultural heritage for the Lao PDR.

Key Issues/Current Debates

The open attitude to visitors in the first decade of the twenty-first century has resulted in a dramatic increase in tourism since the turn of the millennium. This increase has also had a big impact on the politics of heritage. If the main purpose of heritage as it is defined by law is to make the Lao people feel strongly and proudly for their nation, the most important practical purpose of cultural heritage in Laos today is to attract foreign visitors and generate income. As the country began to open up, it first attracted mainly

backpackers. The government in collaboration with foreign experts began to develop ecotourism and other forms of alternative tourism, in order to attract a clientele with more resources to spend and with more sensitive interests in the country's nature and culture. It has proven a very successful strategy, and Laos has been referred to as a model country for the development of alternative tourism (Harrison and Schipani 2007). The knowledge and sensitive consumption of heritage are a major concern for ecotourists, and the Lao National Tourism Administration is therefore a main actor in cultural heritage management in Laos today. The two World Heritage sites Luang Prabang and Vat Phu are key tourist magnets and appeal to ecotourists as well as backpackers. Monumental archaeological sites, temples, and historical architecture are generally marketed for ecotourists, while sites related to communism and war seem to attract more backpacker visitors. Non-Western tourists, mainly from Thailand, Vietnam, and China, are also a large and growing group of visitors, which the tourism industry in Laos are likely to adjust to in the near future.

The softer communist politics over the last couple of decades has also opened up an appreciation of cultural heritage with associations to the royal history of the country. Lao communism has always has a strong unusual connection with Buddhism. Buddhist buildings, objects, and traditions have therefore also kept a strong position as national heritage. Recently, there has also been a renewed interest in the royal past, with celebrations of kings' anniversaries and other important royal events. Along with this development, the buildings, objects, and stories of former kings and royal families have also gained status as important national heritage (Evans 2009).

International Perspectives

From an international perspective, cultural heritage management in Laos is interesting as an example of an unusual union between communism, a colonial legacy, Buddhism, and an increasingly important royal past.

The cultural heritage of Laos also provides an interesting example of the complex relations between materiality and spirituality in a Buddhist context. The different attitudes to materiality and spirituality, in Buddhism on the one side and common heritage management on the other, are part of the mundane reality for heritage management in Laos, but it can be fundamentally challenging for a strong international discourse of heritage preservation where the values of material authenticity and originality are often taken for granted (Karlström 2009).

Future Directions

The current tendency for the cultural heritage of Laos is to have it more involved as objects to be consumed by the growing tourism industry. Both in terms of tourism and other international relations that bring necessary funding to heritage management and all other sectors of society in Laos, less is now coming from the West and more from China, Vietnam, Japan, and other Asian states. If this tendency continues, it may well have profound consequences for the future cultural heritage management in Laos.

Cross-References

- ▶ Cambodia: Cultural Heritage Management
- ▶ China: Cultural Heritage Management
- ▶ Cultural Heritage Management and Poverty
- ▶ Cultural Heritage Management and the Colonial Culture
- ▶ Heritage Tourism and the Marketplace
- ▶ Heritage: History and Context
- ▶ Indo-Pacific Prehistory Association (IPPA)
- ▶ Intangible Cultural Heritage
- ▶ Local Populations and Global Heritage
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- ▶ Tangible Heritage in Archaeology
- ▶ Thailand: Cultural Heritage Management

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Las Vegas: Environmental Archaeology of an Early Site in Coastal Ecuador

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Introduction

At the end of the Pleistocene, the Las Vegas people developed an adaptation focused on a wide variety of marine, estuarine, and terrestrial resources in the Pacific littoral of today's Ecuador. While they may be classified as broad-spectrum foragers, hunters, and fishermen, they initiated an enduring pattern of plant cultivation, figured among the earliest cultivators in America, and participated in the domestication of useful plant species in the Neotropical region while progressively intensifying both fishing and horticulture. The Las Vegas adaptation has been reconstructed from a wide variety of evidence found in 32 archaeological sites in the western part of the Santa Elena Peninsula (SEP).

The chronological framework for interpreting Las Vegas evidence is based upon 30 radiocarbon dates (Stothert et al. 2003; Table 1). These form a coherent series, and agree well with independent stratigraphic interpretations. Deep preceramic midden in Site 80 permitted the identification of a little known Pre-Las Vegas occupation, as well as two Las Vegas phase dated to the Early Holocene period (EH) (Stothert 1985, 1988). All dates are stated in radiocarbon years before present (RCYBP), but some calibrated dates are included (Table 1). The use of calibrated dates has the effect

Las Vegas: Environmental Archaeology of an Early Site in Coastal Ecuador, Table 1 Radiocarbon dates for the study of Las Vegas history

Geological and cultural periods	Age in radiocarbon years before present (RCYBP)	Calibrated RC age (BP)
Late Las Vegas	8,000–6,600	9,000–7,300[a]
Early Las Vegas	10,000–8,000	11,000–9,000[a]
Pre-Las Vegas	10,840–10,510	13,820–10,850[a]
Clovis in North America	11,500–10,800	13,500–13,000
Monte Verde in Chile	12,500	13,800–14,800
Early Holocene (EH)	10,000–7,000	11,500–7,800
Terminal Pleistocene (TP)	12,000–10,000	13,900–11,500

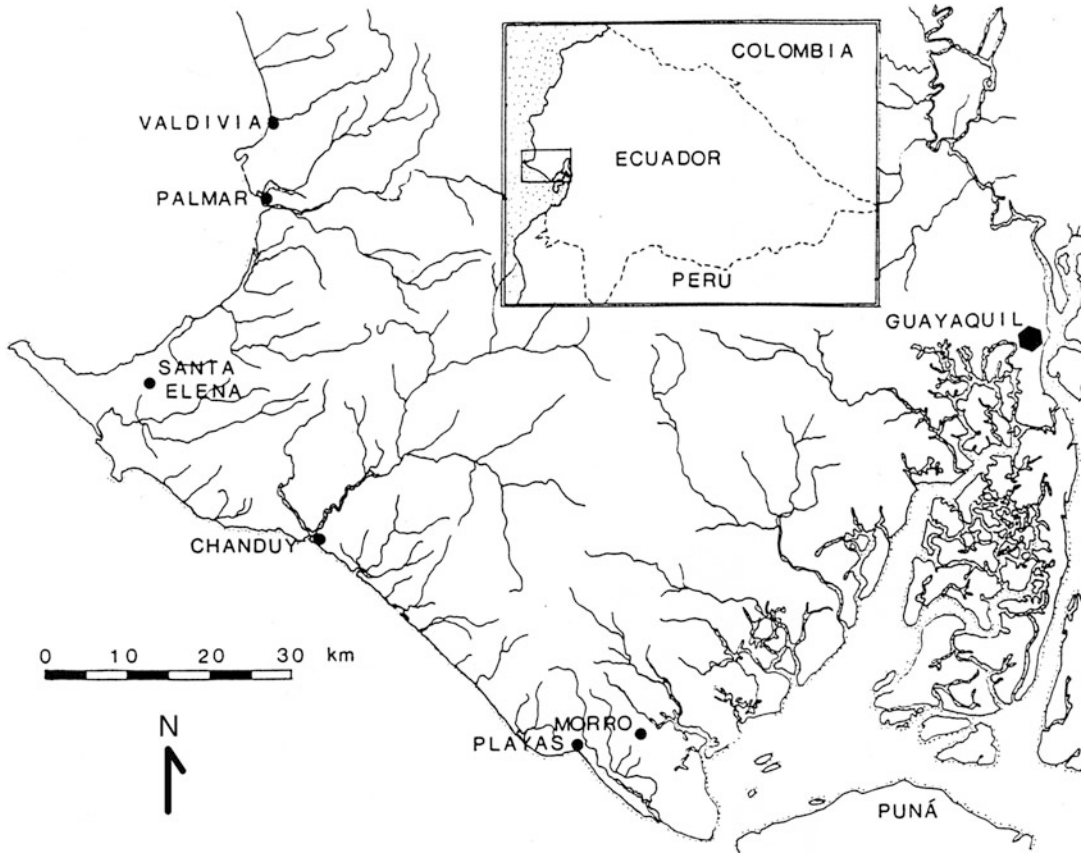
[a]Two-sigma dendrocalibrated age ranges

of lengthening the period in which Vegas sites were occupied.

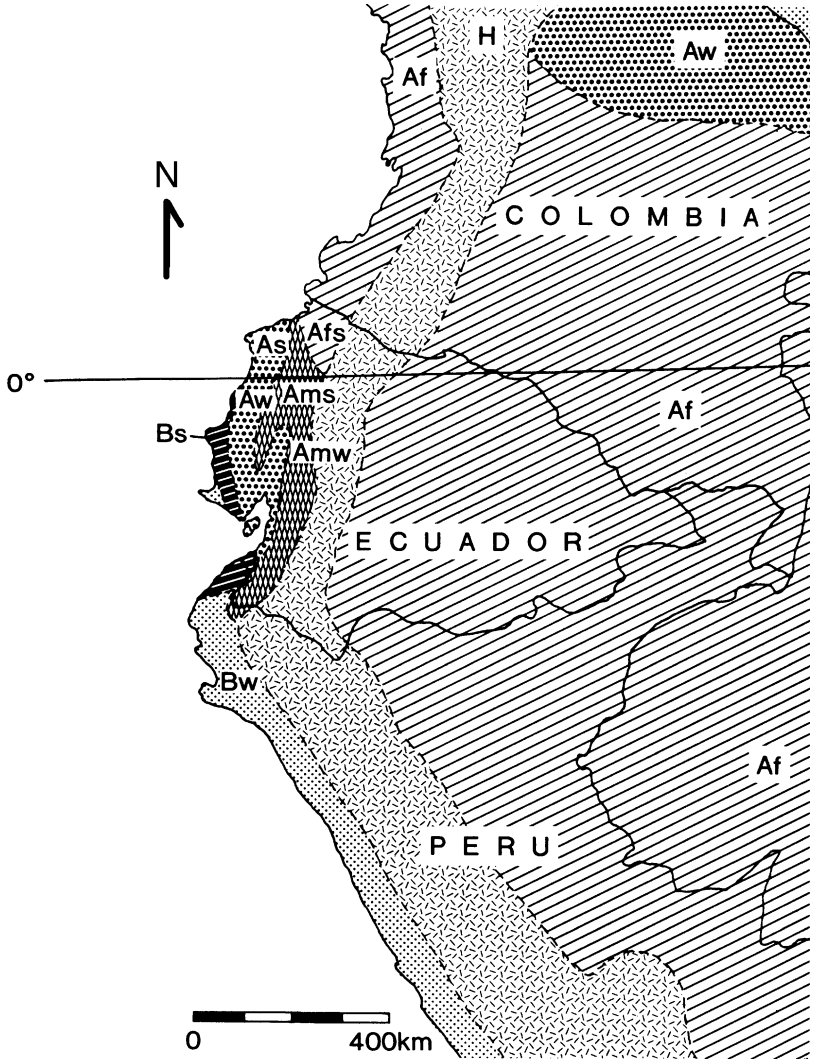
The earliest known inhabitants of the coast of Ecuador occupied the Las Vegas type site, known as Site 80 or CT M5 A3-80, located at 2°13′ S, 80°52′W on the SEP (Fig. 1). Scant evidence from the deepest levels of this site indicates that people visited Site 80 between 10,840 and 10,100 RCYBP; substantial archaeological remains from Site 80 and Site 67 (located 15 km further east) are evidence of more intense human occupation spanning the EH. Both sites are characterized by deep midden and human burials.

Today's Ecuador is a small country (270,000 km^2) characterized by a large number of compressed terrestrial zones with impressive variations in altitude and rainfall from region to region (Fig. 2). The tropical lowlands of the coastal zone include the environmentally diverse slopes of the Andes, a seasonally wet coastal plain dominated by the great Guayas river system, and the Pacific littoral which today is semiarid in the south but characterized by seasonally dry and very wet tropical forest in the north. This environmentally complex coastal region is 700-km long, and has a maximum width of only 200 km. Adequate rainfall and good soils predominate in most of this environmental mosaic, but the subhumid SEP has limited agricultural potential.

The Santa Elena region constitutes a tropical ecotone characterized by a mosaic microenvironment and impressive biological complexity and an



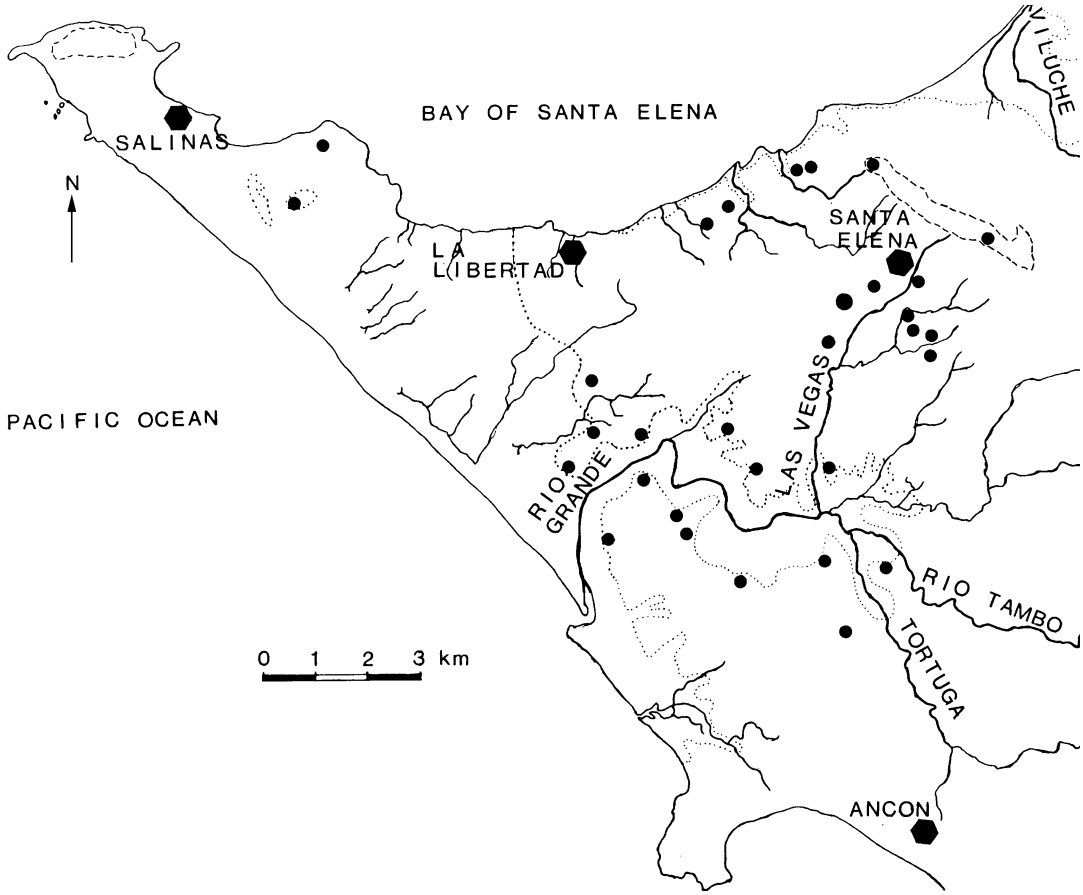
Las Vegas: Environmental Archaeology of an Early Site in Coastal Ecuador, Fig. 1 Location of several modern towns and seasonal rivers of the Province of Santa Elena, also showing the city of Guayaquil (*black hexagon*) on the mangrove estuary of the Guayas river system. Narrowly defined, the Santa Elena Peninsula (SEP) is the area west of a line between Palmar and Chanduy



Las Vegas: Environmental Archaeology of an Early Site in Coastal Ecuador, Fig. 2 Northwestern South America showing the exceptional compression of distinct environmental zones in coastal Ecuador (Stothert 2011: 357, Fig. 15.2). *Af* tropical wet; *Afs* tropical wet with precipitation distributed seasonally; *As* tropical wet-and-dry; *Aw* tropical wet-and-dry with an emphatic dry season; *Ams* tropical wet with two yearly precipitation maxima; *Amw* tropical wet with a strong dry season; *Bs* semiarid; *Bw* arid or desert; *H* undifferentiated highlands. The western portion of the SEP is classified today as *Bw*

important interface with the sea. The shallow coastal waters of Ecuador are rich in pelagic fish, economic crustaceans, and mollusks. The terrestrial environment that was characterized by seasonally dry tropical forest in the nineteenth century is now an anthropogenic desert caused by recent deforestation. The main cause of aridity is the concentration of precipitation in one short season, followed by at least six dry months: This is the effect of the cold current along the southwest coast of Ecuador and the north coast of Peru (Stothert et al. 2003). It is likely that the SEP and northern coastal Peru were moister in the EH because of the more southerly position of the warm Equatorial Counter Current.

Las Vegas camps are known only from the western extreme of the SEP (Fig. 3) where people apparently occupied Site 80 repeatedly for as much as 5,000 calendar years. Most known Vegas sites are small campsites that facilitated the exploitation of a range of resources (Stothert 1988: 225–236). Although evidence is lacking, it seems probable that many Vegas sites are lost or submerged on the continental shelf, and that Las Vegas groups once settled throughout the tropical lowlands of Ecuador, and carried on social



Las Vegas: Environmental Archaeology of an Early Site in Coastal Ecuador, Fig. 3 Map of the western portion of the SEP showing the distribution of Las Vegas preceramic sites; the modern drainage pattern; the modern 10 m contour line (*dotted line*); modern towns (*hexagons*); Las Vegas Site 80 (*large dot* near the town of Santa Elena); and 30 other Las Vegas campsites (*small dots*)

relations with other peoples in northwestern South America.

Definition

The western portion of the Santa Elena Peninsula (SEP) lies west of a line drawn from Chanduy to Palmar (Fig. 1), but the subhumid lands lying south of a line between Guayaquil and Santa Elena belong to the greater Peninsula of Santa Elena and El Morro.

The early preceramic people in America (sometimes called Paleoindians) were immigrants from the Old World, who, by the end of the Pleistocene, had occupied both North and South America, developing myriad regional cultural adaptations. In Ecuador, the term "preceramic" refers to the period and cultures dated before the beginning of the Valdivia phase, characterized by the use of ceramic pottery dated as early as 5,000 RCYB (c. 6,400 calendar years BP).

Phytoliths are the inorganic, silica structures that form inside some kinds of plant cells. When recovered from sediments, they provide evidence of plants that decayed in ancient times. These microfossils permit the identification of some wild and domesticated plants, and they may be dated directly by the AMS radiocarbon method or by their association with other datable archaeological materials.

Key Issues/Current Debates

Peopling America and Early Coastal Adaptation

By 10,000 RCYBP, groups of foragers with distinct adaptations and variable technologies occupied most of the South America (Dillehay 2000), but archaeologists have not recognized any clear or simple pattern of entry and dispersal through the heterogeneous environments of the TP. The evidence of early coastal adaptations in Peru and Ecuador supports the idea that all Pleistocene people were not big game hunters (e.g., Sandweiss et al. 1998; Sandweiss 2008; Dillehay 2011) and offers an alternative to the traditional view that the first Americans were Clovis hunters who walked across Beringia into America.

Coastal research has recently grown in importance, and it is now thought that Old World people, long adapted to both coastal environments and seafaring in East Asia, dispersed into America and down the Pacific coast of South America by boat before Clovis times (Erlandson 2002; Faught 2008; Davis 2011). Evidence from Chile's Monte Verde site (recognized as the earliest settlement in the New World) indicates that marine resources were important to the broadly adapted people of that site before 12,000 years ago (Dillehay 2000: 160–168; 221). Because no North American coastal sites predate Clovis, the issue of initial peopling of South America by hunters from the north continues to be debated. Las Vegas data inform recent research on the antiquity of human use of the world's coastal habitats and marine resources (Stothert 2011).

Climate and Paleoenvironmental Change

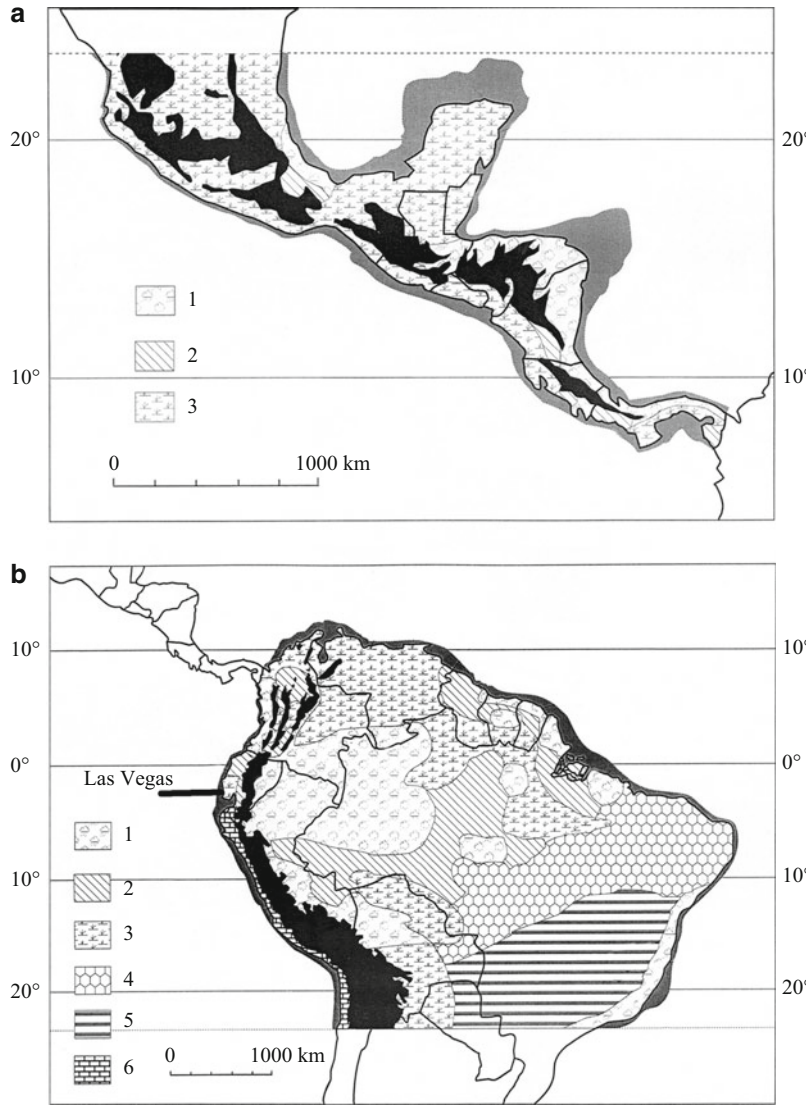
Any discussion of the Las Vegas adaptation depends upon an understanding of the effects of climatic and environmental change on terrestrial and marine resources. Independent paleoecological data have not been generated from any location on the SEP; nevertheless, ancient environmental conditions can be inferred from evidence recovered in archaeological midden and the growing evidence concerning paleoenvironments in South America (Fig. 4).

The late Pleistocene environments of tropical America were characterized by dry, cool climates and vegetation and faunal communities that differed substantially from those seen today (Piperno and Pearsall 1998: Chapter 2). Poorly dated Ice Age paleontological finds from the Santa Elena Peninsula and the north coast of Peru show Ice Age creatures who grazed, browsed, and paddled in environments characterized by open grasslands with gallery vegetation along the river courses, and rainfall apparently maintained a high water table, standing pools of water, and vegetation along drainage courses. Rainfall in Santa Elena and in northern Peru apparently was not sufficient to support forests between the rivers (Stothert et al. 2003).

Probably EH people in South America were challenged by "gradual and oscillating climatic amelioration" after which there were "greater seasonal extremes in temperature and moisture" that resulted in "substantial changes in the communities of plants and animals." As ecological conditions changed, edible resources would have been in a "constant state of spatial and temporal flux" (Stahl 1996: 11). Human responses to these challenges are of great interest to researchers today. Vegas midden deposits are too compressed to allow the documentation of climate processes and minor oscillations, but apparently, Vegas people adapted well to both long- and short-term environmental variations in the EH.

Marine Transgression

Conditions along the Santa Elena coast were very different in the past and varied through time due to postglacial changes in sea level involving marine transgression and regressions as well as dramatic local tectonic uplift that caused geomorphological and associated ecological alterations. There is little information about the timing and extent of these changes; however, the isobaths drawn in Fig. 5 reflect modern coastal topography and may also be employed to model ancient conditions. About 10,000 years ago, mean sea level was depressed circa 30 m below its modern position which would have exposed about 600 km^2 of land and lengthened the interface between the land and the sea. A diverse landscape of mangrove

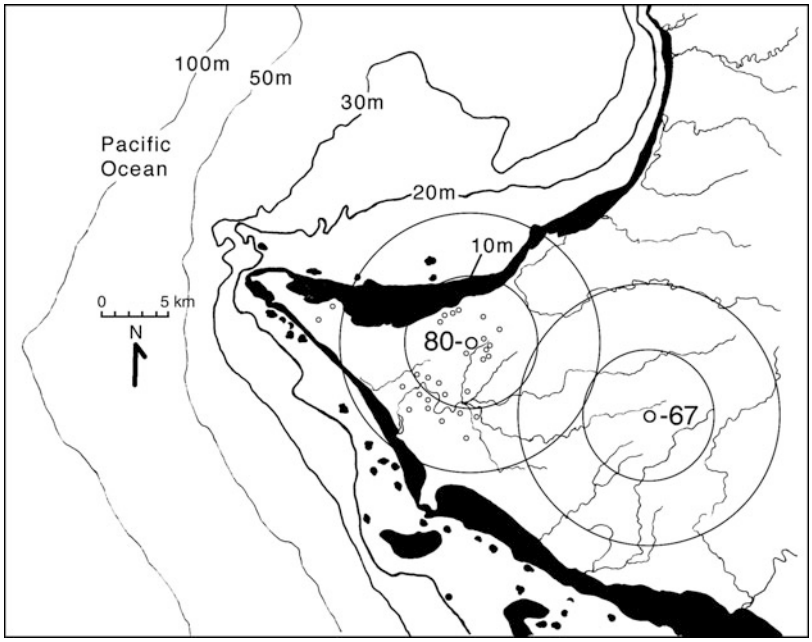


Las Vegas: Environmental Archaeology of an Early Site in Coastal Ecuador, Fig. 4 Reconstructed vegetation of lowland tropical Central America (**a**) and South America (**b**) between 20,000 and c. 10,500 RCYBP (Piperno 2006: Fig. 7.4). (1) Moist forest; (2) dry forest; (3) thorn woodland, low scrub, and savanna; (4) dry and open, few trees; (5) open forest and semi-evergreen forest; (6) desert/cactus scrub. The SEP may have had terrestrial vegetation classified as (3)

formations and estuarine zones may have existed at that time (Stothert et al. 2003; Table 2).

Several pulses of glacial melt water between 10,000 and 7,000 BP affected coasts in various ways, and the great amplitude of short-term sea level oscillations in the EH tapered off through time: As sea level fluctuated, Vegas people witnessed the creation and destruction of coastal habitats until stabilization c. 6,000 years ago (Bird 1993). At the beginning of the Late Las Vegas phase, around 8,000 BP (c. 8,600 cal. BP), Site 80 might have been located 12 km from the north shore of the peninsula, but people would have taken advantage of some 360 km^2 of land, as well as estuaries and mangrove formations, that are submerged today.

The most important implication of modeling the Early Holocene littoral is that the ancient configuration of coastal resources was constantly changing. Even without specifying which physiographic changes took place precisely when, plant and animal communities living along the coasts would have been affected by both sea level fluctuations and tectonic uplift. We may infer that



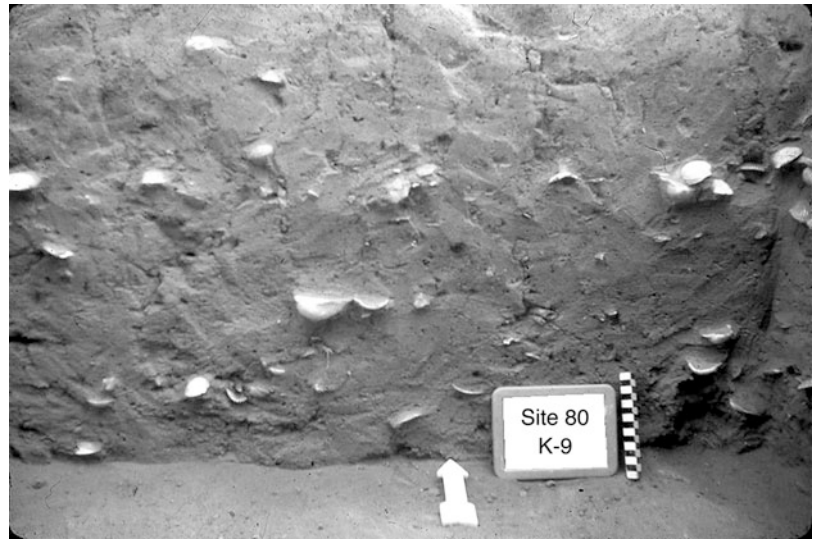
Las Vegas: Environmental Archaeology of an Early Site in Coastal Ecuador, Fig. 5 Changing coastline of the SEP as inferred from bathymetric readings of the modern sea floor. When sea level was depressed 30 m, the ancient coastline may have approximated the 30 m isobath, and the continental shelf between the contour line and the present coast may have been dry land. The area between the 10 m isobath and the present coastline is marked in *black* and models the terrestrial zone at 7,000 RCYBP. Small circles represent small Las Vegas sites, and Sites 80 and 67 are shown with their respective 10 km and 20 km catchment areas

these processes affected water table levels, river gradients, sedimentation rates, and settlement patterns in the terrestrial zone. These phenomena might have taxed the Las Vegas people by destroying traditional resources, but at the same time other resources were created, presenting opportunities to increase productivity by adjusting subsistence strategies. A deep-sea core from off the coast of Ecuador reflects conditions on the continent and provides evidence that mangrove vegetation reached its maximum development between 12,000 and 7,000 years ago (Heusser and Shackleton 1994: 223). In fact, mangrove clams (*Anadara tuberculosa*) that were well represented in Early Vegas assemblages declined in relative importance in Late Las Vegas assemblages (Stothert et al. 2003; Table 4). These numbers may track a long-term decline in the extent of mangrove formations on the peninsula, but the pattern probably reflects sociocultural change as well.

Paleoenvironmental Reconstruction

Fauna

Both floral and faunal remains have been used to reconstruct past environments and to chart long-term changes in the history of the Vegas culture. The bones and shells of animals that accumulated for over 3,000 years in Sites 80 and 67 were well preserved by alkaline soils (Fig. 6). In the early 1980s, the study of a small faunal sample identified 25 taxa of fish from offshore, in shore, estuarine, rocky, and beach habitats; three taxa of cosmopolitan amphibians; a few turtles, lizards, and snakes; parrot bones; a rare marine mammal; and an array of cosmopolitan mammals, including deer, fox (*Lycalopex* sp.), opossum, rabbit, weasel, peccary (rare), rats and mice, other rodents, anteater, squirrel, and a feline (Stothert et al. 2003; Table 5). New research, based on 100% of the excavated remains, has resulted in the recognition of more birds from wetland habitats.



Las Vegas: Environmental Archaeology of an Early Site in Coastal Ecuador, Fig. 6 The excavated north wall of Quadrant K-9 in Site 80 shows the compressed Las Vegas midden that preserves faunal remains and plant microfossils deposited by Las Vegas foragers and cultivators in the Early Holocene

Evidence indicates that the same species of fish taken from near-shore waters in Vegas times are available today on the SEP, although shallow bays, shoals, lagoons, estuaries, and mangroves were distributed differently in the ancient environment. Apparently, the changes in Early Holocene ocean currents dramatically altered the distribution of marine faunal species further south in Peru, but did not affect the marine biotope of Santa Elena, although local mangroves were decimated in the twentieth century.

Analysis of small samples of vertebrate animals has led to the suggestion that Late Vegas people acquired half of their animal food from marine and estuarine environments, while the other half came from the land. Terrestrial vertebrate remains show that the western SEP was always subhumid and characterized by seasonally dry forest and savannas. Vegas people probably enjoyed somewhat moister conditions than today, with rainfall more evenly distributed throughout the year, but monkeys and other species characteristic of moist tropical forests are missing from Vegas faunal assemblages. By exploiting a wide variety of species, Vegas people enjoyed a constant supply of animal protein.

A comparison of faunal assemblages in Site 80 has shown a subtle evolution in exploitation patterns from Early to Late Vegas times (Stothert 1985: 620, 1988: 193–195): The earlier people concentrated on land animals, principally deer, while the later people apparently intensified their fishing activities.

Large mangrove clams dominate the molluscan remains from Site 80, but crabs and 19 other species of shellfish from a variety of inshore ecosystems are also present. Few species were acquired from deep waters. The surprising number of fresh water snails (*Pomacea* sp.) in the Early Vegas levels supports the notion that the ancient SEP received more rainfall and that Early Vegas people visited ponds of standing fresh water.

Based on a calculation of the minimum number of individuals (MNI) represented in samples of molluscan remains, it has been shown that the percentage of mangrove clams declined substantially in Late Las Vegas midden, and rock-living species were much more frequently sought in the Late Vegas period (Stothert et al. 2003; Table 4). While rocky points may have become more accessible in the Late Vegas period, mangrove habitats may have decreased in extent. This reduction might track an increased use of marine fish in the Late Las Vegas period. The increased emphasis on fish may have been encouraged by improved technologies that made fishing more efficient, or by a reduction in available meat from terrestrial sources, or the desire to produce surpluses of dried, salted, or smoked fish for social purposes.

Flora

Pollen and macro-plant remains were not preserved in Vegas soils, but the presence of microfossils, including starch grains and phytoliths, has revolutionized the interpretation of Vegas environments and cultural practices. Phytoliths from grasses and shrubs are evidence that the ancient environment was characterized by thorn scrub and wooded savanna vegetation in the Early Holocene (Piperno and Pearsall 1998: Chapter 2 and 183–199, Fig. 4.1a, b). Palm phytoliths, found commonly in archaeological soils in moist tropical habitats, do not appear in Vegas assemblages.

The study of microfossils at Site 80 shows a progressive development in the use of plants from Early to Late Vegas times (Piperno and Pearsall 1998: 183–199; Stothert et al. 2003; Piperno 2006). Early Vegas farmers cultivated bottle gourd (*Lagenaria siceraria*) as early as 9,000 BP, and phytoliths from this species continued in later archaeological levels. Bottle gourd, a plant always cultivated in America, may have been a source of seeds or fruits that can be used as containers, netfloats, or rattles. The diagnostic phytoliths from various kinds of squash seeds (*Cucurbita* sp.) are ubiquitous in the midden. Phytoliths from the seeds of *Calathea allouia* (a plant called leren) also appeared in a 9,000 BP context and became common in later levels: Today this plant is cultivated for its starchy root in northern South America and the Antilles. Edge-ground cobbles and small grinding stones may have been used to process this root food or a variety of seeds. *Zea mays* phytoliths that indicate a primitive form of corn were present in the latest midden level at Site 80 but do not represent a staple food. Maize seeds, originally from West Mexico, were widespread among preceramic peoples in Central America and northwestern South America by 7,000 years ago. A long dry season in Santa Elena would have favored the cultivation and storage of maize and other seeds crops. It is likely that Late Vegas people also cultivated beans, cotton, peanuts, and other tropical root crops because these were present in contemporary archaeological contexts in neighboring regions (Dillehay 2011; Piperno 2011a, b).

Cultivation and Domestication

The seasonally dry environments of Central and South America have drawn scientific attention because the wild ancestors of many plants that eventually were domesticated in America were found there, and because archaeological evidence indicates that people in today's Panama, Colombia, Ecuador, and Peru were cultivating and modifying the genetic makeup of plants by the beginning of the EH (Piperno 2006, 2011a). The idea that plants were cultivated and domesticated at the beginning of the EH is now widely accepted. Cultivation of genetically modified plants may be seen as a successful adjustment to fluctuating environmental conditions and shifting resource availability in a seasonally dry tropical zone. Cultivation was innovated in many localities, and not in just a few centers.

Vegas people probably harvested wild fruits and nuts from trees, and a variety of annual plants as well as roots and tubers, which famously store starch for the dry season. Foraging for wild resources, however, may not have been as energetically efficient as cultivation, especially as populations increased and mobility decreased. In Central and South America, as EH people began to cultivate plants, some responded positively resulting in more attractive, domesticated forms. Women might have been interested in reducing their mobility and increasing their per capita productivity by selecting certain improved species for cultivation, increasing the local availability of a valued resource.

Vegas people living in a seasonally dry ecotone were among the early cultivators of plants in northwestern South America: Phytoliths and starch grains from domesticated plants constitute evidence that the Las Vegas people began to manipulate economically important species between 9,000 and 10,000 BP. These data support the inference that both seed plants (squashes and bottle gourd) and a root crop (leren) were cultivated in alluvial soils on the SEP by 9,000 BP.

Measuring the squash phytoliths found in sediments at Site 80 has shown how the ancient seeds and fruits evolved through time (Piperno and Pearsall 1998: 194–195; Piperno and Stothert 2003). This pattern tracks the progressive

domestication of the squash plant, supporting the argument that cultivation was underway by 9,000 BP in Santa Elena, and providing evidence for independent domestication of squash species in lowland tropical South America during the earliest Holocene.

In modeling the origin of cultivation in the tropics, Piperno and Pearsall (1998: Chapters 1–4; Piperno 2006, 2011a) argue that broad-spectrum collecting developed as human groups found more energetically efficient adjustments to the changing resource patterns: because Pleistocene people operated in an ecosystem poor in starchy wild plants, they would have found it desirable to introduce more calories into their diet. Furthermore, in seasonally dry tropical forested biomes, plant cultivation is a more energetically efficient subsistence activity than wild plant collecting. Evidence from several regions supports the idea that plant cultivation was a low-cost subsistence strategy. Not surprisingly, horticulture developed in Central and South America before 9,000 BP, during a period when there was much more environmental instability than was experienced by people later in the Middle Holocene.

Reconstructing Intangible Culture

By Late Vegas times, animals from both aquatic and terrestrial environments were used as symbols in the Vegas ideological system (Stothert 1988: 133–170). Human burials at Site 80 were associated with offerings of teeth from the desert fox (*Lycalopex* sp., formerly *Dusicyon sechurae*). These canids may have been evoked as psychopomps. Also, shells of various species were used to construct a bed for the burial of an infant, and other mortuary offerings were manufactured from shell: These include ornaments of nacreous shells, dish-like artifacts that served to protect the joints of the dead, a container for ground red ochre, a conch trumpet, and two carefully perforated immature valves of *Malea ringens* that are functional whistles but might have been employed as containers for snuff. Shell is a useful raw material, but shells are often brilliant in color, and associated with spirituality, immortality, water, life, and fertility.

Marine and Terrestrial Resources

The Vegas case is important because it reveals a durable foraging adaptation of people focused on marine, estuarine, and terrestrial resources and who also participated in the domestication of useful plant species and progressively intensified both their efforts in fishing and horticulture for more than 3,000 years. The long-lived Vegas way of life was enabled by local conditions: Aquatic resources enabled sedentary life and underwrote experiments in plant cultivation, while the development of small-scale farming meant that people could maintain their residence by the sea and coastal wetlands and enjoy a balanced diet.

The study of the well-preserved (mineralized) skeletal remains of c. 200 individuals buried in Sites 80 and 67 between 8,250 and 6,600 BP proves that Late Las Vegas people were relatively long-lived and enjoyed very good health, with a low incidence of anemia and caries (Stothert 1988; Ubelaker and Newson 2002). This pattern of good health manifests a successful adaptation underwritten apparently by the mosaic of resources of the SEP, and sustained by the capacity of Vegas people to continuously adjust their foraging and farming practices.

Long- and short-term changes in the climate and biogeography of the Santa Elena Peninsula were factors that shaped the Las Vegas adaptation, and long-term demographic growth may have been another selective pressure. In order to model change successfully, paleoenvironmental studies of the peninsula are required, and only the discovery of more Early Las Vegas sites will generate information about demographic and socioeconomic change.

The Vegas case contributes a corpus of data to the study of the origin of horticulture in the Neotropics and supports the notion that cultivation originated as foragers, familiar with a wide variety of species within their complex tropical ecotone, experimented with cultivation. Their early experiments with horticulture and domestication were enabled by their access to predictable aquatic resources whose natural fluctuations were in part independent of the changing patterns of rainfall that affected the plant and animal communities of the terrestrial zone.

Late Las Vegas people, compared to their ancestors, consumed more fish, trapped fewer small animals, hunted large animals, and cultivated improved squash, root crops (like lerén and perhaps manioc), and eventually maize. Perhaps Late Vegas Period men hunted deer as before, but also parties of kinsmen developed ways of fishing together, improving the productivity of their lines and nets. Women may have gardened in the bottomland of seasonal rivers, an activity viewed as more productive than foraging in the bush. If Las Vegas women traditionally were responsible for collecting plants and small animals, then their growing specialization in cultivation may explain the decrease in the utilization of small animals in the Late Las Vegas phase.

Logistical collecting and relatively sedentary settlement may have been favored because of the economic benefits of exploiting both predictable terrestrial and marine/estuarine resources. During the long EH, the Las Vegas people became progressively more committed to feeding themselves with garden products while exploiting the rich aquatic resources of Santa Elena. Their farming and fishing strategies proved to be successful adjustments to a dynamic, complex tropical, coastal ecosystem. Late phase Vegas people undertook some social changes, including the development of elaborate communal burial activities. The mixed farming and fishing strategy of the Late Vegas people was well suited to the SEP: It can be seen as a preadaptation for the development of fully agricultural, village life in coastal Ecuador in the Valdivia ceramic period, and it continued to be the basis of life during the entire aboriginal period in what is now coastal Ecuador.

Social Complexity in the Late Las Vegas Period

Las Vegas men and women might have changed their behavior and reallocated their labor in order to optimize productivity and minimize risk in the dynamic environmental context of the EH, and their increasing efficiency in exploiting fish (harvested from a huge inshore biomass) and their ability to produce abundant plant food seasonally may have created the opportunity to grow the local community and undertake sociocultural change. Plants figure widely in human exchange activities, as do salt, and dried or smoked fish and shellfish. People may have invested labor in order to build alliances, engage in reciprocity with other people and with their ancestors, and undertake regional and extraregional exchange – activities that characterize more complex social life.

The founding of cemeteries in the deep midden at the two largest known Vegas sties indicates a greater degree of settlement stability and social complexity in the Late Vegas period. Funeral practices are evidence that people invested more time and effort in community social activities. One imagines that groups of families developed integrative mechanisms, such as complex mortuary rituals, that perhaps helped them to share food on a regular or irregular basis, and reminded them of the relationships that allowed the fielding of larger work groups and the defense of the resources of their territory. Ceremonial gatherings imply both the consumption of special foods and the giving of food as gifts. Growing food and producing quantities of fish in order to share is another way that people ensure themselves against resource fluctuation. Food sharing is a strategy for minimizing risk. The intensification of both fishing and farming may have underwritten the development of ceremonial activities, alliance building, and reciprocal exchange. Amerindians have a long history of maintaining robust patterns of interaction with near and distant neighbors.

International Perspectives

Research in the last 40 years has brought to light the existence of TP and EH archaeological sites in almost every country in South America, and key issues are now discussed across modern national boundaries. Innovative research tools developed by archaeologists, climatologists, botanists, zoologists, geneticists, and linguists are now employed throughout the tropics in order to better understand issues related to the development of culture in the New World.

Future Directions

Although most of the analyses of excavated evidence took place 30 years ago, research on phytoliths and starch from Vegas sediments, artifacts, and human teeth has proceeded continuously, and recent and proposed restudies of Vegas materials will yield improved interpretations.

New data are needed to facilitate the archaeological investigation of the initial peopling of coastal Ecuador, early horticulture, and the development of more complex social behavior. This will require the discovery of additional sites in all regions of Ecuador, but especially in the great Guayas River Basin and at points along the coast where the present shore is not too far removed from the ancient high tide line. Recently discovered preceramic sites in the Guayas Basin may result in expanding knowledge of the prehistory of Ecuador's coastal lowlands. Fortunately, the ongoing study of the domestication of native plants in the Neotropics will continue to generate invaluable evidence and interpretations.

Crucial is the long-term preservation of sites and excavated remains: This will require the commitment of individual archaeologists and governmental and private institutions in assuring that the archaeological record continues to be available for investigation. Recent restudies of curated remains illustrate the importance of applying current methods to answering today's research questions. Site 80 is now the campus of the regional museum in Santa Elena, where a portion of the ancient midden is protected for future scientific investigation.

Cross-References

- ▶ Agricultural Practices: A Case Study from Papua New Guinea
- ▶ Archaeobotany
- ▶ Island Nation Sites and Rising Sea Levels
- ▶ Mesoamerica: Subsistence Strategies by Region
- ▶ Molluscs (Invertebrates): Analyses in Environmental Archaeology
- ▶ Phytolith Studies in Archaeology
- ▶ Squash: Origins and Development
- ▶ Submerged Prehistoric Landscapes
- ▶ Zooarchaeology

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Late Antique Anatolia, Archaeology of

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Introduction

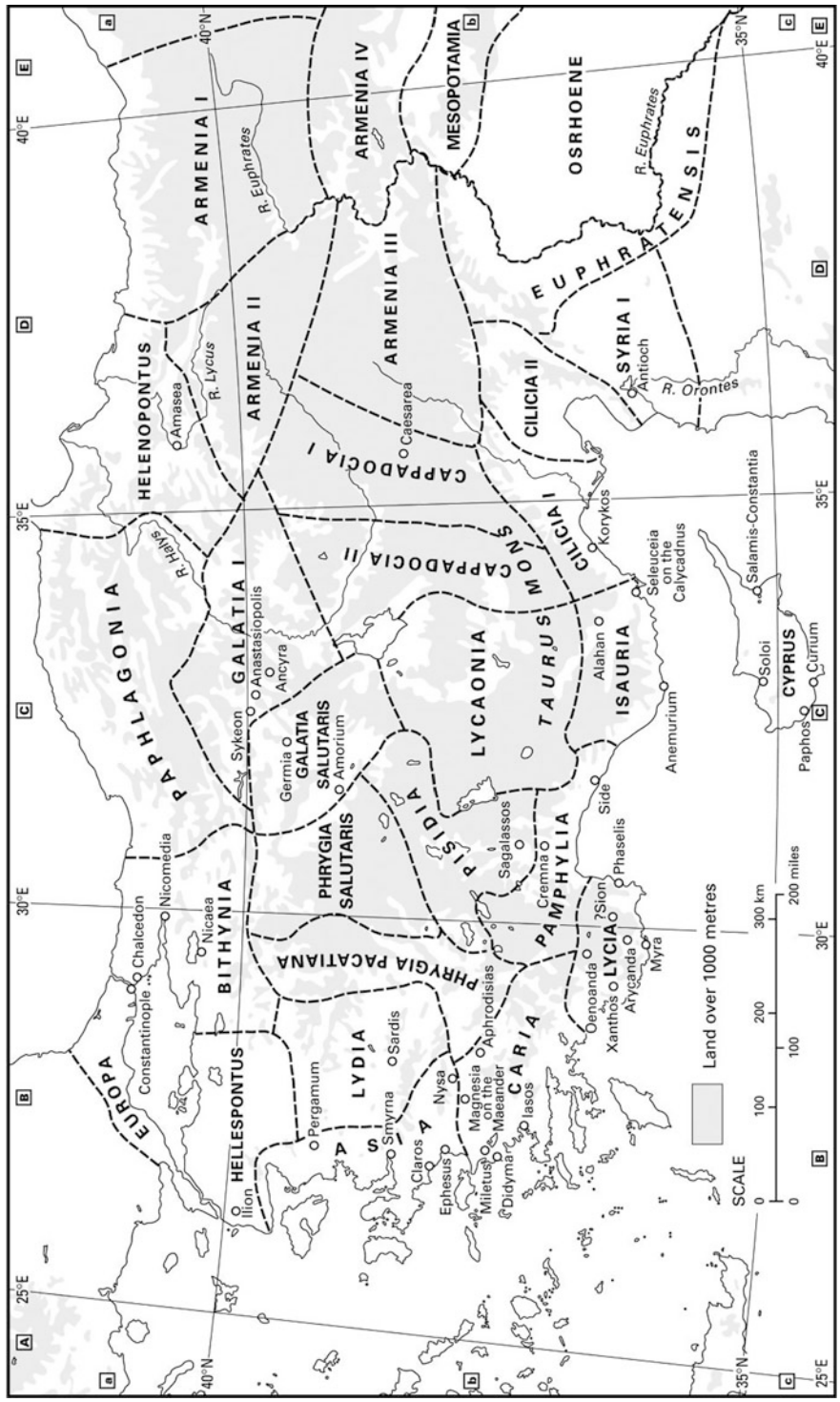
Together with Syria-Palestine, Anatolia, otherwise known as Asia Minor, in Late Antique and Early Byzantine times belonged to the more populated and dynamic regions of the Roman Empire. Both cities and countryside continued to prosper at least until the middle of the sixth century. There is much inconsistency in the use of the terms Late Antique and Early Byzantine. Here, the first period is considered to have started in 324, the year Constantinople was founded as the new Roman capital, and to have ended in 527, the beginning of the reign of Justinian. The Early Byzantine Empire ends in 640, when the internal structures of the Roman state were dramatically changed in response to the Arab conquests.

Definition

Anatolia is situated in the westernmost part of the Asian continent, roughly corresponding to the Asian territory of modern-day Turkey, between the Aegean and the Euphrates (Fig. 1).

The region was bordered by the Black Sea in the north, the Aegean Sea in the west, and the Mediterranean Sea in the south. Just as it had in previous centuries, the eastern border with the Persian Empire was constantly changing.

The richest provinces of the region were situated along the fertile Aegean and Mediterranean coasts and the great river valleys starting on the Anatolian plateau. Due to their easy access to water transport, these areas were well connected to the Mediterranean economy. They were also the most densely occupied by villages and cities,



Late Antique Anatolia, Archaeology of, Fig. 1 Map of the provinces in Late Antique Anatolia (Roueché 2000: Map 14)

despite imperial efforts to foster greater administrative and fiscal efficiency by creating cities on the central plateau of Anatolia. The interior of the region was separated from the coastal strip by the Pontic mountains in the north and the Taurus mountains in the south, which begin on the Lycian coast and run all the way to the Euphrates. The nature of the inland plateau is harsh and rugged overall, rendering it fairly marginal to the Roman Empire. The Taurus Mountains also separated the provinces of Isauria and Cilicia from the rest of Anatolia. This was acknowledged in the past when these provinces were assigned to the diocese of Oriens. The remainder of Anatolia was divided into the diocese of Asia and the diocese of Pontica. Even in Late Antique and Early Byzantine times, various peoples populated Anatolia. Their internal differences and diverse historical and cultural backgrounds were acknowledged in the provincial division under the tetrarchy, which was still based on ancient tribal units and kingdoms (Roueché 2000: 572).

Historical Background

In 324, Constantine established his imperial capital at Constantinople. The city, which reached full development after Theodosius I took permanent residence there, counted a population of 300–400,000 in the fifth century, and around 500,000 by the time of Justinian. The concentration of people and power in this corner of Anatolia had far-reaching political, social, and economic consequences for the entire region.

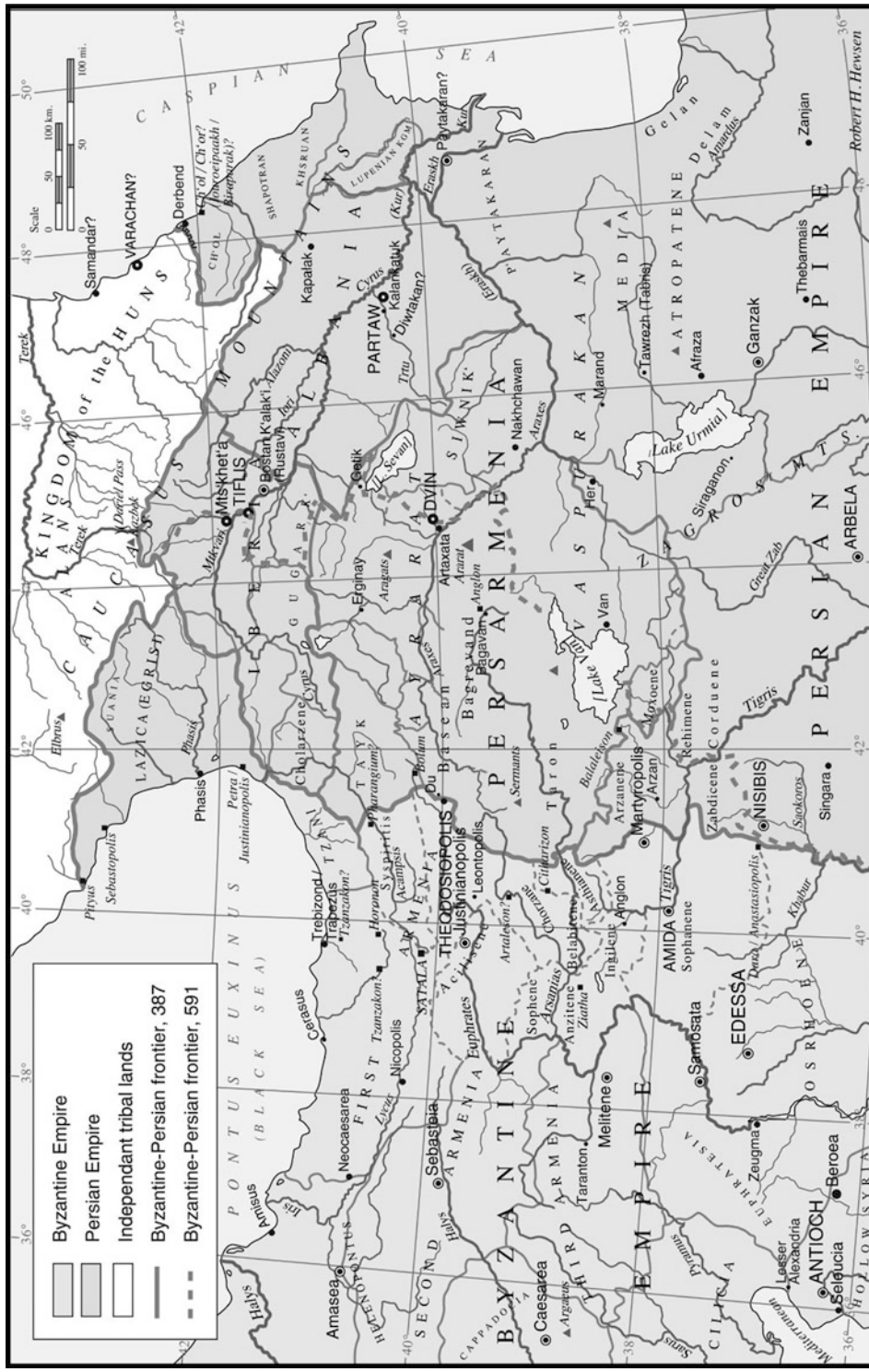
The location of the city was strategically chosen at a crossroad of sea and land routes, and it was well protected from attacks over land by Greece and Thrace to the west and Syria, Armenia, and Anatolia to the east. Anatolia itself was well protected by natural borders. The most important threats came from the east, where the mountainous districts of Armenia and the Caucasian kingdoms formed a vital frontier region with the Sassanid Persian Empire (Fig. 2).

Not only were these regions densely populated and rich in natural resources; the Caspian Gates in the Transcaucasus provided a barrier against the incursions from the north. For instance, the Huns who harassed Anatolia between 395 and 398 invaded through Transcaucasia. Consequently, both Romans and Persians attempted to impose their authority on this broad frontier zone until the Arab conquest. Overall, the Persians dominated the eastern Caucasus and at times succeeded in extending their power as far as the Black Sea. Roman emperors frequently turned down requests for financial and military assistance in guarding the passes across the mountains, which resulted in more armed conflicts between the two Empires. The various local people – the most important group being the Armenians, the Iberians, and the Lazi – were in many respects culturally indebted and politically influenced by Iran, but their adoption of Christianity strengthened their loyalties to Rome. They frequently changed sides in this never-ending conflict (Greatrex and Lieu 2002).

The largest internal threat for Anatolia came from the province of Isauria, whose inhabitants were notorious for their raids on neighboring areas. They had already revolted in the 270 s, and their activities further escalated during the fifth century, when they were reported to have attacked settlements as far away as Cappadocia and Pamphylia. The region was only pacified under Anastasius in 498.

According to a law decreed in 534, the provinces of the Greek islands, of Caria and of Cyprus were made suppliers of the Balkan frontier, a ruling which suggests that the countryside of these provinces was still rich and prosperous. This may have changed when the Great Plague arrived in Anatolia in 541/2. It is generally assumed that the population of the Empire dropped drastically due to recurrent outbreaks of the disease (Little 2007).

Anatolia then took on a vital role in the final conflict with Persia, as it became the base of operations for Heraclius and his army from 610 onward. In 626, Constantinople was besieged by Persians, Avars, and Slavs. In a counteroffensive, Heraclius prompted the Persian nobility to overthrow their king in 628. However, the ongoing war had weakened both Empires, so much so that neither was able to resist by the time the Arabs



Late Antique Anatolia, Archaeology of, Fig. 2 Map of the Roman-Persian frontier in Armenia and surrounding regions (Greatrex and Lieu 2002: Map 3)

began their conquest in 634. By 641, the Roman Empire had shrunken to the Aegean, parts of the coasts of Greece, and Anatolia to the west of the Taurus mountains (Haldon 1990: 41–53). State control was weak, and small-scale brigandage and robbery had become frequent hazards.

As seen elsewhere in the Roman Empire, the Christianization of Anatolia happened quickly but inconsistently. Although civic temples were deserted and had begun to crumble from the fourth century onward, educated elites still held on to their pagan and mythological past. In certain localities, cults survived far into the sixth century, even longer in some cases. Aphrodosias especially, in Caria, had a strong pagan presence until the late fifth or early sixth century and was the location of a Neoplatonist school centered on Asklepiodotos of Alexandria. He and others like him traveled throughout the eastern Mediterranean studying and encouraging pagan religious practice. Likewise, though Christian shrines could be found in the countryside of regions such as Galatia, Cappadocia, Paphlagonia, Pontus, and Armenia Minor from the fourth century onward, John of Ephesus still claimed to have baptized 80,000 pagans in Asia, Caria, Lydia, and Phrygia in the 540 s (Mitchell 1995: 62, 68–9).

Key Issues/Current Debates

Archaeology of the City

Although our knowledge of the city in Anatolia is fairly advanced, there are still many uncertainties. First, Late Antique remains suffered severely from deficient excavation techniques and from the excavators' wish to expose the attractive classical city. Second, larger urban centers such as Ephesus or Aphrodisias have traditionally attracted much more attention than smaller towns. Moreover, the interior, the east, and the north have been far less explored than the Aegean and the Mediterranean coasts. On the whole, there is little evidence for urban activity in these regions after the early fourth century. Third, details about the civic government are more obscure than in previous centuries because the epigraphic record was largely reduced to verse inscriptions composed in honor of imperial officials, usually provincial governors (Mitchell 1995: 120–1, 336).

For the most part, Late Antique and Early Byzantine undertakings were of a more modest nature than their predecessors. This change was brought about by the profound restructuring of imperial and municipal institutions, which began under Diocletian, and the subsequent lack of money, at least in the smaller cities of the provinces. Building projects in provincial capitals still testify to the larger number of resources concentrated in the hands of the governor. Nevertheless, the reuse of architectural fragments also proliferated here from the fourth century onward. As the urban fabric of cities in Anatolia had already been saturated by the third century, building anew was less frequent than renovation and repair works. The money for these interventions came from municipal funds. Private benefactions had become rare and modest but were still commemorated with pride. Thus, when parts of the portico of Tiberius at Aphrodisias collapsed in the sixth century, the western side was reconstructed by one generous donor, while several others contributed to the restoration of the south side. Imperial funding remained limited to the capital and larger pilgrimage sites (Jacobs 2012: 482–535).

The level of activity in Late Antique and Early Byzantine times was, however, far from constant. After an initial quiet period, construction suddenly became more extensive after 350, first in provincial capitals and also in smaller cities around the 400 s. These decades were primarily characterized by widespread construction of civic fortifications, which often reused earlier Hellenistic wall stretches, even when the city had grown in the meantime (Fig. 3).

New major monuments – such as the Martyrium of St. Philip at Hierapolis and suburban quarters such as the Paktolos suburb at Sardis – were located outside the walls, suggesting that the climate was not too hostile.

The most elaborate achievement was the Theodosian defensive system of Constantinople, which enclosed a surface of 650 ha. Some of these walls show signs of later repairs. Another significant change taking place was the deconsecration

Late Antique Anatolia, Archaeology of, Fig. 3 The late antique city gate at Blaundos (Lydia)

of temples. In the following decades and centuries, most of them would be dismantled. However, temples on central locations had often already been converted into churches by the first half of the fifth century, as at Sagalassos or Aizanoi, or by the second half, as at Aphrodisias. The first newly built churches in this period were established in imposing positions that often held significant associations, such as the Church of St. John at Ephesus.

