

Knowledge, Embodiment, Skill and Risk: Anthropological Perspectives on Women's Everyday Technologies in Rural Northern China

Mareile Flitsch

Received: 23 January 2008 / Accepted: 29 August 2008 /
Published online: 15 November 2008
© National Science Council, Taiwan 2008

Abstract Knowledge organisation, embodiment of knowledge and knowledge representation are important issues for an anthropology of technology, which seeks to explore the ways in which people find and shape everyday solutions to social and technical challenges. This article discusses the impact of skill and of risk prevention on women's decision-making, as well as on the domestication and appropriation of new technologies. Particular attention is paid to non-synchronicity as a retarding factor and to the obsolescence of skills as a critical moment in the transformation of socio-technical systems in twentieth century rural northern China as elsewhere.

Keywords Practical knowledge · Embodied knowledge · Skill ·
Everyday technologies · Northeast China

In northern China, until recently, farmers lived in houses made of local materials, of mud, stone and wood. In general, people were deeply involved in the work of construction and maintenance, either personally lending a hand or helped by local craftsmen.

The author is indebted to several colleagues for valuable comments and critical remarks, especially to Francesca Bray, Xiujie Wu, Laurel Bossen, Ingo Nentwig and two very informed anonymous peer reviewers. The latter pushed me to reconsider the concept of de-skilling for a future publication and to rethink fieldwork plans or even a research project on women's everyday practical knowledge in Northeast China.

M. Flitsch (✉)

Ethnographic Museum of the University of Zürich, Pelikanstrasse 40, 8001 Zürich, Switzerland
e-mail: flitsch@vmz.uzh.ch

When it came to constructing fixed features inside the house, men would personally build their *kangs*, the heatable living spaces inside the rooms. They were intimately familiar with materials, room sizes, heating effects and the degrees of heat needed for their particular family and for the individual bodies of their family members. For women, on the other hand, the *kang* was an important space in their everyday work. Practical knowledge about the socio-technical gendered use of this daily living space has been embodied in a whole set of gestures, terminology and ways of acting throughout the seasonal and life cycles of the everyday, of work or in ritual contexts (Flitsch 2008a, 1999b). The amount of fuel available, the number of family members, their health, risk prevention, the amount of certain mineral fertilisers needed for gardening or forthcoming events and initiation rites were among the constituents of practical decisions relating to man and *kang*. It is fully justified to speak about a body–artefact relationship, in this case a body–*kang* relationship. For a skilled farmer and his wife, this body–*kang* relationship was crucial in solving a number of daily routines and challenges, as well as in mitigating everyday risks.

New materials—above all concrete and steel—as well as professional modern house construction and housing equipment that can be purchased for cash have in recent decades made many of the housing skills of farmers in developing areas obsolete. The changes that made life easier were often sudden: Central heating, electricity, modern textiles, new medical knowledge or concepts of hygiene make daily life comfortable. It means no more dust from beaten floors, no more damage caused by rain, no more contamination with carbon monoxide and a reduced danger of fires. In the case of the *kang*, electricity, electric blankets and other modern heating devices have opened the way to its dismantling and to an entirely new design of rooms. Modern industrial designers and producers for the large Chinese market in turn are now interested in body–artefact relationships. They depend on seizing the transition in consumption patterns “from sensational feelings to routine use” (Pantzar 1997: 52) to improve their marketing of consumer goods.

Thus, the recent story of housing in rural China looks like a tale of progress and modernisation. Any trace of the former *kang* tends to look old fashioned. If the story is told from the perspective of bodily comfort, embodiment of knowledge and everyday skills, however, different tales emerge.

1 Skills Beyond Time: An Anthropological Perspective on Women’s Everyday Technologies

After having worked in the field of Chinese anthropology for several years now, I affiliate myself to the anthropology of technology and more precisely to an everyday technology approach, which I have been able to develop in the VW foundation funded research project “History and anthropology of Chinese everyday technologies” between 2002 and 2005. Starting from the artefacts or technologies in their own histories and cultural contexts, we focussed on the socio-technical ways in

which people satisfy general human needs for shelter, clothing, food, transport or communication.¹

Whilst modern technologies have been intensively studied by STS scholars and feminist scholars of technology (Cockburn and Omrod 1993; Pantzar 1997; Bray 2007, see also Orland 1998; Oudshoorn and Pinch 2003; Mackenzie and Wajcman 1999), everyday technologies have not yet received the attention they deserve considering their impact on future developments. Many of the persistent everyday technologies have been assigned to “traditional material culture” and “pre-industrial household technologies” (Cowan 1983, see also Bourdieu 1970). This has had two consequences. First, it has veiled the fact that dichotomies like pre-industrial vs. industrial or modern artificially create homogeneous spaces and times, which may not correspond to any of the truly existing socio-technical everyday systems of the world, for example those of modern China. Secondly, focussing on “materialities that are essentially black-boxed by the designers/producers of the technical artefacts”² entails focussing on consumers and underestimating the fact that before the recent emergence of “consumer societies”, the skilled user was the producer of his or her own everyday environment. Skilled users then permeated their environment in a completely different way from today’s consumers.

An approach that looks at everyday technological transformation processes in a globalised world as processes of domestication is nowadays widely accepted. The appropriation of the bicycle, the internet, the microwave, the automobile or the truck have been described as having passed through phases of appropriation, objectification and incorporation before their conversion into normal elements of everyday life (Lie and Sørensen 1996; Cockburn and Omrod 1993; Hahn 2004; Beck 2001, 2004, 2007; Moghaddass Esfehiani 2003). Yet, here again, we look at things modern, underestimating the skills that were there before. Maybe, studies of indigenous or local knowledge (e.g. Doxater 2004), driven by the hope that local processes of modernisation would work out more smoothly if they incorporated local agricultural and ecological expertise, are an exception to this.

The above-mentioned dichotomy of former and later, past and present technologies falls short in several ways. We can for example easily observe how and when an artefact, a technique and a daily practice become obsolete; the related skills often have an afterlife. This is due to the fact that the human body is

¹ I recently edited the special issue entitled “Technik im chinesischesn Alltag” (Technology in Everyday China, in German language) of the journal *Technikgeschichte* (History of Technology, Berlin) Vol. 2008.2. It includes an introduction entitled “Positioning a Chinese Anthropology of Technology” (Flitsch 2008b) as well as “One-wheeled Locomotion: Passenger Transport by Wheelbarrows in Pre-industrial China” by Nanny Kim, “Bound Hand and Foot: Women’s Work and Footbinding in Early 20th Century China” by Laurel Bossen, “The Dilemma of Electricity: Political and Technical Enlightenment during the Rural Electrification of North China” by Wu Xiujie, “Dress Uniformity, Revolutionary Asceticism, and Economic Necessity: Positioning Social Groups through Dress during the ‘Great Proletarian Cultural Revolution’” by Iris Hopf and “The Technical Transformation of Everyday Life in a Tibetan Fishing Community: The End of the Yak Hide Coracles” by Diana Altner. The introduction was published recently in Chinese in a conference volume of the Institute for the History of Natural Sciences at the Chinese Academy of Sciences. See also Hahn 2005; Ingold 1997; Leroi-Gourhan 1964, 1965; Pfaffenberger 1992; Schiffer 2001; for China Hommel 1969.

² Bray (1997) in her comment to this paper.

configured in its everyday environment and that skills have to be embodied to be of use. Both the moment of change and the persistence of non-synchronous skills are indeed crucial to understanding the transformation of everyday life.

Unlike in western countries, people in many areas in the world today do not experience the technical transformation of their everyday life as long, slow processes. On the contrary, the rapidity with which globalisation takes command often leads to accelerated processes of transformation. Under such conditions, even though the transformation of everyday life is unforeseeable, non-synchronicity unfolds its effects. Lévi-Strauss' idea of *bricolage* should today indeed be reconsidered (Lévi-Strauss 1962). If David Edgerton's "The shock of the Old" (2006) is to be taken seriously, then the anthropology of technology constitutes an important research field for what he describes as "technology in use", which we have to understand before being able to write the global history of technology that Edgerton suggests.

For an anthropologist, practical knowledge is of particular interest. How do people act, how do they reflect on, how do they transmit and what they do in and know about their everyday life? How far is it possible to gain access to this knowledge? Practical knowledge, we learn, is stored in the artefact or technique itself as well as in the human body that uses it. The relation between them, the body–artefact relation, is especially meaningful.

In fact, we know very well that the culturally socialised human body can be understood as a kind of repository of everyday knowledge. People know, perform and act through their bodies, which are in many ways to be understood as tools. If we reconsider Marcel Mauss's concept of culturally specific body techniques (Mauss 1935, also Warnier 1999; Ingold 2001) in view of the cultural anatomy that it also implies, it seems evident that we have to embed any everyday technology into the body history of its users and time.

Tim Ingold has gone beyond Mauss's concept of body techniques to explore skills, "the capabilities of action and perception of the whole organic being (indissolubly mind and body) situated in a richly structured environment... Skills are... incorporated into the *modus operandi* of the developing human organism through training and experience in the performance of a particular task" (Ingold 2000: 5). Focussing on skill, I argue, allows us to approach questions of everyday decision-making that have an effect on the transformation of daily life (see also Eyferth 2009).

