The Journal of Burma Studies Vol. 15 No. 1 (2011), pp. 21–42

Genealogies of Nurture: Of Pots and Professors

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Kris Lehman loves puzzles, be they linguistic, historical, mathematical, religious, or ecological. He instilled this love of puzzles in his students. In honor of his retirement, this paper builds on his enduring interest in cultural historical puzzles in Southeast Asia.

One day in 1970, while planning a thesis on the relationship between Brahmanic and Buddhist ritual in Thailand, I saw a pot with a red-on-buff painted design in an antique store in Bangkok. It probably came from one of the many looted collections of late-period Ban Chiang painted pottery; the complexity of the designs fascinated me. When my daughter Chandra was born three months before my doctoral exams, I took the opportunity to shift my focus of study somewhat. Inspired by Kris Lehman's work with mathematical modeling and cognitive anthropology, I worked with symmetry theory to produce my PhD thesis on late-period Ban Chiang painted pottery under his direction.

In the early 1970s, little was known about the context of the pottery because most was lodged in the illegal private collections of powerful Thai elites; I was limited in what I could do with the information from the collections. Today we know more. To anticipate my argument, we now know that Ban Chiang and many sites in the region elaborated infant burials; fetuses, newborns, and infants were often buried inside ceramic jars or with jars as grave goods.

Ban Chiang is a mixed-use mortuary and occupation site in northeast Thailand in mainland Southeast Asia occupied for over two thousand years from about 2100 BCE to 200 CE.

Bronze was in use at least by 1500 BCE and iron, by 500 BCE. Here, settled villagers cultivated yams and rice and raised domestic cattle, pigs, and dogs. The mound site was partially excavated in the late 1960s and early 1970s, and the detailed site report is nearing completion.

Speculations: Men of Prowess

The site with its beautiful pottery, and the potential for early and indigenous bronze and iron development in the region, encouraged much speculation among Thai and foreign analysts. Were these Thailand's first rice farmers? Do we have evidence for bronze complexes that were not used for weapons but for personal adornment? Since intensive wet rice agriculture favors rapid population increase, did this result in expansion into formerly unoccupied lands of the Khorat plateau, northeast Thailand? Could these sedentary rice-farming communities be considered chiefdoms led by 'men of prowess' or 'big men' in the centuries before Indianization?

Extensive trade networks provided luxury goods such as marine shell, exotic stone, and leather in the communities of the Khorat plateau. Speculations about the distribution of bronze objects from sites such as Non Nok Tha and Ban Chiang raised questions about social ranking systems, and whether there was direct evidence of organized warfare or only sporadic raiding in the first millennium BCE. Some speculated that there were high levels of conflict in the area, but since almost half the traumatic injuries were on women (Pietrusewsky and Douglas 2002, 171) and are not compatible with war wounds, this is unlikely.

Are the sites in the region evidence of a transition from a model where exchange of valuables and the establishment of affinal ties promote alliances with minimal social ranking, to a model where rank was fixed through unequal production and exchange, facilitated by a shift from managed swamps to increasing reliance on fixed rice fields (White 1995)? Wet rice cultivation with a diversified subsistence base can support

large populations necessary for the development of state systems. Arguments abound over the earliest dates for rice, bronze, and iron, and the major transitions in the region — from the Neolithic to Bronze Age to Iron Age and finally to the Indianized states of Southeast Asia.

It is also possible that the models we use to make sense of Southeast Asia's past are biased toward the idea of structure as hierarchical rather than heterarchical structures where each element is either unranked relative to other elements or possesses the potential for being ranked in a number of different ways (Crumley 1987, 158; White 1995). Heterarchy is particularly suited for understanding the great variation in sites throughout northeastern Thailand. Here local groups exhibit something like flexible hierarchy as they differentiate themselves from one another by elaboration of one artifact type over another.

What Higham calls "seminal variables" (1984, 4) inherent in Southeast Asia before the establishment of expansive Indianized state societies (incidentally, the subject of Kris Lehman's PhD thesis at Columbia) provides a glimpse into what I now view as male models of state formation. These speculations read as if warfare, the drive to augment personal wealth and obtain rare objects of personal adornment by men of prowess, were somehow responsible for the increase in population in these pre-state societies. While rice cultivation can support huge populations, in order to make history or states at all, people first have to make babies that survive childhood. The most direct variable affecting population increase and density is infant and child survival. A focus on child survival and nurturance in mainland Southeast Asia might present a very different perspective on social processes, albeit not a seminal one.

