

# Forager-Traders in South and Southeast Asia

Long-Term Histories

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TO MARK AND JOHN

critical source of manpower for military levies. She explains (1999:45): "There was always a delicate balance between aggression and harmony in these relationships. Even so, until relatively recent times, plains peoples tended to hold the bearers of 'tribal' titles in mingled fear and reverence. Their hills and forests commanded respect as the domains of blood-taking deities whose powers of *sakti* or activated divine energy empower both kings and gods to contend with the unclean or 'demonic' forces which continually menace the ordered dharmic world."

6 Evidently, any tribe can be compared with any other. When this results in comparisons between, for example, peoples of the far northeast and the far south, who have virtually nothing in common beyond their shared tribal label and citizenship in the Indian republic (cf. Fürer-Haimendorf 1982), the curious resilience of the tribal label becomes clearer. If tribals are relegated to anthropology, while others are the subject of history and archaeology, then interaction between tribals and non-tribals need not be addressed, nor indeed need the whole conception of tribalism be re-examined. Clearly, however, if the whole notion of "tribe" is suspect, as I would argue it is, then comparisons between tribals *as such* lose their automatic justification. All this is not to say that comparisons are not warranted and useful, as indeed the project of this volume asserts that they are.

7 For more recent ethnographic perspectives on South Asian hunting and gathering groups, especially those from the northeast which are, unfortunately, not well represented in this volume, see Lee and Daly (1999).

### 3 Hunting and gathering strategies in prehistoric India: a biocultural perspective on trade and subsistence

JOHN R. LUKACS

#### Hunter-gatherers, trade and subsistence: introductory models

The vital role of trade to the origin and florescence of early civilizations is a topic of considerable interest to prehistorians (Algaze 1993). The analysis of Harappan trade networks is often sub-divided into internal systems of distribution and external trade contacts. The significance of Harappan long-distance trade, the items exchanged, and the mechanics of interaction are topics of continuing debate. Harappan trade relations with prehistoric cultures of the Arabian Peninsula, Central Asia, and Mesopotamia are exciting, of wide interest, and have been extensively documented.<sup>1</sup> Pre-Harappan settlements at Mehrgarh (Baluchistan) provide evidence for trade networks extending to the Makran coast and Central Asia during early Chalcolithic (c. 4500 BC) and even Neolithic (c. 6500 BC) times (Jarrige 1985; Lechevallier and Quivron 1985). The archaeological focus on long-distance trade systems in prehistory diverts attention from another important form of exchange and population interaction: small-scale, localized interaction between nomadic hunter-gatherers or pastoralists and settled agriculturalists. Although certainly less spectacular than the nature of indicators for long-distance trade, evidence for this type of interchange should be archaeologically detectable and may have constituted a primary means by which urban centers acquired widely dispersed raw materials essential to a variety of manufacturing goals.

The purpose of this chapter is: (1) to review the development of a biocultural perspective on "interactive trade" between hunter-gatherers and agriculturalists in Indian prehistory; (2) to stress the importance of an integrative biocultural perspective on interactive trade systems past and present; (3) to review and refute the recent application of interactive exchange suggested for microlithic hunter-gatherers and agriculturalists of the mid-Ganga Plain; and (4) to summarize recent research accomplishments in the ethnography of modern hunter-gatherers and pastoralists with special attention to new models of cultural interaction and their implications for understanding prehistoric population boundaries.

While controversy surrounds the utility of ethnographic models as heuristic devices to aid in understanding and interpreting the archaeological evidence, and while numerous paradigm shifts have occurred in the perception of hunter-gatherers (Morrison, chapter 1 this volume), a fresh examination of interactive trade in Indian prehistory in light of recent developments in South Asian ethnography may prove worthwhile. As an anthropology undergraduate at Syracuse University, my first acquaintance with hunter-gatherer lifeways was through films and readings about the !Kung San, Mbuti Pygmies and Australian aboriginals. In the 1960s anthropological consensus was that the hunter-gatherers were isolated or marginalized populations that were economically independent and self-sufficient (Lee and DeVore 1968a). Subsistence activities and other types of labor were calculated to be considerably less arduous than those typically encountered among agricultural and industrial societies, giving rise to the idea of a leisurely lifestyle, often referred to as "the original affluent society" (Lee 1969). This perspective on hunting-foraging societies, recently labeled the "evolutionary ecological approach" (Stiles 1993), originated in part from the Harvard Kalahari Project and used ethnographic evidence for subsistence, settlement, and social behaviors to build models for understanding similar adaptations among prehistoric peoples and ancient hominids (Kelly 1995).

An alternative approach to hunter-gatherers, designated "historical particularism" (Stiles 1993), developed in the late 1970s and 1980s and placed greater emphasis on historical evidence of interdependence between foragers and their agricultural neighbors (Headland and Reid 1989; Kelly 1995; Kent 1996). Also at issue is the question of whether hunter-gatherers could ever have lived in tropical rainforest independent of agriculturalists (Headland and Bailey 1991; Junker, chapter 7 this volume). Extensive surveys of hunter-gatherer diets and subsistence patterns essentially confirm the "carbohydrate scarcity hypothesis," and support the idea of vital links with agricultural neighbors or some reliance on food production as a prerequisite to life in the tropical rainforest. The historical particularist paradigm embraces a broader adaptive flexibility in subsistence for hunter-gatherers that includes some experience with food production and occasionally "wage-gathering" (Bird 1983). In contrast with the evolutionary ecological approach to modern foragers, this paradigm is less concerned with the use of ethnographic models as aids in the interpretation of archaeological evidence.

A more recent model based on nomadic pastoralists of Tibet and hunter-gatherers of South India represents an eclectic adaptive pattern in which societies vacillate between periods of contact and interdependence with

agriculturalists and strict isolation from settled neighbors with different cultural values and norms. This model, developed by Gardner (1985), is labeled "oscillating biculturalism." It emphasizes the opportunistic versatility of some hunter-gatherers, is especially appropriate for certain modern South Asian foragers, and may provide a valuable new model for interpreting prehistoric population interaction. Hunter-gatherers that know and can easily function in two distinct cultures and have the ability to choose between them on the basis of economic, social, and emotional factors are bicultural. The ethnographic analysis of modern cultural frontiers or culture contact zones should provide insight into the mechanisms and processes of cultural exchange relevant to archaeological interpretation. While archaeological theory regarding cultural frontiers and contextual evidence of hunter-gatherer/farmer contact has been considered at some length for European prehistory (Dennell 1985b), the interpretation of culture contact zones in Indian prehistory can be dramatically improved by integrating recent developments in the ethnology, archaeology, and biological anthropology of South Asia. Fostering a synthetic biocultural approach to trade and subsistence in Indian prehistory is the immediate goal of this contribution.