Until the above-mentioned moment of change in skill in northern China, when long-lasting everyday technologies like the *kang* became obsolete, women in rural *kang*-using areas handled their artefact world, their material culture and life necessities according to contemporary embodied practical knowledge and skill. This accumulated knowledge was contextualised in the socio-technological framework of their time. Practical knowledge was embodied through socialisation and practice and thus "regrown" (Ingold 2000: 5) in each generation. Embodiment of knowledge was part of the skilling of women. Rural women constantly refined their skills, trained their hands, in competition or in exchange with other women. One of the ways in which women's practical knowledge was manifested was in their use of everyday artefacts and tools. The hand that grasped and used an artefact performed embodied knowledge or demonstrated its disappearance or lack.

Thus, the way a woman handled, organised, ordered and represented the artefact world of her daily life told of her skill (see also Fong 2004; McLaren 2004; Lu 2003,

2004). When women reflected on, memorised, encoded and transmitted everyday technical knowledge, they were talking about skill. They en-skilled their children, their daughters, in many different ways and through varying media: through using and shaping artefacts, through body technique and gesture, terminology, oral tradition or popular art (Flitsch 1999a). Such media as terminology, folksongs, proverbs, mnemonic rhymes, tales, riddles, sayings, jokes or popular art are often underestimated in their value for understanding local everyday knowledge. Some of them are memory-aids. Others link embodied technical skill to social matters. Others again seem to play on the body–artefact relations and to echo its variability.³ In all, “each generation contributes to the next by... introducing novices into contexts which afford selected opportunities for perception and action, and by providing the scaffolding that enables them to make use of these affordances” (Ingold 2001: 22).

Understanding women as masters of their everyday life implies that their own individual concerns are clues for understanding them. In fact, *worry* has always been and still is an important issue in their daily life. Every day, they are confronted in many ways with issues of security and risk. They worry about their family members and they worry about cattle and fowl, about fodder and fuels, about economic matters, about food and meals, about food preservation and cooking times. Domestic responsibilities force women to care for the health and bodily well-being of their children, of their husband and of old people.

Seen in this light, the prevention of risk was an important element in rural Chinese women’s decision-making as well as in changes in knowledge organisation and knowledge representation. Both are up for discussion when the processes of domesticating new technologies loom on the horizon. I argue throughout this paper that the body–artefact relation plays a major role in decelerating and intensifying this process.

In modern China, the economic reforms initiated since the early 1980s brought about a major shift in everyday life, at first for urban citizens and then, with a certain delay, for rural areas. A consumer revolution took place, which led to a rapid and complete transformation of society, and which in many ways entirely changed body–artefact relations. Visibly, this meant easier access to new materials, to innovative commodities and to resources in general; a multiplication of technical solutions to everyday tasks; and availability of consumer goods through an ever-improving market infrastructure. In the case of the *kang*, water-resistant layers protected the surface more efficiently. Covers or mats heated with electricity changed heating strategies. Modern beds and other furniture became available and fashionable.

At the same time, though less visible, the consumer revolution implied the “withdrawal of the producer”,⁴ a successive deconstruction of everyday skills through the consumption of the ready made. Scholars like Cowan (1983) used the term “alienation” to depict the process in which people, in the transition from pre-industrial production to consumption of technologies, in many ways lost control over their everyday technologies.

³ My own research on the *kang* has mainly taken into account the representation of practical knowledge in oral literature.

⁴ “I conclude that the transition, in the history of human technicity, from the hand-tool to the machine, is not from the simple to the complex, but is rather tantamount to the withdrawal of the producer, in person, from the center to the periphery of the productive process. It is a history, in other words, not of complexification but of externalisation.” (Ingold 2000: 298).

As part and parcel of a personality, skills are part of the body and do not just disappear when no longer needed.⁵ They continue, non-synchronously, to influence the person who possesses them. In the moment when a skill becomes obsolete, women may adopt a habitual risk-prevention strategy that is of no use; they may even adopt one that in the new context has fatal consequences.

Since the second half of the twentieth century, European anthropologists like Hermann Bausinger and Wolfgang Kaschuba have taken up Ernst Bloch's theory of the "co-existence of the non-synchronous" ("Gleichzeitigkeit des Ungleichzeitigen") in daily life.⁶ For Bloch—in his critique of German fascism—people in a society live in different times, in different realities, non-synchronous, non-coeval. The co-existence of non-synchronous realities means that certain traces of a past, former layers of pasts, former elements of knowledge, remain uncompensated ("unerledigt"); like scores that are unsettled, they carry the risk or the potential to strike a blow at society or even to take revenge.⁷ For Ernst Bloch, non-synchronicity was especially visible in rural society.

Bloch's theory has been taken up anthropologists. Apart from Fabian (1983, 2002, 2007) who used Bloch to reproach anthropology for its attitude of "denied coevalness", Hermann Bausinger (1989) at the end of the 1970s relied on Ernst Bloch to formulate a new historical perspective for European anthropology. Kaschuba and Lips (1982: 9), for their part, argue that living in the non-synchronous, the capacity of merging antagonisms in daily life has been an important survival strategy for rural society. Can the non-synchronous, then, also be understood as a means of knowledge preservation? It seems that embodying knowledge cultivates non-synchronicity and entails a deceleration of socio-technical change in daily life, while the sudden obsolescence of skills may lead to inconsistent or even arbitrary change.

This article is meant to show the interest of looking at embodied knowledge, skills and body–artefact relations, offering the example of devices and techniques for thermo-regulating the body through heating and cooking in rural everyday northern China.

2 The Case Study: From Providing Heat for the Body to Heating the Room

For its well-being and functioning, the human body is dependent on a clearly defined range of body temperatures. The thermo-regulation of the body through clothing, food and movement, as well as through the protective architecture people live in, is a

⁵ After having read Braverman (1974) and Glenn Stone's account on de-skilling in rural northern India (2007), I have been enthusiastic to apply the concept of de-skilling to the processes of transformation of everyday technologies in rural China. One of the anonymous referees has persuaded me though that my use of the notion of de-skilling in this context is still inconsistent. I thus plan to explore this issue in a separate publication.

⁶ During a Max Planck workshop on Chinese anthropology at the Max Planck Institute for Social Anthropology in Halle, Germany, in 2006, Wu Xiujie proposed to take up the concept of "Ungleichzeitigkeit", the "non-synchronous" for a fresh look at the rapidly changing modern Chinese everyday. See also Dietsch 1988.

⁷ Bloch held this phenomenon responsible for inconsistencies and for relapses into archaism or regression, even in modern societies. See Bloch 1962: 104: "Nicht alle sind im selben Jetzt da. Sie sind es nur äußerlich, dadurch, dass sie heute zu sehen sind. Damit aber leben sie noch nicht mit den anderen zugleich. Sie tragen vielmehr Früheres mit, das mischt sich ein. Je nachdem, wo einer leiblich, vor allem klassenhaft steht, hat er seine Zeiten. Ältere Zeiten als die heutigen wirken in älteren Schichten nach."

crucial concern in everyday life. In rural northern Chinese winters, the main concern in everyday life is heating.

Dikötter recently summarised the history of everyday heating in China:

Shelter and clothing were intimately connected: the cotton clothes which spread after the fourteenth century ideally complemented permeable buildings, as more layers of garments could be put on as temperatures became colder [...]. Lack of heating in poorly insulated houses encouraged the isolation of the body by one layer of cotton after the other, an observation which is true of the luxury skyscrapers in Hong Kong today as it was for mud huts in Beijing in the fifteenth century. [...] (Dikötter 2007: 157)

According to the locality, thermo-regulation strategies may vary. Thus, Berliner, for example, describes the case of Huizhou where white lime, which covers the exterior of the houses, prevents the sun's heat from entering the interior directly and masonry walls helping mitigate heat in summer. In winter, poor heating devices force people to protect themselves against the cold with multiple layers of clothing, with mobile charcoal braziers or cone-shaped buckets, with a charcoal basin underneath used for small children (Berliner 2003: 144)

Today, we find historical heating devices, lime braziers and buckets or models of *kangs* in museum collections. We know that the thermo-regulation of the body was an important concern of women in rural China. But what do we know about women's concepts of thermo-regulating the body, about their risk-prevention strategies, about related body concepts and popular medical ideas or even therapies in case of illnesses related to catching cold or overheating?

In north and northeastern China, rural houses even today are still equipped with the heated brick platform *kang*. In my post-doctoral thesis, entitled "The *Kang*. A study of the everyday material culture of rural farmsteads in Manchuria", I investigate this basic technology and space in peasants heating and cooking strategies in detail (Flitsch 2004).

2.1 The *Kang* 火炕

The use and maintenance of the *kang* depend—for safety as well as comfort—on the users' intimate familiarity with its technical functioning (Fig. 1). The related knowledge then is a practioner's knowledge. And is the transmission of this technical knowledge a crucial requirement for continuing to use the *kang*?

Technologically speaking, the *kang* resembles the Roman hypocaust.