Nurturing Women

While the archaeology of northeast Thailand has advanced since my thesis was written more than thirty years ago, my research has taken me in new directions concerning gender,

food systems, and young child feeding. This latter research makes me wonder if androcentric conceptual models that focus on war, trade, hierarchy, and men of prowess have discouraged us from paying sufficient attention to women's capacity to give birth and nurture infants and children into adults of reproductive age, the crux of all population questions.

Human infants survive and grow to be productive adults only if they are fed and nurtured by others. The features in Southeast Asia of most relevance to nurturance and infant survival include the capacity to keep infants and children cool, in well-ventilated houses providing shelter from the sun. Tropical houses are often raised off the ground to avoid floods, provide good ventilation, and dispose of sewage and waste by dropping it under house for pigs and dogs to eat. Perhaps the open houses encourage more community control regarding child socialization, resulting in less child abuse. Toddlers are also kept comfortable by the use of cooling powders or pastes, and frequent bathing. In Southeast Asia, even small children bathe standing, with fresh water poured over them so that germs and dirt from the lower body are carried away from the head. Hot weather presents a greater risk of anorexia and loss of appetite among infants and children.

Children usually sleep with mothers on mats, with easy access to breastfeeding at night. The tropical light pattern favors early sleep and early rising, a pattern most conducive to breastfeeding on demand. Dehydration and diarrhea were probably great dangers in tropical environments. Infants would need liquids along with complementary foods, although breast milk, composed of 87 percent water, adjusts to temperature so that exclusively breastfed infants do not need extra water. Infants and young children need some water to accompany food only after the cessation of breastfeeding. Child minders would have to keep their charges away from hazards such as insects and snakes, and cope with the faster growth of bacteria in tropical

environments, including care to avoid intestinal parasites and food contamination. Fermented foods are helpful in this regard. There is some speculation that protein requirements per kilogram of body weight may be higher for infants in the tropics.

Infant survival in pre-modern times depended primarily on a mother's capacity to breastfeed, or her ability to have other women breastfeed for her, and on the availability of suitable complementary foods after six months of age to help the child make the transition from a milk-based diet to an adult diet based on household foods. While androcentric models draw attention to the regional transition to rice agriculture — the large picture — other speculative models might focus on the transitions to rice occurring in the lives of infants and young children the little picture. Following my work with Richard O'Connor, we ask: what is the relationship between the little and the large, and how can we place them in the same conceptual model?

The topic of child survival is seldom addressed in models speculating on the culture history of mainland Southeast Asia. Recent efforts to locate and define the roles of women in the past (cf. Hamilton, R. Whitehouse, and K. Wright 2007, Nelso and Rosen-Ayalon, eds. 2002) have provided new evidence for the sexual division of labor. But if we plug this new evidence about women into androcentric paradigms, we are not fully exploring alternative ways of thinking about the human condition.

The lack of interest in questions around nurturance and child survival by archaeologists and cultural historians cannot be attributed to lack of direct evidence. We cannot excavate a nurturant breast, but neither can we excavate a 'man of prowess.' Both are conceptual constructions based on speculations from partial evidence. We attribute luxury trade goods to men and speculate about 'men of prowess' until we find burials of women and infants with extraordinary grave goods, as we find in the mainland sites discussed below.

Perhaps the topic of nurturance and lactation in archaeology has been avoided so as not to overstress women's contribution as centered in biological reproduction, rather than in the reproduction of social system per se. Interestingly, feminist anthropology generally ignores lactation as a process for many of the same reasons (Van Esterik 1991). The inclusion of microlevel examinations of household processes that favor child survival is one step toward redressing past androcentric biases.

Infant Burials

European visitors to Southeast Asia in the seventeenth and eighteenth century stressed the attention lavished on both male and female children, whose births were spaced further apart than children in Europe, encouraging lower child mortality compared to the neglect the European poor showed their children (Reid 1988, 50). Two thousand years earlier, families were already lavishing attention on infants and young children. We now know more about the context in infant burials in Ban Chiang and other sites in the region from several sources (White 1982, 1995, 2006; Pietrusewsky and Douglas 2002; Bacus 2007; O'Reilly 2003). Generally the graves of infants and children were as well as or better endowed as those of adults (White 1995, 110).