Despite the changed religious climate, cultural activities largely continued. Odeia, and especially theaters, remained major meeting places, in addition to providing a venue for mimes, pantomimes, and games, even into the sixth century. Traditional *thermae* were repaired, whereas smaller, asymmetrical baths proliferated. Constantinople possessed 153 of them by the early fifth century as well as 8 *thermae* complexes. Small baths were also built in Didyma, Priene, Ephesus, Samos, Perge, Side, and Anemurium. Stadia such as those of Aphrodisias and Perge came to house an amphitheater at one of their ends. Gymnasia went out of use, maybe as the result of an altered vision on agonistic culture, maybe because the maintenance of such large complexes was no longer possible. They were dismantled and encroached upon by either houses and workshops, similar to what happened to the gymnasia at Salamis-Constantia and Anemurium, or by churches, which was the case with at least two abandoned gymnasia at Ephesus.

In contrast, the city's colonnaded streets and agorae remained highly frequented areas. At the beginning of Late Antiquity, new imperial fora and other large and smaller plazas were still laid out at Constantinople. New agorae also appeared in the larger cities of the provinces, such as Pisidian Antioch and Aphrodisias (Fig. 4; Lavan 2006).

Even though some existing agorae went out of use and were encroached upon by houses and workshops (the most famous being the State Agora at Ephesus) or by churches (e.g., the Lower Agora at Xanthos and the agora at Phaselis and Iasos), most of them survived as political, social, and commercial centers into the sixth and sometimes even into the seventh century. Colonnaded streets were still built and renovated in both large and small cities (e.g., Constantinople, Ephesus, Aphrodisias, Sardis, Aizanoi) (Fig. 5).

With the exception of those at Aphrodisias, a city with a long-lasting local quarrying and stone carving tradition, both the colonnades and street pavements were now composed of varied spolia. The offices, shops, workshops, and restaurants housed behind the colonnades continued to draw a large number of visitors. Already by 400, their commercial function was extended even further when permanent structures with a commercial

Late Antique Anatolia, Archaeology of, Fig. 4 The fourth-century Tetrastoon at Aphrodisias (Caria)

Late Antique Anatolia, Archaeology of, Fig. 5 The late antique colonnaded street at Aizanoi (Phrygia)

and/or artisanal character encroached underneath their colonnades (Jacobs 2012: 625–37).

Finally, the fourth and also the first half of the fifth century saw the construction of large and lavishly decorated urban mansions in cities such as Ephesus, Sardis, Aphrodisias, Halikarnassos, Xanthos, Sagalassos, Paphos, Salamis, and so on (Uytterhoeven 2007: 82–5). They comprised both public areas with reception and dining halls as well as private areas with bedrooms, kitchens, and sometimes a bath complex. Some of them can be identified as official residences of provincial governors, bishops, or other officials. The elaborate town houses to the north of the Hippodrome at Constantinople could be identified as the palaces of Lausus and Antiochus, both *praepositus sacri cubiculi* of the early fifth century (Mundell Mango 2000: 950).

On the whole, the period after the mid-fifth to early sixth century was less eventful in the field of secular construction – though there are exceptions such as the city of Amorium that flourished under the reign of Zeno. Instead, this period saw the invasion of the city center by numerous churches, monasteries, *martyria*, and welfare establishments. Whereas many of the earliest churches resulted from conversions of temples and secular monuments, churches were now mostly constructed anew, following a simple basilical plan with three aisles preceded by a peristyle courtyard. The church exterior was kept simple and monotonous, though the interior was lavishly decorated with marble and mosaic floors, marble chancel and ambo plates, and wall paintings and wall mosaics. Only ecclesiastical foundations in Cilicia and Isauria possessed lavishly decorated exterior facades, as did those in other provinces of the Oriens diocese. Although the construction of lavish private houses apparently stopped after the mid-fifth century, the *episkopeia* that could be identified at Ephesus, Miletus, Side, and so on belong to the first half of the sixth century or later.

With the exception of the diocesian capital of Ephesus, the cities of Anatolia received little attention during the reign of Justinian. The emperor's activities were instead concentrated on Constantinople – where he constructed or rebuilt a senate house, a forum, a seaside promenade, a bath complex, a vast cistern, six hospices, and four palaces, as well as 33 churches including St. Sophia – and along the eastern frontier zone. In Pontos, Lazica, and Armenia, both Anastasius and Justinian established or refortified strongholds, such as Petra in Lazica, Theodosiopolis in western Armenia, and Martyropolis in highland Armenia, and further endowed these settlements with sizeable churches (Mitchell 2007: 339).

From the second half of the sixth century onward, the appearance of cities in Anatolia quickly deteriorated, and human actions became purely functionally motivated: statuary was thrown in limekilns, fountains were converted into water tanks, dilapidated colonnades were no longer reerected, and garbage dumps appeared in the center of the city. By the late sixth or early seventh century, even most churches showed few traces of continuing activity, save for the intramural necropoleis developing around them. These events, which would transform towns into rural villages, occurred several years, or even decades, before the Persian incursions. They had largely concluded before cities such as Ephesus, Sardis, Sagalassos, Aphrodisias, Phaselis, and Magnesia began constructing smaller fortification walls in the course of the seventh century. The positions of these *kastra* were primarily chosen for defensive reasons, with little or no respect for the earlier city (Jacobs 2012: 96).

The Countryside

Surveys of the countryside, which have been carried out since the 1950s, are starting to provide a more detailed picture of the settlement patterns in Anatolia. At the Marmara coast of Bithynia and in Cappadocia, large, often senatorial, landowners could be found. The church also acquired vast landholdings, and its landownership grew substantially in the sixth century, most notably in the development of monasteries on the outskirts of villages. Elsewhere, estates were mostly controlled by a city-based aristocracy. Only on the eastern Anatolian plateau (Pontos, Cappadocia) may there have been more isolated rural estate centers present (Morrison and Sodini 2002: 182). Rural life was therefore mainly confined to peasants, both landowning and dependent, who were living in villages or farmsteads.

Villages started to develop in the third century and flourished until the end of the sixth. The center of gravity was located along the coastal regions of southern Asia Minor, where cities and villages alike could profit from their position on the shipping routes from Alexandria, Syria, and Cyprus to the Aegean and Constantinople. Surveys in central Lycia as well as around Kyaneai near the coast show a Late Antique expansion in the number of villages, farms, and farmed terraces, probably dating to the fifth/sixth century. In Cilicia and Isauria, new villages developed from the fourth century onward. But also in inland regions, such as Pisidia and the Konya plain, new settlements were established and existing communities expanded. Byzantine Cyprus saw the widespread proliferation of Late Roman sites. Whereas

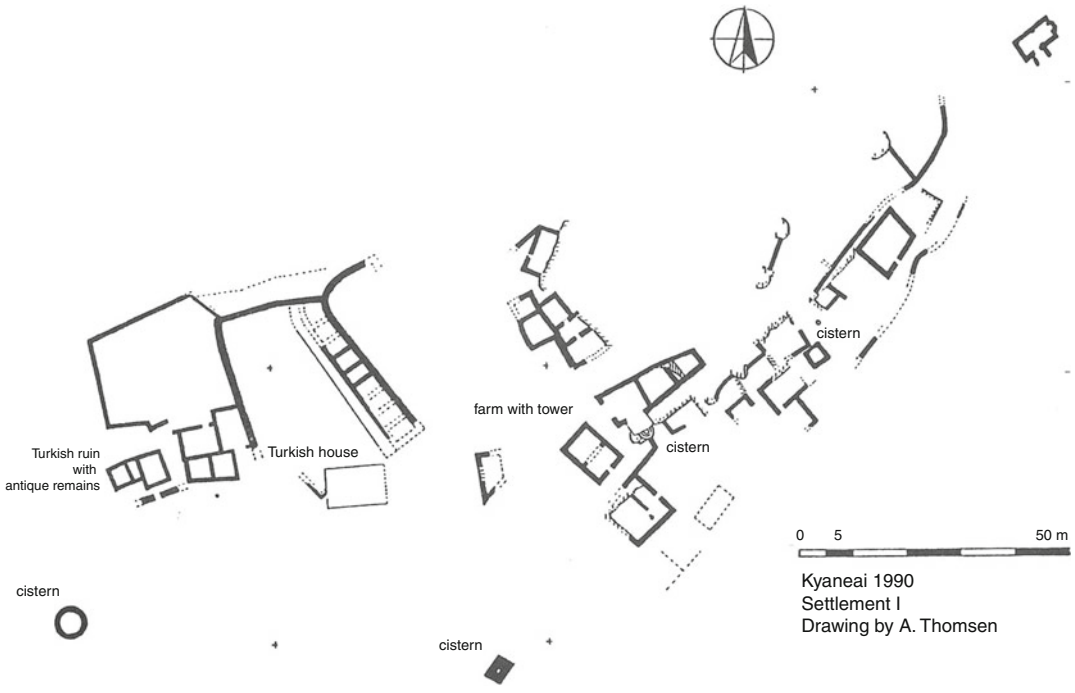
rural settlements again disappear from the map in the course of the seventh century, demographic expansion on Cyprus continued during the sixth and early seventh century.

Villages ranged in size from small hamlets to larger settlements that hardly differed from cities. Although a formal street plan was mostly lacking, they were commonly equipped with agricultural installations and storage buildings. Spacious village houses and bathhouses, and from the early fourth century onward also at least one church, often substantially built, testify to sizeable capital outlay by these small communities (Fig. 6; Morrison and Sodini 2002: 176–7; Chavarria and Lewit 2004: 18).

The money probably came from inside the local community, though powerful landowners and *kouratores* of imperial estates sometimes also functioned as patrons (Wickham 2005: 461).

Surprisingly, whereas inscriptions in the cities were disappearing, in inland Cilicia and Phrygia, they suddenly became more numerous from the fourth century and continued throughout most of the sixth. For instance, in the commercial entrepot of Corycus in Cilicia, nearly 600 individuals, including olive and wine merchants, shipowners, shipbuilders, sailmakers, and potters, organized into guilds, recorded their professional status on their sarcophagi (Mitchell 1995: 338). This wealthy settlement was provided with fortifications. In contrast to other regions in the East, within Anatolia, there is indeed more evidence of the existence of rural sites with towers and walls and small fortified villas (Sodini 1997: 479–82).

Novelties in the settlement pattern of Anatolia were the ecclesiastic foundations. Self-sufficient communities following the monastic rule of Basil the Great rose up in the city, and even more so in the countryside, with the greatest concentration in and around Constantinople. Even though the first, such as that of Dalmatios in Constantinople, were founded around 380, the largest growth was situated in the late fifth and sixth centuries. They were often endowed with luxurious liturgical fittings, including patens, chalices, lamps on stands,



Late Antique Anatolia, Archaeology of, Fig. 6 Small settlement (Siedlung I) near Kyaneai (Lycia) (Thomson 1993: Fig. 19)

chandeliers, and other lighting devices. Christian communities, sometimes with their own fortification and water supply, also developed around church complexes established by rich landowners, such as the "Basileias" outside Caesareia. The same occurred around important pilgrimage centers, such as the Martyrium of St. Thecla at Meriamlik, that of St. Theodore at Euchaita, and also around the tomb of St. John on the Ayasoluk Hill at Ephesus (Mitchell 1995: 113–16), which were often endowed with imperial benefactions.

Production and Exchange

Mining of metals in Anatolia continued until the end of antiquity. Armenia and the Caucasus were rich in gold mines. Ore sources of silver can be found both in the Black Sea region and in the Taurus mountains. The first was probably transported to Constantinople; the second was likely to have been worked locally at Tarsus and Antioch. Manufacture took place both in private workshops and workshops controlled by the *comes sacrarum largitionum*. Objects produced were intended primarily for trade, both within and outside the Empire, with finds in northern Europe and Central Asia (Mundell Mango 2009). Copper continued to be quarried both in local and in industrial mines on Cyprus. Iron was extracted from the Taurus mountains near Caesareia, the location of an imperial arms factory. The largest of these establishments, which provided armor and weapons for the entire diocese, was located at Sardis. Finally, even if there were tin mines in Asia Minor, they probably did not have sufficient output to meet demands. The nearest alternative source was Britain.

The marble quarries of Proconnesos (Island of Marmara), Ezine in the Troad, and Dokimeion-Iscehisar, which were located in a favorable position for providing the new capital with building materials, came to dominate production and trade in the whole Mediterranean during the fifth and sixth centuries. Proconnesian gray-striped marble, which lay in imperial hands, became the main building stone for the construction projects in Constantinople. Half-finished columns, capitals, bases, and chancel screens were exported all over the Mediterranean, even reaching inland sites in the Negev desert. Part of the distribution can be connected to imperial building projects or gifts from emperors or higher officials, for example, to influential patrons such as Julianus Argentarius and Theoderic the Ostrogoth in the West. Furthermore, much was produced and sold in terms of commerce (Waelkens 1999: 560–1). Cities within Asia Minor – in particular Constantinople, Ephesus, and Aphrodisias – also remained centers of marble statuary production, especially of small-scale statuettes and of portrait statuary (Fig. 7).

In the mid-fourth-century *Expositio*, the province of Asia Minor is mentioned as a producer of grain, wine, and olive oil. It is assumed that most cities produced at least enough foodstuff to be self-sufficient. Only Cappadocia may have depended on grain imports from neighboring provinces (Decker 2009: 246–8). In contrast, Constantinople had become a consumer of such

Late Antique Anatolia, Archaeology of, Fig. 7 Head of Eutropius found in the Marble Street at Ephesos (Kunsthistorisches Museum Wien)

enormous magnitude that a system of provision based on that of Rome had to be created.

The origin of the products lay in Anatolia, at least partially. In Lycia, granaries and other storage facilities have been found in several coastal settlements (Foss 1994). Although the diocese of Oriens is especially known for its olive oil production, the evidence from Late Antique and Byzantine oil installations in southern Anatolia are sizeable enough to indicate surplus production. Presses were particularly numerous in Aperlae, a site with an extremely rugged and truncated hinterland whose survival depended on its place in sea trade. Scattered amphora evidence and textual fragments further suggest that local economies in Cyprus, Cilicia I–II, Isauria, and the Lycian coast heavily depended on oil production (Decker 2009: 163–4).

Transport of foodstuff occurred mostly in locally produced amphorae. The production of Late Roman 2 (LR2) amphorae is associated with, among others, the island of Chios in front of the west coast of Anatolia. Furthermore, in several locations along the west coast of Anatolia, amphorae of the Late Roman 3 (LR3) type were produced. They have been found in cities such as Ephesus, Pergamon, and Sardis, but also in *castella* along the limes. More important were the Late Roman 1 (LR1) amphorae, which were manufactured from the fourth to the seventh century. The smaller subvarieties initially were intended for wine, while larger types carried wine and oil and likely other regional products as well. It now seems that production started along the coast of Cilicia, with Cypriotic production sites appearing in the late fifth or sixth century (Pieri 2005). LR1 amphorae were exported to every coastal region of the Mediterranean, the Black Sea, the Danube, and the Euphrates frontier, and as far away as western Britain and Nubia. They also represent the most common amphora import in Constantinople, which once again suggests that the capital's (wine) supply derived from Cilicia and Cyprus rather than from Palestine and Egypt.

Within Late Antique Anatolia, two major international fine tableware groups were present which no doubt profited from the new dynamics created by the founding of Constantinople. In the area between Pergamon, Phokaia, and Pitane, Phocaean Red Slip Ware, also known as Late Roman C (LRC), was produced between the late fourth and the late seventh century. LRC was found throughout the Aegean and the Near East, but was also common on Crete and in Cyrenaica (Fig. 8).

In addition, from the mid-fourth century onward in south Asia Minor, Cyprus and the central Levant, Late Roman D (LRD), or Cypriot Red Slip Ware, became the most common fine ware. It may very well have developed on the back of LR1 amphorae. Both ceramics types are currently thought to have continued into the eighth century (Poblome and Fırat 2011).

There were also several smaller active tableware manufactories, operating on different scales, with a more restricted distribution pattern which as yet remains unknown. For instance, Sagalassos produced a fine ware with a regional distribution; Sardis, though only located some 100 km on a river inland from Phokaia, always had predominantly local wares, as had other inland sites such as Aphrodisias. Especially in the second half of the sixth century, such inland sites depended on regional wares, even though imports remained frequent at the coast.

The road network of Anatolia, used for short- and medium-distance trade, was well maintained until the sixth and even seventh century. Its spinal cord was the great road running across the region from Constantinople to Ankara and further to Syrian Antioch. However, the largest part of transport and trade took place overseas. The main ports on the west coasts included Smyrna, Miletos, and especially Ephesus. In the south, the Pamphylian ports Attaleia, Perge, and Side were essential. They were supplemented with numerous smaller ports. The capital itself was equipped with four harbors, the youngest of which was built under Theodosius I. Constantinople maintained contacts with all parts of the known world through a dense network of sea-lanes, which, as is testified by pottery, coins, shipwrecks, and hagiographical texts, remained dense up to the seventh century (Avramea 2002: 83–5).

Products derived from Anatolia were found all over the Mediterranean, and they even reached the Atlantic via the Strait of Gibraltar. LR1 and LR3

Late Antique Anatolia, Archaeology of, Fig. 8 The distribution of Phocaean Red Slip Ware in the Eastern Mediterranean, based on data assembled from published literature (© Rinse Willet, Philip Bes, ICRATES project)

amphorae as well as LRC have been found in Britain and Ireland, where their content was probably traded for tin and silver. African Red Slip Ware made in Africa Proconsularis and lamps from Byzacena testify that produce from the West was also imported, both to Constantinople and the rest of Anatolia. To the East, Anatolian products reached India by way of the Red Sea and Central Asia by land. Though the sea routes were partially in Byzantine hands, the land routes were dominated by the Sassanians. They imposed tolls of 25% on silk imports (from southern China), precious metals, gems, and spices coming into the Roman Empire. From the early fifth century onward, there were only three custom ports: Nisibis in Mesopotamia, Artaxata in Armenia – which was replaced by Dubios (Dwin) in the mid-sixth century – and Callinicum on the Euphrates. The long distance trade of luxury goods between the Roman Empire and Far East was supervised by imperial functionaries here, but elsewhere it was prohibited. Conversely, everyday goods freely crossed the frontier in both directions. The problem of heavy levies on silk was partially countered in 551, when the secret of silk production was brought to Constantinople by missionary monks (Morrison and Sodini 2002: 210–12; Mitchell 2007: 341–3).

Future Directions

Present-day archaeological research in Anatolia has moved beyond the exposure of monumental city centers. Reconstruction of everyday life has come to the forefront of attention, with research topics such as middle- and lower-class housing, artisanal manufacture, and everyday objects of use. In addition, attention has been extended to the suburbia and settlement patterns in the hinterland. Further exploration of the countryside still needs to clarify whether or not rural settlements in the fifth and sixth centuries grew at the expense of the cities, as it is clear that activity was dwindling at some urban sites during the sixth century. Likewise, the role of ecclesiastical foundations as new social and economic centers needs to be assessed in archaeological remains. Moreover, the country estates known through literary sources remain archaeologically unexplored.

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Further Reading

Excavation and survey reports of all projects in Turkey since 2004 are available on-line: http://ekitap.kulturturizm.gov.tr/belge/1-63254/arkeoloji.html
http://www.une.edu.au/cat/ offers up-to-date information on archaeological projects currently operating in modern Turkey. With links to project-websites.

Late Antique Egypt, Archaeology of

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Introduction

The archaeological study of late antique Egypt is a relatively recent field of study. Excavations at key settlements such as Alexandria, Antinoopolis, Abu Mina, Berenike, Kellia, Naqlun, Sketis, Tebtunis, Thebes, Sinai, and the oases illustrate the diverse settlements available for analysis. The archaeology of late antique Egypt is significantly impacted by the introduction of both ecclesiastical monumental architecture and monastic settlements. The earliest presence of new architectural forms is evident in the fourth century with churches built in older Roman urban centers and then alongside newly designed monastic settlements. Ostraca and the papyrological corpus in Greek, Coptic, and eventually Arabic provide a rich body of evidence for reading alongside the diverse archaeological record. Methodological choices from the fields of late antique studies, landscape archaeology, and the archaeology of religion contribute to a wide array of interpretations for explaining Egypt's transition from the late Roman Empire to the Islamic caliphate.

Definition and Historical Background

Defining the historical limits for what constitutes late antique Egypt is difficult. The late antique period in the Mediterranean generally signals a transformation or adaption of the classical world to a world shaped by Christian and Islamic theology and the empires led by their respective emperors and caliphs. Late antique studies now have a 40-year history as an accepted field of study, which is, in its very nature, multidisciplinary and interregional. Although linked to the political changes of the Roman and its successor empires, the periodization of late antiquity is intentionally non-imperial and does not favor a particular religious society or culture. Instead, the name evokes a deliberate impression of continuity with the classical Mediterranean world with a focus upon regional variations from Gaul to Asia Minor, to Palestine, and to Egypt. Dates for late antiquity vary depending upon the region.

Egypt in the third century CE was an important province of the Roman Empire. As an agricultural boon for Rome, possession of Egypt afforded a stable food supply and revenue. Political events which usher in late antique Egypt are usually defined by two events tied to Diocletian in 284 CE: first, his division of the Roman Empire into two regions, which permanently secured Egypt's place in the eastern empire, and second, Diocletian's religious persecutions of Christians. The latter event was significant enough for the Egyptian Christians to begin using his accession date as the start of a new Christian calendar Anno Martyrum, Age of the Martyrs. Frequently inscriptions and dipinto in archaeological contexts include this dating.

The archaeological evidence of a third-century legionary shrine within the pharaonic Luxor

Temple shows the importance of Egypt's monumental architecture, especially under Diocletian. The ancient temple was enclosed by a Roman wall and formed the core of a legionary fortress. In 2009, the American Research Center in Egypt (ARCE) finished conservation of the Roman wall paintings, which show Roman senators before the imperial throne. This monument is a rare example of Diocletian's decorative program and illustrates the common practice of adapting existing architecture for new functions. The practice of adaptive reuse will be continued and expanded by monks and Christians in the building of new communities and churches.

The most significant change in the archaeological record of late antique Egypt is the introduction of Christianity with the building of churches, monasteries, and pilgrimage centers. As a social, cultural, and religious institution, Christian monasticism flourished and provided substantial archaeological evidence for new settlements and the expansion of Christianity into abandoned landscapes. The ascetic lifestyle motivated a new Christian demographic to seek unique locations for habitations, as monastics sought to build new urban settings dedicated to ascetic living. Frequently the settlements were located on the borders between arable lands and the sharply rising limestone cliffs that line the agricultural fields along the Nile. Monastics also adopted long deserted pharaonic temples, quarries, and tombs for convenient habitations. The building of churches in ancient pharaonic temples such as the Karnak Temple, Abydos, Luxor Temple, Medinet Habu, and Ramesseum highlights the importance of continued sacrality of older religious monuments. Additionally there is a dramatic increase in monastic settlements and the building of new monumental churches throughout the Nile Valley.

The end of late antique Egypt is frequently tied to the military conquest of the Delta, with the capture of Babylon (modern Cairo) and Alexandria in 641 CE. However, the shift to a fully Arabized territory is not evident until the mid-eighth century. As a result of the long transitional period, late antique Egypt spans to the eighth century. After this period, scholars speak of the post-conquest period. This designator seeks to moderate the presumption of immediate conversion or assimilation to Islam as the caliphates negotiated how to manage a predominately Christian territory.

The challenge in defining the period is evident in many of the published archaeological monographs over the last two centuries. Sites are interchangeably described as late Roman or early Byzantine and later as Coptic or Islamic. These labels frequently evoke different periods or interpretative assumptions about religious populations depending upon one's specialization. To identify artifacts as Coptic, for example, suggests the item is likely Christian, as the name is an etymological derivative of the Arabic and then earlier Greek name for indigenous Egyptians. For the Muslims, Copt or qibt was a convenient designator for Egyptians who were predominately Christian in the seventh century. Coptic also refers to the language that became dominant in the third and fourth centuries. The script is Greek, with the addition of several letters to represent Egyptian letters not found in Greek. For much of late antiquity, Greek and Coptic were used, and in the eighth century, Arabic became prominent.

Archaeology of Late Antique Egypt

The largest and most significant city of late antique Egypt is Alexandria. Located on the Mediterranean coast, equipped with two major harbors, and connected to the Nile via canals, Alexandria was the gem of the Mediterranean world. The Hellenistic city thrived under the Ptolemies and became a site for agricultural commerce, maritime trade, shipbuilding, and an intellectual center for medicine, philosophy, physics, and eventually Christian theology. Its rich heritage with a large Macedonian and Greek population, a large Jewish Diaspora, and a robust international trade with the Western empire and India (via the Red Sea ports) made Alexandria a cosmopolitan city. The architectural character of the city changed by the fourth century with many Christian churches built to rival the hundreds of temples as well as the museum, theater, Serapeum, amphitheater, Pharos lighthouse, and several instructional institutions. The city was the

central aim of Amr ibn al-As in 641 CE when he captured the city from the Byzantine forces for the Islamic caliph Umar.

The archaeological evidence of late antique Egypt is seen in select areas of the modern city, which continues to thrive as the second largest city in Egypt and is its largest maritime center. Since the 1960s, a Polish mission has excavated and conserved a Roman and Byzantine section of Alexandria at the site of Kom el-Dikka. The site includes a series of public and private buildings, which provide a valuable indication of late antique urban settlement. A series of public buildings, primarily in use from the fourth to seventh centuries, include a small theater, a multi-roomed bath complex large cisterns, and sixth-century lecture halls (auditoria). A collection of domestic residences, villas, private baths, and artisan workshops date to the period. The residential sections are understood to have shops on the first floor and then residences on the second storeys. Mosaics and wall paintings, showing Christian iconography, reflect late antique artistic preferences. Elsewhere in the city are several famous catacombs from the Greco-Roman period (Kom el-Shoqafa is one), but few have substantive evidence for late antique use. Salvage archaeology work at Gabbari has recovered Ptolemaic burials, which were reused in the fourth and fifth centuries by Christians. Extensive underwater excavation by the French Center for Alexandrian Studies has recovered primarily Ptolemaic material that was already submerged by the late antique period.

Equally significant is Abu Mina (about 45 km southwest of Alexandria), a vast Christian pilgrimage site in late antique Egypt whose building additions increasingly accommodated visitors. The earliest structure at Abu Mina is the fourth-century tomb of St. Menas, now covered by the Martyr Tomb Church. The central building for the city is the late fifth-century stone Great Basilica, which was built and remodeled twice. The Great Basilica is part of a martyr complex and abuts a later sixth-century tetraconch Martyr Tomb Church of St. Menas, a baptistery, and residences associated with the healing cult of the saint. Several pilgrimage flasks, or ampullae, from Abu Mina bear the image of St. Menas. The flasks are found throughout the Mediterranean world, reflecting the importance of the city for late antique Christian religious tourism. Evidence of the saint's popularity is found throughout Egypt and along the trade routes that conveniently provided transport to the shrine.

After leaving Alexandria, individuals and goods would travel south to the military installation of Babylon (modern Old Cairo). The Roman fort built on the Nile just south of ancient Heliopolis was equipped with quays for easy transfer of goods from the Red Sea and Mediterranean and facilitated the monitoring of movements through Egypt along the Nile and the canal that connected the Nile to the Red Sea. The architecture of the fort, still visible today by the Coptic Museum, in fact dates to the late third century. The fort was abandoned between the seventh and tenth centuries. The building of a new Muslim military camp surpassed Babylon. For the last 80 years, archaeologists have worked to excavate the extensive Muslim city of al-Fustat, founded in the late seventh century and abandoned by the eleventh century. Al-Fustat and Babylon would eventually become the core of Old Cairo.

Babylon directly linked the Nile to the Red Sea ports via canals and desert roads. The ports, in turn, provide evidence for the extensive Egyptian trade networks which connected the Roman Empire to the empires of the Indian Ocean and the East African coast. Berenike, Myos Hormos, and Clysma are the three most important harbor towns for the Roman and Byzantine periods. Strong prevailing north winds made the Suez site of Clysma less suitable for the seasonal transport of goods, which were more commonly found at the southern ports of Myos Hormos and Berenike. Once at port, the imports and exports then moved across the Eastern Desert along to the Nile and then down to Babylon's harbor (Old Cairo). The final leg of the journey led to Alexandria and then the Mediterranean. Demand for Indian goods in the Roman world explains why the port cities were so active during the third through sixth centuries.

Berenike, located on the Red Sea coast, is perhaps the most well-known of the ports from the Ptolemaic and Roman periods. The port

ceased to function by the mid-sixth century and had periods of minimal activity in the fourth century. The rich documentary evidence from middens, ceramics, and archaeobotanical remains testify to Berenike's active role in interregional trade via the Indian Ocean. Beads from East Java, mats from India, peppercorns in Indian-produced ceramics, and cotton textiles provide tangible clues to the multicultural nature of Berenike. Eleven different languages appear in the ostraca, papyri, and inscribed monuments recovered from the port including Tamil-Brahmi, Greek, pre-Islamic South Arabian, Latin, and Palmyrene.

The port served as a gateway between the seafaring community and the desert-road trade routes of Egypt. Artifacts recovered represent a wide range of goods imported from the Indian Ocean trading circles and items exported from the Roman and Byzantine Empire. Peppercorn is perhaps the most significant and largest quantity of Indian imports. Additional food goods from India and Southeast Asia appear in excavation layers including rice, coconuts, mung beans, and amla. By the fourth century, construction patterns included the use of coral, which is more commonly diagnostic of architecture in sites along the East African coast and in the Indian Ocean. Timber from the Mediterranean and India (teak, bamboo, Boswellia, cedar, and fir) indicates the wide realm of contacts for Berenike.

By the middle of the sixth century, residents of Berenike were more desert-road travelers. Their diet had shifted from a diverse selection of fish, pork, and beef to consist solely of sheep and goat. The material remains also reflect the diminishing importance of the port, which excavators attribute to a variety of factors including the silting up of the harbor, a plague in the mid-sixth century, and more efficient transport further north along the Red Sea coast, such as Clysma with its canal.

Myos Hormos is a port located north of Berenike and near the modern city of Quseir. The earliest evidence of settlement is Roman, although its occupation does not extend beyond the third century. The settlement shares many similarities with Berenike in being a multicultural port with several languages in use and the presence of teak from India. However, the site was substantially smaller than Berenike, and excavators believe that the more favorable winds to the south made Berenike preferable for docking than at Myos Hormos.

Clysma (known also as Cleopatris/Arsinoë and later Qolzoum) emerged as the most important port on the Red Sea by the end of the late antique period, supplanting Berenike and Myos Hormos. Its location near modern Suez reflects the importance of this pathway as a more efficient route from the Red Sea to the Mediterranean by way of a canal connected to Babylon. Clysma was first excavated in the 1930s and now a new project is using satellite images, topographical mapping, and sedimentological analysis to document the extant remains of the ancient port.

Several cities throughout the Nile Valley point to the stable economy of late antique Egypt. The site of Hermopolis Magna in Middle Egypt typifies the process of Christianization of a major urban city. The city reflects both Greek and Egyptian religious temple complexes, and by the mid-fifth century, Hermopolis Magna hosted one of the largest Christian basilicas in Egypt with a circular apse, tombs of bishops, and a baptistery. Late antique houses and middens are found throughout the site. Across the river from Hermopolis Magna is Antinoopolis, an ancient site rebuilt by Hadrian in the second century. The site was selected by Diocletian to be a district capital for the Thebaid and held garrison troops. Italian excavations, active since the 1960s, have identified several late antique burials and several churches. Some monastic residences were built in and around the city for apparently distinct female and male communities. Literary evidence highlights the city as an important center for the veneration of Sts. Claudius and Colluthus. A nearby southern suburb called Ansina contains a significant late antique community. Dating from the fifth to eighth century, the site contains impressive mud brick walls preserved to over 8 m, churches, chapels, a tower, and several residences. The site was recently surveyed and mapped by a British team to establish a record of this architectural rich and unexamined late antique city.

Further north along the Nile, the site of Oxyrhynchus, 180 km south of Cairo, is known

primarily for the late nineteenth-century recovery of the largest collection of Ptolemaic, Roman, and Byzantine papyri. The site was a prominent city in late antiquity with a bishopric and several monasteries. British and Italian excavations recovered parts of the city with the largest theater in Egypt, cemeteries, and several examples of late antique sculpture. Excavations are ongoing but are overshadowed by the still ongoing analysis of the vast and rich documentary corpus written in Greek, Latin, Coptic, Arabic, and Persian. The texts cover almost every spectrum of society such as private sales, loans, private letters, and religious texts both for Greco-Roman and Christian traditions, plays, and imperial correspondence.

Kharga and Dakhla are the two central oases of Egypt's Western Desert. Both show signs of importance in the late Roman period, although their importance as urban centers diminished in late antiquity. Bagawat cemetery is in the northern region of Kharga Oasis and provides several examples of Christian burials with painted tomb chapels with scenes from the Old and New Testament, lives of saints, and lives of Paul and Thecla. A monastic site at Deir Mustafa Kashef includes the modification of a rock-cut tomb, a church, areas for visitors, and monastic quarters. An Australian mission recently surveyed the site and excavations will begin soon.

To the west of Kharga is Dakhla Oasis. Several excavations since the 1980s by Australian, American, and Egyptian teams have recovered the urban and monastic settlements of this oasis. Signs of late antique occupation appear at Ain el-Gadida, Deir Abu Metta, the cemetery at El-Muzawwaka, Kellis, and Amheida. Kellis was a significant Roman city. Excavations testify to the presence of churches, a nymphaeum, a bath house, domestic quarter with multi-roomed houses, and cemeteries. Textual evidence on papyrus and wood and written in Greek, Coptic, and Syriac describe religious and private life within the city. Much of the evidence illuminates the Manichean community at Kellis. To the west is the late antique site of Amheida, currently under excavation by an American team. The discovery of a fourth century villa of Serenus preserves several wall paintings which provide evidence of secular iconography involving geometric and figural representations.

Monastic Settlements

While early monastic literature highlights the importance of physical isolation from non-monastic communities in the desert, the archaeological evidence points to several diverse locations for monasteries. Some communities elected to live along the edges of the Nile or in desert cliffs, which made the settlements quite visible and known to local communities. Some settlements were impressively purpose-built environments with their own unique architecture and site planning. More moderate settlements were made from modifications of quarries, ancient tombs, or natural caves nestled in the sharply rising cliffs which demarcate the Nile Valley. Other monks resided in areas that were far more difficult to reach or see; thereby their settlements reflected a greater desire to embrace a life of relative isolation. These settlements are often modifications of naturally forming caves in the wadis of the high desert or near trade routes. The documentary evidence from ostraca and papyri illustrates that the affinity for isolation espoused in the literary sources was not evident in daily living. The majority of monasteries in Egypt were agents of connectivity between local communities and elites in late antiquity.

The early twentieth century began with the unanticipated discoveries of two large monastic settlements which provided the basis for all initial studies into early monastic visual culture. The Monastery of Jeremias, for example, was built in the valley just south of the Step Pyramid at Saqqara. Excavated by the British Egypt Exploration Fund in the early twentieth century, the site provided a rich array of material evidence in stone of Coptic art which is now in the Coptic Museum in Cairo. The site was first occupied in the fifth or sixth century when monastics began a massive building campaign to construct three elaborate stone and mud brick churches, adjoining refectories, residences, chapels, a hospital, and a series of rooms for monks and pilgrims. At its height, the community supported communities for men and possibly women. Despite its close proximity to

pharaonic tombs and mortuary structures, the monks did not occupy the abandoned buildings of the Old Kingdom but chose to build their own spaces constructed from materials gleaned from the surrounding area (both stone and mud bricks). Many of the cells contain monastic paintings which show a range of Christian iconographic themes: monastic saints, angels holding holy bread, galaktotrophousa lactans (Virgin Mary nursing Jesus), Abraham's sacrifice of Isaac, and Christ in Majesty.

In Middle Egypt is the site of Bawit, which was excavated in the early twentieth century by the French Institute of Archaeology in Cairo. Excavations revealed a complex settlement known as the Monastery of Apa Apollo. The site produced an unprecedented amount of late antique material to compare with the monastery at Saqqara. Additionally, papyri and ostraca recovered from Bawit document a monastic community with economic ties to a variety of smaller monastic settlements and neighboring cities. Recent French excavations and geophysical prospection have explored the massive site further. Results of geophysical survey document a densely occupied 40-ha settlement. Limestone sculpture, monastic paintings, carved wood, bone artifacts, and archaeobotanical evidence all contribute to the reassessment of this important late antique monastery. The domestic spaces may have served as oratories or as commemorative chapels for particular individuals. Many contained monastic paintings with images of Christ in Majesty, Mary flanked by Apostles, saints, monks, and representations of flora and fauna. The communities of Bawit and Saqqara therefore provided the foundation for the field of early Byzantine art in Egypt until the development of the field of late antiquity in the 1970s.

Monks frequently redesigned and adapted quarries and tombs for habitation. Several sites throughout Egypt contain evidence of Christian occupation such as Sheikh Said, Der el Dik, Abydos, and Amarna in Middle Egypt; Abu Darag by the Red Sea; and Hagr Edfu in Upper Egypt. Ancient pharaonic tombs provided convenient, multi-roomed, spaces that could be easily modified for habitation. At Beni Hasan, Helwan, Wadi Sarga, Aswan, and the numerous tombs of the Theban area, monks often used a tomb as a foundation for a new settlement and then built out from the opening into the terraces with mud brick and timber additions. The occupants Christianized the residence with white plaster upon which they painted crosses, added multicolored Christian iconographic programs, and inscribed their Coptic prayers. Many sites contain ostraca in Coptic and late antique ceramic assemblages and, more rarely, monastic burials.

The most well-known example of the late antique adaptive reuse pattern is found in Thebes in the western hills. The Monastery of Epiphanius, a small sixth- and seventh-century residence, was excavated in the 1920s by the Metropolitan Museum of Art. The site typifies the extension of a monastery from a Middle Kingdom tomb onto the flat terrace of the surrounding cliffs, and excavations produced a collection of ostraca and papyri. Like many other modified tomb residences, the occupation does not usually span beyond a century of use. In addition to these examples of modest settlements, several sites included purpose-built structures specifically for monastic living. The sites were also large enough to be considered villages and rival the size of some smaller cities. The sites shared common features such as churches, domestic quarters, storage, wells, kitchens, areas of production, cemeteries, refectories, and housing for visitors.

Archaeological investigation into monastic sites resumed after a nearly 60-year hiatus with work at two of the most well-known monastic sites from Christian literature: Kellia and Scetis. The Apophthegmata Patrum, known as the Sayings of the Desert Fathers, recounts the deeds, sayings, and history of the first Egyptian monastics who were later used as inspirations for European monastic communities. Kellia, Scetis, and Nitria were often linked together in the didactic and hagiographic stories. While Nitria's exact location is still uncertain, Kellia and Scetis were definitively found in the deserts of the northwest Delta. Kellia, known as the Cells, consists of seventeen discrete areas or mounds of which five areas show a higher percentage of occupation than the others. Beginning in 1964, several decades of excavations by French, Swiss, and Egyptian

teams have documented the extensive settlements at Kellia with at least 1,500 buildings. None of the settlement was walled and no central church has been identified, although several structures clearly functioned as churches, chapels, martyrium, and oratories. The buildings consist of a range of forms from two-roomed private residences for a solitary monk to 50-roomed buildings which could house over a dozen monks. The earliest structures do not date before the fifth century and the latest occupation is in the eighth century.

Although Kellia was eventually abandoned, Scetis has had a continuous monastic presence since its first occupation in the fourth century. Excavations at and near the four contemporary monasteries (Deir Anba Maqar, Deir Anba Bishoi, Deir al-Suryan, and Deir el-Baramous) and in between these sites illustrate that settlements originally began as unwalled residences. The monastic communities dot a low-laying wadi valley marked by several large natron lakes. With similar residential designs to Kellia, Scetis had hundreds of multi-roomed buildings that were scattered throughout the desert and clustered together as if to form small villages. It was only later, after a decline in numbers, raids from desert inhabitants, and environmental factors, that these communities diminished and were enclosed by a single wall so that by the medieval period, probably in the tenth and eleventh centuries, the four remaining monasteries resembled fortresses. The height of monastic occupation seems to be between the seventh and tenth centuries. On the northern end of Wadi Natrun, a Dutch excavation at Deir el-Baramous points to a late fourth-century founding of a community with a church, monastic residences, and kitchen facilities for feeding residents and guests. It was later abandoned in the fourteenth century. At the opposite end of the natron lakes, Deir Anba Maqar is currently a walled monastery. However, recent survey work illustrates that it sits amidst a densely pocketed settlement with several buildings without defensive walls. Finally, a third site is the Monastery of John the Little (John Kolobos) which an American team is excavating and surveying. The map of the site shows over 80 residences with one being comparable in size to the existing Deir al-Suryan. Excavations include evidence of tenth- and eleventh-century monastic life with visually rich monastic paintings and dated painted inscriptions in the tenth century.

Late antique monastic settlements did not follow a standard site plan, but they do reflect a sensitivity to the environment and natural landscape in settlement design. In the Fayyum, for example, the monastic community at Naqlun is the best representative of a late antique settlement for this semi-oasis area. The settlement is 100 km south of Cairo and roughly 25 km west of the Nile. Under excavation by a Polish team since 1986, Naqlun is a settlement with two distinct components with rich archaeological material for monasticism. One region is the shale and limestone cliffs. Here the monastic community used the natural topography and geological features to construct 90 independent residences. Some residences were modest with four rooms extending from an open courtyard closed by a thin mud brick wall. Other residences included 18–19 rooms. Each seems to have enough space for housing two individuals. Habitation begins in the late fifth century, with new construction in the sixth century and after the seventh century. Occupation of the residences diminished after the post-conquest period, with only sparse evidence of Arabic inscriptions or pottery. The second area of the settlement, at the foot of the cliffs, dates to the end of the fifth and early sixth century. The plateau hosts a central church, several ecclesiastical buildings, a late antique cemetery, and a few remote residences. The burial shrouds from the cemetery indicate that the lay community used the cemetery, but not the monks. The documentary evidence from the residences indicates that the lay community visited the site regularly for medical and religious purposes.

A second settlement provides a unique example of variation. At the site of Esna, south of Thebes, a French excavation team discovered fifteen semisubterranean monastic dwellings in the 1960s. Esna is the only known example of a moderate-sized community that chose this style of building. The buildings are accessed by a staircase which leads down to a sunken open-air courtyard. Doorways were protected by short mud

brick walls, which likely functioned as sand barriers. A series of sleeping quarters, oratories, and kitchens extend from around this natural atrium. The oratories in particular show significant signs of religious activity with numerous inscribed and painted crosses, petitions, and Christian iconography. The site was relatively short-lived when compared with the great monastic centers at Kellia, Scetis, Saqqara, and Bawit. Based upon ceramic and epigraphic evidence, the excavators concluded the site was established early in the fifth century and later abandoned by the middle of the seventh century without any sign of destruction, either natural or man-made.

Just north of Esna is the ancient center of Thebes, home to the mortuary tombs and temples of the pharaohs. The late antique settlements in this region represent the density of monastic settlements and their close proximity to lay communities, such as the town of Djeme, which was built directly within the walled temple of Medinet Habu. Textual and artifactual evidence illustrate a successful town in the late antique and early Islamic periods. The community had a large church built directly into the colonnaded court of Ramesses III. French, German, American, and Polish excavations in the last decades are producing remarkable evidence for late antique Thebes. Hundreds of monks resided in the monasteries such as the Monastery of St. Phoibammon, Deir el-Roumi, Deir el-Medina, Deir el-Bachit, Deir el-Bahri, and Gurnet Marai. Surveys currently in the Valley of the Queens and in the wadis into the Western Desert by French archaeologists show that the occupation is far higher than once thought. Monks remodeled tombs, built on escarpments, and located themselves in a variety of remote and very visible locations. The sites include invaluable ostraca documenting monastic life, lease of cells, religious life, and economic activities with local communities. Monastic burials at Qurnet Marai, Deir el-Medina, and the Monastery of Epiphanius, for example, include men wrapped in linens and then clothed with leather aprons and leather hoods. Based upon ceramic, epigraphic, and artifactual evidence, the town of Djeme and many of the associated monastic communities were abandoned by 800 CE.

Finally, the most recent work at two monasteries in Atripe, modern Sohag, represents the importance of continued efforts to document and preserve late antique Egypt. The area was known in the fifth century as part of the large monastic White Monastery Federation led by a prolific author St. Shenoute. Over 3,000 pages of his writings to his community and to laity preserve the largest collection by a single author from late antiquity. Written in Coptic, Shenoute's writings touch on aspects of monastic living for men and women, how to host refugees, conflicts between monastic authority and urban elites, and religious life in the fifth century. Two central areas of his community still exist: the Monastery of St. Shenoute, known today as the White Monastery, and the Church of Saints Bishai and Bigol, known now as the Red Monastery.

Today the White Monastery includes the famous fifth-century church, which is one of the best preserved late antique Christian monuments and is still in use. Built of dressed limestone blocks, it includes a triconch apse and figural paintings. Its exterior bears similarities to ancient pharaonic temples. Several components of the site were excavated in the 1980s by an Egyptian team, but not published. An international team headed now by American directors has worked since 2005 to document the church and to record the surrounding archaeological remains of the monastic settlement which includes storerooms, a cistern, a refectory, public toilets, domestic quarters, kilns, and a cemetery. Recently the American team discovered a tomb chapel that they now identify as the tomb of St. Shenoute. The cliffs to the west show some indication of monastic occupation, but not substantial.

To the north is the Red Monastery, which is part of an ongoing American project to conserve and study the largest painted program from the late antique world. Over 80% of the existing church of the Red Monastery still preserves late antique paintings. Sculptural pieces also accentuate the uniqueness of this monument whose conservation by a team of Italian specialists demonstrates that Upper Egypt monastic sites had high-quality late antique art. A multidisciplinary publication of the paintings,

inscriptions, and the architectural history will significantly restructure conversations about late antique Egypt, how scholars regard monastic art, and the importance of the sites for understanding Christian iconography more broadly.

Cross-References

- ▶ Eastern Provinces of the Roman Empire, Archaeology of the
- ▶ Hellenistic and Roman Egypt, Archaeology of
- ▶ Papyrology in the Greco-Roman World

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Latin America: Indigenous Peoples' Rights

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Introduction

The current indigenous population in Latin America has been estimated between 40 and 50 million, representing about 10% of the total population of the region, although these figures are not always reliable given the disparity of criteria used in each country to conduct indigenous censuses. This population includes bands of Amazonian hunter-gatherers, peasant societies, particularly in the Andes and Mesoamerica, and those who live in urban centers. Within the framework of an intense process of ethnic revitalization, 826 indigenous peoples have been counted, and it is estimated that there are another 200 who live in voluntary isolation. Some of them show remarkable demographic fragility and social and cultural vulnerability (Del Pópolo 2017).

Definitions

"Indigenous peoples" have been defined as indigenous communities, peoples, and nations which, having a historical continuity with the pre-invader and pre-colonial societies that took place in

their territories, are considered distinct from other sectors of the societies that now prevail in those territories or parts of them. They currently constitute non-dominant sectors of society and are determined to preserve, develop and transmit to their future generations their ancestral territories and their ethnic identity as the basis of their continuity as a people, in accordance with their own cultural patterns, their social institutions and their legal systems (Martínez Cobo 1986).

The cultural heritage of indigenous peoples is a holistic and intergenerational concept based on common material and spiritual values. It includes tangible and intangible manifestations of their ways of life, accomplishments, and creativity and should be considered an expression of their self-determination and their spiritual and physical relations with their lands, territories, and resources. It consists of all objects, sites, plants and animal species, customs and practices, expressions, beliefs, and knowledge, whose nature or use has been transmitted from generation to generation and which are considered to be characteristic of a particular town or its territory (see Opinion No. 8 (2015) of the Expert Mechanism – A/HRC/30/53).

In recent decades, indigenous peoples' rights have been widely recognized internationally. In this section particular reference will be made to cultural rights, especially the right to cultural heritage access, which has been recognized by international human rights standards and includes the right to participate in cultural life, the right to enjoy their own culture, and the right to self-determination in relation to their own cultural heritage.

The protection of indigenous peoples' cultural rights generates the challenge of contemplating the collective rights, connected to their own identity as peoples and to developing their culture (Pact of San José de Costa Rica). In this regard, the recognition made in the United Nations Declaration on the Rights of Indigenous Peoples deserves to be highlighted by establishing that they have the right to "maintain, control, protect and develop … their traditional knowledge … and the manifestations of their sciences, technologies and cultures …" and "maintain, control, protect and develop their intellectual property of … their traditional knowledge …" (Art. 31).

However, the protection of traditional knowledge at the international level undergoes a series of shortcomings linked to the lack of a clear and thorough definition, the determination of what traditional knowledge is to be protected and with what legal mechanisms.

Traditional knowledge is understood as all knowledge, creation, innovation, or cultural expression owned by indigenous or local communities and transmitted from generation to generation. Although there is no shared and accepted definition of "traditional knowledge" in the various international instruments, reference has been made to related concepts such as:

(a) The knowledge, innovations, and practices of indigenous and local communities incorporated into traditional lifestyles relevant for the conservation and sustainable use of biological diversity
(b) Relevant traditional knowledge of plant genetic resources for food and agriculture
(c) Cultural heritage, traditional knowledge, traditional cultural expressions, and manifestations of sciences, technologies and cultures, including human and genetic resources, seeds, medicines, knowledge of fauna and flora properties, oral traditions, literatures, designs, traditional sports and games, and visual and performing arts (OMPI 2008)

Historical Background

During the second half of the nineteenth century and the beginning of the twentieth century, the new Latin American nations consolidated their dominion over their territories, given the need to have large land areas to be used in economic production, in accordance with the agro-export economic model that was imposed on the region (Halperín Donghi 1989: 309–312). Consequently, they implemented systematic political practices of land dispossession of territories that belonged to indigenous groups and even indigenous

extermination. The incorporated lands were, in some cases, usufruct of the State and sold freely, in others, divided into small units and granted to their owners, dissolving the community property system.

Indigenous communities ceased to be considered "indigenous towns" with a special legal system as they were during the Spanish colonial period, to become part of the national citizenship, although in some cases they did not enjoy full rights but instead were considered incapable of rights and, therefore, subjected to the tutelage of the State. In practice, these normative reforms deprived indigenous groups of their ethnic identity and their rights to ancestral property to community lands and far from improving their living conditions generated greater social, cultural, and economic exclusion. In some countries with a significant native population, the distinction between mestizos and Indians resulted in strong social and political differentiation, as well as discriminatory situations to the detriment of the latter.

Positivism and social Darwinism had during those times a marked influence on the Spanish-American intellectual elites and served as a justification for national policies. This racist ideology considered indigenous peoples an obstacle against progress and civilization (Politis 1995). The antiquity and richness of their past was denied, the absence of cultural continuity between contemporary and past indigenous people was assumed, and therefore pre-European history was appropriated by the State as well as their material culture (Macera 2000; Gnecco and Ayala Rocabado 2010).

During this period, several Latin American countries enacted their first archaeological heritage laws, establishing the public domain of the State over these goods, even if they were in private lands (e.g., Mexican Law of 1897, Argentine Law 9080 of 1913, Peruvian Law 6634 of 1929, Colombian Law 103 of 1931, etc.).

The emphasis on "national history" in schools and museums was used as a state policy to strengthen a national identity model based on the idea of a homogeneous culture or melting pot, denying any ethnic differentiation that could generate geographical fragmentation. In this sense it can be stated that in many Latin American countries, a real cultural genocide was carried out (Gnecco and Ayala Rocabado 2010).

As a result of all these policies, some descendants internalized the "stigma of being an Indian" and tried to deny their condition, others resisted the impossibility of obtaining fair treatment, which generated, in some cases, violent situations.

On the other hand, the study of the human remains and the material culture of the indigenous peoples became a matter of scientific interest, since they were considered relicts of past cultures and, consequently, they had to be collected before their disappearance, seen as inevitable. Natural history and ethnography museums were created for their custody and exhibition, following the model of European museums and the Smithsonian Institute of the USA.

In the first decades of the twentieth century, racist ideologies were overtaken by different movements that occurred alternately in different Latin American countries, such as *Indigenismo*, socialism, Hispanicism, and nationalism. The idea of race was gradually replaced by that of class or social group (Helg 1990: 38). Each of these movements exerted its influence on the heritage management policies of each country.

The *Indigenista* movement was promoted by intellectuals and had a significant boost in countries like Mexico and Peru, contributing to the construction of a national history that had its roots in the imperial pre-Hispanic past (i.e., Aztec, Inka). An important milestone of the indigenous movement was the celebration of the Pátzcuaro Conference in 1940 that gave rise to the creation of the Inter-American Indian Institute. However, Indigenist discourse had no major consequences in practice, in the sense that it failed to improve the living conditions of rural indigenous populations in those countries (Patterson 1995: 84).

On the contrary, countries such as Argentina, Chile, and Uruguay built a national history rooted in traditional Hispanic and Catholic history, denying all indigenous influence or other possible influence (such as that of Afro-descendants or that of Portuguese or Brazilians in Uruguay) (Politis 1992). In the case of Brazil, the policy

of denial of indigenous peoples remained unchanged until the late 1930s, when they began to receive greater attention from the State, some scholars and intellectuals (Endere et al. 2010).

However, all countries showed interest in controlling pre-Hispanic sites as part of the national heritage. The laws of national monuments were popular in all countries, as well as the creation of institutes for their research and/or management (National Institute of Anthropology and History of Mexico, 1939; the National Ethnological Institute of Colombia, 1941; the National Institute of the Tradition of Argentina, 1943; National Institute of Culture of Peru, 1971; etc.).

In the last decades of the twentieth century, especially after the restoration of democracy in the region, a social and political movement generated by a multiplicity of indigenous organizations of different levels was consolidated throughout Latin America. At first, their demands focused on historical claims, affirming their existence, as well as their pre-existence to National States. Then the claims focused on more specific issues, connected with the possession and ownership of the land and the improvement of livelihood and living conditions.

The emergence of indigenous peoples as new political actors, favored by an international context more attentive to their claims, has allowed them to change their relationship with the States, and, little by little, they were gaining recognition in the legal sphere. The claims and the new positive discrimination policies that were enacted at least in some countries were forging emerging identities. In this context, the new Indigenist discourse is more elaborate since it is the product of the formation of an elite of indigenous youngsters with academic training. This discourse was gradually putting more emphasis on ideological issues (Stavenhagen 2004).

The Current Debate

The recognition of the rights of indigenous peoples has been present in the political agenda of Latin America since the 1980s, although this was not always reflected on the supreme norms of the countries of the region.

Latin American constitutions can be divided into three groups, following Barié's analysis (2003: 87). The first group, composed of the constitutions of Belize, Chile, French Guiana, Suriname, and Uruguay, are characterized by making no reference to the native peoples, either because their legal traditions are essentially Anglo-Saxon or because they have not had substantial reforms in the last years. A second set of constitutions, formed by those of Costa Rica, El Salvador, Guyana, and Honduras, grants some specific protection to their ethnic minorities but "within an incomplete or poorly articulated legal framework." The third group includes the constitutions of Argentina, Bolivia, Brazil, Colombia, Ecuador, Guatemala, Mexico, Nicaragua, Panama, Paraguay, Peru, and Venezuela and makes an encompassing recognition of indigenous rights, as a result of reforms made since the middle of the 1980s.

In the case of Chile, the indigenous movement has strengthened in recent decades and has been gaining recognition in both political and academic fields. The result of this is the approval of the Indigenous Law 19,253 in 1993, and recently a draft constitutional reform bill was presented to the Congress in which the existence of indigenous peoples in their territory is recognized.

Uruguay has started a process of recognition of the current indigenous population through the approval of Law 18,589 which declares April 11 as "Day of the *Charrúa* Nation and Indigenous Identity." The Council of the *Charrúa* Nation was also formed, an indigenous organization of national character that fights for the vindication of their rights and the ratification of ILO Convention 169.

In Belize, Costa Rica, El Salvador, Guyana, French Guiana, Honduras, and Suriname, the indigenous population has poor visibility, and their groupings are relatively recent; the indigenous issue in general has been poorly studied and debated.

The rest of the Latin American countries have declared themselves as multicultural nationals, explicitly recognizing the pre-existence of

indigenous peoples and granting them a set of rights, including cultural rights (Harvey 2008).

The Present Situation

Most of the countries in the region, particularly those identified with the third group, have issued indigenous laws in which they grant legal recognition to indigenous communities or peoples and operationalize some rights recognized in the constitutions. However, these rules do not always include particular aspects of indigenous culture such as those connected with their cultural heritage. In general, archaeological heritage is still regulated by specific rules that do not usually mention indigenous peoples or do so vaguely, so their rights to participate in management are usually not effective in practice.

On the other hand, the native peoples are mainly focused in recovering their ancestral territories or gain ownership of the lands they occupy, the preservation of the environment in the areas where they live, and the improvement of their socioeconomic conditions, often pressing their governments to comply with the provisions of indigenous laws. Conflicts between indigenous organizations, government authorities of different levels, and mining and timber companies or responsible for tree-clearing or other productive activities are present throughout the region, and in some cases they have characteristics of high and growing potential for social conflict.

However, the situation of the indigenous population varies significantly in each country. While in some of them they constitute a minority with little political power, in countries like Peru, Bolivia, or Ecuador, they constitute the majority of the population and have occasionally gained political influence. However, the ethnic emergency process is strong throughout the region. In recent years, there has been a growing political participation, a strengthening of their own institutions, and the formation of new regional and international alliances for the fight of their rights (e.g., the caucus and the *Abya Yala* Indigenous Forum that influenced the definition of the 2030 Agenda for Sustainable Development) (CEPAL 2018; Del Pópolo 2017).

The voices of actors, previously invisible, who have begun to attract attention within their communities and in society in general, are added to theirs. This is the case of indigenous women, who perform significant functions within their communities, especially in the transmission of knowledge, as well as in cultural and ceremonial events.

In general, the interest of indigenous communities in cultural heritage issues is of the second order of priority for indigenous populations in the region. This interest has focused on the dispute over the control of the historical narrative exercised by archaeology and in some countries, on their ancestors' human remains; yet, their participation in the management of archaeological sites is still exceptional. There are records of some cases in which they have resisted archaeological excavations in places they consider sacred.

The claims for the restitution of human remains' that are kept in museums have been particularly significant in Argentina and Uruguay due to the social and political impact. There, the first restitution cases of the remains of indigenous chiefs who had a renowned historical trajectory were recorded (e.g., Chief Inakayal restituted in 1994 and Chief Mariano Rosas returned in 2001 in Argentina, and Chief Vaimaca Pirú given back to Uruguay by France in 2003). In addition, Argentina has a general repatriation law that recognizes the right of the communities of belonging to claim the repatriation of human remains found in museums and the requirement that any scientific undertaking that aims at indigenous cultural heritage be carried out with the prior consent of the affected community (Law 25.517, Art. 1 and 3) (Endere and Ayala 2012).

All in all, the divorce between political discourse and practice and the lack of coherence between indigenous laws and heritage norms have made indigenous participation in heritage management generally impracticable. Besides, the academic isolation of a large part of archaeologists and researchers in general and the lack of unity and coherence among the indigenous groups have prevented them from unifying their

discourse on the matter. Despite recent changes in the standards of professional ethics and periodic meetings to discuss the ethical implications of the work of archaeologists and bioanthropologists, they have put these countries' academic communities in motion to positions more open to dialogue and more willing to adapt their work methodologies to make them compatible with the respect of the rights of indigenous peoples to their cultural heritage.

International Perspective

In the second half of the twentieth century, when the decolonization process had already been consolidated in the world and the United Nations Universal Declaration of the Rights of Man (UN) was in force, there began a process of recognition of the rights of Indigenous peoples whose first milestone was the adoption by the International Labour Organization (ILO) of Convention 107 on Indigenous and Tribal Populations in 1957. Another important milestone was the publication of a study by the rapporteur José Martínez Cobo on discrimination against indigenous populations in 1986, while the presence of indigenous organizations in all international spheres where these issues were discussed was intensified (Barié 2003).

In international law, the issue of ethnic minorities has generally been addressed from the point of view of individual human rights (e.g., the Universal Declaration of Human Rights (1948), the International Covenant on Civil and Political Rights, the International Covenant on Economic, Social and Cultural Rights 1976, etc.). The most significant legal instruments regarding indigenous rights are the Convention for the Prevention and Punishment of the Crime of Genocide (1948), the International Convention on the Elimination of All Forms of Racial Discrimination (1965), Convention 169 (1989), the American Declaration on the Rights of Indigenous Peoples (1997), and the Declaration on the Rights of Indigenous Populations (2007).

Regarding human rights in Latin America, it is worth noticing the approval of the American Declaration of the Rights and Duties of Man (Bogotá, 1948) and the Protocol of San Salvador on Economic, Social and Cultural Rights in 1988, in addition to the American Convention on Human Rights, known as the San José de Costa Rica Pact of 1969, which constitutes the fundamental human rights charter of the American continent. In addition, many of the countries in the region signed the International Covenants on Civil and Political Rights and Economic, Social and Cultural Rights (Harvey 2008).

