HOW TO STAY WARM GUIDE

conserve your own heat

insulate your surroundings

stay active

layout furniture appropriately

HOW-TO-STAY-WARM GUIDE

2.

3.

4.

The How to Stay Warm Guide features a non-exhaustive catalogue of heat-producing or heat-storing devices and techniques developped through centuries in cultures around the world. To cope with cold climates, people have come up with ingenious ways to keep or contain heat and reuse the heat created by different energy sources.

Naturally, these heat sources generate areas in which people tend to congregate. Often tied with certain rituals and etiquettes, these objects and customs start to form an integral part of the culture and in some cases the architecture.

Technical, social, ideological and spiritual, the manual seeks to awaken our conciousness about our environment and the role heating and heating devices play in it and opening up new possibilities and combinations to takle this topic we are always confronted with in our climates.

The Zitrone are constantly confronted with this theme in the interim buildings they occupy. Equipped with malfunctioning and sometimes even non-existant heating systems, they have to find ways to cope with interior temperatures that may seem uncomfortable at first but can be seized as an opportunity to generate social environments.

Our project proposes additions to localized heating solutions to be used in both social situations and individual atelier spaces, seeking inspiration in some of the following examples in this booklet: the mesa camilla, the soapstone footwarmer and the sauna.

Additionally, the cover of this booklet, an A3 poster, can be hung in places in which people are often cold to remind them of behavioural actions they can implement in their daily routine to feel warmer in their environments.

Three physical phenomena allow heat transmission:

- conduction (contact)
- radiation (waves) usually unnoticeable
- convection (wind)

The most direct experience of a thermal process is through conduction, for the sense of touch has an immediacy and undeniable reality to it. Our affection for many everyday objects may be derived partly from simply enjoying their warmth or coolness as we touch them. the most direct experience of a thermal process is through conduction, for the sense of touch has an immediacy and undeniable reality to it. Our affection for many everyday objects may be derived partly from simply enjoying their warmth or coolness as we touch them.

Water has one of the highest thermal capacities at 4.2 kJ/(kg*K) whereas concrete has about one third of that. On the other hand, concrete can be heated to much higher temperatures (1200 C) by for example electrical heating and therefore has a much higher overall volumetric capacity. [1]