The quest for better controlled, longer burning, safer and less smokey space heating, led some cultures to the development of an enclosed combustion chamber. Surrounding a firebox with a mass of usually clay-based material, prolonged and extended the heating effects by using a larger surface area and the thermal storage potential of the mass construction. The introduction of a jacket of air between the firebox and the surrounding structure further extended the capacity of an oven to provide heating—by conducted warm air—to rooms other than the one in which it was situated. This sort of system was elaborately developed in ancient China in the *kang* to provide both localised and

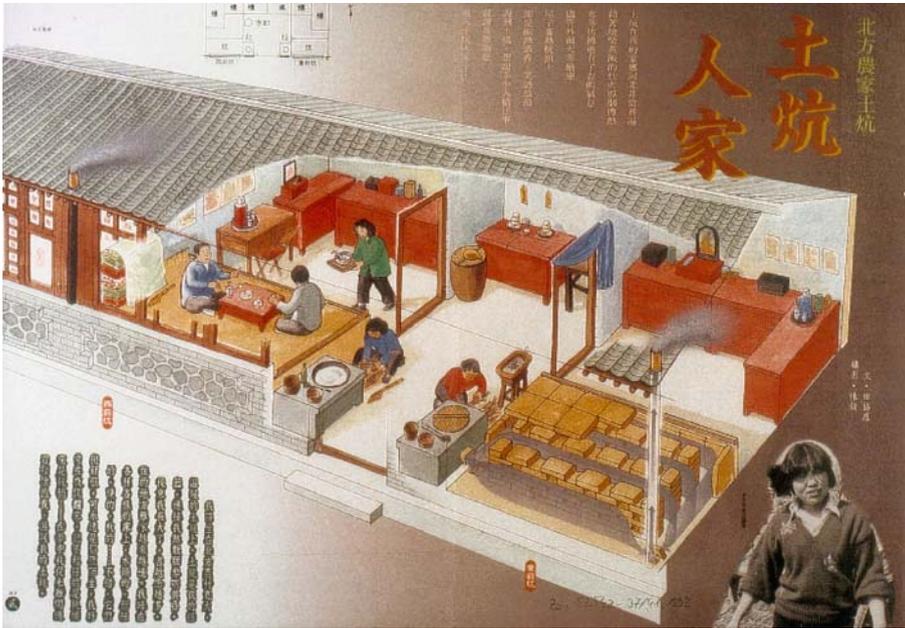


Fig. 1 The structure of a *kang* in Hebei province, Northern China. From Tian Fuyan (1992a, b, pp. 1–2)

background warmth. (Hayward 1997: 428, detailed description in Starikov 1967, 2008; Gramont 1771)

If we look at the *kang* from the perspective of its position in a house, it is in fact part of a technical axis consisting of three sections: the cooking stove, the *kang* platform and the chimney.⁸ This is an axis of differing levels of heating which are, in turn, an integral part of women's everyday knowledge. The way in which the hot air from the stove is conducted through the *kang* platform makes it a dichotomous space with the warmer end closer to the stove side. The thermal dichotomy of the *kang* translates into its manifold social, technical and even ritual uses in everyday life.

A *kang* consists of several elements. Its adobe brick elements are ephemeral, since they are torn down and reconstructed at regular intervals in order to obtain adobe fertiliser and to avoid the breaking of adobe and the danger of asphyxiation. The following elements are made of adobe: a square surrounding adobe brick wall *kangqiang* 炕墙, leaning against one or several surrounding room walls, if possible including a wall with a window; flues *kangdao* 炕道 made of adobe brick piles and broken walls within the square space formed by the *kang* walls to allow the circulation of smoke and heat; a front wall *kangqiang* with the permanent element, the *kang* beam *kangyan* 炕沿 which fixes the *kang* edge, a beam made from precious wood that is kept and cherished for generations; the *kang* floor *kangmian* 炕面 of several layers of dried

⁸ It has to be mentioned that *kangs* in China vary in form and also technique. Thus, in the context of research on Salar housing in Qinghai in which I am engaged in at the German Archaeological Institute, we documented *kangs* which are heated from outside the house and stand in no relation to the stove. Our publication on Salar housing is forthcoming in Wagner e.a. 2007.

loam guaranteeing stability as well as impermeability to poisonous gases; mats or other coverings, changing in quality and quantity in response to climatic conditions and family cycle, or reflecting financial resources; a wooden *kang* table *kangzhuo*; chests and trunks (*kanggui*, *kangxiang*) for storing bedding; the bedding *beiru*, consisting of a cotton-padded mat *ruzi* and the padded bed cover *beizi*, unfolded into the particular “bed-nest” *beiwo* for sleeping, and folded and piled away in daytime; a small basket for tobacco and the *kang* broom, a small hand-broom to clear away dust; also perhaps a feather-duster; and finally, the hand-warmer *huopen*.

2.2 Hearth and Kang: An Example of Context-Specific Practical Knowledge and Skill

The *kang* is a modular, extendable structure easily adapted to everyday demands. The basic module of the enclosed combustion chamber can be technically upgraded to all needs, exploiting the appropriate capacities of combustion. The *kang* is an extension of the combustion chamber, which additionally exploits the heating capacities of smoke. The *kang* at its minimum is the size of a heated seat and at a maximum encompasses a room with several bays *jian*; in northeastern Manchu houses, it even takes the form of a large II-shaped structure. We find it in dwellings, as well as in the temporary huts that people construct in the fields during summer time. The *kang* is also used for other activities like, for example, kiln drying. Extensions of the *kang* are the heated wall *huoqiang* or forms of floor or underfloor heating. Any extension is linked to the combustion chamber, the stove.

Accounts of the *kang* often stress the fact that we have to consider linked heating structures. “Within the rooms [of earthen houses] usually they build *kang* flues which are linked to the hearth for preparing food. Heat is produced by smoky fire, some also construct beds, which are generally put into guest rooms”.⁹ “In the market towns and villages of the north, the *kang* and matters of cooking were linked. Very often, the same fire served for cooking and heating purposes, which led to an intensive use and circulation of energy and surplus heat.”¹⁰

Gender participation in the building process was shaped by male dominance in construction work and female dominance in maintenance and household matters.¹¹ The construction and technical planning of the stove and the *kang*—just like house construction—in rural areas in northern China was predominantly male practical work. General functional rules like the following were widely known: *Qi hang guotai ba hang kang, jiu hang meihuo shao de wang* 七行鍋台八行炕, 九行煤火燒得旺 (Seven levels/rows [of bricks] for the hearth, eight for the *Kang*, with nine the coal burns brightly). Other functional rules of this kind were: *Guotai gao guo kang, mao yan wang hui qiang* 鍋台高過炕, 冒煙往回噲 (If the hearth is built higher than the *kang*, the smoke will come back); *Yancong yao gao guo fang, yao ai ai bu guo qiang* 煙囪要高高過房, 要矮矮不過牆 (If the chimney should be high, it must be higher than the house; if it should be small, it must not reach beyond the wall); *Yan zou bubu gao, zaokeng cai haoshao* 煙

⁹ SD *Zhanhua xianzhi* 沾化县志 1935, in: Ding and Zhao *Huadong I*, 1995: 171.

¹⁰ Lin Yongkuang and Yuan Lize 2001: 121, referring to Xu Ke 1986 *Qingbai leichao*.

¹¹ See Prussin 1997: 82.

走步步高，灶坑才好燒 (Only if the smoke rises step by step, will the fire burn well in the hearth). Such functional rules show basic concepts and reveal a general understanding of fuel heating qualities and heat transfer and of thermal radiation and conduction. People in rural areas are very clear about the exact measurements of houses, of the height of chimneys and of the depth of flues.

The role of women in using hearth and *kang* involved the gathering of firewood and fuel, the tending of the fire, the use of the hearth's and *kang*'s space and heat in domestic work, maintaining hearth and *kang*, and keeping the material culture related to it in order. Women were in many ways bound to hearth and *kang*. It was their space of display for everyday technical competence and knowledge, of the production of meals for different social purposes, of religious involvement through the hearth god and seasonal rituals, of social order through positioning artefacts and objects in correct places. For all these matters, some basic technical knowledge was indispensable.

The basic context-specific technical knowledge that is necessary to use an enclosed combustion chamber properly concerns different combustion materials and the techniques of dealing with them. Thus, knowledge is required of fire and combustion, fuel, oxygen transfer and controlling combustion processes; of ignition temperatures specific to the materials; of the development of heat, in calculating heat and time, cooking conditions and cooking times; of measurements of volume, in channelling and using smoke and gases; of dealing with side-products or waste (ashes, particulate matter); and of controlling danger and poison (fire fighting and carbon monoxide). How did this basic contextual knowledge inform the texts that we rely on for our research?

Tantan tou, sifang yao, yi jue yi ba, yi zhang gao 壇壇頭，四方腰，一擻一巴，一丈高 (My head is round, my body is square, if I raise my tail, it reaches one *zhang* high) says a riddle about the stove, depicting all its details. Similarly, finger games may depict whole technical structures.

Thus, a popular finger game (Fig. 2) displays the structure of the cooking and heating devices in rural houses very clearly.¹² It shows a hearth–*kang*–chimney axis (Flitsch 2004: 1). This axis is of major importance for the understanding of women's everyday technological knowledge and orientation. The inhabitants of the house need regular food and also heating to survive. The hearth–*kang*–chimney axis needs regular firing in order to be maintained. If anyone heats the hearth, the *kang* is heated too and the chimney is needed for draft and for conducting the smoke. So, in a way, the *kang* was a model for continuity and stability.

Western travellers were amazed by the firing techniques:

... The convenience and economy of the k'ang are marvelous.... it is wonderful how little fuel is required to heat it. A boy lights a wisp of straw and stuffs it in a hole at the foot of the k'ang—so small a wisp very often that he has scarcely time to leave the room before it is burnt out—and it seems impossible so insignificant a fire can affect the great mass of brickwork. But in about half an

¹² I am indebted to my colleague Zhang Xu from Jilin Folklore Society for leading my attention to this game.

