

Contours of an urban architectural anthropology: built environment, climate control and socio - material practices in winter in Chongqing (south - west China)

Kobi, Madlen; Istituto di storia e teoria dell'arte e dell'architettura (ISA), Accademia di architettura, Università della Svizzera italiana, Switzerland

Published by John Wiley & Sons in *Social Anthropology/Anthropologie Sociale*, 27 Nov. 2019
Volume 27, Issue 4, November 2019, pp. 689-704

Published version: <https://doi.org/10.1111/1469-8676.12718>

Contours of an Urban Architectural Anthropology: Built Environment, Climate Control and Socio-Material Practices in Winter in Chongqing (Southwest China)

Introduction

A December day in Chongqing (southwest China). Temperatures outside are mild, around 10°C; fog covers the cityscape. It feels like we are living in a huge cloud as I walk with Wang Kenan through the streets of the previously industrial Huangjueping district. Kenan remarks that the omnipresent clouds covering the sky in winter are difficult to bear. He grew up in a mountainous area in the neighbouring province of Sichuan and mentions that even though he has adapted to the humid winters of Chongqing, he misses the sun and blue skies. 'In my hometown, it is also very cold in winter and we have no heating, but at least it is comfortably warm during the daytime, when the sun is shining.'

The destination of our brief excursion is a privately owned library in a neighbourhood where art lovers gather to share the latest gossip and immerse themselves in the study of art books. Due to government plans to renew the building stock of this district, the library has recently moved from a small single-storey house to this two-storey building from the 1970s, which in socialist times was a storehouse for foodstuffs. The main room is tiled, but the comfortable positioning of furniture, pleasant decoration and vases full of flowers make it feel cosy. Even when the front door (a non-airtight glass door) is shut, temperatures inside and outside feel pretty much the same. Upon entering, there is no need to take off one's jacket, so Kenan, I and two other book lovers sit around the table in our coats, drinking tea, reading and having a chat. After a while, some staff arrive in a truck and come in through the front door. They proceed to bring in some new furniture such as tables, wooden bookcases and chairs that they have collected from a house in the neighbourhood that was about to be demolished. As we are sitting next to the doors, which are constantly opening and closing, the incoming draught makes me feel as if cold air is entering, but in fact there is probably no real change in temperature. I must look worried though, because one of the library owners asks me whether I feel chilly. I agree that maybe we should close the windows, which have been open until now, and suddenly the owner switches on a small electric heater (Ch: *xiao taiyang*) in the form of a cage with an extension cable going under the table. The radiating heat warms the legs of all of us sitting around the table and the cosiness increases dramatically.

Architecture and climate in the city

Since the widespread electrification of urban areas in the second half of the twentieth

century, active climate control through heating or air-conditioning devices has become the global norm in indoor microclimate regulation (e.g. Ackermann 2002; Sahakian 2014; Roesler and Kobi 2018). Scientific approaches to climate control in urban housing primarily focus on adaptive thermal comfort indoors. Even if the term “thermal comfort”—coined during studies in the comfort chamber in the 1920s (Chang 2016)—is slowly loosening from its universal connotations (Nicol and Roaf 2017), it still figures prominently in discussions of indoor climatization. Studies on thermal regulation practices inquire into the interactions between social actors and their material environment and largely focus on the role of air conditioning (Hitchings and Lee 2008; Sahakian 2014) and heating (Cupples et al. 2007; Hitchings et al. 2015). Beyond the wish to regulate indoor conditions for the physical body, climate control also addresses the social body: atmospheres, sensations and sociality either contribute to or impede senses of thermal comfort (Heschong 1979; Madsen and Gram-Hanssen 2017). Especially with regard to reducing carbon emissions in light of climate change, many of these approaches try to find ways to achieve more energy-efficient and sustainable behaviour so as to minimize the use of resources.

In the thermal regulation of urban indoor spaces, responsibilities are distributed among various professionals (such as an investment company, architects, heating installers, interior designers, construction companies and craftsmen) and the inhabitants (Pink et al. 2013; Wade et al. 2016; Strebel and Bovet 2018). Understanding urban architecture as a social field implies considering the customs of the different actors involved and the relations between them, as Henning (2005: 8) outlines for her policy-oriented project on energy-efficient housing in Sweden: ‘not only do individual end-users have “habits”, so also do retailers and tradespeople such as wholesale dealers and plumbers, and [...] the interaction between these actors is equally important for the implementation process’. Studying climate-responsive urban architecture means engaging with the negotiation and power processes between actors on the ground, with their economic, ecological, knowledge-based and comfort-oriented motives in the choice and use of materials and devices.