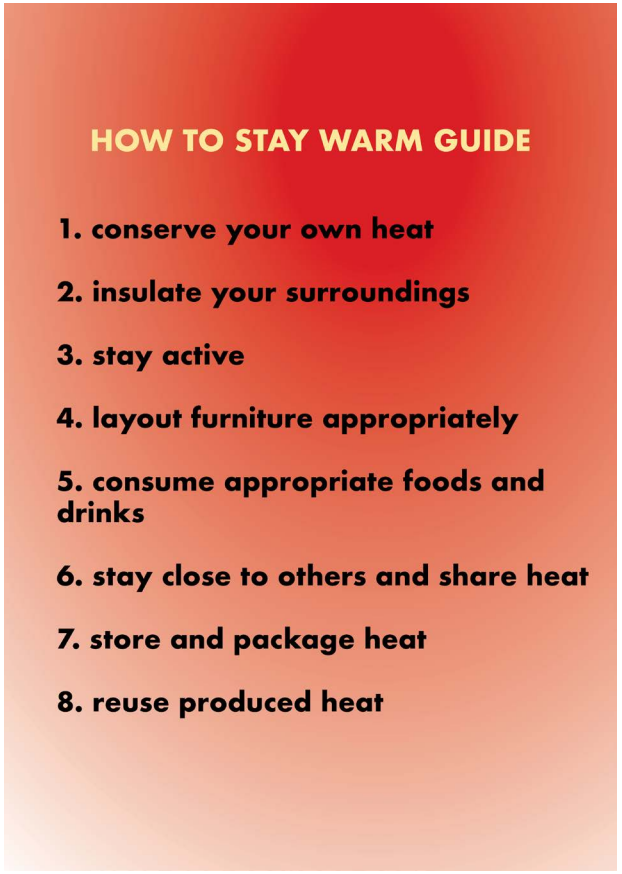
Sorted by Heat Capacity

Material	Density Kg/m3	Specific Heat j/kg °C	Heat Capacity MJ/°C M3	Btus/ ft3/ degree	Thermal Conduct. W/(mK)	Comments
Water	1000	4186	4.186	112.35	0.6	Not easily heated over 200F
Cordierite	2098	1475	3.094	83.06	1.3	Used for pizza stones
Soapstone	2980	980	2.920	78.38	6.4	
Thermal Salts	1992	1447	2.882	77.36	0.50	Used for thermal solar storage
Magnesium Oxide	3043	885	2.693	72.28	2.00	
Wax	897	2951	2.647	71.04	0.20	Fire Danger
Fire Clay Brick	2403	1050	2.523	67.72	1.40	
Concrete	2500	1000	2.500	67.10	1.00	Working Temperature limit 400F
Aluminum	2400	900	2.430	65.22	230	Expensive
Kaolinite	2600	920	2.392	64.20	0.37	
Basalt	2800	840	2.352	63.13	1.70	
Glass	2600	837	2.176	58.41	0.80	Some glass up to 1.4
Granite	2600	800	2.080	55.83	2.00	Some up to 4.
Red Brick	1400	1000	1.400	37.57	1.10	
Clay	1400	950	1.330	35.70	0.25	Heavily dependent on moisture %
Sand	1500	800	1.200	32.21	0.32	Heavily dependent on moisture %
Cinder Block	1602	674	1.079	28.98	0.76	Filled w/cement improves #s

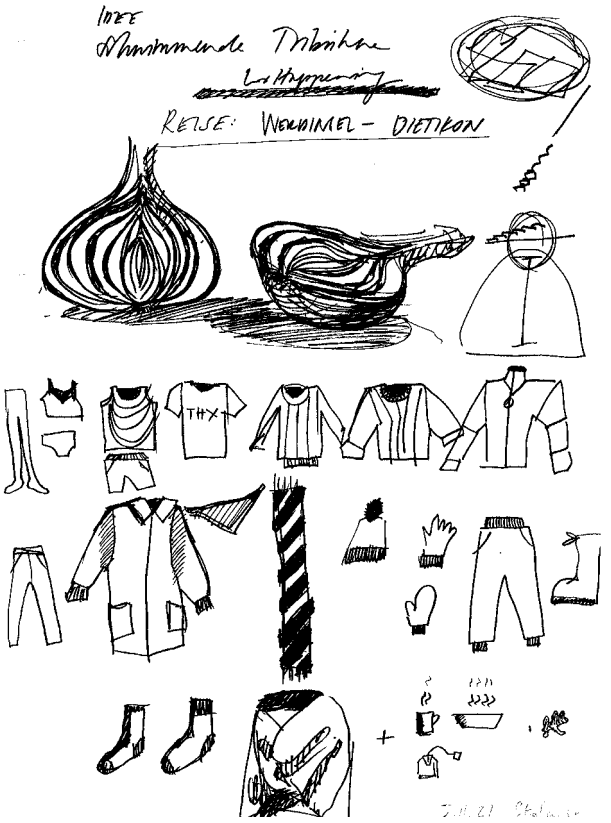
Heat storage capacity of different materials

table of contents

The table of contents of this booklet is reproduced on its cover in the form of a separate A3 page which can serve as a poster to be hung in places in which people are often cold to remind them of behavioural actions, objects and systems they can implement in their daily routine to feel warmer in their environments.



1. conserve your own heat



Use layering
Stephanie Zitrone Dietikon
Workshop, November 5th 2021

1. conserve your own heat

A korsi is a type of low table found in Iran, with a heater underneath it, and blankets thrown over it. It is a traditional item of furniture in Iranian culture. A family or other gathering sits on the floor around the korsi during the winter. It used to be popular for entire families to gather together during yearly Yalda celebrations.

Korsis are generally heated with electric elements or, traditionally, with a brazier containing hot coals that was placed under the table. The table is covered with a thick cloth overhanging on all sides to keep its occupants warm. The occupants sit on large cushions around the korsi with the cloth over their laps.

