ANIMALS IN ARCHAEOLOGY

Integrating Landscapes, Environment and Humans in South Asia

(A Festschrift for Prof. P.P. Joglekar)

Volume 1

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Faunal Analysis and the Archaeology of Social Practices: How Can We Learn about Human-Animal Relationships When We Do Not Find Bones?

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Abstract: Archaeologists endeavour to find structures, features and artefacts that enable us to tell the story of the human past. Yet often evidence is absent, whether because of site formation processes or because of the locality within a site that is being investigated. While the lack of animal bones might leave a faunal analyst with little to say, we consider three ways in which such absence enriches the analysis of cultural practices. First, the meaning of faunal analysis can be broadened beyond animal bones to model the totality of animal presence through the use of artefacts such as figurines and ornaments, as well as the mentions and status of animals in contemporaneous historical texts. Second, the understanding of animal agency provides the opportunity to evaluate how human settlements constitute niches of activity that animals deliberately inhabit, even if they leave little trace of their presence for archaeologists to find. Finally, the historical emergence and significance of vegetarianism in the South Asian region lead to new appreciations of the meaning of the absence of bones in archaeological sites. Examples are provided by Early Historic archaeological settlements in the eastern coastal region of Odisha.

Introduction

Archaeology is comprised of a distinct set of methods, data and analytical approaches to the study of the ancient past. Nearly every question that archaeologists ask has some resonance in our concerns of the present day: the relationship between health, gender and household economic status; the development of technology that unites or divides social groups; the beginnings of settled agricultural life and the subsequent growth of

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cities, states and empires. In particular, the longitudinal study of human interactions with the environment is of pressing interest as we become increasingly aware of the many significant impacts that people make on the planet.

Although there are many ways of acquiring archaeological data, including surface survey and deep sediment coring, excavation is the most common archaeological method for the retrieval of data to address human-environmental dynamics. The analysis of the recovered material is deeply intertwined with the physical sciences such as chemistry and geology and with the life sciences such as botany and zoology. People who study these aspects of the natural world in an archaeological context rely on specific types of statistical and comparative analyses of human interactions with the physical world; thus an archaeobotanist is more than a specialist in plants, a geomorphologist has skills beyond the analysis of sediments and a faunal analyst is more than a zoologist.

Faunal analysis is a methodology used to address sentient living beings in the past that are not human but whose activities condition the response of humans within settlements and landscapes. In a natural environment, there are many types of animals that populate the air, the ground, and the waters, including birds, mammals, fish, and molluscs. As soon as humans inhabited a landscape, starting with our earliest ancestors, they interacted with those animals in a variety of ways. The bones, teeth, and (sometimes) hair, scales, carapaces, and other animal parts that we retrieve from archaeological sites provide evidence of the selectivity of humans upon animals, and sometimes also the selectivity of animals upon humans as they made their way into settlements even against the wishes of the people living there.

The evidence for the use of animals as food represents the greatest part of any faunal assemblage (Fig. 1). The treatment of animals as meat is related to cuisine, nutrition and

Fig. 1: Bones from the archaeological site of Kankeikuda, Odisha.

the aesthetics of consumption over time. In addition to humans' generalized dentition and the mammalian inheritance of occasional meat-eating amidst a general pattern of omnivory (Lieberman 2014), it might be worth considering other practical reasons why meat has formed a significant component of human diets worldwide. In contrast to plants, there are fewer species of animals meaning that the selection process is more straightforward; animals also are easy to spot because they move around and can often be easily detected in the terrestrial realms that humans inhabit (in this way, animals are the mobile equivalent of fruit, which is also easily seen amidst foliage). The killing of an animal results in a straightforward acquisition of edible meat. The process of butchery is scalable, in that once a person has become skilled in disarticulating a carcass, those same skills can be applied to a carcass of any animal of any size. While plants have many inedible or poisonous parts, animals are largely edible (except for carnivore liver which can prompt the development of a debilitating illness known as hypervitaminosis A; see Walker et al. 1982).