### **The biocultural approach to hunter-gatherers and prehistoric populations**

A biocultural approach to living and prehistoric cultures relies upon the cooperation of archaeologists, biological anthropologists, and ethnologists in an effort to develop research designs, methods, and interpretations that meld concepts and ideas from these diverse subdisciplines of anthropology. The goals of a biocultural approach include a holistic and unified reconstruction of subsistence economy, behavioral patterns and associated cultures through synthetic integration of biological data from human skeletons with archaeological data from artifactual evidence. The ethnographic record is a crucial component in the conduct of biocultural research. The biocultural approach, or bioarchaeology, originated during the excavation and analysis of Native American mortuary sites and skeletal remains. This perspective on past cultures has historical depth and a well-established methodology, and has dramatically improved our knowledge of the dynamic nature of biocultural change in prehistory.<sup>2</sup> While at the cutting edge of anthropological research, a biocultural approach has not been extensively employed in the analysis of Old World cultures, cemeteries, and human skeletal samples. In Asia a few notable exceptions include the University of California excavations of cemetery R-37 at Harappa, Pakistan (Dales and Kenoyer 1993; Lukacs 1992), and the excavation of the early farming village of Inamgaon in India (Dhavalikar et al. 1988; Lukacs 2002;

Lukacs and Walimbe 1996, 1998, 2000; Lukacs et al. 2001; Lukacs and Pal 2003).

A biocultural approach to hunter-gatherers developed with comprehensive studies of demography and health status in the late 1970s (Howell 1979; Nurse and Jenkins 1977). This work led to the realization that small group size, nomadism, dietary diversity, and routine exercise result in better average health among hunter-gatherers than among residents of pre-industrial urban centers (Cohen 1989). The "healthy hunter" model was subsequently used to interpret variation in health and mortality among prehistoric peoples with distinctive lifeways, subsistence systems, or settlement patterns. Palaeodemographic analysis of a low-status residential compound at Teotihuacan suggests that the "Law of Natural Urban Decrease" documented for pre-industrial Europe may apply to early agricultural urban centers of the New World as well. The Teotihuacan workforce required continual recruitment of laborers from healthy rural areas to urban centers that had higher morbidity and mortality rates (Storey 1992). Agricultural peoples are characterized by larger and denser populations, a sedentary existence, a less diverse and more refined diet, and living in close association with domesticated animals. A lifestyle based on agricultural subsistence often leads to numerous health hazards, including an increased prevalence of parasitism, infectious disease, and degenerative skeletal conditions (Larsen 1995). The popular best-seller *The Paleolithic Prescription* makes the same point: that the level of exercise and dietary quality of our ancestors resulted in a healthier existence than the inactive lifestyle and unhealthy diet (low fiber, high fat, high calorie) of many modern humans (Eaton et al. 1988). Although this perspective may overly idealize and romanticize the lifeways and diets of our ancestors (Garn and Leonard 1989), who were undoubtedly exposed to plant toxins, animal parasites, and hazardous natural materials, the basic contentions of the model are probably correct (Eaton 1989). Archaeological and ethnographic discussions of hunter-gatherer/agriculturalist exchange often overlook the important health implications that derive from contact between people practicing different subsistence strategies (Lukacs 1990; Spielmann and Eder 1994).

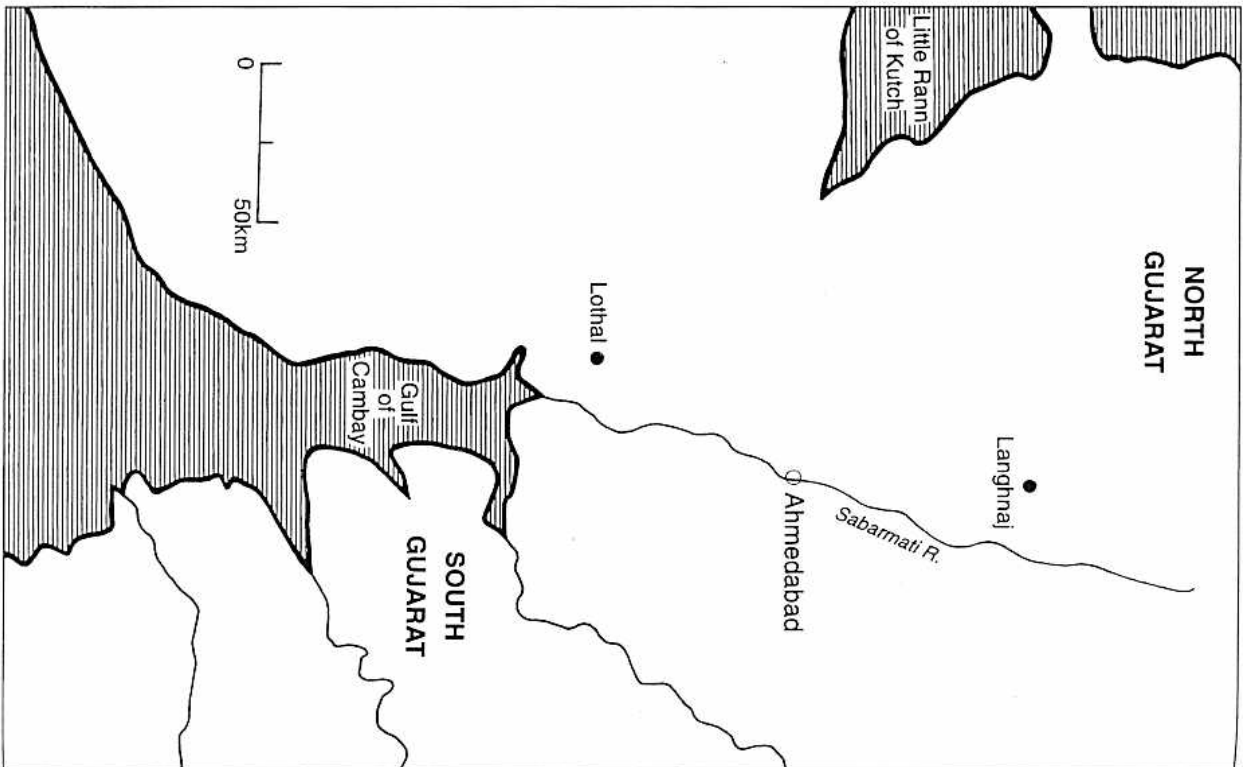
A biocultural perspective is often missing from ethnographic analyses of population interaction at culture contact zones (Spielmann and Eder 1994). However, Weitz (1984) refers to the marketplace cities such as Peshawar (Northwest Frontier Province, Pakistan), with which rural agriculturalists traded surplus produce, as "disease reservoirs" from which traders brought communicable diseases home to rural villages, thereby influencing demographic patterns (see also McNeill 1976). Recent work by Gardner (1993) on the Palyans of Tamil Nadu, South India, calls attention to the biological