A special woven rug called ru korsi is usually placed over any blankets to protect them from food stains. [2]

Korsi
Iran
origin unknown

1. conserve your own heat

The mesa camilla, or simply camilla, is a circular, rectangular or square table, made of wood, provided with a frame.

It is a table that, usually in winter, is covered with one or more layers of thick fabric that can reach almost to the floor (these fabrics are called “faldas”(skirts), “ropa” (clothes), or “enaguas” (slip)).

It is a gathering spot in the house, to eat or for instance for a card game. During the winter, a wood platform with a large central circular hole to place a brazier is placed at foot level.

The family would gather around it, putting their legs under the “skirt” to warm their lower-body, and the skirts could be lifted so that the warm air from under the table would spread throughout the room and raise its temperature. [3]

Brasero and mesa camilla
Spain
Middle Ages

1. conserve your own heat

A kotatsu is a low, wooden table frame covered by a futon, or heavy blanket, upon which a table top sits. Underneath is a heat source, formerly a charcoal brazier but now electric, often built into the table itself.

The history of the kotatsu begins in the Muromachi period or Ashikaga shogunate during the fourteenth century. Its origins begin with the Japanese cooking hearth, known as the irori. Charcoal was the primary method of cooking and heating in the traditional Japanese household and was used to heat the irori. By the fourteenth century in Japan, a seating platform was introduced to the irori and its cooking function became separated from its seating function. On top of the wooden platform a quilt was placed, known as an oki that trapped and localized the heat of the charcoal burner. This early ancestor to the modern kotatsu was called a hori-gotatsu.

In the middle of the twentieth-century charcoal was replaced with electricity as a heating source. Instead of having the moveable earthen pot of charcoals beneath the kotatsu, it was possible to attach an electric heating fixture directly to the frame of the kotatsu. By the end of the 1990s, the majority of Japanese homes had the modern irori and 81 percent had a kotatsu, though they are nowadays warmed using electricity instead of glowing coals or charcoal. [4]

Kotatsu
Japan
14th century

The four-poster bed provides a good example of a place that is not warm in itself yet carries strong thermal associations. It slowly becomes warm as the air within the drawn curtains is warmed by body heat. While such a thermal process is a bit subtle to perceive, the overall experience of warmth can be related to the context of a very distinct and identifiable place. The limits of the space are clearly marked by the four posts that frame the bed. The space is further enclosed by the curtains hung from the frame. Such a strong spatial definition ensures that our memories will associate the experience of thermal comfort with something in particular—the place itself. [5]

The curtains also helped to give privacy to the sleepers, since servants and bodyguards often slept in the same room. In the mediaeval era and up to the 18th century beds were items of furniture on which great personages and royalty made public appearances and held court, thus they were designed to impress. A four poster bed with backboard and tester allowed extra space from which to display and hang expensive fabrics and heraldic decoration. [6]

Four-poster Bed
Europe
3rd Century

The thick felt, or non-woven wool, used to cover gers came from the nomads' own animals. Central Asian nomads had herds of sheep, yak, and goats. The wool of all these animals could be felted. The traditional method of felting wool among steppe communities was to thoroughly wet it, roll it around a pole, wrap it in yak hide, and drag it behind a galloping horse. This efficiently compressed the wool fibers to tough, sturdy felt. Most yurts have three to five layers of felt, and, often, an outer layer of waterproof fabric such as canvas. [7] Animal skins are also used as insulating element and rugs are sometimes added to the interior for decorative and insulating purposes. [8]

Yurt (Russia) and Ger (Mongolia)
Central Asia
at least 11th century BC

A carpet is a textile floor covering typically consisting of an upper layer of pile attached to a backing. The pile was traditionally made from wool, but since the 20th century, synthetic fibers such as polypropylene, nylon or polyester are often used, as these fibers are less expensive than wool. The pile usually consists of twisted tufts that are typically heat-treated to maintain their structure.