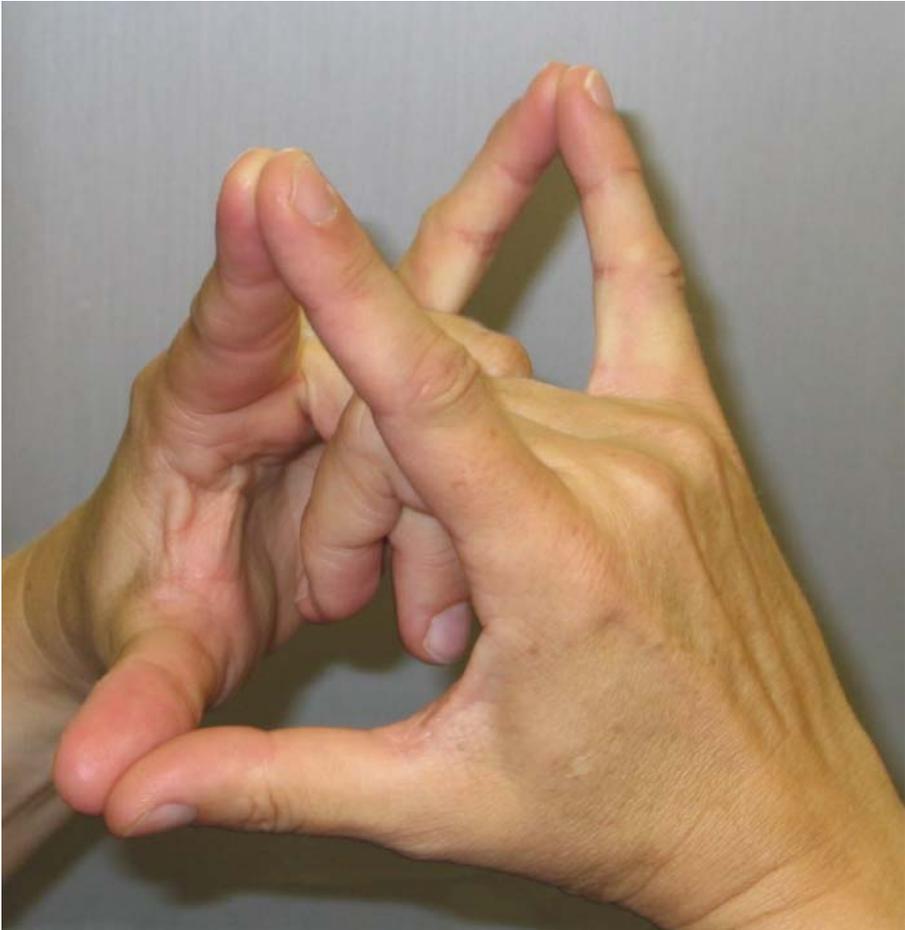


Fig. 2 Finger game from Northeast China: The thumbs and the forefingers form the “hearth”, the middle and ring fingers form the mat and *kang* surface (seen from above) and the flues (seen from below) and the little fingers form the chimney. The game may go as follows: An adult asks the child: “What is cooking in the kettle?” “Fish!” “Do you want to smell it?” The child approaches the hands and when it is about to smell the “fish”, the adult snaps its nose. Thus, a simple finger game may instruct a child about the structure of the house, the *kang*-axis in particular, as well as about the dangers of fire and heat. Photo by Philipp Mahltig

hour a gentle glow pervades the top of the k’ang, and all the night long it remains delightfully warm. (James 1888, pp. 136–137)

But, as this traveller puts it, there were also dilemmas with these firing techniques:

If in ignorance we ever ordered more fuel for the k’ang, we only made it insufferably hot. Occasionally in inns we found k’angs so scorching by reason of several series of dinners having been cooked, or because our beds were too near to the boiler, that we were compelled to sleep on the floor or on tables, or else to lay a quantity of straw under our bedding to mitigate the heat. (James 1888: 136–137)

Such dilemmas are also reflected in folksongs:

拉大车, 搂豆叶 这头烧, 那头热, 炮的子孙叫爷爷。	<i>La dache, lou douye, Zhetou shao, neitou re, Pao de zisun jiao yeye.</i>	Draw the big cart, heap bean leaves, If you heat on this side, it will be hot on that side, So scorching that the grandchildren will cry for their paternal grandfather.
-----------------------------------	---	---

Heat development in an enclosed combustion chamber and *kang* is predictable and controllable through fuels (quality and quantity), the addition of oxygen and calculation of time. Firing the hearth leads to a considerable heating of the side of the *kang* near the hearth, while temperatures gradually decrease at the other end of the *kang*. This dichotomy plays an important role in the use of the *kang*, as expressed in the many joke songs on the topic of who is allowed to sit on which end of the *kang*. There are many songs like *Lao liang kou zheng rekang* 老俩口争热炕 (The old couple quarrels over the heated kang). The following song tells of conservative old people:

老頭老頭坐炕頭,	<i>Laotou laotou zuo kangtou,</i>	Old man, old man sits on the <i>kang</i> -head,
拾屁股倆小猴。	<i>yi tai pigu liang xiao hou.</i>	As soon as he lifts his ass there are two small monkeys,
老婆老婆左炕梢,	<i>Laopo laopo zuo kangshao,</i>	Old lady, old lady, sits at the <i>kang</i> -end,
拾屁股倆小貓。	<i>yi tai pigu liang xiao mao.</i>	As soon as she lifts her ass there are two cats. ¹³

The thermal dichotomy of the *kang* may be used for technical as well as for social solutions. Thus, for example, spaces heated with different intensities are used for controlling yeast activity for dough production, for drying or preparing food, for egg-laying and incubation or for raising chickens, for keeping silk worms, for therapeutic aims or as a suitable place for a sick person, for honouring a guest with the best sitting place as well as for organising the everyday artefact–universe on and around the *kang*.

We have very little information on the conceptual categories for degrees of heat that Chinese women use to organise their work and to calculate processes of cooking. To my knowledge, this has never been researched, if indeed they did think of them as categories.¹⁴ From examples like the following on incubation, however,

¹³ Informants told me that the monkeys stand for the hot side of the *kang*, while the cat symbolises its temperate part. They could not tell me the reason, though.

¹⁴ I am very grateful to one of the anonymous referees of this paper who expressed the expectation to find in this paper detailed information on fire and heat terminologies, on the colour of fires, on distinctions made between the qualities of fire perceptions and bodily experiences of *kang* fire and living conditions; on how people integrate different senses—visual (colours), textile (degrees of heat), hearing (sounds of fire) or olfactory (smell of smoke)—in making judgments of fire conditions and deciding which body technique to apply. “This information can help readers get a sense of how *kang* is appropriated and how conditions related to *kang* are experienced and objectified, thereby making them teachable to subsequent generations.” When I did field research in Northeast China in the 1980s and 1990s, I was not yet sensitive enough to the significance of women’s practical everyday knowledge but rather focussed on relocating technical knowledge transmitted through oral literature in everyday life. Later, when doing field research, I became aware of the technical difficulties of investigating Chinese women’s practical knowledge. Since women do not necessarily formulate their knowledge, access to it is difficult, and fieldwork would require a sophisticated interdisciplinary methodological preparation.

we know that women—as well as men—were very sensitive to temperature differences:

Throughout the incubation period the most careful watch and control is kept over the temperature. No thermometer is used but the operator raises the lid or quilt, removes an egg, pressing the large end into the eye socket. In this way a large contact is made where the skin is sensitive, nearly constant in temperature, but little below blood heat and the air is excluded for the time. Long practice permits them thus to judge small differences of temperature expeditiously and with great accuracy; and they maintain different temperatures during different stages of incubation.¹⁵

The few other examples we have also reveal a very sensitive awareness of exact heat. Thus, for example, in Heilongjiang, the term *huilong* 回笼 refers to a very short additional steaming of buns after they are already cooked. People use the term *huilongjiaor* 回笼觉儿 “extra-steaming-sleep” to describe the phenomenon of a short extra nap (on the *kang*) into which one may fall after one has already woken (Flitsch 2004: 223). Functional rules like *Kang lao pi, shui bu zhu, pi lao kang, shui dao liang* 炕烙皮, 睡不住, 皮烙炕, 睡到凉 (If the *kang* heats the skin one cannot sleep. If the skin heats the *kang* one can sleep until dawn) are indicative of the same kind of knowledge.

A functional knowledge of heat transfer and thermal conduction played an important role in women’s daily lives. The essence of this practical knowledge was firing techniques. There is very little substantial information about women’s techniques of firing the hearth, which is, after all, a lifelong central space of domestic work. Instead, descriptions of the hearth are concerned with fixed features of structure, design and perhaps sacred elements. If one looks for information on firing techniques, the importance of *huohou* 火候, of controlling the heat for correct cooking in Chinese cuisine, is mostly discussed in the context of professional cooking. Few scholars have yet done research on rural women’s calculations of fuel and heat. What we may find is indirect information.

First of all, we are informed about local firing materials. The gazetteer from Shandong Zhanhua county informs us, for example, that: “Wheat straw 禾秸 and wild grass were used for fuel; few used coal.”¹⁶ The burning qualities of such fuels are calculable and informative concerning local firing conditions.