dimensions of trade and culture contact as a fruitful area for further investigation. The prior success record of biocultural research in the Americas, and its initial success in the Indian subcontinent, recommend its routine adoption in planning and conduct of archaeological and sociocultural research in South Asia. Toward this goal, a biocultural approach is adopted here in reviewing the development of an interactive exchange model in prehistoric Gujarat, and in evaluating the potential role interactive trade may have served in subsistence activities among Mesolithic foragers of the Ganga Plain. The primary contention of this chapter is that human patterns of behavior, especially trade and subsistence activities, cannot be fully comprehended without considering the dynamic interaction of biological and cultural systems.

### **Interactive trade in prehistoric India: the development of a biocultural synthesis**

The concept of an interdependent economic relationship between prehistoric hunter-gatherers and urban agriculturalists in Indian prehistory was initially developed by Gregory Possehl (1976) and is further elaborated by him in this volume. The idea of interactive trade is founded on three kinds of data: (1) archaeological evidence from the Harappan town of Lothal and from the microlithic campsite of Langhnaj (Figure 3.1); (2) the distribution of archaeological sites with evidence of agriculture *versus* distribution of nomadic campsites in Gujarat; and (3) ethnographic descriptions of contemporary interaction patterns between South Asian hunter-gatherers and their agricultural neighbors. The presence at Langhnaj of a 98 percent pure copper knife, Black and Red Ware typologically similar to sherds from Lothal, and Harappan disk beads strongly suggests interactive exchange between the occupants of these two sites. The absence of agricultural villages in the plain of northern Gujarat is due to the absence of moisture-retentive black cotton soil, but northern Gujarat is a suitable habitat for nomadic hunter-foragers whose campsites are quite common there. Cautiously and with qualification, Possehl (1976:126) adopts the "professional primitive" interpretation of Indian hunter-gatherers developed by R.G. Fox (1969) as an ethnographic parallel for understanding prehistoric exchange between Harappan urbanites and rural nomads. This is coupled with the idea of Lothal as a "gateway" settlement through which resources and raw materials obtained from exchange with hunter-gatherers were filtered from the "periphery" (Lothal) to "central" towns and cities of the Harappan Civilization in Sind and Punjab. Subsequent distribution analysis of mature Harappan towns revealed distinctive variations interpreted to reveal the role of nomadic pastoralists as



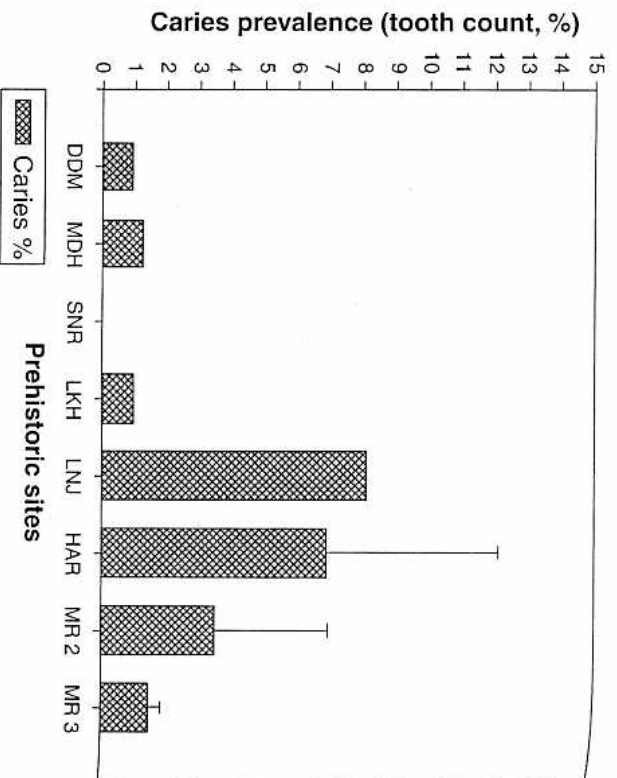


3.1 Location map showing relative geographic position of Langhnaj and Lothal

a key, yet overlooked factor of the mature Harappan culture. Possehl (1979) discerned an even distribution of sites in some southern regions (Sind and Kutch), but a discontinuous, clustered pattern of sites in Punjab and the Kacchi Plain. Isolated Harappan sites and settlement clusters separated from one another by relatively large distances can be explained by an undiscovered component of the Harappan subsistence spectrum: pastoral nomadism. Possehl contends that, "pastoral nomads, or other highly mobile (itinerant) occupational specialists filled the interstices in the Harappan settlement pattern" (Possehl 1979:547). The absence of numerous nomad campsites on the inventory of archaeological sites is explained by the "fragility" or impermanence of temporary campsites, the absence of an appropriate archaeological search image, and the lack of well-planned exploratory surveys to detect such sites. Possehl envisions these ephemeral, and for the moment largely undocumented, pastoral nomads as having an interdependent and symbiotic relationship with the settled Harappan townsfolk: "The farmers and my hypothesized pastoralists should not be thought of as isolated from one another, but as complementary subsystems: two aspects of an integrated whole" (Possehl 1979:548). The role of nomadic peoples in the Harappan sphere of influence is judged to be significant in several respects.

From this perspective the presence of the pastoral nomads makes very good sense if we see them as the mobile population which bridged the gap between settlements as the carriers of information, as the transporters of goods, as the population through which the Harappan Civilization achieved its remarkable degree of integration. (Possehl, 1979:548)

Insights from biological anthropology were first brought to bear on the question of contact and exchange between the people of Lothal and Langhnaj in 1979 (Possehl and Kennedy 1979). Human skeletal remains from both sites were studied by Kennedy, who concluded from a comparative statistical analysis that a number of physical traits present in the human skeletons from Lothal suggest that their closest biological affinities are with hunting-gathering communities whose descendants are found among the tribal enclaves in modern India. The idea of genetic exchange in conjunction with parallel economic transactions between the people of Lothal and Langhnaj suggests more than a casual relationship between them. More complex statistical analyses were subsequently conducted on skull measurements of the Lothal and Langhnaj specimens and the likelihood of gene flow between the two groups was further substantiated (Kennedy et al. 1984).