In the early period, Ban Chiang (2000–1500 BCE), eight of seventeen children under the age of five were buried in mortuary jars (Pietrusewsky and Douglas 2002, 160), often decorated with curvilinear, impressed, and incised designs; a five-year-old was buried in bronze anklets, and another child burial was provided with a cup and food offerings. Most of the infants appear to have been a few weeks old.

In the middle period (800–400 BCE.) the elaboration of infant and child burials continues. A one-year-old was buried under sherd sheets from seven pots, and unlike adult burials, which were laid out on the ground with mounds over them, this child was placed in a grave. A five-year-old was buried with both bronze and iron bangles under a sherd sheet of

carinated vessels. The young are buried with the funerary style and grave goods commensurate with adult burials (White 1982, 26). In fact, more bronze jewelery was found with child burials.

The elaboration of infant and child burials continued in the late period (300 BCE–200 CE). The excavators nicknamed one five-year-old child Bianca. Bianca was adorned with a multi-strand wire necklace made of a bronze of unusually high tin content, which would have had to be formed into wire while hot, quenched with water several times, and then formed into delicate jewelry. An eighteen-month-old child was buried with five burnished and painted vessels, four ceramic rollers, and the disarticulated skeleton of a dog — his skull in one bowl, vertebrate, and ribs in a pot, and the remaining bones over the child's chest (White 1982, 73). Another child about six years old was adorned with orange-red glass-like beads. In late-period burials, necklaces made from bronze wire, ceramic rollers with a wide variety of designs, and the most elaborate of the painted pottery are concentrated in the graves of fetuses, infants, and children under the age of six. More recently, other sites have been excavated in the area. At nearby Ban Na Di, the small size of bronze bracelets on adult skeletons indicates that they began to be worn when the individuals were young and could not have been removed in adulthood (Bacus 2007, 330). In a Bronze Age site, Nong Nor from 1500 BC, children had a similar range of burial goods as adults (Higham 2002).

At Ban Lum Khao, neonates were buried with more goods than infants or children. Some infants were buried in large lidded burial jars (O'Reilly 2003, 302–3). The initial settlement dates around 1400–1000 BCE. The infant burial jars were buried near heads of women. But O'Reilly speculates that this reflects the fashion of the time (2003, 303). At Non Mak La, a Bronze- and Iron Age site, infants were also buried in ceramic jars (Higham 2002, 81). At Ban Na Di, a six-month-old infant was buried with six cattle figurines and a bracelet repaired with bronze, the only bronze found in the earliest graves

(Higham 1998, 102), and nearby, a five-year-old child was buried under a shroud of crocodile skin (Higham 1998, 105).

At Khok Phanom Di, a coastal site some distance away, two infants (one about fifteen months old) were buried on either side of a very rich women's grave, accompanied by almost the same set of grave goods as adults, some in miniature (Higham 2002, 212). Further away in the late Neolithic site of Ban Mac in Vietnam, all children less than five had grave goods; a few children were found in ceramic pots; a six-month-old infant was buried with two pots and pellets; and an eight-year-old child grasped shell knives, among the richest grave goods at the site (Oxenham et al. 2009).

Why Children?

Why children? Infant and child death is both normal and abnormal: normal in the high infant mortality rates and accidental death rates for children everywhere except in privileged modern industrialized communities. Abnormal in that infants and children are not supposed to die before their parents; old people die.

Why take objects that require the most intensive expenditure of time, materials, and energy to make, and are often non-utilitarian, and deposit them in the graves of infants and children — members of society that have not had a chance to achieve any notable status, and in fact, in many societies would not yet be considered fully human?

The evidence does not suggest sampling errors, preservation issues, ancestor worship, child sacrifice, epidemics, or infanticide could explain the distribution. For example, in the sites around northeast Thailand, without the cultural elaboration of warfare and militarism favoring the exaggeration of masculine values, there is less likelihood of the development of female infanticide. But in mainland Southeast Asia in the last millennium BCE, we find hints that death of a pre-term stillborn, newborn, infant, or a toddler is more than a personal tragedy. We find communities pouring

their greatest technological and artistic skills into the graves of infants and children.

