



## NATURALCULTURAL ENCOUNTERS IN BALI: Monkeys, Temples, Tourists, and Ethnoprimatology

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Humans are animals and members of a global ecology. This is a view widely accepted not only in biology and in many philosophical circles (e.g., Derrida 2008; Haraway 2003), but also in such social scientific enterprises as ecological and environmental anthropology (Rose 2004; Vivieros de Castro 1998). Eben Kirksey and Stefan Helmreich (this volume) suggest that anthropological knowledge, produced through multispecies ethnography, can be developed as a mode of naturalcultural criticism and may contribute to new kinds of biological, and other, anthropologies. Here I offer an example of an integrated and multispecies anthropology that offers a fresh kind of biological anthropology (see also Fuentes 2009; Marks 2009; Schultz 2009). In this essay, drawing on Donna Haraway (2003), I use the term “natureculture” to reflect upon a particular multispecies interface—that between humans and monkeys in Bali, Indonesia—in which the two species are simultaneously actors and participants in sharing and shaping mutual ecologies.

Mutual ecologies involve an interweaving of structural and social ecologies. “Structural ecology” involves the study of the biotic landscape and physical environment in which creatures such as humans and macaques live. “Social ecology” asks after how different agents navigate and create social networks, sometimes across species lines (cf. Latour 1993; see also Popielarz and Neal 2007); it keeps the forces of history, political economy, interindividual relationships, and culture clearly in view. To explore and explain entanglements of structural and social ecologies in the case from my fieldwork in Bali, I employ the notion of *niche construction* (Fuentes 2009; Odling-Smee et al. 2003), which I suggest can be of broader use in studies

of natureculture. I am also influenced by Popielarz and Neal's (2007) description of niche as a theoretical tool for explaining what social entities are and do (for a metaphorical use of the niche concept in social studies of medicine, see Hacking 1998).

Understanding the interactions of organisms within mutual ecologies—how they coproduce and coconstruct each other's niches in behavioral, ecological and physiological senses can help social scientists describe this moment in history, when humans have become major agents of environmental changes, in a time that has lately been dubbed the epoch of the Anthropocene (Crutzen and Stoermer 2000; Rose 2009). Such social–ecological approaches can make examinations of the Anthropocene just a little less anthropocentric (Kirksey and Helmreich this issue). Such work can also advance emerging investigations in multispecies ethnography and an “anthropology of life,” an inquiry concerned with the integration, engagement and interface between humans and other kinds of living things (Kohn 2007).

As humans, we are literal and figurative kin to the alloprimates (those primates that are not also humans), and a transdisciplinary anthropology of the interface of humans and alloprimates is already emerging. Biological anthropologists and primatologists are responding to Donna Haraway's argument in *Primate Visions* that “primatology is about an Order, a taxonomic and therefore political order that works by negotiation of boundaries achieved through ordering differences” (1989:10). A different kind of intellectual order is now forming, rejecting previous epistemological boundaries, employing a revised primatological practice—an inclusive view that places humans and alloprimates in an integrated, shared, ecological, and social space: a space that opens biological anthropology to input from other types of anthropology. That space is ethnoprimateology.<sup>1</sup> In this usage, the “ethno” prefix marks the inclusion of anthropogenic elements, including social, economic, and political histories and contexts as a core component of primatological inquiry (Fuentes and Hockings 2010; Fuentes and Wolfe 2002; Riley 2006). Such use must be distinguished from the deployment of the “ethno” prefix in such forms as *ethnobotany* or *ethnomathematics*, in which the “ethno” usually marks some cultural difference from unmarked Western scientific knowledges, which are implicitly taken to be universal.

Methodologically, ethnoprimateology attempts to integrate models of behavioral and ecological data collection from primatology, ethnographic practice (formal and informal) from social anthropology, and demographic, sociostructural and community-based assessments from geography, sociology, and a broader anthropology. Most ethnoprimateology is conducted by teams, not lone investigators.

This is especially true for the Bali project I discuss below, which involved numerous researchers from various cultures and disciplines. Throughout the project my Balinese colleagues—primatologists and other sorts of collaborators—taught me that the human–macaque interface is a complex fabric of perception and action. In alliance with these, and other, scholars, ethnoprimateology moves away from dominant views of primatology that prioritize the study of primates in seemingly pristine sites in order to assess the baseline for natural behavior—or even human nature (see Fuentes and Hockings 2010; Haraway 1989; Strum and Fedigan 2000).

Unlike many of the traditional views in primate studies (emerging from biology and psychology) ethnoprimateology accepts nature as a constructed, constructive process in which humans and others are core contributors. Rather than assert a privileged perspective of scientific objectivity, ethnoprimateology seeks to move primate studies toward a scientific and ethnographic integration, one that is comfortable dealing in primatological data as well as social, political, and economic interpretation. For example, Leslie Sponsel and colleagues show that the coconut-picking macaques of Thailand are integral members of the human communities in which they live. Their labor forms a core part of local economies, shifts the structural ecology of coconut picking, and creates a long-term multispecies bond across economic and social lines (Sponsel 1997; Sponsel et al. 2002). Rather than limiting the research focus to primate behavior and ecology, as in mainstream primatology, or to symbolic interpretations—uses of primates, as in much cultural anthropology, ethnoprimateology merges these two approaches. However, this view does not necessarily sit well within the dominant paradigm in primatology, one that seeks to maintain focus on adaptationist explanations for “natural” primate behavior.