The competences of married women in household matters are a current item in folk literature: *Jin le yuanzi you san xiang, yi xiang guotai er xiang kang, zai xiang daren haizi chuande zenme yang* 进了院子有三相, 一相锅台二相炕, 再相大人孩子穿得怎么样 (If you enter the farmstead, pay attention to three things: first to the hearth, second to the *kang*, third to the clothing of adults and children). Among the competences judged is the knowledge of how to heat a stove properly and how to cook in order to obtain correct results. These are sanctioned in folk literature. In positive examples, the bride introduces

¹⁵ King 1911/1990: 179; see Wagner 1926/1980: 627.

¹⁶ Shandong *Zhanhua xianzhi* 沾化县志 1935, in: Ding and Zhao Huadong I, 1995: 170.

herself into her new family through the display of her mastery of certain cooking techniques, which also relate to mastery of degrees of heat:

小大姐，起五更， 豆和米，煮几升， 水也滚，豆也烂 叫爹娘，来吃饭	<i>Xiao dajie, qi wugeng, Dou he mi, zu ji sheng, Shui ye gun, dou ye lan, Jiao die niang lai chifan.</i>	Little elder sister, getting up at the fifth watch of beans and grains, she will cook several liters, the water is cooling, the beans are cooked, she calls father and mother to come and eat.
--	---	--

The folksong *Laogua wo, shao gunguo* 老鸹窝，烧滚锅 (Crows nest, a stove heated boiling hot) recounts a negative example, scoffing at a woman incapable of properly fulfilling her domestic duties:

老头儿老头儿不用疯， 回来给你摊煎饼。	<i>Laotour laotour buyong feng, Huilai gei ni tan jianbing.</i>	My old man, my old man don't get mad, When you come back, I will make you pancakes.
煎饼摊的黑了， 气的老头走了。	<i>Jianbing tan de oule, Qide laotour zoule.</i>	She fried the pancakes black, The old man got so angry that he left.

Even though there is little direct evidence of women's techniques of firing and heating, some information may be deduced from the numerous descriptions of local foods and food preparation. Thus, for poorer areas like Zhangbei 张北 county in northern Hebei around 1934, everyday food consisted of *youmian* 莜面,¹⁷ cooked oat flour in the morning and steamed rolls made of oats (*youmian juanzi*) at noon: "The preparation of this meal was more time-consuming but since the women prepare it in advance it does normally not delay work." For supper, people ate millet gruel or fried leftovers from breakfast or dinner. People had pickles with their main dishes; there is no mention of extra food fried or cooked together with the staple food.¹⁸ In Yangyuan 阳原 county in the same area in 1935, poorer people ate cooked millet flour *guzi mianhuhu*, potatoes and millet gruel for breakfast. They had steamed *gaoliang* (sorghum) flour or wheat-flour cakes at noon and cooked millet or millet gruel for supper. In addition to the grains, simple vegetables and seasoning (salt, sesame oil, onions) were served.¹⁹

The information we may deduce from this kind of description concerns local conditions of energy consumption and time calculation. As the Belgian Scheut missionary Segers (1932, 62) described in northwestern Liaoning, two large bundles of *gaoliang* stalks and two small bundles of firewood were sufficient to cook millet and to properly warm up the *kang* at the same time. Today, we can still see women coming home at noon from the fields, carrying bundles of corn cobs, some wood, some straw and two or three *gaoliang* roots for the kitchen. They know by experience that this fuel will suffice for their particular purpose of heating and cooking. But how do they calculate the quantities?

We also have only rare information about technical solutions. How is smoke conceived and used or prevented? How did women solve technical problems like those of the difficulties of dense smoke or returning smoke due to blocked flues? Women showed me their personal techniques of igniting small explosions by

¹⁷ *Youmian*: *Avena nuda*. A description of the preparation of *youmian* is available under <http://www.chinesefolklore.com/9/yinsi.files/0000620.htm>.

¹⁸ Ding and Zhao *Huabei* 1989a, b: 158.

¹⁹ Ding and Zhao *Huadong I* 1995: 180.

throwing cold water into the fire to unblock the passages and make the flues free to heat the *kang*.²⁰

Aside from such technical problems, life in rural areas in China was repeatedly threatened by food and fuel shortages, if not by famines.²¹ What is interesting is that techniques under conditions of normal subsistence production allowed a kind of optimal solution. Everyday technologies are adaptable and bear the knowledge of what to do under conditions of shortage or in times of bad harvest or even in times of social decline. Inherent in the strategies of energy and food consumption just discussed is the topic of how to save resources in times of shortage. Any technical response to such circumstances directly affected the use of the hearth and with it the *kang*. The first measure mentioned was a reduced choice in kinds of food and in sophistication of preparations, together with a reduction in the number of meals to save energy. Thus, it reads in the *Qingbai leichao*:

Lanzhou is the capital of Gansu province. Its inhabitants eat two meals a day, one with rice, one with wheat. Rice is produced in Ganzhou; it is naturally not to be eaten by the poor. Poor people cook noodles by putting them into boiling water. When eating they add salt and pungent flavours. (*Qingbai leichao juan* 13, from: Lin Yongkuang and Yuan Lize 2001: 28)

This brings us to yet another crucial issue in *kang* studies: body techniques. The *kang* must be understood first of all as a means to heat bodies and only secondly as a means to provide background heating.²² Furthermore, as has been described many times by scholars like Craig Clunas, the ancient Chinese body technique of squatting and floor dwelling survived on the *kang*. The *kang* was structurally adapted to the human body. The height of the hearth, with the fire hole next to the ground, the height of the *kang* and the thermal conditions on the *kang* all influenced the body or was influenced by the body techniques of its inhabitants. The body techniques of squatting, kneeling and sitting on the ground in various forms dominated everyday life and domestic resting and working positions. Thus, the enclosed combustion chamber was directly linked to the bodies of the people who used it. With regard to the stove, even simple proverbs like *Yi ge shifu yi ge ling, yi ge guoshao yi ge bing* 一个师傅一个令, 一个锅勺一个柄, (One master, one command; one frying spoon, one handle) indirectly describes both the artefact and the action of cooking. Here, the frying spoon is equalled to the master of the house, with the hand of the spoon resp. the order of the master leading the action. The scarce pictorial evidence shows women squatting while firing the stove, standing when cooking and sitting on the *kang* in the tailor's seat. For modern China, I was able to partially reconstruct the everyday terminology of body movements on the *kang*.²³ For women, sitting with legs stretched out or cross-legged or

²⁰ See Ma Xiaomi 1992: 31.

²¹ See Edgerton-Tarpley 2004.

²² This becomes clear when we understand for example that in the late imperial Chinese, countryside people apparently used to sleep naked and that layers of clothes were a major element in the calculation of the relation between heat degrees on the *kang* and outside temperatures.

²³ Flitsch 2004: 183–184.

moving on the *kang* by sliding cautiously over its surface shows that the body is also conditioned according to the technical particularities of the *kang* construction.

The relation of *kang* and human body may reach beyond the visible conditions of the *kang* as a kind of place for moving, sitting, lying or sleeping. First of all, the construction of the *kang* may be conceived in accordance with the bodily needs of the people. Part of these measures is to structure the flues within the *kang* with regard to the bodies of the people using it; stronger covers were for heavier people; extra layers of loam serve against carbon monoxide evaporation; blocking off parts of the flues was for newborn children sensitive to heat; extra large flues were for old people; conducting smoke into a room was to keep mosquitoes away; extra mats were to mitigate heat etc.

In late imperial northern China, the particularly female condition of living with bound feet made the *kang* a special place for these women. Foot binding signified a redefinition of the female body, with the need to create a new balance for the particularly fragile and disarranged body equilibrium through sheer discipline. This discipline consisted in learning to walk and in walking, in learning to take care of bandages and to bind; in hygiene rules, in specific medical care with alum and other substances, with massage or with diet; in techniques of unburdening body and feet through sitting in particular ways, walking mainly on the calcaneus or heelbone; in techniques of balancing the body with the help of a stick or of arm movements; and in techniques of mitigating temperatures, heat as well as cold, or of avoiding moisture to prevent injury, inflammation or simply a stronger circulation of the blood.²⁴

Foot binding was officially abolished in China at the beginning of the twentieth century. As Dorothy Ko (2005) and others have persuasively shown, its abolition created a highly non-synchronous situation for women who, in a quickly modernising world with high heels and sports for girls and women, were forced to stay in the shadow of modernity. Women born before 1920 often recall their traumatic experience of mutilation as a process that was directly linked to the *kang*. It was the space where their feet were bound for the first time, the space where they suffered pain and where they complained about their fate. On the *kang*, a minimum of pain relief was achieved through sitting cross-legged and through sliding on the buttocks.²⁵ But *Yuan tuo sheng tuzi man shan beng, buyuan tuo sheng nüzi man kang (cheng) [ceng]* 愿托生兔子满山蹦, 不愿托生女子满炕 (乘) [蹭] (One would rather be reborn as a rabbit leaping in the mountains than be reborn as a girl and always have to move/slide over the *kang*). The *kang* beam was the place where letting the feet hang down and dangle provided a little relief, where they could find support when walking the first steps. In the first years, the heat of the *kang* was a problem though, since it enhanced blood circulation.²⁶ Girls would, for example, lay their feet high and leave them uncovered when sleeping.²⁷

²⁴ Ko 2001, ch. 2; Flitsch 2001, 2005. See also Ebrey 1999; Levy 1990.

²⁵ See Lévy 1966: 225, 229.

²⁶ See Lévy 1966: 226, 236.

²⁷ Gao Hongxing 1995: 112; Flitsch 2004, ch. 3.1.6; Flitsch 2005.