Carpets are used for a variety of purposes, including insulating a person's feet from a cold tile or concrete floor, making a room more comfortable as a place to sit on the floor (e.g., as a prayer rug), reducing sound from walking (particularly in apartment buildings), zoning areas and adding decoration or color to a room. [9]

Carpet
Persia and Armenia
5th century BC

In the Middle Ages, the system of insulation is highly visible: the use of exquisite, intricately woven tapestries and carpets in the great medieval halls. The practice originated with the European peasants who would hang skins or lengths of cloth on the walls of their houses during the cold weather. This created an extra insulating air space and a radiation barrier between the inhabitants and the cold exterior walls. Eventually royalty took to commisioning the weaving of very special pictoral hangings, the tapestries, to grace the ever-cold stone walls of their castles. Such tapestries clearly transcended their role as insulators and evolved into one of the high art forms of the period.

The Mughuls of India developed a similar system in order to heat their open and airy stone palaces in winter. Collections of Persian carpets, in addition to providing insulating layers over the stone floors for people to sit on, were also hung from hooks along the walls. The carpets were greatly valued for their beauty but also for the sense of warmth and comfort they conveyed. Their removal when the warm weather arrived reinforced their seasonal and thermal associations. [10]

Tapestries
Europe
Middle Ages

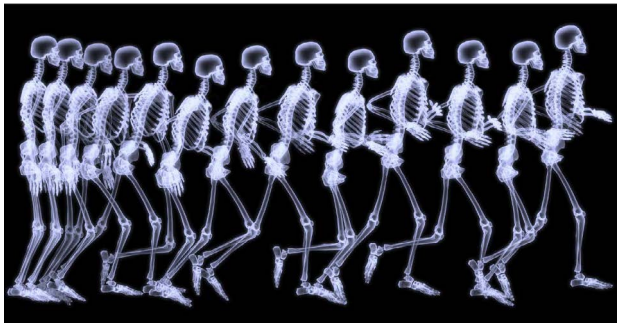
Their relation to thermal function is quite obvious because they are only in place when extra insulation is needed. The draught stopper is held snug against the inside of a window frame or a door to prevent drafts. Putting this object becomes a bit like putting the house to bed at night. [11]

Draught Stopper
origin unknown

One factor that can help us to appreciate the thermal function of a place or object is variability. We are more likely to notice the function of something if there are times when it is not in operation, to notice the significance of soemthing's presence if there are times when it is not there. Shutters provide an interesting example. Their function, clearly, is to close off the window to shelter the interior of the house from storm winds or excess heat. Even while open, their presence conveys a reassuring sense of shelter, for there is the implication that they can be closed when needed. [12]

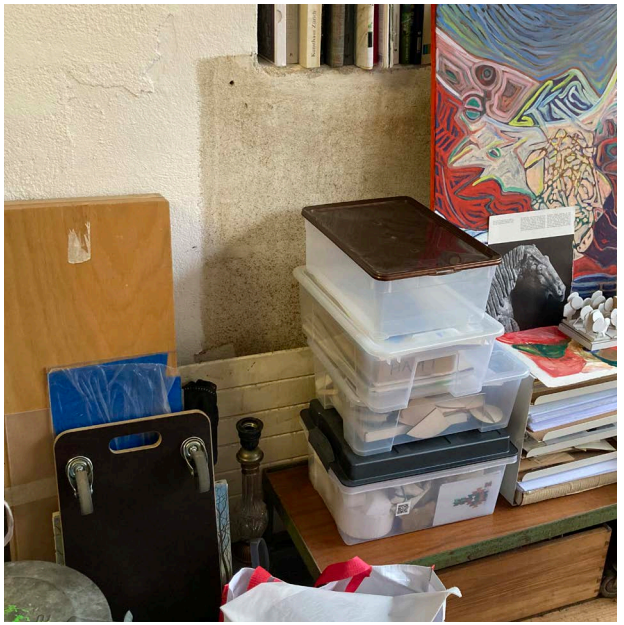
Shutters
Ancient Greece

3. stay active



Move to stay warm, don’t stay immobile for too long

4. layout furniture appropriately



Leave enough space around radiators
for the heat to circulate properly in the room
Zitrone Dietikon
December 2022

5. consume appropriate foods and drinks

In general, foods that take longer to digest can help raise your body temperature and make you feel warmer. The medical term for this process is thermogenesis, which is the process of your body producing heat caused by food metabolizing. Look for food that's high in healthy fats, proteins and carbohydrates.