Ethnographic Analogies

"Death throws into relief the most important cultural values by which people live their lives and evaluate their experiences" (Huntington and Metcalf 1979, 2). In Ban Chiang society, then, infants and children were not on the periphery of experience but at the center; not socially insignificant but socially pivotal. In some way, the death of infants and children "rent the social fabric." Considering the painstaking attention taken with infant and child burials, we must assume that children were highly valued in life.

What possible ethnographic analogies might help us understand the elaboration of child and infant burials? In Buddhist Southeast Asia today, the death of infants is a personal tragedy surrounded with supernatural dangers related to the production of fierce ghosts — something to deal with quickly and separate oneself from, but not a rending of the social fabric, since the infant was not yet fully human. As Young observed, "For the funeral of a baby, cremation is rare, and few of the rituals and ceremonies described are held ... The Thai peasant does not regard the death of a baby as a loss. A baby has not yet become an integral part of the family or community; its death does not produce a social or economic gap (1907, 73). Kingshill, too, observed that a six-year-old boy who died was buried that afternoon by his relatives without ceremony (1965, 364). The absence of elaborate funeral rites for infants and children is quite common. Hertz writes, "the emotion aroused by death varies extremely in intensity according to the social status of the deceased ... the death ... of a child will go almost unnoticed" (1960, 76). A review of the Human Relations Area files confirmed the general pattern that when a child who is less productive economically and who has fewer social ties dies, this is a private emotional tragedy and not a public community loss occasioning an elaborate funeral. However,

it is also obvious that anthropologists have not paid a great deal of attention to infant and child death. The paradigms and theories are developed for adult death, with particular attention to abnormal death, such as accident, childbirth, or murder.

Throughout Polynesia and Melanesia, ceremonies with a child as the central figure appear to be common to celebrate the advent of a new human being. Among the Tikopia, every ceremony involves display, presentation, or exchange of goods. Feasts for children provide opportunities for men to assert their wealth and social position. Rituals to promote the welfare of infants and children react secondarily to promote the welfare of the community as a whole (Firth 1967, 61). At these rituals, great supplies of food were exchanged between households and children were supplied with shell arm rings, beads and valuables. But these rituals were not given to every child; first born of each sex may have more elaborate rituals and stand as an exemplar for others. Other rituals celebrate the personal achievement of children — first feeding with fish, first fishing expedition, etc. The rituals appear to act not simply as socialization for the young, but as moral injunction for adults as well.

Other analogies for elaboration of infant and child status come from Balinese literature that suggests that an infant has a ranking higher than its parents (Bateson and Mead 1942). Perhaps we have been phrasing the question in the wrong way. We ask — why celebrate the newborn when it is hardly human — not yet a social being? We assume *not yet human* (and therefore expect less ritual elaboration). From Balinese evidence we might assume *still deity* (and expect a burial suitable for a being belonging to the spirit world). The infant and the child, then, are closer to deified ancestors than adults.

Speculative Models

Building on the new burial evidence available and these analogies, can we generate any hypotheses about might explain the elaboration of infant burials? (See figure 1.) What

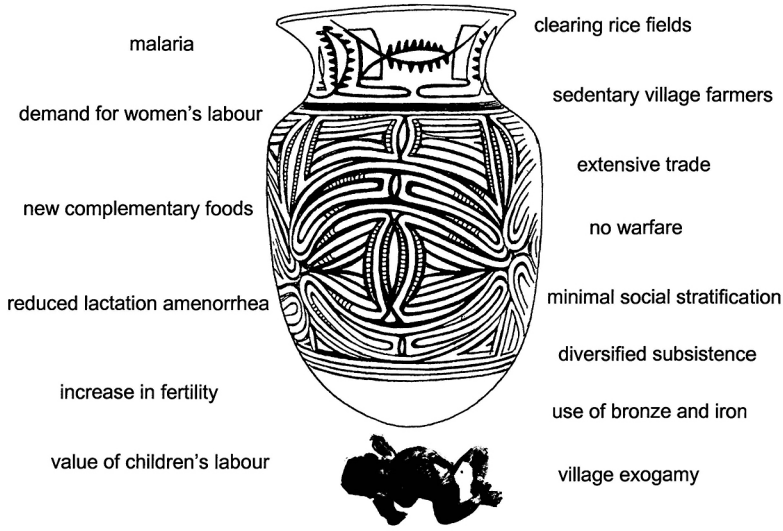

Figure 1 Factors related to the elaboration of infant burials at Ban Chiang.

kind of social structure might fit with a situation where infants and children have considerable structural importance? What might Kris Lehman suggest? He would probably direct me to look at kinship and ecology, and the relation between them. We might ask if the death of infants highlights particular strains and asymmetries in the social system.