This paper inquires into the economic, ecological and social implications of poor-quality thermal infrastructure in multistorey apartment houses in Chongqing. Drawing on ethnographic fieldwork, I engage with the architectural, thermal-material and social construction of microclimates in these urban apartments. The analysed data include semistructured interviews with architects and other experts engaged in the building industry, and visits to informants’ apartments to assess and discuss the thermal-material practices they use to stay warm during the winter. The architectural-anthropological approach considers the

relations and thermal perceptions of urban residents within the built environment and how active and passive forms of climate control interact in everyday residential practices and settings. The broader aim is to outline an urban architectural anthropology which links the material structure of the house with the socio-cultural practices of housing.

Approaching thermal comfort with a socio-material practice approach

As well as this paper contributing to the discussion of how indoor thermal comfort is achieved, by adding ethnographic insights from southern China to the often-dominant discussion of examples from European and North American contexts, my principal aim is to combine resident-oriented studies with consideration of the architectural structures. When it comes to generating knowledge about climate control within the urban built environment, there is obviously a gap between architectural studies engaging with the material structure of houses and those rather focusing on social practices. To bring these two perspectives together, I rely on Strebel (2011) and Ingold (1995) and consider architecture not as something finished once built, but as evolving within a socio-material context in and through ‘situated practices of those who live and work with buildings’ (Strebel 2011: 248). Architecture as part of the built environment not only involves the process of design and construction but is constantly transformed through the activities of “dwelling”. As Ingold (1995: 58) explains, a dwelling perspective goes beyond a simple consideration of architectural form; ‘through being lived in, rather than through having been constructed along the lines of some formal design [...] the world becomes a meaningful environment for people’.

Referring to Actor–Network Theory, which works with a binary system of human and non-human actors involved in the production of social networks (Latour 2007), I follow Schatzki’s (2010) expansion of those human/non-human arrangements constituting social life with a focus on practices. In relying on Schatzki, I consider the social phenomenon of indoor climate control as a nexus of practices and arrangements embedded in specific time-space histories. This allows the simultaneous consideration of specific choices of actors intending to make themselves comfortable as well as the material world of the house and the apartment interior. In the words of Schatzki (2010: 140), ‘the practices could not be carried on in the absence of the arrangements’ and ‘almost all practices would not exist or would take different forms were it not for the presence in them of particular material entities’. In consequence, climate mitigation is not something that happens solely between materials and human actors, but is constituted in social life. There is no universal idea of what comprises a thermally comfortable place; however, thermal comfort is always embedded in local forms of dwelling,

which are accessible through situated ethnographies.

Transferring the centrality of localized human practices for social life to the field of heating means that the material objects involved (such as quilted pyjamas, slippers, blankets) and technologies (electric heaters, underfloor heating, infrared heaters and so on) mediate between human practices and materiality. It is both the physical-chemical composition and effects of materials as well as the practices related to the use of energy sources (oil, electricity, gas) that lead to the heating effect (cf. Schatzki 2010: 138). Far from just facilitating the creation of warm and comfortable indoor spaces, arrangements between materials and social users also allow other social practices to take place—such as eating, child-care, making oneself cozy, socializing or sleeping. Those practices are reflected in the aforementioned “dwelling perspective” on architecture. In light of this we can observe that thermal comfort is a situated practice closely entangled with other areas of social life, and which unfolds differently in each socio-cultural context. Beyond local particularities, diversity exists even among actors within the same climate zone, as occupants, engineers and architects often have different conceptions of comfort (Chappells and Shove 2005: 35).

Climatic conditions in a non-heated urban context

Chongqing municipality is under direct administration of the central government. The focus of my inquiry is its capital, Chongqing, a mega-city of roughly 8 million inhabitants located on the banks of the Yangtze river in Southwest China. It has a humid subtropical climate. Within China, Chongqing belongs to the ‘summer-hot-winter-cold’ zone, which includes the region along the Yangtze with cities such as Shanghai, Hangzhou, Wuhan and Chengdu.¹ The subtropical climate in Chongqing allows for pleasant autumns and springs, but demands adaptations of residential practices in summer and winter. The summer months (in particular July and August) are extremely hot, with average temperatures around 35°C, but on peak days reaching more than 40°C. Winters are comparatively mild, with temperatures on the coldest days ranging between 5 and 10°C. Further, Chongqing is characterized by having only a few sunny days in winter (on average, one day in seven) and a very high humidity of about 80 per cent all year round (Tian and Zhou 2015). Many Chongqing residents complain about the inhospitableness of the coldest winter months (mid-December to mid-February). However, they downplay winter discomfort and ascribe much more importance to the mitigation of the extremely hot summer conditions, a common finding in subtropical areas (e.g. for Australia, see Hitchings et al. 2015: 163).