In culinary terms, meat also is relatively easy to prepare with minimalist tools. Meat can be eaten raw, but also can be seared, sanitized and rendered more easily consumed by simply placing a carcass in the fire and then cutting off portions of the cooked flesh. Compare this relative ease of preparation with the human engagement with plants: although fruits can be eaten raw without any preparation as such, most vegetal matter requires some lengthy process of preparation such as leaching, fermenting or cooking. These processes may be scalable, but they are not always interchangeable and different preparation techniques must be learned for different types of vegetal matter such as tubers, nuts and squashes. Grains are the most labour-intensive of all, as they only render nutritional value when they are prepared through the use of a suite of cooking implements that include grinding stones or cooking pots.

In other words, meat is a relatively easy and safe provisioning strategy that can involve minimal resources of time and energy in preparation and cuisine, providing calories and nutrients and encompassing an aesthetic of human prowess and success in hunting. The meaning of meat is encoded into many social and economic configurations; to this day in many countries, an increase in meat consumption is linked to an increase in a household's economic capacity and purchasing power (Clonan et al. 2016). Thus, it is not surprising that there is a considerable amount of evidence in archaeological contexts for capturing, preparing and consuming animals as evidenced in cut marks on bones, fractures indicative of the extraction of marrow and evidence for cooking and stewing that leaves distinct marks ("pot polish") on animal remains (Gifford-Gonzalez 2018: 326).

Humans engage in purposeful uses of animals beyond meat, of course. Living contexts of animal husbandry include the use of renewable resources such as wool, hair, milk, and dung (the "secondary products" described by Sherratt 1981). Animals also are used for draught power in hauling carts and ploughs and engaged in other farm labour such as threshing (Fig. 2). Humans also on occasion bring individual wild animals into settlements as tame companions, along with individual carcasses or renewable animal products used as raw materials for craft production and for ritual purposes, including leather, ivory, horn, antler, fur, tortoise shell, marine shell and feathers.

Yet humans' deliberate actions of transportation and management are not the only way that animals come into archaeological sites because animals bring themselves into

Fig. 2: Bullocks threshing rice, Odisha

settlements by flying, walking or burrowing their way in. Some of these animals accommodate themselves to the human realm in ways that people find tolerable or even useful (such as the "domestication" of dogs and cats as the result of mutual affection and dependence; see Grimm 2014; Kaminski et al. 2019). Animals also use settlements as resource-rich niches for exploitation, including mice, rats and primates, all of which enhance their well-being at the expense of human food supplies (e.g., Weissbrod et al. 2017; Barua and Sinha 2019). The role of birds is perhaps the least known of all, but distinctive capacities of flight and many species' omnivorous tendencies would have made settlements a preferential location for foraging.

The presence of animals leads to physical remains of the type found and interpreted by faunal analysts in archaeological sites the world over. Although the recovery of the evidence of animals thus indicates cultural practices and animals' own interests in human settlements, how does one interpret the absence of such remains? Two quite different causes can be ascertained for the absence of animal bones: natural processes of decomposition and cultural processes of animal engagement.

Absence of Evidence: Taphonomy and Site Formation Processes

The recovery and observation of animal bones from archaeological sites is a challenging exercise because the disposition of animals within an anthropogenic context is not the same as their disposition in a natural context. Animal bones, as they are organic, are subject to natural processes of decay through weathering, fragmentation, and consumption by rodents and bacteria. In some soils animal bones will be quite fragile

and subject to complete decomposition, leaving little to find; in other cases, contexts of deposition can enhance preservation, for example, if people discarded bones inside of ceramic vessels, or if natural processes of water filtration have encased the bones in a protective matrix of calcium carbonate or other precipitates.

The presence of animal bones within a site is conditioned not only by human activities of acquisition but by human patterns of discard. People made decisions about which animals or animal parts to bring into a settlement context and made decisions about where to discard the unusable parts. Unlike the use of grain for which there is little subsequent evidence once humans have eaten and digested the plants, the use of animals for food nearly always has a follow-on effect of discarded bone and other animal parts. These discarded elements were mixed in with other discards of differential preservation: pottery and stone are generally indestructible, but organic materials such as textiles and wood usually decompose quite quickly and are rarely found by archaeologists.