Bananas
Oats
Coffee
Red Meat
Sweet Potatoes
Butternut Squash
Root Vegetables
Complex carbohydrates (oats, whole grains, potatoes, lentils)
Eggs
Seeds: cumin, cinnamon, sesame seeds, pepper, tumeric, cinnamon
Iron-rich foods
Dry fruits and nuts
Honey
Black beans
Garlic

Ginger Tea
Water
avoid Alcohol [13]

Eating specific food will help keep you warm

A samovar (literally "self-brewer" in Russian) is a metal container traditionally used to heat and boil water. Although originating in Russia, the use of the samovar has spread through to Eastern Europe, South-Eastern Europe, Iran, Afghanistan, Kashmir, the Middle East, Azerbaijan and is also known in some parts of Central Europe. Since the heated water is typically used to make tea, many samovars have a ring-shaped attachment around the chimney to hold and heat a teapot filled with tea concentrate. Though traditionally heated with coal or kindling, many newer samovars use electricity to heat water in a manner similar to an electric water boiler. Antique samovars are often prized for their beautiful workmanship.

The samovar would sit in the center of the room and would thus help to heat the room. [14]

Samovar
Russia, Iran, Kashmir, Turkey
at least 18th century

6. stay close to others and share heat

As its name suggests, a housebarn is a building that is a combination of a house and a barn.

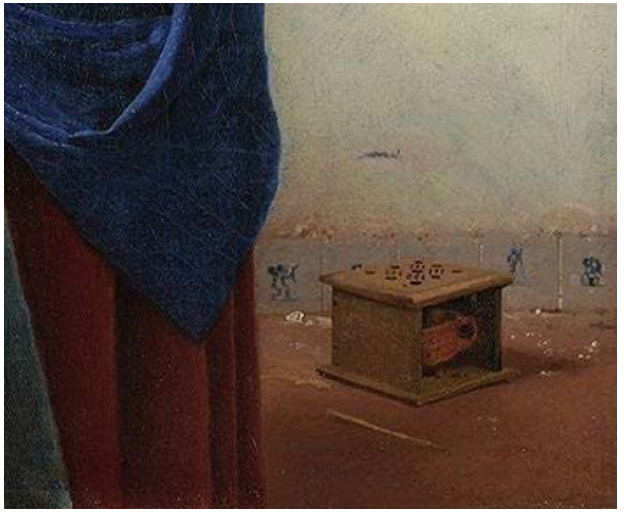
One style features the barn as the lower portion of the building and the house as the second floor such as the Black Forest-style house.

Housebarns were built beginning in prehistoric times after people discovered that the body heat of animals helps to warm human living areas. The ancient four room house is an Iron Age type highly identified with the ancient Israelites.

Living with livestock in the combined building also allowed people to be able to prevent thieves from stealing their animals. Housebarns were developed in western Europe, Scandinavia, and the British Isles and continued being built into the 19th century. [15]

Housebarn
Western Europe, Scandinavia, British Isles
Prehistory

A foot stove consists of a wooden box which is open on one side, with holes or a slab at the top. In it, a bowl made of pottery or metal with burning charcoal was placed. The feet were positioned on top of the stove to become warm. By putting a blanket or clothing on the legs the heat could be isolated and the lower legs were heated. [16]



Foot stove
Netherlands, Northern Germany, United States
15th century

The soapstone foot warmer was heated on a stove and then placed in a sleigh or pung to warm one's feet. Unlike foot warmers that were heated with live coals, soapstone foot warmers posed no fire risk. [17]

In its purest form, soapstone is talc. Talc is what gives the stone the characteristic greasy feel for which it is named. Native Americans understood that soapstone holds heat extremely well; they carved bowls out of it and cooked food in them.