Due to the city’s location in the southern half of China, houses in Chongqing are built

without central or district heating installations. This situation goes back to a policy from the 1950s, when the Chinese government decided to use its scarce fuel resources only for heating buildings in the northern half of the country (Long 2013: 45). This policy still impacts around 550 million Chinese citizens and 43 per cent of the nation's urban residential and commercial stock (Draugelis and Li 2012: 182). Thus, while heating is subsidized by the state in the northern half of China, solutions for staying warm in winter in the southern zone rely on the market and on individual abilities to afford heating systems. This policy-related north–south division only applies to urban buildings. Heating solutions in rural areas in both southern and northern China are more individualized and have parallels to the self-organized practices described here for Chongqing. In the colder climatic zones of the north, for example, detached rural houses often use fire-related heating systems such as the *kang* – a sitting and sleeping platform in the living room that is warmed through a system of underlying pipes distributing heat from the main stove. Architecture is here materially related to the heating method, as the *kang* is part of the built structure of the house (Flitsch 2004).

In addition to being located in China's southern 'non-heated zone', outdated housing stock and the inadequately implemented ecological building regulations lead to a generally fragile materiality of apartment buildings in Chongqing. Due to a lack of insulation in the outdoor walls of these steel and concrete structures, an effective (and energy-efficient) cooling or warming of indoor spaces through passive means is impeded. Several problems exist apropos sealing the outside walls: insulation has only been mandatory since the 2000s, windows are often still only single glazed and there are frequently air-leak spots in the façade – for instance where split-unit air conditioners have been self-installed. This results in poor thermal performance of the building stock (Fernandez 2006: 54) and triggers corresponding socio-material practices indoors.

The thermal-material culture of residents in response to a non-heated structure

Due to the lack of insulation in the walls of new buildings and the paucity of heating infrastructure, most buildings in Chongqing fail to provide warm indoor spaces in winter. Without the intervention of residents, indoor and outdoor temperatures would be much the same. In order to achieve indoor comfort in their apartments, residents compensate for the construction deficiencies with their own 'system of thermal-material culture' (Shove et al. 2014: 118). It is through a wide diversity of objects and devices that residents cope with the failing architectural structure. In the words of Shove, Walker and Brown: 'In technical terms, indoor climates are outcomes of dynamic processes of heat transfer through and between air,

people, furniture, fans, heaters, walls, objects, etc. and the components and molecules of which these are made' (2014: 115). Objects used to mitigate winter cold in Chongqing include air conditioning,² electric blankets (*dianre tan*), small electric heating devices (*nuanqi pian*, *qunuanqi* or *xiao taiyang*), electric underfloor heating (*dinuan*), hand heaters carried in the pocket, thermal underwear, electric shoe-warmers, heat patches (*nuan baobao*) and quilted pyjamas among others. I did not encounter anyone who would have considered adding an insulation plate to the interior or exterior of their wall in the course of construction, even if insulation could be significantly improved with just minimal investment in a 5 cm thick polystyrene board (*jisuban*). Instead of insulating rooms, people prefer to insulate themselves, using warm clothes and shoes to stay comfortable indoors. It is in and through such practices that people employ materials and objects to generate their ideals of thermal comfort.

Partial heating and the nuances of thermal comfort

During fieldwork in late December 2017, I make a home visit to Wang Chongshi, a 35-yearold social scientist. He lives alone in a two-bedroom apartment in a high-rise building in a middle-class residential area in Shapingba, the university district of Chongqing. His compound is clearly inhabited by lower middle-class people, because in winter one can spot many quilted pyjamas – as Chongshi jokingly remarks: 'the amount of quilted pyjamas is an indicator for the social status of a compound. If you walk around in Tiandi [an upper-class residential area], you see only a few such pyjamas. But here, many people use them.' Upperclass people heat their homes differently, for example with underfloor heating or airconditioning, and have no need of such pyjamas to stay warm.