### 3.2. Dental caries prevalence in prehistoric India

(Key to abbreviations: DDM – Dandama, MDH – Mahadaha, SRN – Sarai Nahar Rai, LKH – Lekhahia, LNJ – Langhnaj, HAR – Harappa, MR 2 – Chalcolithic Mehrgarh, MR 3 – Neolithic Mehrgarh)

Supplemental evidence from palaeopathology indicated a new dimension to the genetic and economic links between urban agriculturalists of Lothal and the nomadic foragers of Langhnaj (Lukacs 1990). A comparative analysis of the prevalence of dental diseases among several “Mesolithic” hunting and foraging groups of the Indian subcontinent showed a generally consistent pattern: hunter-gatherers display low dental caries rates, often between zero and 1.5 percent. Prehistoric groups that are partially or completely reliant upon agriculture show substantially higher caries prevalences – between 4.4 percent and 12.1 percent. The caries rate for Langhnaj is 8.0 percent, a value significantly different from the “Mesolithic” range, but near the mid-point of the range of values typically associated with agricultural groups (Figure 3.2). This anomaly was interpreted to result from the consumption of refined agricultural food items that the people of Langhnaj may have obtained in trade from their contacts with the inhabitants of Lothal (Lukacs 1990). Ethnographic documentation for modern hunter-gatherers reveals that exchange of food items is a common and important aspect of trade between sedentary farmers and forest nomads (R.G. Fox 1969; Kelly 1995; Kent 1996; Spielmann and Eder 1994).

A review of the interactive trade interpretation of Lothal–Langhnaj interaction was presented by Possehl (1992) in his review of the Sorath and Sindh Harappans of Gujarat. The archaeological evidence in support of interaction is briefly considered and the theoretical value of understanding Indian hunter-gatherers is emphasized. The idea of balanced reciprocity reaching a mutually advantageous level of accommodation is advanced to explain the Lothal–Langhnaj interaction. The longstanding temporal duration of such interaction (2500 BC to the present), still evident in some regions of South Asia today, points to the tough yet resilient and versatile nature of this mode of accommodation. While this summary account of Lothal–Langhnaj interaction and hunter-gatherer models is generally useful, there are several areas that require closer examination or elaboration. These include: (1) the multifactorial nature of the biological evidence; (2) new archaeological and textual support for interactive trade in prehistoric and early historic Gujarat; and (3) the availability of more appropriate, abundant, and diverse ethnographic descriptions and models.

The multifactorial nature of biological support for interactive trade is based upon the idea that biological variations derive from two primary sources: genetic and environmental. Traits whose variation is determined mainly by genetic factors (dental morphology and discrete skeletal attributes, for example) are most useful in assessing population relationships and the amount of genetic exchange between groups. In contrast, characteristics whose variation is determined directly or primarily by environmental influences (dental disease, accidental trauma, and degenerative conditions like arthritis) yield insights regarding diet, subsistence, and behavior. A fully biocultural approach to population interaction will employ both kinds of biological evidence, as recounted above in the Lothal–Langhnaj example. Kennedy recognized evidence of gene flow in the analysis of traits with high heritability, while I found evidence of dietary similarities from parallels in the prevalence of dental caries, a trait whose variability is mainly environmentally caused. These types of biological evidence are mutually independent and therefore each provides distinctive support for the idea of interactive trade.

New archaeological and early historical research results tend to generally confirm interactive trade in Gujarat, while survey work currently in progress will permit the model to be refined and revised. Archaeological evidence for mobile pastoralism in post-Harappan Gujarat is reviewed by Varma (1991) whose analysis considers settlement patterns and site types. Varma's attempt to classify archaeological sites in Gujarat, recognize pastoral campsites, and provide ethnographic examples of modern pastoral adaptations is clearly a valuable one that builds upon Possehl's earlier work

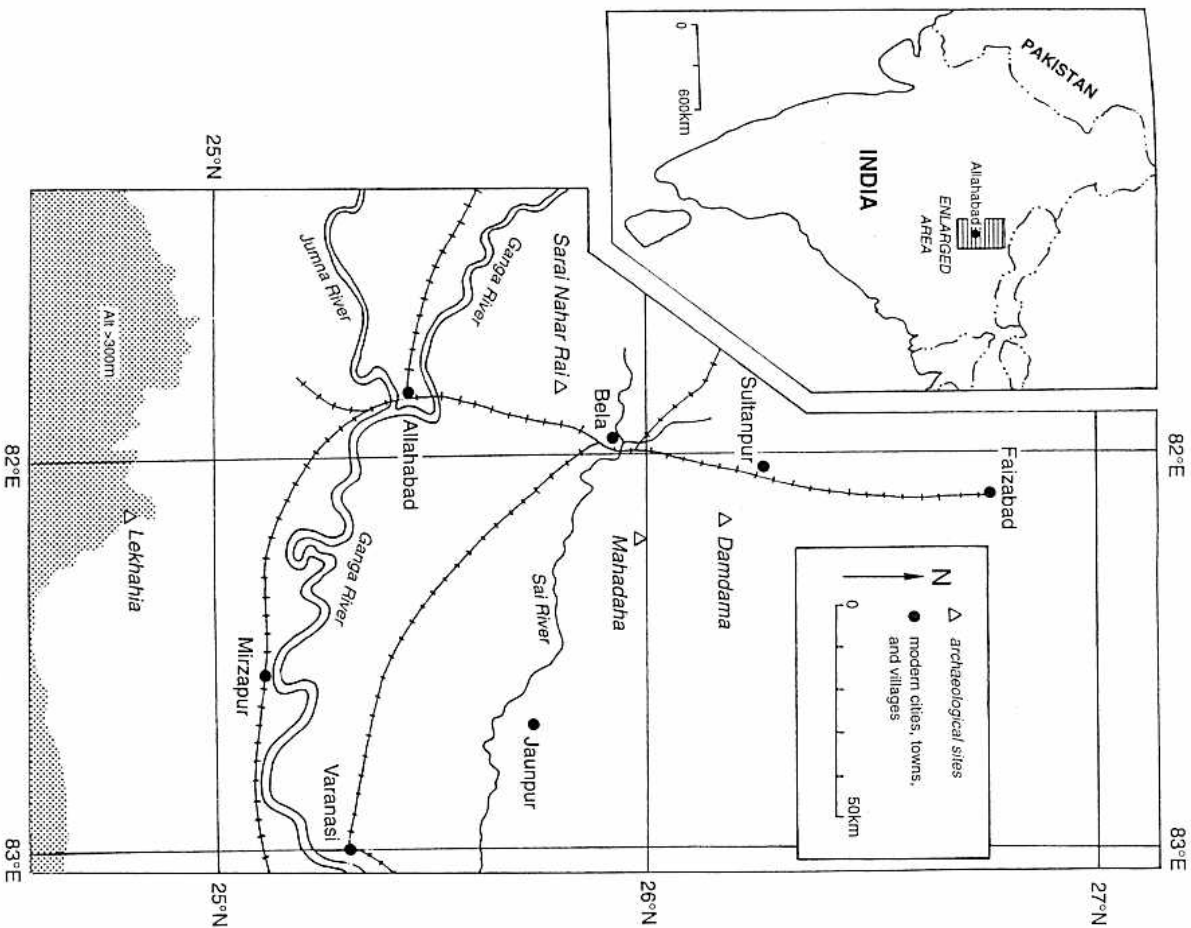
and complements similar reconnaissance surveys by Parel (1994). Archaeological evidence for Harappan nomads is detailed by Mughal (1994) for the Hakra depression of Cholistan. Mughal's extensive survey lends support to Posselt's thesis regarding the important functional role of nomadic pastoralists in Harappan society and similarly views this interaction as symbiotic on the basis of modern ethnographic evidence (Mughal 1994:60–1).