While ethnoprimateology is becoming increasingly popular amongst Ph.D. students and some established primatologists, there remains some skepticism of the ethnoprimateological approach. To date I have coorganized one edited volume (*Primates Face to Face*, Fuentes and Wolf 2002) and two special journal issues (*Ecological and Evolutionary Anthropology* 2006; *American Journal of Primatology* 2010) that focus on ethnoprimateological themes. Some reviewers met the chapters and essays submitted with suspicion. Typical critiques included “These groups are in unnatural environments, you cannot truly test established ecological and behavioral hypothesis” and “There is a lack of theory and hypothesis testing here. Where is the science?” This is the conundrum facing those attempting to publish ethnoprimateological work: one is forced to navigate an opposition between nature and culture that emerges from the strict adaptationist/reductionist worldview typifying much of dominant primatology. However, given the recent grant success by Ph.D.

students embarking on ethnoprimate efforts and the increasing presence of ethnoprimate articles in mainstream journals, there is evidence that the methodological and philosophical orientation of ethnoprimate is impinging on mainstream primatology. Importantly, it is impossible to deny that the majority of primate populations now interact regularly and consistently with humans.

### OF NICHE AND NICHE CONSTRUCTION

Ethnoprimate views humans and other primates (alloprimates) as co-participants in active, inclusive ecosystems, ecosystems made of interacting niches. The coproduced and coconstructed *niche*, the lynchpin of what I call mutual ecologies, is the dynamic N-dimensional space that an organism lives in and creates interactively with multiple other species (cf. Hutchinson 1957; Wake et al. 2009). This conceptual tool might help us understand emerging relationships in the Anthropocene, involving the entanglement of human social, political, and economic forces (Popielarz and Neal 2007) with the behavioral and ecological lives of alloprimates and other organisms.

The concept of the niche came to prominence in the work of the naturalist Joseph Grinnel in 1910, and was elaborated by biologists C. E. Elton and G. E. Hutchinson later in the 20th century (Griesemer 1992; Hutchinson 1957, 1978; Wake et al. 2009). The initial conceptualization of niche was rooted in the concept of “life zones” and species’ distributions in relation to their biotic and abiotic requirements (Wake et al. 2009). Some scholars saw the connections between organism and their local ecologies as so tight that they might undermine analysts’ abilities (and organisms’ own abilities) to distinguish individual creatures from their spatial/ecological surroundings (see Caillois 1984). The perception that organisms assimilate their environment through their body and that their bodies “environmentalize” their local ecologies was present in the early 20th century and was elegantly conceptualized by the Japanese scholar Kinji Imanishi (2002). Unfortunately, Imanishi’s main theoretical works have only appeared in English in the past two decades and, thus, had little effect on the Anglophone 20th-century construction of the living niche concept. However, during the period of 1950–70 innovations in North American and European niche theory began to converge on similar conceptualizations.

By the 1950s, Hutchinson described the niche as a multidimensional hypervolume reflecting consumable resources available to an organism. He divided the bioecological conception of niches into a “fundamental niche” and a “realized niche” (Hutchinson 1957; Wake et al. 2009). The fundamental niche is a heuristic

concept used to represent the basic requirements of a species: space, nutrients, and other physical factors. The realized niche is the same set of conditions as in the fundamental niche, but restructured and altered by a reality occupied not only by the organism but also shaped by the presence of competitors and other agents in a shared environment. The application of the niche concept in studies of social organization originates with Lazarsfeld and Merton's (1954) use of homophily and its relation to social networks and recruitment into social organizations. This was expanded via Blau's (1977) multidimensional spatial conception for social structure and later McPherson's (1983) depiction of a social organization's niches as a multidimensional space defined by the range of its member's sociodemographic characteristics (Popielarz and Neal 2007). The contemporary concept of niche includes notions of fundamental and realized niches that are neither static nor passive but, rather, malleable and mutually interactive with the species that exist within them. This extends to both the strict ecological use of niche and the application of a niche concept to the analyses of social organizations and structure (Popielarz and Neal 2007).

The critical concept of "niche construction"—the building, modifying, and altering of ecological niches and the concomitant pressures that play back on organisms (Odling-Smee et al. 2003)—emerged in dialog with evolutionary theorists (e.g., Bateson 1962; Lewontin 1983; Waddington 1959). Niche construction, widely understood to be an important factor in human evolution, also provides an important tool for understanding the relevance of a simultaneous examination of humans and alloprimates. The ability of humans radically to modify global ecology (a key factor of the Anthropocene) should be central to any explanation of human behavior, and the way that humans do this is farther reaching and more comprehensive than that of most other animals. As our surroundings include the social, biotic, and abiotic components of the ecology, understanding human behavior requires assessing the interactive and mutable relationship humans and other animals have with social and structural ecologies. One can envision an interface with humans and other animals as a form of niche construction, involving transformations during social interactions in the historical present as well as evolutionary changes over longer periods of time (Fuentes 2009).

Humans and alloprimates can be important partners in the construction of social and ecological niches (Fuentes 2006a, 2007). Usually described along the wild vs. domesticated continuum, the actual relationships between human primates and alloprimates are much more complex. Assessing this relationship, and its potential for shaping niches, requires the incorporation of meth-

ods that cross the boundaries between ethnography, ecology, and biology (at least). Shared histories from long-term sympatry (geographic overlap) can result in coecologies. Shared ecological pressures might impact humans and alloprimates such that they share similar physiological adaptations and behavioral-cultural responses; these can be considered overlapping niches (e.g., Fuentes 2006b, 2007, 2009).