Chongshi himself does not sport any special indoor dress for winter. Instead, he walks around in normal clothes, but does not take off his jacket or shoes. When we enter his apartment, I realize that despite the outdoor temperature being only around 12°C, the balcony door is wide open, thereby levelling indoor and outdoor temperatures. Chongshi says that he can be found in this living room sometimes but, as a passionate researcher, he spends most of the time at home in front of his computer, which is located in the smaller of his two bedrooms, next to a single bed (Figure 2). As he explains:

I use the bigger sleeping room in summer. But in winter I prefer to use the smaller room as I can warm it up more easily. [...] Last year, I bought this radiator (*nuanqi pian*) for around 250 or 300 RMB. By using it I can create a comfortable working atmosphere. During the daytime, I often work in my [heated] office at the university, but in the evening I work here. Usually, I close the door to keep the heat inside the room. (Fieldwork conversation, December 2017)

I also inquire whether in winter he sometimes uses the air-conditioning unit hanging

above his bed, but he states that he does not. Even if the air-conditioning unit heats the room faster, he does not believe it is a comfortable heat and is afraid of getting sick:

The radiator heats the room a bit more slowly, but I think it is the most comfortable heat. [...] I also refrain from using the small infrared heater [*qunuanqi/xiao taiyang*] because its heat makes your legs feel numb and I don't like it.

Selection of the right heating device seems crucial for people's sense of thermal comfort. The fostering of a comfortable living and working atmosphere is not only related to the temperature on a thermometer, but also depends on the device employed and the forms of conduction, convection and radiation at play. These different human/non-human arrangements produce settings for social interaction – for example during meetings, as a heating engineer from Shanghai (also located in the non-heated zone) explained:

With regard to comfort [in winter], one has to consider that here in the south of China we are always well clad in our jackets when we have meetings. This is not really comfortable. Further, it makes a difference whether we use a radiator, underfloor heating or an air-conditioning unit. If we use the air conditioning in the heating mode, we only produce hot air. It might be comfortable to sit in front of the unit where the hot air streams out, but this heat is only temporary. The walls remain cold and so does the room. A radiator is more comfortable. (Fieldwork conversation, December 2017)

Air conditioning creates convection, which means that the air is heated, but as soon as the device is turned off the room turns cold again. Rapid cooling also characterizes the radiating heat from small devices that use infrared. On the other hand, radiators or underfloor water pipes produce conduction, a more lasting warmth.

Personal preferences for certain heating devices also depend on factors such as age, preventive healthcare or gender. Elderly residents often make use of a traditional warming strategy, the foot bath (*paojiao/tangjiao*). It used to be a custom, particularly in the evening, to soak one's feet in a warm-water bath, which stimulates blood circulation throughout the body. The conventional method involves a bucket and some warm water, but today one can also buy electric warm-water tubs, sometimes with integrated foot massage functions. This practice helps the body to maintain equilibrium and avoid overheating or going hypothermic. Informants also mention certain eating and drinking practices that help in dealing with the cold and damp winter weather. However, those methods based on Chinese Medicine always correspond to the constitution and life experiences of individuals (cf. Rittersmith 2009: 11). The use or non-use of a device also heavily depends on socio-economic means. Fuel poverty in China is not widely discussed, but some sectors of the population are more affected by cold indoor temperatures than others. Long (2013: 43) emphasizes the importance of a warm environment for the sustaining of health, especially in elderly people, whose lowest

tolerance temperature for still feeling comfortable is higher than in younger people. Buying quilted pyjamas is a relatively cheap option to survive the winter cold in an apartment, as this requires no maintenance costs for electricity.

For a few hours of radiator use in the evening, Chongshi pays about 10 RMB electricity costs per day. Even if he only uses it during the two coldest months, this sort of expense is untenable for poorer parts of the population. He also admitted that he refrains from using the air-conditioning system in winter not only because it creates an uncomfortable sort of heat but also because he deems it too expensive. The costs of running manifold heating devices, such as an electric blanket, a small radiator or a foot bath, remain the responsibility of residents. This is not a feature specific to developing economies such as China: in other mild winter places with insufficiently insulated houses, socio-cultural and economic factors determine people's heating practices. In a study of residents in Christchurch (New Zealand), the authors found that some heating measures such as 'central heating, double glazing, or insulation were "way too expensive" and were [considered] an unnecessary and excessive luxury' (Cupples et al. 2007: 2889).