The pattern of complex grave goods in infant and child burials could reflect alliances between both maternal and paternal relatives, and a mechanism for producing children of higher rank than their parents. A non-exclusive mode of tracing descent, through all descendents — male and female — from a founding ancestor might provide these conditions. Cognatic descent, for example, might provide means for the exchange of valuables used as grave goods without dispersing wealth. We might expect tension or competition between matrilateral and patrilateral kin. O'Reilly suggests possible evidence for two unequal lineage groups in nearby Ban Lum Khao (2003, 204).

Balinese solve the problem of producing high-ranking children through patrilateral parallel cousin marriage, resulting in the concentration of ancestral power from both maternal and paternal relatives, elevating the status of the child above that of its parents, the child as the sum of maternal and paternal power. Perhaps these rituals for children celebrated the fact that birth conferred adult status on their parents, and the prestige goods reflect the status of their parents, or the prestige that their children might have acquired should they have lived a normal life.[1]

Others have speculated about social organization in the region, including arguments for matrilocality (based on shared isotopes, evidence suggests that men grew up in areas distant from women) and patrilocality (based on the diversity of pottery designs distributed in the northeast area of Thailand in the first millennium BCE) (Bentley et al. 2005). Whatever the kin system, we may suggest flexible systems of marrying in hunting and gathering people and marrying out rice farmers, as a way to spread farming throughout the region over the last millennium BCE.

Effects of Sedentarism

Both ethnographic and archaeological evidence supports the argument that any change in the subsistence economy that allows reduced mobility may be sufficient to increase fertility. Women in hunting and gathering communities can be mobile if they only have to carry one or two children. The longer interval between births is accomplished by lactation amenorrhea as a result of keeping infants breastfeeding into the third or fourth year, with solid foods introduced around six months. This is the exact pattern proposed by the World Health Organization as ideal for maximizing child health and child spacing. Frequent night feeds facilitate this lactation amenorrhea.[2]

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1 I am grateful to Leedom Lefferts who suggested this teknonymic explanation.

2 The relation between lactation, ovulation, infanticide, and women's

The analysis of the skeletal remains at Ban Chiang demonstrates the results of sedentism and intensification of agriculture: "Less mobility may result in an increase in fertility and improved weaning foods, as well as an increase in infant mortality resulting from more infectious diseases in densely inhabited villages" (Pietrusky and Douglas 2002, 160). At Ban Chiang, the age of death declines over time; there is an increase in fertility, although there is a healthy lifestyle for adults, with a low dependency ratio (two workers for every dependent maintained through time). Intensive rice agriculture suggests an increasing consumption of carbohydrates and a decline in the use of other resources such as wild foods. Less hunting may have reduced the dietary quality and complexity of the diet in the region (Pietrusky and Douglas 2002, 164–5).

Rice and Weaning

Let us look more closely at rice in relation to nurturance and infant survival; how might our man of prowess have been fed at six months of age? In addition to providing the major source of calories for adult diets, rice changes the potential for infant feeding substantially. Rice provides one of the most easily digested weaning foods known. It is still the first complementary food given to most of the world's children. Most international nutritionists would probably agree that homemade and locally made rice-based weaning foods are adequate. Non-glutinous rice preparation (in the days before rice cookers) also produces a by-product, rice water, which in the past was used as an inadequate breastmilk substitute. When rice is boiled, a small portion may be removed and mashed with rice water, and fed to an infant. Feeding this rice gruel is a labor-intensive activity, but often assigned to an older sibling, freeing the mother for other work.

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work was explained by Richard Lee (1980) from his fieldwork among the !Kung San. The nomadic !Kung diet is deficient in soft weaning foods such as milk and gruels, which are easily digested by infants and toddlers.

Researchers have argued that the earliest rice grown in Thailand was probably glutinous (Nguyen Xuan Hien 2001). The more glutinous varieties of rice need to be soaked and steamed, and the cooking process does not produce rice water. Nor does feeding toddlers require close supervision. As Lao mothers boast: "the child feeds itself" — with a handful of sticky rice — the original "fun food." This practice has implications for the high infant mortality among lowland Lao People's Democratic Republic (Lao PDF).