Behavioral observations, physiological measurements, and descriptive analyses of habitat partitioning—use enable us to examine these possibilities and characterize the niches as they change over time. This overlap can also impact human conceptualizations of, and the way they interact with, alloprimates. Ethnographic investigation, interviews, and participant observation are required to examine and attempt to understand these factors of the relationship. Taken as a whole the multifaceted set of relationships between macaques and humans can be viewed as a suite of ecological, biological, and social processes that act as niche construction mechanisms. This interface connects humans and alloprimates in systems of mutual connectivity at social, ecological, and physiological levels. This in turn can affect the phenomenological structuring of human perceptions—views of nature, disease, food, pests, and pets—as ecological and physiological variables translate/affect our perceptions of worlds around us (Kohn 2007). Using the ethnoprimate perspective we are not seeking to explain “fitness” as in a traditional adaptationist paradigm but are rather seeking to discern processes, patterns, and relationships within mutual ecologies and shared niches. While not excluding more traditional evolutionary explanations, examining the humans and macaques under this rubric can offer up alternative (or additional) explanations that would not emerge if we limited our investigations to a functionalist framework.

Humans and alloprimates share intertwined histories across Indonesia and their interface is a rich arena for multiple types of anthropological inquiry, especially in primatological and political ecologies (Lowe 2004; Riley 2006; Riley and Fuentes in press). Bali, Indonesia, long a focus for ethnographic fieldwork (e.g., Bateson and Mead 1978; Geertz and Geertz 1975; Lansing 1991), also turns out to be an important locale for primatological inquiry and an excellent site to think through the analytic of niche construction (Fuentes et al. 2005; Lane et al. 2010; Wheatley 1999).

### LIVES AND NICHES AT PADANGTEGAL TEMPLE

In 1989, I visited the temple forest complex at Padangtegal (Ubud), Bali, Indonesia, for the first time—a place called the Ubud Monkey Forest in most

guides for tourists. This was one of my first encounters with long-tailed macaques (*Macaca fascicularis*). These monkeys have one of the largest distributions of the primates (along with humans, rhesus macaques, and baboons), and are ubiquitous across much of Southeast Asia, preferring habitats on the edge of forests and fields over primary forest. Their spatial and ecological overlap with humans is substantial. They live in groups usually consisting of between 20 and 50 individuals, with young adult males leaving their natal groups and seeking to integrate themselves into neighboring ones. Females spend their entire lives in their natal group, surrounded by female relatives, forming tight matrifocal clusters of two to four generations of females and their offspring. Clusters of youngsters spend much of the day playing and foraging while adults navigate through a complex series of conflictual and cooperative social relationships. Adult males are substantially larger than females and usually supersede them in access to favored resources. On average, with larger matrifocal clusters comes greater dominance of females in the group. It is quite common to see coalitions among the higher ranking males and the main females of the larger matrifocal clusters. With each adult macaque maintaining multiple social relationships of varying intensity and quality, the daily life of the macaques embodies a dynamic social ecology.

At Padangtegal, macaque monkeys and humans coexist and interact on a daily basis; humans and monkeys share the space and place and have done so for centuries (Wheatley 1999). The patterns of social interaction amongst the monkey groups ebb and flow in relation to the presence and activity of the local Balinese as well as the many tourists meandering through the temple complex and forest. Humans and long-tailed macaques are involved in daily rhythms of activity within the social and structural ecologies of this site. Human–monkey interfaces are often described in terms of the shared use of space or conflict over resources. But these natural-cultural contact zones are instead characterized by subtle behavioral and ecological interactions against the backdrop of the *longue durée* of human histories and paleohistories.

In Bali there are over ten thousand macaques and nearly four million humans, with populations of both species having inhabited the island for millennia. Bali is often represented as an island paradise, a place of endemic multispecies mingling (Robinson 1995). But over the last eight centuries increasing human populations and intensifying agricultural systems have heavily modified the ecosystems of Bali. During this period many large mammals decreased in number, including silver leaf monkeys and some deer species. Other species, like the Bali tiger—the smallest of the tiger subspecies—went extinct (Whitten et al. 1996). Periodic

catastrophes—paleohistories of volcanic eruptions and earthquakes and episodes of state violence—haunt human memories and have helped structure the landscape and patterns of human–alloprimate interaction. Following centuries of Dutch colonial excesses, some 80,000 Balinese residents, suspected of communist sympathies, were murdered after a CIA-backed Indonesian military coup in 1965 (Robinson 1995). However, Bali enters the 21st century as a resilient Indonesian province and dominant tourist mecca. The contingencies introduced by of centuries of habitat alteration, decades of modernization, the green revolution, political change, and the tourist industry structure the raw materials and social contexts of the niches shared and shaped by monkeys and humans on Bali today. Against this background, I have found subtle day-to-day conflicts among humans and primates but also sites of naturecultural hope in Bali.

Macaque monkeys continue to thrive on Bali, especially in and around human villages and temple complexes, where many humans provide them with food. Some Balinese hunt and trap monkeys, a fact that foils any attempt to suggest that the species live in harmony or peaceful coexistence. Spending a number of years watching the macaques and humans interact, working with local researchers, priests, and villagers, I reject the view that there is a simple relationships between humans and alloprimates and propose that there is neither a strict competitive nor a purely reciprocal association between humans and alloprimates. Follow critiques of ideologies of exchange that regard individuals as free partners who engage and disengage at will (Clifford 1997; Pratt 1992), I argue that the interface between species constructs mutual ecologies that structure their relationships. In these zones of contact there is an entanglement of economies, bodies, and daily practice that leads to the construction and coproduction of niches (see also Fuentes 2006b; Jones-Engel et al. 2005; Lane et al. 2010). These entanglements affect the size of macaque populations, their group compositions, and behavior (Fuentes et al. 2005).