For a warm family life: Affording the 'luxury' of underfloor heating

In general, electricity costs in China are relatively low, which is a strategy of the government to keep citizens calm and also to facilitate consumerism in the field of electronic devices. As long as electricity is cheaper than gas, residents will continue heating their apartments with electric devices (Long 2013: 47). This is also one of the reasons why a new trend among middle- and upper middle-class residents in Chongqing is the installation of electric underfloor heating. Zhang Jiong, a 30-year-old psychologist, invited me to attend the installation of underfloor heating in her new apartment, located on the ninth floor of a newly built apartment house in the Shapingba district. Jiong had got married the year before. She met her husband during her studies in Guangzhou (Southeast China), where she grew up. When we met, she was pregnant with her first child. Because her husband got a job in Chongqing, they moved here; in order to care for their future grandchild, her parents-in-law also moved to Chongqing from Changji, a town in Xinjiang (Northwest China). The entire family (Jiong, her husband, the future baby and the parents-in-law) would be living in this new two-bedroom apartment. It was the parents-in-law who decided that, in order to cope with the cold and wet winter in Chongqing, they ought to get underfloor heating. Jiong's mother-in-law explained that they wanted to provide a comfortable environment for their grandchild, but that this was one among several motivations:

In our apartment in Changji we also have underfloor heating, so I am used to living in a warm place. But in Changji, the heating is provided by the government; they install heating systems in every apartment. It does not run on electricity, but is a system of hot water pipes under the floor. [...] Winter in Chongqing is very unpleasant. When I go into the apartment, I want to be able to take off my coat. [...] Recently, I saw on a TV programme that the government wanted to provide central heating to people in Guizhou [the province south of Chongqing] but the residents rejected it! I really can't understand this, people from southern China are so strange! (Fieldwork conversation, December 2017)

In comparison to the north of China, where hot water underfloor heating is the norm and where heating is state subsidized, in Chongqing the financial means of a family decide whether they are capable and willing to pay for the installation and running of such a system. After the decision for installation was taken, Jiong's husband and father-in-law found an installation company at a trade fair. The installer was present during my visit and had been in the business for ten years. He said that recently the demand for underfloor heating had rapidly increased: 'Before, people simply did not know that anything like this existed.' This trend was confirmed by the head of another heating installation company, who had been running his business since 2009 and specialized in energy-efficient systems. When I interviewed him in his office, the air temperature was comfortably warmed to 22°C, apparently with underfloor heating and in-wall heating. Although he estimated that not more than 5 per cent of apartments in Chongqing had underfloor heating, the number is rising. In his opinion, 'heating is not a necessity in Chongqing, but with the rising quality of life in Chinese cities, those who can afford it invest in comfortably warmed apartments' (Fieldwork conversation, December 2017).

The underfloor system installed in Jiong's apartment was from the Korean brand *Korwoo* (Figure 3). The installer mentioned that due to high gas prices, Koreans had started to develop good-quality materials for electric heating early. The newly installed heating would cover 50 out of the 69 square metres of the apartment and cost around 13,000 RMB. The bathroom and kitchen were excluded. The family's guess was that the new heating would amount to an additional 500 RMB in electricity costs per month. They were willing to accept this because apparently it would be less than the cost of running an air-conditioning unit throughout the day. Besides the lower electricity bills, underfloor heating is also more energy efficient than air conditioning when used all the time (Long 2013: 46). However, for sporadic use an air-conditioning unit is more energy efficient.

Besides considerations about energy efficiency and the related costs, the most important factor determining what kind of socio-technical systems people use to stay warm in

winter is a feeling of individual comfort related to their own experiences. Another informant told me the story of when her husband moved from the north of China to Chongqing:

Winter was difficult for him in the beginning. His first winter in Chongqing was a very mild one for us. We went out in pullovers while he was running around in his down jacket and my mother used to mock him! While I simply go for a walk if I am cold in my apartment, my husband wants to switch on the electric blanket every evening and complains about the cold all the time. (Fieldwork conversation, September 2017)

While people who have grown up in the non-heated southern zone get used to coping with winter temperatures, it is often residents who have moved south from northern, heated areas of China who complain more about the situation. Some of them even move back north because they cannot bear the winter cold indoors. The northern climate is much colder in winter, with minus temperatures and freezing winds. People wrap up very warm when leaving their homes, but as soon as they enter a building they can take off their outer layers, sometimes only wearing a t-shirt because generally they cannot regulate the intensity of the heating themselves.

Architectural structure and socio-material practices

Analysing the ethnographic data with a practice-oriented approach emphasizes that heating-related practices in winter in Chongqing emerge within specific socio-economic and domestic settings. Arrangements for staying warm are not only determined by networks between actors and the heating devices they choose, and between the building structure and its interior, but are most of all embedded in everyday practices. When Chongshi describes how he heats the smaller of his two bedrooms to be able to work there in winter, he chooses an electric heater due to financial and comfort-related motives. In addition, this practice is related to the fact that he lives in a high-rise building. Chongshi later mentioned that during the coldest part of the winter, which falls around the time of the Spring Festival (*chunjie*), he spends several weeks in the house of his parents in rural Sichuan (the neighbouring province), which they heat with a wood fire. Even if both housing typologies (the high-rise and the single-storey farmhouse) are not connected to a heating system, the particular heating practices and materials employed differ significantly. Heating strategies as practice-arrangement nexuses have not only evolved historically with the development of newer technologies, they also differ depending on geographical location and the material arrangements of the landscape (cf. Schatzki 2010: 144–45).