The heat conductivity of the stone is what made it popular. The stone was so dense that it was able to retain and radiate heat. Most metals absorb heat from the fire and then release it rapidly. Soapstone releases heat very slowly. Another point in its favor versus other stones is that some stones when heated repeatedly will crack and break. Soapstone, with its density, can be reheated over and over with no damage to itself.

The soapstone foot warmers were simply placed near the fire before bedtime and allowed to heat up. They were heated to the point that they could be touched to pick up, but not be able to be held for any length of time. The stone could then be rubbed along the entire mattress to warm it up and then the stone was usually wrapped in a cloth and put at the foot of the bed for a continued slow release of heat throughout the night. [18]

Soapstone Foot Warmers
United States
19th century

A hot-water bottle is a bottle filled with hot water and sealed with a stopper, used to provide warmth, typically while in bed, but also for the application of heat to a specific part of the body.

Containers for warmth in bed were in use as early as the 16th century. The earliest versions contained hot coals from the dying embers of the fire, and these bed warmers were used to warm the bed before getting into it.

Containers using hot water were soon also used, with the advantages that they could remain in the bed with the sleeper and were not so hot as to be a fire risk.

Prior to the invention of rubber that could withstand sufficient heat, these early hot-water bottles were made of a variety of materials, such as zinc, copper, brass, glass, earthenware or wood. To prevent burning, the metal hot water flasks were wrapped in a soft cloth bag. [19]

Hot Water Bottle
Europe
16th century

Grain pillows are pillows filled with different materials, which are used for both heat and cold therapy. They are described as a natural remedy because they are made from organic raw materials.

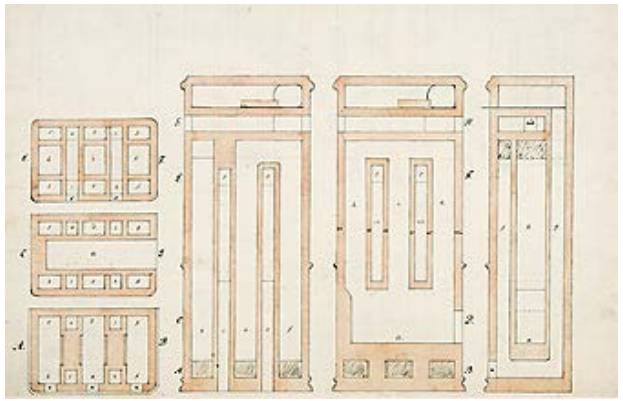
Filling:
Cereal grains (wheat, rye, spelt and others) are ideal as fillings due to their very good storage properties. Through them, the temperature is kept for a long time and, above all, constant.

Fruit pits (grapes, cherries and others) are not grains, but are often equated with grain pillows. Kernels, unlike grains, store a dry heat or cold. [20]

Körnerkissen
Germany, Austria, Switzerland
Middle Ages

A masonry heater (or stove) is a device for warming an interior space through radiant heating, by capturing the heat from periodic burning of fuel (usually wood), and then radiating the heat at a fairly constant temperature for a long period. Masonry heaters covered in tile are called cocklestoves (also tile stoves or ceramic stoves). The technology has existed in different forms, from back into the Neoglacial and Neolithic periods. Archaeological digs have revealed excavations of ancient inhabitants utilizing hot smoke from fires in their subterranean dwellings, to radiate into the living spaces.