The role of the port of Broach in commercial trade under the Sakas and Guptas during the early centuries AD appears to have been functionally equivalent to the role Lothal played during Harappan times (Stiles 1993). Although during the early centuries AD some of the traded items may have differed, with an emphasis on natural plant and animal resources of religious value (incense, arts and crafts, medicals), hunter-gatherers served as "a type of specialist primary producer of natural resource commodities" (Stiles 1993:161). This well-documented example of the functional links between hunter-gatherers and their neighbors from Early Historic Gujarat parallels Posselt's model for Lothal in adopting the "professional primitive" perspective on hunter-gatherers advocated by R.G. Fox (1969). Stiles' research provides valuable and detailed documentation of a more continuous record of interactive trade in northwest India.

To summarize, the growth and development of ideas on interaction between the people of Lothal and Langhnaj has matured and evolved over a period of twenty years. Its gradual formulation included the expansion of an exclusively archaeological perspective to one that includes valuable confirmatory evidence and collateral insights from special areas of inquiry within biological anthropology. The current interpretation of Lothal–Langhnaj interaction can therefore be considered an exemplary case of the utility of a biocultural or bioarchaeological approach to prehistory. Though the case for interactive exchange in Gujarat is now well documented, can this complex biocultural model be employed with confidence to understand population interaction in other temporal and cultural settings in the subcontinent?

### Are recently proposed extensions of the interactive trade model valid?

In 1992 the interactive trade model developed for Lothal and Langhnaj was proposed as a possible interpretation for the "Mesolithic" inhabitants of Mahadaha, a site in Pratapgarh District, north of Allahabad, in Uttar Pradesh, India (Figure 3.3). In their review of the chronological framework for Indian prehistory, Posselt and Rissman (1992:473) state, "what we may have, for Mahadaha at least, are signs of the kind of accommodation between a hunting-gathering population and later food



3.3 Location map showing relative geographic position of "Mesolithic" sites of the mid-Ganga Plain and Vindhya Hills

producers that has been suggested for the interactive trade and barter aspect of the Indian microlithic tradition." In a subsequent discussion of the antiquity of Indian Mesolithic cultures, Kennedy et al. (1992:8) draws attention to a single late date for the nearby site of Sarai Nahar Rai ( $2,860 \pm 120$  BP,



TF-1356; Agrawal and Kusumgar 1975) and three late dates for Mahadaha ( $2,880 \pm 250$  BP, BS-137;  $3,840 \pm 130$  BP, BS-138,  $4,010 \pm 120$  BP, BS-136; Rajagopalan et al. 1982), reiterating the interpretation provided by Posselt and Rissman (above). The primary basis for this attribution of culture contact or "accommodation" between people practicing hunter-gatherer/agricultural subsistence in the mid-Ganga Plain is chronological. Problems arise at this point because the chronology of the Indian Mesolithic, especially in the Ganga Plain, has been inconsistent and controversial, and because no other biological or archaeological evidence has been offered in support of such contact or interaction.<sup>3</sup>

The contention advanced here is that a holistic biocultural perspective on trade and subsistence, in conjunction with new re-dating of key "Mesolithic" sites in the Ganga Plain, precludes interactive trade between hunter/foragers and agriculturalists in this region. The biological evidence reveals similar dental and skeletal pathology profiles for "Mesolithic" sites (Damdama, Lekhabhia, Mahadaha, Sarai Nahar Rai) that are fully consistent with a diet that is coarse and unrefined in texture and diverse enough to adequately satisfy nutritional requirements (Lukacs and Misra 1997; Lukacs and Pal 1993). In short, the pattern of variability in pathological lesions for these four Mesolithic sites is typical of people who practice a hunting-gathering mode of subsistence. The skeletal and dental pathology profile of these people is inconsistent with consumption of refined or agriculturally produced foods and with a sedentary lifestyle. Furthermore, biological variations in dental and skeletal structure, such as tooth size (large) and craniofacial structure (robust), of these groups are similar and consistent with expectations for groups adapted to an eclectic diet obtained through hunting and foraging (Lukacs and Misra 2000; Lukacs and Pal 1993, 2002). From the archaeological record, no substantive evidence of trade goods derived from agricultural communities is presently available from these Mesolithic sites. A biocultural approach to the hypothesis of interactive trade between Mesolithic hunter-gatherers of the Ganga Plain and settled agriculturalists does not provide the evidence necessary to confirm or support the idea. The biological evidence reveals a homogeneous set of hunter-gatherer adaptations in morphology and pathology, while archaeological indications of trade are absent.