ILO Convention 169 had an unquestionable impact in the region because of its binding nature and because it advances on key issues such as the right "to participate in the formulation, implementation and evaluation of national and regional development plans and programs that can directly affect them" (Section 7, Sub. 1). It also establishes that the social, cultural, religious, and spiritual values and practices of these peoples must be respected (Section 5). At present, this agreement has been ratified by all Latin American countries with the exception of Belize, Panama, Uruguay, Guyana, French Guiana, El Salvador, and Suriname. Even those who have not ratified it have taken it into account when reforming their constitutions or sanctioning some specific rules.

The ethnic issue became important in the debates of the UN in the last two decades. The result was the Declaration on the Rights of People belonging to National or Ethnic, Religious and Linguistic Minorities approved in 1992 and the approval of the Declaration on the Rights of Indigenous Peoples in 2007.

It should be noted that the declarations approved by a resolution of the UN General Assembly can only have the character of recommendations and do not constitute binding norms. However, the dominant opinion in the doctrine affirms the obligatory nature of Human Rights Declarations indirectly, based on the fact that the rights recognized in them represent "general principles of the law of civilized nations" (one of the sources of international law recognized by the Statute of the International Court of Justice, Art. 38.1). The 2007 declaration has been repeatedly cited by the Inter-American Court of Human Rights as the basis for its decisions

(e.g., Pueblo Saramaka vs. Suriname case-CIDH judicial sentence 11/28/2007, Series CN ° 172), implicitly recognizing the principles of international law contained in it (Rodríguez-Piñero Royo 2010: 351).

The Declaration on the Rights of Indigenous Peoples of 2007 fully recognizes and guarantees the human rights of these peoples, placing them as political subjects at an international level and filling one of the great legal voids in international human rights law (Montes and Torres Cisneros 2010: 149).

In matters of indigenous cultural heritage, it recognizes the right to control its movable and immovable heritage; the right to the restoration of its cultural, intellectual, religious, and spiritual property (Art. 11); the right to repatriation of their human remains or ceremonial objects (Art. 12); and the right to protect their intellectual property over their cultural heritage, traditional knowledge, and traditional cultural expressions (Art. 31).

After a decade that this declaration was issued, the idea that it has generated a positive impact on the domestic legal system of the countries is recognized. It also highlights the importance of the jurisprudence of the Inter-American Court of Human Rights in the interpretation of the scope of the rights that it recognizes.

In 2016, the OAS approved the American Declaration on the Rights of Indigenous Peoples. It is the first instrument of this organization that deals with the protection of these peoples. There is a broad, complete, and exhaustive list of rights, including self-identification, self-determination and autonomy, as well as belonging to one or more indigenous peoples. Collective rights are incorporated as peoples, gender equality, and the right of indigenous peoples in voluntary isolation "to remain in that condition and to live freely and according to their cultures."

In addition, the right to "their cultural, tangible and intangible heritage, including the historical and ancestral, as well as the protection, preservation, maintenance and development of such cultural heritage for their collective continuity and that of their members, and to pass it on to future generations" (Art. XIII. 1) was recognized. It is stipulated that "States shall provide reparation through effective mechanisms, which may include restitution, established jointly with indigenous peoples, in respect of cultural, intellectual, religious and spiritual goods that they have been deprived without their free, prior and informed consent or in violation of their laws, traditions and customs" (Art. XIII. 2). The "right to preserve, protect and access their sacred sites is also considered, including their places of burial, to use and control their relics and sacred objects and to recover their human remains" (Art. XVI. 3). In 2017, a Plan of Action was approved whereby the member States are committed in creating institutional mechanisms to monitor the implementation of this declaration.

Future Addresses

Two main issues have been added to the traditional agenda connected with indigenous peoples at the international level: the need to eliminate ethnic, gender, and generational inequities in these peoples and the importance of including them in the elaboration and execution of strategies and projects that would be developed in the context of the 2030 Agenda for Sustainable Development (see A/HRC/RES/36/14, 2017). Within that framework, the need to build specific disaggregated indicators of sustainable development for indigenous peoples (CEPAL 2018), which should include aspects related to their cultural heritage, has been pointed out.

At the national level, although significant progress is recognized, inequalities continue to be deep, and there is concern about the gap in the implementation of these rights, the need to harmonize the regulatory systems to guarantee their exercise, and, in particular, the difficulties to implement consultation and free, prior, and informed consent (CEPAL 2014; Del Pópolo 2017).

A particularly critical issue is that of traditional knowledges, since their protection is not usually provided for in national legislation on intellectual property and patents, which only protects individual rights. At the international level, the

Intergovernmental Committee on Intellectual Property and Genetic Resources, Traditional Knowledge and Folklore is working on the development of a new regulation with the participation of indigenous peoples as observers. In some countries of the region, *Sui generis* standard projects are being discussed in order to fill this legal vacuum. Some examples can be mentioned: the Panama 20/2000 Law that creates a special regime for the protection of collective rights of intellectual property, traditional knowledge, and traditional expressions that are part of their indigenous cultural heritage and the Peruvian Law 27.811/2002 that establishes a protection regime of collective knowledge of indigenous peoples connected to biological resources. Likewise, the Andean Community (made up of Bolivia, Colombia, Ecuador, and Peru), through Decision 486, prevents the registration of trademarks or denominations that constitute the expression of the culture or practices of an indigenous community, without their expressed consent.

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► United Nations Declaration on the Rights of Indigenous Peoples (2007)

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Latin American Social Archaeology

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Introduction and Definition

Social archaeology is both a theoretical and methodological practice emerging directly from Marxism. In particular, this occurs by the founding contributions of Soviet archaeology, as envisaged by the Australian archaeologist Vere Gordon Childe (Gándara et al. 1986; Bate 1990). At the core, social archaeology is the construction of a method of archaeological process analysis that is significant and scientific in the manner it connects past and present. According to one of its founders, archaeologist Luis Lumbreras (1974), it was introduced in Peru in the 1950s by Emilio Choy to give the Andean process a coherent explanation. Its aim is to go beyond the explanations that are inferred by the ordering of archaeological materials, which lead to the development of productive forces to make comparisons between groups with similar characteristics and thus identify the levels of social hierarchy produced as a consequence of class struggle. In the mid-1970s, the adjective Latin American was added (Gándara et al. 1986), and subsequently Manuel Gándara in Mexico proposed to call it Ibero-American Social Archaeology (Gándara 1996), since it appeared primarily within Spanish social archaeological discourses. Key contributions have been made by archaeologists who have founded schools of thought developed in Marxism in Mexico, Venezuela, Peru, Cuba, and the Dominican Republic mainly where the state has been sympathetic to leftist ideas (Bate 1990, 1997). The idea of an archaeology that would serve as a liberation weapon lay in the possibility of discovering the historical roots of peoples and their character as exploited (Lumbreras 1974); the transience of institutions, states, social classes, and behavioral patterns; and the articulation of social archaeology with the other social sciences demonstrating historical processual unity in general terms and in their regional and local characteristics (Sanoja 1982; Vargas Arena 1986; Patterson 1988). The essential feature of their ideology lies in the application of a type of Marxism which holds some influences with Hegelian, Leninist, and Stalinist traditions of the former Soviet school, whose strength lies in the integration with dialectical materialism and neopositivism for explaining social phenomena.

Key Issues/Current Debates/Future Directions/Examples

Discussion

During the 1980s, two key meetings took place that allowed for the development of social archaeology: the Oaxtepec and Cusco meetings. During these meetings, significant issues were discussed related to the construction of analytic categories, methodological theory, the interpretation of historical materialism, and a history of archaeological contexts and production data (Lorenzo 1976; Gándara 1996).

At the second meeting of Oaxtepec, some agreements related with the following concepts were reached: mode of production, socioeconomic training, and modes of life and culture, for the definition of a concrete society. In efforts to create a conceptual unification, the need to develop the elements for a historical periodization for social formations was observed. This was called primitive with its variants: the hunter-gatherer and tribal. The former was developed through the work of Luis Felipe Bate (1990, 1996, 1998), and the latter related to tribal social developments was illustrated through the work of Iraida Vargas Arena (1986) and other researchers, such as Thomas Patterson, and it characterized equally complex social formations as the chiefdom and state societies (1998).

The contemporary context within which social archaeology was able to draw attention to archaeology's theoretical and methodological problems was the fall of the Soviet Union and the so-called real socialism. This became relevant to the discourse as Marxist ideas gave way to methodological theoretical positions relevant to discourses regarding other experiences and perception or interpretation of reality contrasted with the ambitious universal theoretical constructions of historical materialism (López Aguilar 1990).

The development of Latin American Social Archaeology was concurrently being represented within the American archaeological discourses through the work of Bruce Trigger (1992), Thomas Patterson (1988), and Randal McGuire (1992). In their discussions related to "culture" from a Marxist perspective, these scholars argued that the term "culture" should not be reduced to material production or symbolic systems; culture is more than ideology and political economy on the one hand and society on the other.

Despite efforts to unify criteria and categories of analysis, not all social archaeologists use the same categories in their explanations of the historical constructions of archaeological contexts they observe. Also important to keep in mind is the absence of a project in which the strength of the theoretical model may be tested against the relevance of the data. Social archaeology was also constructed contrasting methodological and theoretical positions as in the case of post-processual and processual archaeology, led by the American school (Trigger 1992). Its current production is scarce and scarcely spread in the Latin American context. Not all social archaeologists share the terms and arguments raised in the essential categories and laws of dialectics on the social construction of reality they observe. The ontological diversity is difficult and problematic if the aim is to have a unified methodological view.

Current Status

The social construction of reality has given way to another kind of discourse that goes beyond the borders of the nation state and the symbolic power of its founding myths. The arguments which are developed by schools of archaeology in Latin America vary substantially from country to country. There are still the state institutions that flourished and were consolidated in the middle of the last century which contribute to the need to protect such archaeological contexts. However, the fragmentation of academia, state, and civil society where public policies flow is still far from being organically integrated.

Although Marxist ideas are still part of some leftist discourses that are woven throughout the Latin American context, the need to draw more equitable public policies contrasts with a growth of urban, energetic, vial, mining infrastructure where interventions are needed to protect the cultural integrity of the social groups that may be affected by such growth. Much of the political strength of Marxists arguments has given way to environmental discourse and has even reviewed the concept of nature in that ideology (Bate 1996, 1998). The tension between neoliberal ideas, the weakening of the state as a provider of essential public services, and the decline of social values and social capital where Latin American nations' daily life runs continue to develop liberating creative and innovative elements, emerging from the tension inherent to the capitalist system. Several viable options that activate social cohesion have emerged, much like the Latin American Social

Archaeology attempted when trying to reconstruct the social history of a diverse and complex region.

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- ▶ Archaeology and Politics
- ▶ Childe, Vere Gordon (Political and Social Archaeology)
- ▶ Marx, Karl
- ▶ Marxist Archaeologies Development: Peruvian, Latin American, and Social Archaeology Perspectives
- ▶ Power and Knowledge in Archaeology

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Latium Vetus, Latium Adjectum

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Introduction

Literary sources suggest that Latins and Romans had close cultural ties from prehistoric times (Alföldi 1965: 102–4); their shared identity being recognized in the use of the same language and the adoption of distinctive religious rituals and of converging mythical genealogies. Romans and Latins believed that their common "nation" had indeed formed in Latium, the region of Tyrrhenian central Italy located just south of the Tiber river. The fact that Latium was also the first region to be incorporated by the Roman state in its early expansion certainly reinforced this idea. This connection easily explains why the archaeology of Latium occupies a prominent place in the history of Classical studies, as it represents a point of entry into two crucial aspects of the Roman past: Rome's origins and its first steps in the creation of a Mediterranean Empire.

Since the pioneering work of G. Pinza (who in 1905 was the first to propose a systematization of the prehistoric material of Latium), the study of Rome's origins became the domain of Prehistorians and Etruscologists, who were captivated by the image of a *Lazio primitivo* evoked by the ancient writers and so vividly reflected in the primeval aspect of many elements of the assemblage known in the literature as *cultura Laziale*, Latial culture. Classicists remained quite aloof

from the debate on Roman origins, embarking on extensive mapping projects of the surroundings of Rome whose main goal was to record with particular detail the marks of Roman conquest in the region (e.g., roads and aqueducts, rural elite residences). Famous examples include R. Lanciani's unpublished map of the Agro Romano (1894–1906) and his architectural surveys at Ostia, Portus, and Hadrian's Villa near Tibur; T. Ashby's classical topography of the Roman Campagna (published in the Papers of the British School at Rome in the period 1902–1910); and the Forma Italiae project, relaunched in 1923, with the campaigns of G. Lugli in and around Tarracina and Circeii. Combined with the standing evidence from the main urban centers of Latium (e.g., the excavations of Ostia, resumed in 1909), the systematic documentation of these remains provided a basis to reconstruct the development of monumental architecture in the region and decisively informed early typological studies of Roman construction techniques (see Lugli 1957, a work already completed in 1939).

In the 1950s and 1960s Prehistorians and Etruscologists continued to refine the chronological sequencing of materials dating to the Late Bronze Age, Early Iron Age, and Archaic Period. H. Müller-Karpe and R. Peroni devised a systematic periodization of the Roma-Colli Albani facies, thus encouraging the production of synthetic works on the Latial culture, such as those by P. Gierow (1964, 1966, this is a companion to Gjerstad's work on early Rome, with which it shares a largely discredited methodology) and G. Colonna (1974, 1988). New large-scale excavation projects were started in primate centers of Latium (e.g., Lavinium, Gabii, Praeneste), whose particular emphasis on temples and sanctuaries remained in line with the tradition of architectural history in Classical archaeology. Extensive surface surveys also received a new impetus, after the involvement of the Italian "Centro Nazionale delle Ricerche" (CNR) in the Forma Italiae project (14 volumes published beginning in 1965, featuring among others Tibur, Praeneste, and Ardea).

New research agendas took off in the 1970s, following a wave of important discoveries made in sporadic rescue excavations in the suburban sprawl of Rome, which revealed extensive Iron Age cemeteries and settlement evidence (e.g., Osteria dell'Osa, Castel di Decima, La Rustica). Prehistorians and Etruscologists quickly realized the potential of this material for reassessing the archaeology of early Rome and promoted major museum exhibits (such as that on the *Civiltà del Lazio Primitivo* of 1976, whose catalog contains preliminary reports on the excavations of the Italian state archaeological service and unfortunately remains the only reference for many of the sites) and seminars (notably that on the *Formazione della città nel Lazio*, held in 1977 and published in 1980). For their part, Classical archaeologists were primarily concerned with whether the new evidence could confirm the literary tradition on the origins of Rome (see the 1981 museum exhibit on *Enea nel Lazio*).

This broader interest in the archaeology of the region set in motion significant developments, most notably the official institution of a dedicated branch of the CNR (Comitato per l'Archeologia Laziale, established in 1978), which sponsored a new series of surface surveys (the *Latium Vetus* program directed by L. Quilici and S. Quilici Gigli), along with outreach initiatives such as annual meetings. The latter provided a new forum for presenting not only the activities of the state archaeological service but also the preliminary results of a growing number of Italian and foreign research projects carried out in Latium (12 issues published in the journal *Quaderni di Archeologia Etrusco-Italica*, covering the period 1978–1995). After a brief hiatus, this program was relaunched by the Soprintendenza of Lazio in 2003 as the "Lazio & Sabina" series. This updates regularly on the progress of research activities at sites ranging from Prehistory to Late Antiquity. Furthermore, detailed archaeological guides (e.g., Coarelli 1982) and major general works (particularly on the early phases: Colonna 1988; Bietti Sestieri 1992; Smith 1996; for the material culture of the mid-Republican period, *Roma Medio-repubblicana* 1973; for the late Republic, Coarelli 1987) offer widely accessible and helpful tools to contextualize current themes and approaches to the archaeology of the region.

Definition

Based on comparative linguistics, the ethnic name of the Latins (*Lătīni*) derives from the name of the region in which they were settled – *Lătium* (perhaps from *lātus*, wide, though a non-Indo-European root is also possible) and ethnic suffix *-ī nus* – and is documented in Etruscan inscriptions as early as the seventh century BCE. Historic analogy suggests that the Etruscans chose this collective noun to name those communities living in the coastal region south of the Tiber, who in turn eventually adopted it (Colonna 1988: 425). Latin and Greek authors of the early Imperial period, however, make a clear distinction between Old Latium (*Latium Antiquum* or *Vetus*) and Greater Latium (*Latium Adiectum* or *Novum*) (Pliny *HN* 3.39, 3.46, 3.56 and 3.59; Strabo 5.3), a territory inhabited by non-Latin-speaking peoples which was "added" to Old Latium by the Roman conquest.

In geographical terms, Latium Vetus corresponds to the lands bordered by the river Tiber to the north and beyond the river Anio (modern Aniene, a tributary of the Tiber) up to the hills of Sabinum, the Apenninic formations of the Monti Prenestini and Tiburtini to the northeast, the upper course of the river Trerus (modern Sacco) to the east, and the Monti Lepini and Monte Circeo to the southeast. The core of Vetus Latium is occupied by the Quaternary volcanic district of the Alban Hills. In historic times annual pan-Latin festivals (*feriae Latinae*) were held on the second-highest peak (Mons Albanus, modern Monte Cavo), where the sanctuary of Iuppiter Latiaris was located. To the south of the Alban Hills, the marshy area of the Ager Pomptinus extended down to the Monte Circeo.

Latium Adiectum comprised the adjoining region of the middle and lower Trerus valley (originally inhabited by the Hernici), the Liris (modern Garigliano) river valley (inhabited by the Volsci), and the stretch of coast south of Monte Circeo, framed by the Monti Aurunci (a chain named after the people who originally settled in this area, the Aurunci or Ausones), down to Suessa (a town located on the left banks of the Liris mouth), which marked the boundary with Campania.

By the mid-Republican period both Latium Vetus and Latium Adiectum were part of a densely urbanized region formally integrated in the Roman state. Long-lived towns, generally situated on defensible locations on sites of up to 20–30 ha and with relatively small territories, dotted the slopes of the main volcanic edifice of the Alban Hills, the Tuscolana-Artemisio caldera (Aricia, Labici, Lanuvium, Tusculum, Velitrae). Hilltop sites also characterized the limestone region at the foot of the Apennine chain: the area crossed by the Anio (both Praeneste and Tibur had an acropolis detached from the lower town), the valleys of the rivers Trerus (Artena; the Hernican sites of Anagnia, Ferentinum Aletrium, Verulae) and Liris (e.g., Arpinum, Frusino, Aquinum, Atina; Roman foundations such as Fregellae, Fabrateria, Sora, Interamna), the Monti Lepini (e.g., Cora, Signia, Norba, Setia, Privernum), while most of the towns founded or refounded by the Romans south of the Monti Aurunci lay on flat land (Formiae, Fundi, Minturnae, Suessa). Larger sites in the 30–80 ha range coalesced around secondary craters at the periphery of the caldera (Gabii), on volcanic spurs outcropping in the coastal plain of Latium Vetus (Rome, Fidenae, Crustumerium, Ardea, Lavinium, Antium), and at the margins of the Ager Pomptinus (Tarracina, Satricum). In the Roman period, land communication between the cities of this region was made possible by a network of public roads radiating from Rome, in most cases resulting from the regularization of preexisting routes (the via Appia, crossing in a straight line the marshes of the Ager Pomptinus and the coast south of Tarracina, being an obvious exception): among the most prominent are the via Salaria, serving the district north of the Anio; the via Tiburtina, Gabina/Praenestina, and Labicana, connecting Rome with main tier urban sites to the east; and the via Latina, climbing the Alban Hills up to Tusculum and then continuing in the Trerus-Liris basin to reach Capua in

Campania. A system of secondary roads that bypassed Rome is also attested, such as the so-called via Cavona, stretching on a southernly course from Tibur and Gabii to Antium.

Latium Vetus constituted a culturally unified region since the Final Bronze Age. Despite a remarkable continuity in settlement patterns from the previous period, the archaeological record of this period shows the sudden, widespread, and simultaneous adoption of a standardized and highly distinctive set of burial practices, materializing new forms of cultural and political identity. The formation of regional cultures in neighboring areas during the Late Bronze to Early Iron Age transition can be detected in the radical changes in the distribution and density of sites but was less connotated ideologically, as suggested by the higher variability in mortuary patterns (Pacciarelli 2000). In chronological terms, the formative phase of the Latial culture has been dated archaeologically to the tenth century BCE (Period I), although ^{14}C data suggest a slightly earlier absolute dating (end of the eleventh century – beginning of the tenth century BCE, according to the revised chronology: Nijboer et al. 1999–2000).

The typo-chronology of the Early Iron Age is commonly articulated in three periods; each period has two phases, in turn divided in two subphases (Colonna 1974; Bietti Sestieri 1992; Smith 1996): Periods IIA1-2 and IIB1-2 (900 to 830 BCE and 830 to 770 BCE, respectively; approximately tenth and ninth century BCE according to the revised chronology); Periods IIIA1-2 (770–750 BCE; according to the revised chronology, the Period IIIA1 begins c. 830 cal BCE) and IIIB1-2 (750–730/720 BCE); Periods IVA1-2 (730–720 to 630–620 BCE) and IVB1-2 (630–620 to 580 BCE), also referred to as the "Orientalizing" period (divided into an Early, Middle, and Late phase) by Etruscologists and Mediterranean archaeologists in general.

With the end of the Archaic period (late sixth century BCE), the archaeological phases of Latium are defined after the conventional periodization of Roman history.

Historical Background

Many of the towns in Latium had their own foundation myths, but in the Roman version they figured as offshoots (Rome being the last one) of Alba Longa, a town established on the slopes of *Mons Albanus* by Aeneas' son Ascanius (Iulus), the founder of a dynasty of kings that ruled Latium from the twelfth to eighth century BCE (sources in Alföldi 1965: 102–4). The image of an urban society capable of carrying out a colonization program already in the Late Bronze Age is clearly an anachronism, but the primacy assigned to the Alban Hills' district by historical sources is in fact mirrored in the archaeological record by the outstanding quality and quantity of finds from the area dating to Latial Period I, which remain unchallenged even after the wave of systematic research of the last few decades. These finds reveal small-village-based communities controlling territories of 4–5 km^2, whose military and religious leaders were afforded formal burial according to a funerary ritual characterized by a strong symbolism (mostly male cremations in hut-urns with miniaturized grave goods, including armor). There is a tendency to interpret these territorial entities as the archaeological correlates of those 30 Latin *populi* who took part in the sacrifices on *Mons Albanus*, known from a list given by Pliny (3.5.69; see Colonna 1988: 447–8). As to the form of political organization and social structure of the *populi*, a fundamental disagreement exists, whether these were weakly differentiated tribal societies (Bietti Sestieri), the precursors of gentilitial clans (Peroni), or chiefdoms integrated in a complex regional polity (review of the problem in Carandini 1997: 228–38).

During Latial Period II (particularly in Period IIB), there are increasing signs of settlement nucleation and differentiation, leading to a shift in importance from the Alban Hills to the coastal plain and showing that other Latin communities were undergoing the same process of urbanization that brought Rome into existence. Surface finds attest a clustering of small sites on the same

locations later occupied by the main Latin cities of the historic period (e.g., Gabii, Ardea, Lavinium, Satricum, Crustumerium). This phenomenon is accompanied by the emergence of extensive burial grounds featuring hundreds of graves (e.g., Rome-Esquiline; Gabii-Osteria dell'Osa). Spatial analysis at the Osteria dell'Osa cemetery suggests that burials were grouped according to kinship (i.e., lineages composed of extended families: Bietti Sestieri 1992) or other forms of social organizations (Smith 2007: 166 with further reference).

If the presence of permanent social stratification already in the first phase of the Early Iron Age remains a contested issue, later cultural developments are unambiguously characterized by the display of ascribed status and economic inequality in the funerary sphere. The Latial Period III (when according to the tradition Rome would have been founded) witnessed an intensification of contacts with Etruria (as suggested by the increase in the distribution of metal objects) and Campania (early imports of Greek pottery), particularly by the mid-eighth century BCE. The luxury assemblages documented in the richest burials of Castel di Decima and Praeneste have been correlated with the emergence of ruling aristocracies that secured access to wide exchange networks. In current reconstructions it is maintained that conspicuous consumption and competition among these elites fueled craft specialization and trade, creating the preconditions for the development of political complexity and eventually leading to the formation of the archaic city-states, a process concluded in Rome and elsewhere in the region by the late seventh century BCE at the latest (Cornell 2000).

It has been estimated that at least 20 city-states existed in Latium Vetus by the end of the sixth century BCE (list in Cornell 2000: 213). According to the ancient tradition, in the course of the Archaic period, these came under the hegemony of Rome (whether a formal alliance had been already stipulated at this time is a debated issue; see Smith 2007: 171). The excerpt of an inscription from Aricia cited by Cato (*Origines* fr. 58 P) and a text of Dionysius of Halicarnassus (5.61.2), however, attest an organized coalition of Latin cities (29, in the list given by Dionysius), which waged war against Rome at the beginning of the fifth century BCE. Their defeat resulted in the establishment of a military alliance on equal terms between the league and Rome, known in the sources as the *foedus Cassianum* (493 BCE), soon followed by the incorporation of the Hernici (486 BCE). This settlement marked the beginning of Roman expansion in Southern Latium, which continued throughout the fifth century BCE with joint military campaigns against the Volsci and the Aequi. In newly conquered territory or when lost cities were gained back, Romans and Latins founded colonies (*coloniae Latinae*) that possessed the same rights enjoyed by Latin cities as regards to intermarriage (*conubium*), stipulation of legally binding contracts (*commercium*), and mobility (*ius migrationis*) (Signia, Velitrae, Norba, Antium, Ardea, Labici, and perhaps Cora; Vitellia, perhaps to be identified with Artena, Circeii, Satricum, and Setia in the beginning of the fourth century BCE; on the *ius Latii* see Cornell 2000: 220).

Already in the early fourth century BCE, however, Rome began to absorb cities of Latium Vetus, transforming them into self-governing communities of Roman citizens (*municipia*). Tusculum was the first to be annexed in 381 BCE, followed by most of the Latin members of an anti-Roman alliance that included also Volsci, Aurunci, Sidicini, and Campani (who engaged Rome in the so-called "Latin War", 341–338 BCE). Some (Ardea, Circeii, Cora, Gabii, Norba, Praeneste, Setia, Signia, Tibur) retained formal independence but had to cede part of their territories, while their rights to conduct reciprocal dealings were severely curtailed. In Latium Adiectum the Romans imposed partial citizenship (*civitas sine suffragio*), which required all the burdens and obligations of full citizens but without political rights (Fundi, Formiae, Privernum). In addition, a new program of Latin colonization was launched, which involved strategic areas of Latium Adiectum (e.g., Fregellae, Interamna Lirenas, and Suessa, 313 BCE), the upper Anio (Carseoli, 298 BCE) and upper Liris (Sora, 303 BCE) valleys. It is important to note that since the majority of the colonies founded under this scheme was outside

Latium, the term *colonia Latina* ceased to have an ethnic connotation, referring only to the fact that such communities possessed political institutions modeled on those of the cities of Latium Vetus. Colonies of Roman citizens (*coloniae civium Romanorum*) were founded at Tarracina (329 BCE) and then at Minturnae (296 BCE), on the example of the garrison established a generation earlier at Ostia.

During the late Republican period, many of the Latin towns, while still functioning as *municipia*, suffered a decline and contraction, which was accelerated by the simultaneous growth of nearby Rome as a capital city. Possible causes of this phenomenon include the effects of the civil wars of the 80s BCE (e.g., destruction at Praeneste and Norba; Fregellae had already been razed to the ground as a consequence of a short-lived rebellion in 125 BCE, the inhabitants being relocated to Fabrateria Nova) and the progressive concentration of estates into the hands of a few landowners (an issue that has recently seen controversy; see Witcher 2005, arguing for a rising rural population in the *suburbium* of Rome during the early Imperial period). Monumental building projects funded by Roman aristocrats with local connections are still attested in the late second and early first century. BCE (most notably the sanctuaries at Praeneste, Tibur, Gabii, Cora, Lanuvium: Coarelli 1987; these represent a discrete phenomenon that can be explained in terms of the long history of peer-polity interaction in the region). By the early Imperial period, what were once flourishing urban centers survived only on a much smaller scale (e.g., Gabii) or were completely abandoned (e.g., the coastal sites of Ardea, Lavinium, Circeii), in spite of repeated attempts by the Roman emperors to revive them. A notable exception is Ostia, which continued to thrive as Rome's main harbor town.

Key Issues/Current Debates

A brief summary of current archaeological research on Latium will suffice to show the intrinsic interest of the development of this region as well as its contribution for understanding the cultural and historical trajectory of Rome during the first millennium BCE and beyond.

The process of urbanization and state formation in central Italy represents perhaps the key theme, especially after the recent wave of sensational discoveries in the early levels of Rome. Because Rome was part of it, the wider Latin context has been increasingly taken into account to explain the rise of urban society in the region. The consensus is that urban status was achieved by the late seventh century BCE. Parallels from Latium are now found for all the major innovations that characterized this transition in the built environment of Rome: earthen fortifications or proper walls (e.g., Ardea, Gabii, perhaps Praeneste), public road construction (e.g., Satricum; Crustumerium), and religious architecture (Gabii, Satricum, Lavinium). These features betray an increased level of settlement planning and coordination and the formation of a communal identity. As in the case of Rome, the combined evidence of surface survey, limited excavation, and funerary data from main tier sites in the region (e.g., Gabii; Lavinium) suggests that this shift was the result of a long process of settlement concentration on strategic sites, which in some cases were first inhabited during Middle Bronze Age. In the course of the Early Iron Age (Periods IIA and especially IIB, see Pacciarelli 2000: 120–8), occupation expanded on the wider geomorphological units (plateaus) to which these hilltops sites were connected (e.g., Ardea, Lavinium, Satricum; similar developments are attested at Ficulea, Fidenae, Crustumerium). With the exception of the Alban Hills area, small isolated sites were simultaneously abandoned. New evidence from Lavinium, however, points to the possibility that the entire area later enclosed by the fortification walls was already occupied by the last phase of the Final Bronze Age or the very beginning of the Iron Age, suggesting that the chronological gap between Etruscan and Latin urbanization processes may have been significantly shorter. Despite the smaller scale of the phenomenon in Latium, a reconsideration of old data from Etruscan sites such as Veii and Tarquinia (where occupation in the Final Bronze Age also seems to be limited to the acropolis) shows stronger

similarities in the formation of these sites (recent review of the problem in Fulminante and Stoddart 2010). The reconstruction of the internal organization of these settlements is in most cases based on surface evidence alone, which obviously limits the level of resolution. A generalized pattern has been observed, whereby separate clusters of ceramic material are sparsely distributed over the plateaus. This spatial configuration has been interpreted as a sign that the groups involved in the process of settlement nucleation occupied separate habitation compounds and only gradually merged into a continuous fabric. Different models have been recently proposed to identify the corresponding social organizations into which early urban communities were articulated as direct predecessors of the historical-period *curiae* or clan structures that tried to maintain their social and cultural identity (see discussion in Terrenato 2011).

The archaeology of Roman colonization represents another topic which recent fieldwork and research is focusing on, particularly in the field of architectural history. Latium Vetus and Latium Adiectum were the subject of two distinct waves of colonial foundations: according to the historical tradition, 15 colonies were founded in the period between the late sixth century and 382 BCE; additional Roman and Latin colonies were established after 338 BCE. Important monumental remains are preserved from these sites, providing ample evidence to study the formative phases of Roman urbanism and town-planning practice. The absence of a standardized pattern in the urban layouts of *ex-novo* early Latin colonies (e.g., Norba; cf. Ardea) suggests that these sites were not founded according to a predetermined model, but only progressively acquired specific urban features (city walls, orthogonal layout), and this because they participated in wider cultural developments that influenced the region as a whole, particularly from the early fourth century BCE. The lack of standardization in these early foundations has led some to believe that their establishment was not centrally driven by Rome, but rather represented private enterprises resulting from horizontal mobility at the elite level. The function of these colonies within the regional settlement system has also come under scrutiny, given the impressive continuity of occupation from the previous period that systematic surveys have documented in their territories (e.g., Attema and van Leusen 2004), although in this case it is virtually impossible to distinguish between Latin and specifically Roman pottery assemblages.

Extensive investigations have been conducted in several colonies of the Middle Republican period (Ostia; Minturnae; later stages of occupation at Norba; Fregellae). Large-scale urban surveys at these sites (particularly Norba and Fregellae) have revealed the presence of orthogonal city plans, with a clear spatial articulation of public and private spaces. Excavation has been focused particularly on temples as well as on the civic architecture in the monumental cores (data collected by Lackner 2008), while domestic architecture has received far less attention. According to a recent reassessment of the evidence from Latin colonies in central Italy (Sewell 2010), a model of Roman colonial urbanism can be reconstructed on the basis of specific details of the urban form (e.g., fortification techniques, elongated proportions of the city blocks, disposition of the Forum within the street grid, architecture of political assembly places). These show the influence of contemporary Greek town planning, which in some instances was adapted to accommodate preexisting Roman traditions and conceptualizations (most notable is the rejection of stoa architecture). Considering the generalized lack of third century BCE archaeological evidence other than religious architecture in many of the Middle Republican colonies, the site of Fregellae stands out for the quality and quantity of data on early house design (though poorly published), decoration styles, and technologies (particularly the diffusion of "cocciopesto" and other decorated cement floors), as well as on innovative building types (e.g., public baths) and associated construction techniques. While the assemblage attested at Fregellae is commonly taken to reflect a contemporary Roman cultural package, the possibility should be allowed that at least some of these features were independent developments, particularly because they consistently predate the earliest known examples from Rome. As the case of the Late Republican sanctuaries shows, political

interaction and competition between the urban communities of Latium may well have been responsible for the transmission of cultural models to Rome.

An intense scholarly debate concerns the historiographical problem of the origin of the villa, both as an architectural and as an economic template. The extensive surface surveys conducted in the context of the *Forma Italiae* and Latium Vetus projects show an increase in site density during the fourth and third century BCE, with a predominance of the "small-farm" and "farmstead" settlement types. This phenomenon is usually associated with the emergence of free peasantry in the *suburbium* of Rome. Alternative models have been proposed for the interpretation of this pattern, based on the fact that in some areas these farms coexisted with older, much larger, and richer rural residences (of the kind archaeologically attested at the Auditorium site in Rome), perhaps connected in a system of patron-client relationships (Terrenato 2007). Medium-sized estates involved in cash-crops production become visible only later in the second centuries BCE, but the buildings associated with these estates were still modest in size and architectural refinement. More importantly, it seems that in the *suburbium* of Rome, the large luxurious villas of the late second and first centuries BCE did not grow from direct precedents, but were generally planted *ex-novo*, suggesting that the old elite residences may have served as a model for the construction of a new landscape of power. The presence and involvement of elites in the social life of the Roman countryside in any case remained a constant throughout the history of the region, even after the formation of vast imperial estates (unsurprisingly, many of the imperially owned villas including Hadrian's famous one at Tibur were built atop Late Republican precursors).

Research on the Imperial period, however, is not confined to elite manifestations. Knowledge of lower-class urban structures such as the *insulae* (multistory apartment blocks) is made possible at Ostia by the extraordinary level of preservation of its architecture. Ostia and Portus also provide unparalleled material to study the life of port towns, including issues of identity (which can be compared and contrasted with the rich datasets from the extensive excavations of the cemeteries) and mobility of nonelite groups. Current work seeks to assess more specifically the degree to which these communities were connected with the broader social, economic, and cultural fabric of the Roman Mediterranean.

International Perspectives

The international research community is actively involved in the actual production of archaeological data in the region, thus shaping to a significant degree research agendas in all areas of the current debate. Non-Italian universities are usually granted excavation permits by Italian authorities with no particular limitations. Foreign cultural institutions based in Rome (including the Deutsche Archäologische Institut (*DAI*), the British School at Rome, the École Française de Rome, the American Academy in Rome, the Dutch Institute, the Nordic Institutes) sponsor many of these projects, facilitating the collaboration with Italian parties on a regular basis (e.g., the *Lazio & Sabina* series).

A noteworthy trend in the context of this fieldwork has seen the adoption of large-scale approaches for the study of pre-Roman and Roman urbanism, in both primate centers (e.g., the Spanish excavations at Tusculum, the American excavations at Gabii, the Dutch excavations at Satricum) and colonial towns (German initiatives at Minturnae and Fabrateria Nova). Noninvasive methodologies have also been applied and progressively refined, including geophysics (particularly magnetometry, with work conducted by the British School at Rome at Portus, Fregellae, and Interamna Lirenas) and artifact-based field methodologies (e.g., the Dutch field survey in southern Latium).

Future Directions

Archaeological activity in the core region around Rome still has a lot to offer in terms of richness of data and interpretive potential. The renewed interest on the early phases of central Italian urbanism has already determined a significant shift from

previous approaches based mainly on the interpretation of funerary evidence to research strategies that aim at the recovery of settlement data. A crucial problem that will have to be addressed in future excavations at primate sites is that of their internal organization during the early urban stages, so as to observe and date with much greater precision the alleged merging of hut clusters into a unified fabric. In addition, the fact that many of the Latin centers were relatively unaffected by the disturbances or destruction caused by concrete construction at sites that continued to be developed in the Imperial period should also increase the chance of recovering architecture of the Middle Republican period aside from temples and city walls, whose record at Rome and elsewhere in central Italy is not particularly rich.

Cross-References

- ▶ American Academy in Rome
- ▶ Architecture, Roman
- ▶ Ashby, Thomas
- ▶ Central Italy: Etrusco-Italic Sanctuaries
- ▶ École Française de Rome
- ▶ Economy, Roman
- ▶ Lanciani, Rodolfo
- ▶ Romanization
- ▶ Topography of Rome
- ▶ Urban Planning, Roman
- ▶ Villas and Farms in the Mediterranean World

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Lawyers' Committee for Cultural Heritage Preservation (LCCHP)

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Basic Information

The Lawyers' Committee for Cultural Heritage Preservation (LCCHP) is a not-for-profit organization that fosters the stewardship of the objects, places, and traditions that define us as societies, nations, civilizations, and even human beings. See http://www.culturalheritagelaw.org for more information.

Major Impact

The field of cultural heritage law (or cultural property law or cultural resources law) has grown considerably over the past decade, such that today it can properly be considered a "field" and not merely a practice area within some other field such as environmental law, art law, international law, copyright law, or federal Indian law. The number of attorneys working in the field has blossomed. In 2004, the Lawyers' Committee for Cultural Heritage Preservation ("LCCHP" or "Lawyers' Committee") was formed "to promote the preservation and protection of cultural heritage resources in the United States and internationally through education, research, outreach, and advocacy."

Although there are certainly other organizations promoting preservation and protection of cultural resources, the Lawyers' Committee is the first organization focused on legal education and advocacy to promote preservation both in the United States and internationally. The membership includes attorneys, law students, and interested members of the public. A member of the Board of Directors, however, must either have graduated from an accredited law school or must be a student currently attending law school. This gives the organization a unique perspective and the tools to influence cultural heritage preservation. Currently, 13 members serve on the Board of Directors and a part-time executive director manages the organization. The Board brings an array of expertise to the table: Many Board Members have backgrounds in either art or archaeology and work in academia, private practice, and government agencies. Their expertise ranges from domestic cultural heritage law, to the international illicit trade in antiquities, to the restitution of Holocaust art.

Education is central to the mission of the Lawyers' Committee. LCCHP actively works to inform the public about cultural heritage issues, raises the profile of cultural heritage law in our nation's law schools, and serves as a clearinghouse for employment and internship opportunities for law students and recent graduates. Each year, the organization sponsors a Student Writing Competition in Cultural Heritage Law for law students and works with the DePaul University College of Law to sponsor the successful National

Cultural Heritage Law Moot Court Competition. The organization also maintains a list of law school courses offered in the field nationally and a guide to internships and externships.

Since 2009, LCCHP has held an annual conference, open to both Committee members and the general public, and has periodically sponsored other public events. Topics for these events have included the following: cultural heritage, World War II, and the Pacific; the protection of underwater cultural heritage; international historic preservation in context with the National Historic Preservation Act; the US and the 1954 Hague Convention; free exercise, historic religious properties, and sacred sites; legal and ethical problems in art; foreign sovereign immunities; the trade in antiquities; and collecting Chinese art and antiquities.

As a legal organization, the Lawyers' Committee is also in an ideal position to be a successful advocate for the preservation of cultural heritage. That role is filled by the Committee's submission of comments on pending federal and state legislation that may impact cultural heritage and joinder with other preservationist organizations in the submission of amicus briefs in cases involving cultural heritage issues. For instance, the Lawyers' Committee partnered with a number of other organizations, including the US Committee of the Blue Shield and the Archaeological Institute of America, in providing testimony to the US Senate Foreign Relations Committee. The US Senate ultimately ratified the treaty in September 2008. LCCHP also comments on proposed bilateral agreements between the United States and other countries (including Italy, Cambodia, Cyprus, and Greece) to restrict the import of undocumented archaeological and ethnological materials.

Since its inception, the Lawyers' Committee has advocated for the protection of cultural heritage and has provided mechanisms for educating the public, archaeologists, and future attorneys. As the field of cultural resources law continues to grow and mature, LCCHP will be responsive in order to best assist in the preservation of global cultural heritage.

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Leakey Family

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Basic Biographical Information

The Leakey family is the world's most prolific paleoanthropologist family. Three consecutive generations have conducted research in Africa studying human origins.

Louis Seymour Bazett Leakey was born on August 7, 1903, in Kabete, Kenya, and passed

away October 1, 1972. Louis' parents were British missionaries that lived among the Kikuyu tribe in Kenya of which he was an initiated member at an early age. At an early age, Louis showed an interest in stone arrowheads and tools. He studied at Cambridge University but took a leave of absence during which he undertook his first archaeological expedition which led to multiple fossil-hunting expeditions in East Africa. This was considered an unusual step as the widely accepted paradigm was that human ancestors derived from Asia. He had a son, Colin Leakey (a plant breeder who lives in London with his wife Susan and three daughters), with first wife Frida (divorced 1936). Louis later married Mary Nicol, an illustrator, in 1936. Besides his significant contributions to our understanding of human evolution, Louis influenced and mentored numerous researchers in many fields including Jane Goodall and Dian Fossey in primate behavior.

Mary Leakey was born on February 6, 1913, in London and had an early interest in art and archaeology. In 1930, she began auditing university courses in geology and archaeology. She established herself as a scientific illustrator and became knowledgeable on flint points. Mary first met Louis in 1933 and began illustration work for him. After his divorce from Frida in 1936, they married and had three sons: Jonathon (1940), Richard (1944), and Philip (1948).

Richard Erskine Frere Leakey was born on December 19, 1944. Richard participated in fieldwork at an early age and achieved independent success with his own discoveries. Serving as director of the National Museums of Kenya, Richard led an expedition to Koobi Fora in 1968 and expeditions to Lake Turkana between 1968 and 1989.

In 1989, Richard was appointed as head of Kenya Wildlife Service where he embarked upon combating rhino and elephant poaching. Unfortunately in 1993, Richard was involved in a plane crash resulting in bilateral below-knee amputations. In 1994, he left the Kenya Wildlife Service and served as secretary-general of Safina, a political party, and in 1997 was elected for a seat in the Kenya parliament. Richard's political career reached a pinnacle in 1999 when he was appointed the head of Kenya's Civil Service. He retired from political life in 2001 but continues the fight for political justice in Kenya. He is also involved in conservation projects.

Philip Leakey, born in 1949, was involved in Kenyan politics until 1992. He now runs a company, The Leakey Collection that sells Maasai crafts with wife Katy.

Meave Leakey (nee Epps) was born in London in 1942. Meave obtained joint honors in Zoology and Marine Zoology from the University of North Wales. Meave met the Leakey family the same year she commenced a Ph.D. in Zoology and took a position at the Tigoni Primate Research Center. She completed her Ph.D. in 1968. The following year, Richard Leakey invited her into the field at the Koobi Fora site. They married in 1970 and had two children, Louise and Samira. In 1989, Meave coordinated the National Museum's paleontological field research in the Turkana Basin. Meave's research interests also involve investigating how environments may have influenced hominin evolution.

Louise Leakey was born in 1972 and works alongside her mother Meave at the Turkana Basin Institute. She obtained her Ph.D. from London University, her dissertation focusing on climate change influences in fossil deposits between 3.5 and 1.5 million years ago. She is also a research assistant professor at the University of Stony Brook, Department of Anthropology, New York. Louise is heavily involved in the coordination of the Lake Turkana Basin and local programs aimed at education and health.

Major Accomplishments

The Leakey family centered their research in Tanzania, in particular Olduvai Gorge. It was not until 1948 that Louis made his first important discovery, a skull which he named *Proconsul africanus*, an ape like hominoid that lived over 14 million years ago. Louis attracted controversy at first; however, this and subsequent finds by the Leakey family supported early hominin finds of an earlier pioneer, Raymond Dart.

The Leakeys also uncovered a number of extinct animal fossils in the Olduvai Gorge. It was here that Mary made her first significant discovery, a fossil now known as *Australopithecus boisei* in 1959. In 1960, Leakey announced the discovery of a direct human ancestor, *Homo habilis*, otherwise known as the "handy man." Louise, Mary, and Richard have written a number of books relating to their life and work in Kenya.

Mary's next major achievement was the discovery of *Proconsul africanus* with Louis. She was also involved in the discovery of *Australopithecus boisei* (1959) and *Homo habilis* (1960). In 1979, she discovered footprints preserved at Laetoli. The footprints have been dated to about 3.6 million years old. The significance of this discovery was the proof that human ancestors were bipedal. Until her retirement in 1983, she continued to conduct fieldwork and make important hominid and animal fossil finds. She is also remembered for her meticulous and methodical approach to her work which laid the foundations for fieldwork today.

Jonathon Leakey born in 1940 left fieldwork to farm snakes but not before making his own *Homo habilis* discoveries in Olduvai.

Richard Leakey's success came in fossil hunting. He led expeditions in search of fossils, and in 1984, his team discovered a nearly complete skeleton of a young *Homo erectus* nicknamed Turkana Boy. The following year, he found a skull of *Australopithecus aethiopicus*. He has also written numerous books.

Meave Leaky attained success in her own right as coordinator of field research in the Turkana Basin. In 1994, her team uncovered a new hominid species, *Australopithecus anamensis*, possibly the ancestor to *Australopithecus afarensis*. The significance of this find was that there was evidence of bipedalism 4.2 million years ago. In 2000, Meave and her daughter Louise found fossils of both *Homo habilis* and *Homo erectus* dating 1.5 million years ago east of Lake Turkana leading to the suggestions that they coexisted for approximately 500,000 years signifying that evolution was more complex. Louise Leakey was credited with finding the skull and partial jaw of *Kenyanthropus platyops* and continues research in the Turkana Basin uncovering and exploring fossil deposits. She is also pioneering the use of 3D models as a way of exploring collections online.

The discovery of a new genus, *Kenyanthropus platyops*, by Meave and her team in 2001 revealed that this genus may also be a human ancestor.

Richard, Meave, and Louise continue to run the Turkana Basin Institute which is a private research facility that enables researchers to participate in research at Lake Turkana Basin.

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Leather, Archaeological: Conservation and Preservation

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Introduction

People's first efforts to collect and prepare animal hides to use for clothing and tools included their first efforts for preserving organic material culture. Vegetable materials, tannins from tree bark,

and even the brains of the slaughtered animal were effectively used to prepare hides for use. Leather artifacts excavated from land and dry cave sites and underwater excavations offer special challenges for conservation, based on complex environmentally driven chemical interactions and processes of biological and microbial deterioration. In the late 1980s, the addition of material science studies directed at the conservation of organic materials is contributing new insights and avenues for research in the field of leather artifact conservation. This entry discusses major concerns, issues, and avenues for research and advancement in scientific studies.

Definition

Many definitions describing the natures of conservation and preservation exist. For general discussion, we define processes of conservation as efforts undertaken to prevent the loss of artifacts using chemicals and other materials in an effort to prevent further loss or damage. Restoration is the more involved process of attempting to return deteriorated artifacts to a former state of physical completeness and stability. When chemical treatment strategies fail to stabilize an artifact, resulting in the loss of portions of an artifact, it may be desirable to restore the artifact by replacing missing portions to create a more complete artifact. Conservation involves minimally invasive processes designed to prevent the degradation and loss of an artifact. Preservation efforts often involve returning an artifact aesthetically to a previous state. Organizations such as the International Council of Museums, Committee for Conservation (ICOM-CC) offer extensive descriptions of ethical standards and practices for safeguarding the well-being of artifacts.

Key Issues/Current Debates/Future Directions/Examples

The physical nature of animal skins can be described as being composed of long protein fibers, known as collagen, and fiber bundles. Complex oils and fats that lubricate the fibers and prevent them from becoming rigid surround these fibers and bundles. Fats and oils, which are present in living skins, prevent fibers from shrinking and become fixed one to another. Processes of tanning are designed to chemically treat and lubricate skins and thus preventing fibers from sticking together, hardening, and shrinking.

Archaeological provenience affects the manner in which animal skins and leather artifacts become chemically compromised. Leather artifacts excavated from acidic soils often deteriorate differently than similar artifacts excavated from a marine environment. In extreme situations, leather components of a compound artifact (combining one or more differing components such as leather and a brass buckle) may be missing due to soil acidity or other biological contaminants in soils. Skin artifacts excavated in arid environments may be dry and desiccated, which renders the leather brittle and inflexible. Similar artifacts excavated from marine environments have diminished or depleted collagen and essential oils, causing the artifact to be fragile and structural compromise. The state of hides and leather artifacts is always dependent on a number of factors.

Red Rot and Brown Rot

Red rot readily occurs at pH values of 4.2–4.5. Sulfur dioxide, a common atmospheric pollutant, may convert to sulfuric acid and forms hydrogen peroxide. Hydrogen peroxide chemically reacts with tannins used to preserve the artifact, causing oxidation of proteins in the substrate of the leather. This chemical reaction may form ammonium sulfate and ammonium bisulfate. Red rot appears as powder deposits on the surface of the artifact. The presence of red rot indicates structural weakening of an artifact due to delamination.

Environmental Factors

Apart from sulfur dioxide (SO_2), other atmospheric pollutants including carbon monoxide (CO), ozone (O_3), lead (PB), nitrogen dioxide (NO_2), particulate matter (particle pollution), Methane (CH_4), Nitrogen Dioxide (NO_2), and Carbon Dioxide (CO) and Nitrogen Dioxide

(NO_2), other trace contaminants may be present. A general first step in the conservation of leather is to carefully rinse the artifact in baths of fresh water, to remove soluble salts and debris. If necessary, additional cleaning using a nonionic detergent (approximate 1% solution) or sodium hexametaphosphate may be necessary. In all cases, it is essential to rinse the artifact thoroughly in baths of fresh water after cleaning using detergents (Hamilton 1996: 33). Even dust and dirt are abrasive to already-compromised artifacts. Similar to the abrasive nature of dirt in carpets, so too these contaminants can undermine the integrity of leather artifacts.

Microbial and Bacterial Activity

The skin consists of several layers of tissues, each acting to protect the body from microbial, bacterial, and physical damage. The main layers are epidermis (outer layer of skin), dermis, and hypodermis (deep tissues). The epidermis is a thin layer that acts as a barrier to UV light and contains hair follicles and melanin, which determines skin color. Left untreated, leather excavated from marine sites may appear to have swelled with the outer surfaces of the artifact appearing spongy in texture due to water absorption (water logging).

The dermis is tucked away between the epidermis and hypodermis. It is the layer that holds all the blood vessels, most nerves, hair follicles, collagen, and sweat glands. Collagen and amino acids associated with hair follicles act to keep the skin flexible, and they are responsible for stopping advances of bacteria that are present within the epidermis. Current research at the Archaeological Conservation Research Laboratory at Texas A&M University has determined that amino acids associated with hair follicles are conducive to polymerization or chemical complexing when combined with some forms of chemical treatment. This complex reaction acts to strengthen chemical bonds between the fibers of leather and the bulking agents being used to stabilize the artifacts.

Means of Initial Treatment of Skins

Geographically, the process of preparing animal skins differs from area to area. Skins can be "tanned" using minerals, tannins from the bark of trees, vegetable matter, and even the brains of the animal from which the skin is recovered. Salt, various oils, alum, smoke tanning, and even working a hide with saliva and chewing can be effective in softening and preserving an animal skin. To create harder, more durable skins, however, it is beneficial to not lubricate the fibers of a skin and use slow-drying methods to deliberately harden or stiffen the leather. Known as raw hides, these untreated skins have unique properties. Cut into long strips or formed into specific shapes, these raw hides are less supple than tanned skins and are easily fashioned into harnesses, ropes, and strong lashings used to tools and fasteners. Each treatment method directly affects stiffness or flexibility and other physical characteristics of the skin being treated.

Treatment Strategies for Brittle and/or Desiccated Leather

Leather excavated from archaeological sites offers the conservator a range of challenges, depending on the long-term provenance from which the artifact is excavated. Waterlogged leather from any type of wet environment should remain in wet storage until the artifact can be examined, evaluated, and treated in a laboratory. After excavation, the physical integrity of wet leather is always structurally compromised. Microbial activities, resulting from bacterium, fungus, protozoan, and viruses, are major concerns when determining the state of waterlogged leather. Even with the aid of microscopic evaluation, it is a challenge to determine damage caused by microbial activities. The result however is mechanical deterioration of the matrix of the artifact caused by disintegration of the collagen forming individual fibers and fiber bundles. Dried and desiccated artifacts, such as bookbindings and velum manuscripts, may show signs of deterioration due to mold, fungi, and other biological processes that compromise the artifact.

For decades, one standard for the treatment of desiccated leather has been the Smithsonian glycerin treatment. Glycerin acts as a lubricant and when combined with water, and a small amount of formaldehyde or other biocides, creates an

effective treatment that lubricates and protects the leather. Immersing brittle or desiccated leather in the glycerin/biocide solution makes leather more pliable and restores flexibility to leather. Glycerin, however, is hygroscopic (moisture absorbing) which many believe attracts microbial and bacterial activity (Hamilton 1996: 33).

Glycerol Treatments

In the past, leather from archaeological excavations has been treated using a solution of 30% glycerol and 70% ethanol. Glycerol is a colorless liquid obtained by the saponification of fats and oils. From a conservation perspective, saponification is the name given to the chemical reaction that occurs when the remnants of tanning agents such as vegetable matter or fats (brain tanning) react with alkali-forming conditions.

Glycerol treatments act to introduce lubrication into the damaged matrix of an artifact, replacing collagen and other depleted oils. Delicate leather artifacts may be difficult to conserve when they are stored in alcohol. Their strength capability in water is not as great as leather being stored and treated in ethanol. Alcohol tends to make leather stiffer, thus allowing the conservator to retain the physical characteristics of an artifact during treatment. After immersion in a glycerol/ethanol or glycerol/water solution for a minimum of 2 weeks, the leather is immersed in three successive solvent baths to dry the leather (after Hamilton 1996: 33). While glycerol treatments are not widely used, they can be effective for softening stiff artifacts for short periods of time. Glycerol treatments have been replaced by other leather dressings that create longer lasting, aesthetically pleasing results that attract less dust and airborne pollutants.

Leather Dressing

One successful treatment for leather is known as the British Museum Leather Dressing (BML). Because of the potentially volatile nature of some of the ingredients in this dressing, the conservator should work in a well-ventilated environment. To make BML, 200 g of anhydrous lanolin, 30 ml cedar wood oil, 15 g of beeswax (optional) are warmed while continuously mixing. This mixture is then poured into either 350 ml diethyl ether or 330 ml of hexane. Ether and hexane are flammable liquids so caution is necessary. When cooled, the leather dressing can be rubbed into the surfaces of the leather. It may be necessary to immerse hardened leather in a mixture of 1 part BML to 3 parts Stoddard solvent (Hamilton 1996). Stoddard solvent is a flammable liquid that smells like kerosene (CAS No. 8052-41-3 – generally considered hazardous). With gentle polishing, beeswax seals the surfaces of the leather and adds shine to the artifact. British Museum Leather Dressing is best used post-treatment to protect the surfaces of conserved leather and to create an aesthetically soft shine to the conserved artifact.

Polyethylene Glycol (PEG) and Freeze-Drying Methods

Before treatment, waterlogged leather must be stored in fresh water. For long-term storage, the addition of a small percentage of alcohol or an antimicrobial additive such as Dowicide 1 (biodegradation of o-phenyl phenol) had proven effective. No thorough studies on the possible deleterious effects of antimicrobial additives have been conducted. Accordingly, many conservators do not use them. Regardless of how long artifacts have been stored in water, it is advisable to thoroughly rinse them in several baths of fresh water to ensure removal of soluble salts and debris from the artifact. Insoluble salts and calcareous materials can then be mechanically cleaned using soft wooden dowels or dental tools. Chemical spot treatment of stains is possible. The conservator must proceed cautiously to determine the nature of spots on the artifact and the cause for their appearance. Often, extensive chemical cleaning can cause discoloration and damage to leather. Often, it is advisable to monitor the artifact closely to determine if aggressive cleaning is necessary. After any type of spot treatments, the artifact must be rinsed in additional baths of fresh water. In all cases, it may be better to err on the side of caution and not treat minor staining.

In the 1960s, waterlogged leather was often treated with PEG at elevated temperatures between 80 °C and 85 °C. Also known as

Carbowax, water-soluble PEG was thought to easily penetrate into the damaged cell structure of leather. It was inexpensive and readily available, making it the material of choice for many conservators. More recently, PEG treatments for leather artifacts are carried out at room temperature. A standard treatment might be to immerse the artifact in a low-percentage PEG/water solution, followed by 10% increment additions of PEG and a final percentage of 30–40%. This simple process has proven to be an effective conservation procedure for softening brittle or stiff leather. In most cases, the artifact is left in the PEG/water solution for several days after the final percentage solution is attained, and with occasional inspection, the conservator will note changes in stiffness. After treatment, leather is removed from the PEG solution, surface cleaned using soft cloths, and then allowed to slowly air dry in a humidity controlled environment.

Many forms of PEG are available. PEG 400 and PEG 1450 are used for immersion treatments of leather, and experienced conservators might blend numerous specific molecular weights of the bulking agent to create specific results.

Less commonly used, spot treatments using topically applied aqueous solutions of PEG can be effective in treating small areas of an artifact that show signs of dryness or surface flaking. After consulting the conservation notes from initial conservation of an artifact to determine what molecular weight PEG or blend of molecular weight PEGs were used for initial treatment, it is possible to carefully apply a similar combination of molecular weights of PEG to a small area of the artifact using a Q-tip. Spot-treated areas of the leather will appear darker in coloration. This will dissipate over time. One concern that may need to be addressed is why a particular area of leather requires spot treatment. If bacterial activity is apparent, the addition of PEG as a spot treatment may be detrimental in attempting to stabilize the artifact. Water associated with the topical PEG application may encourage additional bacterial activity. Always try to determine the nature of changes in leather artifacts. Small indicators may indicate that more aggressive re-treatment is necessary. In situations where badly degraded leather artifacts are not stable or self-supporting in aqueous solution of PEG, alcohol is substituted for water.

Prior to freeze-drying PEG-treated leather, the artifact can be pretreated in a solution of 15–20% PEG 400. Freeze-drying, also known as lyophilization, has been a popular means of removing unbound water from the PEG-treated artifact. Because PEG is water miscible, the bulking agent contains water. Freezing PEG-treated artifacts in a vacuum environment forces water molecules to freeze and give off gas from the artifact. After as little as a few days, small artifacts will be relatively dry to touch, and the artifact can be removed from the vacuum freeze-dryer and allowed to stabilize in a controlled temperature and controlled humidity environment. To maintain stability, artifacts should be curated in an RH environment between 50% and 60% after freeze-drying.

Posttreatment, PEG-treated leather conserved using immersion methods is usually darker in coloration. The surfaces of these artifacts may feel damp to touch, and great care must be taken to store them in a controlled environment. With changes in humidity and temperature, it is not uncommon to see PEG migrate to the surfaces of the artifact, resulting in pooled materials that must be removed to maintain the aesthetics of the artifact. As PEG migrates to the surface of the artifact, the artifact may show signs of being unstable. Signs of instability may include a compressed look to the leather or stiffening. In the 1990s some conservators expressed concern that PEG is a carcinogenic chemical and deduced that respirators should be used in situations where long periods of exposure to the chemical are anticipated. The best citations for proper use of PEG are material data safety sheets (MSDS). Although PEG is generally thought to be safe, long-term exposure to PEG and elevated temperatures may cause irritation of skin and inhalation concerns for some individuals. PEG is noted as an irritant when in contact with skin and general inhalation.

In the early 1990, this author developed passivation polymers at Texas A&M University. Commonly referred to as silicone oil methods, these treatment strategies were initially met with

a lot of criticism from conservators because they were developed using polymer-based chemicals and well-established polymer chemistry. Many conservators observed that since the processes are not reversible, they should not be used for the treatment of artifacts. This is a valid concern. Many long-used conservation materials and methods however are also not reversible because they too are polymer-based chemicals (Smith and Hamilton 1998).