Furthermore, the ethnographic examples provided illustrate the importance of

considering demographic and other factors in the analysis of heating arrangements and practices. Gender, age, socio-economic status and biographical background all influence the choice of objects and the warming practices applied. These different material-object arrangements configure different situated practices. The underfloor heating in Jiong's apartment provides a fully heated indoor space for the entire winter period, a permanently warmed shelter for the expanding family. Due to the origin of Jiong's parents-in-law in the northern part of China, they are obviously more affected by the winter cold in Chongqing and consider it essential to create a well-heated indoor place. Informants who have grown up in Chongqing, on the other hand, often remark that they are used to the winter cold and they would rather opt for partial body-heating heating strategies. As with Chongshi, the purchase of an electric heater or the switching on of the air-conditioning machine are directed towards a heating which is less thorough in temporal and spatial terms. This is also a suitable strategy for people with a low budget or those who spend less time at home.

While architectural studies often highlight the relevance of the material structure of the house for thermal conditions indoors, practice-oriented research enables a linking of these material components with a place-based social life. The two fields are necessarily connected, as Madsen and Gram-Hanssen (2017: 92) outline in their sense-oriented practical approach to thermal comfort: 'Teleoaffective structures describe normative aims in practices, and these social meanings are connected to, and materialised in, the physical structures of a house, the things and technologies within it, and the know-how of using them.' In their engagement with the teleoaffective structures of Danish lower- to middle-class residents in single-family houses in the suburbs of Aarhus, the authors engage extensively with material objects in the home, such as duvets, underfloor heating, sweaters and candles. However, they neglect the materiality of the house as structure and as an important factor influencing human/non-human arrangements in thermal control.

This paper aims to contribute to an urban architectural anthropology that approaches the house from a holistic perspective regarding its materiality, namely by considering both the structure and the interior architecture of a house, all embedded in the larger political and economic context. Data from Chongqing highlight that social practices of heating are related to the materiality of the built environment, in this case to the non-existent central or district heating and the insufficient insulation of external walls. Residents respond to the institutional context with individualized 'thermal-material cultures', comprising their uses and choices of technologies and objects, which figure as 'practice-arrangement nexuses' in Schatzki's conceptualization (2010).

Conclusion: Towards an urban architectural anthropology

Studies in architectural anthropology have often either focused on the material structures of buildings or on houses as the living environments of (extended) families. Carsten and Hugh-Jones (1995b: 20–21), for instance, highlight the relevance of analysing houses as social units: ‘The relation between building and group is multifaceted and contextually determined, the house’s role as a complex idiom for social groupings, a vehicle to naturalise rank, and as a source of symbolic power being inseparable from the building itself.’ In such studies, the construction, inhabitation and maintenance of a house are all managed by the same social group. However, a growing proportion of the world population today lives in urban areas, within the institutional and organizational context of multistorey dwellings. From construction to inhabitation, a plethora of actors shapes the various aspects of these buildings. The materiality of and daily life in urban high-rise buildings has scarcely been researched compared to the rich breadth of anthropological and architectural studies on vernacular and rural architecture (e.g. Bourdieu 1976; Carsten and Hugh-Jones 1995a; Waterson 1997). In line with Stender (2016: 7), I am convinced that ‘ethnographic engagement with contemporary, architecturally designed environments could be developed much further’, especially when it comes to the urban residential environment which is now so common. There is great potential to analyse architecture with the methodological tools of ethnographic research and also in moving beyond the rather normative perspective that architects often cultivate towards the materiality of buildings (Stender 2016: 13). Based on my research results on thermal comfort in Chongqing, I recommend combining the strengths of both architectural and anthropological methods to analyse the urban built environment. Such an approach would include, on the one hand, a careful consideration of the material side of urban architecture in terms of both house structure and the interior furnishing with objects for climate control and other purposes. On the other hand, the multiple actors involved in forming the building would have to be more carefully considered in architectural analyses. With regard to thermal comfort studies, architects often emphasize the qualities of the material structure of the building for indoor climate control, while social science approaches tend solely to consider the objects and practices inside those structures. In following a practice-arrangement nexus approach as advocated by Schatzki (2010), I propose to think the two levels as interrelated. Including a building’s architecture more consciously in thermal comfort studies aligns with a recent trend in urban studies that conceptualizes buildings in practical terms, in that ‘it demonstrates that the malleability of natural and built environments