Fig. 3 The ritual sitting of the bride on the *kang*. Papercut by Hou Yumei, summer 1998. Collection by Flitsch

The pain suffered from foot binding and the pride of finally having small feet is a common topic in the tales of women. They recall that in daily life, women with bound feet displayed them by sitting cross-legged and laying them in their lap. A typical gesture would be to softly knead the feet with the hands against pain or numbness. Women with unbound feet would rather hide their large feet under their clothes.²⁸

It is well known that a certain percentage of women underwent a failed binding of their feet and were finally unable to walk. The old lady Lu Zhilan, who was interviewed by Yao Jushun, recalls her sister who was entirely bound to the *kang* due to unprofessional foot binding.²⁹

At certain occasions in the calendar, in seasonal and in life-cycle rhythms, hearth and *kang* appear as religious spaces embedded in the domestic sacred universe. This is true for festivities as well as for all kinds of initiation rituals, especially so for marriage ceremonies, during which the bride was introduced into her working space (Fig. 3).

Vernacular architectures frequently come into being in the course of family rituals, such as birthing, puberty, marriage and funerary ceremonies, and these rituals, often related to dowries and bridewealth, reinforce gender participation to

²⁸ See Gao Hongxing 1995: 107–108, 110.

²⁹ Yao Jushun 1991: 161.

varying degrees in the creation and finish of the building domain. It is a little-recognised fact that for the most part, portable dwellings such as the tipi, the black tent or the yurt are created by women in the course of a marriage ritual and that women are responsible for maintaining and transporting them throughout their lives (Prussin 1997: 83).

Rural northern China was no exception to this. The house, and especially the hearth and *kang*, were liminal spaces par excellence. During weddings, they were materially and spiritually loaded up with protective energies. Fertile and auspicious emblems and amulets were attached to it or used as decoration. Magic spells were pronounced on it. Its symbolic fertility was enhanced through child-bringing symbols. Ritual actions included pounding on the *kang* to symbolically let inner positive energies of evil spirits or protective ancestor spirits surface. Covering the *kang* with red textiles had the same meaning. Only on such occasions was the interweaving of hearth and *kang* into the domestic sacred universe truly visible. In fact, these ceremonies unveiled the way in which hearth and *kang* were linked to the ancestral world. And, if one understands the *kang* as a module in the modular heating structure, the space occupied from the moment of marriage onwards stood at least symbolically for the whole life of the couple and their children.³⁰

The contribution of behaviour around hearth and *kang* to cultural competence for mastering social and technical situations is impressive. In fact, in the core of Han-Chinese hierarchical patrilineal kinship structures, with maternal kin as associated affinal relatives, the introduction of the bride into the groom's family is a crucial moment. It is—like the birth of a child or the death of a family member—the point where a shift in the spatial rotation of people and things on the *kang* and within the house takes place.³¹

3 The Transformation of the Kang-Axis

At a particular point in the history of everyday technologies, major shifts take place, and well-known technical skills become obsolete, leaving deep traces in everyday knowledge organisation and knowledge representation. Embodied gestures and concepts of practical ways of acting, which are an integral part of the personality of a rural woman, are of no use anymore. Women now have to reorganise their material environment. They reorganise their bodies. They reorganise their knowledge and its representation. Former didactic elements of en-skilling the next generation become motifs in an oral history of a past “technology in use”. An entire generation of women identifies itself through a common former technology in use. The transformation of the *kang*-axis stands for the transformation (and dis-articulation) of a central everyday body–artefact relationship with the shift to modern furniture and equipment.

³⁰ Flitsch 2004, ch. 3.4.

³¹ Especially revealing and particularly interesting are the innumerable marriage songs in which the *kang* is revealed as a world of symbolic-sacred meaning. See Flitsch 2004, ch. 3.4.

3.1 Dissolving the Kang-Axis and the Moment of Change

Major changes in the construction and equipment of houses may entail the dissolution of familiar everyday technologies. The case developed in this section involves the transformation of the *kang*-axis (see above) into detached functional elements.

Thanks to the European anthropologist (and heating engineer) Manfred Seifert, there already is a case study on European aspects of this topic. In his article “The dilemma of interpretation” as well as in his dissertation (2002) on the tiled stove, Seifert has shown the ways in which “technology is an introverted part of the baggage of everyday culture”.³² He describes non-synchronous traces in modern European heating technologies.

The above-mentioned process of splitting up the integrated *kang*-axis entails a separation of heating and cooking into the modern electric or gas stove for cooking connected to the chimney on the roof, the bed or even plush bed for sleeping and the sofa with table for receiving guests, the central heating and the radiator as well as the electric blanket for thermo-regulating the body and rooms in today’s farming houses.³³ This transformation encompassed several major shifts: (a) a shift in thermo-regulating the body, from warming up the body to heating the room in which the body dwells; (b) a shift in utilising different degrees of temperature development for food preparation and food preservation; (c) a shift from considering cooking in terms of the whole *kang*-axis to considering cooking on a separate stove disconnected from the rest of the housing structure; (d) the separation of everyday spheres: hearth and kitchen, bed and bedroom, broader social space and living room. This opened the path to an entirely new design of rooms, which we witness all over China today. What did and does this mean for the body–artefact relationship under discussion here?

1. A shift in thermo-regulating the body: Even though a widely spread proverb states *Kang re wuzi nuan* 炕热屋子暖 “If the *kang* is heated the room is warm”, temperatures within farm houses in winter forced farmers to wear several layers of cotton clothing as well as a cotton-padded layer and wool. Techniques of mitigating heat consisted of reduced or intensified body movement, peeling off or adding layers, dietetic measures, portable braziers for heating exposed parts of the body and changes of outer clothing for inside rooms and for outside the house. The *kang* edge marked the transition to a space for warming up the body and even for taking off clothes, especially when cooking or in times of sunshine when the heat on the *kang* was intense.
2. A shift in utilising different degrees of temperature development for food preparation and food preservation: With the degradation of the *kang*-axis women’s skills in calculating with degrees of temperatures along this axis, from fuels to cooking times to fermentation processes, applied to egg breeding and animal raising, became obsolete. There is no systematic study of the transformation of rural northern Chinese household techniques yet, so we do

³² “introvertierter Bestandteil im Reisegepäck der Alltagskultur” (Seifert 2003: 148).

³³ A first article on this topic will appear in a conference volume in Stuttgart. The manuscript has already been accepted (Flitsch 2007).

- not know very much about this process of transformation.³⁴ Electric heating devices for incubation and an improved commercial supply with instant or ready-made food are visible changes. Since food production is linked to defining and producing tastes, non-synchronicity here plays a particularly interesting decelerating role, with people acquiring local fame for still being able to produce certain tastes. The non-synchronous existence and use of different kinds of stoves beyond technical modernisation is often found in rural houses (Wagner et al. 2007).
3. A shift from considering cooking in terms of the whole *kang*-axis to food preparation on a separate stove disconnected from the rest of the housing structure entails that the entire set of female knowledge and skills linked to temperature development, fuel reserves and fuel portioning for meals, to the preparatory boiling of water, to winds and outside temperatures and to smoke development becomes obsolete. The transition becomes visible in individual non-synchronous circadian rhythms and in individual non-synchronous energy-saving techniques inspired by earlier techniques of economies of time. Thus, in the *kang* era, getting up early was also a question of the *kang* surface that had cooled down by the morning. Women have to entirely reorder their way of cooking when starting to use an electric rice cooker or the electric stove. One reason for the way in which the water-boiler-cooler Wu Xiujie describes in this volume does not penetrate into daily routines is the existence of a small radiator in the kitchen, which provides heat for the rooms and in the same time energy for cooking and boiling water! Thus, in many aspects, the *kang*-axis continues to co-exist in the minds beyond its physical existence.³⁵
 4. The separation of everyday spheres into hearth and kitchen, bed and bedroom, broader social space and living room reminds us of the concept of a “Verhäuslichung von Wohn- und Körperfunktionen” (domestication of housing and body functions) formulated by the German sociologist Peter Reinhart Gleichmann in the late 1970s. Relying on Elias’ concept of the civilising process, Gleichmann focussed on topics like sleep and the development of sleeping rooms, and like digestion, dealing with excrement and the development of the toilet in modern Europe (Gleichmann 1976, 1979, 1980a, b). A comparable study for rural northern China remains to be written.

For China, it soon becomes evident that these transformations evolved against the background of an entirely different cultural history of housing. A closer look at body-artefact relations is revealing, since it is this relation that has given long-term shape to the entirely new design of rooms. In northern China, the fact that body postures of ancient Chinese mat dwelling and the much later chair dwelling have been preserved and are linked in rural contexts to the use of the *kang*, is particularly relevant. Here, embodied knowledge plays a particularly decelerating role, since it is linked to bodily comfort (Yu Shuenn-der 2006). Thus, one might even say that it is modern housing and the abolition of the *kang*, its dissolution into different spaces,

³⁴ See Wu Xiujie in this volume.

³⁵ It may be interesting to note that in recent years, the water-boiler-cooler has entered the repertoire of the paper-made objects burnt for the deceased at funerals.

which finally completes the transition from the mat to the chair. Many aspects of this transition look astonishing to a western eye, since they happen in short periods, with fashion trends established through social advancement and mobility as well as through marriage and dowry. The obsolescence of mat dwelling has already reached all those people in China who are no longer able to sit cross-legged for long periods. It is not surprising that the notion of different degrees of heat procured along the *kang*-axis for the daily routine coexists in non-synchronous ways in hosting guests, in receiving the bride, in raising children and in measures to prevent diseases.