Glutinous rice was until recently prechewed for use as a complementary food in northeast Thailand, Burma, and Lao PDR. National and international health authorities, particularly foreigners, discouraged this. They were disgusted at such unhygienic uncivilized practices. However, Pelto et al. (2010) have recently argued that premastication may have many benefits, including the predigestion of starches and lipids before the infant can chew and digest available foods, and the transfer of immunity from mothers to infants.

In the diets of hunting and gathering communities (and transitional communities where hunting and gathering provided supplementary food), premastication of foods would contribute to dietary diversity, particularly during the period of transition between an exclusive breastmilk diet and the household diet. Pelto et al. also suggest premastication may prevent iron and zinc deficiency. The nutrients in tubers, nuts, and meat (particularly when dried and smoked) are made available through premastication. Nuts and meat would be a dangerous choking hazard if not prechewed. Premastication may also promote immune tolerance and modulate allergic responses to new foods such as nuts and eggs (Fewtrell 2010, 21).[3] Unlike mobile groups, settled agricultural communities often have ceramic containers that

3 Could the decline in premastication be linked to the rise in allergic and autoimmune diseases? Lack and Penagos speculate that the development of oral tolerance to dietary antigens might prevent the development of allergies (2010, 25–26).

could be used for boiling milk or rice water that could be substituted for mother's milk.

Premasticated rice is generally not used as a breastmilk substitute, but it may be used to space out infant feedings when the mother is working in the rice fields. While we could not expect evidence of premasticated rice in the archaeological record, there are a few hints. Early dental caries noted in children in Vietnamese sites was similar to signs of problems attributed to premastication in the dental health of contemporary Burmese populations (van Palenstein Hilderman et al. 2006). Rice then offers the possibility of a new pattern of nurturance largely unavailable to more mobile hunting and gathering populations, or to groups dependent on root crops.

Connecting the Dots: Puzzle Pieces

Fertility increases in settled communities like Ban Chiang would be countered by pressures that might increase infant mortality. Infants would face a wider range of parasitic infections related to poor sanitation and the presence of domesticated animals close to houses. Cereal production would increase the availability of complementary foods such as rice-based gruels. These gruels could also be diluted and used as breastmilk substitutes, freeing women to increase their labor time in the rice fields, but at the cost of increasing infant mortality. Complementary foods of a fine consistency such as rice gruel or rice milk can be introduced very early in an infant's life, displacing the more nutritious breastmilk and further shortening the time between births. With the increasing demands on women's time in rice production, the length of time between breastfeeding bouts would increase, an additional factor speeding up the return to fertility. Cross-cultural research suggests that women who were actively engaged in subsistence activities were more likely to introduce foods in the infant's first month of life (Nerlove 1974). The availability of cereal-based gruels may or may not have resulted in a shorter duration of breastfeeding.

Even mixed feeding (breastfeeding combined with the early introduction of rice gruel or prechewed glutinous rice) would shorten the period of lactation amenorrhea. However, if the period of lactation was substantially shortened, and if child spacing decreased, this would contribute to increasing infant mortality in the settled villages in mainland Southeast Asia, keeping population expansion well in check. As in rural Lao PDR today, every mother would have direct or indirect experience of infant and young child death in communities like Ban Chiang in the first millennium BCE.

Pressures against population expansion, including the increase in infections and parasites, the availability and use of dilute weaning foods as replacement for breastmilk, and a resulting shorter spacing between births, are not unique to mainland Southeast Asia. Infant mortality is often higher in village sites than foraging sites, even though the latter were associated with greater population growth (Cassidy 1980, 138). That the same population growth did not occur in Southeast Asia may also be related to malaria.

Malaria

Malaria is caused by a protozoan parasite of the genus *Plasmodium*, which lives in red blood cells. Mosquitoes are the vectors that transmit malaria from one person to another. Each parasite depends on both an insect vector and a mammal host. Of the four species affecting humans, the most severe is *falciparum*, which causes acute symptoms, especially among small children.

According to the World Health Organization, malaria remains one of the principal causes of death in Southeast Asia today. Thailand is one of nine countries accounting for 83 percent of total reported cases of malaria. In 2006, there were more than 257,000 reported cases, and nearly 22,000 cases in neighboring Lao PDF. Nearly all Lao cases were drug-resistant *falciparum* (93.7 percent), while about half were, in Thailand (53.3 percent). Southeast Asia is an area

of unstable malaria (unlike Africa, an area of stable malaria where immunity can be built up).