Revised dates for two "Mesolithic" sites of North India lend additional support to the biocultural conclusions, and raise further concerns about the unqualified application of the interactive trade model to the Ganga Plain Mesolithic. Four new AMS radiocarbon dates, two for Damdama and two for Lekhabhia, are presented below. These dates are based on structural carbonate from the inorganic phase of human cortical bone (proximal femoral

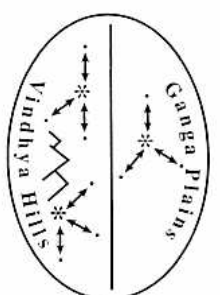
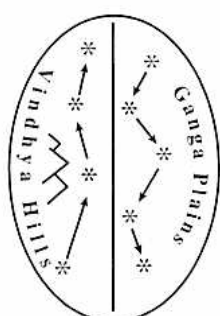
sections). Samples were analyzed by Krueger Enterprises/Geochron Laboratories Division. Preparation included multistage pretreatment with acetic acid washes to remove adsorbed, diagenetic carbonate. Natural and laboratory experiments have shown that accurate dates can be derived from structural carbonate in bio-apatite provided cleaning and pretreatment are thorough and the small carbon samples are measured by AMS (Krueger 1991). The results reported here constitute the first absolute dates for Damdama and suggest an Early Holocene antiquity for this site. The dates for Damdama are internally consistent: DDM-12, the earliest skeleton and the only specimen from Phase I, yielded a date of  $8,865 \pm 65$  BP, while DDM-36a, from Phase VIII, is approximately two centuries younger ( $8,640 \pm 65$  BP). The dates from Lekhabhia are exciting yet somewhat problematic: exciting because they suggest an antiquity for the site that is twice as old as previously thought, but problematic because there is some inconsistency in the results. The stratigraphically deeper skeleton (LKH-13;  $8,000 \pm 75$  BP) has an antiquity that is more than three centuries younger than the skeleton (LKH-4;  $8,370 \pm 75$  BP) stratigraphically above it. According to both Sharma (1965) and V.D. Misra (1977) the stratigraphic position of human skeletons at Lekhabhia is difficult to ascertain due to disturbance, and some specimens could not be assigned to period. Furthermore field notes recorded during the excavation of human skeletons (Gupta n.d.) and laboratory observations of commingled skeletal elements (Lukacs 1994) further document the degree of disturbance at this site. These archaeological and skeletal observations may explain the "inconsistency" of the new radiocarbon dates for Lekhabhia, which are precise and reliable absolute determinations that simply reflect the disturbed stratigraphy at this rockshelter site. These new radiometric ages tentatively place Damdama in the first half of the seventh millennium BC and place Lekhabhia toward the end of the seventh millennium BC. The homogeneous pattern of artifact types, burial patterns, biological adaptations, and pathological lesions from Mahadaha, Damdama, Sarai Nahar Rai, and Lekhabhia (Lukacs and Misra 1996a, 1996b) represents one broadly similar set of biocultural adaptations shared by Early Holocene hunters and foragers of this region. These multiple and independent categories of evidence do not provide convincing evidence for interactive trade with agriculturalists in north central India. The new dates reported here place Damdama and Lekhabhia temporally prior to the local beginnings of agriculture, and biocultural evidence of interactive trade with settled agriculturalists is lacking (Sharma et al. 1980).

If the model of interactive trade between hunter-gatherers and agriculturalists in the mid-Ganga Plain during Early Holocene times is

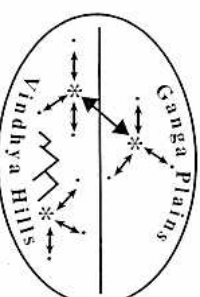
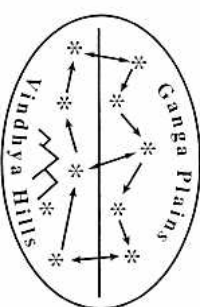
incompatible with the evidence, does this observation completely invalidate other forms of population interaction? Or, are alternative forms of population contact and exchange conceivable, and could they possibly form an essential component of a successful subsistence adaptation? The archaeological record of "Mesolithic" sites in the Ganga Plains and Kaimur Hills has been used as a basis for reconstructing different hypotheses about mobility patterns and resource procurement strategies in the region. The subsistence strategy of "Mesolithic" people of the Ganges Plain has not been clearly discernable from the archaeological record. Sharma et al. (1980) maintain that a seasonally transhumant pattern of migration existed. "Mesolithic" camps in the hills south of the Ganges were occupied during the monsoon, while in the dry season, the Gangetic Plains were inhabited. Each region, according to Sharma, provided valuable resources during different seasons of the year. Sharma's view is based upon three main arguments: (1) thin occupational deposits in hill and plains sites; (2) microliths in plains sites are derived from raw materials available only in the southern hills; and (3) the abundance of food and water in the plains during the time of summer drought in the hills. In contrast, Varma (1981-3) argues that the Gangetic Plains sites contain artifacts (querns and grinding stones, for example) that suggest longer-term, permanent occupations (e.g. incipient villages), on the threshold of agriculture. Sharma's view, which is based primarily on the site of Sarai Nahar Rai, contrasts with the analysis of lithic assemblages from Damdama by Pal (1985-6), who noted the very poor quality raw material from which tools were fabricated. This observation and the remarkably high quality of stone from the Kaimur Hills led Pal to hypothesize that the people of Damdama may have procured their lithic raw materials from local quarries of unknown location in the Ganga Plain. Using theoretical concepts of mobility and sedentism (Binford 1980; Kelly 1992, 1995), Sharma's perspective suggests a form of residential mobility, while Varma's alternative and Pal's lithic evidence suggest an emphasis on logistical mobility (see Figure 3.4). Interestingly, neither perspective admits that interactive trade between semi-sedentary people of hills and plains might constitute an important mechanism of resource distribution. Consequently, in the mid-Ganga Plain distinct patterns of resource acquisition can be envisioned which involve differences in mobility (residential vs. logistical mobility), ecozone exploited (Ganga Plains vs. Vindhya Hills), and interactive trade (present vs. absent). While some people of the plains (Mahadaha, Sarai Nahar Rai) may have obtained some or all of their lithic material from sources in the Kaimur Range of the Vindhya Hills, the method of procurement (residential or logistical mobility, or interactive trade) remains unclear and constitutes an important issue for future research.