Silicone oil treatments rely on the removal of water from leather through the use of solvent baths. Solvent/water displacement is critical for these methods and materials to work. Like PEG mixtures, silicone oil mixtures are variable. Generally, to a volume of silicone oil sufficient to immerse the artifact, a 10% by volume addition of methyltrimethoxysilane (MTMS) is added and mixed thoroughly. Some conservators are noted to use as much as a 70% addition of MTMS to attain desired results.

Once leather is saturated with a solvent (acetone or alcohol), the artifact is rapidly immersed in the silicone oil/cross-linker solution and allowed to sit at room temperature until no off-gassing of solvent (bubbles) is noted. Dr. Helen Dewolf of the Conservation Research Laboratory, Texas A&M University, uses many different percentage mixtures of silicone oil and cross-linker, depending on the attributes she needs to impart on an artifact. Regardless of percentages used, when the leather is fully saturated with the polymer solution, it can be removed and allowed to drain off excess polymer solution. The next stage of this treatment is to expose the artifact to vapors of dibutyltindiacetate (DBTDA) tin-based catalyst. Depending on the size of the leather in treatment, vapor deposition using DBTDA may continue for 24 h or longer (Smith and Hamilton 1998). The last stage of silicone oil preservation is always exposing the treated artifact to fresh air. Atmospheric moisture acts to complete most polymeric reactions, and exposure to fresh air reduces lingering off-gassing odors.

Posttreatment, silicone oil-treated leather does not require specialized long-term storage, often called curation in conservation literature. Changes in temperature and humidity do not affect the stability of the leather. Additionally, atmospheric contaminants and changes in ultraviolet light emissions do not have deleterious effects on treated leather.

Conservation Dilemmas

Given the ever-advancing nature of conservation chemistry, many conservators have adopted a cautious approach to new innovations. Many conservators also elect to simply not conserve some artifacts they feel unqualified to handle. Artifacts in long-term storage may become a problem because even when stored properly, archaeological/waterlogged leather artifacts do deteriorate in a laboratory environment.

Yearly, many artifacts are lost because of a conservator's fear of committing to a conservation strategy and seeing that process through to completion. Many other artifacts are lost each year because of the lack of communication between conservators. In the twenty-first century, the cost of archaeological conservation is forcing conservators to prioritize which artifacts will and will not be conserved. In the past, artifacts were viewed as being equal in importance, especially for their information potential when viewing the corpus of information from a particular excavation. Accordingly, it was important to conserve everything. Alternative means of preserving information have become necessary, as funding is not readily available. Common artifacts such as scraps of leather and square iron nails may be photographed, sketched, and catalogued without undergoing full conservation. Laboratories such as the Wilder 3-Dimensional Imaging Laboratory make three-dimensionally scanned virtual images of artifact to augment assemblage records. Although in its infancy, this new form of photo documentation and rapid prototyping has proven to be an effective and cost-effective alternative to total conservation of an artifact.

Because polymerization is a natural process, conservators are rethinking the "old school" treatment strategies once thought to be reversible. Cross-linking between the materials used for bulking degraded leather and the matrix of the leather itself is a problem we scarcely understand.

Long-term storage of leather artifacts is a challenge, regardless of the methods and materials used for initial conservation. In general, conserved leather is usually stored in a dark, cool environment which may act to inhibit bacterial growth. While leather conserved with silicone oils is resilient to bacterial activity, it is best to curate these artifacts similar to artifacts conserved with other conventional methods.

Observations

With the exception of passivation polymer treatment methods, many conservation methods rely on the introduction of bulking agents as incremental additions in an aqueous solution. These methods are slow but effective. Over time, however, commonly used bulking agents attract atmospheric moisture and airborne contaminants from the museum environment.

The main set of governing principles for archaeological conservation has been the long-term well-being of artifacts. Conservators try to use conservation methods and materials that can be reversed when newer and better methods and materials are available.

During the late 1980s, material science studies and industrial chemistry laboratories expanded general knowledge of archaeological conservation chemistry. Focusing on archaeological chemistry, new scholars are expanding the discipline greatly. The practice of using polymers was once discouraged because conservators believed them to be unstable and unreliable. This is ironic since the mainstay of conservation strategies for archaeological leather is the use of polyethylene glycol (PEG) which, as its name indicates, is a polymer.

In spite of the many contributions archaeological conservators have made with the discipline of archaeology, artifact conservation is also reliant on artistry. As important as it is to understand archaeological chemistry, it is equally important to have knowledge of how material goods were originally made. The conservator must be a scientist, a historical archaeologist, an artist, and a scholar of historic literature.

Cross-References

- ▶ Archaeological Chemistry: Definition
- ▶ Conservation and Preservation in Archaeology in the Twenty-First Century
- ▶ Conservation, Restoration, and Preservation in Classical Archaeology
- ▶ Dry/Desert Conditions: Preservation and Conservation
- ▶ Heritage Conservation Training
- ▶ International Council of Museums (ICOM)
- ▶ Mexico: Underwater Archaeology
- ▶ Underwater Sites in Archaeological Conservation and Preservation

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Legislation in Archaeology: Overview and Introduction

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State of Knowledge and Current Debates

Introduction

Every country in the world has some form of law relating to its cultural heritage. These range from the draconian (and sometimes relatively ineffective: Cleere 1984: 130) to the more loosely formulated and generally respected. In between lies the majority, more or less complex and more or less complied with. Some are "homegrown" and reflect particular local circumstances; others elsewhere are copied from neighboring or more distant places; others again have been adopted from past rulers but remain in place nonetheless. Law has been very important to the development of the idea of preserving material from the past (Carman 2012): laws have always proved a key means by which that preservation was effected. Laws also serve to legitimize the idea of that preservation.

This entry will look at the different kinds of laws that apply to the material heritage in different parts of the world and how they operate. In doing so, it is an exploration and celebration of difference rather than similarity. The common thread, however, lies in the adoption of law – of whatever kind and however written – as the key method of dealing with the cultural heritage. It has been the promulgation of laws to preserve old things – whatever the motivation driving it – that turns a mere private or sectional interest into something like heritage management as we know it. In the current state of heritage management, laws are even more crucial to the preservation of our heritage: without them, it can be cogently argued, there is no heritage (Cleere 1989: 10). At the same time, these laws need to be overseen and put into effect by appropriately empowered agents, whether of the state or independent. These agents too have their powers and duties defined by the laws that govern them and the material on which they act. Accordingly, even in so-called "non-statutory" systems of heritage management, law is the underlying mechanism and the ultimate repository of authority.

The sections of this entry will offer introductory outlines to some of the forms which laws in this area can take, how they are organized and to be interpreted, and the relations between laws at the national and international level. The opening section will examine some of the justifications for laws in this area, a truly global discourse. A section on interpretation of laws will expose the clear differences that exist between legal systems and which necessarily affect our understanding of them and any attempt at international comparison: these include the legal structures of federal versus unitary states, laws derived from traditions of Roman (and other) law, and those grounded in English "Common Law." An overview of international regulation – global in nature but subject to interpretation at the national level – follows. The laws of national territories will then come under scrutiny, representing different systems of laws: those assuming the state to be the proper owner of material versus those where private ownership is held to be the ideal, those favoring direct intervention and control versus more indirect and administrative mechanisms, and so on. Overall, the paradox of the ubiquity of laws to achieve the same ends that take a remarkably diverse set of forms will become clear. A final section will review the effect the promulgation of legislative control has had on the field in terms of the development of professional agendas and associations, both national and international, and the ways these too regulate the practice of heritage management.

This aspect of heritage management is very well documented. This is partly inevitable: laws are usually written documents and to ensure compliance must be made widely available to their intended audience. The literature of heritage management, therefore, abounds with summaries and commentaries at the national level (for the UK, see Carman 1996; Pugh-Smith and Samuels 1996; Hunter and Ralston 2007; for the USA, US Dept.

of the Interior 1989–90; for France, Rigambert 1996; for Austria, Hocke 1975; for German states, Dörge 1971; Eberl et al. 1975; for Switzerland, Hangartner 1981; for Mexico, King et al. 1980; etc.) and at the international and comparative level (Burnham 1974; Prott and O'Keefe 1984; Cleere 1984; Carman 2002: 68–76; and on underwater archaeology Dromgoole 1999).

The Role of Law

Despite the ubiquity of legislation as a foundational tool of heritage management practice, very little of the literature of the field concerns the purpose of such laws or, to put it another way, explains why we pass laws on this matter rather than tackling it in another way. McGimsey (1972), for instance, argues powerfully for legislation as a key component of a state preservation program but also argues against legislation alone since it would be an entirely "negative approach" (McGimsey 1972: 33, 46) lacking the necessary support from the wider public. Prott and O'Keefe (1984) go further: they argue that the dangers facing the archaeological resource are ever greater and that accordingly "some of them can only be controlled by governments" and therefore require legislation (Prott and O'Keefe 1984: 13). At the same time, they recognize the valuable role laws play in resolving key conflicts over material – especially issues of ownership and control – and the setting of policy aims, as well as the increasing requirements of national governments to comply with international treaties concerning the heritage (Prott and O'Keefe 1984: 14). None of these is, however, a reason for law *as such*: both McGimsey and Prott and O'Keefe offer programs of public education and the mustering of political support as alternatives (McGimsey 1972: 29–31; Prott and O'Keefe 1984: 145–15).

In so far as McGimsey does provide a reason for legislation, it must be as part of the requisite "administrative structure" (McGimsey 1972: 27) for such a program, which includes its establishment as a legally recognized authority with its own budget. Pickard (2001: 4–10), reviewing a sample of European states with a view to their response to new international agreements on cultural heritage, expands on this theme by presenting a number of areas where legislation has a valuable defining role:

- Of definition of the heritage, concerning the attributes and characteristics a heritage object should have or be deemed to possess
- Of identification of the heritage, especially the means available of inventory and recording, and the making of lists and schedules
- Of preservation and protection of the heritage, whether through systems of designation or by regulating development
- Of the philosophy of conservation in place, including attitudes to restoration and reconstruction
- Of appropriate sanctions against breaches of the law and the means – coercive or otherwise – to encourage compliance
- Of the integration of cultural preservation with other government policies and imperatives
- Of financial aspects
- Of the specific powers and duties of government and nongovernmental agencies in respect of the heritage
- Of educational and other aspects

From this functionalist perspective, the law in this area can be seen not so much as a mechanism of heritage management but as a facilitator for systems of heritage management to come into being: on its own, it seems, law does nothing but requires other agencies in order to put heritage management into effect. This is perhaps one reason law should so often emerge first in systems of heritage management: it provides the framework on which the other aspects of heritage management can hang. On the other hand, it would seem that other components of a heritage management system could exist independently of legislation to put them into place. The question "why law?" remains.

Although in general sympathetic to heritage management as a practice (and whatever they may choose to call it), others have taken a more critical view of the role of law in this field. A study of English law in this area (Carman 1996) concluded that its main purpose was to give value to archaeological remains. Though a continually

reductive process of selection of certain kinds of object from all the things in the world, subsequent categorization of those things into legal terms and allocation to particular agencies for a limited range of treatments, archaeological sites, and monuments would emerge with a new meaning and a new set of values placed upon them. In doing so, they became officially recognized as important and worthy of protection and preservation. This is a reversal of the usual understanding of the sequence, whereby things that are important are chosen to be preserved by law: here, it is the law that makes certain things important. A similar view was reached in respect of legislation to govern the heritage of indigenous populations in Australia and the USA (Smith 2004: 125–155). As Smith puts it, legislation "plays a key role in the management of Indigenous material culture, as. . . it establishes the need for management procedures and processes" (Smith 2004: 125). Such law therefore goes on to define who will manage indigenous culture and how those involved – archaeologists, indigenous people, and government agencies – will interact. This means law sets "the parameters of acceptable management practice. . ..[and] the scope of policy debate, and influences the way in which debate is conducted between the three actors" (Smith 2004: 125). Overall, "legislation provides governments and bureaucracies with terms, concepts and guidelines against which competing claims to material culture may be assessed" (Smith 2004: 126) and ultimately "provides the conceptual frameworks that must govern debates within" heritage management which "institutionalize and regulate the discipline [of archaeology] as a technology of government" (Smith 2004: 154). Similarly, Fourmile (1996) has reviewed the role of Australian legislation in denying the indigenous population any access to or control over their cultural heritage. These readings of the place of legislation in heritage management locate it at the service of requirements external to the discipline itself and closer to those of government. In other words, rather than law serving the needs of archaeology, archaeology is made to serve the needs of government.

Interestingly, however, it is not just those who are critical (or indeed suspicious) of law who see it in this light. Breeze (1996) – writing on the definition given in Scotland to the British legislative category of "national monument" – is clear that the purpose is "to ensure that all people have access to [Scotland's built] heritage [of all periods] and are able to enjoy it, regardless of their own origins and background" (Breeze 1996: 102). He also acknowledges that "preserving monuments. . . is not entirely an end in itself" and cites government reasoning behind it (Breeze 1996: 102). Accordingly, the idea of a "national" archaeological resource based in law is seen here not as a limiting and exclusive concept but nevertheless one that remains at the service of government agendas. This same idea is reflected in Knudson's (1986) review of cultural resource management practice in the USA. As a result of success in "persuading the major policymakers. . . of the public significance of archaeological resources. . .. the implementation of such policies will not leave anyone. . . out of the process of public accountability for the treatment of those resources," and "this will be conducted within the context of multiple public objectives" (Knudson 1986: 399). The public referred to here is taken to be the Euro-American population of the USA, excluding its indigenous population whose cultural works are under discussion. Accordingly, even though it is acknowledged that conservation of cultural remains is a globally endorsed project, the target of conservation practice in the USA and what flows from it is directed at a particular audience, at least partly the result of "a lack of genetic continuity between the dominant political community in the United States and prehistoric Americans" (Knudson 1986: 396). Here, as elsewhere, law drives the heritage management process rather than providing support for it.

In most writing on heritage management, a legislative basis for preservation practice is taken for granted. The literature is therefore for the most part descriptive rather than critically discursive and does not ask why laws are in place in such profusion. One reason is simply historical: it is "the way it is done." Other reasons emerge from a

closer reading, however, whether from an overtly critical or a more sympathetic perspective: laws serve, as it turns out, not the needs of heritage management but rather the agencies – and in particular national governments – who promote them. This is not an issue of effectiveness, but may have an impact on the way heritage management is done in different contexts.

How to Approach, Read, and Interpret Laws

Laws are technical documents rather than discursive texts, which means they are not only written in a particular way but also designed to be read in a certain way (see, e.g., for the USA, Dickerson 1975; for the UK, Cross 1995; for Italy, Tarello 1980; for international comparisons, MacCormick and Summers 1991). Indeed, "reading" in its conventional everyday sense may not be quite the right word: they are usually designed to be used more like a technical manual than read as a linear narrative. Moreover, the particular manner in which such texts should be read varies from jurisdiction to jurisdiction so that an ability to operate in one legal system does not automatically imply an ability to so operate in a different one. The aim of this section is to outline some of the ways in which laws relevant to archaeology can vary from country to country across the globe.

As I have argued elsewhere (Carman 1996: 17; 2002: 102–103), to have a truly meaningful comparison between the practices of archaeological heritage management, it is necessary to take three factors into account:

- Differences between legal and regulatory systems
- Differences in the nature of the material record of the past between one territory and another
- Differences in the traditions and historical development of archaeology between one territory and the other

The first of these covers such things as the basic assumptions relating to the interests to be served by law, the degree of appropriate state control held to be applicable in an area, the weight to be given to private property laws, or the expected powers and duties of state and other agencies. All of these will differ between one territory and another, or one legal system (e.g., Common or Roman) and another. In the UK or USA, for instance, the usual style is to provide for legal protection without taking material directly into state ownership, but in other territories all archaeological remains and other heritage objects are held to be the property of the state. In the UK, the USA, and Australia, this reflects the ideological authority of private property upheld by a system of Common Law, as against the authority of the state more typical of systems deriving from the European continent. Here, the difference lies in expectations of what is right and proper and more fundamental social values. Where it is expected that heritage objects should belong to the state, the kind of system operated in the UK or USA makes no sense; in the UK or USA, the adoption of a system of generalized state ownership would be seen as an attack on private property. An attempt to assess the merits of one system against another therefore runs up against these fundamental differences in understanding of what laws can and should do and to whom legal authority should be given.

The second and third factors are linked. They concern the nature of the archaeological record and how it inevitably differs in different territories and the understanding given to the purpose and focus of archaeological research which will differ in one country from another, so that very different research traditions may exist, leading to a differential emphasis on types of material. In the UK, for instance, the treatment of different types of material is very often the same regardless of physical form or age. Prehistoric structures in the countryside can be treated in exactly the same way as medieval ruins in a city, and ancient monuments (a legal category that in England now includes some material from the twentieth century) can be placed upon a schedule, while standing buildings can be placed upon a list, both of which offer some form of legal protection. There are other territories, however, where differences in age make a substantial difference. Material from a preliterate past may be treated very differently from material emanating from historical times, or one period of history – or material representing

a particular way of life – may be more highly valued than another, making one subject to legal control and protection, while the other is abandoned to its fate. In the USA, for instance, buried remains of the indigenous population are subject to forms of federal legal control, while the remains of (sometimes contemporary) colonizing Europeans are excluded from this coverage. Such differences will make any direct comparison of UK and US laws rather meaningless, since they are grounded in very different historical circumstances, are driven by very different political and cultural imperatives, and concern significantly different categories of person. At root, therefore, UK and US legislation in this area do not concern the same types of material.

Any set of national laws will also need to be read in accordance with specific standards. These "rules of construction" are quite precise and are often themselves enshrined in law, ensuring that any law of the particular state will be interpreted in the same way as any other and thus guarantee consistency in application. These rules do not, however, cross territorial and jurisdictional boundaries. A brief introduction to some of the key differences that can exist is set out by Prott and O'Keefe (1984: 150–151) and another by Summers and Taruffo (1991: 501), but for specific advice on how to read laws in particular jurisdictions, more precise legal guidance needs to be sought. In particular, there are gross differences between the manner of interpreting laws between systems of legal Codes and the principles of Common Law. All start from the premise that laws are written and composed of words: the question arises as to how to understand the meaning and intent behind certain words and phrases.

Codification of Law: France

As conveniently summarized by Troper et al. (1991: 171), a distinguishing feature of French legal culture is that it is "one of written law. . .. to a large extent codified." The effect of codification is to offer a body of law that is complete and contains no contradictions or elisions: it therefore does not allow opportunities for avoidance or evasion, or for circumstances that are not covered by it. Accordingly, where the law is silent on an issue, it becomes the task of interpreters to fill that silence: either by simply not recognizing the omission or – more likely – by recognizing that the "gap" in legal coverage is a result of the legislator's inability to think of everything in advance and thus prevailing upon the interpreter to do so (Troper et al. 1991: 175–176). It is generally assumed that the legislators intend all laws to comply with the Constitution, and so laws will be interpreted to ensure this (Troper et al. 1991: 195), and that the administration works for the good of the common interest (Troper et al. 1991: 196) although laws restricting liberties are interpreted more strictly (Troper et al. 1991: 202).

Although as elsewhere in the world (see below) interpreters seek the "true" meaning of a law and the intention of the lawmaker, the materials they are allowed to draw upon are very wide rather than being constrained (as elsewhere) by tight legal rules (Troper et al. 1991: 184–189). These may include:

- The historical background to the law
- Documents used in drafting the law, including drafts and consultations
- Interpretations by users of the law, especially public officials
- The language of other, related, laws
- The language of laws amended by the one in question
- The history of legal terminology
- The effect particular interpretations would have in terms of the national Constitution or international treaty obligations
- Customary procedures and practices that would otherwise be affected

Interestingly, especially for comparison with the USA and UK (see below), interpretations by other courts are rarely drawn upon, although those of superior courts within the same hierarchy may be.

Overall, French law is seen as a unity that governs all those it rules. Interpreters of law – that is, the courts – are seen not at all to make law but simply to seek the lawmaker's intention. Accordingly, in filling "gaps" not covered by a specific legal phraseology, they are seen only to be

expressing the will and intent of the legislator rather than making new law or extending its coverage. All laws are interpreted in the light of the overarching Code of which they are a part: it follows that no French law "stands alone" but must be read as part of a coherent and cohesive system that effectively recognizes no differences of status or standing or of exception. As Summers and Taruffo (1991: 501) see it, in French law there are no genuine issues of interpretation, and only one meaning is ever possible, and it is this that interpreters must seek.

A Federal Common Law State: The USA

The French case is very different from that of the USA. While France is a single state, the USA is a federal one, divided into 50 jurisdictions governed by a federal Constitution. All laws of every state and federal law (a jurisdiction in itself) must ultimately comply with the Constitution: as in France, compliance will generally be assumed unless demonstrated otherwise (Summers 1991: 443–444). In the case where a state law is in conflict with a federal law, the federal law prevails, but a statute will prevail over administrative regulation and usually the Common Law which underpins all law (Summers 1991: 444–445). Whereas in French law gaps in legal coverage are acknowledged, in the USA such gaps are generally treated as if they are simple matters of textual interpretation (Summers 1991: 411–412): the issue is one of particular words and their meanings rather than attempts to meet the standards of an overarching Code.

The materials that a US court may draw upon in making interpretations are at once wider than that in other territories and more tightly regulated. Materials that must be taken into account include:

- The language of the text and any titles, subheadings, and other terms relating directly to it (compare with the UK, below)
- Dictionaries and grammars which set out the "ordinary" meanings of words under examination
- Any legal definitions of terms
- The text of other related statutes
- Any prior, repealed, or modified laws
- Any official history of the passage of the law
- Particular historical circumstances the law was intended to address, which may now have altered
- General legal principles
- Interpretations by similar or higher courts
- Interpretations by officials charged with administering the law (Summers 1991: 422–427)

In addition, interpreters are expected (but not required) to take into account interpretations by other (nonofficial) users of the law, by courts in other jurisdictions, and those of senior legal academics. There are also materials expressly forbidden from consideration, such as the testimony of legislators as to what they believed the law to be and nonofficial documentation relating to the history of the legislation.

By contrast especially with France, the US system is one that openly acknowledges the possibility of alternative readings of legal texts (Summers and Taruffo 1991: 501). It follows that US courts have more of a lawmaking role than their French counterparts. The prior interpretation by other courts has also a much more important role here than is evident in the French system, and the authority of officials over legal interpretation is much less evident. Similarly, no requirement exists to make the law fit part of a broader code despite the overarching commitment to constitutionality.

A Unitary Common Law State: The UK

The role of the courts in the UK is not to make law but, similar to their role in France, only to interpret it. Accordingly, it is not the place of the courts to fill gaps in coverage but to leave this to legislators (Bankowski and MacCormick 1991: 362). The law is not codified, and therefore, in large measure, each piece of legislation stands alone and separate from others except where connections are expressly drawn (Bankowski and MacCormick 1991: 363): the focus of interpretation is therefore very much upon the strict interpretation of particular words and phrases rather than seeking to contextualize the whole (Bankowski and MacCormick 1991:

382). Interpretation is therefore an essentially pragmatic process of seeking the "ordinary signification" of words (Bankowski and MacCormick 1991: 382–386) rather than being driven by broader principle, as in France, or constitutionality, as in the USA. Nevertheless, there are certain underlying presumptions that guide the interpretive process: that absurdity is not an intent of legislators; that laws are designed to operate fairly; that laws do not (unless specifically indicating otherwise) operate retrospectively; and that existing laws remain unaffected unless the law specifically indicates otherwise (Bankowski and MacCormick 1991: 391–392). In the UK system, statutes will prevail over all other kinds of law but increasingly need to comply with laws made elsewhere, in particular EU legislation and certain international treaties (Bankowski and MacCormick 1991: 375).

As in the USA, interpreters may draw on certain materials, may use others or are barred from using others: however, the range of materials differs from that elsewhere. The primary source is the specific substantive language of the law itself, excluding any subheadings, titles, or marginal commentary which is only present to guide users to relevant texts and not to determine its meaning (Cross 1995) but including any "Interpretation" section which sets out the precise meanings certain words and phrases may carry. Any previous interpretation by a similar or higher court must also be drawn upon, together with any relevant subsidiary legislation which may bring the law into force (Bankowski and MacCormick 1991: 375). They may (but are not required) to refer to other laws on the same topic, government guides on good practice, any previous legal history of the terms, current usages of officials, and scholarly writings (Bankowski and MacCormick 1991: 376–380). Material expressly barred from consideration includes any information on the history of the law and economic or sociological data on the effects of particular readings (Bankowski and MacCormick 1991: 380–382).

In general, UK law is seen as a body of separate regulations, some of which stand entirely alone, and others which are grouped together, and are interpreted accordingly. Although general principles and assumptions guide the process, the focus is very much upon the specifics of individual provisions rather than the creation of a unified whole. Only those materials directly relevant to the point at issue are taken into account: extrinsic factors are barred because the courts would then be involved in making policy, which is not their role. The assumption – as in France – is that there is a single meaning lying behind a particular provision and the function of interpretation is to find it.

Differences in Reading Laws

These three examples offer a taste – albeit a small one – of how different sets of laws represent different legal ideologies and are therefore to be read differently from one another. In particular, the clear differences between laws that operate as part of a codified system and those that stand alone need to be taken into account, as do the specific materials that can be drawn upon for interpretation and those that cannot and the extent to which underlying principles regarding the presence of "gaps," absurdity, and contradiction may be applied. Although Summers and Taruffo (1991) take France and the USA as exemplary of opposed legal systems, here I have used them merely as examples, placed alongside a third, to illustrate diversity. An area not mentioned here has been international law, which is the topic of the next section.

International Laws and Their Coverage

Technically those materials referred to by (especially but not exclusively) heritage practitioners as "international law" in the field of heritage are not in fact law: rather, for the most part, they are sets of agreements between nation states whereby those states agree to a common standard of treatment for certain classes of object, either generally or in defined sets of circumstances. They may be agreements that are designed to operate globally – such as those promulgated by the United Nations or UNESCO – or regionally, such as those relating to Europe or the Americas. These laws are important in the field because they are taken to represent the global principles to which all those concerned with the heritage

Legislation in Archaeology: Overview and Introduction, Table 1 Main international instruments relating to the cultural heritage

Date	Promoted by (international organization)	Title
1954	UNESCO (portal.unesco.org)	Convention for the Protection of Cultural Property in the Event of Armed Conflict (Hague Convention)
1970		Convention on the Means of Prohibiting and Preventing the Illicit Import, Export and Transfer of Cultural Property (Paris Convention)
1972		Convention concerning the Protection of the World Cultural and Natural Heritage
2001		Convention on the Protection of the Underwater Cultural Heritage
2003		Convention for the Safeguarding of the Intangible Cultural Heritage
2005		Convention on the Protection and Promotion of the Diversity of Cultural Expressions
1971	RAMSAR (http://www.ramsar.org)	RAMSAR Convention on Wetlands
1995	UNIDROIT (http://www.unidroit.org)	Convention on Stolen or Illegally Exported Cultural Objects
1954	Council of Europe (http://www.coe.int)	European Cultural Convention
1969 (revised 1992)		European Convention on the Protection of the Archaeological Heritage
1985		European Convention on Offences Relating to Cultural Property
		Convention for the Protection of the Architectural Heritage of Europe
1976	Organization of American States (http://www.oas.org)	Convention on Protection of the Archaeological, Historical, and Artistic Heritage of the American Nations

subscribe. Increasingly they are also taken as the basis for the passage of law at the national level. The main international laws in force at present are set out in Table 1.

Since they are promulgated by organizations composed of individual nation states, these international agreements are binding only upon the states acceding to them: they cannot be enforced against individuals or agencies unless they have also been incorporated into national laws, although this does not lift the responsibility from national governments to put in place appropriate arrangements to ensure compliance below the level of government. They are to be read and interpreted in a distinctive manner which reflects in many ways their purpose as setters of norms and guidance. Each such document begins with a preamble which sets out the conditions under which it was brought into existence and the purpose it serves: its specific provisions must be read in the light of these opening statements as to function rather than as stand-alone imperatives. This contrasts with the way in which laws are read at the level of some nation states which are binding on individual citizens and state and non-state agencies.

In addition to Conventions, the membership of international bodies such as UNESCO and the Council of Europe may also adopt Resolutions, which have much less legal force than a Convention but nevertheless provide guidance as to norms and expectations. These too are not binding upon individual and state and non-state agencies unless their provisions are adopted into national law, but they may also provide the basis on which future Conventions are constructed. Other international organizations also contribute to international law in this area, in a more substantive manner. The European Union is concerned primarily with economic and political issues, leaving matters of culture to the broader membership of the Council of Europe, but recent changes in the

EU have allowed it to consider cultural matters, and these may become more significant as time moves on. However, as part of its economic remit, it brought forward in 1992 two legal instruments relating to the movement of cultural items into and out of the EU and between member states. The terms of the Directive on the Return of Cultural Objects Unlawfully Removed from the Territory of a Member State will need to be incorporated into national laws before it takes full effect, but this must be done to a set timetable; the Regulation on the export of cultural goods – which places limitations on the export of such items outside the EU – had immediate and direct effect on member states and their citizens.

Like all legislative arrangements, some international instruments purport to relate to all aspects of heritage, such as the UNESCO World Heritage Convention, the European Cultural Convention, and the OAS Convention. Others concern all matters relating to particular types of heritage object, such as the RAMSAR Convention on Wetlands, the European Conventions which separately treat the archaeological and architectural heritage, and the UNESCO Conventions on underwater and intangible heritages. Others attempt to address particular issues that affect cultural objects, such as the UNESCO Hague and Paris Conventions, the UNIDROIT Convention, and the European Union measures in relation to the movement of cultural objects. The Paris and UNIDROIT Conventions and the EU measures all relate in particular to the issue of the illicit acquisition, movement, and transfer of cultural objects from one state to another: whereas most international law seeks to provide guidance and to set standards, these measures endeavor to go further by regulating behavior. In this way they are acting much more like national laws.

Not all states choose to accede to all international laws in this field. In some cases it will be because they consider they lack the resources to meet the standards required by that law; in others – particularly developed states in the West – that they already have laws and mechanisms in place that meet or surpass those of the particular instrument. In some cases it may be felt that the particular instrument – although perhaps introduced by the state in question – is aimed at the practices of other states who do not meet the standard set. In others it will be because it challenges or threatens a particular national interest, such as an economic interest. Failures to accede inevitably weaken the effect of such laws since they cannot be enforced against states that have not done so. In turn this may affect the capacity of the instrument to act as a measure of minimum performance and an international standard. At the same time, such laws have been criticized for adopting a specifically Western approach to ideas of cultural heritage, constructed around notions of the built and monumental heritage, rather than heritages of practice and belief. Such criticisms have led to a refocusing especially by UNESCO on such ideas as the "intangible heritage" and "cultural diversity," reflected in instruments promulgated in the early part of this century. These represent new approaches to the cultural heritage which can be expected to have influence at the level of the nation state, although not all Western states have yet acceded to these new principles.

National Laws and Their Differences

Although references in the literature of the field to international measures are extensive and such laws are invariably treated in the literature of the field as significantly influential (e.g., Cleere 1989; Skeates 2000; Carman 2002; Smith 2004: 106), nevertheless attempts to assess their effect on law and practice at the key level of the nation state are limited. A project by the Council of Europe nevertheless attempted to do this for the European Conventions relating to the archaeological and architectural heritage, by a process of comparison of how different states put the requirements of the Conventions into effect (Pickard 2001). As would possibly be expected, the range of 13 countries from all parts of Europe – some well established, others newly emergent – provided evidence of a wide diversity of treatment, organization, and focus together with different levels of compliance with the Conventions. The project focused in particular on the following aspects of heritage management in each territory:

- Definition of the heritage, including systems of categorization and selection criteria
- Processes of identification and styles of inventories and recording
- Measures to protect, preserve, and prevent damage
- Conservation philosophy, including attitudes to reconstruction and refurbishment
- Sanctions for breach of regulations and coercive measures in place
- Integration of conservation with other planning and land-use regulation
- Financial provisions, including sources of funding, tax regimes, and economic development programs
- The role and structure of relevant agencies and organizations
- Provision for the education and training of staff

The discussion usefully highlights differences between individual countries but also indicates areas few or none have yet addressed, pointing to the future influence likely to be wielded by regional rather than purely national approaches (Pickard 2001: 4–10). Here, I wish to outline the areas where legislative provisions can take a different approach in different parts of the world. These areas are in particular:

- Ways of defining and specifying the object of such laws
- How different bodies of material are addressed in laws
- Issues of rights of ownership and control
- The kinds of sanctions which may be applied

Depending on the system of law in place, the approach taken in these areas will correlate quite closely.

Defining and Specifying Material

There are several ways in which the material covered by a law or a body of law may be described, set out by Prott and O'Keefe (1984: 184–187) as enumeration, categorization, and classification. *Enumeration* is a system of lists of the kinds of material to be covered: this is typical of US federal laws in this area (US Department of the Interior 1989–90) and has been to some extent adopted in the UK for the purpose of describing the kinds of objects that can be considered for the purposes of legal protection (Carman 1996: 120–124 and 187–192). The problem with this approach is that it leaves open the question of whether items not on the list but of a similar kind can be included: for example, if the list specifies "graves and burial sites," does this also cover aboveground disposal of the dead? *Categorization* is a looser approach whereby a broad description of types of material is provided, into which a range of particular objects may fall. The problem of this approach is that too narrow a definition may exclude objects of concern, while too broad a definition may include too much material. By contrast with both, *classification* is not concerned with the form of the object, but with actions taken towards it: in such a system, only those objects officially recognized and designated as such by a responsible authority can be granted protection. While convenient and transparent, the system has the flaw of only recognizing those objects that have been specifically designated, leaving others of similar nature to their fate. At the same time, it is worth noting that these different systems are by no means exclusive. It is possible to use them in combination, so that the list under an enumerative scheme may include categories, while a scheme of categorization may also enumerate particular types of object, and a classificatory scheme may operate in respect of items enumerated or categorized.

These differences represent contrasting approaches to the cultural heritage as a phenomenon as well as the structure of law. Where only designated material is covered by law, the emphasis is placed upon the relevant authority and its decisions; where material is enumerated, anything included is automatically covered, removing authority from agencies and placing it more generally; under schemes of categorization, a measure of interpretation is required, placing some but not all focus upon agencies. An enumerative scheme assumes a solid understanding of the kinds of materials and places constituting the heritage: by its nature, anything not listed is excluded. A scheme of categorization has a greater capacity for the inclusion of new types of material, especially if the categories are drawn not

on the basis of physical form or attributes (e.g., state of ruination or age) but on value ascriptions (e.g., "of architectural, archaeological, etc., interest or importance"). Paradoxically, the greatest flexibility may exist under a scheme of designation, so long as the capacity to designate is drawn widely: if it is limited by enumeration or categorization, then it is significantly less able to include new types of material.

Addressing Different Bodies of Material

The range of objects that can be classed as cultural resources is wide, ranging from individual moveable objects singly or in groups; to upstanding buildings in use, ruined buildings and structures, earthwork sites, buried features, scatters of material, and natural features used by humans; to entire landscapes, built and natural (Carman 2002: 30–57). Under systems of law, the ways of treating them may be as varied as the material itself. In some regimes, all cultural material of whatever kind is treated under the same body of law: while different objects may be treated in particular ways, the overall scheme is common to all classes of material. By contrast, others make a clear distinction between particular kinds of object, so they are not only treated differently but are also subject to different bodies of law. In those cases where a single, overarching national antiquities law covers all cultural objects, no distinction is drawn between individual bodies of material. Regardless of whether the object is a moveable object, a scatter of material, a ruin or a buried feature, an upstanding building, or a landscape, it will be subject to the same regime, effectively rendering them all a single class of object for legal purposes.

By contrast, other regimes make a clear distinction between particular kinds of object, so they are not only treated differently but are also subject to different bodies of law. Distinctions may be drawn on the basis of the physical properties or attributes of the material, so that moveable objects are differentiated from fixed monuments and sites, and the latter perhaps from upstanding buildings in use. While moveable objects are subject to laws concerning ownership and their placement in museums or other archives, fixed sites and monuments may be subject to official protection in the care of the state, while buildings in use are subject to controls on use and alteration. Alternatively, distinctions may be drawn on the basis of whose heritage the object represents: in states where an indigenous population may claim rights over its cultural material, such as the Americas or Australia, such material will be treated differently from the historic heritage of the incoming European population. Here, a distinction between prehistoric (i.e., pre-European contact) material and historic (colonial period) material is effectively drawn: but it is in fact not a distinction based upon age but upon putative cultural origin. European states – except those where an indigenous population dwells, such as in northern Scandinavia and Russia – and numbers of states in Africa and Asia (although not all), generally have no need of such a distinction, and material of all periods is capable of treatment under the same regime, although distinctions between different types of object may also be maintained.

Ownership Versus Control

As Prott and O'Keefe (1984: 189) point out, "it is not usually necessary to have ownership of [material] in order to regulate what may be done in relation to it." Nevertheless, as they go on to add (Prott and O'Keefe 1984: 191), a number of states across the globe do claim a right of ownership of certain classes of cultural material from the moment of discovery. While in most cases this right of ownership applies only to removable material – which will most likely find its way into a museum or archive – in some cases it applies also to the land on which they were found (Prott and O'Keefe 1984: 195). Alternatively, material and land may become subject to compulsory acquisition by the state unless certain conditions (such as the deposition of material in a suitable archive) are met. This "nationalization" of the cultural heritage has a number of advantages:

- It is a coherent and transparent process applied equally to all.
- It ensures full control by appropriate agencies over the fate of material.
- It associates such material with the entire community as represented by the nation state.
- It is simple.

However, it rides roughshod over private rights and may encourage finders to fail to report or record finds.

An alternative to state ownership is to provide for the regulation of the treatment of cultural material while allowing private ownership of that material. This may involve drawing distinctions between material on the basis of its type and circumstances of discovery so that some material is the property of the state, while other material of similar kind is not: this is the case, for instance, with the laws of Treasure Trove and Treasure in England (Carman 1996: 55–61; Bland 2004). Alternatively, the "cultural" component of the material may become controlled by state agencies, while the object itself remains the property of another: this is sometimes the case with upstanding monuments, where the land on which it stands and in which it is rooted remains the property of the landowner, but the monument passes into state control; in such cases, the landowner continues to have use of the land but is subject to limitations on treatment of the monument. A third way is to place controls on the use of land either to prevent damage to existing archaeology or such that the presence of archaeology is so far as possible taken into account before the discovery of cultural material: decisions regarding the fate of any such material will therefore have been taken before any work commences, and where significant material is to be encountered, work likely to damage it may be completely prevented. In cases such as these, laws and administrative arrangements to put them into force will be more complex and potentially more costly but if effective can develop a measure of public support for the project of cultural heritage protection, limiting the problems of avoidance.

Public and Private Agencies

The role of state agencies will differ whether the laws provide for state ownership or state controls on private ownership of cultural material. In the first case, all authority over cultural remains will lie with the state. In the second, state agencies will need to interact and compromise with others who retain an interest in the material.

By far the most common approach is that of central regulation by state control, in which heritage objects are deemed to be the property and thus the responsibility of the nation state and its agencies. Under such a system, only those accredited by the state – frequently its employees but also those granted specific licences – are entitled to conduct archaeological or conservation work. Accordingly, excavation by anyone else is commonly a criminal activity. In theory at least, all building and other work will cease when archaeological remains are encountered and state-employed archaeologists will move onto the site. In practice, however, limitations apply on this potentially draconian system. Small developments will be allowed to proceed unhindered, government-sponsored projects may also proceed without the interference of an archaeologist, and, in many countries where such systems apply, lack of resources will result in incomplete coverage. Nevertheless, the ideal of such a system is a very powerful idea and dominates much thinking in the heritage field. It is the ideal assumed to exist by most international agencies such as UNESCO, and very often those territories or areas not applying this approach can be thought to be deficient. Here, archaeology is a cost carried out of taxation levied on the entire community in whose service it is deemed to exist.

The alternative system, which applies mostly in Anglophone countries such as the UK, USA, and Australia, is that of a partially privatized archaeology. This is essentially a private enterprise system under a measure of regulation by state and state-empowered authorities. In general there will be no limitation on who may carry out archaeological work, although professional bodies will seek to encourage the employment of those accredited by them. Excavation itself will most often be carried out as a result of the need to mitigate the damage of archaeological remains by development projects. In the USA material of "scientific significance" may need to be retrieved or preserved; in the UK, the emphasis is theoretically upon preservation in situ but frequently results in rescue excavation and so-called preservation by record. Where development work reveals archaeological remains, the developer

will be responsible for employing archaeologists to carry out appropriate work, monitored by the local authority to ensure proper standards of recording. Here, archaeology is a cost levied on the developer, treating damage to the heritage as a form of pollution and applying the principle of "the polluter pays" for restitution. This is archaeology as enterprise, although never completely unregulated, and much of the discussion of such systems turns upon issues of regulation and control rather than freedom of action.

Sanctions and Penalties

There are two aspects to the issue of sanctions and penalties applied for breach of laws relating to the archaeological resource: to what kinds of offences they relate and the types of sanction applied. Depending on the kind of regime in place – a state-ownership regime or a "privatized" regime – particular attitudes as to the severity of breach and what types of breach are more serious will prevail, reflected in the sanctions applied both theoretically and in practice. The range of sanctions available runs the full scale of penalties for breach of any kind of law: from prison terms through fines where breach is considered a criminal matter to civil remedies such as damages and carrying the cost of restoration and repair and the confiscation of material. Such penalties may be combined so that a person in breach may have to carry out reparation and pay a fine or serve a prison term. As Pickard (2001: 329) points out, however, such powerful sanctions tend not to be applied: prosecutions may be rare and the penalties awarded relatively light.

Where archaeological material is held to be the property of the state, criminal sanctions are more likely to apply to those who claim it for themselves. It is frequently a breach of criminal law to export such material without the proper authority, and sometimes any private appropriation of such material will be considered a form of theft. In some territories, although private ownership is allowed, penalties apply for the non-reporting of finds (Prott and O'Keefe 1984: 209–210 and 215–216). An alternative is to reward finders for reporting: they may be allowed to retain the find without penalty, or receive payment for its delivery to a suitable repository. Where private ownership of material is the accepted norm, specific provisions may apply to particular classes of material – either on the basis of its attributes, such as its form or material, or on the basis of its context of discovery, such as its location when found, or the process by which it came to light. Accordingly, for the bulk of archaeological material, normal rules for the allocation of ownership will apply, but certain material may become the property of the state. In such cases a need to report may apply to all material or only that owned by the state: in the latter case, provision may nevertheless be made for the voluntary reporting of finds.

Penalties also accrue to those who may damage or destroy archaeological sites and monuments and historic buildings. In some cases, where these are owned by or in the care of the state, the penalties will be criminal, involving fine or prison. In other cases they will be civil, such as reparation or damages. Where arrangements are in place for the control of construction and development work, archaeological remains may be included among those factors to be considered. In such a case, where the likelihood of damage to archaeological remains is envisaged, the proposed work may be prevented altogether but is more likely to have controls placed upon it: for redesign to avoid affecting significant archaeological material, or for advance investigation of such material at the cost of the developer. Failure to comply may result in a fine or the imposition of further controls on development work. In similar vein, some Latin American states may apply sanctions to unsatisfactory excavators for poor quality archaeological work (Prott and O'Keefe 1984: 305): such penalties will involve the cancellation of licences to conduct work in the territory concerned.

Conclusion

It is likely that the kinds of differences between national laws outlined briefly here in some way correlate. Accordingly, where a single body of law applies to all cultural objects, they may also be subject to direct state ownership and control, allow for no non-state agency involvement, and apply at least theoretically strict criminal

sanctions. Where distinctions are made between types of object, different ownership regimes may exist side by side, there may be a measure of non-state involvement in archaeology, and sanctions may be relatively light and civil rather than criminal. To date, however, and despite the work of Prott and O'Keefe (1984) and others (e.g., heritagelaw.org), no substantial work of this nature has yet been completed, so these suggested likely correlations remain only as plausible assertions. Nevertheless, whether or not these types of correlations exist in reality, the crucial point is that differences between legal regimes are not mere matters of administrative convenience: in the same way as the differences of legal interpretation covered above, they represent fundamental differences of ideology in terms of what law is for, where authority resides, and the nature of the cultural heritage. In thus approaching national laws, it is necessary to be sensitive to the kinds of ideology represented and the attitudes towards and expectations of both law and heritage they carry.

The Professionalization of Archaeology

The application of legislation in the field of archaeology and its regulation under law is one of the factors that has encouraged the increasing professionalization of the field. The regulatory influence of official organizations allows them to produce standard-setting documentation which influence practice and require to be met if work is to be granted to those at whom they are aimed: a number of state agencies accordingly have adopted such a nonlegislative approach to controls on archaeological work. Parks Canada, for instance, publish as part of their website (http://parkscanada.pch.gc.ca/library/PC_Guiding_Principles/) their *Cultural Resource Management Policy* setting out the principles guiding their treatment of the historic places in their care. In the UK, English Heritage seek to guide the conduct of publicly funded archaeological work by encouraging a particular managerial approach (English Heritage 1991). English Heritage were also responsible for producing the nationally applicable guidelines for local authorities on the treatment of archaeological sites under threat from development projects (DoE 1990), and their application and effectiveness is monitored by them. The message of such products – whether international or national – is that of the particular expertise of the people responsible for them, which in turn further encourages the professionalization of the discipline as a whole.

In combination with laws and regulatory procedures, systems of self-supervision and oversight create a climate where archaeology operates inevitably as part of systems of governance. Although not widely discussed in these terms (but see Smith 2004: 58–80), the point is recognized by others with an interest in the material remains of the past. Especially in those jurisdictions governed by a tradition of Common Law and private property rather than state control and ownership, those who object to giving control over the past to a "closed" profession, and despite their own inclination towards individualism, organize themselves into groups who may then propagate their own codes of practice and standards of behavior, effectively "professionalizing" an anti-archaeologist stance. This is to some extent the situation in the UK in respect of amateur metal detectors and treasure hunters, many of whom work in association with archaeologists and others. The voluntary Portable Antiquities Scheme – whereby finds are reported and the information made publicly available (http://www.finds.org.uk; Bland 2004) – is given support by the code of practice of the National Council for Metal Detecting (http://www.ncmd.co.uk) among others.

Conclusion

The key points to note from this overview of law and regulation in archaeology are the variations in approaches to law in the field: these in turn represent not mere habit and local practice but real differences in ideology and approach. Where a system is based upon close control by central government, it represents a very different understanding of the purpose and role of archaeology in society from one where private ownership is upheld and regulations are looser and more flexible. These are differences that matter, especially in relation to study or work in an area new to one: ideas that are the norm in one territory do not

transfer simply to another. Such differences are reflected in how archaeologists are trained and qualified, the relations between archaeologists and the state, relations between archaeologists, between archaeologists and others interested in the past, and between archaeologists and the wider public.

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- ▶ Charter for the Protection and Management of the Archaeological Heritage (1990)
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Basic Biographical Information

Daniel Lenihan grew up on the lower east side of New York City. He attended Guilford College in Greensboro, North Carolina, and graduated with a B.A. in Philosophy. His interest in Philosophy stemmed from a deep fascination for understanding human strategies for living, which had a profound impact on his future career choices.

After graduating, Lenihan taught fifth grade in the Virgin Islands. There, he was exposed to diving through a half-day course at a local dive shop. Dan dived with neighbor Alan Albright, who later became the South Carolina underwater archaeologist, and Alan's dive buddy, the Smithsonian's Mendel Peterson. After exposure to diving on cultural resources, in 1971 Dan enrolled at Florida State University for graduate school to study underwater archaeology but thought diving was more captivating than archaeology.

Lenihan spent his days at the University and his nights diving, often in sinkholes and caves, becoming a member of a group of expert cave divers in Florida, leading to his certification as one of the first instructors with the National Association for Cave Diving. In his coursework, Lenihan put more emphasis on studying

anthropology than archaeology because he felt more of an intellectual draw to it, seeing it as a form of applied philosophy. From this, Dan developed his foundational belief that archaeology is a tool to explore human strategies for living, but that if archaeology is not anthropology, it's not living up to its potential. Later, after some time with the NPS, he added to that belief that if archaeology is not historic preservation, it is not satisfying its obligations.

In 1972, as a Teaching Assistant in graduate school, Dan began his work for the National Park Service (NPS) in a temporary position as an underwater archaeologist under the direction of George Fischer. Dan's roles on his first field project, a shipwreck survey at Gulf Island National Seashore, were archaeologist and dive supervisor. He enforced a strict dive program believing that the transition to working underwater was more than just a safety issue, and professional research divers, including archaeologists, could not simply adapt to working underwater, but rather had to work towards doing it efficiently and effectively.

He completed his M.A. in Anthropology in 1973 and continued to work as a temporary NPS archaeologist. In 1974 he moved to New Mexico and began working for Calvin Cummings, lead archaeologist for the Southwest Region, doing terrestrial archaeology with states and the military. He also developed the underwater program for the Southwest Regional Office and became the Regional Dive Officer.

Major Accomplishments

In the mid-1970s, increased reservoir construction revealed uncertainties about what effects inundation had on cultural resources. Federal bureaucrats wanted a resolution and in 1975, because of its preservation ethic, the NPS received funding for the National Reservoir Inundation Study (NRIS). Despite Lenihan's reservations about taking on such a project, Cummings convinced him that this was the gateway to a permanent underwater archaeology program for the NPS. In 1976, Lenihan and crew began fieldwork conducted throughout the western United States to investigate the impacts from inundation. The study was one of the first in underwater archaeology to do a scientific research design based on strict archaeological theory and method. Though Processual Archaeology was beginning to be widely accepted and used, the discipline of underwater archaeology was nascent and most other practitioners had not yet adopted that framework.

At the conclusion of the NRIS (see Lenihan et al. 1981a, b), the assets of the project became the Submerged Cultural Resources Unit (SCRU), a national program of the NPS created to assist parks with underwater archaeological management. In addition, SCRU was the only team of underwater archaeologists in the federal government, and as a result, the team provided service for other agencies and nations as well.

In 1981, Dan suggested and helped organize the School of American Research Advanced Seminar on Shipwreck Anthropology, leading to a publication 2 years later. During the seminar, chaired by Richard Gould, professionals assessed the anthropological significance of shipwrecks and, in doing so, provided an introspective into the budding field of professional underwater archaeology. Dan insisted that solid concepts of research design, research strategy, and theory are critical to professional underwater research; however, he had not seen this framework used in the field and criticized colleagues for conducting projects without scientific methodology (Lenihan 1983: 48). His paper, still considered groundbreaking in the field today, concluded by providing a theoretical basis for the anthropological value of a shipwreck. Lenihan outlined hopes that archaeologists in 2030 would reflect on the development of the field in the late twentieth century, "wherein shipwreck studies where characterized by rich, interdisciplinary efforts conducted with the benefit of explicit research designs and a strong sensitivity for the fragile, nonrenewable nature of the resource" (Lenihan 1983: 64). Dan's critical understanding of an emerging field demonstrates why he did not have to wait 50 years for those three tenets to

become the framework upon which most professional underwater archaeologists today build their research.

Dan spent the following 20 years as Chief of SCRU. He worked on numerous projects all over the country and territories from the Aleutians to the Dry Tortugas, and from the Great Lakes to Kosrae, the Virgin Islands, and Guam. He led the efforts on creating an intricate 3D model of the USS *Arizona* and provided the US Government information it needed to allow divers to explore the no longer radioactive test sites at Bikini Atoll.

On the day of his retirement from Chief of the SRC, Dan was working at the USS *Arizona* Memorial and came back the following day as an employee. He left his position with the NPS in 2009 after 37 years of federal service, but continues to volunteer for the Submerged Resources Center.

Among his greatest contributions to the field are some of the critical theoretical and methodological doctrines with which professionals conduct underwater archaeology. The job of the archaeologist, according to Lenihan, is to assess evidence left behind using a purely scientific approach, to acquire, describe, and explain data in order to understand human strategies for living on the planet. Archaeology is a tool that can aid in achieving the desired outcome of evaluating human decision making, and doing so underwater is especially challenging. Ultimately, historic preservation is the outcome of archaeology and the obligation of any archaeologist is to save the past and pass it down to future generations. While this ideal forms the basis of the enabling legislation for the NPS, it also forms the foundation upon which Lenihan built his career.

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Lentil: Origins and Development

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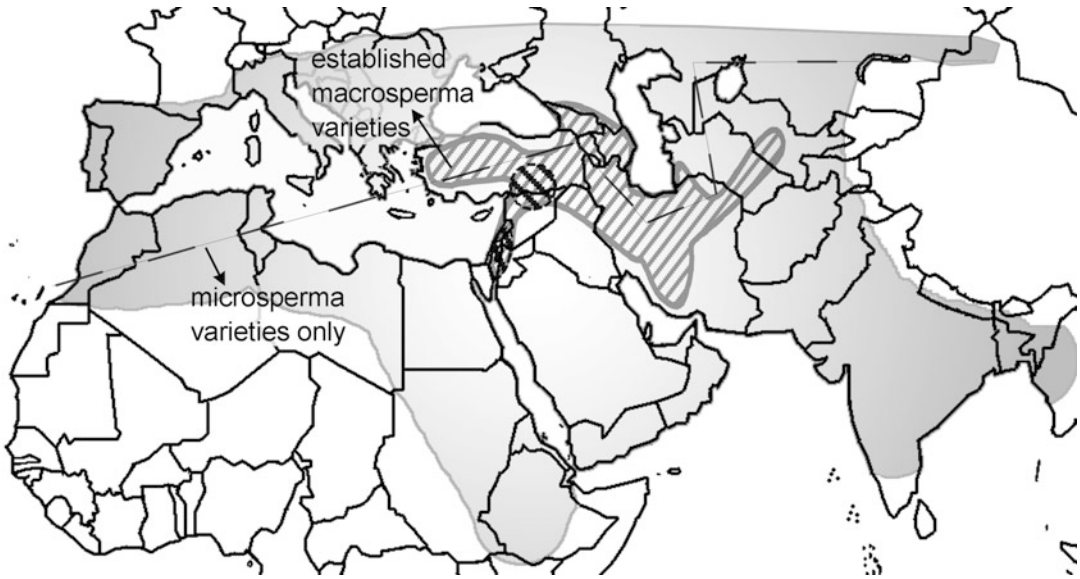
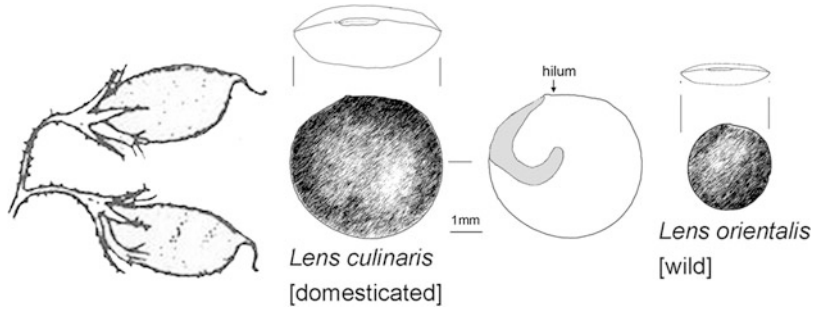
Basic Species Information

Lentil is the common English name of the cultivated legume, *Lens culinaris* Medik. The genus, *Lens*, is in the plant family Fabaceae, in the subfamily Papilionoindeae, and in the tribe Vicieae. Lentil ranks fifth in the world's production of seed legumes, after soybean (*Glycine max* L.), pea (*Pisum sativum*), chickpea (*Cicer arietinum*), and cow pea (*Vigna unguiculata*). It is grown worldwide and the largest producing country is Canada, followed by India, Turkey, and the United States (http://faostat.fao.org). The global success of this crop is due largely to the high protein content of its seeds (25%) and therefore its use as a common meat substitute (Zohary 1995). In addition to being a companion to a starch-rich diet of cereal-based agriculture, legumes are a valuable resource in restoring nitrogen to the soil as they are able to fix atmospheric nitrogen and replenish soil fertility (Zohary et al. 2012).

Lens culinaris was domesticated in Southwest Asia and spread from this region during the "first wave" of crop dispersals beginning in the Early Pre-Pottery Neolithic. It spread with the "founder" crops, which include wheat, barley, flax, pea, bitter vetch, grass pea, and chickpea (Zohary et al. 2012). The wild progenitor of the cultivated species has been identified as *Lens culinaris* subsp. *orientalis*. While this progenitor is distributed through much of Southwest Asia and patchily through Central Asia, genetic variation and archaeobotany point towards a more restricted subzone of domestication in the Fertile Crescent (Fig. 1). The genus includes five other annual wild species restricted to the Mediterranean Basin, Southwest Asia, northern Afghanistan, and Central Asia (Cubero 1981; Zohary et al. 2012).



Lentil: Origins and Development, Fig. 1 Map illustrating the approximate maximal extent of traditional lentil cultivation, the range of the wild progenitor (gray diagonally hatched area), foci of earliest likely cultivation (two dark crosshatched areas), and the dividing line separating traditional *macrosperma* and *microsperma* landraces



Lentil: Origins and Development,
Fig. 2 Drawing of lentil pods and seeds, contrasting domesticated (*culinaris*) and wild (*orientalis*) seed sizes

Major Domestication Traits

The archaeobotanical evidence is most often in the form of charred seeds with only rarely the pods and pod fragments recovered. Lentil is the most commonly recovered pulse in archaeobotanical studies in the Near East which in part is due to its ability to survive carbonization better than fatter pulses. Seeds of lentil are identified based on morphology which is both flat and circular (Fig. 2). With domestication, seeds increase markedly in diameter (Fuller et al. 2012). The earliest archaeobotanical evidence for lentil comes from preagricultural sites located within the wild progenitor species' natural distribution including Epipalaeolithic Ohalo II (Kislev et al. 1992), Epipalaeolithic Abu Hureyra I, and Natufian Wadi Hammeh 27 (Fuller et al. 2012). Lentil cooccurs with cereals inferred to be under "predomestication cultivation" in the Pre-Pottery Neolithic A and Early Pre-Pottery Neolithic B in the southern and northern Levant (Fuller et al. 2011). In addition to evidence of the wild *L. culinaris* subsp. *orientalis*, there is evidence of the exploitation of wild *L. nigricans* from pre-farming sites in Greece, and this species may have been translocated as far west as Spain (Zohary et al. 2012; Fuller et al. 2012). By the Pre-Pottery Neolithic B phase, lentil is a common companion of cultivated wheat and barley with evidence of its spread to Cyprus. During the PPNB there is evidence for larger average diameters in comparison to Early Pre-Pottery Neolithic A specimens (Fuller et al. 2012). Lentils, along with wheat and barley, spread further westwards into Europe during the seventh and sixth millennia BCE, southwards to Egypt during the fifth millennia BCE, and eastwards to the Indian subcontinent, apparently via Afghanistan (Erskine et al. 2011), by 4000 BCE. Lentils were widespread in the Indus Valley and began to be grown in the monsoon zone of India between 2500 and 2000 BCE and are particularly common in the second millennium BCE (Fuller and Harvey 2006). Lentils had reached southern Arabia, both the Yemen and the United Arab Emirates, by c. 2500 BCE (Boivin and Fuller 2009).

Like all of the founder crops, *Lens* is self-pollinated, which was an advantage during the process of domestication because self-pollinated species are able to more easily fix desired genotypes by creating a barrier between cultivated and wild populations. As a result many interfertile landraces have evolved. The two main varieties are subsp. *microsperma* and subsp. *macrosperma*. The *microsperma* have small pods with small seeds, ranging in diameter from 3 to 6 mm. All of the early prehistoric archaeological specimens of domestic lentil are attributed to this variety (van Zeist 1982), as are all traditional landraces that spread to the south and east of the Fertile Crescent. The *macrosperma* varieties have larger pods and seeds, with a diameter ranging between 6 and 9 mm. This larger variety is considered the more established cultivar, and archaeobotanical evidence suggests this type developed in the first millennium BCE and is mainly restricted to Europe and North Africa (Cubero 1981; Zohary et al. 2012).

The primary traits of lentil that evolved under domestication include the retention of the seed in the pod as opposed to separation of the seeds upon maturation. The advantage to the farmer of the seed remaining on the pod is that the seeds must

then be harvested by the cultivator. Another trait that evolved under domestication is the loss of wild-type seed dormancy, which involves seed-coat thickness. In the wild the seed coats are thicker which enables the spread of seed germination over the course of several years by not allowing water to penetrate. The loss of this trait contributes to thinner seed coats which are more permeable to water and as a result all seeds germinate the same year they are sown, although this appears to be difficult to recognize in archaeological specimens (Zohary et al. 2012). Instead it is the increase in seed size, or the dispersal beyond its wild range, that testifies to domestication.

Cross-References

- ▶ Abu Hureyra: Agriculture and Domestication
- ▶ Agriculture: Definition and Overview
- ▶ Archaeobotany of Early Agriculture: Macrobotany
- ▶ Barley: Origins and Development
- ▶ Chickpea: Origins and Development
- ▶ Domestication Syndrome in Plants
- ▶ Domestication: Definition and Overview
- ▶ Genetics of Early Plant Domestication: DNA and aDNA
- ▶ Pigeon Pea: Origins and Development
- ▶ Plant Domestication and Cultivation in Archaeology
- ▶ Plant Processing Technologies in Archaeology
- ▶ Wheats: Origins and Development

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Leone, Mark P.