Absence of Evidence: Cultural Concepts of Animal Use

Human activities affect the animal remains that are brought into or incorporated into a site, but humans also can elect *not* to engage with particular animals for a variety of reasons. The presence/absence ratio of animals represented within archaeological sites is rarely the same ratio in which they are found in nature. For example, particularly fierce animals that might otherwise be avoided by humans may signal special prowess in hunting and thus be overrepresented in archaeological assemblages, and particularly distinctive parts of animals might be preferentially selected and brought into a site even if the food value of that species is low or absent (see Stiner 2014). Not all types of potentially edible animals are considered culturally appropriate as a source of food, and the eligibility of animals to be eaten might be further restricted by the age, gender and reproductive status of the human individuals within a group (e.g., Hastorf 1991; Crown 2001; Kirch and O'Day 2003).

Cultural practices of refuse disposal have a significant impact on the types of remains that are within settlements. Even if animals are consumed or used, their remains are not always in the same localities as the use contexts of architecture and other types of artefacts. Scholars engaging in ethnographic observations note that the different stages of animal processing result in assemblages with different representations of animal body parts (Gifford-Gonzalez 2018). The discard pattern of animal waste also is significantly different from the discard of the more inert and benign byproducts of plant processing. Animal remains' nuisance value is high, as preparation and post-consumption waste draw unwanted scavengers in proximity to living spaces. As a result, there are often cultural prescriptions for the manner in which animal carcasses should be disposed of, compared to the relatively casual discard of so many other types of waste in and around dwellings.

In South Asia, a significant cultural reason for the avoidance of eating animals was the advent of vegetarianism. Although there is little current research on the archaeology of vegetarianism, the cultural history of the Indian subcontinent provides the opportunity to evaluate the impact of changes in religious practices over time that may have resulted in the avoidance of meat for a significant proportion of the population in

ways that are still visible today (for a prescient commentary on the archaeology of Buddhist diets, see Coningham 2001: 88). Starting in the Early Historic period (c. 3rd century BCE-4th century CE), there are several documents and inscriptions that can be examined for their commentary about animals. Early Historic texts include detailed observations about animal behaviour that are interwoven into the Jatakas, the Panchatantra, and the Sangam literature. These documents opine on the *avoidance* of eating animals as a component of newly emergent religious and moral traditions of Buddhism and Jainism. Archaeological investigations of this era can begin with a hypothesis of social change that may be reflected in the faunal record of Early Historic sites such as the ones in the eastern subcontinent.

The Eastern Indian Coastal Plain

The archaeology of the eastern Indian coastal plain in the state of Odisha provides the opportunity to consider the role of animals in an urbanizing landscape during the Early Historic period. The site of Sisupalgarh, whose earliest deposits date to the 8th century BCE, was first investigated by Prof. B.B. Lal in 1948 (Lal 1949, 1991) and subsequently excavated by a Deccan College-UCLA team from 2005-2009 (Mohanty and Smith 2008; Smith and Mohanty 2016, 2018). These investigations were followed by research by the same team at the sites of Talapada (Mohanty, Smith and Ray 2016; Mohanty et al. 2016), Ostapur (Mohanty and Smith 2020), and Kankeikuda; by Deccan College investigations at Golbai Sasan (Mohanty et al. 2012-13), Lathi (Thakuria et al. 2013) and Manikapatana (Mohanty and Joglekar 2010); and by joint investigations with Utkal University at Harirajpur, and at Gauranga Patana (Mohanty et al. 2019).

Studies of faunal remains from Neolithic and Chalcolithic sites in coastal Odisha such as Deltihuda (Acharya et al. 2017), Gopalpur (Kar et al. 1998) and Suabarei (Joglekar and Patnaik 2016) indicate a widespread consumption of a diverse range of wild and domestic animal resources. This approach to animals, including both husbandry of domesticated animals in controlled habitats and incorporation of wild animals from the surrounding forests, rivers and lakes, provided the backdrop for the ethos surrounding animal use as it developed in the urbanization of the Early Historic period. Domesticates continued to play an important role in provisioning the new types of settlements emerging during this time, but wild animals also maintained their importance to economy, ideology and symbolism.

Alternate Evidence for Animals

The assessment of animals beyond their use for meat in a settlement context requires looking beyond the evidence of bones to a more holistic perspective on animal presence in ancient settlements. These approaches can make use of historical texts, both those that are generalizable to the time period in question, and those that might be available in the specific local region. We also can utilize representations of animals as preserved in artefacts and art.