Since 1998 my collaborators and I conducted landscape and population surveys mixed with behavioral observations and ethnographic interviews at over 40 of the more than 63 locales where macaque populations reside on Bali (Fuentes et al. 2005; Lane et al. 2010). Nearly seventy percent of these sites are associated with Balinese Hindu religiously demarcated spaces, ranging from simple shrines in forested patches to elaborate temple complexes with associated forests, heavily used by Balinese and in some cases foreign tourists. These sites, often called monkey forests, are naturalcultural contact zones (cf. Haraway 2003) between macaques and a diverse array of humans.

Ritual cycles are core structuring facets of Balinese lives, constitutive of their social niches. In these temple complexes resident monkey groups are participants in ritual practice. A central component of Balinese Hinduism is the daily placement of offerings at temples, shaping the dietary ecologies of the macaques and the social and economic ecologies of the Balinese. These offerings are given in all ceremonial events—from daily rituals to household festivals every 15 days; from local family events like weddings and tooth filings, to Galungan, the ten day long annual festival of Bali (Bateson and Mead 1942; Belo 1953). The daily offerings can be small, consisting of incense, flowers, rice, and fruit. Once placed appropriately (“offered”) the Balinese see them as having served their purpose and the macaques are free to consume them. During the frequent temple ceremonies and larger celebrations the offerings are much more substantial (Belo 1953). For the larger festivals the offerings consist of a wide array of fruits, rice based foods, meats, and other edible items. These larger offerings are often redistributed to the attendees or destroyed as part of funeral rites alongside human bodies rather than left behind for the monkeys. The portions of offerings that return to festival attendees and other villagers are called *lungsuran*, meaning literally “what is asked back” (Belo 1953). Conflicts arise between the macaques and humans in these events if the monkeys attempt to play their part prior to the humans.

In practice, many portions of the large offerings are eaten by macaques. During rituals it is common to see clusters of macaques in the trees and on the ground a few meters away from the celebrants. They follow the ceremonies with their eyes, ears, and noses, seemingly reading the human response and reacting with the occasional grab at offerings, but largely waiting for the ritual to run its course. When asked about this behavior, many Balinese respond either that the macaques are just a part of the environment (and occasionally a nuisance) or that the macaques can be seen as emissaries of the spiritual-natural forces—the Gods, spirits, souls, or bodies of the dead (Bateson and Mead 1978)—moving the offerings across from the human world into the locally coexistent but distinct spirit world (Fuentes et al. 2005; Wheatley 1999). For the Balinese, these spirits and the relationship between all actors in this scenario are part of a natural ecology. The distinctions between material and nonmaterial agents are not clearcut. Animals and plants, as with humans and spirits, are potential agents of positive and negative physical and spiritual influence (Boehmer and Wickham 1995; Hobart 1990). As Geertz once put it (if in a somewhat romantic register), to the Balinese “the world is still enchanted” (1973:175), in that natural and supernatural worlds (and niches) coexist, equally and simultaneously.

It is also the case that at these monkey forests, thousands of tourists, domestic and foreign, are part of the ecology, drawn by globally distributed advertisements featuring the monkeys of Bali.<sup>2</sup> Income from tourists can be a major part of the household economies for many Balinese and many monkey forests support rings of souvenir stands, restaurants, and vendors selling Bali-related, and monkey-related, goods. This human–macaque interface at the monkey temples is a niche shaped by the interplay of economic dynamics and hybrid cultures. To assess this niche I employed a mixed methodology, one that incorporates structural assessment of the landscape and human and macaque behavior combined with formal and informal interviews and observations of daily life, economic patterns, and local and touristic beliefs.

### RIVERINE FOREST CORRIDORS

The temple sites are connected by naturecultural corridors to wider agro-ecological systems. Land-use patterns and wet-rice agriculture, combined with the complex temple and irrigation systems of the Balinese (Lansing 1991), creates, manages, and maintains a mosaic of riverine forest corridors and small forest islands throughout much of the island (Fuentes et al. 2005). This landscape is in many ways ideal for macaques, who prefer riverine pathways, mixed edge and secondary forests, and are highly flexible in their diets. The landscape has been formed over at least the last millennium and the pattern of distribution of macaque populations across the island suggests that the macaques are exploiting it (Fuentes et al. 2005).

Through noninvasive sampling of macaque feces across many of the temple sites my colleagues and I have been able to extract genetic signatures. Preliminary genetic analyses of the Bali macaque population support the proposal of riverine pathways, with Y-chromosome data showing that male macaques exploit the protection of managed riverine forest stretches to move safely around the island and mitochondrial data showing that females spend their lives in their natal groups (Lane et al. 2010). The human alteration of the landscape combined with macaque social patterns has shaped macaque population genetics, producing clusters of related macaque females with males moving across groups and subpopulations acting as units of gene flow. This flow appears to be channeled along the riverine corridors facilitated and maintained by the Balinese agricultural system. This is a vivid example of niche coconstruction and coproduction by actions and bodies of humans and macaques. In Bali, human place-making acts to shape the niche of macaques—the spaces they inhabit and the structure of their populations (Lane et al. 2010).