is not socially construed (in terms of power, identity and social structure), but is the result of coordinated and collaboratively accomplished activities' (Strebel 2011: 245). It is in and through the socio-material practices of residents – as well as the architect, the concierge or the maintenance workers – that the structure of the house is constantly adapted to new technologies and considerations of what consists a comfortable environment. After their initial construction, houses are not merely a stage for social life to take place; as part of material culture, they are continually being shaped by the inhabitants. When it comes to achieving thermal comfort, the installation of underfloor heating, flexible use of doors and windows to achieve partial heating by creating enclosed spaces, or the choice to wear warm clothes indoors are linked to the material structure of the building that – in the sense of a nonhuman actor – exerts its own influence on residents' practices. Ethnography-based research is able to engage with the diverse interests of actors involved in building and inhabiting houses and essentially contributes to understanding the urban house beyond its materiality, as a place where people make themselves comfortable in social, socio-material and thermal terms.

¹ China is divided into five climate zones: severe cold (sometimes subdivided into three); cold; temperate; hotsummer-warm-winter; hot-summer-cold-winter. Depending on average temperatures in January and July, buildings in these zones have to comply with different architectural regulations for energy efficiency. But even within one zone, differences between climatic conditions vary considerably. Shanghai and Chongqing, both in the 'hot-summer-cold-winter' zone differ in terms of wind speed and average winter temperature.

² Statistical data from Shanghai show that if people feel hot in summer, 73 per cent of residents will turn on their air-conditioning unit (Long 2013: 46). If they feel cold in winter, only 48 per cent will turn on the air conditioning sometimes and 37 per cent will not use it at all during the entire winter season (Long 2013: 46). This situation is comparable to citizens' choices in Chongqing. Different price ranges and types of airconditioning machine are purchased depending on one's economic means: mobile units (yidong kongtiao), window air conditioners (chuangji), split units (bigua shi), standing machines (guiji) or systems integrated into the wall structure (jiayong zhongyang kongtiao)

Figures

Figure 1: Characteristic Chongqing cityscape, showing various different housing typologies. Photograph by the author.

Figure 2: Winter bedroom and workplace of Wang Chongshi, with a radiator under the table next to his legs, December 2017. Photograph by the author.

Figure 3: Installation of an electric underfloor heating system in Zhang Jiong's new apartment, Chongqing, December 2017. Photograph by the author.

References

- Ackermann, M. E. 2002. *Cool Comfort. America's Romance with Air-Conditioning*. Washington: Smithsonian Institution Press.
- Bourdieu, P. 1976. *Entwurf einer Theorie der Praxis auf der ethnologischen Grundlage der kabyllischen Gesellschaft*. Frankfurt am Main: Suhrkamp.
- Carsten, J. and S. Hugh-Jones (eds). 1995a. *About the House. Lévi-Strauss and Beyond*. Cambridge: University Press.
- . 1995b. Introduction. In J. Carsten and S. Hugh-Jones (eds), *About the House. Lévi-Strauss and Beyond*, 1–46. Cambridge: University Press.
- Chappells, H. and E. Shove. 2005. 'Debating the Future of Comfort: Environmental Sustainability, Energy Consumption and the Indoor Environment'. *Building Research and Information* 33(1): 32–40.
- Chang, J.-H. 2016. 'Thermal Comfort and Climatic Design in the Tropics: An Historical Critique'. *The Journal of Architecture* 21(8): 1171–1202.
- Cupples, J., V. Guyatt and J. Pearce. 2007. "'Put on a Jacket, You Wuss": Cultural Identities, Home Heating, and Air Pollution in Christchurch, New Zealand'. *Environment and Planning A* 39: 2883–98.
- Draugelis, G. and S. Fei Li. 2012. 'Energy Efficiency in Buildings'. In A. Bäumler, E. Ijjasz-Vasquez and S. Mehndiratta (eds), *Sustainable Low-Carbon City Development in China*, 179–204. Washington: The World Bank.
- Fernandez, J. 2006. 'Materials and Construction for Low-Energy Buildings in China'. In L. Glicksman and J. Lin (eds), *Sustainable Urban Housing in China. Principles and Case Studies for Low-Energy Design*, 44–74. Dordrecht: Springer.
- Flitsch, M. 2004. *Der Kang: eine Studie zur materiellen Alltagskultur bäuerlicher Gehöfte in der Manjurei*. Wiesbaden: Harrassowitz.
- Henning, A. 2005. 'Climate Change and Energy Use. The Role for Anthropological Research'. *Anthropology Today* 21 (3): 8–12.
- Heschong, L. 1979. *Thermal Delight in Architecture*. Cambridge (Mass.): MIT Press.
- Hitchings, R. and S.J. Lee. 2008. 'Air Conditioning and the Material Culture of Routine Human Encasement. The Case of Young People in Contemporary Singapore'. *Journal of Material Culture* 13(3): 251–65.
- Hitchings, R., G. Waitt, K. Roggeveen and C. Chisholm. 2015. 'Winter Cold in a Summer Place: Perceived Norms of Seasonal Adaptation and Cultures of Home Heating in Australia'. *Energy Research & Social Science* 8: 162–72.
- Ingold, T. 1995. 'Building, Dwelling, Living: How Animals and People Make Themselves at Home in the World'. In M. Strathern (ed), *Shifting Contexts. Transformations in Anthropological Knowledge*, 57–80. London: Routledge.
- Latour, B. 2007. *Reassembling the Social: An Introduction to Actor-Network-Theory*. Oxford: Oxford University Press.
- Nicol, J. F. and S. Roaf. 2017. 'Rethinking Thermal Comfort'. *Building Research & Information* 45(7): 711–16. <https://doi.org/10.1080/09613218.2017.1301698>.
- Pink, S., D. Tutt and A. Dainty (eds). 2013. *Ethnographic Research in the Construction Industry*. London: Routledge.