At the site of Sisupalgarh, we have recovered a number of artefacts that indicate that the concept of animals was much in the mind of the urban inhabitants, even at a moment when the concepts of vegetarianism and the avoidance of animals as meat were making

significant inroads on inhabitants' modes of thought and as urban patterns of consumption may have been changing. These artefacts included terracotta figurines and terracotta ornaments with animal motifs (Fig. 3). While manufactured items would have been made by specialist potters and crafts makers, there were ways that consumers also decorated their possessions with animal imagery, as seen in occasional post-firing graffiti of animals on pottery. There was also the incidental presence of animals noted in the production process of artefacts that were probably made in the outlying region but were used in the city, as seen in the footprint of a dog on a clay tile.

Animals also were depicted in ways that were protective or apotropaic, as in the case of the small snake figurine found at Sisupalgarh (Fig. 4). Snakes are very common in the region today, inhabiting the margins of agricultural fields where they feed on pests but also making their way into houses and storage spaces; in any locale, they pose a danger to humans as seen in the ongoing statistics of snakebite in Odisha which logs hundreds of snakebite deaths per year (Barik 2020). The presence of other animals depicted in the artefacts at Sisupalgarh would have been almost entirely symbolic as the keeping of an animal might require specialized expertise or amounts of space incompatible with densely populated settlements. This would describe the circumstances of artistically depicted animals such as the elephant and horse which would not normally be seen within the urban context.

Fig. 3: Animal presence at the Early Historic city of Sisupalgarh, Odisha: terracotta ring with horse; terracotta elephant pendants; dog print on tile; zoomorph graffito on pottery

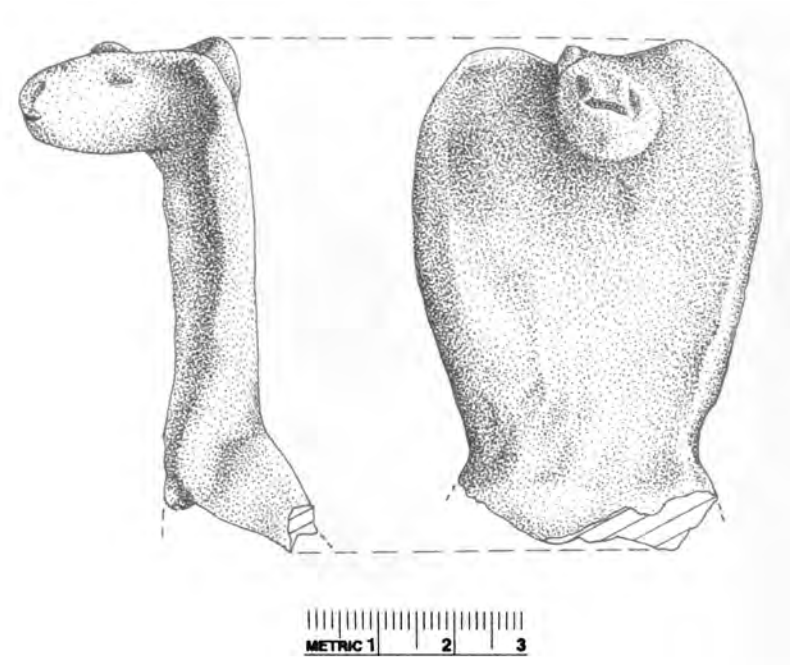

Fig. 4: Terracotta snake figurine from Sisupalgarh (drawing by D.V. Karanjikar)

Another example of animal use in the symbolic realm at Sisupalgarh is indicated in the recovery of what appears to be a ritual deposit in one of the habitation areas. There, we found a series of stacked bowls along with a metal finger ring, a green glass bead, and a complete shed deer antler measuring 58 cm in length (Fig. 5). The recovery of a naturally shed antler, which is an item that could be harmlessly retrieved as a byproduct of a living animal, is of interest in this urban context; a city settlement was hardly the place for a wild deer to have been residing so that the antler must have been brought from outside the rampart of the city. At the same time, the antler represented a potentially useful practical item, as we also recovered a cut antler fragment in this same trench at a higher level and a cut antler elsewhere in the habitation area (Fig. 6).