## RESIDENTIAL MOBILITY MODELS

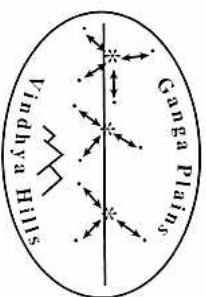
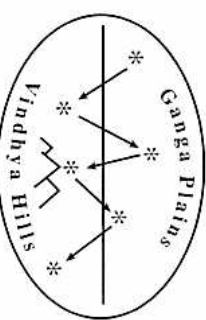
## LOGISTICAL MOBILITY MODELS



Intra-zonal: Resource acquisition restricted to within Ganga Plains or within Vindhya Hills ecozones



Intra-zonal with trade: Most resources acquired within ecozone of residence; select resources obtained from non-resident ecozone indirectly through trade



Inter-zonal: Resources acquired directly from both Ganga Plains and Vindhya Hills ecozones

### 3.4 Theoretical mobility models for "Mesolithic" foragers of the mid-Ganga Plain

However, recent but preliminary analysis of stable carbon isotope variation in compact bone samples from Lekhabia (hills site) and Damdama (plains site) shows significant differences, implying distinctive diets derived from restricted sources in separate ecozones, supporting the intra-zonal model (Lukacs 1996). The exact nature of population interaction and the possibility of economic interaction between hunter-gatherer groups with control over valuable and essential localized raw materials must await more complete surveys, more precise sourcing of raw materials (mineralogy, elemental analysis), and improved chronological controls. The situation is

likely a complex one since different resources may be acquired using different methods, and the most successful adaptation may involve multiple methods, or a series of adaptive shifts through time involving mobility and sedentism as well as trade. Further analysis of archaeological and biological indicators of subsistence, diet, and ecology will be necessary to choose between the alternative theoretical models presented in Figure 3.4.

### Cultural contact, trade, and subsistence: new literature and novel models

Previous discussions of exchange in Indian prehistory have either overlooked or neglected an extensive and valuable literature on South Asian hunter-gatherer trade and subsistence strategies. For example, Khanna (1992, 1993) focused on lithic assemblages as indicating the importance of nomadism in resource acquisition at the Mesolithic site of Bagor in northwestern India. While the acquisition and distribution of valuable raw materials for stone tool production is an important component of mobility (Khanna 1992, 1993), studies of modern nomads suggest that numerous and complex social, political, and economic factors are likely to have been involved in determining the timing and route of their migrations (see below). The purpose of this section is to call attention to the extremely diverse and valuable new corpus of ethnographic and ethnoarchaeological literature and to briefly review new perspectives on hunter-gatherer subsistence adaptation developed by Bird-David (1992b) and Gardner (1985) with particular relevance to understanding Indian prehistory.

#### *Hunter-gatherers*

Ethnographic observation and historical documentation have recently been employed by archaeologists to gain valuable insights regarding material culture, subsistence behavior, and settlement patterns of modern Indian peoples who rely on hunting and foraging as part of a multidimensional subsistence system. Much of the literature presented below originated when archaeologists became aware of continuities in material culture and behavior between prehistoric societies under excavation and living nomadic foragers that today inhabit the same geographic region. In northern India descriptive accounts are available for nineteenth-century hunter-gatherers in an agrarian setting (Nagar and Misra 1989), the Kanjars of the Ganga Plain (Nagar and Misra 1990), the Van Vagris of the Thar Desert (V.N. Misra 1990), and the Pardhis of central and western India (Nagar and Misra 1993). A more cross-cultural comparative approach is adopted in describing varied adaptations to the arid and semi-arid zone of Rajasthan

(V.N. Misra 1994), and documenting the survival of hunting-gathering traditions in central and north India (Nagar and Misra 1994). All these sources emphasize the "broad spectrum" nature of hunting-foraging adaptations, which include trade of "forest products" with settled agriculturalists, or sale of such items in village markets.

For South India, Murthy has analyzed ethnohistorical sources that document the evolving relationship between forest peoples of the Eastern Ghats and the state (Murthy 1978-9, 1981, 1992, 1994). From the fourth century AD through the medieval period, royal lineages of the state appropriated forested areas for the expansion of agriculture, establishment of new settlements, shrines, and temples, safeguarding the state's frontiers, obtaining valued forest resources, and for hunting as a royal sport. Symbiosis between hunters and pastoralists and the state is common, and "The syncretism of folk and Brahmanical religions was the most vital of the ritual processes that integrated the forest and forest peoples, and the state" (Murthy 1992:334). This represents a pattern of interaction between hunter-gatherers and the state parallel to that described above by Stiles (1993) for Gujarat. The work of V.N. Misra, Murthy, and Nagar documents the tremendous variability that interactive exchange or interdependence of hunter-gatherers and settled agriculturalists may assume, and therefore provides a vital ethnographic reference to assist in understanding the range of possible forms interaction may have assumed in prehistory.

#### *Pastoralists*

Recent ethnographic, ethnoarchaeological, and ethnohistorical accounts of nomadic pastoralists should provide numerous valuable insights for further understanding of population interaction in prehistory. The "historical particularist" paradigm is adopted in a series of articles on nomadic pastoralism in a special issue of *Studies in History*. The issue of pastoralism in historical research is introduced by Ratnagar (1991). A broad overview of the role of environmental change in the evolution of South Asian pastoralism is less useful to archaeologists than contributions on pastoralism in Baluchistan (Audouze and Jarrige 1991), western Rajasthan (Kavoori 1991), and post-Harappan Gujarat (Varma 1991; discussed above). Archaeological differentiation of sites occupied by sedentary agriculturalists from those inhabited by nomadic pastoralists is approached through careful analysis of modern nomad encampments and abandoned villages near the site of Mehrgarh, Baluchistan (Audouze and Jarrige 1991). In addition to cereal silos and "granaries," the complexity of settlement plan, abundance of ceramics, density of buildings, specialized craftsmanship, and a number of related variables are considered and are shown to display



a pattern of complexity linked to sedentism as opposed to simplicity in association with nomadism. Since ethnographic evidence came from the area immediately surrounding Mehargarh village, further survey work is required to fully define the range of variation in these attributes among Baluchi nomads and agricultural villages.

Trends and changes in transhumance among modern pastoralists in Rajasthan are considered in some detail by Kawoori (1991). Understanding factors contributing to the emergence and persistence of pastoral migration for the western part of Rajasthan and the nature of change in the pattern, composition, and context of migration in recent times were the objectives of Kawoori's study. The pastoral Dhangars (Gavli and Hatkar groups) of western Maharashtra traditionally engaged in economic exchange with rural peasants, the Gavlis trading animal products (butter) for cereal, oil, and clothing (Malhotra and Gadgil 1984:445), and Halkars wool, sheep manure, and hides for village products (Malhotra and Gadgil 1984:452). While the analysis of nomadic pastoral adaptations also provides an essential parallel to the hunter-gatherer literature reviewed above, significant theoretical developments in understanding cultural frontiers or contacts have not come from either ethnohistory or ethnoarchaeology. Recent work on Indian hunter-gatherers, including the Bihor (D.P. Sinha 1972; S. Sinha 1980), Malapandaram or Hill Pandaram (Morris 1977, 1982b), Naiken (Bird 1983), Nayaka (Bird-David 1988, 1990, 1992b), and especially Paliyan (Gardner 1972, 1985, 1993) has resulted in important theoretical contributions regarding subsistence trade and inter-cultural interaction that should be intensively studied by archaeologists and biological anthropologists.