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Basic Biographical Information

Mark P. Leone (Fig. 1) is an American historical archaeologist who has promoted the application of critical theory in historical archaeology. Leone was born in 1940 in Waltham, Massachusetts, historically a manufacturing town in the western suburbs of Boston. He studied history as an undergraduate at Tufts University, earning a Bachelor of Arts in 1963. Leone received his graduate training in anthropology at the University of Arizona in Tucson, earning a Master of Arts degree in 1966 and receiving his doctorate in 1968. He was an Assistant Professor at the Department of Anthropology at Princeton University (1968–1975). Leone joined the faculty at the University of Maryland, College Park, in 1976 and was

Leone, Mark P., Fig. 1 Mark Leone (Photo by Ben Skolnik)

promoted to Professor in 1990. He served as Chair of the Department of Anthropology (1993–2003) and Chair of the University Senate (2000–2001).

Leone has been extremely active in the profession and held numerous leadership positions. He served on the Governor's Consulting Committee on Historic Places in the State of Maryland (nomination panel for the National Register of Historic Places) (1978–1990). He was Secretary (1979) and then President (1980–1981) of the American Association of University Professors, College Park Chapter. He served on the Board of Managers, Anthropological Society of Washington, before becoming President (1984–1985). He was Chairman (1986–1988) of the Government Affairs Committee of the Society for American Archaeology. He served as Treasurer-Elect (1988), Acting Treasurer (1989), and Treasurer (1989–1992) of the Society for American Archaeology.

Leone directs a long-term research project called "Archaeology in Annapolis," which was founded in 1981 and continues at the time of this publication. Many of Leone's accomplishments have been made possible by this project and its partnerships. Leone provides an excellent synopsis of this project in the preface to *The Archaeology of Liberty in an American Capital* (2005), and the book synthesizes the major discoveries in Annapolis. His more recent *Critical Historical Archaeology* (2010) is very much an intellectual autobiography providing insight into his scholarly objectives and methodology through a series of excerpts from his earlier works.

Major Accomplishments

Leone was highly influenced by Lewis Binford and is counted among the generation that founded the New Archaeology. Although Stanley South is most frequently recognized for bringing processualism into historical archaeology, Leone was also very active in this program, and he carried forward the imperatives for archaeology that were established by Binford during this period. He is also closely associated with postprocessual archaeology, both as a contributor and as a critic. His historical archaeology provided a fertile ground for the introduction and working out of concepts of ideology and power.

One objective of the New Archaeology was to establish greater social relevance by doing research that was engaged rather than detached from public life. Historical archaeology was one outlet for that engagement, since it held out the possibility of understanding the origins of modern society. During the 1970s, Leone found himself critical of the way in which historical archaeology articulated with modern belief systems. Those connections were especially visible in the commemoration and the nationalization of historical sites, which was rarely critical or reflexive, but instead sustained the master narratives of American ideology, especially the idea of possessive individualism, which Leone adopted from Russell Handsman (Leone 1982; Handsman and Leone 1995 [1989]).

Leone found a theory of ideology and its reproduction in the structural Marxism of Louis

Althusser, as well as in the Frankfurt School philosophers, especially Jürgen Habermas and Georg Lukács. Marxist theory was virtually absent from the US academy following the McCarthy era and during the Cold War. Leone was exposed to Marxism by anthropologist Steve Barnett, who taught at Princeton University during Leone's appointment as Assistant Professor early in his career. Barnett was a student of David Schneider at the University of Chicago and authored *Ideology and Everyday Life* with colleague Martin Silverman (Barnett and Silverman 1979). Like Schneider, these scholars wanted to build an anthropology of American culture, and Leone's early focus on Mormonism contributed to this project (Leone 1979).

Leone began the Archaeology in Annapolis project in 1981, in partnership with Joseph Dent and Anne Yentsch. He also found an important partner in the Historic Annapolis Foundation, a preservation advocacy group that helped to connect Archaeology in Annapolis with excavation sites, exhibition space, and other resources. Leone's publications drew a number of graduate students to the project. Early research was directed at the ideological footings for merchant capitalism as expressed in the eighteenth-century formal landscapes and other material cultures. During the late 1980s, the emphasis of his research shifted to African American heritage in the City of Annapolis. The project was focused especially on the cultural and economic strategies of African Americans in different areas of Annapolis following emancipation and the traces of spiritual practices that derive from African tradition. In 2001 the project expanded into research sites on the Eastern Shore of the Chesapeake Bay in Maryland, including former plantations associated with Annapolis elites and communities established by African Americans following emancipation, and the association of these places with Frederick Douglass (Leone and Pruit 2015; Leone and Jenkins 2017).

Throughout his career, Leone has argued that interpretations of the past are a site for political and ideological struggle and that archaeologists can, but frequently do not, play a role in the outcome of these struggles. He has been influential in the development of landscape archaeology (Leone 1984; Leone et al. 2005), as well as approaches to the origins of capitalism (Leone 1988, 1995; Leone and Knauf 2015; Leone and Potter 1999), and the archaeology of African Americans, particularly the identification of spiritual practices with African associations (Leone and Fry 1999; Ruppel et al. 2003; Leone and Pruit 2015). He was also an early proponent of public interpretation at excavation sites, along with Parker B. Potter (1994; also Leone et al. 1987). Mark Leone was awarded the J.C. Harrington Medal in Historical Archaeology by the Society for Historical Archaeology (SHA) in 2016; the SHA's statement on the award, authored by Paul Mullins, provides a fond and detailed summary of Leone's career (Mullins 2016).

Cross-References

- ▶ Annapolis: Historical Archaeology
- ▶ Binford, Lewis R. (Theory)
- ▶ Critical Theory in Archaeology
- ▶ Historic St. Mary's City
- ▶ Leone, Mark P. (Historical Archaeology)
- ▶ Marx, Karl
- ▶ Multicultural Archaeology
- ▶ Post-Processualism, Development of
- ▶ Processualism in Archaeological Theory
- ▶ Race in Archaeology
- ▶ Structural Archaeology

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Leone, Mark P. (Historical Archaeology)

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Basic Biographical Information

American archaeologist Mark P. Leone (b. 1940) holds a B.A. in History (Tufts, 1963) and an M.A. and a Ph.D. in Anthropology (Arizona, 1966 & 1968). He worked at Princeton (Assistant Professor, Anthropology) before moving to the University of Maryland (Associate Professor then Professor, Anthropology; Chair of the Department of Anthropology; Chair of the College Park Senate) and has held positions and offices with the National Science Foundation Advisory Panel for Anthropology, the Governor's Consulting Committee on Historic Places in the State of Maryland, the American Association of University Professors, the Anthropological Society of Washington, the Society for American Archaeology, and the Council for Northeast Historical Archaeology.

Major Accomplishments

Leone's early work – on the prehistory of the southwestern United States – was within the New Archaeology tradition. However, during his time in Arizona, he began to follow an alternative path with a growing interest in questions of the contemporary role of archaeology. His move to Princeton brought with it an introduction to postmodern thought and, more importantly for him, Marxism and critical theory. In the latter, Leone found a means of theorizing the politics of archaeology – one which allowed him to build on rather than abandon his New Archaeology foundations. In parallel, a shift from prehistoric to historical archaeology allowed him to apply his craft to the study of the modern world, resulting in explorations of Mormon material culture, archaeological

analyses of capitalism, and reconsiderations of African-American history.

In much of his work, Leone has combined theory and practice, most notably through the Archaeology in Annapolis project which he has directed since 1981. His consistent concern has been to question the dominant discourses of modern history and to construct alternative narratives of the recent past. His aim has been to expose archaeology as a medium of power and to contribute to a more participatory and democratic understanding of the past by combining scientific hypothesis examination with a reflexive stance and political intent (issues he has discussed in a recent interview: see Dalglish 2007). Mark P. Leone's contribution to the theory and practice of archaeology is widely acknowledged and his well-cited works include his writings on the William Paca Garden (Leone 1984), critical archaeology (Leone et al. 1987) and capitalism (e.g., Leone and Potter 1999). A number of his key works have been collected and published as *Critical Historical Archaeology* (Leone 2010).

Cross-References

- ▶ Annapolis: Historical Archaeology
- ▶ Capitalism in Archaeological Theory
- ▶ Capitalism: Historical Archaeology
- ▶ Critical Historical Archaeology
- ▶ Ideology and Materiality in Archaeological Theory
- ▶ Middle-Range Theory in Archaeology
- ▶ Modern World: Historical Archaeology
- ▶ New Archaeology, Development of
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Further Reading

A full CV and publication list for Mark P. Leone. http://www.anth.umd.edu/sites/anth.umd.edu/files/370/cv/Leone%20CV%202012.pdf

Lepenski Vir: Geography and Culture

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Introduction

Only a few sites/regions in Europe exhibit uninterrupted sequences of occupation across the Mesolithic-Neolithic transition. Moreover, it is rare that one can document rich details of various aspects of life that can shed light on the character of these fundamental changes in the mode of production with concomitant changes in other aspects of life. The Danube Gorges region in the north-central Balkans with a number of settlements found along the Danube and covering the whole duration of the Early Holocene (c. 9600–5500 BCE) offers both the continuous temporal framework for this key period of European prehistory and the richness of evidence for architecture, mortuary practices, ritual, art, and various aspects of daily life. Lepenski Vir is the key site of this sequence, and it epitomizes most of the important elements that characterize the Mesolithic-Neolithic Danube Gorges as a whole, along with the recognition of the site's special character in the period of Mesolithic-Neolithic transformations.

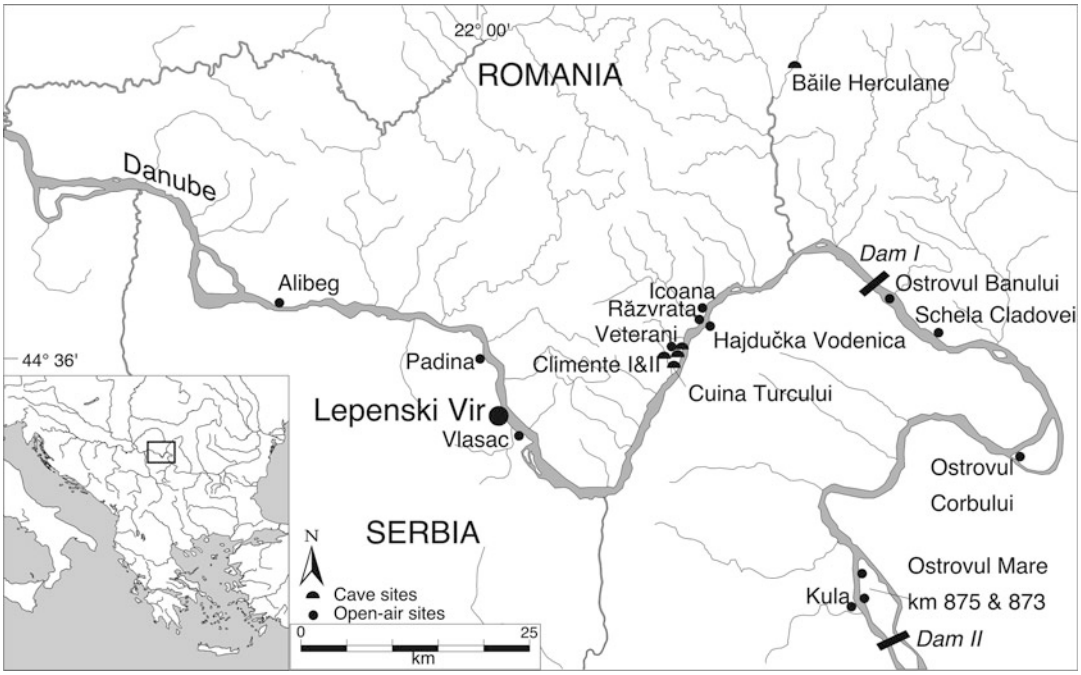
Definition

Lepenski Vir is a settlement found on the right bank of the River Danube in the area known as the Danube Gorges or the Iron Gates on the border between present-day Serbia and Romania. The site became well known in the late 1960s after the discovery of a large forager settlement with standardized trapezoidal building floors associated with sculpted sandstone boulders, which had richly ornamented surfaces. In a number of cases, the boulders were depicting human-fish hybrid beings. The site plays a crucial role in discussions about the nature of forager-farmer interactions at the time of the Neolithic spread in southeast Europe.

Key Issues/Current Debates/Future Directions/Examples

Southeast Europe is the key region for studying the spread of the Neolithic economy and way of life into Europe due to its proximity to areas of the eastern Mediterranean with the earliest well-established and long-lasting Neolithic, agricultural settlements in Eurasia. Models that see the migration or diffusion of farming populations from Anatolia into southeast Europe have persisted in archaeological and popular narratives even though more nuanced scenarios, which see more active role for indigenous forager populations in southeast Europe, have also been suggested (e.g., Tringham 2000; Borić 2002; Whittle et al. 2002). Understanding processes lumped under largely inadequate label of the "Neolithisation" of southeast Europe is still hampered by the lack of evidence for more substantial Mesolithic forager presence across the region as a whole. There are few areas where available evidence documents the presence of the latest phase of the Mesolithic prior to the arrival of the so-called Neolithic package. These processes of subsequent change included wholesale or piecemeal adoption of ceramics, domesticates, ground stone tools, and macro-blade technology to name the most prominent aspects of the archaeological record. One exception to the general rule of scarce Mesolithic presence is the area of the Danube Gorges (Fig. 1). In the course of the rescue excavation project made in the region on both the Serbian and Romanian banks of the river Danube in the 1960s and 1970s, more than 20 sites were found with Mesolithic and/or the earliest Neolithic levels (e.g., Srejović 1972; Radovanović 1996; Bonsall 2008; Borić 2011). Importantly, many of these sites disclosed details of more or less continuous forager occupation of the region since the end of the Last Glacial primarily found in caves and rockshelters, while open-air sites started being occupied after the end of the Younger Dryas, i.e., from around 9600 BCE. The archaeological evidence indicates that these forager communities might have been focused on fishing as the main subsistence base and that particular places in this landscape were utilized as places for specialized fishing in whirlpools.

The site of Lepenski Vir (Lepenski Whirlpool) was one such location found in the Upper or Gospodjin Vir (Lady's Whirlpool) Gorge of the Danube. The site was founded on a "terrace remnant" of the Danube consisting of finely laminated riverine sands in front of a strong whirlpool. Dragoslav Srejović conducted excavations at the site from 1965 to 1970 (Srejović 1972). The extraordinary features of Lepenski Vir brought the archaeological record of the site to the attention of archaeologists worldwide. However, in the decades following the excavation of the site, doubts raised about the precise dating and association of material culture, and Early Neolithic Starčevo pottery in particular, with the most dominant phase I-II, i.e., the phase of trapezoidal buildings (Fig. 2), limited the impact of this evidence on discussions about the nature of Mesolithic-Neolithic transformations in southeast Europe as a whole. The major stumbling block was the conviction of the excavator Srejović that Early Neolithic pottery and other typical Neolithic items of material culture (e.g., polished stone axes) were not associated with the occupation of trapezoidal buildings of phase I-II but intrusions from the overlying layer attributed to Early/Middle Neolithic phase III. In addition, at the time, a series of radiometric dates from Lepenski Vir that were made on charcoal, and available since the

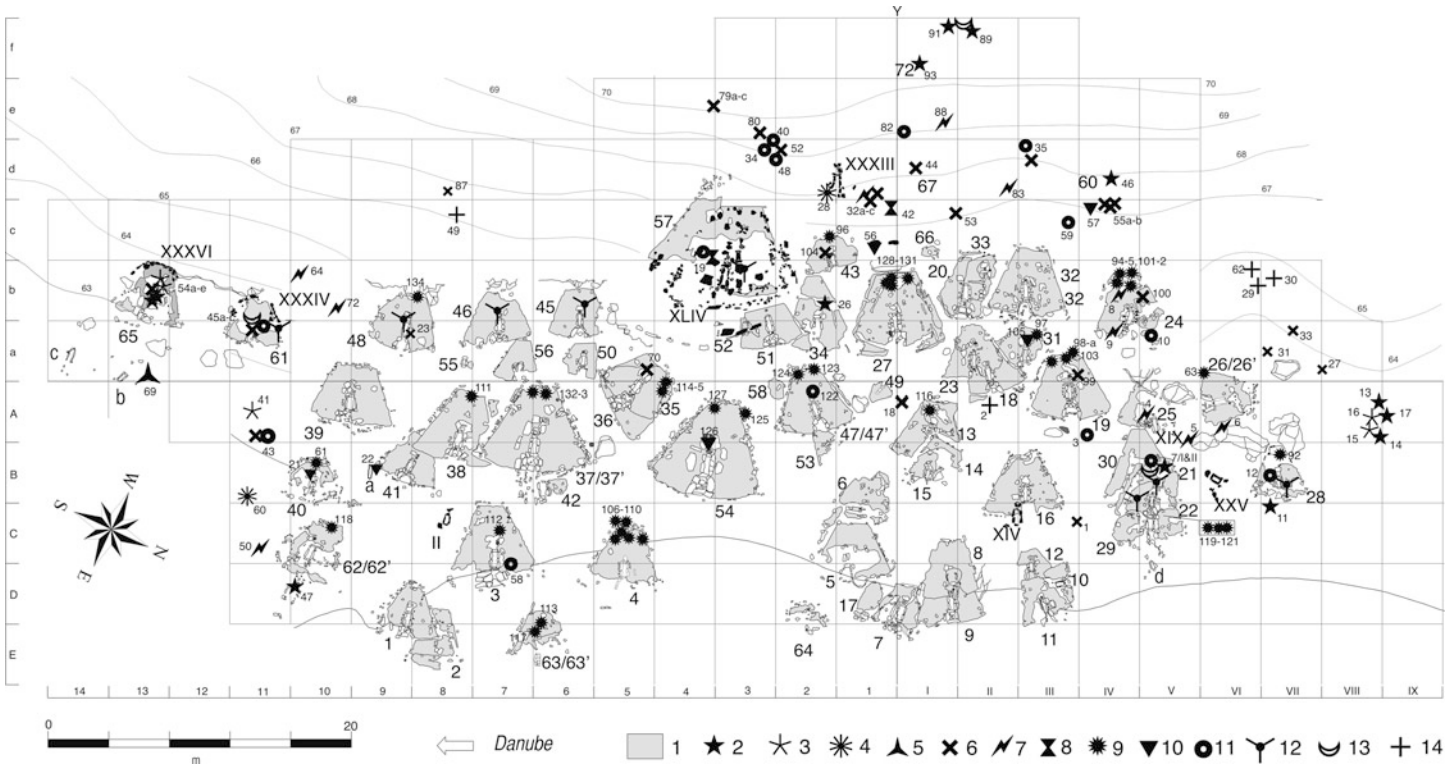


Lepenski Vir: Geography and Culture, Fig. 1 Map of the Danube Gorges with the location of Lepenski Vir and other Epipalaeolithic, Mesolithic, and Early Neolithic sites

L

1970s, were often dismissed as problematic. The reinterpretation of the site's stratigraphy and dating in the late 1990s (Borić 1999, 2002) along with new AMS dates on both animal and human bones associated with the occupation and abandonment of trapezoidal buildings (e.g., Borić & Dimitrijević 2007; Bonsall 2008; Bonsall et al. 2008; Borić 2011) have allowed for a more realistic dating of material culture associations at this site. In addition, it has now clearly been shown that Early Neolithic Starčevo pottery was associated with trapezoidal buildings contrary to the view held by the excavator of the site (Borić 1999, 2011; Garašanin and Radovanović 2001).

Currently, Lepenski Vir is one of the best absolutely dated sites of the period in southeast Europe with over 90 radiometric measurements. These dates have helped to revise the original stratigraphic division of the site and suggested realistic spans for particular phases (cf. Borić and Dimitrijević 2007; Borić 2011). The earliest phase at Lepenski Vir is known as Proto-Lepenski Vir, and it is currently dated to the regional Early and Middle Mesolithic (from the end of the tenth millennium BCE to the last centuries of the eighth millennium BCE). Due to significant disturbance in the course of later occupation at the site, the remains of this long period of occupation are only sporadically found as partially preserved stone constructions, concentrations of artifacts, occasional burials with human remains, and possibly also the earliest forms of rectangular stone-lined hearths. Burials dated to this earliest Mesolithic phase at Lepenski Vir can be characterized as single inhumations, mainly placed in supine extended positions, sometimes with flexed legs. In the course of what can in chronological terms be distinguished as the Middle Mesolithic period (c. 8500–7300 BCE), a particular burial rite is documented at this and several contemporaneous sites in this region: seated burials with crossed legs. It also seems that rectangular stone-lined hearths, which might have been the central part of light dwelling constructions, can also be associated with Proto-Lepenski Vir phase. On the basis of the preserved material culture dated to



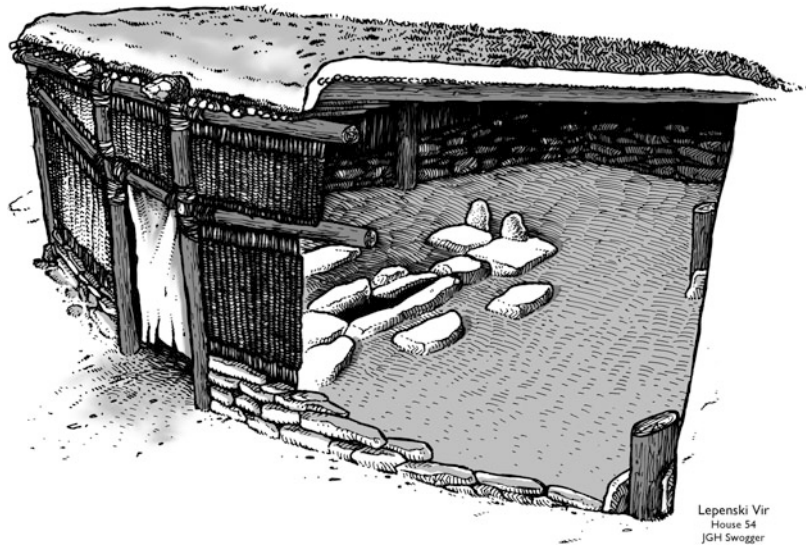
Lepenski Vir: Geography and Culture, Fig. 2 Plan of the excavated area of Lepenski Vir with trapezoidal buildings of phase I-II and burials from all phases represented as symbols. Key: *1* limestone floor, *2* extended skeleton placed on/dug through limestone floor or found outside buildings (parallel to the Danube – oriented downstream), *3* headless extended skeleton placed on/dug through floor and outside buildings (parallel to the Danube – oriented downstream), *4* extended skeleton, *5* seated skeleton with crossed legs, *6* disarticulated postcranial bones on/beneath floor and outside buildings, *7* contracted and flexed skeleton placed on floor or buried outside buildings, *8* headless contracted skeleton, *9* skeletons of neonates and children dug through floors (extended and contracted), *10* human mandible, *11* human skull, *12* red deer skull with antlers, *13* aurochs' skull with horn cores, *14* post-Neolithic burials

this period, there are no elements that can at the moment suggest a more fined-grained chronological resolution for this long duration of Proto-Lepenski Vir phase. Judging by the current distribution of radiometric dates and associated material culture, Lepenski Vir was not inhabited in the course of the regional Late Mesolithic (c. 7300–6200 BCE), i.e., for approximately a thousand years after the end of the Middle Mesolithic phase. On the other hand, the Late Mesolithic period in the Danube Gorges saw intense occupation at many other sites, including two sites neighboring Lepenski Vir: Vlasac, located 3 km downstream, and Padina, located 5 km upstream from Lepenski Vir.

A robust sample of radiometric dates indicates that Lepenski Vir was resettled again after 6200 BCE, in the course of the period that is in the stratigraphy of the site now referred to as phase I-II. This labeling differs from the one suggested by the excavator Srejović (1972) who assumed two separate phases: Lepenski Vir I with subphases a–e, characterized by trapezoidal plan buildings plastered with limestone floors, and Lepenski Vir II, characterized by assumed trapezoidal plan buildings made up of stone walls but without limestone floors. However, it has been shown that the two phases should be merged together since the stone walls of Srejović's phase II buildings overlap with the trapezoidal buildings of phase I, and hence, the limestone floors and the stone walls form part of the same buildings (Borić 2002, 2011). Hence, the label of this phase is I-II. I. Radovanović's (1996) more recent division of phase I as defined by Srejović into subphases 1–3 on the basis of stylistic differences, i.e., presence/absence of particular architectural elements, has also been called in question (Borić & Dimitrijević 2007). It also seems that phase I-II did not last longer than 200 years.

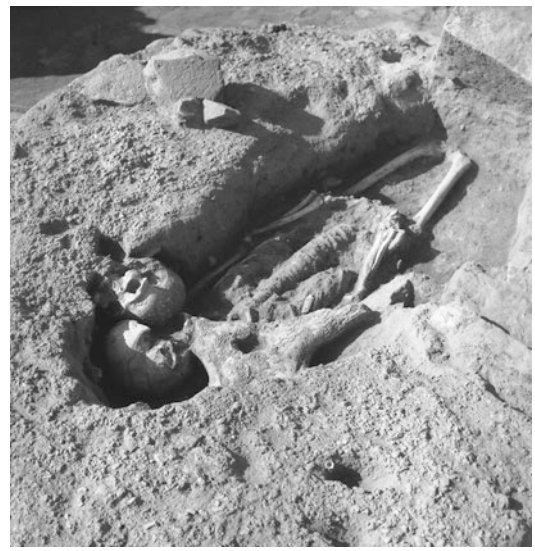
Phase I-II is the period during which the most intense building activity took place at the site with the construction of close to 70 semisubterranean buildings with trapezoidal bases furnished with limestone floors and with central rectangular stone-lined hearths (Fig. 3). The presence of such stone-lined hearths bespeaks of the regional cultural continuity with the previous Late Mesolithic period. Primarily in association with the hearths of trapezoidal buildings, on the floor level, there were over 90 sculpted and aniconic sandstone boulders (Fig. 4), some probably acting as mortars (Srejović 1972; Borić 2005). This large quantity of boulder "artworks" is unmatched for the region as a whole, and only at the sites of Padina, Hajdučka Vodenica, and Cuina Turcului were a few ornamented boulders also found. The reoccupation of Lepenski Vir at a particular historical moment and the outstanding features of this site not shared in character or scale with other contemporaneous sites in the Danube Gorges may suggest that this locale might have been of special interest to the autochthonous forager communities due to the site's particular position within the Danube Gorges' landscape. Namely, the site is situated directly across the Danube from the trapezoidal Treskavac Mountain, a prominent landscape feature in this part of the region. The importance of this landmark can be inferred on the basis of the shape of building floors, which mirrored the mountains trapezoidal shape.

It is also hardly a coincidence that this elaboration and building activity at Lepenski Vir in particular took place at the time when Early Neolithic farming communities became established across the northern areas of the Balkans (Whittle et al. 2002). It is likely that forager communities in the Danube Gorges were strongly emphasizing their cultural tradition as the consequence of increasing contacts with Early Neolithic groups while adopting a number of materialities (e.g., pottery, polished stone axes, new types of ornaments) coming from the expanding world of Neolithic farmers. Yet the adoption of the Neolithic traits at Lepenski Vir was piecemeal, and during phase I-II one finds no domestic animals associated with the occupation of trapezoidal buildings (Borić and Dimitrijević 2007). Moreover, burial rites changed little from the norm of Late Mesolithic burials found across the region and characterized by extended supine inhumations oriented parallel to the axis of the River Danube, with their heads most frequently pointing in the downstream direction of the river course. During phase I-II, burials were interred through limestone floors



Lepenski Vir: Geography and Culture, Fig. 3 Reconstruction of building 54 from Lepenski Vir (Drawing: J.G. Swogger)

Lepenski Vir: Geography and Culture, Fig. 4 Boulders found in situ in building XLIV/57 at Lepenski Vir



Lepenski Vir: Geography and Culture, Fig. 5 Limestone floor of trapezoidal building 21 at Lepenski Vir with extended supine burial 7/I interred through the building floor; this primary burial was associated with disarticulated human skull (no. 7/II) and an aurochs skull, while another red deer skull with antlers was found next to the deceased

(Fig. 5) or placed over the floor area of abandoned buildings. Another unique feature of Lepenski Vir in comparison to other contemporaneous sites is more than 40 neonates found buried beneath the rear, narrow areas of trapezoidal buildings (Borić and Stefanović 2004).

Neither revised stratigraphic evidence nor radiometric dates at present suggest a break in the occupation of Lepenski Vir between phases I-II and III (*contra* Srejović 1972). Yet, around or just after 6000/5950 BCE, there is a significant change in the pattern of occupation at the site. It seems that all or most of the trapezoidal buildings

at Lepenski Vir were abandoned by this time, with some evidence that certain buildings, the floors of which were in some cases already covered with a layer of soil, were used for the interment of burials. The burial practices also change. While there remains a possibility that a few extended burials can be dated to this phase, the dominant burial rite during phase III between 6000/5950 and 5500 BCE are crouched inhumations, placed on their right or left sides, and with variable orientations. There are over 20 such primary burials in evidence, with a number of secondary or disarticulated burials found across the site. In one case, two crouched burials (nos. 8 and 9) were placed symmetrically one facing the other with opposite orientations over the floor of a trapezoidal building (no. 24), likely some time after its abandonment and backfilling. The crouched burial position characterizes the typical Neolithic burial rite across the Balkans and beyond (e.g., Whittle et al. 2002). Moreover, recent results of strontium isotope analyses indicate that a significant number of the individuals placed in crouched positions were migrants, originating in several geologically differentiated areas outside the Danube Gorges (Borić and Price 2013). A new feature, typical of various other Early-Middle Neolithic sites across the northern Balkans at this time, found at Lepenski Vir during phase III are a number of mostly irregular pits of various dimensions found across the settlement. These pits were filled up with large quantities of ceramics, stone weights, and burned daub fragments coming from destroyed walls made in wattle and daub construction techniques, and other cultural material. There is no clear evidence of aboveground dwellings during phase III, and this is a recurrent bias with regard to many other Early-Middle Neolithic sites in the wider region. There is also evidence of several domed ovens attributed to this period and found across the site. Four ceramic hoards have been associated with this phase. Hoard 1 contained a necklace made from Spondylus, nephrite, and *Columbella rustica* beads, Hoard 2 contained stone axes, while Hoards 3 and 4 contained blanks of the so-called "Balkan" or yellow-white spotted flint. This particular raw material at this time became abundantly used across the Balkans, with frequent production of large macro blades with steep retouch. A large quantity of such specimens were also found at Lepenski Vir. The most likely origin of this raw material are outcrops in northern Bulgaria, several hundred kilometers away from the Danube Gorges, indicating the existence of long-distance exchange networks during this period. Of special interest are also several beads and other items from copper minerals found at Lepenski Vir, and which can be associated with both phases I-II and III. The most likely place of origin for these minerals is the nearby mining site of Rudna Glava, which continued to be used in later prehistoric periods for the extraction of copper minerals.

On the face of the current radiometric evidence and archaeological remains from Lepenski Vir, it seems that the site was abandoned before 5500 cal. BCE. Many other sites used more or less continuously throughout the Mesolithic and the Early Neolithic phases in the Danube Gorges were also abandoned around the same time. The abandonment of, by this time, old Mesolithic-Early Neolithic locales along the Danube in this region may relate to another important, region-wide culture change taking place around this time. This change brought to archaeological visibility long-lasting agricultural and stockbreeding communities in the central Balkans known in terms of culture history as the Vinča culture groups. Important changes in settlement pattern and material culture styles were taking place in the century following 5500 cal. BCE, marking the beginnings of the Late Neolithic period in the central Balkans. For these successful agricultural communities, an agriculturally marginal region such as the Danube Gorges and places suitable for large-scale fishing seems to have held little importance. The first post-Neolithic presence at Lepenski Vir is marked by an Early Copper Age burial associated with the Salcuța culture, dated to around 4300 cal. BCE (Bonsall et al. 2008). Sporadically, Lepenski Vir was also used in Roman and Medieval times, with several buried individuals associated with these respective periods now directly AMS dated (Bonsall et al. 2008).

Stable isotope data are now available for a number of burials from Lepenski Vir and other sites in the Danube Gorges, providing important information on dietary practices of Holocene foragers and early farmers in this region (Cook et al. 2002; Bonsall 2008). Furthermore, the combination of isotopic research and AMS dating has suggested that throughout the Mesolithic significant intake of river fish and migratory sturgeon species, which come from a different ecosystem than the atmosphere, deposited "old carbon" in humans and domestic dogs, with both species abundantly feeding on fish. Such physiological processes affect radiocarbon measurements made on the bones of these species. In such instances, when $\delta^{15}N$ values are elevated (over 13.0 ‰ and with many burials at Lepenski Vir and other forager sites in the region exhibiting values of 15.0 ‰ and over), a substantial intake of fish protein in the diet of measured individuals can be inferred. Such insights prompted researchers to devise a correction factor specific to this particular region that can be applied to the obtained radiometric measurements before calibration of dates (Cook et al. 2002). While fish-dominated diet seems to have remained constant throughout the Mesolithic period in the Danube Gorges, a number of burials from Lepenski Vir also show less elevated values (around or below 10.0 ‰). Such burials with lower $\delta^{15}N$ are also consistently dated to the phase of Mesolithic-Neolithic transformations, i.e., Lepenski Vir I-II, as well as to the Early/Middle Neolithic, i.e., phase III. Moreover, a number of these individuals were buried in crouched positions, suggesting a correlation between Neolithic-style mortuary practices and a diet less dominated by fish. Combined with recent insights from strontium isotope analyses, this evidence suggests that in the course of transformational phase I-II and in particular during phase III, a significant number of first-generation migrants from Neolithic communities were mixing with the locals at Lepenski Vir.

While research efforts in the past decade or so clarified many aspects of the existing evidence from the site of Lepenski Vir, there still remains an important task of providing systematic and detailed publications of various strands of data that would disclose in full the richness of this extraordinary site for the students of European prehistory. Moreover, forthcoming DNA research on the large collection of human remains from this and other sites in the Danube Gorges will provide a unique opportunity for better understanding of population dynamics at the crucial point in the transition from the Mesolithic to the Neolithic social milieus in this key area of prehistoric Europe.

Cross-References

- ▶ Animal Domestication and Pastoralism: Socio-Environmental Contexts
- ▶ Complex Hunter-Gatherers
- ▶ Demographic Transitions
- ▶ Europe: Mesolithic-Neolithic Transition
- ▶ European Mesolithic: Geography and Culture
- ▶ Hunter-Gatherer Settlement and Mobility
- ▶ Hunter-Gatherer Subsistence Variation and Intensification
- ▶ Hunter-Gatherers, Archaeology of
- ▶ Isotopic Studies of Foragers' Diet: Environmental Archaeological Approaches

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Basic Biographical Information

André Leroi-Gourhan was one of the greatest prehistorians of the twentieth century. He is well known for his significant contributions to

archaeological method and theory and to the study of rock art. Born in 1911 in Paris, Leroi-Gourhan was orphaned very early and grew up with his maternal grandparents, who took him on frequent visits to the Natural History Museum in Paris. These visits awoke in him a fascination with the natural sciences. This fascination, along with the influence of his grandfather who was a member of the Naturalists' Association, converted Leroi-Gourhan into an ardent nature lover who soon came into contact with a range of prehistorians.

At first, Leroi-Gourhan was not a motivated student, and he left study when he was 14 years old to be apprenticed to a merchant. He soon changed jobs and met some of the people who would most influence him in the future. His godmother played an important role in his development by giving him the gift of a book by Marcellin Boule, *Les hommes fossiles*, and by introducing him to Paul Boyer, the administrator of the School of Oriental Languages, who would offer Leroi-Gourhan a post as assistant secretary and library helper. These positions allowed Leroi-Gourhan to continue his studies, and he finished a diploma course at the Sorbonne in Russian in 1931 and in Chinese in 1933.

Leroi-Gourhan embraced the study of ethnology, while working for the France Institute of London in the ethnography department of the British Museum. Two of Leroi-Gourhan's works were completed during this period: *Bestiaire du bronze chinois* (1936a) and *La civilisation du Renne* (1936b). That same year, he married Arlette Boyer, the daughter of Paul Boyer. As a research professor of CNRS (Centre National de la Recherche Scientifique) and the Collège de France, Leroi-Gourhan began working on two of the works that would become points of reference for the world of prehistory: *L'homme et la matière* (1943) and *Milieu et techniques* (1945). During the Second World War, Leroi-Gourhan was commissioned to watch over the security of some of the art objects evacuated from the Louvre Museum and that he took part in different activities with the French Resistance, which earned him several honorary decorations.

In 1946, while deputy director of the Museum of Man (Musée de l'Homme), Leroi-Gourhan was named Professor of Colonial Ethnology at the University of Lyon. This position allowed him to develop the teachings in comparative technology that would form the future foundations of his research and teaching in prehistoric ethnology. At this time, he completed his doctoral thesis, directed by Marcel Mauss and entitled *Archéologie du Pacifique nord et documents pour l'art comparé de l'Eurasie Septentrionale* (1945). Later, he completed a second doctoral thesis *Les tracés d'équilibre mécanique du crâne des vertébrés terrestres et etude des restes humains fossiles provenant des grottes d'Arcy-sur-Cure* (1954). In 1956, Leroi-Gourhan was appointed to the Chair of General Ethnology and Prehistory at the University of the Sorbonne, and later, between 1969 and 1982, he was the Chair of Prehistory at the Collège de France.

Leroi-Gourhan received numerous awards and prizes for his contributions. In 1973 he was awarded the Gold Medal of the Centre National de la Recherche Scientifique in recognition of his outstanding contributions to archaeology, both nationally and internationally. In 1978 he received the Grande Prix of the national archaeology of the Ministry of Culture and in 1979 the Golden Medal of the Academy of Architecture, national prize of the Fissen fund, and the Legion of Honour. In 1980, he was elected in the Academy. Leroi-Gourhan died in 1986.

Major Accomplishments

Leroi-Gourhan's major accomplishments include a modernization of excavation methods in France, including the incorporation of multidisciplinary teams into archaeological investigation and the introduction of spatial studies, ethnographic concepts in Paleolithic studies, such as the *chaine operatoire* concept, and structural analysis in the study of prehistoric rock art.

Excavation Methods

Leroi-Gourhan was trained in a prehistoric archaeology that was more concerned with excavation to recover objects than in research for its own sake. However, possibly due to his

ethnographic training, he became aware that objects without their context only contributed part of the information. That is to say, they provided the relative chronologies without an understanding of the ways of life. For this reason he developed excavation methods which focused on the quality of documentation and the area excavation of sites, with the objective of enabling the reconstruction of all aspects of the population that had lived there thousands of years before.

This approach meant that all archaeological remains were recovered, no matter how small or fragmented, so they could later be studied by a group of specialists from diverse disciplines. An example of this excavation methodology was the Magdalenian site of Pincevent, where for over 20 years (from 1964), Leroi-Gourhan educated many prehistorians in his passion to reconstruct the past through a multidisciplinary spatial analysis, which would lay the foundations of prehistoric ethnology.

Paleo-Ethnology: Technique and Culture

Leroi-Gourhan's ethnographic education formed the basis for all his work and effort in studying prehistory. This is well exemplified in his most famous publications *L'homme et la matière* (1943), *Milieu et techniques* (1945), and *Le geste et la parole* (1964b). Within this ensemble of investigations, it is worth highlighting his adaptation of the ethnographic concept of the operative chain (*chaine opératoire*) to prehistory (Balfet 1991). This deals with a theoretical concept that attempts to understand archaeological occurrences, be they physical or artistic, in terms of the sequence of technical operations implied in all phases of their production. This concept, reformulated in the 1990s, has been the basis for the development of technological studies, both in rock art and in the analysis of lithic industries.

Prehistoric Art

Leroi-Gourhan transformed the study of prehistoric art. In particular, he is accepted as being the first scholar to introduce structuralism to the analysis of rock art. Using ethnographic comparisons, he treated prehistoric art as an expression of a religion, or magical aspects, during the Paleolithic. This approach is especially evident in his work *Les religions de la préhistoire* (1964a). However, his greatest contribution to this field was to propose a progressive evolution of diverse styles of Paleolithic art, from the simplest to the most complex, published in his work *Préhistoire de l'art occidental* (1965b).

During the twentieth century, methods for examining prehistoric art were completely reformed, thanks to Leroi-Gourhan's studies. His scrupulousness in the excavation process was translated to his analysis of painted walls, where the study of each figure in relation to its neighbors, and to the rest of the panel and the topography of the cavity, enabled him to develop the hypothesis that the panels were ordered in a relationship to the central figures and that in general a duality could be observed between man and woman in the images of bison and horses.

Leroi-Gourhan's proposal articulated the existence of four great stylist phases and became the model of reference in the field till the close of the twentieth century, when the direct dating of figures from diverse locations provoked a reconsideration of these hypotheses by some researchers, sparking off a widespread controversy that persists to this day (Alcolea and Balbin 2007).

Cross-References

- ▶ Europe: Prehistoric Rock Art
- ▶ European Upper Paleolithic Rock Art: Sacredness, Sanctity, and Symbolism
- ▶ Lithic Technology, Paleolithic
- ▶ Structural Archaeology
- ▶ Style: Its Role in the Archaeology of Art

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Lev, David N.

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Basic Biographical Information

David Natanovich Lev (1905–1969) was the leading investigator of the Stone Age in Central Asia, and a professor at the University of Samarkand.

In 1931, he graduated from Leningrad State University with an archaeologist specialty. From 1931 to 1942, David Lev worked in the Department of Archaeology of the Museum of Anthropology and Ethnography at the Academy of Sciences of the USSR in Leningrad as a researcher and then as head of the department. During this period, he published two guides on the Department of Archaeology and collections stored there relating mainly to the old mining. D.N. Lev had dedicated his Ph.D. dissertation (thesis) to the history of ancient mining. He graduated in 1945. He was a close disciple of P.P. Efimenko, and participated in Efimenko's excavations at Kostenki. At the same time, fate brought Lev together with another major archaeologist – V.A. Gorodtsov. Circumstances were that in the 1930s, when V.A. Gorodtsov was still full of strength and energy and seeking to organize large archaeological expeditions, only two of his young scientific friends were true, selfless helpers: D.A. Krainov and D.N. Lev, together with Gorodtsov, excavated the Elizabethan settlement in the Kuban and the Ilsk Paleolithic site.

From 1944 to 1969, David Lev was the head of the Department of General History in the History Department at the University of Samarkand, where he led the preparation of extensive field research on the Paleolithic of Uzbekistan.

Major Accomplishments

David Lev's studies provided excellent results, especially those concerning the systematically excavated cave of Aman-Kutan near Samarkand and Samarkand late Paleolithic site. Aman-Kutan was widely known among archaeologists in the Soviet Union and abroad, and now, following Teshik-Tash and Obirakhmat, is one of the richest expressions of Mousterian cave settlements of Central Asia.

The excavations of Samarkand site, from 1958 to 1968, were very fruitful. Materials of late Paleolithic settlements are unique, because in the huge territory of Central Asia and Kazakhstan, they discovered for the first time the bones of an old man of the modern physical type of *Homo sapiens sapiens*. Samarkand revealed three cultural layers, separated by a sterile layer at a depth of 1.70–6 m from the ground surface. The deposits included stone products (over 800 items), fossil fauna, the remains of dwellings, ochre, and objects of art. The materials of the Samarkand site, published in a number of papers by D.N. Lev, certainly helped to resolve many important issues of the Stone Age, not only in Central Asia but also in Iran, Pakistan, India, and other countries.

The great discoveries of archaeological sites of Paleolithic Time were added with Mesolithic and

Neolithic complexes so-called Sazagan culture in Samarkand region. The Sazagan antiquities were opened by O.I. Ibragimov, and investigated by D.N. Lev from 1966. These artifacts enabled identification of some features of the Neolithic inhabitants, and the evolution and continuity of the Stone Age cultures of Zarafshan.

David Lev is best known as the researcher of Paleolithic Uzbekistan (Mousterian cave site Aman-Kutan, Samarkand Upper Paleolithic), but his archaeological work was comprehensive and included analysis of the monuments of different archaeological periods. Lev surveyed and registered additional monuments almost every time he visited the Zarafshan Valley. His scientific publications are not very widely known among researchers, despite their undoubted importance. Most of the results of his research remained in his diaries, manuscripts, and archives of the Department of Archaeology in the History Faculty of Samarkand State University. Among these is a general report on his work, submitted for the degree of Doctor of Sciences on the theme: "*Research on the Paleolithic of Uzbekistan*" (1966).

The style of David Natanovich's scientific activity was the use excellent language and an absence of repetition. The abundance of empirical data, which he owned, provided material that would have allowed Lev to write much more than the number of his printed works (about 50 titles). Nevertheless, his materials on Paleolithic sites of Uzbekistan received world recognition.

Teaching activities have an important place in the biography of David Lev. The lectures of Lev had great success. He channeled all the passion of his inquisitive nature into his lectures. He sought to give the students not only large knowledge, but convey to them the thirst for investigation and joy of archaeological inspiration. He wanted not only to give his listeners certain information, but also to share his passion for archaeological research with them.

D.N. Lev was a founder of the Scientific Laboratory for the historical and archaeological study of settlement Afrasiab at Samarkand State University.

David N. Lev combined a deep knowledge on the Stone Age, mining, ethnography, and museum studies with teaching activity (1941–1969) at Samarkand State University. Unfortunately, the scientific and organizational creativity of D.N. Lev is still not widely appreciated in archaeological literature, but this publication goes some way toward redressing this.

Cross-References

- ▶ Central Asia: Paleolithic
- ▶ Gorodtsov, Vasily A.
- ▶ *Homo sapiens*
- ▶ Kostenki: Geography and Culture
- ▶ Lithic Technology, Paleolithic
- ▶ Mousterian Industry Tradition
- ▶ Okladnikov, Alexey P.

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Levallois Technology: Overview of Middle Paleolithic Technologies

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Introduction

The Middle Paleolithic (MP), generally speaking, is the period characterized by the emergence

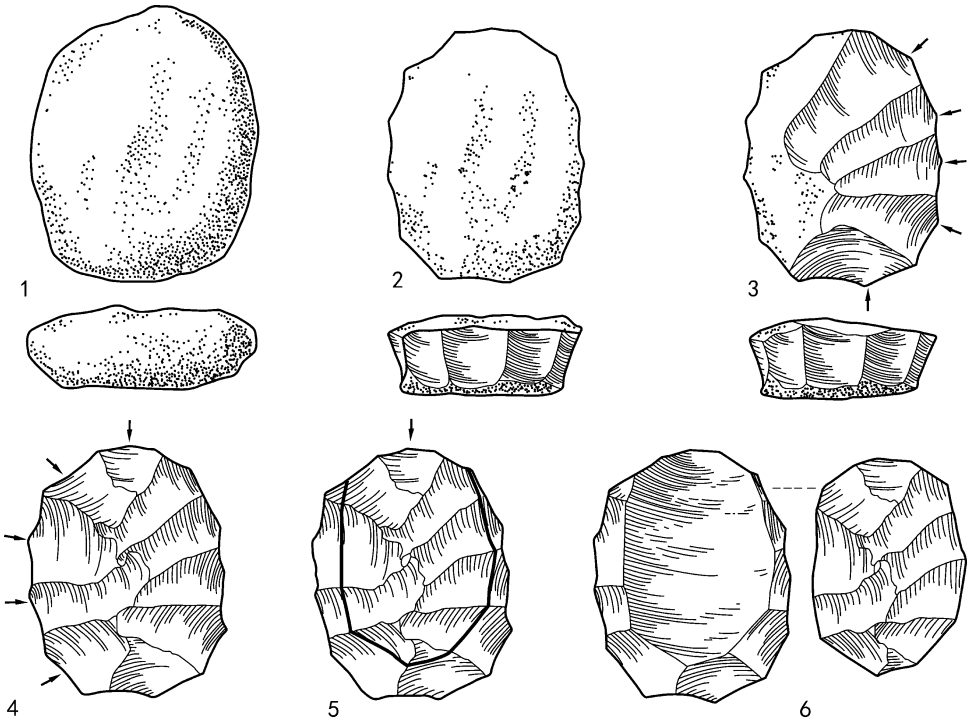
and spread of Levallois technology and various flake tools, spanning circa 250,000–300,000 to 40,000–50,000 years ago. The Levallois technology of Middle Paleolithic was associated with at least three hominin populations: late *Homo heidelbergensis*, *Homo neanderthalensis*, and *Homo sapiens*. As the Middle Paleolithic were replaced by the Upper Paleolithic associated with behaviorally and anatomically modern humans who migrated out of Africa around 40,000–50,000 years ago, this reasoning engenders big questions such as the disappearance of the Neanderthals and their cultures, the dispersal of modern humans, and their cultural and physical interactions with archaic hominin groups. Such unsolved problems have drawn a great deal of attention among both the prehistorians and the public. Levallois technology seems to have its origins in the Lower Paleolithic Acheulian (Adler et al. 2014; Rolland 1995); however, its use became much more prevalent in the Middle Paleolithic. As one of the most sophisticated lithic technologies, research relating to the Levallois method has dominated the Middle Paleolithic literature including topics such as the cognitive ability and depth of planning of archaic hominins, economy of lithic technology, diffusion and interaction of technology, and social learning of lithic technology.

Definition

Levallois, named after a stone quarry in the northern Paris suburb of Levallois-Perret, is a sophisticated core reduction method for producing relatively standardized flake and blade blanks. In general, Levallois flaking involves careful preparation of the core in such a way as to predetermine the shape of the intended blanks, which distinguishes it from other flaking methods. The first attempt to identify unique Levallois artifacts dates to 1867 (Schlanger 1996), yet the first formal definition of Levallois flakes was made much later by Reboux (quoted by Schlanger 1996) as being "they were prepared and trimmed on the core before being separated." Subsequently, little by little, additional criteria for the definition of Levallois were added which emphasized the end products of classic Levallois types, including facetted striking platforms, the angle between the platform and interior surface, a stable longitudinal and cross section, etc. In the mid-twentieth century, François Bordes (1961a, b), a French prehistorian, formulated his now-famous definition of Levallois blanks with technological criteria and presented a framework of the main Levallois types (Fig. 1). For Bordes, Levallois consists of the manufacture of a "flake of a form predetermined by special preparation of the core before removal of the flake" (Bordes 1961a: 14). Although prevalent for more than three decades, many "Levallois" assemblages which do not fit Bordes' definition have been identified by many scholars. Faced with this disparity, pioneering work in the 1980s and early 1990s done by Marks (Marks and Volkman 1983), Boëda (1986, 1995), Van Peer (1992), and others emphasizing refitting and experimental studies initialized a new era for research on Levallois technology. Following the French approach called *chaîne opératoire*, researchers emphasized the reduction sequence consisting of a dynamic process from raw material procurement to the discard of exhausted stone artifacts, instead of a handful of pristine end products representing a narrow typological range of variability. Thus, it has become increasingly apparent by the early 1990s that the definition of Levallois technology should focus on the underlying manufacturing processes rather than on the end products themselves (Dibble and Bar-Yosef 1995).

The most detailed studies of European Middle Paleolithic industries are those carried out by Eric Boëda (1986, 1995). Boëda has identified what he refers to as a basic "Levallois concept" with a volumetric reconstruction representing the unifying element behind all flaking techniques to which the term Levallois can be properly applied. Six technical criteria were used for defining a Levallois core (Fig. 2; Boëda 1986, 1995):

1. Two asymmetrical convex secant surfaces form the core volume, and the intersection of these surfaces defines a plane.
2. The two core surfaces are hierarchically related: one produces defined and varied blanks that are predetermined, and the other



Levallois Technology: Overview of Middle Paleolithic Technologies, Fig. 1 Stages of production of a classic Levallois core, according to Bordes 1961b

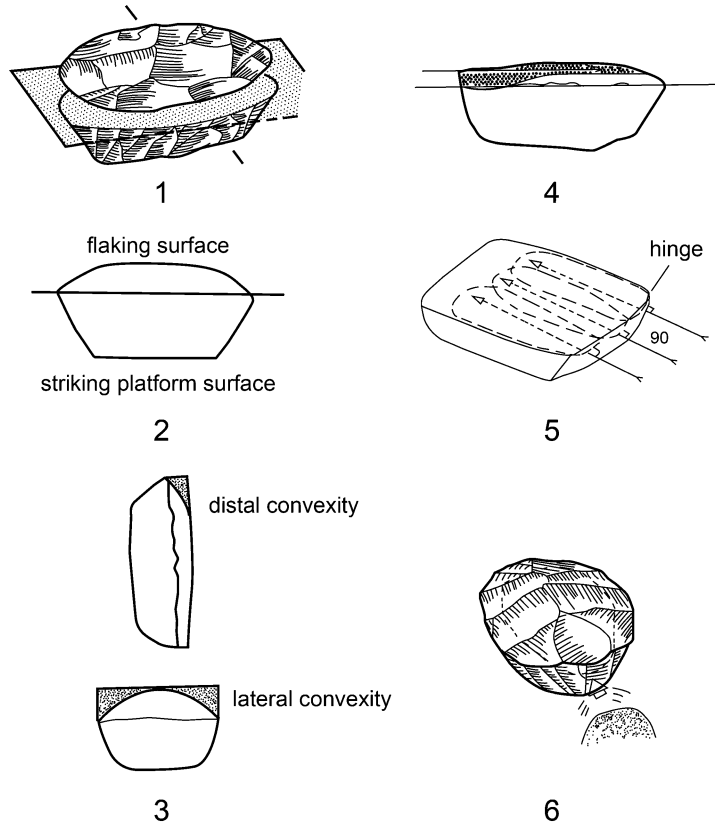
serves as a surface for striking platforms. The role of the two surfaces cannot be reversed in a single production sequence.

3. The flaking surface is prepared for predetermined products consisting of maintenance of the lateral and distal convexities.
4. The fracture plane of the predetermined blanks is parallel to the plane of intersection of the two core surfaces.
5. The striking platform is maintained depending on the method chosen for the detachment of predetermined blanks but always exhibits one characteristic – the surface of striking platforms is always oriented in a position that is perpendicular to the flaking axis of the predetermined blanks.
6. Only one technique of flaking is used in the Levallois operational scheme: direct hard hammer percussion.

Two large clusters of Levallois methods have been observed in the Paleolithic record: a preferential method designed to produce a single major blank as the goal from one prepared surface and a recurrent method intended to produce several blanks from a single flaking surface without any re-preparation during the reduction (Boëda 1995). The shape of predetermined Levallois products varies and can be oval or rectangular in outline (what are generally referred to as Levallois flakes), elongate and narrow (Levallois blades), and triangular (Levallois points). However, Levallois reduction also produces many generalized flakes and certain technical spalls including débordant and dos limité flakes during the rejuvenation and maintenance of the core platforms and flaking faces.

Key Issues/Current Debates/Future Directions

Opinions concerning the roots of Levallois technology vary although, generally, scholars agree that it originated in the Acheulian technocomplex of the Lower Paleolithic. As a prepared-core



Levallois Technology: Overview of Middle Paleolithic Technologies, Fig. 2 Boëda's technological criteria for identifying the Levallois method (drawings modified after Boëda 1995)

technology, the Victoria West (also called "proto-Levallois") core technology in South Africa, dating to approximately 1 Ma, was considered by many to be the antecedent of Levallois technology (Riet Lowe 1945). More recent work has led many authors to emphasize in situ evolution from handaxe technology (Adler et al. 2014; Rolland 1995). However, the timing of the transition from Acheulian to early Levallois assemblages in different regions is not simultaneous. The picture of continuity in Africa combined with the discontinuity and apparent lack of any proto-Levallois stage in Europe lends support to Foley and Lahr's (1997) "Mode 3" hypothesis that advocates an exclusive African genesis for prepared-core technology. On the contrary, others have proposed a multiregional origin of Levallois technology in geographically dispersed regions (Adler et al. 2014; Rolland 1995). Discoveries of the early synchronic use of bifacial and Levallois technology in the Southern Caucasus (Adler et al. 2014), Northwestern Europe (White and Ashton 2003), and Southwest Asia (Debono and Goran-Inbar 2001) all tend to suggest that the transition from Acheulian to Levallois occurred independently in geographically dispersed, technologically precocious hominin populations with a shared technological ancestry (i.e., technological convergence).

The spatial distribution of Levallois technology during the Middle Paleolithic includes Africa, Europe, West and Central Asia, and the Indian subcontinent, and, of course, variations among Middle Paleolithic Levallois assemblages are present in different regions. The presence of this technology in a vast area which encompasses many geographically and environmentally variable regions raises many interesting research questions. For example, some authors have suggested that the Levallois technology signals the dispersal of specific hominin population (s) across the Eurasia toward the East

(Bar-Yosef and Belger-Cohen 2013; Foley and Lahr 1997). Instead of a population dispersal model, shared knowledge of knapping methods may have been the major component in such dispersals through cultural transmission (Lycett and Norton 2010; Lycett et al. 2016). Scholars have also considered economic explanations (e.g., Brantingham and Kuhn 2001; Lycett and Eren 2013). Brantingham and Kuhn (2001) presented a geometric model that permits controlled manipulation of a few key parameters defining Levallois core morphology, concluding that mechanical and economic constraints are the main factors underlying the broad geographic distribution and temporal persistence of Levallois reduction technologies.

A number of authors have considered possible cognitive implications of the Levallois technology. As one of the most sophisticated lithic technologies for producing predetermined blanks, the Levallois approach involves strategic planning of knapping procedures, including deliberate preparation of the core platforms and detachment surfaces. Many argue that both the products and the procedure of these Paleolithic knapping methods were clearly predetermined in terms of overall size and shape which implies a level of cognitive ability (Boëda 1995; Schlanger 1996). Wynn and Coolidge (2004) have used Levallois to support arguments that Neanderthals were capable to possess a long-term working memory. Others have even used this sophisticated lithic technology to advocate the linguistic capacity of extinct hominins (Lieberman 1984). However, a small number of researchers demonstrated that the Levallois products are not necessarily statistically more standardized than non-Levallois products; thus their manufacture could not be linked to the presence of linguistic rules, structure, or categories (Dibble 1989). Recent morphometric comparison of experimental preferential Levallois flakes and debitage flakes shows statistically significant standardization among Levallois flakes (Eren and Lycett 2012). Eren and Lycett's results (2012) support the hypothesis that the lengthy, multiphase, and hierarchically organized process of Levallois reduction was a deliberate, engineered strategy orientated toward specific goals. In turn, their results suggested that Levallois knapping relied on a cognitive capacity for long-term working memory and may also imply that the cognitive capacity of Neanderthals and modern humans was not as sharp as some scholars have previously suggested (Eren and Lycett 2012).

The Middle Paleolithic includes a great deal of industrial variability represented by several named technocomplexes throughout the Old World. Therefore, inter- and intra-site and regional Middle Paleolithic industrial variability is a crucial issue, although it has tended to be neglected by paleoanthropologists. In addition to the Mousterian technocomplex which is commonly associated with Levallois technology in Western Europe, many other Middle Paleolithic industries are present in the Old World, including the pre-Mousterian, the Micoquian, the Tayacian, and the Taubachian, among others, from Western, Central, and Eastern Europe, the Levantine Yabrudian, and the Middle Stone Age of Africa (Dibble and Mellars 1992). In addition to the major knapping method – Levallois – many other flaking technologies were present in the Middle Paleolithic, including discoidal, "salami slice" (Quina), and blade technology, etc. A more striking phenomenon of the Middle Paleolithic variability is that contemporaneous lithic assemblages in East and Southeast Asia differ greatly from those of Western Eurasia and Africa in that they lack prepared-core technologies in general. Archaeologists have argued for a distinctive and continuous technological evolution of the East Asian Paleolithic since the Early Pleistocene (Gao 2013), while others suggested a demographic model that relatively smaller effective population sizes inhibited the in situ evolution of Levallois technology in East and Southeast Asia (Lycett and Norton 2010). Many of these questions have not been completely resolved to date. Nevertheless, the implications of the similarities and differences among lithic technologies in the Middle Paleolithic across the Old World – and in Levallois technology in particular – will continue to attract attention from archaeologists in terms of human dispersal and technology adaptation.

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Lévi-Strauss, Claude

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Basic Biographical Information

Claude Lévi-Strauss was born on November 8, 1908, in Brussels and raised in Paris where his

father worked as a painter. His upbringing in a secular Jewish family passionate for art gave him access to books, museums, flea markets, art galleries, and operas. During his years at the *lycée*, Lévi-Strauss became fascinated by geology, read Freud as soon as his books were translated in French, and was introduced by a family friend to the socialist movement and the works of Marx. In these three early intellectual interests, he found rational explanations for the seemingly illogical phenomena underlying the earth, the mind, and society. Lévi-Strauss passed the *agrégation* of philosophy in 1931 and became a high school teacher in Mont-de-Marsan. But his desire to apply philosophical knowledge and thirst for new discoveries pushed him toward a career as an ethnologist.