The consecration of a deer antler, especially one of such size, to a symbolic context must have been the result of some conversations about balancing the relative spiritual and economic value of this commodity which was likely to have become rarer in the local environment as the city's population grew and wild animals retreated into nearby forests. The retrieval of wild animal parts as "found" materials in nature might have been symbolically akin to the use of other found materials in special-use contexts, such as the small pebbles recovered in great number in the survey and excavation of Sisupalgarh's central pillar area (Smith 2018), or Neolithic celts that Early Historic inhabitants occasionally found at nearby sites and carried home with them (e.g., Mohanty, Smith and Ray 2016: 157-158).

The realm of animals was likely present in other ways that provided a strong visual presence even if the number of actual animals was low. The occasional parade of an elephant or two through the broad streets of the city, or as labour strength to haul the monolithic pillars that graced the central precinct, would have left an indelible impression. In addition to the presence of commensal dogs and cats, the long Indian tradition of keeping a pet mongoose on a chain might have already been taken up by a

Fig. 5: Antler and vessel feature from Sisupalgarh, Operation 3 habitation area (Scale is one meter)

Fig. 6: Cut antler portion from the lower depths of Core Sequence 1, Sisupalgarh

few households. When people went out of the city for pilgrimage, trade or agriculture, they encountered an entire realm of mammals, snakes and birds like the kites that still circle today over the dusty fields, and the vultures that have since tragically disappeared from the skies.

Archaeological excavations often recover animals that are "unseen" or ignored by humans, such as rodents, but rarely the bones of the animals that are common but transient visitors to living settlements such as monkeys and wild birds. Animals in life are fleeting but their capture by humans takes many durable forms, whether a day's worth of meat rendered into a carcass that lasts for weeks (or perhaps forever, if buried) or a symbol permanently inscribed on a durable piece of fired clay. In fact, much of the

impact of animals is not from the animal itself, whether it is quickly dispatched for eating or roaming beyond a human's line of sight, but the talk about animals and their visualization that make them a permanent part of the landscape. This is particularly true for wild animals; domestic animals are all around us, but wild animals become a categorical configuration translated into the human realm through art and language.

Discussion

The practice of eating meat has been part of the human culinary repertoire since the beginnings of our species, but "food" is more than just a matter of nutrition or convenience. Instead, foodways are always part of a social evolution in progress, from the omnivory of the Lower Paleolithic period more than a million years ago to the even greater food selections of the Broad Spectrum Revolution in the Upper Paleolithic period c. 20,000 years ago (see, e.g., Zeder 2012). Faunal analysts are essential workers in the study of archaeology and in the assessment of human-environmental dynamics over time, and are poised to address questions beyond presence-absence to addressing how and why particular animals are found in an archaeological site.

The study of ancient cuisine is a way of discerning what is eaten but also provides the opportunity to evaluate what is *not* eaten within a cultural context and how particular foods come to be preferred by individuals and groups (Hayden 2003; Smith 2006; Twiss 2007; Hastorf 2017). The avoidance of meat is a subject of considerable interest in the present for several reasons. As we are currently aware, there is a high environmental price paid for meat, particularly the meat of terrestrial mammals which utilizes a large amount of fodder and water, and that also produces methane in a discernable amount (Clonan et al. 2016). In the current global discourse of foodways, it is increasingly clear that the subject of meat-eating is causing heightened awareness of the morality and ethics of consumption, and of the impact of meat-eating on both people and animals in the present (Ammerman and Smith n.d.).

The study of animal bones provides the opportunity for archaeologists to consider the meaning of the concept of meat over time, and the way in which the absence of a particular kind of evidence (animal bones as a component of food waste) provides an opportunity not only to consider an archaeology of vegetarianism but to broaden our perception of animals at ancient sites. What would an archaeology of vegetarianism look like? An omnivore classifies all animals as to whether they are socially viewed as edible or non-edible, but a vegetarian does not need to engage in this classification exercise. Inside the kitchen, vegetarianism is not only the absence of meat in the diet, but a suite of distinctive cooking implements, farming practices, and storage technologies. Outside of the kitchen, vegetarianism is also a series of practices that encompasses knowledge about animals with a recognition of sociability and shared characteristics.