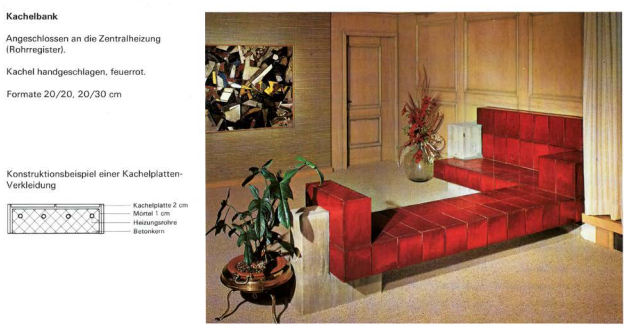
Evidence found from 5,000 B.C. of massive blocks of masonry used to retain heat foreshadowed early forms of fire hearths that were used as multifunctional heating sources. Later evolutions came in the Roman hypocaust and Austro-German cocklestove (Kachelofen, literally “tile oven”, or Steinofen, “stone oven”), using the smoke and exhaust of a single fire. In Eastern and Northern Europe and North Asia, these stoves evolved in many different forms and names: for example the Russian stove, the Finnish stove (pystyuuni or kaakeliuuni, “tile oven”) and the Swedish stove (kakelugn, “tile stove”) associated with Carl Johan Cronstedt (see here his drawing from 1767). The Chinese developed the same principle into their K’ang bed-stove. [21]



Masonry Heater
Europe
since the Neolithic period in different forms

The German Kachelofen (cocklestove) is a relatively large home heater surrounded with ceramic tile. During the Renaissance period in Germany, the builders of such stoves were part of a distinct trade and were called Hafnermeister.

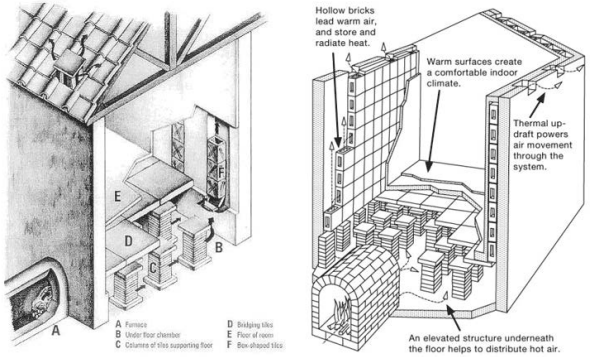
A cocklestove uses a maze-like passage created out of firebrick to release gases and smoke from the wood fire slowly, allowing the firebrick to retain as much heat as possible from the gases and smoke. The ceramic tile surrounding the stove also acts as insulation to retain heat. Such stoves were carefully designed so that the minimum amount of heat would escape, only as much as needed to warm the flue to maintain a proper air draught. The firebrick used in the construction holds 80% more heat than ferrous metals such as cast iron, while its heat conductivity is 1/45 that of iron or steel. A cocklestove is efficient enough to warm a house for up to 6 to 12 hours after the fire has stopped burning. [22]



Kachelofen & Kachelbank
Germany, Austria, Switzerland
15th century

A hypocaust (Latin: hypocaustum) is a system of central heating in a building that produces and circulates hot air below the floor of a room, and may also warm the walls with a series of pipes through which the hot air passes. This air can warm the upper floors as well. The word derives from the Ancient Greek hypo meaning "under" and caust-, meaning "burnt" (as in caustic). The earliest reference to such a system suggests that the temple of Ephesus in 350 BC was heated in this manner, although Vitruvius attributes its invention to Sergius Orata in c. 80 BC. Its invention improved the hygiene and living conditions of citizens, and was a forerunner of modern central heating.

Today, analogous systems like the Gloria (Castille, Spain, Middle Ages) and the Ondol (Korea, -5000) are still used. [23]