In 1934, he was offered a position as a sociology professor on a French university mission to Brazil. Before embarking on the 20-day boat trip from Marseilles, he read, what would become standards for his own research, Robert Lowie, Franz Boas, and Alfred Kroeber. At the end of his first academic year in São Paulo in 1935, Lévi-Strauss set out on a 4-month expedition to the Caduveo and Bororo tribes. Three years later, a longer expedition sponsored by the *Musée de l'Homme* allowed him to spend almost an entire year in the Mato Grosso with the Nambikwara, Munde, and Tupi-Kawahib tribes. He returned to Paris with his ethnographic material in March 1939 but was immediately sent to the front at the start of World War II. Lévi-Strauss managed to escape to southern France before the invasion of the German army. However, after the Statute on Jews was adopted in October 1940, he lost his French citizenship and any chance of finding a teaching job. In addition, his request for a visa to return to Brazil was denied.

Promised to a brilliant career in his own country, Lévi-Strauss found refuge in the United States. With the help of Alfred Métraux, Robert Lowie, and his aunt Aline Caro-Delvaille in New York, the New School for Social Research (recently opened by the Rockefeller Foundation) invited him to teach a course on South America. He would stay from 1941 to 1947 bringing with him the notes and diaries, photographs, and maps collected in Brazil used to finish a classic ethnographic report and formal analysis of his earlier expeditions' results (1948). He also spent much time in the New York Public Library collecting information on kinship systems. While in the United States, he met American anthropologists such as Boas, Kroeber, Linton, Benedict, and Mead and became the friend and colleague of other exiled intellectuals like the Russian linguist Roman Jakobson, whose structural linguistics offered Lévi-Strauss the general inspiration for the analysis of his ethnographic data.

Major Accomplishments

It was in conversation with Roman Jakobson that Claude Lévi-Strauss developed the theoretical model for which he is now best known: structuralism. Lévi-Strauss' structuralism studies human and social phenomena as diverse as kinship, mythology, and rituals to discover the underlying structures by which meaning is produced within a culture. As Jakobson did with languages, in order to go beyond the simple accumulation of facts, Lévi-Strauss examined kinship as a set of relations. Having adopted this model, he completed his thesis in February 1947 and defended it a few months later upon his return to France. The results of his labor would be published as *Les structures élémentaires de la parenté* (1949), which, if recognized by some as a reference work, was criticized, especially within French academia, as too ambitious. Lévi-Strauss' book did offer an encompassing methodology to scientifically examine family organization. Rather than focusing on the relationship between family members itself, he considered the logical structures underlying them. The methodological direction Lévi-Strauss embarked upon in the 1940s would lead, less than two decades later, to the publication of *Anthropologie structurale* (1958) – a collection of articles written in the 1950s investigating kinship, myths, magic, and art. Extending beyond the disciplinary boundaries of anthropology, this manifesto of structuralism would have a lasting influence in all fields within the social sciences and humanities during the second half of the twentieth century.

While considered by some as his least "scientific" work, *Tristes tropiques* (1955), a memoir of the anthropologist's travels combining personal recollections, ethnographic insights, and philosophical meditations, brought Lévi-Strauss the most public recognition. In this autobiographical account, he revealed a critique of western civilization and its associated destructive forces. In 1952, Lévi-Strauss was asked by the UNESCO to write *Race et histoire*. Here again, the author critically examined the supposed benefits of such taken-for-granted notions as social evolution, technological progress, and cultural diversity. The 1950s also marked a transition in Lévi-Strauss' teachings from kinship to mythology. He published the four-volume *Mythologiques*, which follows a single myth in all of its variations from South to North America. Again, rather than focusing on the content of the stories themselves, he examined the underlying structures and relations between their different elements starting with the opposition between raw and cooked (1964). In *La voie des masques* (1975), Lévi-Strauss adapted this structural framework to consider the stylistic differences among Native American masks made in the Pacific Northwest.

Among the many honors received during his lifetime, Lévi-Strauss was elected to the *Collège de France* in 1959 and entered the *Académie Française* in 1974. After retiring from the *Collège* on October 1, 1982 (50 years to the day after beginning his first job in Mont-de-Marsan), Lévi-Strauss remained active publishing *La potière jalouse* (1985), a critique of Freudian interpretations of myths, and *Histoire de lynx* (1991), deploring the human and environmental catastrophes brought on by western colonialism. He also spent time travelling and gave many interviews to journalists. In *De près et de loin*, a book based on a series of conversation between Didier Eribon and Lévi-Strauss, approaching his 80th birthday, the anthropologist reiterated the paradox behind some of his philosophical views – a pessimistic diagnosis of the destructive power of modern, western societies associated with an imperturbable faith in the totalizing power of science to understand cultural and natural phenomena. Claude Lévi-Strauss died in Paris on October 30, 2009, at the age of 101.

Cross-References

► Structural Archaeology

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Lewis-Williams, James David

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Basic Biographical Information

David Lewis-Williams was born in 1934 in Cape Town, South Africa. He undertook his undergraduate studies at the University of Cape Town, graduating in 1956. He began teaching English and

Geography at Selborne College in 1958, moving to Kearsney College in 1963. In 1965, he completed an honors degree at the University of South Africa. While at Kearsney College, he was active in running the student archaeology club. It was with students from this club that Lewis-Williams began exploring the Drakensberg mountains for San rock art. It was also during this time that he met John Argyle, an anthropologist at the University of Natal (now, the University of KwaZulu-Natal). Argyle encouraged Lewis-Williams to pursue his interest in San rock art by writing a Ph.D thesis. The thesis was completed in 1978 at the University of Natal and was then published in 1981. Entitled *Believing and Seeing: Symbolic Meanings in Southern San Rock Paintings*, the published thesis has become one of the landmark works on the symbology of rock art and has been widely cited (Lewis-Williams 1981).

In 1978, Lewis-Williams was appointed to the Department of Anthropology at the University of the Witwatersrand. While teaching in the department, he was exposed to the structural Marxist thinking that pervaded the social sciences and humanities at the time and that was so influential in South Africa's intellectual, anti-Apartheid circles. In 1982, he published the first Marxist paper on rock art, breaking radically from the functionalist interpretations of earlier and contemporary scholars (Lewis-Williams 1982). In 1980, Lewis-Williams was offered a position in the Department of Archaeology at the University of the Witwatersrand, where he would receive laboratory space for working on the hand-traced copies of large rock art panels that were beginning to become a feature of rock art research at the time. From this position, he received a grant to undertake the research and documentation of San rock art in the Harrismith District on the Maloti Mountains. On the strength of this project, Lewis-Williams established the Rock Art Research Unit, with a small dedicated team, to work on recording and researching San rock art. Later the unit became a center, and after Lewis-Williams' retirement in 1999, it received the status of an institute. He was appointed as Professor of Cognitive Archaeology in the Department of Archaeology in 1987. At the end of 2012, he continues to be Professor Emeritus in the Rock Art Research Institute, where he is still actively researching and publishing.

Major Accomplishments

Following the success of *Believing and Seeing*, Lewis-Williams began an ambitious publishing schedule, regularly producing groundbreaking papers on the interpretation of San rock art. Influenced by the work of Victor Turner, the anthropologist, Lewis-Williams established the methodology by which San rock art could be interpreted by reading ethnography, most notably the now-famous 19 Bleek and Lloyd records. From the early 1980s, he added the use of literature on neuropsychology and altered states of consciousness as an additional tool for interpretation. Throughout the 1980s, a steady stream of publications saw the deciphering of previously enigmatic images in San rock art through the combination of ethnographic and neuropsychological evidence. Much of the art was shown to concern the San's ritual practices and religious beliefs about the spirit world. In particular, Lewis-Williams argued that the art was principally concerned with the practices of San shamans (known as owners of potency in their own languages), such as their healing and rainmaking activities. Moreover, Lewis-Williams, together with a colleague, Thomas Dowson, identified the use of natural rock features in the composition of some images; certain figures were observed to be composed in a manner that made them appear to be entering or exiting features such as steps and cracks in the rock surface (Lewis-Williams and Dowson 1990). Based on these observations, Lewis-Williams and Dowson argued that the rock surface acted as a veil between this world and the spirit realm. This observation became a significant one globally and sparked the recognition of the use of natural rock features in the composition of rock art images all over the world. By the mid-1990s, the rapid rate of publication by Lewis-Williams and his students had led to a significant body of interpretative material on San rock art in southern Africa. From this point

onward, while continuing work on the San rock art of southern Africa, Lewis-Williams shifted his focus to Europe, to both the Upper Paleolithic and the Neolithic periods.

The starting point for Lewis-Williams's work on both the Neolithic and the Upper Paleolithic was the research on altered states of consciousness that had influenced his interpretative work on San rock art. Lewis-Williams, again with Dowson, argued that at least, some of the imagery in the Upper Paleolithic caves, was generated in altered states of consciousness and thus suggested that the art was made within a shamanistic context (Lewis-Williams and Dowson 1988). In 1996, Lewis-Williams, together with Jean Clottes, published the first major book arguing that Upper Paleolithic rock art was shamanistic (Lewis-Williams and Clottes 1996). This was followed by a trilogy of books, expanding Lewis-Williams's ideas on the Upper Paleolithic (Lewis-Williams 2002) and the Neolithic (2005, together with David Pearce) and on the origins of art and religion (2010). Throughout his long career, Lewis-Williams's work has a number of related threads that span his writing on San rock art, the Neolithic, and the Upper Paleolithic. These are as follows:

1. His focus on deciphering meanings of ancient images and artefacts with methods that are more than "gaze and guess"
2. His emphasis on understanding the mind and, as far as possible, the brain and how it works in creating meaning
3. His efforts to always situate the understanding of how meanings are created by the mind/brain within a social context

His research has left an enduring mark on the scholarship of the Upper Paleolithic and Neolithic periods, and his research on San rock art has defined and shaped the field for decades to come.

Cross-References

- ▶ Altamira and Paleolithic Cave Art of Northern Spain
- ▶ Art, Paleolithic
- ▶ Europe: Prehistoric Rock Art
- ▶ European Upper Paleolithic Rock Art: Sacredness, Sanctity, and Symbolism
- ▶ Leroi-Gourhan, André
- ▶ Mobiliary Art, Paleolithic
- ▶ Paleoart Studies: Scientific Methods
- ▶ Rock Art, Forms of

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Lightfoot, Kent G.

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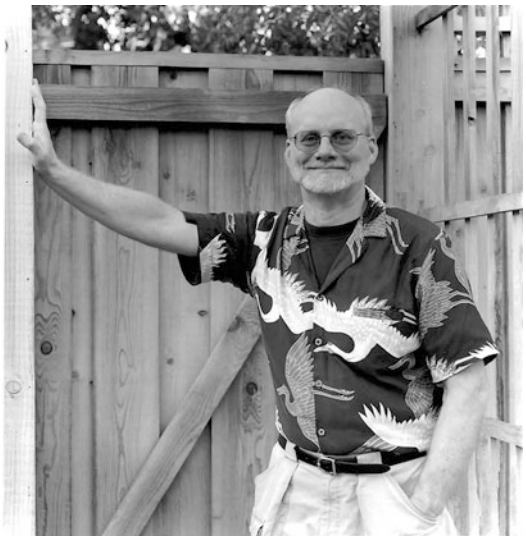
Basic Biographical Information

Dr. Kent G. Lightfoot (b. May 23, 1953) (Fig. 1) is a North American archaeologist whose research transformed the relationship between history and prehistory and who developed widely adopted practices for collaborative relationships between archaeologists and Native Americans. Kent



Lightfoot, Kent G., Fig. 1 Dr. Kent G. Lightfoot

Lightfoot was educated at Stanford University (B.A., Anthropology, 1975) and Arizona State University (M.A., Anthropology, 1977; Ph.D., Anthropology, 1981). He taught at Arizona State University (1981), Northern Illinois University (1982), and State University of New York at Stony Brook (1982–1987) before moving to the University of California, Berkeley (1987–present), where he is currently professor of Anthropology and curator of North American Archaeology at the Phoebe Hearst Museum of Anthropology. He is a fellow of the California Academy of Sciences; has received over a dozen teaching awards, including the 2007 American Anthropological Association Award for Excellence in Undergraduate Teaching; and was honored with the Society for Historical Archaeology 2007 James Deetz Book Award for *Indians, Missionaries, and Merchants* (Lightfoot 2005) and the 2010 Society for California Archaeology Martin A. Baumhoff Special Achievement Award for *California Indians and Their Environment* (Lightfoot and Parrish 2009). In addition to numerous academic publications, he is the founder and frequent contributor to a long-running essay series, titled Archaeology and Indians, in the magazine *News from Native California*.

Major Accomplishments

In North American historical archaeology, Lightfoot has been responsible for forging the study of culture contact in the archaeology of colonization, fundamentally transforming the perceived relationship between history and prehistory and developing practices for collaboration between archaeologists and indigenous communities. His landmark article, "Culture Contact Studies" (Lightfoot 1995), charged that the disciplinary division between prehistoric and historical archaeology created an ethnically segregated view of the North American past, in which Native American cultures are studied by prehistorians, and nonindigenous cultures, by historical archaeologists. As a result, present-day and historical Native American communities were used primarily as a source of analogy for prehistoric archaeology or were neglected altogether. Lightfoot critiqued the privileging of documentary evidence over archaeological evidence in the interpretation of colonial sites, as such documents rarely represented the Native American- and African-descendant laborers who were the majority of residents at most European colonial settlements in North America. Building on his prior research on cultural change in the US Southwest (Lightfoot 1984), Lightfoot argued that European colonial settlements must be studied within the long-term, comparative perspective afforded by the conjuncture of prehistoric and historic archaeology.

Lightfoot first implemented this approach through sustained research during the 1990s and 2000s at Colony Ross (also called Fort Ross) (Fig. 2), a Russian colonial settlement established on the Central California coast during 1812–1841. Russian colonial administrators conscripted Native Alaskan Alutiiq men to work as sea mammal hunters at Colony Ross and drew domestic and agricultural laborers from nearby villages of the Kashaya Pomo, the Native Californian tribe on whose ancestral land Colony Ross was founded.

Under Lightfoot's direction, research at Colony Ross followed several core principles that have now been widely adopted in the archaeology

Lightfoot, Kent G., Fig. 2 Dr. Kent G. Lightfoot during field research at Colony Ross, 1994

of colonization: (1) sustained collaboration with descendent communities, including adopting culturally appropriate research practices and field methods that minimize disturbance to archaeological deposits; (2) expanding the spatial framework of analysis from the central colonial compound to include labor encampments, task-specific sites, and regional networks of indigenous and colonial settlements; (3) integrating data from prehistoric and historic sites to facilitate long-term diachronic comparative analysis; (4) emphasizing multidirectional cultural exchange within the pluralistic demography of colonial settlements; and (5) concern with the long-term political and cultural consequences of colonization for present-day indigenous communities. Lightfoot's initial research at Colony Ross focused on the interethnic households formed by Native Alaskan men and Kashaya Pomo women under Russian supervision (Lightfoot et al. 1998). In contradiction to acculturative models of unidirectional cultural change, Lightfoot and his team found that despite intimate intercultural engagements, Russian, Alutiiq, and Kashaya residents of Colony Ross largely adopted only those cultural innovations that "fit" within their preexisting conceptions of what constituted proper behavior. Within the upheavals of colonization, there was great continuity between prehistoric and historic spatial patterns, material culture, and foodways. Subsequent studies at Colony Ross have investigated several Kashaya Pomo village sites, both near to and far from the colonial settlement, and task-specific colonial outposts such as ranches and boat docks.

In the book *Indians, Missionaries, and Merchants: The Legacy of Colonial Encounters on the California Frontiers* (Lightfoot 2005), Lightfoot expanded this research program to compare the long-term effects of Russian and Spanish colonization for Native Californian communities today. Using a methodology he terms holistic historical anthropology, Lightfoot drew on sources from ethnohistory, ethnography, native texts, and archaeology to compare multiple dimensions of colonization, including enculturation programs, resettlement programs, social mobility, labor practices, interethnic unions, demographic parameters, and temporal dimensions. He concluded that there were three basic processes of cultural change that unfolded in colonial-era California: indigenous political consolidation in the northern California regions affected by Russian colonization, massive Spanish-colonial resettlement programs in the central California missions, and modified relocation in the southern Spanish-colonial California missions. Significantly, Lightfoot determined that these differences in historical experience had far-reaching effects for Federal recognition of indigenous tribes in the present day, with those Indian descendants of the northern missions facing the most difficult task of proving political and cultural autonomy in the face of disruptive resettlements and ever-changing social and economic conditions.

Lightfoot's current research expands this diachronic, comparative methodology to archaeological studies of indigenous environmental management and historical ecology. With Kashaya Pomo elder Otis Parrish, Lightfoot coauthored the reference book *California Indians and Their Environment* (Lightfoot and Parrish 2009). Most recently, in collaboration with Mutsun Ohlone band member and environmental scientist Chuck Striplen, Lightfoot has directed a series of archaeological field research projects investigating indigenous environmental management practices on state-owned lands, in order to improve Native Californian access to traditional resources and to inform government land management strategies used by government agencies (e.g., Cuttrell et al. 2012).

Lightfoot has also made important advances to the prehistoric archaeology of the North American Pacific Coast, especially through synthetic analyses of existing research and new research on prehistoric mound-builders in Central California (e.g., Lightfoot 2011) (Fig. 3). His career is also marked by continual attention to methodological innovation, from pioneering statistical analysis of archaeological survey methods and site detection probabilities to more recent efforts to develop minimally invasive and culturally sensitive field methods (Lightfoot 2006).

Lightfoot, Kent G., Fig. 3 Dr. Kent G. Lightfoot with UC Berkeley student Ryan Posca during archaeological survey at Pinnacles National Monument, 2011

Cross-References

- ▶ Colonial Encounters, Archaeology of
- ▶ Cultural Heritage Management and Native Americans
- ▶ Indigenous Archaeologies
- ▶ Local Communities and Archaeology: A Caribbean Perspective
- ▶ Mission Archaeology in North America
- ▶ North America (USA): Historical Archaeology
- ▶ People as Agents of Environmental Change

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Lima, Tania Andrade

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Basic Biographical Information

Born in Rio de Janeiro, Brazil, Tania Andrade Lima graduated in Archaeology in 1979 at the Universidade Estácio de Sá (Rio de Janeiro, Brazil). In 1980, she received a specialization at the Universidade Federal do Rio de Janeiro, obtaining a doctorate degree in sciences (Archaeology) from the Universidade de São Paulo in 1991.

Currently, she is an Associate Professor at the Anthropology Department of the National Museum/Rio de Janeiro Federal University, and a researcher at the Brazilian National Council for the Scientific and Technological Development (CNPQ).

Major Accomplishments

Lima began her professional career in the 1980s as a pre-historian. Back then she was investigating a regional settlement system of fishermen/gatherers in the islands of Ribeira Bay, Angra dos Reis, for her Ph.D. research. It was precisely due to one of these shell-middens that she got interested in Historical Archaeology, and more specifically as a result of the presence of nineteenth-century remnants at their superficial deposits. At that time, Historical Archeology in Brazil was just giving its first steps by producing scarce and isolated researches.

Through observing and comparing the similarity of the material culture recovered from these investigations – usually considered apparently insignificant objects – Lima understood that she was standing before a phenomenon that configured a peculiarity in the Brazilian social formation: the rising of a bourgeoisie way of life yet during the slavery era that preceded the implantation of capitalism itself. The latter only took place with the consolidation of the republican regime and the industrializing process in the twentieth century.

Alongside the studies on prehistoric archaeology, Lima has devoted much of her attention to the study of the slow process of substituting the old mentalities for a progressively broader capitalist vision, focusing on the embryonic stage of capitalism in Brazil in the nineteenth century. Basically working with domestic units in both rural and urban environments, Lima has investigated the close relation between ordinary daily lives

and the major economic, politic, and social changes taking place through unconscious, daily, and anonymous behaviors. She has also analyzed the symbolic aspects of domestic material culture and the statement that nineteenth-century society of Rio de Janeiro was making about itself by means of used objects in table rituals, hygienic body practices, children's plays, and also through the iconography of gravestones (Lima 1994, 1996, 1999).

Another approach considered by Lima to the perspective of embryonic capitalism in Brazil is the Archaeology of Slavery. She did so by excavating a slave house in a coffee plantation at Paraíba Valley and later by analyzing low social prestige trades performed by urban slaves in one of the main downtown squares in Rio de Janeiro (Lima 2008). Most recently, in a research drawn specifically toward this goal, she found the remains of Valongo at the seaport zone, which was the exclusive slave wharf in the first half of nineteenth century. This was the harbor that received the greatest number of Africans destined for slavery in the Americas. Along with these remains, an exceptional collection of objects related to personal and magical-religious use was found. As an African Diaspora Memorial, the Valongo site has been transformed into a monument of reference to African-descendants communities in Brazil, and a new square has been specially considered to allow Valongo's presentation and its interaction with the public.

One of the most remarkable characteristics of Tania Lima's work is her astonishing capacity of using oral and written language to create a story that seduces the reader by transforming archaeology into much more than a simple interpretation of the past.

Cross-References

- ▶ African Diaspora Archaeology
- ▶ Brazil: Historical Archaeology
- ▶ Capitalism: Historical Archaeology
- ▶ Colonial Encounters, Archaeology of
- ▶ Engendering Historical Archaeology
- ▶ Social Identity in Historical Archaeology

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Linearbandkeramik Site Excavation

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Introduction and Definition

The Linearbandkeramik (Linear Pottery culture, LBK) is the earliest Neolithic culture so far defined in Central Europe. At its maximum extent, it reaches from western Hungary (where it emerges around 5500 cal BCE) to the Paris Basin, into Ukraine, and as far as the Northern European Plain. The LBK is characterized by a distinctive style of pottery (with linear bands) and monumental wooden longhouses flanked by pits. Enclosures and burial grounds also occasionally occur. In the earliest phase (until about 5250 cal BCE), material culture is more uniform,

but this gives way to increasing regionalization until the LBK is finally replaced by a series of successor cultures, a regionally varied process completed by about 4900 cal BCE.

Key Issues/Current Debates/Future Directions/Examples

Finding Sites

Most LBK sites are located on fertile *loess* soils, on the terraces of river valleys. Loess is a windborne glacial sediment deposited during the Ice Age which turned to fertile black earth. Subsequent decalcification and brunification have since degraded these soils, a process which began before the Neolithic and continued to at least the Iron Age. It has resulted in the top *A horizon* becoming much more lightly colored, and this has obscured the top sections of any Neolithic features and parts of their stratigraphy. Degraded black earth can also filter downward through cracks, so that the cuts of features are often indistinct and smudged.

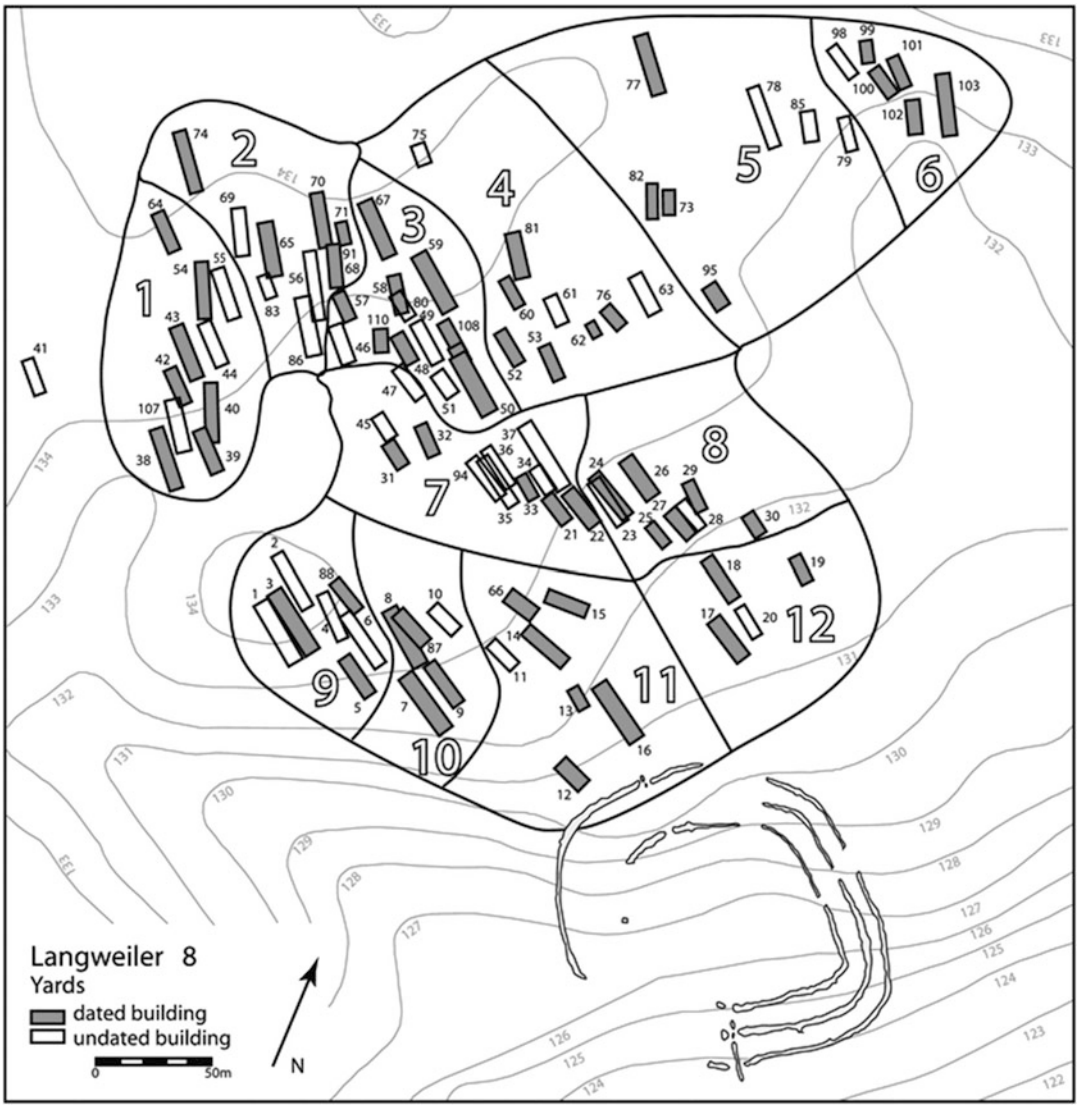
After the Neolithic, but particularly after the Roman period, cultivation caused erosion in higher parts of slopes and the consequent deposit of colluvium in the river valleys. Where loess soils are still being plowed today, LBK sites are easy to locate from pottery on the surface, but generally at least half a meter of their deposit has been lost through plowing. Old ground surfaces and floor layers are thus not preserved, leaving only traces of cut features. Conversely, any sites in valley bottoms are now buried under colluvium. The bone is also not well preserved in many areas (Schalich 1988). One difficulty in digging a Bandkeramik site is hence to identify features which have virtually blended into the surrounding loess (and which may only become visible over time or in specific weather conditions).

Excavation

The destruction of a large part of the Aldenhoven Plateau in the German Rhineland in the course of opencast lignite mining in the 1970s and 1980s first provided an opportunity to study a whole LBK landscape and (alongside similar excavations in the Aisne valley, France (Ilett 2012), and at Bylany in Bohemia (Pavlů et al. 2017)) has fundamentally framed the way we approach these sites. An entire valley comprising nine LBK settlements and one burial ground was excavated under rescue conditions in a multidisciplinary project led by Jens Lüning, revealing hundreds of intercutting houses alongside pits and earthworks (Fig. 1).

The main challenge became to understand the chronological development and settlement structure of the sites. Sequencing was mainly achieved by pottery seriation and resulted in the definition of 14 chronological phases. On the basis of dated pits associated with house plans, it was shown that houses shifted within a circumscribed area of the settlement, termed a "yard" (Zimmermann et al. 2005; Zimmermann 2012). Contemporary houses were hence tens of meters apart from each other, while overlapping house plans were separated by several phases. The duration of each phase was estimated at around 25 years. In addition, on the basis of production waste, it emerged that the largest settlement in the valley, Langweiler 8, imported high-quality flint from the Netherlands, which was then passed on to other sites. Environmental analyses also indicated that the area was rapidly abandoned at the end of the LBK, when there was a distinct reforestation episode (Zimmermann et al. 2005).

Excavation method has usually employed the *spit*, where the deposit is lowered in an artificial horizontal slice c 10 cm thick (American *arbitrary layer*; here often called a *planum*, pl. *plana*). Pits may be *box-sectioned* (where the section is extended into subsoil), and all the material collected together and attributed to the feature. Otherwise a subterranean feature may be divided into *quadrants*, each excavated in artificial spits. Excavating alternate quadrants gives continuous orthogonal profiles through the feature fill (Fig. 2). Where layers are hard to distinguish visually or features are complex, the latter is the preferable method as it allows for both horizontal and vertical controls. These approaches have their rationale in the difficulty of defining edges, the need to supervise untrained helpers, and time constraints.



Linearbandkeramik Site Excavation, Fig. 1 Plan of the settlement of Langweiler 8. (After Stehli 1994: 87)

Future Developments

Although it is hard to overstress the range and quality of the previous work carried out under difficult conditions, newer projects have challenged many aspects of the original models. For example, at Vaihingen in southwest Germany, two pottery styles existed simultaneously and were associated with different yard clusters, termed "clans," and also defined by other material culture and economic preferences (Bogaard et al. 2011, 2016), and this spatial dimension may also be important in the Rhineland (e.g., Van de Velde 2007). Rather than self-sufficient households, there could have been factions within each LBK site, an aspect which can only be addressed by excavating large parts of a site and comparing artifact distributions in detail.

In recent years, large-scale rescue excavations have also taken place in other regions, for instance in Saxony, and numerous LBK settlements have been completely or largely exposed. This showed that sites can occasionally also

Linearbandkeramik Site Excavation, Fig. 2 Part of the Bandkeramik site of Wang (Lower Bavaria) under excavation, showing parts of a house and associated features. (Photo: Alasdair Whittle)

occur in landscape settings which diverge from the expected pattern, in this case away from streams and rivers. Instead, elaborate wooden wells were constructed to secure the water supply. These have been block lifted for excavation and have yielded a wealth of environmental and technological information, as well as in some cases evidence for ritual deposition at their base (Stäuble and Veit 2016; Elburg 2011).

Future method should focus on obtaining more stratigraphic information and on the elucidation of formation processes. Layers can be hard to recognize, and how pit fills formed remains elusive (Stäuble and Wolfram 2012). Was chronologically homogenous material deposited quickly, or are we dealing with mixed assemblages, perhaps in a secondary position? To answer these questions, material should at the very least be collected in artificial spits and investigated for refits, with additional methods such as micromorphology employed where possible. However, there is scope for stratigraphic excavation at some LBK sites, and this should be attempted where possible to better understand formation processes and sequence.

There is also much scope for further radiocarbon work. Many existing dates have been taken from the charcoal of long-lived species or from bulk samples. This is of doubtful value. As it is currently debated whether the "earliest" and subsequent phases of the LBK culture overlap, tighter dating frameworks are needed. The problem is even more acute for the beginning and ending of the LBK. Mesolithic groups could have coexisted with the LBK for varying durations, and it is unclear whether the transition to the post-LBK cultures was dramatic and rapid or a slow mosaic process with several generations of coexistence. Promising beginnings have been made in dating the ceramic sequences of some regions (Denaire et al. 2017), and it is to be hoped that future work can significantly enhance both the overall dating framework and the biographies of individual sites.

Finally, isotopic work is routinely identifying individuals who did not spend their childhood on loess soils. This indicates that the LBK settlement system may have included a substantial upland component (Turck et al. 2012). Identifying such non-loess settlement sites remains an important challenge for the future.

Cross-References

- ▶ Europe: Mesolithic-Neolithic Transition
- ▶ Excavation Methods in Archaeology
- ▶ Neustupný, Evžen
- ▶ Radiocarbon Dating in Archaeology
- ▶ Zvelebil, Marek

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Basic Biographical Information

Dr. Dorothy T. Lippert (2-18-1967–) is a Native American archaeologist from the United States currently working as a Case Officer in the Repatriation Department at the Smithsonian Institution's Natural History Museum. Of Choctaw Nation decent, Dr. Lippert graduated from Lee High School in San Antonio, Texas, and was chosen "Outstanding Teen" in 1985 in a program sponsored by the San Antonio Express-News. She received a Bachelor of Arts from Rice University and a Doctorate from the University of Texas at Austin, both in Anthropology. Dr. Lippert currently lives in Arlington, Virginia, United States.

Major Accomplishments

Dr. Lippert is known for her participation in the indigenous archaeologies movement by advocating for the repatriation of Native American remains and funerary items to their affiliated Native American communities. With other members of the Closet Chickens, an informal group of

Native American archaeologists, Dr. Lippert has critiqued anthropology's sordid past researching Native American communities and their cultural remains. She has been instrumental in providing alternative methods to working with Native American communities, methods that recognize that Native American remains and cultural remains should be treated with respect, dignity, and humanity. Dr. Lippert is the Indigenous Representative to the Executive of the World Archaeological Congress and is a past member of the Board of Directors for the Society for American Archaeology. In 2011, Dr. Lippert was appointed by President Barack Obama to serve on the Advisory Council on Historic Preservation (ACHP), an independent United States government entity which promotes the preservation of historic resources. Important academic papers include "Echoes from the Bones: The Importance of Maintaining a Voice to Speak for the Ancestors" (Lippert 2010), "The Rise of Indigenous Archaeology: How Repatriation has Transformed Archaeological Ethics and Practice" (Lippert 2008), and "Remembering Humanity: How to include Human Values in a Scientific Endeavor" (Lippert 2005).

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- ▶ Closet Chickens
- ▶ Indigenous Archaeologies
- ▶ Repatriation: Overview

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Lithic Technology, Paleolithic

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Introduction

Paleolithic stone tool technology extends over a period of close to 2.5 Ma and provides a unique dataset for the study of early hominin behavior. While it is safe to assume that technologies involving organic materials played a critical role in the adaptation and society of early humans, these materials rarely survive so archaeologists are forced to pull as much information as is possible from the study of lithic assemblages.

Historical Background

Archaeologists working in Eurasia tend to structure the Paleolithic into the Lower, Middle, and Upper Paleolithic, while Africanists use the terminology of Early, Middle, and Late Stone Age. There are a multitude of regional level subdivisions of these periods. Transitional industries – such as the Chatelperronian, which is found at the Middle to Upper Paleolithic transition in Western Europe, or the Fauresmith, which is associated with the transition from the Early to Middle Stone Age in Southern Africa – are often the focus of particular interest and debate. In an effort to cut across regional variation Grahame Clark defined five modes of stone tool production (Foley and Lahr 2003). Clark defined mode 1 as simple chopper and flake industries, mode 2 as the production of large flakes and shaped tools such as handaxes mode 3 as production of flakes from prepared cores, and mode 4 as blade production and a diversified tool assemblage. For mode 5, Clark emphasized the development of microlithic tools, which he associated with the Mesolithic.

Key Issues/Current Debates

In the current state of the discipline, Clark's modes of tool production can be reformulated as a series of major themes that are central to contemporary research on Paleolithic stone tool technology (for another approach, see Shea 2012). The first question looks at the earliest stone tools and questions the complexity of production methods. Ultimately, the goal is to understand the evolutionary context for the appearance of stone tool technology in the hominin lineage. The next question looks at the transition to shaped artifacts, principally hand axes and cleavers, in relation to the evolution and dispersal of *Homo erectus*. The third issue is the emergence of prepared core technologies. Archaeologists are questioning the relationship of prepared core technology with changes in hominin cognitive capacity and exploring the significance of variability within these industries. A final question revolves around the origins and development of projectile technology during the later stages of hominin evolution. Increasingly experimental studies are shedding light on the performance of stone projectile tips and developing criteria for identifying hunting techniques.

The Origins of Tool Use

Ethological and experimental research on tool use by primates and other animals provides important context for the study of the earliest stone tool industries (Schick et al. 1999). The oldest known stone tools are found in the Hadar region of Ethiopia and are securely dated between 2.3 and 2.4 Ma ago based on argon ages on volcanic tuff layers (Semaw 2000). At the Hadar, the stone tool technology seems to be extremely simple, and tool types are restricted to flakes and choppers. Choppers are cobbles with a series of flake removals, often alternating off two faces of the cobble, along one edge (Fig. 1). The evidence from the Hadar suggests that stone tool technology emerged gradually and that hominins were simply striking flakes off the edge of a cobble. However, evidence from the site of Lokalalei in Kenya presents a very different picture of early stone tool technology. At Lokalalei, which is dated to 2.3 Ma ago, it was possible to refit flakes onto the cores from which they were removed. This analysis showed that core reduction involved long sequences, reaching as many as 50 removals from a single core, and that the knappers organized flaking based on a spatial model of the core (Delagnes and Roche 2005). In Southern Africa, the earliest known stone tool industries date to around 2 Ma ago and are found at Sterkfontein and a number of other sites in the Cradle of Humankind as well as at Wonderwerk Cave (Kuman and Clarke 2000). Although there are a number of large choppers at Sterkfontein, many of the tools at this site and at Wonderwerk are very small (<3 cm.), raising further questions about early stone tool technology.

Lithic Technology, Paleolithic, Fig. 1 Oldowan chopper from the Nile Valley, Egypt. The *arrows* indicate the direction in which flakes were removed. This figure was prepared based on a 3D scan of the chopper using Meshlab software. (Copyright M. Chazan)

The Oldowan was first defined on the basis of the bed 1 industries found at Olduvai Gorge. Bed 1 is dated between 1.9 and 1.7 Ma ago and is thus over half a million years younger than the tools found at the Hadar. Opinions vary as to whether the Hadar and Lokalalei should be included within the Oldowan. In addition to cores and flakes, the Olduvai Gorge assemblages include polyhedrons and spheroids. It is not clear whether these are distinctive types of tools or simply forms of exhausted cores.

Shaped Artifacts

The earliest stone tool industries involve removals along a single edge to form a chopper or the kind of exploitation of the volume of a cobble found at

Lokalalei. Spheroids and polyhedrons are more extensively exploited, but there is little evidence that these are tools where the removals are deliberately organized to form the shape of a tool. The emergence of Acheulean technology marks the transition to the use of flaking to deliberately shape tools. The earliest Acheulean is found at the site of Kokiselei 4, Kenya, dated to 1.76 Ma ago (Lepre et al. 2011). The characteristic Acheulean stone tools are bifaces that are shaped by removals of both faces of a flat cobble or natural spall, or a large flake (Fig. 2). Handaxes are bifaces where the base is broader than the working tip, whereas cleavers have a wide working edge. Cleavers are mostly found in African Acheulean sites and are often made on very large flakes.

Following the pioneering work of Derek Roe, archaeologists have developed a wide range of methods to quantify the shape of handaxes. A major focus of research is to determine the degree to which variability in handaxe shape can be explained on the basis of characteristics of raw material. There is relatively little functional data on handaxes, and most archaeologists assume that these are multipurpose tools. There is limited evidence for use of handaxes in working wood (Dominguez-Rodrigo et al. 2001). One puzzling aspect of the Acheulean is that there are a number of sites at which bifaces are found in very large numbers, often estimated in the thousands.

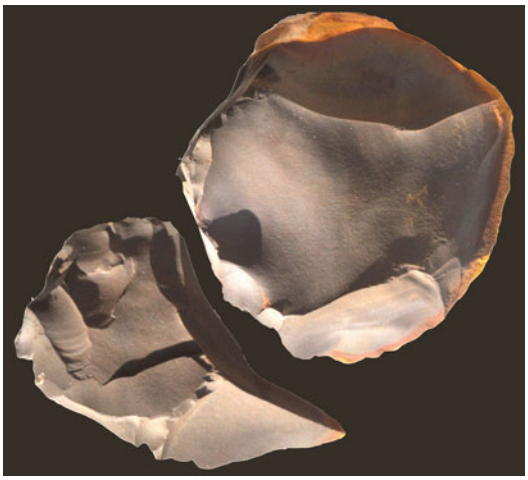
The development of Acheulean technology is roughly contemporary with the first appearance of *Homo erectus*, but the significance of this association remains unclear. Surprisingly, the earliest hominin expansion into Europe found at sites such as Dmanisi, Georgia, and Atapuerca, Spain, is not accompanied by an Acheulean toolkit. The stone tool industries at these sites are very simple and are considered by some archaeologists to be pre-Oldowan. Bifaces are rarely found east of India, a geographical boundary known as the Movius Line. Recent discoveries of handaxes in the Bose Basin, China, dated to 800,000 years ago, limit the validity of the Movius Line (Yamei et al. 2000). In Europe, the earliest Acheulean industries date to 500,000 years ago.

Lithic Technology, Paleolithic, Fig. 2 Hand axe from the early Acheulean of Wonderwerk Cave, South Africa. This figure was prepared based on a 3D scan of the hand axe using Meshlab software. (Copyright M. Chazan)

There is a great deal of variation in Acheulean industries. At sites such as Gesher Benot Ya'akov in Israel, handaxes and cleavers are made on very large flakes struck from massive cores. While the earliest bifaces, such as those from Kokiselei 4, are quite crude, there is a trajectory overtime toward the development of more refined handaxes, many of which have a high degree of symmetry and display a high degree of technical skill. It appears that in some cases, a soft hammer was used for the final stages of shaping hand-axes. It is important to emphasize that simple flake-based industries persist alongside the Acheulean, for instance, in the Clactonian industries found in Britain.

Prepared Core Methods

Prepared core methods involve careful control over the morphology of the core with the goal of producing detached pieces of a desired morphology. It is difficult to pinpoint when flint knappers began to have control over the shape of detached pieces or flakes. There is already a hint of this capacity in the core reduction found on the early site of Lokalalei, but the degree of control in this assemblage is very limited. One of the earliest prepared core methods is the Victoria West method found on Earlier Stone Age sites in South Africa (McNabb 2001). This method involves shaping the surface of a large natural rock spall to prepare for the removal of a large flake that can be easily retouched to form a cleaver. Unfortunately, the precise age of the Victoria West method has not been determined, although it appears to be roughly 1 Ma old.



Lithic Technology, Paleolithic, Fig. 3 Experimental Levallois flake and core. (Copyright M. Chazan)

The Levallois method is among the most elaborate prepared core methods and has been the subject of intensive archaeological research (Fig. 3; Chazan 1997). This method is associated with Neanderthals in Europe and the Middle East and with modern humans in Africa and the Middle East (Qafzeh and Skhul Caves). Chronologically, these methods are characteristic of the Middle Paleolithic (Eurasia) and the Middle Stone Age (Africa). Typological definitions of the Levallois method focus on characteristic tortoise-shape cores and thin large flakes with a continuous cutting edge, often with a well-prepared platform. Technological definition of the Levallois method focuses on the conceptual model that underlies the use of the method. Five criteria are used in the technological definition of the Levallois method: (1) The core is constructing to consist of two surfaces that meet at a plain of intersection. (2) The surfaces are hierarchically related with one surface serving as a striking platform and the other as the surface for large flake removals. (3) The production face is organized so that the morphology of products is predetermined based on the management of lateral and distal convexities. (4) The removal of predetermined flakes is subparallel to the plane of intersection between the two faces. (5) The striking platform is organized so as to allow the removal of the predetermined flakes from the production surface.

The Levallois method allows the knapper a high degree of flexibility in determining the types of flakes produced. There is clear evidence for temporal and geographical patterning in the strategies adopted, which implies that flint knapping was a skill acquired through social learning. Among the types of flakes that can be produced using the Levallois method, depending on the choices made by the knapper in shaping the core, are triangular points, large ovate flakes, and elongated flakes.

In addition to the Levallois method, a number of other prepared core methods play a significant role in the Middle Paleolithic and Middle Stone Age archaeological record. These include the discoidal method in which the core is constructed with two surfaces but without a hierarchical relation between these surfaces, and the trifacial method where three surfaces are exploited. The use of prepared core methods implies a developed capacity for guiding technical action based on abstract concepts.

The analysis of Middle Paleolithic stone tool industries in Europe employs a highly developed typology based on the shape and location of retouched edges. Characteristic tool types are sidescrapers, notches, and denticulates. There is a significant debate over the significance of variability in retouch. François Bordes argued that the types found in an assemblage were characteristic of distinct cultural groups, while Lewis Binford held the position that the types of tools found on a site were the result of the activities that were carried out at that location. Harold Dibble has advanced the argument that variation in tool types reflects the intensity of tool use and resharpening.

Elongated flakes, defined as blades if their length is twice their width, play a particular role in Paleolithic archaeology as these types of tools become prevalent in the Upper Paleolithic. Blade production has now been identified on sites dating as early as 500,000 years ago in Africa (Wilkins and Chazan 2012) and slightly later at Qesem Cave in Israel. Blade production is also firmly established as one aspect of Neanderthal lithic technology (Bar-Yosef and Kuhn 2008). There

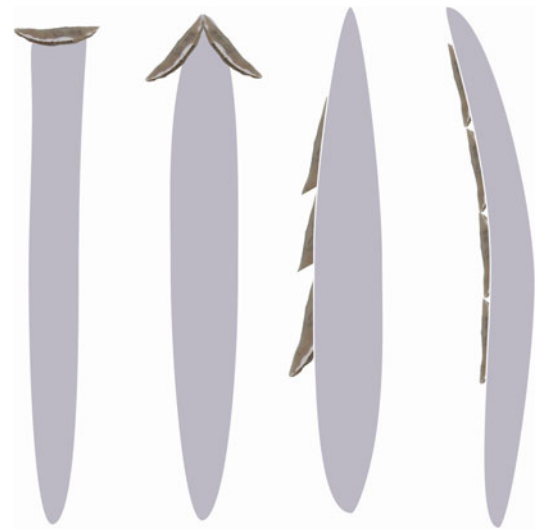
are aspects of Upper Paleolithic blade production that are distinctive. Jacques Pelegrin describes Upper Paleolithic blade production as the exploitation of a volume rather than exploitation of surfaces that is characteristic of the earlier production methods. In many Upper Paleolithic industries, crested blades are used to shape the core and initiate blade removal sequences. By the later stages of the Upper Paleolithic, blade production methods, often involving the use of a soft hammer, developed to the point where the knapper was able to remove a long sequence of very regular and narrow blades. Upper Paleolithic blade technology is also characterized by a shift toward retouched tools that include end scrapers and burins. Burins are tools that are shaped by removing a long spall of the margin. Burins have a strong working tip as well as robust edges useful for tasks such as shaping bone and wood.

Projectile Tips

It is not clear that stone tools were used for hunting during the early stages of the Lower Paleolithic. There have been suggestions that Oldowan spheroids might have been used as bolas or that Acheulean handaxes might have been used as a throwing weapon, but both of these proposals remain speculative. It is likely that wood spears were used for hunting before the development of stone armatures. The discovery of a series of spectacularly preserved wooden spears from the site of Schöningen, Germany (Thieme 1997), dated to 400,000 years ago provides a vivid illustration of hunting tools that did not involve stone armatures (although stone tools would have been necessary to shape the spears). One interesting question is what the exact advantage is of stone projectile points with one study showing evidence that stone tips have only a slightly increased ability to penetrate a target (Waguespack et al. 2009).

The criteria for identifying projectile points as opposed to pointed tools used for other tasks remain the subject of debate. There is very wide consensus that stone-tipped thrusting spears were used during the Middle Paleolithic and Europe and the Middle East and the Middle Stone Age of Africa. The discovery of a fragment of a Levallois point embedded in the vertebra of a wild ass at the Middle Paleolithic site of Umm El Tlel, Syria, and from Klasies River Mouth, South Africa, offers clear evidence that stone-tipped tools were in fact used for hunting. At Umm el Tlel, traces of bitumen hafting were also identified on Levallois flakes. There is emerging evidence that the use of stone-tipped spears likely dates back as far as 500,000 years ago.

Bladelets are small narrow flakes, usually smaller than 2 cm in length. Small blades and bladelets can be assembled to form a range of hafted composite tools (Fig. 4). The earliest strong evidence for the use of bladelets as elements of composite hunting tools comes from the Middle Stone Howiesons Poort industry of Southern Africa dated to c. 60,000 years ago (Lombard and Pargeter 2008). The Howiesons Poort bladelets were often retouched into crescents and might have served as barbs in composite points. The discovery of complex bone tools at the site of Katanda, Zaire, dated to c. 75,000 years ago provides the earliest evidence of a developed bone tool industry that includes barbed points. It is



Lithic Technology, Paleolithic, Fig. 4 Examples of options for hafting microliths into a composite tool. From *left* to *right*: transversal arrowhead, pointed arrowhead, barbed point, and cutting tool. (Copyright M. Chazan)

interesting that these tools were likely used for capturing large lake fish.

The complex hunting tools found in the Middle Stone Age of Africa are not found in Europe until the Upper Paleolithic. The Aurignacian, the initial period of the Upper Paleolithic, is characterized by the presence of both bone points and standardized bladelets (Chazan 2010). Although the function of Aurignacian bladelets remains to be conclusively demonstrated, it is highly likely that they were barbs used on composite points. The Gravettian period sees innovation of a series of small point forms, and it is likely that the alt atl or spear-thrower is already in use in this period. The Solutrean is characterized by the use of fine pressure flaking both for small-shouldered points as well as large bifacial points. In the Magdalenian period, there is a return to bladelets, some of which are found embedded in bone points, and the repertoire of bone hunting tools becomes highly developed. The Epipaleolithic sees the development of highly developed microlithic industries. The bifacial projectile points that are characteristic of the archaeological record in the Americas are not found in Europe or Africa, although bifacial points are found in Siberia.

International Perspectives

The application of methods of analysis inspired by the concept of the *chaîne opératoire* developed by André Leroi-Gourhan has led French archaeologists to place an emphasis on understanding not only the form of tools but also the knowledge and skill involved in tool production and use (Tostevin 2011). At the same time, North American and European archaeologists have tended to emphasize quantitative methods, such as the scraper reduction model applied by Harold Dibble (1995) to the analysis of Middle Paleolithic scrapers. Quantitative research, often paired with the study of raw material sources, often takes place in a theoretical framework that considers stone tools as a component of the adaptations of mobile hunter-gatherers (Kelly 1988). At the same time, use-wear analysis and experimental replication are increasingly allowing archaeologists to determine the relationship between tool form and function (Odell 2001). Until quite recently, lithic analysis has been characterized by a polarization between researchers working from different research traditions. Thus, for example, there was significant debate of the relative value of low-power versus high-power microscopy for use-wear analysis. Similarly, debate between advocates of the *chaîne opératoire* and their American counterparts was often characterized by sharply discordant perspectives. However, the lines between research traditions are beginning to blur, and lithic analysts are coming to appreciate the value of adopting multiple perspectives in approaching Paleolithic stone tool technology.

Future Directions

Paleolithic lithic analysis is undergoing rapid development with the adoption of emerging digital imaging techniques that allow for the analysis of the three-dimensional morphology of tools and reduction sequences. Improved methods of trace element analysis using ICP-MS open new potential for sourcing raw materials used in tool manufacture, and developments in microscopy have the potential to renew the study of tool function. Methods of residue analysis are also bringing new opportunities for the study of tool use. A robust theoretical debate is sharpening perspectives on both the role of stone tools in hominin adaptation and the potential of stone tool analysis to provide insight into hominin cognitive evolution. Rigorous methods of fieldwork open up new potential for analysis of the spatial organization of lithic tool manufacture and use and allow lithic analysts to contribute to the study of social organization in the Paleolithic. However, as Glynn Isaac (1977) recognized, the challenge involved in "squeezing blood from stones" remains immense.

Cross-References

▶ Acheulean Industrial Complex
▶ Clark, John Grahame Douglas

▶ Europe: Paleolithic Art
▶ Handaxes and Biface Technology
▶ Mousterian Industry Tradition
▶ Oldowan Industrial Complex

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Basic Biographical Information

Barbara J. Little graduated at Penn State University with a bachelor's degree in anthropology. She received a doctoral degree in anthropology from the State University of New York at Buffalo, in 1987, with a dissertation entitled *Ideology and Media: Historical Archaeology of Printing in Eighteenth-Century Annapolis, Maryland*. She has a long history of federal service as an archaeologist in the Archeology Program, National Parks Service and teaches anthropology at the University of Maryland, College Park. Her areas of interest are public archaeology and public history; historical archaeology; method and theory; feminist archaeology; and North America and other parts of the British colonial world.

Barbara J. Little has served in committees for the Society for American Archaeology, and since 2009 she has served as editor of *CRM: The Journal of Heritage Stewardship*. Recently she was recognized by the University of Massachusetts Amherst Center for Heritage and Society as a 2011 honoree.

Major Accomplishments

Since the late 1980s, Barbara J. Little has been a prolific scholar interested in the links between documentary records and material culture in the United States (e.g., Little 1988). Little considers that historical archaeology is action archaeology, since research may address contemporary groups "that have close ties to the earlier peoples under study to help set research agendas that will both illuminate the past and contribute to the aims" of modern communities (Little 2007a: 23). Recently, Little emphasized her continuous interest "in civic engagement, public outreach, and the public relevance of archaeology and all aspects of heritage" (Little n.d.).

In *Text-Aided Archaeology* (Little 1992), Little gathers in a single-volume contributions exemplifying the use of documents, oral history, and material culture to address substantive and methodological questions. The relationship between history and archaeology, and especially their combined potential to help advance understanding of the ties between everyday experiences and larger structures of social change (Little 2007b: 17), has been a common denominator of Little's contributions.

An outstanding contribution to the field of historical archaeology is the volume edited by Shackel and Little on the *Historical Archaeology of the Chesapeake* (1994), one of the first regions of the United States studied from a historical archaeology perspective. The volume is an example of the balance between historical information and archaeological remains within an investigation of the recent past. Foremost, Little's essay advocates for a feminist archaeology approach to the study of muted groups who resisted dominant ideology, expressing themselves through particular choices of material culture in the 1770s (Little 1994: 196).

Little's book *Historical Archaeology: Why the Past Matters* (2007a), conceived as an introductory volume for students with a Marxist theoretical perspective, has been praised as a relevant survey of historical archaeology; the volume presents insights concerning social relations, power, and inequality "and the many ways in which the modern world has been shaped by colonialism, capitalism, and globalization" (Rotman 2008), using American case studies to illustrate the points discussed in the book.

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- ▶ Capitalism: Historical Archaeology
- ▶ Conservation and Management of Archaeological Sites
- ▶ Critical Historical Archaeology
- ▶ Deetz, James (Historical Archaeology)
- ▶ Gender, Feminist, and Queer Archaeologies: USA Perspective
- ▶ Historical Archaeology
- ▶ Historical Archaeology: Indigenous Perspectives and Approaches
- ▶ Leone, Mark P. (Historical Archaeology)
- ▶ North America (USA): Historical Archaeology
- ▶ Oral Sources and Oral History
- ▶ Post-Processual Archaeology
- ▶ Public Archaeology, The Move Towards
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- ▶ Society for Historical Archaeology (SHA) (Historical Archaeology)

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Litvak King, Jaime

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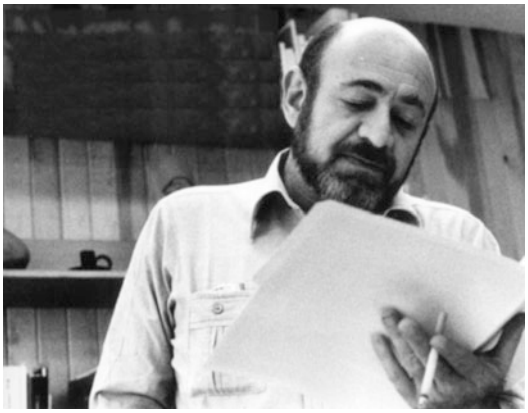
Basic Biographical Information

Jaime Litvak King (1933–2006) was born in Mexico City in the midst of a family of Eastern European immigrants. As an undergraduate, he studied economics at Mexico City College, and from 1958 to 1962, he attended to the National School of Anthropology and History (ENAH), obtaining his masters degree in 1963. Later, in 1970, he earned a Ph.D. in anthropology at the National Autonomous University (UNAM). His dissertation illustrates the use of statistical methods applied to the research of settlement patterning in pre-Columbian archaeology. Founding



Litvak King, Jaime, Fig. 1 Jaime Litvak at his office, the early 1990s

the Institute of Anthropological Investigations at UNAM in 1973, he became as well its first director. Among the distinctions, he was honored in his lifetime with the Fray Bernardino de Sahagún Archaeology Prize awarded by the National Institute of Anthropology and History in 1971, the National University Award in 1996, and the Lifetime Achievement Award presented by the Society for American Archaeology in 2002. Two years later, in 2004, he was elected professor emeritus at UNAM (Fig. 1).

He was one of the first researchers in Mexico who incorporated quantitative methods, computer applications, and innovations in archaeological field methods. Through his life, he kept a continuous interest in pre-Columbian Mesoamerica. Yet, he was the first major Mexican archaeologist and maybe the only one who indeed recognized the importance of industrial archaeology and Mexican industrial heritage research, supporting both of them until the day of his death.

The first steps taken to support Mexican industrial heritage go back to the 1980s, when different individuals throughout the country started an effort in rescuing and reusing it. This latter was mostly expressed by turning industrial heritage sites into museums. In 1995, the Mexican Committee for the Conservation of the Industrial Heritage (CMCPI) was created, and in December 2006, the Mexican Section of The International Committee for the Conservation of the Industrial Heritage (TICCIH México) commenced as a result of the consideration that work to support industrial heritage needed to be reinforced.

In May of 1997, Litvak became a member of the CMCPI, offering his complete support, and this was a commitment that he kept until the day he passed away. He was the person in charge of publishing the CMCPI bulletins from 1997 to 1999, and in that same year, he included a section dedicated to the committee at the webpage of UNAM'S Institute of Anthropological Research. After 1999, Litvak became an academic consultant of CMCPI.

Major Accomplishments

In 1991, the Historical Archive and Mining Museum Civil Association (AHMM) proposed a research project for the rescuing and reusing of mining sites in Pachuca, Real del Monte, Mineral El Chico, and Mineral de La Reforma. This included mines and ore-processing plants dating from the eighteenth to the twentieth century. In 1998, industrial archaeology studies started, and from that moment on, Litvak became a teammate, actively collaborating with Iván Hernández Ibar who conducted the fieldwork. In 2000, the project was supported by a research grant on industrial archaeology issued by the Ignacio Zaragoza Research System–National Council for Science and Technology (CONACYT) with Litvak as the principal investigator.

Fieldwork was under the responsibility of Hernandez Ibar, and as a result of excavations, some steam boilers' ash boxes were uncovered. Further investigation in this area was prevented during the second field season since Litvak, who managed and supervised the research project, insisted that the materials found during the excavations required deeper examination. As a result of Litvak's academic contacts and generosity, Hernández Ibar was able to analyze the materials at the Physics Department of the National University (UNAM) under the guidance of Dr. José Luis Ruvalcaba Sil (Hernández Ibar and Ruvalcaba Sil 2010).

Under the supervision of Litvak, in 2002, Hernández Ibar became the first student of the

National School of Anthropology and History (ENAH) who graduated with a Bachelor's thesis on industrial archaeology. The following year, Yolanda Beltrán Aguirre wrote another thesis on the same subject. With this, Litvak not only demonstrated his interest and support for Mexican industrial archaeology (e.g., Litvak King and Rodríguez 2003) but above all his commitment with the education of a new generation: the generation of industrial archaeologists. These students were indeed fortunate. They were opening a new field of research, contributing to the development of industrial archaeology, in a country where pre-Columbian archaeology has long prevailed.

The invaluable support provided by Jaime Litvak King to the industrial heritage of Mexico encompasses two main fields: first by training young archaeologists and second by promoting and disseminating this subject. Through the website he created, access was provided to the CMCPI Industrial Archaeology Bulletins – a small-circulation journal – in which he shared industrial archaeology studies both in Mexico and worldwide.

Litvak was an outstanding person, one of the great characters in Mexican archaeology. He was a "teacher everywhere and at all times" who stressed creativity and scientific rigor in archaeology (Schmidt Schoenberg 2008: 161–2). He was a man committed with his country, its history, and its people. Despite the few years that Litvak actively participated in the industrial heritage world and an active promoter of industrial archaeology, his personality and massive imprint will always be present.

Cross-References

- ▶ Industrial Archaeology
- ▶ Industrial Heritage in Archaeology
- ▶ International Council on Monuments and Sites (ICOMOS) (Ethics)
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Living Communities: Local Communities in Site Management and Advocates for Site Preservation

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Introduction

Most archaeologically important sites are not static locations divorced from modern communities. Rather, as has been the case throughout history, local communities live in or around, and participate in activities at, these important locales. Though one of many stakeholders, local, living communities are often imperative for the long-term preservation of archaeological sites because their active use and interaction with these places make them good stewards of such cultural heritage. Tourism, and its economic development, however, has often resulted in the sidelining or

even outright relocation, of local communities, to the determinant of the communities as well as the archaeological sites themselves. More than ever, there is an urgent need to provide holistic strategies for the management of important archaeological sites that include the incorporation of local communities and that take into account the long-term socioeconomic impact of tourism on their daily lives.

In order to explore these important issues, this entry will present the specific case study of the UNESCO World Heritage site of Petra to illustrate how the past and the present can be better managed within cultural heritage schemes.