In Southeast Asia, pregnant women suffering from malaria experience high rates of abortion and fetal death. If malaria occurs late in pregnancy, stillbirth, premature labor, and maternal death are likely. Congenital malaria has also been reported in Southeast Asia (WHO 1990, 58); thalassemia was widespread in the population in Khok Phanom Di but not in Ban Chiang (Tayles 1996). Was malaria a serious threat to infants in village farming communities like Ban Chiang in the first millennium BCE? The introduction of rice agriculture, particularly with iron tools and draft animals (both present in northeast Thai sites in the first millennium BCE.), changed the tropical forest ecology radically to resemble a seasonal marsh or managed swamp (White 1991), to the benefit of mosquitoes who now had access to standing water for breeding.

The significance of malaria for population expansion in mainland Southeast Asia is most easily seen in comparison with areas of Asia where root crops predominate. Complementary foods based on root crops are less nutritious, and rarely used as breastmilk substitutes. Starchy root crops such as sweet potato, yam, and taro are very bulky carbohydrates, and infants would need to consume vast amounts to meet their protein needs. In the past, communities dependent on root crops would only have green coconut water available as a breastmilk substitute, and this would usually kill infants. Unlike the situation in rice-growing areas, there is no available product to be used as a breastmilk substitute, and thus, infant survival depends on the protein from exclusive breastfeeding with the addition of supplementary foods — probably prechewed — around six months of age. In Ban Chiang where yams and rice were both available, we can imagine the appeal of rice as a complementary food for our little big men. Societies dependent on root crops often encourage long periods of post-partum sexual abstinence and long durations

of breastfeeding as a means of preventing infant protein-deficiency diseases resulting from feeding infants starchy root crops (Marshall 1985).

Why might communities dependent on root crops deliberately restrict protein foods until an infant was at least six months of age? These food patterns may be a cultural adaptation to the local environment, specifically to endemic malaria (cf. Lepowsky 1985, 55). They increase the child's dependence on breastmilk for protein and reduce the danger from consuming fatty foods that might result in diarrhea and dehydration. In areas of endemic malaria, mild malnutrition and deficiencies of protein, iron, and vitamins, in the presence of an all-milk diet, have been related to greater resistance to malaria and lowered risk of mortality from the disease (Lepowsky 1987, 83). Children exposed to malaria remain free of this disease as long as they are breastfed because human milk is very low in paraaminobenzoic acid. Exclusively breastfed babies are more resistant to malaria (Berg 1973, 97).

The time and energy spent on elaborating child burials suggest not a single epidemic, but a constant, regular experience of infant and young child death in communities where children were highly valued, but where mothers were still experimenting with new strategies for balancing the tradeoffs between their productive and reproductive lives. In mainland Southeast Asia, in the context of endemic malaria where infants only have passive immunity when they are on an all-milk diet, the availability of either prechewed glutinous rice or easily diluted rice-based gruels, and premasticated meat must have offered a tempting array of ways to feed infants. Ban Chiang and related sites may provide insight into a moment in human history where two trajectories collide; when women have an increasingly important role in rice production and when they are increasingly valued as producers and nurturers of children who also have an important role in rice production. Just as it has often been suggested that it was malaria that stopped Chinese

populations from flowing south into Southeast Asia, so it may well have been malaria that kept Southeast Asian rice-growing communities in the first millennium BCE burying their children as fast as they produced them.

Kris Lehman led his students to explore wildly improbable scenarios if they lead to new and productive lines of thinking about the human condition compatible with empirical evidence. His corridor courses were as valuable as his formal classes. He taught us to think about our research as providing one of a possible set of theories, rather than *the* theory. Here, I have tried to "connect the dots" to provide one of a possible set of theories to explore a puzzle I left undone to thank him for encouraging holistic interdisciplinary model building about the complexities of Southeast Asia's cultural history.

I want to acknowledge my debt to Richard O'Connor whose work on Southeast Asian cultural and agricultural systems has inspired much of my own work. We are currently collaborating on two other projects involving nurture — on eating disorders and infant feeding. I also thank Elizabeth Graham who encouraged me to produce an earlier draft of this paper, and Kathryn Denning who helped bring me up to date with new citations on Ban Chiang and on archeological theory.

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