Bird-David (1992b:40-1) advocates a prototypical model of modern hunter-gatherers, not a definitional one, based on studies of the Nayaka. The Bird-David model consists of four main components:

- 1 Autonomous pursuit of resource-getting activities. Individuals and families autonomously shift from one means of resource procurement to another in response to opportunities and circumstances.
- 2 Diachronic variation. Variety and flexibility in methods of resource acquisition are evident in any diachronic perspective (short or long term).
- 3 Synchronic diversity. Diverse means of resource procurement are simultaneously pursued within the social group; variety and flexibility are characteristic of any synchronic perspective.
- 4 Continuous presence of hunting and gathering. Hunting and gathering activities are practiced either intermittently by all adults or by relatives or friends when an adult is not hunting and gathering.

A significant consequence of Bird-David's hunter-gatherer model is that it can be elaborated as follows (Bird-David 1992b:41):

Normally some members of the group pursue hunting and gathering. Their associates do not, but keep in close contact with the former. The experiences of the former reinforce the common trust in the viability of hunting and gathering for everybody in the group. While not currently involved in hunting and gathering, the latter do not fully commit themselves to their respective diverse activities. They shift between them on the basis of opportunities and eventually take up hunting and gathering.

Some of the diverse activities are direct interactions with settled agriculturalists, and include trade of forest resources for village products and wage labor for a variety of services.

Analysis of settlement and subsistence patterns among the Paliyan of Tamil Nadu by Gardner (1985, 1993) provides further support for the eclectic, opportunistic, and flexible adaptive pattern displayed by some modern Indian hunter-gatherers. In his work Gardner advances two ideas that are especially provocative and have significant relevance for a biocultural approach to trade and subsistence in prehistory. These concepts include: (1) a theory of cultural interaction called "oscillating bioculturalism" (see above); and (2) the caution that "historical particularist," "professional primitive," and other theories of interdependence that have supplanted the isolationist, or evolutionary ecology, position are often equally oversimplistic (Gardner 1993:134). The paradigm shift from one model to another seems to perpetuate the idea that simplified models are appropriate for technologically simple societies. Gardner's cautionary note implies a concern for continued critical evaluation of past and current models of hunter-gatherer subsistence and interaction. This concern constitutes the primary lesson of this chapter. The interactive trade model for prehistoric hunter-gatherer/agriculturalist exchange in Gujarat is an exceptional example of the success of a biocultural or bioarchaeological approach to the past. Nevertheless, however appropriate this model may be for Gujarat, it cannot be transferred *en masse* to other regions and time frames without caution. Each area of suspected population interaction must be independently evaluated with adequate attention devoted to the archaeological evidence, the biological characteristics (genetic and environmental) of the people, and the temporal context of the site. Bird-David and Gardner provide valuable insights into contemporary and often unique adaptations of modern Indian hunter-gatherers and the diversity of their cultural manifestations. The models they generate are essential prerequisites to building a strong biocultural approach to the past.



### Concluding remarks

This consideration of the role of trade and subsistence in the survival strategies of prehistoric hunter-gatherers in South Asia suggests that several factors are indispensable to gaining a complete picture of past population interactions.

First, while subsistence strategy models are important to the analysis of both living and prehistoric foraging societies, the tendency to force data to fit existing models is a practice that must be avoided. Evolutionary ecological, historical particularist, professional primitive, oscillating bicultural, and interactive trade models must be regarded as hypotheses against which local societies and prehistoric cultures are compared and evaluated. Models may require fine-tuning, major revision, or complete replacement as novel and unique situations are encountered.

Second, population interaction is multidimensional and has both cultural and biological components. The only mechanism permitting realistic assessment of the full impact of inter-cultural contact and exchange between living or prehistoric peoples is a biocultural approach. While such an approach is relatively new in South Asian prehistory, it has been proven to yield positive insights into hunter-gatherer/agriculturalist interaction in prehistoric Gujarat, and was subsequently proposed to explain adaptations of "Mesolithic" cultures in the mid-Ganga Valley.

Third, new results derived from biological anthropology and from the chronometric reassessment of Mesolithic sites in the mid-Ganga Plains reveal an Early Holocene hunting-gathering subsistence adaptation that lacks interactive association with agricultural societies. The idea that interactive exchange, of the kind documented for prehistoric Gujarat, played a role in the survival strategy of "Mesolithic" foragers of the Ganga Valley is contradicted by: (1) a consistent and shared pattern of hunter-gatherer biological attributes that include a robust skeletal structure and low prevalence of dental caries; (2) the absence of traded artifacts from archaeologically agricultural sites in "Mesolithic" contexts; and (3) new AMS radiocarbon dates that suggest these "Mesolithic" sites have an antiquity that precedes the local development of intensive agriculture.

Finally, anthropologists interested in using the biocultural approach to assist in solving problems of prehistoric population interaction, trade, and subsistence must be well informed of current developments in the ethnology and ethnohistory of modern populations. Descriptive inventories of the nature of trade interactions and the kinds of materials exchanged are important because they help to enlighten the past and simultaneously lead to the development of new and better models for understanding the

biocultural features of population interaction. South Asia is a fruitful area for further studies of such issues and the next decade should witness a higher-level cooperation between archaeologists, bioanthropologists, and ethnologists.

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### NOTES

- 1 The internal and external nature of Harappan trade is discussed by Allchin and Allchin (1982), Chakrabarti (1990), and Lahiri (1992). For more on the mechanisms and nature of exchange items in Harappan trade refer to Dales (1962), Lamberg-Karlovsky (1972), and Tosi (1993). On external Harappan trade with Arabian states refer to Cleuziou (1992), Edens (1993), and Potts (1993); for Central Asia see Ashana (1982) and Francoeur (1992); and for Mesopotamia refer to Ashana (1979), Chakrabarti (1982), and Edens (1992).
- 2 For historical background on bioarchaeology see Buikstra (1991); for methodology consult Huss-Ashmore et al. (1982), Larsen (1987), and Powell et al. (1991); and for examples of successful bioarchaeology in the Americas see Powell (1988) and Storey (1992).
- 3 Claims of early rice domestication in the mid-Ganga Plains suffer from multiple problems, including: unsystematic sampling (no flotation), inadequate reporting of data, and an unclear temporal sequence (Fuller 2002). "Thus the evidence from impressions at Koldihwa and Mahagara would appear to indicate only that crop-processing waste from rice cultivation was used as tempering; it says nothing about the evolution of rice cultivation" (Fuller 2002:300).