Definition

The Petra National Trust (PNT) is a non-governmental organization dedicated to the preservation of the archaeology, cultural heritage, and environment of the UNESCO World Heritage Site of Petra. To implement its goals, PNT conducts projects in the preservation of the archaeological, natural, and cultural heritage, as well as programs to raise awareness among the youth of Petra, the future agents of site preservation, on the uniqueness and fragility of this site. In executing its projects and programs, PNT contracts with local and international specialists; it engages both local and international volunteers and employs skilled labor from among the different local communities in its conservation efforts.

Ultimately, to safeguard the significance and integrity of the site for coming generations against damage to the environment, the deterioration of monuments and the inevitable impact on the quality of life of the local communities, PNT finds that community-based participation is imperative to long-term sustainable preservation in that the local communities' continued involvement offers an enormous opportunity to further local stewardship and empowerment. It is in recognition of the importance of community participation that the PNT has expanded its work in Petra and has, since 2010, introduced the Petra Junior Ranger Program to its program activities in education and outreach.

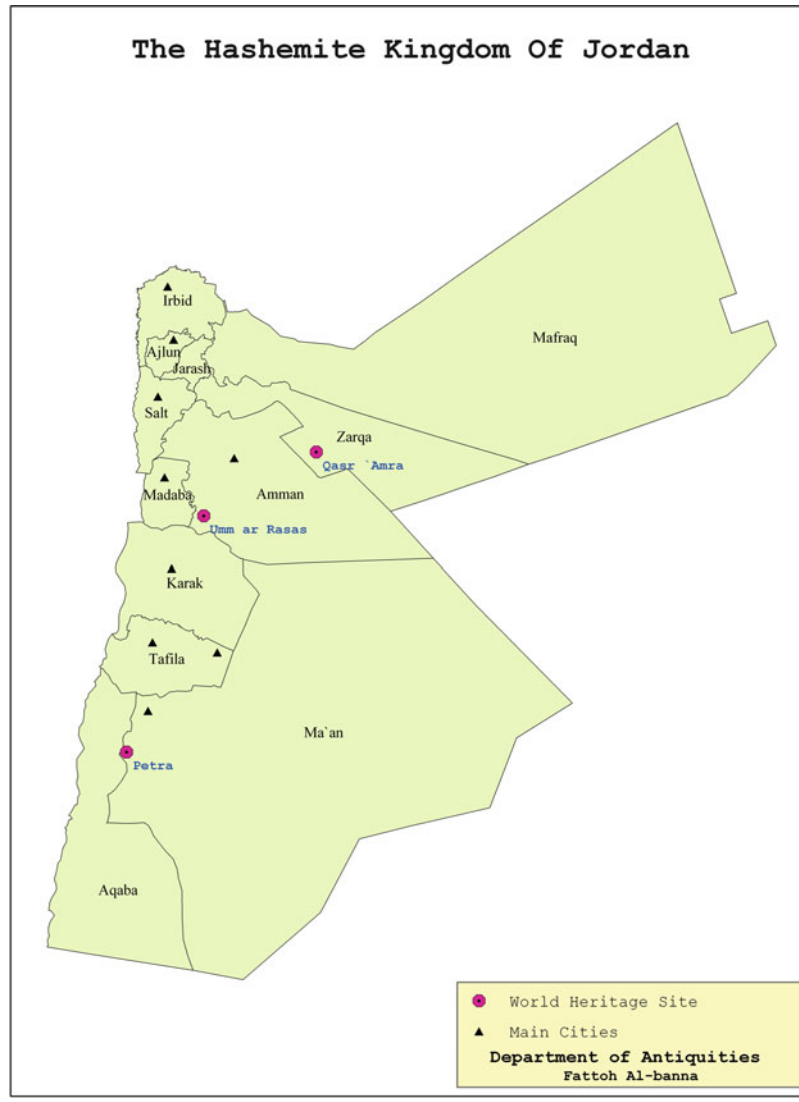
The Petra Junior Ranger Program is an engaging and interactive 6-day workshop for children and youth that aims to instill a sense of identity and pride in Petra's cultural and natural heritage and inspire a commitment to preserving and protecting Petra's outstanding universal values.

Key Issues/Current Debates/Future Directions/Examples

Petra, Site, and History

Located in southwestern Jordan (Fig. 1), Petra has been a place for human habitation for over 200,000 years. Today, the residents of the Petra area live in modern stone and concrete hillside villages as well as Bedouin encampments. About 13,000 years ago, an early seasonal village was established at Beidha, just north of Petra. The site was rebuilt and occupied year-round by a group of Neolithic farmers around 7000 BCE. In addition, the presence of mineral resources made the region important. Both bitumen and copper, one of the earliest metals to be manipulated by humans, have been mined and utilized since the earliest times.

Numerous cultures rose to prominence, beginning with the Edomites in the first millennium BCE. Edom gave rise to the nucleus of an Arab state, the Nabataean Kingdom, in the third century BCE. The Nabataeans made Petra the capital of their rich and powerful kingdom, filling it with spectacular buildings and carved facades and making water flow to every corner of the kingdom. In CE 106, Petra became part of the Roman province of Arabia. By the fifth century CE, Petra was the administrative center of the Byzantine province of Palaestina Tertia. During the seventh century, as a result of the Islamic takeover, trade routes were redirected and Petra declined in importance. In the twelfth century, the crusaders went across the rift valley from their capital, Jerusalem, to Petra. They later withdrew to the Mediterranean in 1189. It was not until 1812 that Petra was again visited, this time by the Swiss explorer Johann Ludwig Burckhardt. Travelers that followed suit give vivid description of its monuments and the conditions of the country during Ottoman rule. They describe the Huwaitat tribes and their roles in



Living Communities: Local Communities in Site Management and Advocates for Site Preservation, Fig. 1 Map of Jordan

ensuring the security of caravans and the protection of the pilgrims. Under the Huwaitat, a Bedouin confederacy connected the tribes that now live in villages surrounding Petra: the Bdul, Layathneh, and Amarin tribes. Traditionally these tribes tended to their animals and undertook the seasonal planting of grains. Later with the arrival of tourism, in the twentieth century, they moved closer to the archaeological site and sustained a living by tilling the land, working on archaeological excavations, and guiding tourists.

Many still lived in caves in the vicinity of the monuments, the main inhabitants being the Bdul tribe. In 1985, Petra was inscribed on the list of World Heritage sites. Based on the recommendation of UNESCO, the government relocated the Bdul people in two stages: first in 1985 and then again in 1987 to an adjacent area outside the Park boundaries overseeing the archaeological sites and having a very high visual, social, and economic impact. The social dimension of this relocation was addressed at the time in as much as it affected the antiquities. There was no socioeconomic plan to provide the community with agricultural lands in order to maintain their livelihood prior to the relocation. The increasing numbers of

tourists, however, helped the Bdul in adapting to a more "settled" style of life. Furthermore, with the signature of the 1994 peace agreement with Israel, tourism figures spiked and, in parallel, triggered an increase in commercial activities improving the socioeconomic conditions of the communities, albeit, at the cost of preserving site significance and integrity.

Tourism in Jordan generates 12% of the GDP. This impact, however, is accompanied by unplanned development, neglect, institutional weakness, noninclusion of major stakeholders, and illicit trading of antiquities, all of which can irreparably impact the World Heritage site for present and future generations.

Local Communities as Stakeholders

For stakeholders in the local community to become stewards of preservation, it is important that a comprehensive evaluation be undertaken of the site, the local communities, development conditions, and constraints. Several studies have been done in the past at a time when the subject was less urgent. The focus however, was on one community, the Bdul tribe, neglecting the study of the other main villages surrounding Park. The number of visitors to Petra has doubled since; this increase in visitation provided a pretext for the local owners of concessions to expand tourism services to the point where it is now negatively impacting site integrity.

More than ever, there is now an urgent need to update and expand the study of the socioeconomic factors that constitute and lead to the understanding of the human relations and different needs and economic benefits to include all the six surrounding communities. Only then can a holistic strategy for the management of the Park be defined and developed to incorporate the local communities.

The government authorities in Jordan recognize the importance of integration of the local communities in the overall management of Petra and incorporated it in the laws of the successive Petra management authorities of 1995, 2005, and in the current authority established in 2009. In practice, however, participation of the local communities has been minimal and inconsistent. Then and now, decision-making in the absence of the communities is a prominent source of unease among the communities and the governing body. More recently this has been evidenced during the so-called Arab Spring uprisings with demands of better inclusion in the management and decision-making process.

Today in the Petra region, the communities surrounding the Park mainly focus on the socioeconomic value of Petra through tourism; this is demonstrated, for example, by the number of souvenir kiosks, tea tents, restaurants, etc., that are located intrusively on the main thoroughfare referred to as the "Main Spine" that tourists traverse to visit Petra. The government licenses these vending outlets in an attempt to satisfy what the local community perceives as their entitlement.

Child labor selling items including finds and colorful rocks at the high price of their schooling is widely manifested throughout the areas visited by tourists. A great number of the complaints that the government receives from tourists regard the harassment they encounter by children. To increase the carrying capacity, different types of transportation as in vehicles and animals, for example, camels, horses, and donkeys, are seen throughout the Archaeological Park. In addition, the Petra Archaeological Park is now considering providing buses to transport visitors out of the site using the Turkomania road notwithstanding the negative impact on the monuments and the vegetation among other impacts. The intended beneficiaries of this transportation system will be the local communities. The anticipated economic benefit, to be derived from the proposed transportation system, overrides the communities' interest in maintaining the site's legacy and its relevance to their cultural heritage and identity. Many do not realize that unless judiciously managed, tourism and the development of related facilities can negatively impact the significance and integrity of the property. This is partially explained by the discrepancy that exists between traditional tribal laws versus the modern laws that came into effect with the establishment of Jordan as an independent nation in 1946. According to the laws established after the independence, the government owns lands surrounding the Park as well as lands within the Park. In contrast, in the

perception of the tribal communities, there are Miri lands that fall under tribal or customary law. The restriction of development and commercial activities on lands perceived by the tribal communities as belonging to its traditional owners is not an easy regulation to impose in a tribal society, and doing so continues to present a challenge to this date.

The Petra region does not lack economic assets, but they have not been developed adequately to benefit all the local communities. On 25th of November 2005, at UNESCO's headquarters in Paris, a 16-member international jury proclaimed The Cultural Space of the *Bedu* in Petra and Wadi Rum a masterpiece of the oral and intangible heritage of humanity. This proclamation gives international recognition, visibility, and fame to one of the great nomadic cultures of the world, that of the *bedu*, in the specific natural and historical contexts of two outstanding areas in the south of Jordan. It carries a enormous potential for the concerned communities in terms of preservation of their heritage and improvement of their livelihoods.

In turn the social and economic benefits these resources provide can vest in the local communities a sense of purpose. Recent tourism trends indicate that visitors to the region seek to expand their experience beyond the Archaeological Park proper; local communities should be encouraged to take advantage of this interest in their intangible heritage. Hence, there is a growing need for facets of local heritage to be explored. This development can enable local communities to reap Petra's economic benefits. Moreover, fostering interest in heritage will simultaneously encourage the preservation and protection of heritage.

Junior Ranger Program

It is in recognition of the importance of community participation that the PNT introduced to its programs activities in education and outreach: the Petra Junior Ranger Program in 2010. It is an

Living Communities: Local Communities in Site Management and Advocates for Site Preservation, Fig. 2 Pledging the junior ranges oath at the graduation ceremony, Petra Junior Ranger Program

educational program based on the paradigm of explore, learn, and protect. In its mission to preserve and protect Petra, PNT is seeking to develop an educational and stimulating program for the youth of Petra. The program introduces the culture (peoples, traditions, and practices) and history of Petra in an entertaining and engaging way by employing a hands-on learning approach for youth, that is, learning by doing, exploring, and discovering. It will allow children to interact with the site, feel its importance and uniqueness, explore and discover its archaeology and natural features, and participate in different activities that will teach them about the site. PNT believes that this can be achieved by instilling a greater understanding and appreciation of Petra and by integrating the interests of the local community into Petra's preservation efforts. The Petra Junior Ranger Program is an effective method to involve and engage the youth of the local community in sustaining the values that set Petra apart as a world heritage site. PNT believes that the youth of today will become tomorrow's stewards of this heritage.

Throughout the workshop, participants learn about Petra, its significance, and why and how to preserve it. The program fosters critical thinking skills and civic engagement, essential building blocks for a healthy civil society. The workshops conclude with a ceremony in which participants recite the Junior Ranger pledge and graduate as Petra Junior Rangers (Fig. 2). The program targets children and youth from the six villages of the Petra region: Beidha, Um Seyhun, Wadi Musa, Taybeh, Rajef, and Dlagha. The program is divided by age group: 7–9, 10–12, and 13–15 year olds. Each workshop includes 20 participants and five teenage volunteers from the Petra region. From January 2011 to February 2012, PNT has implemented five workshops for the 7–9 year old age group and three workshops for the 10–12 year old age group.

The Junior Ranger curriculum focuses on the outstanding universal values (OUVs) that render Petra a UNESCO World Heritage Site. The program first addresses Petra's cultural value by introducing participants to the different peoples that contributed to their heritage. The type and depth of the activities expand with the age groups. For example, while the 7–9 age group studies four time periods: the Nabataean, Roman, Byzantine, and modern period, the 10–12 age group additionally studies the Neolithic period.

The activities focus on the different historic periods and their relation to modern times. Participants wear costumes to show the similarities between the attire then and now. In the classroom, participants dress up in Neolithic style costumes and use flint stones to make spark (Fig. 3).

Another classroom activity exposes participants to the round and square Neolithic houses; participants notice the similarities to modern houses, which help them to identify with this heritage. When participants visit the Neolithic site of Beidha, they do a bread-baking activity. First they see the oblong quern that Neolithic people used to grind wheat, and they compare it to rounded basalt querns that are still used today. Then they bake bread over fire, again in the way

Living Communities: Local Communities in Site Management and Advocates for Site Preservation, Fig. 3 Participants dressed up in Neolithic costumes

Living Communities: Local Communities in Site Management and Advocates for Site Preservation,

Fig. 4 Neolithic round and rectangular houses in the Neolithic settlement in Beidha, Petra

that Neolithic people used to do it. This activity further encourages participants to connect with their heritage (Figs. 4, 5, and 6).

Following the Neolithic period, in addition to costumes, participants are introduced to the Nabataeans through their fine and delicate pottery; in the classroom participants learn to make and paint their own pottery. The "Decorating My Wall" activity based on the Nabataean wall painting in biclinium 849 in Siq al-Barid that was conserved recently by PNT encourages the appreciation of cultural and natural heritage, preservation practices, and creative expression (Figs. 7 and 8). On a field trip to Siq al-Barid, the participants have the opportunity to appreciate firsthand the content of the painting which includes endemic plants and animals as well as figures from Greco-Roman mythology. The instructor also draws the participants' attention to "vandalism" that has caused extensive damage to this unique example of wall paintings and connects this example to protection of heritage and the general concept of the need for preservation.

The workshop ends with a graduation event where parents, siblings, government and Park officials, local parliamentarians, and sponsors and members of the Board of the Petra National Trust attend. The work of the participants is exhibited on this occasion, and the junior rangers take the pledge, "I promise to appreciate, respect and preserve Petra. I promise to share with others what I have learned and to help protect the archaeological, natural, and cultural heritage of Petra."

PNT plans to further expand the Petra Junior Ranger Program to adapt the Petra Junior Ranger program to other archaeological sites in Jordan. PNT will also use the momentum from the Petra Junior Ranger Program to launch further youth and adult engagement initiatives to build a generation of aware, engaged, and active advocates for Petra.

Conclusion

In conclusion, a variety of factors threaten the world's rich and diverse cultural heritage. There emerges an exigent need to responsibly preserve this heritage for this and future generations. Moreover, cultural and natural assets can provide a path to development for local communities in Jordan. Whether from tourism or from investments in cultural heritage and related industries, there is ample potential to generate a broad scope of economic entrepreneurial activities that have the capacity to create wealth and cultivate pride and

Living Communities: Local Communities in Site Management and Advocates for Site Preservation,

Fig. 5 Modern rectangular house in Wadi Musa, Petra

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Fig. 6 Participants building their own habitat

amelioration of level of comfort. In the case of Petra in Jordan, heritage manifests itself in everything from hospitality customs to traditional food serves to bolster tourists' experience in the region. Their heritage is what makes local communities more unique; expanded utilization of this heritage will bring socioeconomic benefits to Petra and other archaeological regions in Jordan. The challenge is galvanizing financial and other resources to invest in development of cultural heritage to bring benefits to the communities surrounding Petra and other heritage sites in Jordan.

Living Communities: Local Communities in Site Management and Advocates for Site Preservation,

Fig. 7 Recreating the wall painting on the ceiling of Biclinium 849 in Siq al-Baird, Petra

Living Communities: Local Communities in Site Management and Advocates for Site Preservation,

Fig. 8 Completing the wall painting on the ceiling of Biclinium 849 in Siq al-Baird, Petra

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Local Communities and Archaeology: A Caribbean Perspective

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Introduction

Archaeology in the Caribbean has from its beginning in the early to mid-twentieth century been controlled by overseas universities and researchers. It is primarily academic-driven research that has and continues to produce excellent scholarship and impressive collections of cultural objects. It has also generated large amounts of information on the history and natural history of the islands. Management of data and collections is an ongoing challenge for many communities on the islands of the Caribbean.

Key Issues/Current Debates/Future Directions/Examples

Local Archaeology in the Caribbean Region

Despite more than a half century of research, only the islands of the Greater Antilles with large populations and universities have "local" archaeologists and departments of archaeology. The colonial French and Dutch Antilles also have resident archaeologists and departments of archaeology, but they are part of the European systems and the archaeologists are mostly from Europe. Regardless, academically focused archaeology is still at the forefront of research and excavations on those islands. In the independent islands of the former British colonies, archaeology is completely dominated by overseas academics from a large number of universities who visit annually for short periods of time. This discussion will refer specifically to the situation in the former British colonies of the Eastern Caribbean.

Most of the small islands have major economic issues, and archaeology and museum development have been and continue to be led by a few individuals who volunteer their time and resources for archaeology and heritage development. Sustainability is an issue although their efforts are well recognized by the development authorities and local governments on their various islands. Yet their efforts and projects including the safeguarding and management of their islands cultural relics and antiquities are grossly underfunded by their governments, if at all.

During the annual field seasons, archaeology field schools with new generations of archaeologists seeking to make their mark descend on the islands eager to recover the secrets and mysteries of the past. From their perspective they are providing a valuable service while gaining knowledge and recovering archaeological collections for study and publication. This is indeed admirable and welcome, but there is another side of the story. Many of the findings taken overseas for study and documentation are never returned to the islands. Most are lost in the basements and closets of universities as the students graduate and memories and promises fade. Ironically, the vast body of data and cutting-edge information is also lost within the halls of academia as papers, theses, dissertations, and presentations are produced and presented to fellow academics. Very little of this knowledge will ever trickle back to the islanders and into their history books. On the other hand, there are academics that have sufficient time, funds and students to be able to extract their required data, photos, and analysis on the islands, and then leave behind their excavated collections in the hands of the local museums and avocational

island archaeologists. To their credit they have done the right thing, except that most islands lack the resources and capacity to curate, manage, research, publish, and store the enormous collections that grow considerably every year. Throughout the islands there are collections that have been abandoned as their formerly well-labeled containers rot in the tropical heat. Plastic bags and bins dry and crumble, while insects and vermin, hurricanes, and vandalism contribute to the rapid destruction of cardboard, plastic, and wooden boxes and bins. Dedicated space for the storage of collections, primarily the bulk of non-diagnostic sherds, shells, soil samples, glass, and much more, is nonexistent. As the small nonprofit museums with untrained volunteers and staff struggle to cope with little-to-no resources, funding, or curation, the question will arise, "Why are we spending our limited resources on keeping this non-museum quality junk when we can't pay the utilities or improve the exhibits?" Before they can answer the question, its field season again and more archaeologists and their students descend on the islands.

So where does the academics' responsibility begin and end? Clearly the end of the field school museum day exhibition and meet-the-public day is not sufficient. Many academics try to build capacity by encouraging "locals" to come and dig alongside their students, but this too is an issue. While the academic has years of study, ethical responsibilities, and scholarship, the "local volunteer" will have only acquired the knowledge of how to find a site, where to dig, and what is of value. A little knowledge is indeed a dangerous thing, so this well-intended event could be the training camp for potential looters. Speaking from the perspective of a "local," it is strongly advised to use only committed museum staff, seriously interested older local students, and volunteers who are committed to heritage preservation.

The solutions to these issues begin with the academics. In the rush to find sites and lay claim to an island as one's research territory, the colonial mindset must be left behind. It is not "your site or artifacts or data." Before the excavations begin, one must start to develop capacity in the local communities and institutions that are responsible for the curation of the results of your work. While developing a research proposal, one must always include capacity building, training in curation and management of collections, and the values and ethical principles of archaeology. We must ensure that there are funds and space for sustainable long-term storage and that the organizations themselves are also sustainable and not solely dependent on a single individual for management or source of funds for survival.

Caribbean archaeology is growing in popularity, and recent projects on Antigua and Barbuda by CUNY have adapted this approach and developed close relationships with the museums (HERC 2011). A field station has been setup on Barbuda for a long-term commitment in research, museum development, storage, and training. They work in partnership with the museums on Antigua, and both organizations are benefiting from the new body of data, collections, and opportunities, an ideal case study in ethics and responsibilities.

Cross-References

- ▶ Caribbean Historical Archaeology
- ▶ Caribbean Maritime Archaeology
- ▶ Communicating Archaeology: Education, Ethics, and Community Outreach in North America

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Local Discourses in Archaeology

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Introduction

Archaeologists generally accept that they cannot leave their work to be used only by others (e.g., Jeppson 1997; Little and Shackel 2007). Archaeologists also understand that there is a community outside of archaeology that has a practical interest in the outcomes of archaeological endeavors (e.g., La Roche and Blakey 1997; McDavid 1997, 2011; Leone et al. 2011). Many archaeologists support a responsibility to the public to meet their needs by explaining what they say about the sites and people being investigated (Edwards-Ingram 1997; Jeppson 1997). The difficulty, as an archaeologist, is developing a means to reach out to these communities effectively. It may not be an easy task to identify such communities and to draw the line between who is a part of it and who is not. Archaeologists engaging with stakeholders, which is how we define local discourses, consider these issues as they develop research designs for their projects.

Archaeology in Annapolis (AiA) has been working with the local communities in Annapolis and with communities outside of Annapolis since its inception in 1981. AiA was formed out of a partnership between the University of Maryland and several local community groups in Annapolis, including the Historic Annapolis Foundation, the Banneker-Douglass Museum, and the Kunta Kinte/Alex Haley Foundation. Through these partnerships, AiA has excavated over 40 archaeological sites in Annapolis and has provided a variety of ways to teach residents and visitors about the lost, hidden, missing, or misinterpreted cultures of groups that were and continue to be important in Annapolis. Teaching, our basic definition of discourse, has been done through public open sites, news media, and public displays of artifacts. Public media allow local communities to receive updated news of the discoveries being made through archaeology in the city. Public access to sites provides archaeologists the means to demonstrate what they are doing, how they are doing it, and how it leads to their ultimate conclusions. However, not every site can be opened up for the public to visit, and newspaper articles and TV newscasts are not continuous. Archaeologists interested in engaging communities have to find a way to reach their audiences and not only provide information but also start and sustain a two-way dialogue that can constitute a local discourse.

Definition

It would seem that any conversation that an archaeologist has about a site with a related community could constitute a local discourse. However, this is not the operational definition of local discourses. As we use it for AiA, local discourses are the conversations that archaeologists have with the stakeholders of a specific project to obtain information and give information about a particular site or project so that both the general public and the archaeologists end with more information. Local discourses, by our definition, also engage the stakeholders and local community in the project, so that the project is not just being done about a group, but for a group, with their interests and questions in mind as the research design is developed.

In the sociocultural anthropological contexts, local discourses have been defined as comparable to oral histories and have been used for the benefit of the anthropologist, as a way to gain more information about the subject under study (Agar 2005: 2). However, archaeologists typically do not see these discourses as solely for the benefit of the anthropologist.

Theoretically, our understanding of "discourse" is influenced by Jürgen Habermas (1981) and Michel Foucault (1969). Many of the problems archaeologists have had with local communities stem from a lack of communication, openness, trust, respect, and accountability, while many of the successes have come from an abundance of these (e.g., La Roche and Blakey 1997; McDavid 1997; Little and Shackel 2007). Habermas discusses the notion of the "ideal speech situation," that is, a situation in which all interested parties can come together to create and sustain a discussion, hear and be heard equally, participate in the discussion on equal footing, and weigh all of the options presented before being able to arrive at a general consensus (Habermas 1981). However, while striving to achieve Habermas' ideal speech situation, there are barriers which prevent archaeologists from achieving it, which in turn have ramifications for our understanding of local discourse. Central among these is archaeology's perceived authority to make statements of cultural fact (Jeppson 1997). Mostly located within academia, archaeologists use what Foucault introduced as the concept of knowledge/power, which asserts that there are hidden power relations embedded within any form of discourse in which one group possesses knowledge that it can use over another (Foucault 1969). Just as doctors have power over their patients and lawyers have power over their clients because they possess specialized knowledge and skills the other does not, archaeologists have power over the local communities in which they work. By ignoring this fact, power relations of the status quo are unwittingly maintained at the expense of the groups with whom archaeologists are supposed to be working. This is not to say that specialized knowledge is inherently bad. By recognizing the knowledge/power embedded within the practice of archaeology, archaeologists can take steps to change the way they relate to local communities and in doing so come closer to Habermas' ideal speech situation. Central to the attempts of archaeologists to work with local communities is a balancing act between trying to achieve Habermas' ideal speech situation and at the same time possessing Foucault's knowledge/power by acting as experts and authorities.

Key Issues/Current Debates/Future Directions/Examples

Engaging with the general public when doing archaeology presents several problems. The first is how to define a public. In some ways, it makes sense to define the audience as the people who live in the community surrounding the archaeological site being investigated. However, this can be problematic, especially when there is a descendant community with an interest in the site that is not local. In many cases, archaeologists end up having to deal with several different groups, who are not mutually exclusive, but who have different needs (McDavid 1997; Franklin and McKee 2004), and "archaeologists have historically oversimplified our notions of 'community'" (Brandon 2008: 149). For example, when working at Wye House, there is a known descendant community living in Unionville, Maryland. During the Civil War, 18 slaves were removed from the Wye House plantation by the Union Army and promised freedom in exchange for military service. After the end of the war, they returned to the area and settled on Quaker land approximately 3 miles away from Wye House and developed the town of Unionville. When Mrs. R. Carmichael Tilghman invited Archaeology in Annapolis to excavate at Wye House in 2004, researchers from AiA went to Unionville to start a dialogue with this descendant community. Mark Leone went to the main church in Unionville, St. Stephen's African Methodist Episcopal (AME), and started listening to the prominent members of this community about the excavations at Wye House that he was going to conduct through Archaeology in Annapolis. One member indicated that she wanted to know if there was "evidence of slave spirituality" and "what the Lloyds had done for freedom." These two questions, combined with the early interest of the Lloyd descendants, shaped significantly the research design that led to nine seasons of excavations at Wye House.

As direct descendants of the community being investigated through the archaeological investigations of AiA, this descendant community clearly has an interest in the work and is an audience. But should this audience be given a higher priority or be more included in the decision-making process than another local community? We decided they should be, and we made sure to consult with this community before excavations began at Wye House. This in some ways is less problematic than other descendant communities because the proximity of Unionville to Wye House allows it to be grouped within the "local" communities. However, we do encounter situations where the descendant community is not really a community, so much as a person, and that person lives on the other side of the country. In this case, the opinion of the descendant is solicited.

This was the case for one of the properties excavated in Annapolis, Maryland, where AiA members have worked directly with descendants of James Holliday to develop archaeological research designs. In the fall of 2009, a homeowner whose family had owned, and continues to own, the James Holliday House wanted to know more about her family than could be determined from historical records alone. James Holliday was a freed slave who was one of the first African-Americans to be employed at the US Naval Academy. He purchased a brick townhome just off of State Circle in downtown Annapolis in 1850. James Holliday and his descendants have owned the property ever since. This gracious homeowner agreed to let Archaeology in Annapolis excavate the yard and basement of the property for three summers, in exchange for any information the researchers could provide her about her family. The specific interests of the homeowner and the oral histories she has provided have significantly influenced the research design of this project. For example, the homeowner of this property is interested in the role her great-grandfather, James Holliday played at the US Naval Academy, and as a result, much of the research that has been done on this property has been focused on determining how the Holliday family's relationship with the Navy and Naval Academy influenced their standing within the Annapolitan African-American community. Three summers of archaeological investigation have led to the conclusion that the Holliday family was well established within the middle class and appears to conform, to some degree, to the previously established trends within the African-American community in Annapolis, in spite of their continued contact with these predominantly white institutions. Because this descendant homeowner does not live in Annapolis today, most of the information exchanged between the researchers and the homeowner has been done through phone calls and e-mails.

In their work at the African Burial Ground in New York City, La Roche and Blakey (1997) strove to create a project that both informed and was informed by the local community. Excavations began at the African Burial Ground in the summer of 1991 and continued into the summer of 1992 before a group of "influential and determined African-Americans, and others, combined to halt excavation, take moral responsibility, and seize intellectual power" (La Roche and Blakey 1997: 85). The burial ground is the largest and earliest example of such an African-American site in the United States and, as a result, is of great interest to both the academic community and to the descendant community. Local discourses surrounding this archaeological excavation were started largely as a reaction to the outraged local community, led by congressmen, senators, the New York City Landmarks Commission, journalists, artists, clergy members, and other concerned citizens. Their reactions and activism resulted in the project changing hands, from the US General Services Administration to a team of concerned academics, led by Michael Blakey at Howard University. According to La Roche and Blakey, the addition of the academics to this group of concerned citizens provided the "final necessary component" of intellectual power and technical expertise to the project (1997: 85).

La Roche and Blakey (1997) assert that understanding and sustaining local discourses require not only an understanding of the specific project at hand but also an understanding of the larger scholarly and public concerns related to the topic, especially the related long-standing political debates.

Most of the work of this project to establish and sustain conversation with the local community and interested stakeholders was done through the Office of Public Education and Interpretation (OPEI). OPEI opened in 1993 and was tasked with informing and educating the public about the ongoing progress of the African Burial Ground project, both on- and off-site (La Roche and Blakey 1997). In 2006, management of the OPEI was transferred to the National Park Service, which continues to interact with community members and volunteers through meetings, forums, the development of an interpretative center, and the dedication of a memorial (African Burial Ground 2007).

How does a project qualify as a local discourse? Is "local" anything that pertains to the site? For Annapolis, we determined that all descendants, regardless of their physical location, should be included in the target audience that is consulted in our outreach. What happens when different factions within the same community have competing interests? Do you, as the archaeologist, take a stand and advocate for a particular side?

In an effort to deal with the problem of a large, spread-out audience and community, archaeologists in Annapolis have moved toward working with an online blog. This is easily accessed, is easily updated by the archaeologists, and provides the opportunity to present research in an informal way that is more easily understood. It also allows people access to excavation sites that might otherwise be inaccessible due to size or privacy. For example, our excavations in the backyards of Annapolis households or the Wye House plantation are largely unavailable for the public. In order to open up a conversation about research, it is necessary for researchers to construct a space to share experiences and discoveries while allowing feedback from the community. A blog creates such a space in a digital environment and welcomes a discourse not only with the community that is local but also with a dispersed community with a shared interest in the findings and interpretations of Archaeology in Annapolis. This informal medium is the ideal space in which to demonstrate a reflexive, contextual, and interactive presentation of research because it shows people the ongoing process of inquiry and analysis in archaeology and permits commentary and questions from any reader. Kenneth Brown and Carol McDavid identified these attributes as the objectives for the Levi Jordan Plantation archaeological site, which was used to promote a collaborative project between archaeologists and the decedent community (McDavid 2004). In the development of a project website, McDavid brought the research on the Levi Jordan Plantation – a nineteenth-century site in Texas – into an environment of shared control with the African-American and European-American decedents. From the beginning stages of Web design, interaction with the community was an important factor, leading to workshops with descendants to determine how the public would engage with the features of the site. The final product included a discussion forum, feedback forms, and questionnaires, which allowed users of the site to contribute opinions, ask questions, and begin conversations (McDavid 2004: 46). One of the goals of the project was that every stakeholder – the community members, family members, and academics – had an equal and legitimate voice to add to the final website. Through a diversity of collaborators and the openness of the project, McDavid demonstrated a local discourse that leads to collaboration in "reciprocal, nonhierarchical, [and] mutually empowering ways" (41).

Due to the accessibility of the Internet, blogging has become a "spaceless" public sphere, where there exists a freedom of opinion, personal communication, and information exchange that brings users closer to Habermas' "ideal speech situation" (Dakroury and Birdsall 2008). Blogging in archaeology allows public access to the discussion of excavations and analyses without the constraints of uneven power relations, constructing a discourse where inclusion and the right to contribute knowledge within this online community are central.

The AiA Blog began in 2011 as an experiment in Web-based outreach and provided access to a community that stretches the definition of "local" and demonstrated a few of the positives and negatives of an online discourse. The main aim of the blog was to engage local communities connected

to our Annapolis and Wye House sites, but the global nature of the Internet meant that our project was open to any party with web access. By virtue of making our blog public, we expanded our audience to include local residents, descendants who have relocated, other archaeologists, and any other readers who have an interest in our archaeological work. The main problem, however, is gauging how effective the blog is in reaching our intended communities. The anonymity of the Internet allows readers to offer comments or ask questions without identifying who they are. Some commenters on the blog declare themselves to be local residents, while others make no mention of an affiliation. Additionally, it is difficult to assess the reach and readership of the blog simply from its comments, because a majority of visitors to blogs will read the content but not contribute to any discussion. It is both frustrating and gratifying to attempt a local discourse through an online medium.

In an attempt to create discourse through an online medium, Archaeology in Annapolis has used a number of different approaches, including online databases to allow the public to interact with archaeological sites from afar (Archaeology in Annapolis 2017). For Annapolis, Timothy Goddard created a tool in 2005 that allows the user to spatially search through historical data for the city by exploring an interactive Web GIS (geographic information systems) map. Another searchable database was created for Wye House in 2012. This database created by Beth Pruitt focused on search for individual names within the records of the enslaved at the plantation in the late eighteenth and early nineteenth centuries. The most recent project, Locating People in the Past, combines the methods of the first two, creating an interactive Web GIS (geographic information systems) resource that combines census data from before and after emancipation with contemporary maps in Talbot County, Maryland, to show where enslaved people lived, which is otherwise unavailable. This project was funded by the FIA-Deutsch Seed Grant Competition and developed in 2014 by a team of Archaeology in Annapolis graduate and undergraduate students. Our work at Wye House also attracted the interest of a local nonprofit creative studio, Assemble, who helped us produce professional video summaries of our work and make them available to the general public. Opening up our work in the manner of public blogs, searchable databases, and videos takes a great deal of the control of information out of the archaeologists' hands and places it into the view of an at-times faceless audience. Although using online mediums offers a number of benefits, archaeologists cannot assume that all communities will have equal access to the Internet. Being flexible and adapting to the situation of the community, in addition to using online approaches, allows archaeologists to create an entirely different sort of community, one that is not confined by physical location.

Historical archaeologists have sometimes been invested in working with communities to not only inform their own investigations but also to incorporate stakeholder concerns into the research design. The information gleaned from excavations can be of benefit to everyone. Through conversations with the public, archaeologists work toward an "ideal speech situation," in which the researcher and the public participate in a dialogue. An added difficulty in engaging with a local discourse comes from the oftentimes nebulous definition of the "local" community. Simply drawing a line around the residents with physical proximity to the research area can be problematic, and outlying members of the descendent community or other members of the general public may have a vested interest in the archaeological findings. One solution has been to take the discourse out of the realm of the physical and into the digital, where blogs can work toward allowing an informal record of archaeological work and a conversation between interested parties in a "spaceless" public sphere.

Cross-References

- ▶ Activism and Archaeology
- ▶ African Diaspora Archaeology
- ▶ Archaeological Stewardship
- ▶ Communicating Archaeology: Education, Ethics, and Community Outreach in North America

- ▶ Community Archaeology
- ▶ Cultural Heritage and Communities
- ▶ Cultural Heritage and the Public
- ▶ Cultural Heritage Outreach
- ▶ Decolonization in Archaeological Theory
- ▶ Heritage and Archaeology
- ▶ Heritage and Society
- ▶ Heritage Values, Communication of
- ▶ Leone, Mark P. (Historical Archaeology)
- ▶ Local Communities and Archaeology: A Caribbean Perspective
- ▶ Media and Archaeology
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Local Populations and Global Heritage

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Introduction

Over the last 30 years, archaeologists and heritage managers have developed reflective, ethical

practices and methods to take into account the relationships "local" communities have with the archaeological sites that they live near and among and/or to which they lay spiritual, ethnic, or other cultural claim. In the late 1990s and early 2000s, during the height of postmodern critique, practitioners began designing projects that aimed to gain specific insights into how people use the material past to construct, perform, and maintain distinctive, "local" identities in an increasingly globalized world, the ways in which they contest, appropriate, and negotiate political and economic interests in relation to tourism and heritage management policies, as well as how they situate their pasts in relation to "world" history and human origins. As a result, the integration of "local" concerns, values, and beliefs became a routine part of heritage management practices, not only at United Nations Economic Scientific and Cultural Organization (UNESCO) World Heritage Sites (WHS) but also more widely at regional, local, and grassroots levels.

During the last 15 years in particular, projects relating to "communities," material remains, and the practices employed to produce, manage, and represent them have taken on new foci that embody global urgencies that overtly and *actively* engage with the networked and fractious geopolitical environments in which they are practiced. These can be outlined as four distinct but overlapping spheres of thinking and practice and include:

1. Projects that aim specifically to decolonize the fields of archaeology and heritage in a *meaningful* way by producing genuinely "co-created" and "co-authored" studies that give equal weight to communities and "professionals" in research design (Bollwerk et al. 2017).
2. Projects that examine how local communities, archaeologists, and heritage managers can help to understand and potentially assist in planning for sustainable futures, particularly in relation to defining the Anthropocene and gaining insight into how local communities can mitigate against climate change (Lane 2015).
3. Projects that explore the way in which "local/global" dynamics are implicated in social, economic, and cultural value creation (Jones 2017).
4. Finally, there is a recognition that archaeology and heritage practices can assist in contributing to understanding and resistance to the rise of conservative populism and ultranationalist discourses across the world, and a need for projects that examine how this might be possible (Gonzolez-Ruibal et al. 2018).

This entry summarizes the history of these developments and the current status they occupy in contemporary thinking around the local/global dynamics at heritage sites. It discusses and defines the approaches, techniques, and practices that have come to characterize critical archaeological and heritage discourses and the changing ways in which local communities relate to, produce, engage with, and use material remains, both in the global south and north.

Definition

Within archaeology and heritage management policies and practices, the relationship between the "global," that is, aspects of archaeological and historic remains that relate to their myriad values and significances in relation to human histories and origins, and the "local," that is, the *particular* assemblages of histories, traditions, and cultural practices in which those sites are entangled, is foregrounded as a particularly important and active dynamic in the ongoing lives of archaeological monuments. A number of trends emerged over the last three decades in theory, practice, and the development of heritage policy that are intended both to explore and "manage" this relationship. These have included participatory strategies that draw on the values, knowledge, and beliefs of "local" populations in *collaborative* ways that aim to enrich archaeological understanding and to empower and include social actors whose interests had previously been obscured or marginalized within the production,

management, and dissemination of archaeological knowledge. It has also included adopting frameworks that have "consultation" and, more recently, "co-creation/co-authorship" at their core. Often, participatory frameworks have been employed in order to *mediate* tensions that have the potential to arise when a site's meaning and worth are defined by those who lay social, cultural, historic, and economic claims to them, while archaeologists, historians, and other heritage "experts" are given the authority to define how they are used and presented in official, legitimized terms. UNESCO has been particularly active in employing such research and practices within its World Heritage Site management policy guidance, but these models are often used today in "grassroots," bottom-up ways. Furthermore, the relationships local communities have with archaeological sites and monuments are often used to gain insight into issues around cultural and environmental sustainability and defining the advent of the "Anthropocene."

Historical Background

Concern with the "global"/"local" dynamics of archaeological sites as defined above can be traced to the convergence of several strands of research that emerged across the humanities and social sciences in the 1980s and 1990s. Specifically, the impact of postmodern thought on archaeology led to the "postprocessual" movement during the 1980s, which led scholars to acknowledge and examine the subjective nature of archaeological interpretation (Trigger 2006). Appropriating approaches associated with a number of theorists and philosophers like Jacques Derrida, Michel Foucault, and Judith Butler, the assertions that characterized this paradigm included that archaeologists "read" the past in much the same way as texts (Hodder 1986) and that archaeological sites and objects are generally described and understood according to the subjective narrative experiences and identities of the discipline's practitioners. Such contentions evolved to include the interrogation of tendencies for archaeological remains to be presented to audiences as objective "facts" to be described and understood objectively by experts, as well as explorations of the traditionally unequal power relations that characterize interpretive encounters.

Postcolonial and feminist strands of postmodern thought also raised intellectual and practical challenges for archaeology and its practitioners throughout the late 1980s and 1990s. The World Archaeological Congress (WAC) was established during this era, becoming an important force for championing indigenous claims to the past, and questions also became common within archaeological discourse about the ways in which the construction of modernist metanarratives of human history had obscured and marginalized the voices of women and oppressed colonial societies whose pasts are the subject of archaeological scrutiny (Rowlands 1998).

Concurrently, scholars across the humanities and social sciences, particularly in Euro-American academic institutions, were becoming concerned with the increasing pace of "globalization" and its impacts on people's experience of identity and place (Appadurai 1986, 1996). Additionally, the collapse of Eastern European communism, the rise of neoliberal politics, and growing significance of international market economies and consumer capitalism also led scholars to become interested in changing cultural forms and the experience of everyday life in an increasingly mediated image and knowledge-saturated world. As a result, studies of people's experience of tourism and travel, how "local" identities are "performed" for visitors and maintained for cultural survival in communities, as well as the instrumental use of "culture" within development agendas all became commonplace in the academy.

Within these arenas of inquiry, a great deal of research focused on how, in particular, archaeological and historical "heritage" is used to construct politicized narratives of the past to serve nationalist agendas and political establishments in the present (see especially Handler 1988).

As a result, epistemological questions like "who owns the past?" "who decides what is preserved?" "who controls how the past is presented?" and "how do archaeological practices impact on those people who live near archaeological sites" became routinely raised in

archaeological dialogues, eventually leading to widespread integration of reflexive research and practices within governmental heritage policy and legislation across the world.

The involvement of "local" populations in cultural resource and "heritage" management practices, as increasingly recommended by UNESCO guidelines at WHS, generally involves the adoption of various strategies and research methodologies from the social sciences, to establish insights into the values, beliefs, and knowledge that they hold about particular sites and landscapes. This, it is generally argued by its proponents, enables collaborative research themes to develop and grow *out of* the issues deemed important by local communities (often termed "stakeholders" and "descendant communities"), with the specific intention of encouraging and nurturing more equitable participation in the management process than previous exclusionary heritage practices had allowed.

The language that characterizes such methodological approaches is purposefully inclusive and draws on active, "empowering" terms like "participation," "collaboration," and "action research." Although quantitative research is sometimes used to gain understandings of such values, it is generally forms of qualitative inquiry, including ethnographic approaches, experiential techniques, and qualitative interviewing, that have come to be the primary approaches used in this process (see Edgeworth 2006; Himilakis 2009), in order to gain nuanced views of people's knowledge and experience of archaeological sites.

The kinds of knowledge, values, and insights often identified as relevant to the heritage management process include historical traditions through which those sites are understood by local populations, like folkloric material, oral histories, and place names (Gazin-Schwartz and Holtorf 1999), as well as examining the role such traditions play in the construction of senses of place, authenticity, community itself, and ideas about the "rootedness" of identity to particular landscapes in the present (Jones 2004). Other spheres of knowledge with which such research tended to engage include how archaeological sites are represented within tourism media, the ways in which local economies and "sustainability" agendas are impacted by WHS management in both "developed" and "developing" nations (see Breen 2007 on WHS management in sub-Saharan Africa), as well as how the practices surrounding the sites themselves are appropriated and incorporated into "local" spheres of meaning and practice.

The knowledge gathered from such research exercises tends to be both *applied*, in that the results may be used within heritage management practices specifically to gain understanding of, and therefore better represent local interests within, the heritage management process, and *informing* archaeologists and heritage managers' understandings of how those people value heritage sites and the ways in which, for example, local identities, social structures, and views of the past are constructed in that process (see especially Breglia's account of traditions of inherited labor roles among Mayan communities at Chichen Itza WHS and Muke, Denaham, and Genuropa's 2005 investigation into the use of Kawelka traditional land tenure frameworks to denote conservation areas in order to better serve management of the Kuk WHS in Papua New Guinea).

Key Issues and Current Debates

While the socially liberal underpinnings of questions like "who owns the past?" "who is in charge of presenting it?" and similar questions regarding power relations in the construction of archaeological knowledge remain at the center of much critical heritage research, archaeologists have striven to engage directly with how those questions are relevant to twenty-first-century global problems and conditions, including the urgency of climate change, the rise of right-wing forms of populism that include ultranationalist and racist beliefs, and the necessity of the cooperative production of knowledge for the common good and future-oriented endeavors. What follow are short discussions around these strands of thinking and practice in local/global contexts.

Decolonization and Co-creation/Production

Archaeologists who work or have worked with local populations and social groups in the context of local heritage that has global significance have begun to reflect critically on the outcomes of engaging in "participatory" frameworks since they became regular practice in the early 2000s. While there is much to recommend in terms of success in more equitable representational of local interests, scholars are increasingly aware that reflexive research in this area must emphasize the decolonization of archaeological knowledge and embrace meaningful co-creation. As Breglia (2005) has pointed out, archaeological interpretation that is truly collaborative must not treat local concerns as secondary to more traditional forms of the presentation of archaeological data in research reports, monographs, and heritage policy agendas. This, she argues, needs to be reflected in the structure of research designs, as well as the representation of archaeological knowledge produced from such projects. Otherwise, true praxis cannot be achieved, and such efforts remain top-down endeavors and thus not central to the production of archaeological knowledge (Breglia 2005). Using reflexive ethnographic techniques and creative approaches to writing and integrating local knowledge to research design are possible solutions to such issues. If identity studies and reflexive methodologies emerging from the social sciences and humanities have taught us that cultures and landscapes are constantly in flux, who therefore decides which communities and interests are "local" in relation to heritage of global renown, what factors (geographic, historical) contribute to these "classifications," and which section of those societies' interests are foregrounded in heritage management processes? To reify the trope of "localness" simply reproduces the very exclusionary practices that the identity studies of the 1990s and 2000s sought to interrogate.

Incorporating lexicons and practices derived from cybernetic culture as well as gender and postcolonial activist research, archaeologists have taken on terminologies like "open access/open source," "commoning," as well as "decolonization" and "co-creation" to describe the integration of multiple authors and democratic modes of creating and disseminating archaeological knowledge.

Archaeological Heritage, Sustainability, and the Anthropocene

Recent work by Lane (2015) and Lafrenz Samuels et al. (2016) outlines the essential roles of archaeological knowledge in efforts to fight climate change, both to trace its genesis to specific, geographically significant human behaviors that have contributed to it and use that knowledge to inform contemporary and future-orienting planning strategies designed to mitigate it. Indeed, the definition of the Anthropocene – a human-made geological epoch – depends on the correlation of archaeological facts with historical narratives in order to build a picture of how we have constructed this situation through deep time. How can communities negotiate a willingness to become "sustainable" using the lessons of the past to inform the present?

As Edgeworth (2013) notes, working on conceptions of "scale" using archaeological evidence, too, is important in this regard, as moving between temporalities in tracing behaviors from deep time to the present requires a nuanced understanding of spatiotemporal contexts. How was the Anthropocene constructed through time and space in different places? How can archaeologists and geologists intertwine their respective disciplinary scales to achieve integrated understandings of climate change and its genesis within local populations and thus inform sustainable practices and strategies?

Value Production

A significant sphere of debate about the local/global heritage dynamic centers around definitions of "value" and "significance" as they relate to historic and archaeological remains (Jones 2017). Some argue the ways in which definitions of these concepts are ultimately rooted in the histories and practices of the capitalist nation state (Samuels 2008; see especially Holtorf 2009). Such values, they argue, have traditionally been dictated by economic significance, as defined by the World Bank and related to notions of private property, as well as according to

essentialist conceptions of culture as espoused by Western European ideas about citizenship and national identity. Such ideas continue to dictate how "heritage" is defined, produced, classified, and managed globally, despite recent attempts to integrate "local" values and to recognize the shifting center of identity that reflects the movement and immigration of people, knowledge, and practices associated with globalization. Any ethical treatment of heritage, then, must therefore center on dynamic processes of cultural change.

Another layer of the complexity of global heritage as it relates to local cultural practices overlaps significantly with critiques of the conception of "value" as discussed above and posits that the very concept of "global" heritage, especially as manifest in the UNESCO World Heritage List, privileges and legitimizes a modernist metanarrative of human heritage and its definitions. In an extensive critique of the concept of "World Heritage," Narkunas (2007) points out that the World Heritage agenda, as outlined by UNESCO, is underpinned by essentialist notions of culture that aspire to "normalize criteria" of culture in relation to the liberal democratic model of the nation state, which is underpinned by enlightenment ideas that aspire to objectivity and universal humanism. Such philosophical positions, especially in the context of defining what heritage is and how it should be managed and represented, "trump" the ways in which it may be defined and understood on smaller scales, preventing a truly ethical stance on providing equal weight to the knowledge and value systems of all concerned populations that have interests in heritage sites.

Heritage and Populism

Gonzalez et al. (2018) have recently argued that archaeologists and heritage specialists have a responsibility to counter right-wing populist movements with "facts" about the universality of humankind, despite the tendency of "community" and "public archaeology" discourses that give "equal" voice to those who lay claim to material remains. Although this position may in some ways run counter to the efforts outlined above, the authors pose the important question of how archaeologists and heritage specialist should engage those "communities" whose claims to the past relate to racist and ultranationalist agendas. What happens to the "subjective" nature of interpretation in these instances, in the context of post-truth populism, and how can we integrate ideas about "facts" and "universality" into analyses after three decades of emphasizing subjectivities?

Future Directions

The relationship between global heritage and local cultural dynamics continues to be an important, growing area of inquiry, with a particular view toward discussing it in relation to morality and socially liberal ethics: the ways in which the relationship of local knowledge and values to "global" heritage is crucial to engaging with, and intervening in, current crises of climate change, the rise of right-wing populism, and continuing global capitalism.

Cross-References

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- ▶ Community Archaeology
- ▶ Global Heritage Fund (GHF)
- ▶ Post-processual Archaeology
- ▶ Post-processualism, Development of
- ▶ Public Archaeology and Education: Present Relevance to the Past

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Basic Biographical Information

William (Bill) Logan completed a doctorate in 1981 in the field of urban geography with a thesis focused on the politics of housing, planning, and heritage conservation in inner Melbourne. He has long been on the faculty of Deakin University in Melbourne, Australia, where he has held numerous senior administrative positions including Dean as well as Research Director in the Faculty of Arts (1993–1998). He was awarded the Deakin University Researcher of the Year Award in 2002 and was made an Alfred Deakin Professor in 2004 for his contribution to the university's research profile. His research record includes numerous Australian Research Council and other grants.

Major Accomplishments

Dr. Logan has been involved in cultural heritage conservation since the early 1970s when he took part in the resident action movement in inner Melbourne. He has been engaged in teaching, research, and consulting on Australian and Asian heritage issues since then. He holds the UNESCO Chair of Heritage and Urbanism in the School of Humanities and Social Sciences.

Since 1986, Dr. Logan has been an International Expert for the UNESCO Division of Cultural Heritage in Paris, where his work has mainly been related to UNESCO's international campaigns to safeguard world cultural heritage sites in Pakistan, Sri Lanka, Bangladesh, Nepal, China, and Vietnam. He has also acted for the UNESCO World Heritage Centre at international meetings of experts in Vietnam, Indonesia, and Korea and has contributed to its "State of the World Heritage" Report (2005).

He is a member of Australia ICOMOS and was its president from 1999 to 2002. He has

represented ICOMOS at international meetings in Japan and Korea. He has been a consultant to AusAID, the Australian Heritage Commission and Department of the Environment and Heritage, and the Victorian Department of Infrastructure, and he is a member of AusHeritage (including Board Member, 1998–1999).

He is a member of the Heritage Council of Victoria and fellow of the Academy of Social Sciences in Australia. His involvement with international and national heritage bodies directly led to course innovations and research activities at Deakin University. Professor Logan introduced two courses in Vietnamese history and culture and instigated the development of an Asian Studies major. He led the establishment of the Cultural Heritage postgraduate program at Deakin in 2000. He is the immediately former Director of CHCAP/Cultural Heritage Centre for Asia and the Pacific, a research and training center that has UNESCO endorsement.

His research interests include World Heritage, heritage and human rights, heritage education and training, the heritage of war, heritage theory, and Asian heritage, especially of Vietnam. In addition to books, some of which appear below, Dr. Logan also has many articles in refereed and professional journals, as well as conference papers. His book, *Hanoi, Biography of a City* (2000), won the International Planning History Society Book Prize in 2002 and was republished in Vietnamese translation in Hanoi in 2010 as part of the city's millennial celebrations.

In addition to establishing heritage programs in several Victorian universities, he helped develop postgraduate heritage courses at Silpakorn University in Bangkok and the University of Santo Tomas in Manila. He has been member of the international advisory boards of the Academy of Irish Cultural Heritages at the University of Ulster, in the UK, and the Centre for Cultural Heritage Studies at the Chinese University of Hong Kong. He is a member of the editorial boards of Spatial Habitus, he is co-editor of the Routledge 'Key Issues in Cultural Heritage' book series and a series of monographs published by the University of Hawaii Press and the China Institute in America, NY; *International Journal of Heritage Studies*; and *Historic Environment*, the journal of Australia ICOMOS.

Professor Logan was an invited expert at the Consultative Meeting on Cultural Rights at the UN Human Rights Commission, Geneva, in February 2011 where he also addressed the Human Rights Council. He gave the keynote presentation at the 'Our Common Dignity: Towards Rights-Based World Heritage Management' seminar conducted by Norway ICOMOS, the Norwegian Centre for Human Rights and the Norwegian Helsinki Committee in March 2011 and in May 2012 he played a lead role in an interregional conference on 'Living with World Heritage' hosted by the Norwegian Ministry of Environment in Røros, also in Norway.

Cross-References

- ▶ Australia: Cultural Heritage Management Education
- ▶ Convention for the Safeguarding of Intangible Cultural Heritage (2003)
- ▶ Cultural Heritage and Communities
- ▶ Heritage and Higher Education
- ▶ Intangible Cultural Heritage
- ▶ UNESCO World Heritage Convention (1972)
- ▶ Urban Heritage
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Looting and Vandalism (Cultural Heritage Management)

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Introduction and Definition

The looting of archaeological sites is today one of the major threats to the world's cultural heritage, second only to the intensification of agriculture and to urban development. Looting in this context may be defined as the unrecorded destruction of archaeological sites in order to provide artifacts for sale on the illicit market for antiquities. What is shocking is that it derives, in some senses, from the recognition of the value of these tangible components of the cultural heritage. But instead of encouraging the careful preservation of their context of discovery, the price that such collectibles can command leads to clandestine excavation and the sale of "unprovenanced" antiquities. Their true value, of course, lies in what, when properly understood in their context of discovery and fully published by competent researchers, they can tell us about the shared past of humankind. Their commercial value is what they can command on the market, sold by unscrupulous middlemen and dealers to unquestioning private collectors. What is particularly shocking is that some of the great museums of the world continue, to this day, to accept gifts or even to purchase "unprovenanced" antiquities (Gill 2011) which derive, often via auction houses like Bonham's in London (see Bonhams 2006) or Sotheby's in New York (Watson 1997), from the illicit trade.

Key Issues/Current Debates/Future Directions/Examples

It should be acknowledged that the collection of antiquities by the scholars of the Renaissance was the starting point for the princely collections of Italy and beyond which gave birth to the first great museums of the world before the discipline of archaeology came of age in the nineteenth century. Until the techniques of stratigraphic excavation and professional publication were developed by pioneers such as General Pitt Rivers or Flinders Petrie, the antiquities themselves were the prize rather than the information which controlled excavation can provide. But by the time that the Archaeological Survey of India was established in 1861, the importance of cultural heritage management was widely realized. From then on, looting and archaeological research could be separated clearly. From then on, the great museums, and increasingly the universities, led expeditions which laid the foundations for world archaeology, albeit at that time in a colonialist or imperialist mode. It was not until after the Second World War that UNESCO (the United Nations Educational Scientific and Cultural Organization, established in 1945) passed its 1970 *Convention on the Means of Prohibiting and Preventing the Illicit Import Export and Transfer of Ownership of Cultural Property* (reprinted in Askerud and Clément 1997). This proved a turning point. For although it requires ratification by participating nations to have legal effect, the individual national enactments do usually have significant consequences, such as the United Kingdom's *Dealing in Cultural*

Objects (Offences) Act of 2003, which supports and extends the 1996 *Treasure Act* for England and Wales. The ratification of the 1970 UNESCO Convention by the United States of America and by Switzerland likewise brought important national legislation in each case (Gerstenblith 2003).

Despite these legal provisions, the looting of antiquities, which is illegal under most national legislations, continues unabated, and the looters are locally recognized by their own occupational names: *clandestini* in Italy, *archaiokapiloi* in Greece, and *huaqueros* in Peru. The problem is internationally recognized (O'Keefe 1997; Brodie et al. 2001; Brodie and Tubb 2002), but many national and regional governments find it difficult to control, and national agencies (for instance, the Red Army in China) are sometimes complicit. The reality is that illicit excavation – i.e., looting – is difficult to control in the field.

If the supply end is difficult to restrain, the consumption – by dealers, collectors, and museums – ought to be easier to regulate, at least when the looted antiquities turn up as "unprovenanced" items in auction houses and museums. In reality the world's museums have been slow in learning to undertake proper "due diligence" (Brodie and Renfrew 2005). The University Museum of Pennsylvania in Philadelphia in 1970 was one of the first (Renfrew 2000: 118), and the British Museum in 1998 was the first of the great museums explicitly to formulate the "1970 Rule": "Wherever possible the Trustees will only acquire those objects which have documentation to show that they were exported from their country of origin before 1970" (Renfrew 2000: 125). The merit of this formulation is that it places upon the vendor or donor to the museum the onus of proving the lawful excavation and export of the antiquity in question and thus excludes the acquisition (even by gift or bequest) of those dubious "unprovenanced" antiquities which have so often proved to be the product of looting (Brodie and Renfrew 2005). After the scandals in various museums in the United States, as noted below, a strong version of the "1970 Rule" in their new acquisition policy was approved and published by the Trustees of the J. Paul Getty Museum in Los Angeles in 2007. Significantly the 1970 Rule was also adopted by the Association of Art Museum Directors of the USA in 2007 and by the Metropolitan Museum of New York after the retirement of the Director, Philippe de Montebello, in 2008.

These important decisions in the USA might not have come about had it not been for the diligence and persistence of the Italian Carabinieri Art Squad in pursuing looted antiquities and their cooperation with the Swiss authorities in seizing in 1995 the contents at the free port in Geneva of the warehouse of the Italian dealer Giacomo Medici (Watson and Todeschini 2006). The looted antiquities and the documentation then recovered ultimately persuaded the Metropolitan Museum that the notorious Euphronios vase (an Attic red-figure crater painted and signed by the vase painter Euphronios), purchased in dubious circumstances in 1972, should be returned to Italy (Silver 2009). Although the return was at first strongly resisted by the Museum's Director, Philippe de Montebello, he was constrained to agree to the restitution in 2008. The Italian authorities also initiated the prosecution of the Curator of Antiquities at the Getty Museum, Marion True, a prosecution which was allowed to lapse with the return to Italy of a number of antiquities including a remarkable marble sculpture of griffins, now known to come from Ascoli in southern Italy and to date from the fourth century BCE (Bottoni and Setari 2009; Renfrew 2010).

The last two decades have brought many scandals to light involving scholars, collectors, and illicit antiquities, sometimes with the attempted suppression of the evidence. One notable example was the attempt by University College London in conjunction with the Norwegian collector, Martin Schøyen (2005), to suppress the report which it had itself commissioned into his loan of a major group of Aramaic incantation bowls, very

possibly looted from Iraq (Balter 2007). It may be that the spirit of the 1970 UNESCO Convention will yet prevail. But the prices of "unprovenanced" antiquities continue to rise on the open market. At present there is no doubt that the looting continues unabated.

Vandalism has a different motivation from the avarice which drives looting. In times of war, it is not uncommon for conflicting powers to seek to demoralize the enemy by laying waste to their cultural heritage. That has been true from biblical times, or indeed before, from the destruction of heathen images down to the "Baedeker" raids of the Second World War, named after the series of travelers' guidebooks to the artistic treasures of nations. Taking its name from the Vandals who, as legend has it, laid waste to Ancient Rome, it has its modern equivalent in religious as well as ethnic bigotry. The destruction of the bridge at Mostar in Croatia in 1993 (Renfrew and Bahn 2008: 550) was the work of Croatian nationalists in the ethnic conflicts which convulsed the former Yugoslavia. The demolition by dynamite of the great figure of the Buddha at Bamiyan in Afghanistan in 2001 was all the more shocking as the work of the Taliban (Renfrew and Bahn 2008: 547) who, as the effective government at that time, had overall responsibility for the protection of the nation's heritage.