- Rittersmith, A. 2009. 'Contextualizing Chinese Medicine in Singapore. Microcosm and Macrocosm'. *Journal of the Anthropological Society of Oxford Online* 1(1): 1–24.
- Roesler, S. and M. Kobi (eds). 2018. *The Urban Microclimate as Artifact. Towards an Architectural Theory of Thermal Diversity*. Basel: Birkhäuser.
- Sahakian, M. 2014. *Keeping Cool in Southeast Asia. Energy Consumption and Urban Air-Conditioning*. Basingstoke: Palgrave Macmillan.
- Schatzki, T. 2010. 'Materiality and Social Life'. *Nature and Culture* 5(2): 123–49.
- Shove, E., G. Walker and S. Brown. 2014. 'Material Culture, Room Temperature and the Social Organisation of Thermal Energy'. *Journal of Material Culture* 19(2): 113–24.
- Stender, M. 2016. 'Towards an Architectural Anthropology – What Architects Can Learn from Anthropology and Vice Versa'. *Architectural Theory Review*, 1–17.
<http://dx.doi.org/10.1080/13264826.2016.1256333>.
- Strebel, I. 2011. 'The Living Building. Towards a Geography of Maintenance Work'. *Social & Cultural Geography* 12(3): 243–62.
- Strebel, I. and A. Bovet. 2018. "'Dann müssen wir es so lassen": Reparatur ist (immer) mehr als die Wiederherstellung des Normalzustandes'. In Krebs S., G. Schabacher and H. Weber (eds), *Kulturen des Reparierens. Dinge. Wissen. Praktiken*, 347–72. Bielefeld: transcript.
- Wade, F., M. Shipworth and R. Hitchings. 2016. 'How Installers Select and Explain Domestic Heating Controls'. *Building Research & Information* 45(4): 371–83.
- Waterson, R. 1997. *The Living House. An Anthropology of Architecture in South-East Asia*. London: Thames and Hudson.
- 田 Tian, 静Jing, and 铁军Tiejun 周Zhou. 2015. '重庆传统建筑环境摄影性研究——中山古镇传统建筑与当代建筑对比分析 / Study on Chongqing Traditional Architecture Based on Environmental Adaptability: Comparing Zhongshan Traditional Architecture with Contemporary Architecture'. *建筑文化 (Architectural Culture)*: 154–58.
- 龙 Long, 惟定 Weiding. 2013. '夏热冬冷地区住宅供暖问题刍议 Xiare Dongleng Diqu Zhuzhai Gongnuan Wenti Chuyi'. *暖通空调HV&AC* 43 (6): 42–49.



Figure 1: Characteristic Chongqing cityscape, showing various different housing typologies. Photograph by the author.
609x406mm (180 x 180 DPI)



Figure 2: Winter bedroom and workplace of Wang Chongshi, with a radiator under the table next to his legs, December 2017. Photograph by the author.
772x514mm (180 x 180 DPI)



Figure 3: Installation of an electronic underfloor heating system in the new apartment of Zhang Jiong, Chongqing, December 2017. Photograph by the author.
772x514mm (180 x 180 DPI)