The advent of a vegetarian diet has significant implications for the accessibility of nutritional value among different members of a household and community, a factor that might have been particularly salient as a social-levelling mechanism at the beginning of urbanism when people were becoming accustomed to more frequent interactions in close quarters and were also becoming accustomed to new foodways. In cities, people were less likely to keep an entire harvest of food within the home as was the case in villages, and instead became dependent on markets, itinerant vendors and other

provisioning mechanisms for ingredients as well as for cooked foods (Smith 2019). Vegetarian preparations, whether from small home cookpots or large communal feasting vessels, result in numerous identical portions compared to the distribution of meat in which the different parts of the animal have different perceptions of status such that "(t)he inherent inequality of roasted meat portions can result in its distribution becoming a political act" (Potter and Ortman 2004: 179).

In the Early Historic period, the notion of vegetarianism, or at least situational meat avoidance, was a contrast to a long-standing tradition of animal use and animal sacrifice. That hesitancy is clear in the Ashokan inscriptions, in which the ruler seeking to explain the rules of *dhamma* struggled to emplace new concepts of non-violence in ways that could be easily quantified and understood in culinary terms: "Formerly, in the kitchens of the Beloved of the Gods, the King Piyadassi, many hundreds of thousands of living animals were killed daily for meat. But now, at the time of writing this inscription on *Dhamma*, only three animals are killed, two peacocks and a deer, and the deer not invariably. Even these three animals will not be killed in future" (Thapar 1997: 250).

In the context of the new awareness of animals as symbolic, mythical and ideological as well as culinary subjects starting in the Early Historic period, the archaeological record is a place to explore ongoing ambiguities about what constitutes "meat." Fish is a particularly ambiguous category even today, and the study of ancient fish is one in which there could be much more work regarding their role as a fresh or dried food source in ancient South Asian cities as is being done elsewhere (see, for example, the recent special issue of "Fish and Fishing Communities: Understanding Ancient and Modern Fisheries through Archaeological Fish Remains" and the accompanying editorial by Fradkin et al. 2019). Another category that could be more frequently addressed is that of renewable animal resources, such as eggs, which are avoided today by many vegetarians who otherwise consume milk and other dairy products but which may well be represented in ancient contexts particularly those contexts in which vegetarianism was first being introduced as a concept.

In addition to combining historical, artefactual and faunal data for the evaluation of the human uses of animals, researchers also should consider the study of environmental DNA as a way of evaluating the totality of a landscape's living creatures (both plant and animal; see Pedersen et al. 2015). E-DNA studies might be applied, for example, to archaeological deposits recovered from urban contexts to ascertain the presence of small and medium-sized commensal species such as dogs and cats whose bones are rarely recovered from archaeological sites, or to identify the presence of very large mammals such as horses and elephants within urban spaces. E-DNA as a way of recreating environmental systems could also be supplemented by the investigation of species-specific biological traces such as faecal remains and parasites in a site's biostratigraphy (e.g., Mahaney et al. 2019).

Non-faunal treatments of animals in rock art, as figurines and as sculptures further illustrate that people think about animals much more than as a target of eating. A holistic perspective on faunal analysis encompasses questions of "what animals are *not* present in this site?" and the active dialogues that people would have sustained in the past about the animals in their midst. The religious traditions of Buddhism and Jainism starting in the Early Historic period were just the first of many dialogues about food consumption that were interwoven with notions of religion, culture, cuisine and daily practices of the

kind that are reflected in the faunal record. Foodways have continued to evolve in the Indian subcontinent, for example through the avoidance of "foreign" foods such as potatoes and tomatoes in temple cooking (Sahoo 2020: 68) and the recent uptick in veganism (Chittilapally 2019). For a faunal analyst, the avoidance of meat might be the most compelling question of all: a disappearance of a type of evidence from the archaeological record that results from the addition of something very distinct to the human moral and philosophical repertoire.

Conclusion

The study of archaeological fauna encompasses many aspects of the intertwined lives of animals and humans. This paper has considered the *absence* of faunal evidence through the consideration of purposeful changes of material practices, such as changes in diet and changes in settlement life linked to the development of urbanism. Yet even the absence of animal bones is not a signal of the absence of animals in settlements; particularly in cities, people continued or perhaps even augmented their use of an animal aesthetic as evidenced in portable goods, sculpture, poems and stories.

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