Any deep understanding of these riverine pathways, and the temple forests they connect, requires that we include a cultural analysis of the landscape and the human forces and processes that shape it. I follow Paige West's (2005) assertions that some academic/intellectual translation of the beliefs and meanings of peoples' relationships with animals and their ecology sometimes fail to acknowledge (or recognize) that environments (writ large) are both materially and symbolically created. One needs to be with, and speak with, people to identify and engage with the symbolically and socially constructed aspects of local ecologies. Here I deviate in part from the adaptive analytic frame used by Stephen Lansing (1991) in his examination of water temples and agrarian systems in Bali (see also Lansing 2000). Stefan Helmreich points out that Lansing's model of Balinese temple networks as complex adaptive systems "mutes politics" and collapses "cultural and historical processes into an evolutionary language" that sometimes silences human agency (Helmreich 1999, 2000). Building on Helmreich, and departing from Lansing's functionalism, I suggest that the traditional language of evolutionary adaptation is, by itself, inadequate to explain the macaques' exploitation of human institutions and engineering projects. An ethnoprimateological approach places the ecology of the sites, the behavior of the humans and macaques, as well as historical and economic forces, into dynamic interaction. Actions and interactions by and between the macaques and humans are shaping and reshaping, constructing and coproducing, the shared components of ecological and social niches—and are doing so in ways that must be understood simultaneously through ethnographic, behavioral, and epidemiological lenses.

Macaque bodies do more than occupy Balinese temples and riverine forest corridors. They coproduce and coconstruct human epidemiological landscapes and even genomes (physiological niches). Recent analyses of viral pathogens in macaques and in Balinese who have frequent contact with them demonstrates that some pathogens, such as simian foamy virus (SFV), are shared, exchanged across species boundaries, with potentially more regularity than previously thought (Jones-Engel et al. 2008). SFV is a retrovirus, meaning that it inserts viral code into the DNA of host cells. Many nonhuman primates carry this virus, but it can infect humans as well. The virus can kill cells *in vitro*, though there is no indication of any disease associated with SFV infection in any primates (including humans). SFV infections are lifelong and the vast majority of macaques have acquired SFV infection by adulthood. SFV infection in humans is very rare, but the few non-laboratory instances recorded recently involve people from Bali, and other parts of Southeast Asia, who are in frequent contact with macaques, especially in and around monkey

forests—temple complexes (Jones-Engel et al. 2008). Simultaneously, we also know that human viruses, such as measles, can be found in the bodies of Bali macaques (although, interestingly, macaques do not appear to become ill from this infection). Common gut parasites, such as the worm *Ascaris* or the protozoan *Entamoeba*, are also found in both monkeys and humans on Bali. So in addition to sharing space and place, macaques and humans have entangled epidemiologies, influencing one another's niches as part of a multispecies relationship.

### INTERSPECIES TOLERANCE AND VIOLENCE

Formal and informal discussions with informants and research collaborators over the past decade indicate that the Balinese see the macaques inhabiting a range of roles: from crop raiding pests, to tolerated coresidents and household pets, to participants in the Balinese Hindu mythos, to tourist attractions. In these conversations about macaques, the Balinese paint pictures of tolerance in most circumstances, express anger in issues of crop damage and vendor stall raiding in others, and, in the case of many temple workers who interact daily with the macaques, a sense of affection or admiration. At the same time, our observations of the macaques show that they can often interact with, or avoid, humans by altering their use of space, that they preferentially overlap with people in certain times and places (frequently associated with access to food) and that overall, a lack of macaque initiated direct physical or behavioral interaction characterizes a majority of the coexistence. To study and describe these relationships we can heed Matei Candea's call for researchers to avoid viewing animal–human relations along the dichotomous engagement–detachment continuum (Candea 2010). Rather than seeking to identify and be with the macaques or to disengage from seeing them as participating in the anthropogenic niche, we need perceive these interfaces as dynamic, incorporating and constructing multiple modes of relation.

The parking area adjacent to the southern end of the monkey forest at Padan-tegal is a good place to watch macaques and Balinese engaged in casual interactions. On a slow tourism day one might see a smattering of small tour busses, a few private cars, and a number of minibuses parked in between the entrance to the temple forest area and a small *warung* (food stall) at the southern end of the parking area. Sitting in the various areas of shade one can find a number of Balinese drivers (usually men) drinking coffee and smoking cigarettes waiting for their passengers to return. Among and around these humans, in the same highly valued shade, one will frequently see 5 or 10 young macaques (mostly males) sitting or moving about at a relaxed pace. Interactions between the two species here are calm and range

from ignoring one another to the occasional tossing of food by human to monkey or approach, touch, and run away play by a young monkey to a human. When asked about this relationship one older driver in his fifties said (translated from Indonesian) to me, “they are here, we are here, as long as they do not damage the (side) mirrors on my minivan, we both wait together.”

At the monkey forest temple site of Alas Kedaton (also central Bali) nearly all of the tour guides are young women. On a slow day you will see them sitting in groups in the shade waiting for tourists to arrive. Above them in the trees and alongside them on the ground you can also find clusters of female and male macaques, along with their young, resting and playing within meters of the humans. Little overt interaction occurs, but both species are aware of one another and their sharing of that particular structural and social space. When asked in summer 2000 about the lack of conflict or aggression in this context one young tour guide responded (translated from Indonesian), “we are both are waiting for tourists, we’ll both go to work soon.” Here the monkeys and the Balinese are occupying a similar social niche in the geopolitical economy: waiting for the tourists to arrive.