4 Concluding Remarks

Today's everyday material culture reflects the profound social and technical transformation of rural China. Looking at coeval but non-synchronous practices is particularly rewarding, since it enables us to trace developments with regard to the impact of history on their form of modernity. Such a perspective seems helpful in view of the need for a more self-critical approach to the analytical frameworks derived from other studies focussed on high technology, frameworks which have largely been taken for granted by STS scholars in the past.

For western consumers, heating means heating rooms, and cooking is associated with the kitchen. Heating and cooking are no longer related. Their bodies do not perceive them as related. As has been shown in this paper, for users in non-western countries, heating and cooking may on the contrary be intimately linked. The embodied knowledge about this relation translates into skills of calculating with heat or of mitigating risks. On the way into modern lifestyles, it is the embodiment of everyday knowledge that makes the difference for the incorporation of new technologies. Thus, socio-technical systems also differ with regard to body histories and man–artefact relations, and such differences shape their futures.

References

- Bausinger, H. (1989). Ungleichzeitigkeiten. Von der Volkskunde zur empirischen Kulturwissenschaft. In H. Berking & R. Faber (Eds.), *Kultursozilogie – Symptom des Zeitgeistes* (pp. 267–285). Würzburg: Königshausen and Neumann.
- Beck, K. (2001). Die Aneignung der Maschine. In K.-H. Kohl & N. Schaffhausen (Eds.), *New Heimat*. New York: Lukas and Sternberg.
- Beck, K. (2004). Bedfords metamorphose. In K. Beck, T. Förster & H. P. Hahn (Eds.), *Blick nach vorn: Festgabe für Gerd Spittler zum 65. Geburtstag* (pp. 250–263). Köln: Rüdiger Köppe.
- Beck, K. (2007). Brutstätten der Kreativität. Die Aneignung des LKWs im Sudan. Available from <http://www.ethnologie.lmu.de/Africans/docs/Beck/fsb.htm> (cited 8 October 2007).
- Berliner, N. (2003). *Yin Yu Tang. The architecture and daily life of a Chinese house*. Boston: Tuttle.
- Bloch, E. (1962). Ungleichzeitigkeit und die Pflicht zu ihrer Dialektik. In E. Bloch (Ed.), *Erbschaft dieser Zeit* (pp. 104–126). Frankfurt a.M.: Suhrkamp.
- Bourdieu, P. (1970). La maison kabyle ou le monde renversé. In J. Pouillon, & P. Maranda (Eds.), *Échanges et communications. Mélanges offertes à C. Lévi-Strauss à l'occasion de son 60^e anniversaire* (pp. 739–758). The Hague; Paris: Mouton.
- Braverman, H. (1974). *Labor and monopoly capital. The degradation of work in 20th century*. New York: Monthly Review.
- Bray, F. (1997). *Technology and gender: Fabrics of power in late imperial China*. University of California Press.

- Bray, F. (2007). Gender and technology. *Annual Review of Anthropology*, 36 (pp. 37–53) [First published online as a Review in Advance on April 18, 2007].
- Cockburn, C., & Omrod, S. (1993). *Gender and technology in the making*. London: Sage.
- Cowan, R. S. (1983). *More work for mother: The ironies of household technology from the open hearth to the microwave*. New York: Basic Books.
- Dietschy, B. (1988). *Gebrochene Gegenwart. Ernst Bloch, Ungleichzeitigkeit und das Geschichtsbild der Moderne*. Frankfurt a.M.: Vervuert.
- Dikötter, F. (2007). *Things Modern. Material Culture and Everyday Life in China*. London: Hurst.
- Ding Shiliang 丁世良 and Zhao Fang 趙放, eds. (1989a). *Zhongguo difang zhi minsu ziliao huibian, Huabei juan* 中國地方誌民俗資料彙編, 華北卷 (Collected Folklore Materials from Chinese Local Gazetteers, Vol. North China). Beijing: Shumu wenxian chubanshe.
- Ding Shiliang 丁世良 and Zhao Fang 趙放, eds. (1989b). *Zhongguo difang zhi minsu ziliao huibian, Dongbei juan* 中國地方誌民俗資料 彙編, 東北卷 (Collected Folklore Materials from Chinese Local Gazetteers, Vol. Northeast China). Beijing: Shumu wenxian chubanshe.
- Ding Shiliang 丁世良 and Zhao Fang 趙放, eds. (1995). *Zhongguo difang zhi minsu ziliao huibian, Huadong juan, shangzhongxia sance* 中國地方誌民俗資料彙編, 華東卷, 上中下三冊 (Collected Folklore Materials from Chinese Local Gazetteers, Vols. East China I, II, III). Beijing: Shumu wenxian chubanshe.
- Doxtater, M. G. (2004). Indigenous knowledge in the decolonial era. *The American Indian Quarterly*, 28 (3–4), 618–633.
- Ebrey, P. B. (1999). Gender and sinology: Shifting western interpretations of footbinding, 1300–1890. *Late Imperial China*, 20(2), 1–34.
- Edgerton, D. (2006). *The shock of the Old: Technology and global history since 1900*. London: Profile Books.
- Edgerton-Tarpley, K. (2004). Family and gender in famine: Cultural responses to disaster in North China, 1876–1879. *Journal of Women's History*, 16(4), 119–147.
- Eyferth, J. (2009). Eating rice from bamboo roots. The social history of a community of artisans in Southwest China, 1920–2000. Harvard East Asian Monographs 2009
- Fabian, J. (1983). *Time and the Other: How anthropology makes its object*. New York: Columbia University Press.
- Fabian, J. (2002). *Time and the Other: How anthropology makes its object*. New York: Columbia University Press 1st ed. 1983.
- Fabian, J. (2007). Verweigerte Zeitgenossenschaft. Uhrenvergleich zwischen Afrika und Europa. *Berliner Gazette* 22.8.2007. Available from <http://www.berlingazette.de> (cited 8 October 2007).
- Flitsch, M. (1999a). Papercut stories of the Manchu woman artist Hou Yumei. *Asian Folklore Studies*, LVIII-2, 353–375 [available from www.nanzan-u.ac.jp/SHUBUNKEN/publications/afs/pdf/a1298.pdf].
- Flitsch, M. (1999b). Vor dem “Auge der Schwiegermutter”. Zur materiellen Alltagskultur der Frauen im ländlichen Nord-und Nordost-China. In M. Übelhör (Ed.), *Frauenleben im traditionellen China. Grenzen und Möglichkeiten einer Rekonstruktion* (pp. 182–209). Marburg: Universitätsbibliothek Marburg Schriften der Universitätsbibliothek Marburg 94.
- Flitsch, M. (2001). Balance und kleine Schritte. Die Deformierung der Füße und der Alltag chinesischer Frauen im China der Jahrhundertwende. [Balance and small steps. The deformation of the feet and the everyday life of Chinese women around the turn from 19th to 20th century]. In M. Übelhör (Ed.), *Zwischen Tradition und Revolution. Lebensentwürfe und Lebensvollzüge chinesischer Frauen an der Schwelle zur Moderne* (pp. 227–252). Marburg: Universitätsbibliothek Marburg Schriften der Universitätsbibliothek Marburg Band 107.
- Flitsch, M. (2004). *Der Kang. Eine Studie zur materiellen Alltagskultur bäuerlicher Gehöfte in der Manjurei*. Opera Sinologica. Wiesbaden: Harrassowitz.
- Flitsch, M. (2005). Fuß and Schuh – Technikethnologische Überlegungen zur Präsentation von materieller Kultur in Museumsausstellungen. In Graf, Bernhard and Müller, Astrid B. (Eds.), *Austellen von Kunst und Kulturen der Welt. Tagungsband. Mitteilungen und Berichte aus dem Institut für Museumskunde Staatliche Museen zu Berlin [Berlin] No. 30, 2005, S. 26–41*.
- Flitsch, M. (2005). Technische Effizienz–Soziale Ordnung–Raumorientierung. Überlegungen zu alltäglicher Wissensorganisation und Repräsentation am Beispiel des Hauses in China. Paper for the conference Weltbilder und Technik, IZKT China Program, University of Stuttgart, January 2006. (in press)
- Flitsch, M. (2008a). Body–Posture–Tool. Anthropological Reflections on the Depiction of Body Artefact Relationships in Popular Chinese Art. In Siegfried Zielinski and Eckhardt Fuerlus (Ed.) *Variantology 3. Workshop, Cologne, on Deep Time Relations of the Arts, Sciences and Technology in China and Elsewhere*. Köln: Walter König 2008. pp. 191–210.