These are among the most flagrant recent examples. It is sad that religious divisions continue to result in damage to the cultural heritage. Looting, however, for financial gain, results in more widespread damage in nearly every part of the world. Fortunately it is to some extent countered by modern tourism which increasingly focuses upon cultural history. Governments which previously neglected the cultural heritage now see the benefits of a program of protection and conservation which encourages the tourist industry. Yet some of the world's major museums, like the Miho Museum in Japan or the Metropolitan Museum of Art in New York, continue to exhibit unprovenanced antiquities which have become known since the year of the 1970 UNESCO Convention. As long as they continue to do so, the incentives for the looters will be obvious.

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- ▶ UNESCO (1972) and Malta (1992) Conventions
- ▶ Vandalism and Looting: Destruction, Preservation, and the Theft of the Past

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Basic Biographical Information

In 1996, the University of London awarded her doctoral degree in archaeology, based on her dissertation, discussing classification issues in the analysis of Maya pottery from northern Belize. She completed her undergraduate studies at the Escuela Nacional de Antropología e Historia in 1987 and obtained a Master of Arts in Archaeology at the Institute of Archaeology of the University College London, in 1989. The Alexander von Humboldt Foundation awarded her a postdoctoral grant at the University of Bonn in 1996, where she specialized in archaeological sciences, bringing together scientists from the Max Planck, the Freie Universität Berlin, and Leiden University to characterize Maya pottery from the site of K'axob in Belize (McAnany and López Varela 1999; López Varela et al. 2001; López Varela et al. 2002; López Varela 2004). Since 2013, Sandra L. López Varela is a professor at the Faculty of Philosophy and Literature of the Universidad Nacional Autónoma de Mexico.

Major Accomplishments

Her current research studies concentrate on the analysis of social development policies and institutional economics to combat poverty, an interest that developed from her ethnoarchaeological studies of griddle making at Cuentepec, in the State of Morelos (López Varela and Dore 2010; López Varela 2012a, 2014a). The transdisciplinary and international approach to her research has brought together scientists from apparently unrelated fields to archaeology and to contribute to modern social inquiry, a dialogue that awarded her the "Friedrich Wilhelm Bessel Award" from the Alexander von Humboldt Foundation in 2012 (Fig. 1), with the project "Sustaining Heritage in the Future Cities of Development: archaeological analysis of institutional solutions to poverty." Deriving from this innovative project (López Varela 2014c, 2014d), she has developed a mobile application, "Alternative Mexico," available on the iTunes and Android stores, financed by UNAM (López Varela 2015). The project aims to empower and promote local communities' definition of heritage in Mexico's City metropolitan area. Her international

López Varela, Sandra L., Fig. 1 Dr. López Varela, a Humboldt fellow and awardee, has long been at the forefront of promoting international cooperation and collaboration among scientists and scholars to promote the universe of knowledge for world understanding

recognition to advance our knowledge of the past was recognized with her holding the Archaeology Seat as an Executive Board Member at the American Anthropological Association (2011–2014). She has served as President/Vice president of the Society for Archaeological Sciences (2009–2011) and as Treasurer of the Sociedad Mexicana de Antropología (2015–2017). Since 2005, Dr. López Varela is a Registered Professional Archaeologist (RPA 15480) and a member of the Mexican Academy of Sciences, Arts, Technology, and Humanities since 2009.

Cross-References

- Ceramics: Scientific Analysis
- Cultural Heritage Management and Poverty
- Ethnoarchaeology
- Ethnoarchaeology: Approaches to Fieldwork
- Heritage and Public Policy
- Heritage and Society
- Mesoamerica in the Preclassic Period: Early, Middle, Late Formative
- Mesoamerica: Complex Society Development
- Technological Studies in Archaeological Science

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Loring, Stephen

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Basic Biographical Information

Stephen Loring was born on October 15, 1950, in Concord, Massachusetts (with his twin David), as the oldest of six children, to Victoria Harrington and Charles G. Loring. Growing up alongside the Concord and Assabet Rivers, he spent much of his spare time emulating the philosopher, naturalist, and antiquarian Henry David Thoreau, by exploring his natural surroundings, searching for artifacts, learning about lore and history in the town's library, and catching turtles and taming raccoons. Completing high school in 1968, he went for an undergraduate degree in anthropology at Goddard College in Plainfield, Vermont, graduating in 1973. That college allowed Loring to focus his interests on archaeology, with an internship at

Harvard's Peabody Museum of Archaeology and Ethnology, fieldwork in Guatemala and Arkansas, and independent research on older New England artifact collections, particularly from Vermont. Loring's 261-page senior thesis *An Appraisal of Vermont Archaeology* was the first synthesis of northern New England prehistory using neglected avocational, museum, and historical society collections.

Between 1971 and 1974, with summers with the Arkansas Archaeological Survey in the American Southeast and falls in the Cree country along James Bay in northern Quebec, Canada, Loring realized his true calling was the northern sub-Arctic and Arctic. He was drawn there by the opportunity to learn in an unbookish way about the life of northern hunters. He befriended a number of Cree families who introduced him to their style of living and their lands and the serious problems they were facing in the path of gigantic hydroelectric schemes. That interaction taught Loring much more directly, intensively, and sensitively about the people, past and present, than the learned tomes of anthropologists had done until then. If he were to work there as an archaeologist, he better articulate archaeology with the real-life problems of northern Native communities.

His experience in the Boreal forest and his interest in the Native history of the "Far Northeast" brought him to the attention of Bill Fitzhugh (Smithsonian Institution) who hired him in 1975 to join the archaeological and ethnohistorical survey of the Labrador coast he was directing. Infatuated by the knowledge, skills, and wisdom of many of the elders Loring got to know, he ended up focusing on pre- and post-contact Native history. Bill Fitzhugh encouraged Loring to go on for graduate training. As an erstwhile New England archaeologist, seeing no clear cultural or logical boundaries between New England and its Labradorian far Northeast, he entered graduate school in 1977 at the University of Massachusetts, with the New England archaeologist Prof. Dena Dincauze, obtaining his MA in 1981. While working on his doctoral dissertation, Loring also worked as administrator of the Arctic Studies Program at Middlebury College (1983/1984) and as instructor in the Anthropology Department of the University of South Carolina (1984–1990), interrupted by fieldwork in New England, Argentina, Labrador, and Alaska. He completed his doctoral thesis in 1992 (*Princes and Princesses of Ragged Fame: Innu (Naskapi) Archaeology and Ethnohistory in Labrador*), with Dincauze as chair.

In 1991, Loring was hired as museum anthropologist and Arctic archaeologist with the Arctic Studies Program of the Department of Anthropology at the Smithsonian's National Museum of Natural History in Washington, DC, a position he has occupied since then. At the Smithsonian, he helps curate the archaeological and ethnological collections from all across the North American Arctic. Throughout that region, he regularly carries out ethnohistoric, archaeological, and archival research and curates and consults about exhibits that deal with or touch upon it. He is the human interface between the ethnographic and archaeological collections of the Smithsonian and the descendants of the people whose artifacts and archives the Institution curates. Loring has covered this topical area with more than 70 presentations at professional meetings, the organization of a large number of professional symposia, about 70 publications, and numerous grants and contracts. He is very active in professional associations and in the various contexts in which professionals can assist the populations they publish about dealing with the serious problems they are facing today.

Since 1981, Loring has been married to Prof. Joan Gero (emerita, Department of Anthropology, American University, Washington, DC, 1944–2016). Before Joan Gero's untimely death in 2016, Loring and Gero were considered by many of their colleagues as a model to emulate for their commitment to exert a positive influence on the profession and its relations to its subjects and to do battle for progressive causes in the discipline. In recognition, the two of them were jointly honored in 2013 with the Lifetime Achievement Award of the World Archaeological Congress. Loring resides in Silver Springs, Maryland.

Major Accomplishments

Loring has translated more than 40 years of interacting with northern community members in general, and the Innu and Inuit communities of Labrador specifically, into a pioneering project that has become known as community archaeology. It is based on the realization of the horrific conditions that Arctic communities have to deal with on a daily basis, including the disintegration of traditional social structures; loss of, or alienation from, traditional knowledges; outside encroachment on their traditional land and resources; glaring health and educational iniquities; and destructive rates of alcoholism and suicide, among others. For the archaeologist (and other scientists), this requires first to learn from the community members about their problems and, then, to develop with them a praxis that helps to remediate these problems.

Loring has been trendsetting in helping northern communities to reconnect with their material patrimony and archival data curated at the Smithsonian Institution, to facilitate the repatriation of knowledge and materials to descendant communities (and the archival safeguarding of that patrimony), and to honor the custodians of traditional knowledge, by having them teach others with the help of this material patrimony (including the archaeologists). In the field, Loring has rethought archaeological field "schools" by sponsoring young community members to spend time on their traditional lands, to give them the opportunity to interact with their elders on their knowledge, to strengthen their connection to community history and environment, to give them positive educational experiences, and to encourage them to become self-propelled learners about their community and its place in nature and history. In Loring's community archaeology, it is the community benefit that drives what is done with the cultural patrimony, not the research interests of the (usually noncommunity) archaeologists. That long-time commitment to community archaeology, of course, also makes Loring a forerunner, model, and frequent contributor to indigenous archaeology worldwide. In addition, he has been an important spokesperson on the side of Native groups, in defense of their cultural patrimony, as, for example, in the Kennewick case.

Loring, Stephen, Fig. 1 Stephen Loring with an arm load of Murre eggs (previously dislodged by a gang of ravens) taken from beneath the rookery on Agattu in the western Aleutians, 1996. (Photograph: *Western Aleutian Archaeology and Paleoecology Project, Arctic Studies Center, Smithsonian Institution*)

Loring's expertise on the Native history of Northern Canada and the American Arctic is widely acknowledged. He controls northern technologies like few other non-Natives. In addition, Loring has contributed significantly to lithic technology, as, for example, in his publications on the Native history of lithic raw materials and how they relate to social and spiritual process. Finally, he has always remained an important contributor to New England archaeology, including to the archaeology of Concord, Massachusetts, where he spent his early years (Fig. 1). The references provide and select bibliography of his publications since 1997.

Cross-References

- ▶ Australia, New Zealand, and Papua New Guinea: Museums
- ▶ Canada: Cultural Heritage Management and First Nations
- ▶ Community Archaeology
- ▶ Community Engagement in Archaeology
- ▶ Cultural Heritage Management and Native Americans
- ▶ Descendant Communities in French Guiana: Amerindians

▶ Gero, Joan
▶ Indigenous Knowledge and Traditional Knowledge
▶ Indigenous Archaeologies
▶ Oral Sources and Oral History
▶ Repatriation Acts: Before NAGPRA
▶ Smithsonian Institution

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Lubbock, John

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Basic Biographical Information

John Lubbock was a key figure in the establishment of archaeology as a science and a strong advocate of Spencerian progressivism during the Victorian era. Lubbock was born in 1834, the son of Sir John Lubbock, third baronet, a London banker. He grew up on the family country estate of High Elms near Downe in Kent, England. Serendipitously the estate was adjacent to the home of Charles Darwin. The great naturalist befriended the boy, guided him in studying insects and flora, and benefitted later by Lubbock's membership in a group of younger scientists within the Royal Society, the "X-Club," that proselytized evolution. Lubbock attended Eton to the age of 14. He then joined his father's bank and became a partner at the age of 22.

During the 1860s, Lubbock held a number of influential positions, including President of the

Ethnological Society (1864–1865), Vice-President of the Linnean Society (1865), and President of the International Association for Prehistoric Archaeology (1868). In the 1870s, he held the position of President of the Royal Anthropological Society (1871–1873), as well as the position of Vice-President of the Royal Society (1871). As economic historian Marc Flandreau describes in his 2016 book, Lubbock was simultaneously a leader in the Corporation of Foreign Bondholders, dealing with schemes to exploit resources in weak foreign nations. Lubbock's imprimatur as scientist authority on foreign peoples gave credibility to bonds issued for such schemes, resulting in strengthening British imperial power. Lubbock received honorary degrees from Oxford, Cambridge, Edinburgh, Dublin, and Würzburg in recognition of his scientific contributions.

Lubbock was active in politics, elected Member of Parliament in 1870 on his third attempt. As MP, he succeeded in his greatest claim to fame, the Bank Holidays Act of 1871, providing summer Monday holidays to give working people long weekends. A number of other legislative measures he initiated or espoused similarly benefitted the laboring class. Teaching science in schools was another of his campaigns, part of his enthusiasm for the idea that humans progress from savagery (ruled by superstition) to civilization enlightened by rational thinking freed from metaphysics. Darwin was his mentor in scientific work, especially entomology, but Herbert Spencer's mystical faith in progress is more evident in Lubbock's books than Darwin's doggedly empirical evolution.

Major Accomplishments

Lubbock's *Pre-historic Times* (1865) is a compendium of several articles he published in *Natural History Review* following trips to view archaeological sites including Swiss "lake dwellings," Danish "kitchen middens," and Boucher de Perthes' Somme gravels. The book was a publisher's effort to profit from the popularity of Daniel Wilson's sold-out *Prehistoric Man* (1862). Wilson, from Edinburgh, was the first to use the term "prehistory" in English, in 1851. He taught that prehistoric archaeology should follow a geology model relying on stratigraphy and comparison of artifacts with contemporary versions viewed alive; for this, he spent summers on Lake Superior canoeing with Ojibwe Indians to observe living hunter-fishers in forests similar to ancient Scotland's. Lubbock, disliking primitive conditions, did not travel outside Europe. Thus, his book relies heavily on secondary sources. In contrast to Wilson's systematic, firsthand survey of primarily American First Nations' architecture and artifacts, respectful of the accomplishments they embody, Lubbock's book begins with a chapter on masterfully crafted bronze weapons and then moves onto stone artifacts, tumuli, the Swiss and Danish Neolithic sites, "Antiquity of Man" (on which Charles Lyell accused him of plagiarism) and "North American Archaeology" (failing to cite passages lifted from Wilson), and finally "Modern Savages," for which he begs readers' understanding that the brutal ugliness depicted cannot be passed over. Two factors made *Pre-historic Times* very successful in England, going into seven editions through 1913. First, the book was promoted by Lubbock's many influential friends in London, whereas Wilson, from a poor Scottish family, lived in Toronto far from Britain's scientific circles. Second, Lubbock wrote with an optimism echoing the spirit of his own Victorian business class, moving into positions of power in industrializing imperial Britain.

Five years later, Lubbock published a sequel, *On the Origin of Civilisation* (1870), expanding upon the Savages section of the earlier book. Its political relevance jumps out in the first sentence: "The study of the lower races of men, apart from the direct importance which it possesses in an empire like ours . . .." He explains in this opening chapter that vestiges of savage or (next higher) barbarian cultures survive in ritual or folk customs and are, by implication, worth winnowing out. But more important than administrative guidance in the empire or divesting civilization of now-senseless vestiges is the realization that his stage-ordered comparisons of primitives and

barbarians around the world clearly demonstrate that the human race is progressing, not degrading as some theologians held. He claimed that the reason that the lower races have not progressed like the White Man is biological and that adult savages remain remarkably like (civilized) children (p. 522). Understanding this, he says, "might have saved us many national misfortunes, from the loss of Captain Cook down to the Abyssinian war."

Lubbock was a gentleman of science, moneyed enough to travel comfortably in Europe and dine in exclusive clubs. Much more than that, he loved politics and energetically pushed for legislation and organizations that could ameliorate the condition of the British working class and London dwellers in particular (he was on the London County Council). His interest in archaeology culminated in sponsoring the 1882 Ancient Monuments Act, protecting them as national patrimony. A decade earlier he had purchased the huge henge monument Avebury, near Stonehenge, to preserve it from threatened destruction (a village sits in its middle). In 1900, the baronet was raised to the rank of Baron and chose the title Lord Avebury.

Lubbock's piquant eclecticism in his "archaeological" books (really treatises on Spencerian cultural evolution) met a very different mode of archaeology in the practice of Augustus Lane Fox, who took the surname Pitt Rivers upon inheriting a great-uncle's vast estate in the region that includes Stonehenge and Avebury. Pitt Rivers was an Army man meticulous in laying out grid excavations, keeping detailed notes, and logically constructing lines of progressive development in classes of artifacts culled from all over the world (preserved in the Oxford museum bearing his name). Lubbock, widowed, married Pitt Rivers' daughter in 1884. The father-in-law influenced the practice of field archaeology; the son-in-law helped preserve and popularize the archaeological record. Both men believed that archaeological remains illustrate the progress of mankind from bestial origins through an evolutionary force (Spencerian, not Darwinian) to the present pinnacle of educated Englishmen and likely to greater perfection in the future. Both used archaeology didactically, Pitt Rivers welcoming tourists and Lubbock writing books, in the cause of promulgating Spencerian progressivism. In the case of John Lubbock, first Baron Avebury, his indefatigable politicking for liberal social laws and welfare organizations created his real contributions, more significant than the haphazard archaeology in *Pre-historic Times* and the racist aggregation of travelers' stories in *Origin of Civilisation*.

Cross-References

- ▶ Heritage: History and Context
- ▶ Histories of the Archaeological Discipline: Issues to Consider

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Lucy

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Introduction

Lucy is a famous fossil specimen of the extinct hominin species *Australopithecus afarensis* (Fig. 1) discovered in 1974 at Hadar, Ethiopia, by paleoanthropologist Donald C. Johanson. *A. afarensis* was a small-brained, large-jawed, bipedal hominin that has since been discovered at several other sites in Ethiopia, Kenya, Tanzania, and possibly Chad. The known time range of the species is c. 3.8–3.0 Ma. The discovery of Lucy changed perceptions about the timing and nature of the first appearance of traits that make us human.

Lucy, Fig. 1 Lucy (A.L. 288-1 partial skeleton). (Image courtesy of the Institute of Human Origins, Arizona State University)

Definition

Lucy is the nickname given to a partial skeleton (A.L. [Afar Locality] 288-1) recovered from the Hadar Formation, central Afar, Ethiopia, and attributed to the species *Australopithecus afarensis*. The skeleton is roughly 40% complete and includes cranial fragments, the mandible, and a large proportion of the postcranial skeleton, including a complete sacrum, complete left pelvic bone, and complete left femur (Johanson et al. 1982a). Lucy is dated to 3.2 Ma ago based on single-crystal $^{40}Ar/^{39}Ar$ analysis (Walter 1994).

Lucy, Fig. 2 Donald C. Johanson excavating Lucy's pelvic bone. (Image courtesy of Donald C. Johanson/Institute of Human Origins, Arizona State University)

Key Issues/Current Debates/Future Directions/Examples

Donald Johanson and Tom Gray discovered Lucy in 1974 (Fig. 2) while surveying near the Kada Hadar tributary of the Awash River as part of the International Afar Research Expedition (IARE). The IARE was formed by Maurice Taieb, Donald Johanson, and Yves Coppens in 1973. Lucy was named after the Beatles' song, "Lucy in the Sky with Diamonds," which played in camp during celebrations the evening of the fossil's discovery (Johanson and Edey 1981). Lucy represents the

most complete of numerous *A. afarensis* individuals recovered from the Hadar Formation. The 1973 IARE field season had yielded hominin lower limb bones with a knee joint consistent with bipedal locomotion (A.L. 128-1).

The discovery of Lucy and other *A. afarensis* specimens recovered on this expedition formed the first significant sample of hominins more than 3 Ma old (Kimbel and Delezene 2009). In addition to confirming that bipedalism evolved in humans before major expansions in brain size (Johanson and Edey 1981), the Hadar discoveries are in part responsible for the recognition that the hominin divergence from extant great apes occurred relatively recently – in the early Pliocene or late Miocene, rather than the middle Miocene – and have provided important insights for understanding the origins of bipedalism, the uniquely human pattern of life history, and hominin dietary adaptations (Kimbel and Delezene 2009).

Lucy's discovery was so remarkable and highly publicized that she quickly became a household name and a key figure in raising awareness about human origins and evolution among the general public.

Lucy had a brain just slightly larger than that of a chimpanzee (less than ~500 c.c.) and was small in stature – standing just over a meter tall – with relatively longer arms than legs. In many respects, Lucy resembled extant great apes. However, unlike extant great apes, Lucy did not have an enlarged, apelike canine honing complex (when the upper canines are sharpened against the lower third premolar) and walked on two legs.

The morphology of the pelvis and lower limb bones reveals that Lucy walked bipedally in a striding gait. For example, the shape of the pelvis allows the hip muscles to control balance of the torso when standing on one leg (as we do when we walk). A prominent patellar lip on Lucy's distal femur keeps the patella (knee cap) from dislocating due to action of the thigh muscles on an inwardly angled femur, which is a unique feature of the human leg.

Paleoanthropologists know that Lucy is female, because of her small size compared to the nearly 400 specimens of *A. afarensis* now known from East Africa.

Lucy had relatively large, thickly enameled, low-cusped premolars and molars, and, generally, these dental features are associated with adaptations to consuming hard objects like seeds and nuts. The robusticity of *A. afarensis'* jaw is also consistent with a hard object diet. However, the frequency and morphology of pits and striations (i.e., dental microwear) on *A. afarensis* molars, including the mandibular molars of Lucy, are quite different from the pattern observed in extant primate hard-object feeders (Grine et al. 2006). These observations are true for *A. afarensis* specimens from different inferred paleohabitats and through time. It is possible that the morphological characteristics of *A. afarensis'* teeth and masticatory apparatus represent adaptations to "fallback foods" – resources of relatively low preference that are used seasonally when preferred foods are unavailable – rather than the preferred and main component of the diet (Grine et al. 2006).

The Hadar Formation is divided into four members, from bottom to top, the Basal, Sidi Hakoma, Denen Dora, and Kada Hadar (Johanson et al. 1982b). Lucy was discovered in the lower levels (KH-1 submember) of the Kada Hadar Member. The sediments Lucy was recovered from lie just above a volcanic tuff named the Kada Hadar Tuff (KHT), which was dated by crystal $^{40}Ar/^{39}Ar$ analysis to ~3.2 Ma (Walter 1994). Sediments near the top of the Kada Hadar Member date to ~3.0 Ma. Within the KH-1 submember, Lucy derives from sandy sediments known as the KH-1 sands that are up to 1 m thick in places and are situated between the KHT and a deposit known as Confetti Clay. The KH-1 sand represents a fluvial (i.e., stream or river) deposit, within a dynamic and cyclical fluvial and lacustrine (i.e., lake) depositional environment (Campisano and Feibel 2007).

Lucy's excellent preservation, which is rare in the early hominin fossil record, may be in part due to the high sedimentation rate at Hadar compared to other East African localities (Campisano and Feibel 2007). There is little evidence for carnivore damage, and the bones do not exhibit weathering prior to fossilization (Johanson et al. 1982b), suggesting that Lucy was deposited and buried

relatively quickly after death, most likely in fine sediments near a water source.

Hadar was a wetter place when Lucy inhabited it than the arid desert it is today. There was a large lake with an extensive system of meandering and braided rivers and streams, which would have supported a mosaic environment with woodlands, shrublands, and grasslands, and a diverse mammalian population including pigs, hippos, and antelopes. The environment was not static, however. Paleoenvironmental reconstructions based on paleontological indicators show that the Hadar habitat fluctuated between more open, arid, grassy conditions and more closed, wetter, wooded conditions (Reed 2008). The Kada Hadar Member from which Lucy was recovered yields the highest number of ungulates, suggestive of a more arid environment than earlier in the Pliocene. As a species, *A. afarensis* appears to have inhabited a variety of habitats, and persisted through periods of dramatic climate change, suggesting that the species was adaptively flexible and able to tolerate a wide range of ecological conditions (Reed 2008).

While there is consensus that Lucy did walk bipedally, there is debate about the relative importance of bipedalism and tree climbing within her locomotor repertoire (Ward 2002). Some of the apelike features of *A. afarensis*, such as relatively longer forelimbs than hindlimbs and longer curved phalanges, are generally interpreted in one of two ways. First, these traits may represent retained primitive features that did not play a significant functional role in locomotion and were retained as vestigial traits rather than being favored by selection. Alternatively, these traits may have played a significant functional role and were subject to stabilizing selection because they enhanced the tree climbing ability of *A. afarensis*.

In primates, the degree of dimorphism between males and females is related to intrasexual competition and social behavior. Generally, taxa with frequent and intense male-male competition show increased male body and maxillary canine size compared to females, and monogamous and polyandrous taxa show less difference between males and females. *A. afarensis* shows a high degree of body size dimorphism, consistent with intense male-male competition, but a low degree of canine size dimorphism, consistent with monogamy or polyandry (Plavcan and van Schaik 1997). There are no extant analogs among primates for this pattern of sexual dimorphism, making it difficult to establish the nature of *A. afarensis* social behavior and how it may have differed from earlier and later hominins.

Intentionally manufactured stone tools are not known in the archaeological record until 2.6 Ma, after the last known occurrence of *A. afarensis*. Generally, the origins of the first known stone tool industry – the Oldowan – are associated with *Homo habilis*. However, 3.4-Ma-old fossil animal bones from the site of Dikika, across the river from Hadar, appear to exhibit deliberate cutmarks (McPherron et al. 2010). This finding suggests that *A. afarensis* might have used unmodified stone tools with naturally sharp edges to process animal remains.

Lucy's partial skeleton is usually housed at the National Museum of Ethiopia in Addis Ababa. In 2007, the original specimen began touring across the United States as part of an exhibit called "Lucy's Legacy: The Hidden Treasures of Ethiopia." The tour is controversial because some paleoanthropologists were concerned about loss and damage, protesting the transport of the irreplaceable fossil (Gibbons 2006).

Cross-References

- ▶ African Stone Age
- ▶ Australopithecines
- ▶ Hominids, Earliest African
- ▶ Hominin Paleoecology and Environmental Archaeology
- ▶ *Homo habilis*
- ▶ Human Evolution: Theory and Progress
- ▶ Oldowan Industrial Complex

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Lull, Vicente

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Basic Biographical Information

Vicente Lull (La Plata, Argentina, 1949) is Professor of Prehistory at the Autonomous University of Barcelona (Spain), where he teaches since 1980; he is also supervisor of the research group in Mediterranean Social Archaeoecology (ASOME). His academic training was at the University of Barcelona, where he submitted his PhD dissertation on the Bronze Age of *El Argar*. Joan Maluquer de Motes was the dissertation supervisor (1980). Since the 1970s, he has conducted a large number research projects on the Prehistory of southeastern Iberia and the Balearic Islands, in addition to making fundamental contributions in key fields of archaeological theory and method.

Major Accomplishments

Lull is a key figure in the theoretical and methodological renewal of archaeological research in Spain and one of the main advocators of historical materialism implementation in Western Mediterranean Late Prehistory research. His reference work on *El Argar* (Lull 1983), one of the most important archaeological entities of the European Early Bronze Age, is the most cited book on the Iberian Bronze Age. It marked a rupture with the historically and culturally dominant perspectives, characterized by an archival orientation in the study of the archaeological record and skepticism regarding the possibility of knowing prehistoric social organizations. He applied Marxist categories of historical analysis ("means of production", "relations of production", "surplus", "exploitation", among others) and statistical analysis and offered a proposal of socioeconomic and political organization that still marks out the research agenda.

Lull's break with traditional archaeology also kept distance to the late, yet enthusiastic, adoption of Anglo-Saxon processual approaches in Spain. The effort in the proposal of a methodology grounded on an explicit theoretical framework was translated, on the one hand, into an excavation and record system based on set theory (Gasull et al. 1984) and an original definition of archaeological objects and their expression dimensions (Lull 1988) and, on the other, in a social theory around the Marxist concept of "production of

social life" expressed empirically in social practices (Castro et al. 1996a, 2001).

The research on the society of El Argar also led to a critical alternative to the "archaeology of death" and its claim to evaluate levels of "sociopolitical complexity." This approach faced a dilemma when determining the *value* of the objects deposited as grave goods: either to impose our current value scale or to face a controversial quantification of the energy expenditure concept derived from the production and distribution costs of each object. Given these unsatisfactory solutions, he set out to investigate the social value of the objects in their specific social and historical background, according to a criterion that the most valuable objects would be the scarcest in the studied sample, but, at the same time, documented in the individual tombs with more grave goods (Lull and Estévez 1986). The results of the quantitative analysis led to characterize El Argar as a class society politically articulated as a state in the Marxist definition, that is, a political organization at the service of the exploiting class whose main objective is to maintain the privileges of such class through coercion practiced by specialists. The debate with traditional and procedural proposals was immediate and lasting, because two, often implicit dogmas, were questioned: (1) there were no states in Western Europe until, at least, the centuries before the Roman conquest, and (2) the political variability research of the so-called complex societies (chiefdoms, civilizations) must follow a comparative method, although, doing this, archaeology will be subordinated to anthropological and historiographic proposals and categories (Lull and Micó 2011). Instead, the investigation proposed addresses the challenge of empirically validating relational categories such as "surplus," "exploitation," "social class," and "coercive violence" and, if the data allow it, to identify a state organization even when elements traditionally considered diagnostic, such as writing, may be missing.

The Marxist hypothesis about the development of the state in the European Early Bronze Age was based on the analysis of funerary contexts, and, therefore, its testing required new research on other types of contexts and evidence (Lull and Risch 1995). This objective has strongly influenced the agenda of all research teams during the last decades. To get the necessary answers, Lull, together with R. Chapman, M. Picazo, and Mª E. Sanahuja, promoted the "Gatas Project (Almeria)" since 1985 around the investigation of the eponymous Argaric site (Castro et al. 1999). At present, the work continues in the "Bastida Project" framework, focused on the rich and outstanding findings in La Bastida, Tira del Lienzo, and La Almoloya (Murcia) (Lull et al. 2014; Delgado et al. 2016).

For Lull, research has always been synonymous of teamwork, but a team is not just an aggregate of individuals. Since the mid-1980s, it had a decisive role in the formation of a research team that, in addition to pursuing the aforementioned scientific objectives, gave rise to a demanding, critical, and collectivizing work and learning environment based on mutual support, thanks to which a group of archaeologists was formed who, over the years, have followed diverse paths. The individual competition and the search for the self-benefit prevailing today erode this kind of initiatives that, however, are the ideal means for the production of knowledge and its public dissemination.

This same group gave new impetus to research on the recent Prehistory of the Balearic Islands, initiated by Lull in 1975 with the first excavations at the monumental sites of Son Fornés and Son Ferragut (Mallorca), and later extended to Menorca, where they studied the amazing ritual and ceremonial contexts of the Es Càrritx and Es Mussol caves (Lull et al. 1999). This has resulted in the periodization and the social and economic model of the Balearic societies, from the insular colonization at the end of the third millennium cal BCE to the Roman conquest, which today dominates the state of the art. Son Fornés is also a reference in the dissemination and musealization of the archaeological legacy.

In addition, it is worth highlighting the pioneering contributions in the use of extensive series of radiocarbon dating to built social syntheses in recent Prehistory, both at European (González et al. 1992) and Iberian (Castro et al. 1996b) or Balearic scales (Lull et al. 1999).

In recent years, Lull has combined large-scale research in Iberian and Balearic sites, with the exploration of new paths of archaeological and social thought. In *Los objetos distinguidos* (*The Distinguished Objects)* (2007), he suggests a redefinition of the central categories of social thought ("work," "production," "society," "value," "property," "satisfaction vs. need," among others) and a materialist ontology, critical of Humanism, which places objects as *producers* of social life. This original consideration of objects has been known, although not recognized, by the latest reflections of the so-called symmetric archaeology or human-thing-entanglement. It is another example of a usual practice (colonial?) of the Anglo-Saxon academy: to take advantage of "new ideas and practical contributions" from different regions of the world and present them as their own, more or less simplified, through a handful of powerful transnational publishing companies.

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Basic Biographical Information

Lumbreras is one of the most influential Peruvian archaeologists of the second half of the twentieth century. He was born on the 29th of July in 1936 in the city of Huamanga, Ayacucho. Moving to Lima to complete his education, first in La Recoleta school, and later, in 1951, he continued his secondary education at Antonio Raimondi college. From the 4th year in secondary school, Lumbreras founded a study group with his classmates, dedicated to doing research and holding social gatherings and informative lectures on subjects of history and archaeology.

Lumbreras studied at the Universidad Nacional Mayor de San Marcos (UNMSM), obtaining his Bachelor of Arts and Humanities in 1959 and his Doctorate in Arts with special mention in Archaeology and Ethnology in 1960. At the time of his university training, he had Raúl Porras Barrenechea, Luis E. Valcárcel, Jorge C. Muelle, and José Matos Mar as professors. The visiting professors he had the opportunity to work with were John V. Murra, John Rowe, and Juan Comas.

In 1960 Lumbreras joined the faculty of the recently reopened Universidad Nacional de San Cristóbal de Huamanga in Ayacucho. There he met César Guardia Mayorga, with whom he systematically studied Marxism. This phase represents the greatest part of Lumbreras' political and philosophical training, in which he matures his thinking due to the immersion in the Ayacucho reality, not only in the university, but also in the field and in political work.

In 1966 Lumbreras returned to Lima to teach in different universities, among them the UNMSM. In this same year, he began excavations in Chavín de Huantar where he would excavate its most important archaeological context, the *Galería de las Ofrendas* (Gallery of Offerings). During these years, his Marxist thinking matured, as it can be seen in the text he devoted to his excavations in Chavín (Lumbreras 1993). At this time, he masterminded what would to be an important analytical category of his work and of the so-called Archaeology as a Social Science school, *unidad arqueológica socialmente significativa* (socially significant archaeological unity).

In 1960 he published the book *De las Artes, los Pueblos y las culturas del Antiguo Perú* (translated by Betty Meggers in 1974 as *Peoples and Cultures of Ancient Peru*) (Lumbreras 1969), a classic text in which the influence of positivism and culturalism of his academic training is still notable. However, he also laid out a chronological sequence contrary to that of John Rowe, suggesting more evolutionary stages based on social processes.

In 1970, Lumbreras organized the symposium *Formaciones autóctonas en América* (Native Formations in America) in the 40th International Congress of Americanists, in Lima, aiming to unite the leftist intellectuals of Latin America. Already consolidated in the UNMSM, his Marxist position became more notorious and influential. It materialized in one of his most popular books *De los orígenes del estado en el Perú* (On the Origins of the State in Peru) (Lumbreras 1972). In that book, it is clear that what moved him towards Andean prehistory was, in a Marxist style, class struggle.

Based on notes he made for an archaeology course he taught at the University of Concepción in Chile, he published his most popular theoretical book, *La Arqueología como Ciencia Social* (Archaeology as a Social Science) (Lumbreras 1974). This text would inspire José Luis Lorenzo to organize the *Reunión de Teotihuacán* (Meeting of Teotihuacán) in 1975, establishing common lines of action in the historic materialist perspective that the participants were developing in their own countries. From that meeting and from the one he organized in Paracas, Peru, he crafted his book *Arqueología de la América Andina* (Archaeology of Andean America) (Lumbreras 1981), where he laid out culture-historical areas for this part of the American, influential in Andean archaeology to this date.

In the 1970s, and under the auspice of Juan Velasco Alvarado's military government, Lumbreras worked in providing the archaeological cultural material the Peruvian state needed (Tantaleán 2005). One of the most important positions he held was that of director of the Peruvian National Archaeology Museum between 1973 and 1979.

During the 1980s, his career would encompass teaching and research. In those years, he wrote extensively for the journal *Gaceta Arqueología Andina*, refining his chronological and cultural sequence of 1974 (Lumbreras 2005). In 1989, he was named professor emeritus at the UNMSM. The following year, he toured Europe, giving classes in Spain – Universidad Complutense de Madrid (1991) and Universidad Autónoma de Barcelona (1991–1994) – and Germany (1995–1996) where he continued developing his Marxist approach, especially regarding the origins of the state (Lumbreras 2005: 192–229).

In 1996 he returned to South America. He spent four years in Brazil, teaching at the Universidade Estadual do Norte Fluminense, in Rio De Janeiro. Settled again in Peru in 1999, Lumbreras was appointed National Director of Culture, supporting Peruvian archaeology with regional projects, such as the symbolic *Qhapaq Ñan*, the purpose of which is to elevate the Inca road system to UNESCO's World Heritage List. Today, outside of government and university structures, Lumbreras continues to be active, publishing and lecturing in the Marxist approach that has provided him with a holistic and global perspective of the pre-Hispanic, historic, and contemporary Andean world.

Cross-References

- ▶ Andes: Prehistoric Period
- ▶ Latin American Social Archaeology
- ▶ Marx, Karl
- ▶ Marxist Archaeologies Development: Peruvian, Latin American, and Social Archaeology Perspectives
- ▶ Social Archaeology

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Lydia, Archaeology of

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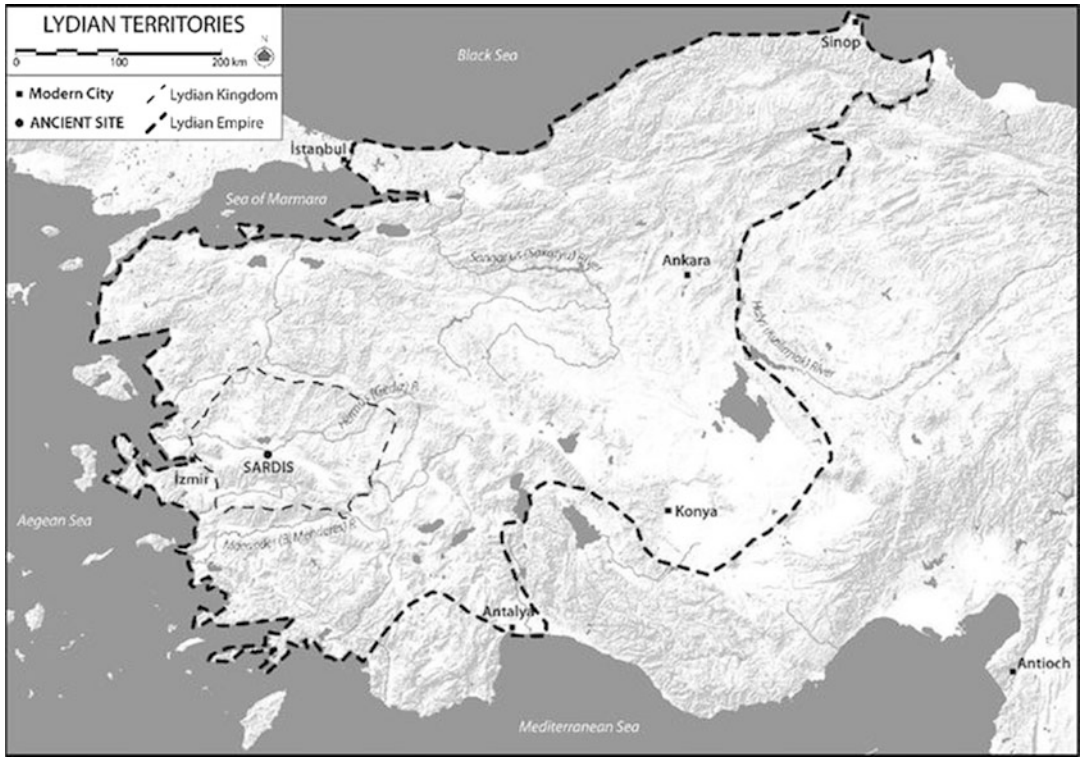
Introduction

Lydia is an ancient region in western Anatolia (modern Turkey) (Fig. 1) long famed for its wealth and legendary landscapes: the proverbially-rich King Croesus; the gold-bearing Pactolus stream, where King Midas of Phrygia was said to have washed off his golden touch; the wise Mt. Tmolus, who judged the musical contest between Pan and Apollo; and the Gygean lake, with its "everflowing" waters and neighboring burial mounds, among other noted features. The heyday of Lydian culture was the Archaic period (seventh-sixth centuries BCE), the era of the Mermnad kings and their expansion of Lydian domination through most of western Asia Minor. But even after the Lydian empire fell to the Persians ca. 545 BCE, Lydia remained a distinct cultural region within the Persian empire and later, in the Hellenistic period and in the Roman empire. The Lydian capital, Sardis, retained prominence as the seat of a Persian satrap, the site of an



Lydia, Archaeology of, Fig. 1 Map of the Lydian Kingdom and Empire (C.H. Roosevelt)

important Hellenistic Temple of Artemis, monumental urban center in the Roman empire, and home to thriving Jewish and Christian communities in late antiquity.

Definition

The heart of Lydia lies in the fertile valleys of the Hermus (modern Gediz) and Cayster (now Küçük Menderes) Rivers and their tributaries, surrounded by foothills and higher mountain ranges (Fig. 2). The Hermus and Cayster descend gradually from the edges of the central Anatolian plateau westward toward the Aegean coast, which was colonized by Greeks by the time of the Iron Age. Lydia's western neighbors were thus Ionian and Aeolian Greeks, while its other borders were shared with other Anatolian populations: Mysians at northwest and north, Phrygians to the northeast and east, and Carians to the south. The kingdom of Lydia reached its greatest extent under King Croesus in the first half of the sixth century BCE. Croesus's father, Alyattes, had extended Lydian control towards both the west and the east, and Croesus succeeded in bringing the majority of western Anatolia under Lydian sway, all the way from the Aegean coast to the Halys River in Cappadocia. The Greek historian Herodotus tells the story of how Croesus's decision to push beyond the Halys into Median Persian territory led to the collapse of his vast empire.

The archaeology of Lydia encompasses the study of ancient sites in the region of historical Lydia both before and after the time of the Lydian empire, from earliest human occupation through the Roman era to the Ottoman period. It includes long-term excavation of the Lydian capital, Sardis, as well as recent excavation of a Bronze Age citadel, Kaymakçı; salvage excavations of looted burial mounds and other sites elsewhere in Lydia; and regional survey in central Lydia.

Historical Background

The discovery of ancient Lydia began with visits of European travelers to the standing remains of Roman-period buildings at Sardis, including the Temple of Artemis (Fig. 3), beginning as early as the fifteenth century. In the mid-nineteenth century, the conspicuous burial mounds of Bin Tepe, the royal cemetery of Sardis (Fig. 2), drew the interest of the Prussian consul at nearby Smyrna (now İzmir), Ludwig Spiegelthal. The first excavations in Lydia were carried out in 1853 by Spiegelthal at the largest of all the mounds in Bin Tepe, the Tumulus of Alyattes. The massive mound had been associated with the Lydian king Alyattes, father of Croesus, since at least the time of Herodotus (in the late fifth century BCE). Spiegelthal was able to locate the finely built marble chamber but it, like most other Lydian tombs found to date, had already been looted of its original grave offerings (Ratté 2011: 69–72). Further explorations of Lydian tumuli were undertaken in the 1870s by Auguste Choisy and George Dennis (better known for his work on Etruscan tombs). More comprehensive excavations commenced with Princeton's expedition at Sardis in the early twentieth century, under Howard Crosby Butler (1910–1914 and 1922). Work was halted by World War I and the Turkish War of Independence, but in keeping with excavation practices of the day the team uncovered the entire plan of the Temple of Artemis and excavated more than 1000 chamber tombs in the nearby "Necropolis" hillside in those six seasons (Butler 1922) (Fig. 3).

Starting in 1958, the Archaeological Exploration of Sardis, sponsored by Harvard and Cornell Universities, worked steadily to understand all eras of the city's long history, with particular emphasis on a bath-gymnasium complex and synagogue of the Roman period, the Lydian fortification wall, and a burned destruction level associated with the Persian conquest of Lydia ca. 545 BCE (Hanfmann and Mierse 1983; Cahill 2010: 74–105). Recent excavations have focused on Lydian terraces built on "natural spurs of the acropolis" and later structures built atop them, a Roman imperial cult sanctuary on a lower terrace, and a monumental arch that spanned the main avenue near the city gate (Cahill 2015).

Lydia, Archaeology of, Fig. 2 View of Hermus Valley and Bin Tepe from atop the Tumulus of Alyattes, showing smaller tumuli and the Acropolis and Necropolis hills of Sardis in the foothills of the Tmolus range (author photo)

Lydia, Archaeology of, Fig. 3 Sardis, Temple of Artemis and Necropolis hill. The Pactolus stream runs between. Depressions in the side of the Necropolis hill mark the locations of collapsed chamber tombs

Investigations of Lydian sites outside of Sardis have been more limited but are now a focus of current research. Until recently, archaeological investigations were undertaken mostly for salvage operations or on an ad hoc basis, as were occasional surface surveys. The Central Lydia Archaeology Survey (Boston University) in 2005 commenced systematic study of the areas surrounding the Gygean Lake through both intensive and extensive survey methods as well as excavation. The resultant identification and exploration of many new sites, including several fortified Middle to Late Bronze Age settlements, has significantly revised our understanding of early Lydia (Roosevelt in Cahill 2010: 37–73; Roosevelt and Luke 2017), and the project is using the latest digital technologies to pioneer new methods of archaeological investigation and recording (Roosevelt et al. 2015).

Key Issues/Current Debates

Early Lydia (Paleolithic – Bronze Age)

Human occupation began as early as the Middle Paleolithic period in the area that came to be known as Lydia, as evidenced by stone tools collected in surface survey in Bin Tepe and occasional finds elsewhere. The transition to settled farming communities in the Neolithic period may mark the advent of new people to this area (Roosevelt in Cahill 2010: 43–46). At least 12 Late Neolithic sites have been identified, but only one has so far been excavated (Ulucak, near İzmir). Settlements grew in size and number through the Chalcolithic and Early Bronze Ages. Five Early Bronze Age (EBA) sites have been excavated in Lydia, and more than 100 have been identified through surface survey. The finds suggest connections with other West Anatolian EBA cultures and include pithos burials as well as cist graves, pottery, stone vessels and figurines, weapons, and jewelry made of various metal types, including silver and gold as well as bronze (Hanfmann and Mierse 1983: 16–20; Roosevelt in Cahill 2010: 40–51). Middle Bronze Age (MBA) Lydia has come to light only in recent years, with survey of fortified citadels of this era around the Gygean Lake. From the number of identifiable sites in this period, it appears that the population of Lydia contracted in this period from the many smaller villages of the EBA into centralized, fortified settlements of the Middle and Late Bronze Ages. The largest of these citadels is the site of Kaymakçı, at the west end of the Gygean Lake (Fig. 4): with a fortified lower town and upper

Lydia, Archaeology of, Fig. 4 Kaymakçı: Three-dimensional rendering of Quickbird satellite image of the citadel. (© Central Lydia Archaeology Survey)

citadel, it is comparable to, yet much larger than, Troy VI. This site seems to have been an important regional center in the Middle and Late Bronze Ages (Roosevelt in Cahill 2010: 51–53; Roosevelt and Luke 2017: 136–137). By the Late Bronze Age, this part of central Lydia was known to Hittites as the Seha River Land, and the Cayster valley to the south was known as the land of Mira. These place names are mentioned in Hittite texts, and Hittite-style rock reliefs in these areas (one near Ephesos, in a mountain pass connecting Lydia to Ionia, and another near Manisa) provide physical evidence for Hittite cultural connections in this period (Roosevelt in Cahill 2010: 53–56; Roosevelt and Luke 2017). In addition to traces of Late Bronze Age (LBA) occupation of sites around the Gygean Lake, an LBA level has been discovered in a limited exposure at Sardis (Hanfmann and Mierse 1983: 20–24).

Early Iron Age and Archaic Lydia

When Lydian-speaking peoples settled in this region is a matter of debate that may perhaps be solved through future excavations. The area was known as Lydia by at least the seventh century BCE, when it was mentioned in the annals of the Assyrian king Assurbanipal. This was the time of the beginning of the Mermnad dynasty under its first king, Gyges, also mentioned by name in Assyrian texts. According to Greek historical sources, an earlier dynasty (the Heraclids) had ruled for 22 generations after the founding of Lydia by one Lydus, son of Atys. This would place the beginnings of Lydia as a cultural entity right at the transition from the Bronze to Iron Ages. Archaeological evidence for this transitional period is at this point severely limited, but initial results of the Central Lydia Archaeology Survey do suggest an interruption or change in settlement patterns around the turn of the first millennium BCE, with the abandonment of large fortified sites, the establishment of new sites, and the use of different clay sources for pottery production. But whether these changes indicate the arrival of new, Lydian-speaking peoples to the area is still uncertain, as there is some continuity in place names from the Bronze Age and the changes could just as easily be explained by internal social and political factors (Roosevelt in Cahill 2010: 56–60).

It was in the Iron Age that Sardis emerged as a new regional urban center. Iron Age and early Archaic levels have been exposed only in limited excavation sectors at Sardis but include monumental terrace walls and a thriving industrial/domestic quarter. In the area adjacent to the Pactolus stream, evidence shows that Lydians experimented with techniques of extracting pure gold from electrum, a natural alloy of gold and silver, and developed the world's earliest known gold-refinery by the late seventh century BCE (Ramage and Craddock 2000; Bruce 2015). An altar of Kybele decorated with lions stood in the middle of this area. The minting of coins of pure gold and silver soon followed and Croesus's lion-bull issues (Fig. 5, ca. 561–545 BCE) represent the first known bimetallic system of coinage.

The growth of the Lydian empire in the first half of the sixth century under Alyattes and Croesus is also linked with the monumentalization of Sardis, through the construction of finely built,

Lydia, Archaeology of, Fig. 5 Gold Croeseid stater from Sardis. The Metropolitan Museum of Art, Gift of The American Society for the Excavation of Sardis, 1926 (26.59.2). (© The Metropolitan Museum of Art)

ashlar terrace walls on the slopes of the acropolis and a massive fortification wall enclosing the city center at the foot of the acropolis. The high terraces probably supported royal palace structures, though many centuries of later use have obscured the picture (Ratté 2011: 9–11, 99–107; Cahill 2015). The city wall was composed of mudbrick courses (at least 10 m high) supported on a wide stone base or socle (as much as 20 m wide), in some places reinforced with an additional sloping mud glacis enclosed by stone arms (Fig. 6) (Cahill 2010: 77–81). The fortification seems to have undergone several phases of construction before its fiery destruction in the Persian sack of the city ca. 545, and the stone facings display a remarkable range of approaches to stone-cutting. The masonry of the recessed area around the city gate at the north, on what was probably the main east-west travel route, is particularly fine, with variously colored sandstone ashlars and a variety of masons' marks in the Lydian alphabet, conspicuous and still not fully understood (Ratté 2011: 9–12, 108–112).

Lydian houses have been discovered in several excavation sectors at Sardis, both inside and outside the city wall. They generally have mudbrick walls on stone foundations with clay floors, though a house excavated beneath the later (Hellenistic-Roman) theater had stone paving and a stone column (Cahill 2010: 86–90).

Lydia, Archaeology of, Fig. 6 View of the Lydian fortification wall at Sardis (N. D. Cahill)

Decorated architectural terracottas found in some areas probably adorned the wealthier houses, along the lines of a reconstruction made by the Harvard-Cornell team in the expedition compound (Fig. 7) (Ramage 1978). Within these Lydian houses, a wide range of domestic activities are attested: grinding grain and other foods, cooking, eating and drinking, spinning and weaving, cosmetics, gaming, and, in some cases, craft production (Cahill 2010: 90–99). Common pottery shapes include cups (skyphoi), pitchers (oinochoai), mixing bowls (kraters and lebetes), and amphoras, all associated with the mixing and serving of wine. Tall stemmed dishes were also popular, and a distinctive Lydian shape is a small round-bodied container with foot, known as a lydion and probably used for perfumed oil (Fig. 8). Types of decoration applied to these pottery shapes include monochrome grey and black-burnished wares, linear designs in black-on-red or "bichrome" styles, streaky glaze, and

Lydia, Archaeology of, Fig. 7 Reconstruction of a Lydian mudbrick house with architectural terracottas, Sardis Expedition compound (author photo)

Lydia, Archaeology of, Fig. 8 'Marbled Ware' lydion from Sardis, sixth century BCE. New York, The Metropolitan Museum of Art, Gift of The American Society for the Excavation of Sardis, 1926 (26.164.27). (© The Metropolitan Museum of Art)

distinctively Lydian "marbled ware" (Fig. 8). More elaborate decorative styles (such as the "Sardis Style" and the misnamed "Ephesian Ware"), with a lively combination of animal, floral, and geometric motifs, are comparable with East Greek Orientalizing vase-painting (Greenewalt in Cahill 2010: 106–124). Imports from eastern and mainland Greece are also found. These can be more firmly dated than local styles and are therefore crucial for establishing chronology. A series of dinner sets (cup, pitcher, dish, knife, and pot or jug) deposited in a sixth-century residential/commercial quarter outside the city walls may represent ritual dinners or religious offerings of some kind, since the pot or jug usually contained a complete puppy skeleton (Greenewalt 1978).

The destruction debris that covered many of these houses has been linked with the Persian sack of the city ca. 545 BCE by relative pottery chronology, since the latest securely datable pottery in the destruction level is dated ca. 550 (Greenewalt 1992; Cahill 2010: 339–361). Analysis of the human victims found in the debris confirms the martial nature of the conflagration, since two of the skeletons showed muscle development compatible with a soldier's life – the left arm had habitually carried something heavy (like a shield) while the right arm indicated repetitive movement as would result from throwing or thrusting weapons (Cahill 2010: 348–352). Both also had sustained violent wounds. The neck of one victim showed signs of having carried heavy weight on the head, and a helmet made of iron and bronze was found nearby. Weapons found among the debris include a wide variety of arrowheads,

slingstones, an iron saber, and an iron sickle of a type seen in some depictions of warriors from elsewhere in Anatolia.

Tombs and Burial Customs

Lydian graves ranged in form from simple cist graves to rock-cut chamber tombs, tumuli covering marble or limestone burial chambers or sarcophagi, and monumental built tombs (Roosevelt 2009: 135–183). Tumuli are found throughout Lydia and are one of the best indicators of settlement patterns, since so few occupation sites have been surveyed and excavated (Roosevelt 2006b). Rock-cut tombs are found only at Sardis and in a few other locations. Only the three largest tumuli at Bin Tepe (which means "Thousand Mounds" in Turkish, though the true number of mounds is closer to 130, see Fig. 2) probably belong to the Lydian era, before the Persian conquest. Dominating the valley on a low ridge adjacent to the Gygean Lake, these conspicuous monuments linked the Lydian kings to memories of the Bronze Age past (Luke and Roosevelt 2016). The smaller tumuli were probably built by Persian nobility and local elite in emulation of the earlier Lydian kings. The earliest datable chamber tombs at Sardis were used in the sixth century BCE, but the majority of them were used (or re-used) in the Persian era and later periods, and later re-use may have obliterated traces of earlier burials. No tombs of the Early Iron Age or seventh century have yet been identified in Lydia.

In both tumulus chambers and in rock-cut tombs, burials were often placed on bed-like platforms, cut from bedrock, or built of marble or limestone. The most elaborate examples are carved and painted to resemble wooden banquet couches of a type known in Greece as *klinai*. Along with the banqueting vessels that must have once completed many grave assemblages, to judge from looted finds, these couches may have served to identify the deceased as elite banqueters (Baughan 2013). Burials in terracotta and stone sarcophagi are nearly as common, however, and remains of wood and nails in some chamber tombs suggest that wooden coffins may have also been used, even in connection with rock-cut "couches." Grave goods include fine jewelry of metal, stone, and glass; sealstones and pendants; mirrors, combs, and cosmetic utensils; ceramic, stone, and metal vessels; utensils for serving and consuming food and drink (cups, pitchers, dishes, strainers, ladles, etc.); and containers for perfumed oils, further accoutrements of banqueting. These items may be seen as expressions of wealth and indications of a leisure-loving lifestyle (Baughan in Cahill 2010: 273–304).

Set before the entrances to some rock-cut tombs and the edges of some tumuli were carved stone stelai with sculpted relief and/or Lydian inscriptions. Some of the reliefs represent doors, which may symbolize the home, the door of the tomb, or the final passage (Roosevelt 2006a). Other reliefs represent the deceased in a characteristic activity, such as banqueting (Roosevelt 2009: 156–162). The inscriptions usually identify the owner(s) of the tomb and warn potential violators of divine retribution.

Late Lydia (Persian, Hellenistic, Roman, Byzantine, and Islamic Periods)

Under Persian rule, Sardis became the capital of a province (satrapy) of the Achaemenid Persian empire. Physical remains of this period are limited at Sardis, where Roman builders often dug as far as Lydian levels when laying their foundations, but finds from tombs at Sardis and throughout greater Lydia reveal a thriving and probably multiethnic elite population during the Persian era. Among the many grave goods recovered from looted tumuli (since very few burials in Lydia have been found undisturbed) are sealstones carved with Persian motifs in local styles, gold clothing appliqués thought to be of Persian type, and precious metal banqueting sets with some local and some Persian vessel shapes and decorative motifs (Dusinberre 2003; Miller 2007). The "Lydian Treasure," looted from tumuli in eastern Lydia in the 1960s and recovered from the Metropolitan Museum of Art in the 1990s, offers the most famous assortment of luxury goods from Persian-period Lydia (Özgen et al. 1996). Recent studies of this and related material have stressed, however, that even "Persian"-style objects may

have been produced in Lydia, highlighting the role of Lydian craftsmen in the creation of an "International" Achaemenid style (Miller 2007).

It was early in the Persian period, or the late sixth century BCE, that the first altar was built in the area that became a sanctuary of Artemis and home to Sardis's most well-known standing remains (Fig. 3). The monumental stone Temple of Artemis, in the Ionic order, was begun in the Late Classical/Hellenistic period (ca. 300 BCE) and was never finished. Construction resumed with a somewhat different plan in the Roman imperial era, when it served at least partly as a locus for imperial cult worship (Cahill and Greenewalt 2016). Lydian dedicatory inscriptions carved at the bottoms of some of the re-used columns attest to the continued importance of Lydian families and of the Lydian language more than two centuries after the collapse of the Lydian empire (Yegül in Cahill 2010: 362–388; Yegül 2014).

By the Roman period, Sardis held all the usual components of a city in the eastern part of the Roman empire: a theater and stadium, several temples, baths, a gymnasium with civic and commercial space, colonnaded avenues, and urban townhouses. Recent excavations have shed new light on the richly decorated imperial cult sanctuary that was built on a large terrace in the Julio-Claudian period (Cahill 2014). The massive triple arch revealed by recent work on the main colonnaded avenue next to the Bath-Gymnasium Complex is one of the largest known in the Roman world, with a central bay 13 m wide (Cahill 2015). The civic basilica in that complex was converted to a synagogue in the fourth or sixth century CE (Magness 2005), and several Christian churches were built at Sardis in the Byzantine era (Buchwald 2015), when the acropolis was fortified. A thirteenth-century Islamic village has been identified around the remains of one of the churches, and Sardis remained occupied as a series of villages through the Ottoman period, with some continuity to the modern era suggested in the shared name of modern villages in the vicinity, Sart (Crane 1987). Other important Roman and Byzantine sites in Lydia include Thyateira (modern Akhisar), Philadelphia (modern Alaşehir), and Magnesia ad Sipylum (modern Manisa), though none have been explored to the same degree as Sardis.

Current Issues

One of the biggest problems in the archaeology of Lydia, with its many conspicuous tumuli, is illicit digging by treasure-hunters. The destruction of archaeological context is permanent and irreparable, and the sale of looted artifacts on the black market is deplorable. Even when objects that end up in private collections or in museums can be reasonably associated with a Lydian provenance, their full context – for instance, location in a particular tomb, or association with other objects – can never be known. Cultural heritage management and community outreach are thus major concerns of current archaeological work in the region (Roosevelt and Luke 2006; Luke in Cahill 2010: 389–403). Other current issues include defining the borders of Lydia, investigating Lydian relationships with neighboring cultures (e.g., Gürtekin-Demir 2014), and understanding Lydian identities in Late Lydian periods (e.g., Rojas 2010).

The richness of current scholarship on ancient Lydia was demonstrated in May 2017 at a conference in Izmir, involving around 100 scholars from 19 different countries (Laflı et al. forthcoming). The papers at this conference presented new insights on a range of topics including: Lydian cities other than Sardis (such as Thyateira and Saittae) and on the borders of Lydia (such as Tripolis and Tabae); the geographical limits and ethno-linguistic identity of Lydia; Lydian contacts with neighboring regions (such as Caria and the Troad) as well as further afield (such as Illyria and the Caucasus); the prehistory of Lydia; the Achaemenid, Hellenistic, Roman, and Byzantine periods; urban development and monumental architecture; religion, epigraphy, and numismatics; and Lydia and Lydians in Greek and Latin literary traditions. The publication of these papers promises to make a monumental contribution to the study of ancient Lydia.

Cross-References

- ▶ Basilica in Classical Archaeology
- ▶ Baths and Bathing, Roman
- ▶ Eastern Provinces of the Roman Empire, Archaeology of the
- ▶ Hellenistic and Roman Anatolia, Archaeology of
- ▶ Terracotta Architectural Sculpture in Classical Archaeology
- ▶ Urban Planning, Roman

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Further Readings

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