Crop damage and vendor shop—stall raiding creates a different dynamic between the Balinese and the macaques. One of the most extreme cases of aggression I ever observed between macaques and a human was at the monkey forest temple site of Sangeh in 1994. A colleague and I were following a group of monkeys, about 24 males, females, and young, as they moved through a series of dry crop gardens adjacent to the southern end of the forest. We were standing just north of the macaque group when an adult female screamed an alarm call and ran past us. The group was immediately all around us calling and scrambling over the ground toward the forest. At that point we saw an elderly Balinese farmer chasing the macaques from his field with a large scythe, which he swung, nicking a female carrying a young infant. She screamed and the entire group turned and ran past us again, charging the farmer. Six females and a male attacked the farmer, drawing blood. He ran off. At this point, the group turned and slowly made their way back to the forest (completely ignoring me and my colleague). Tracking down the farmer we discovered that his wounds were relatively minor.

Asking the local temple workers later if this was a common occurrence and how local farmers feel about it, I was advised that the farmers do not steal from the monkeys in their forest. Farmers feel that the monkeys should know that if they try to steal crops the farmers will fight them. These perspectives—of tolerance in shared non-conflict areas, aggression in areas of contested resources, and

assumptions about shared understanding of spatial boundaries between species—were found in the majority of responses by Balinese in a cross-island series of interviews about monkeys conducted in 2003 (Loudon et al. 2006). This assumption about an “understanding” of space and behavior between Balinese and the macaques is reinforced by the much more frequent conflicts between foreign tourists and macaques relative to Balinese and macaques.

Foreign tourists are much more likely to be bitten by macaques (Fuentes et al. 2005), largely owing to the tourists’ high likelihood of initiating a conflict. Unlike the Balinese, who share their space and place with the macaques, conversations with tourists from the United States, Europe, and northern Asia reveal a penchant for seeing the macaques as furry almost-people, as naughty comedians, jesters of the animal kingdom. It is as if our similarities in bodies and physiologies create a false sense of understanding and identification (for a related situation of identification between television audiences and meerkats, see Candea 2010). Many of these tourists display a desire to interact, and a degree of carelessness, around the macaques (Fuentes 2006c). They imagine themselves as part of a social niche where they are in a relationship of touching and intermingling with fellow primates. However, the tourists do not occupy the same place in this multispecies relationship as the Balinese, and the macaques recognize this. The most dramatic instance of this was in 2001, when a young Swiss woman approached a young female macaque carrying an infant that was a few days old. Cooing and baby talking, she took the infant from its mother in a quick grab and was immediately attacked by five adult females and one adult male. She needed over 140 stitches in seven places across her body. The workers, and priest, at the monkey forest where this occurred offered to pay the woman’s medical bill, but held no ill will toward the macaques. In the words of my Balinese associate at that site, “The monkeys were only doing what they saw as right, protecting the baby. That girl should not have behaved the way she did in the forest.”

Interestingly, the number of Balinese reporting fearful views of the macaques—a response nearly absent from Loudon and colleagues’ 2003 survey—may be increasing. This sentiment, previously limited to areas with fewer tourists that did not derive direct economic benefits from the monkeys, has spread over the course of the last decade. Perspectives, and types of conflicts, may be changing. A recently published study indicated that even in the central Bali areas where the monkey forests are economically quite important and most monkeys live in around temple sites, 8 of 91 macaques x-rayed had air rifle pellets lodged in their bodies (Schillaci et al. 2010).

Many Balinese living around monkey forests see the macaques as income generators. In well-known sites, such as Padangtegal and Alas Kedaton, over 100,000 tourists visit per year, paying entrance fees of \$1.00–\$2.50 and contributing to local economies at restaurants, hotels, and gift shops. In Padangtegal, revenue generated from monkey tourism can result in tens of thousands of U.S. dollars equivalent annually, much of which is funneled back into village community building, temple enhancement and restoration, and agricultural projects. In this case the activity of the macaques facilitates an economic benefit that in turn alters the structural and social ecologies of the Balinese villages and towns associated with them. This can result in human expansion of macaque habitat, again an example of mutually shaping their ecologies and modifying their interfaced niches.

For example, beginning in 1999 the village of Padangtegal initiated a management scheme for the monkey forest that included reinvestment of some tourist income generated from entrance tickets into reforestation, litter removal, and provisioning of the monkeys. In the last ten years this approach resulted in a 25 percent expansion of a forested area. This substantially increased the vertical and three-dimensional area used by the macaques, enabling an increase in the population size without substantial conflict between the resident groups (there were three in 1999 and five in 2009). This investment of increased tourist revenue also led to a 200 percent increase in the quantity of the food provided by the management staff to the monkeys which, coupled with the expanded ranging area and the protection offered by the temple complex, enabled a doubling of the monkey population size in the last decade.

Changes to this system of interaction emerge from the interaction of Balinese beliefs about what is good for the monkeys and the views of primatologists or ecologists about what is good for the monkeys. The dominant view of primatologists and ecologists is that healthy monkeys are good but increasing the population size so dramatically is dangerous. For the Balinese, larger macaque families mean an increased number of young and thus more active macaque movement and play behavior. These are good things as they reflect what the temple manager calls a more “aman” (relaxed, secure, or peaceful) way of living for the monkeys. Many international researchers began to worry about the increased population and the concomitant risk of increased conflicts and aggression between monkey groups and between monkeys and humans. Conventional primatologists wanted to control the population and the macaque ranging behavior to minimize potential conflicts (solutions such as birth control, culling, and building complex arboreal pathways to keep macaques and people apart). The Balinese at Padangtegal agreed

with those outcomes (minimization of conflict), but used a largely non-Western approach: they simply hired more local villagers to feed monkeys, to monitor the boundaries between the forest and crop fields and to assist the tourists in and around the temple. This plan emerged from the already established set of relationships between humans and macaques at Padangtegal, and in fact worked very well. A recent report from Padangtegal (March 2010) has the monkey population above 500 individuals and the rate of human–macaque aggression below what it was ten years ago with 200 individuals. The Balinese are teaching international primatologists unexpected lessons about the structures and behaviors surrounding the human–monkey interface. This ethnoprimateological endeavor emerges from different knowledge systems intermingling to coproduce new ways of describing and navigating this multispecies relationship.