- Flitsch, M. (2008b). Einleitung. Technikethnologie Chinas. Eine Standortbestimmung. In Themenheft "Technik im chinesischen Alltag" der Zeitschrift *Technikgeschichte*, 2008.2, S. 83–99.
- Fong, G. S. (2004). Female hands: embroidery as a knowledge field in women's everyday life in late imperial and early republican China. *Late Imperial China*, 25(1), 1–58.
- Gao, H. 高洪興 1995. *Chan zu shi* 纏足史 (The History of Footbinding). Shanghai: Shanghai wenyi chubanshe.
- Gleichmann, P. R. (1976). Wandel der Wohnverhältnisse, Verhäuslichung der Vitalfunktionen. *Zeitschrift für Soziologie*, 5, 319–329.
- Gleichmann, P. R. (1979). Die Verhäuslichung von Harn- und Kotentleerungen. *MMG, Medizin–Mensch–Gesellschaft*, 4, 46–52.
- Gleichmann, P. R. (1980a). Einige soziale Wandlungen des Schlafens. *Zeitschrift für Soziologie*, 9, S. 236–250.
- Gleichmann, P. R. (1980b). Schlafen und Schlafräume. *Journal für Geschichte*, 2(1), 14–19.
- Gramont, (1771). An account of the Kang or Chinese stoves. *Philosophical Transactions of the Royal Society of London*, 61(1), 61–70.
- Hahn, H.-P. (2004). Die Aneignung des Fahrrads. In K. Beck, T. Förster & H. P. Hahn (Eds.), *Blick nach vorn: Festgabe für Gerd Spittler zum 65. Geburtstag* (pp. 264–280). Köln: Rüdiger Köppe.
- Hahn, H.-P. (2005). *Materielle Kultur: Eine Einführung*. Berlin: Reimer.
- Hayward, R. (1997). Cooking and heating. In P. Oliver (Ed.), *Encyclopaedia of Vernacular Architecture of the World*, Vol. 1, (pp. 427–429). Cambridge: Cambridge University Press.
- Hommel, R. P. (1969). *China at Work. An illustrated record of the primitive industries of China's masses, whose life is toil, and thus an account of Chinese civilization*. [1. Ed. New York 1937]. Cambridge, MA: MIT Press.
- Ingold, T. (1997). Eight themes in the anthropology of technology. *Social Analysis*, 4(1), 106–138.
- Ingold, T. (2000). *The perception of the environment. Essays in livelihood, dwelling and skill*. London: Routledge.
- Ingold, T. (2001). Beyond art and technology: the anthropology of skill. In M. B. Schiffer (Ed.), *Anthropological perspectives on technology* (pp. 17–31). Albuquerque: University of New Mexico Press.
- James, H. E. M. (1888). *The Long White Mountain, or A Journey in Manchuria with some account of the history, people, administration and religion of that country*. London: Longmans, Green, & Co.
- Kaschuba, W., & Lips, C. (1982). *Dörfliches Überleben. Zur Geschichte materieller und sozialer Reproduktion ländlicher Gesellschaft im 19. und frühen 20. Jahrhundert*. Tübingen: Tübinger Vereinigung für Volkskunde.
- King, F. H. (1990). *Farmers of forty centuries, or permanent agriculture in China, Korea and Japan*. [1st ed. Emmaus, Pennsylvania 1911.]. Emmaus: Rodale.
- Ko, D. (2001). *Every step a lotus. Shoes for bound feet*. Berkeley: University of California Press.
- Ko, D. (2005). *Cinderella's sisters. A revisionist history of footbinding*. Berkeley: University of California Press.
- Leroi-Gourhan, A. (1964). *Le geste et la parole. T. I, Technique et langage*. Paris: Editions Albin Michel.
- Leroi-Gourhan, A. (1965). *Le geste et la parole. T. II, Le mémoire et les rythmes*. Paris: Editions Albin Michel.
- Lévi-Strauss, C. (1962). *La pensée sauvage*. Paris: Plon.
- Lévy, H. S. (1966). Chinese footbinding: The history of a curious erotic custom. New York: Rawls.
- Levy, H. S. (1990). *Chinese Footbinding: The History of a Curious Erotic Custom*. [1st ed. New York 1966]. Taipei: Institute of Modern History, Academia Sinica.
- Lie, M., & Sørensen, K. H. (1996). *Making technology our own? Domesticating technology into everyday life*. Oslo: Scandianvian University Press.
- Lin Y. 林永匡 and Yuan Lize 袁立泽 (2001). *Zhongguo fengsu tongshi Qingdai juan*. Zhongguo fengsu tongshi, Qingdai juan 中国风俗通史清代卷 (A Complete History of Chinese Customs and Habits, Volume Qing Dynasty). Shanghai: Shanghai wenyi chubanshe.
- Lu, H. (2003). The significance of the insignificant: Reconstructing the daily lives of the common people of China. *China: An International Journal*, 1(1), 144–158.
- Lu, W. (2004). Beyond the paradigm—tea-picking women in imperial China. *Journal of Women's History*, 15(4), 19–46.
- Ma, X. 馬小彌 (1992). *Tukang xiaoji* 土炕小記 (Notes on the kang). In *Beifang nongjia tukang, 1992*, 27–31.
- Mackenzie, D., & Wajcman, J. (eds.) (1999). *The social shaping of technology*. Madenhead: Open University Press.
- Mauss, M. (1935). Les techniques du corps. *Journal de Psychologie Normale et Pathologique*, 32(3–4), 271–293.

- McLaren, A. E. (ed.) (2004). *Chinese women: Living and working*. London: Routledge Curzon.
- Moghaddass Esfehiani, Amir (2003). The Bicycle's Long Way to China. The Appropriation of Cycling as a Foreign Cultural Technique 1860–1940. In: *Cycle History 13. Proceedings, 13th International Cycling History Conference*, 94–102. San Francisco: Van der Plas Publications. Available as <http://www.imperialtours.net/bicycle.htm>
- Orland, B. (1998). Haushalt, Konsum und Alltagsleben in der Technikgeschichte. *Technikgeschichte* [Berlin] 65: 173–195. (Available as <http://www.tg.eth.ch/dokumente/pdf.files/OrlandALltag.pdf>)
- Oudshoorn, N., & Pinch, T. (Eds.) (2003). *How users matter: the co-construction of users and technology*. Cambridge, MA: MIT Press.
- Pantzar, M. (1997). Domestication of everyday life technology: dynamic views on the social histories of artifacts. *Design Issues*, 13(3), 52–65.
- Pfaffenberger, B. (1992). *Social anthropology of technology*. (21, pp. 491–516). Annual Review of Anthropology.
- Prussin, L. (1997). Gender roles. In P. Oliver (Ed.), *Encyclopedia of Vernacular Architecture of the World*, Vol. 1, (pp. 82–84). Cambridge: Cambridge University Press.
- Schiffer, M. B. (Ed.) (2001). *Anthropological perspectives on technology*. Albuquerque: University of New Mexico Press.
- Segers, A. (1932). *La Chine. Le peuple, sa vie quotidienne et ses cérémonies*. Anvers: Editions de Sikkel.
- Seifert, M. (2002). *Technische Innovation und kulturelle Bewertung. Zum Wandel des Wohnverhaltens und der Wohnwünsche am Beispiel des Kachelofens*. Dissertation Universität Passau.
- Seifert, M. (2003). Das Dilemma der Interpretation. Über moderne Wohnwelten und ihre kulturwissenschaftliche Erforschung. In S. Göttisch, & Chr. Köhle-Hezinger (Eds.), *Komplexe Welt. Kulturelle Ordnungssysteme als Orientierung* (pp. 143–157). Münster: Waxmann.
- Starikov, V. S. (1967). *Material'naja kul'tura kitajcev Severo-Vostocnych provincij KNR* (The Material Culture of the Chinese of the Northeastern Provinces of the PR of China). Moskau: Nauka.
- Starikov, V. S. (2008). *Die materielle Kultur der Chinesen in den Nordost-Provinzen der VR China*. [1st edition 1967, translated by Rainer Schwarz]. Wiesbaden: Harrassowitz.
- Stone, G. D. (2007). Agricultural deskillung and the spread of genetically modified cotton in Warangal. *Current Anthropology* [Chicago], 48(1), 67–103.
- Tian Fuyan 田福雁 (1992a). *Tukang renjia* 土炕人家 (Kang-People). In *Beifang nongjia tukang*, 1992: 1–14.
- Tian Fuyan 田福雁 (1992b). *You nitu dao nitu, pankang* 由泥土到泥土, 盤炕 (Out of Mudd into Mudd: Constructing the Kang). In *Beifang nongjia tukang* 1992: 15–20.
- Wagner, W. (1980). *Die chinesische Landwirtschaft*. [1st ed. Berlin 1926]. New York/London: Garland.
- Wagner, M., Flitsch, M., Winterstein, C., Lehmann, H., Heußner, K.-U., Ren X., Xiao Y., Cai L., Wulf-Rheidt, U., Tarasov, P., & Dwyer, A. (2007). Traditionelles Bauen und Wohnen der Salar in Nordwest-China. *AMIT Archäologische Mitteilungen aus Iran und Turan* 39.
- Warnier, J. -P. (1999). *Construire la culture matérielle – L'homme qui pensait avec ses doigts*. Paris: Presses Universitaires de France.
- Xu Ke 徐珂 (1986). *Qingbai leichao* 清稗类钞 (*Collection of anecdotes of Qing Dynasty*). [Original edition 1917]. Reprint Beijing: Zhonghua shuju.
- Yao Jushun 姚居顺 (1991). *Zhongguo chanzu fengsu* 中國纏足風俗 (Customs of Footbinding in China). Shenyang: Liaoning daxue chubanshe.
- Yu Shuenn-der 余舜德 (2006). *Wu yu shentigan de lishi: Yi ge yanjiu quxiang zhi tansuo* 物與身體感的歷史：一個研究取向之探索: Objects and History of Experience of the Body: Contemplation of a New Approach. In *Si yu yan: Renwen yu shehui kexue zazhi* 思與言：人文與社會科學雜誌: *Thought and Words: Journal of the Humanities and Social Science*, 44(1), 5–47.