It is clear that the behavior of the macaques is tied to the actions of the local humans, influenced by the economic and social impact of the macaques via tourism. This is a malleable relationship. Viewing it only through an adaptive or ecological lens (as in a traditional primatological approach) is incomplete, as cultural elements are also at play in building and reshaping the local niches of the humans and macaques. For example, the *Ramayana*, a corpus of Hindu myths that are a central focus for much Balinese art and dance, informs interpretations of Balinese folklore as well as the macaques' pattern of inhabiting temples. Dances and other performances associated with the *Ramayana* are central to Balinese festivals and temple celebrations (Belo 1953), and monkeys, specifically as core agents via their association with the god Hanuman, are common and popular characters. Hanuman plays a major role in many dance and puppet performances of the *Ramayana*, and his comical behavior and interactions with the audience are popular facets of such performances. Temple macaques and monkeys in general, are associated with Hanuman, and specifically with his monkey minions, a relevant facet of our understanding of the social organization of the macaque–human interface if we consider Popielarz and Neal's (2007) notion of a social organization's niche as a multidimensional space defined by the range of its member's sociodemographic characteristics.

Macaques are considered residents of temples and other religiously marked places, coparticipants in Balinese place. As noted above during significant ceremonies at temple complexes, enormous amounts of offerings are provided for ritual activities. Hundreds of attendees are fed. This creates an explosion of food for the macaques. However, the actual interactions are not as straightforward as monkeys taking food. The macaques move away or into the trees when the large

processions enter and remain on the periphery of the proceedings. As the event unfolds and the offerings are made and pyres ignited the macaques begin to move in and around the Balinese, feeding and resting in close proximity. Unless macaques attempt to grab offerings or food that has not yet fulfilled its ritual or gustatory purpose, they are tolerated and their presence as peripheral participants acknowledged. This is a relationship of tolerance, not reverence, and it lays a particular basis for understanding the interactions between humans and macaques on Bali. The fact that macaques appear frequently in popular theater and dance, and that they are also potential economic boons, means that they are often represented in tourist masks and paintings (Hanuman is among the popular subject in these media). Here there is a melding of social, symbolic, economic, and even dietary facets of their shared niches.

### INTERCULTURAL MONKEY MANAGEMENT

My initial Balinese collaborators, Dr. Gede Komang Suaryana (former director of the Primate Research Institute at Udayana University) and Mr.<sup>3</sup> Wayan Selamet (long-term manager of the Padangtegal [Ubud] monkey forest and a central colleague and interlocutor for my work), drove this integrative perspective on primate research in Bali home. Celia Lowe (2004) notes that Indonesian primatologists are simultaneously elite (within their nation) and subaltern (within transnational science). Residing inside and outside of primatology's mainstream tradition and having a multilevel relationship with their own subjects of study enables them to see this interface in an ethnoprimate perspective. Both Dr. Komang and Mr. Selamet positioned their approach to primate studies and management simultaneously in primatological, societal, economic, and historical terms. The web of interconnectivity between these areas was a baseline, not a post hoc, conglomeration of only loosely related arenas.

Since 1999 Mr. Selamet has been a central force in the management and modification of the monkey forest at Padangtegal (Ubud) and by extension many other monkey forests on Bali that seek to emulate his extremely successful programs. Both he and Dr. Komang (along with Dr. Bruce Wheatley and Dr. I. D. K. Harya Putra, see also Boehmer and Wickham 1995; Budihardjo 1990) suggest that we can look to the principle of the Tri Hita Karana (considered by some Balinese to be a focal point for Balinese Hindu natural theology) to help us understand core symbolic and sociocultural perspectives of these relationships between monkeys and humans. It posits that happiness (balance) is dependent on three harmonious relationships:

- Parhyangan—People should live in harmony with God(s), the Creator  
 Pawongan—People should live in harmony with other peoples and other creatures  
 Palemahan—People should maintain the environment where they live

Dr. Komang, explaining the relationships of monkeys and people to the students of my 1998 field school in Bali, stated that harmony is an active process. He noted that the Balinese and monkeys are coparticipants in their environment (in my terms, in social and structural ecologies). And that “we both use the same land and God(s) help us decide how to live together in this space.” Dr. Komang and Dr. I. D. K. Harya Putra (currently a dean at Universitas Udayana in Bali) stressed that the *Tri Hita Karena* is not so much a mandate, but rather a way to think about, or perceive, relationships (Budihardjo 1990).

The notion that the *Tri Hita Karena* might be relevant to our analyses of the factors involved in niche construction at the macaque–human interface is supported by the way that particular species of trees and structural aspects of the environment are viewed in and around temples. For example, at the site of Padangtegal, the building of a much-needed new parking area was held up for over seven months (with concomitant loss of tourist revenue) because no one in the cluster of local villages in the area would act to cut down the large dead tree that resided on the spot. Mr. Selamat eventually had to hire a team from outside of the regency to come in and remove the tree. When asked as to why this was such a problem, the nearly uniform answer was that for the local Balinese in the area the tree was part of the temple site and thus the symbolic risk of being the one to remove it weighed very heavily on them (see also Couteau 1990). Symbol and perception influenced action, which impacted the structural ecology at the site. This is a simple example but should make us cognizant that such events are ongoing and multifarious at Padangtegal (and other similar locations) and play active roles in the dynamism of local ecologies.

Dr. Komang and Mr. Selamat, while fully aware of the economic and social contexts of the macaques (and not always in positive terms), have convinced me that this particular Balinese view lays a baseline for the possibility of a type of generosity between humans and macaques on Bali: a sort of multispecies niche that involves cultural, historical, physiological, and ecological factors. They have urged me, as well as other primatologists and anthropologists, to work with Balinese people and landscapes—exploring novel approaches and using new toolkits in our attempts to effectively characterize this coproductive, naturalcultural relationship.

For over a decade the insights of Dr. Komang and Mr. Selamet drove significant portions of the research and publications of the Bali macaque project. Many of our research foci for projects at Padangtegal were on the physical and behavioral impacts of monkeys and humans interacting and the subsequent social, physiological, and economic outcomes. This was, in part, at the request of Mr. Selamet as his interest lay in the management of the monkey populations, the tourist experience, and the relationships between his charges (macaques, temple forests, and associated sites), the priests and the staff of the temples themselves, and his community (residents of Padangtegal and Ubud). The hybrid methodological and conceptual toolkit of ethnoprimateology—integrating the social, mythical, economic, and historical alongside the ecological and behavioral—thus offers a way to grapple with countervailing forces and agents in this multispecies system.

### CONCLUSION

Opening our perceptions and paradigms to include the human–alloprimate interface can lead to a new wave of cultural and of primate anthropology. Employing an ethnoprimateology that incorporates niche construction can facilitate our move towards a more effective investigation of the landscapes where species meet.

I borrow from my own work (2006b, in response to Coetzee's [2003] *Elizabeth Costello*) to close this essay: Sometimes I feel like an ape because I am an ape and other apes will see that in me. I am a primate, an anthropoid primate, and I have no doubt that the anthropoid primates I have worked with see me as something quite different than a seagull or a cat and are fully cognizant of my gaze upon them and our interactions. Our shared “nakedness” (what connects our mutual gaze/interconnectivity, to paraphrase Derrida 2008) is that of mutual physiologies, ecologies, social-experiential contexts, leading in some cases to shared niches. If we share niches, we coparticipate in their construction, alteration, and destruction. Humans and alloprimates participate in a greater set of naturecultural linkages than many (but not all) organisms. We need to reject domesticated versus wild, natural versus unnatural, and engagement versus detachment dichotomies in the study of human–alloprimate interfaces. We should move past the notion of definitive discrete distinctions in favor of fluid and reciprocating interfaces that change over time creating spaces, bodies, and niches of relevance to our understanding of human animal and the other animal experiences.

Here I have suggested that looking to the human/alloprimate interface in Bali and thinking about the possibilities of niche construction urges us to retrain our gaze to include other beings, and their diverse sets of physio-behavioral-ecological

realities, as part of our questions about humans being with other beings. As Paige West notes, we need to accept “the fact that human relations with the natural world are aesthetic, poetic, social, and moral” (2005:633), as well as directly ecological, and that they can shape environments and niches. We humans are altering global and local ecologies at a rate beyond that of any time in history. Recognizing that we are participants in a diversity of multispecies relationships and incorporating this view into our studies, especially in an ethnoprimateological approach, might open up a space of naturecultural hope, helping us achieve in some way an integrated and more inclusive anthropology.

### ABSTRACT

*Examining the interface between humans and other primates can illuminate how interspecies relationships create and maintain complex social and ecological spaces. Humans and macaque monkeys share ecologies that include cultural, historical, and physiological dimensions. In this essay, I examine such ecologies while undertaking an ethnoprimateological project in Bali, Indonesia. This multispecies ethnography of humans and macaques demonstrates that human perceptions and land use intertwine with macaque social behavior and pathogen physiologies to affect local ecologies and economies for both species. In these contact zones where any clear boundary separating nature/culture is difficult to discern, I use the concept of “niche construction” and an ethnoprimateological lens to explore and understand these relationships. This article also serves as an invitation to move an ethnoprimateological approach away from the periphery and into a broader primatological and anthropological engagement with naturalcultural relations.*

**Keywords:** Bali, humans, macaques, natureculture, niche, niche construction, ethnoprimateology

### NOTES

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1. The ecological anthropologist Leslie Sponsel (1997) is generally associated with coining the term “ethnoprimateology” and Bruce Wheatley contributed the first book-length exploration on

- the subject (1999). See also the work of cultural anthropologist Loretta Cormier (2003) and a core group of ethnoprimateological publications: Fuentes 2006a, 2007; Fuentes and Hockings in press; Fuentes and Wolfe 2002; Jones-Engel et al. 2005; Paterson and Wallis 2005; Riley 2006; Riley and Fuentes in press.
2. The global attraction of Bali monkeys is quite substantial and a vast majority of advertisements for Bali tourism use monkeys images in their brochures and Web pages. For example, the search term *Bali-monkey* generates more than 250,000 hits on Google, and nearly 8,000 images, and the term *Ubud-monkey-forest* (referring to the Padangtegal temple complex) alone merits 62,000 hits and has its own Wikipedia page.
  3. I translate the Bahasa Indonesian term of respectful address for men, *Pak*, to “Mr.”

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