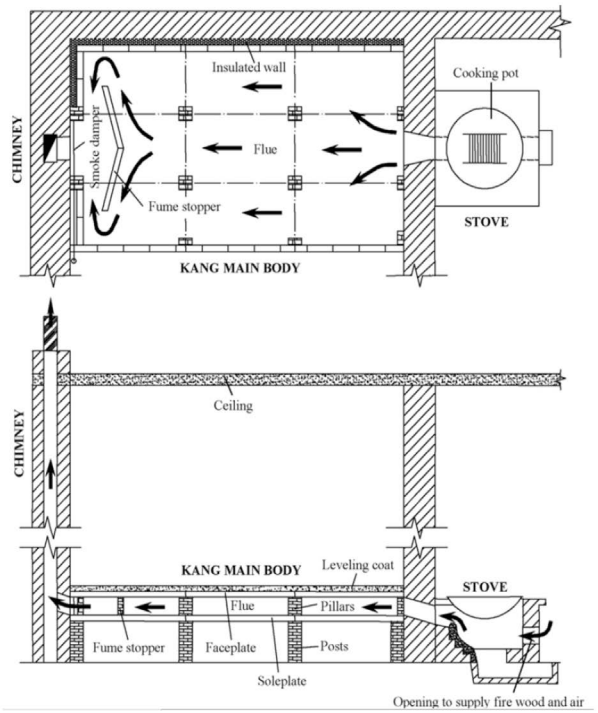


Hypocaust
Ancient Rome
350 BC

The k'ang is a traditional long (2 metres or more) platform for general living, working, entertaining and sleeping used in the northern part of China, where the winter climate is cold. It is made of bricks or other forms of fired clay and more recently of concrete in some locations.

Its interior cavity, leading to a (often) convoluted flue system, channels the hot exhaust from a firewood/coal fireplace, usually the cooking fire from an adjacent room that serves as a kitchen, sometimes from a stove set below floor level. This allows a longer contact time between the exhaust (which still contains much heat from the combustion source) and (indirectly) the inside of the room, hence more heat transfer/recycling back into the room, effectively making it a ducted heating system similar to the hypocaust system used by ancient Romans. Typically, a kang occupies one third to one half of the area the room, and is used for sleeping at night and for other activities during the day. A kang which covers the entire floor is called a dikang.

Like the European cocklestove, a massive block of masonry is used to retain heat. While it might take several hours of heating to reach the desired surface temperature, a properly designed bed raised to sufficient temperature should remain warm throughout the night without the need to maintain a fire. [24]



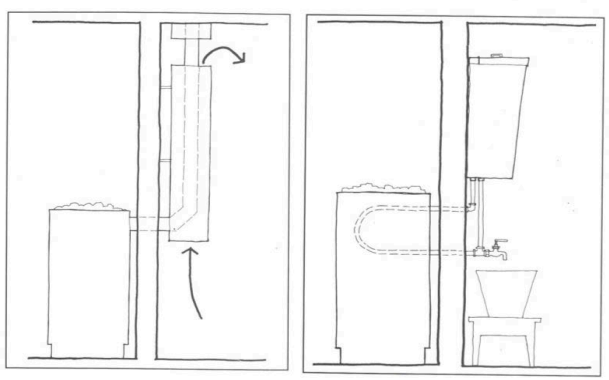
K'ang or Ondol bed-stove
China (Kang) and Korea (Ondol)
ca 5000 BC

8. reuse produced heat

Heat remaining in the stove after bathing has been completed can be utilized to heat an adjoining room.

At some farms and summer cottages in Finland the sauna is even today the only bathroom. Water, used for washing during the sauna, can be heated by the stove in one of the following ways:

- in a cistern built into the body of the stove;
- in a cistern hung on the side of the stove;
- in a cistern placed in the wash room with a pipe passing through the body of the stove. [25]



Sauna: Water pipes pass through heat source to have hot water
Finland
19th century

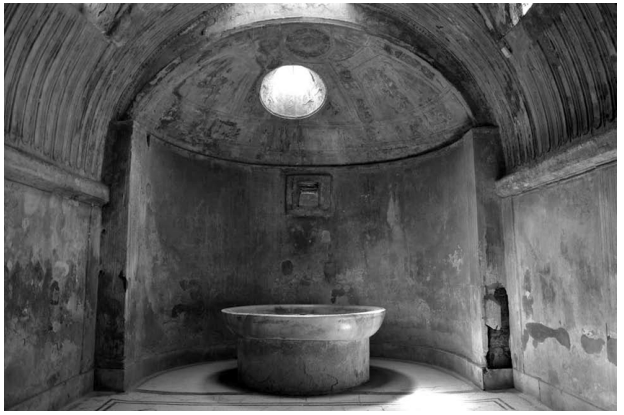
9. heat as cleanser

A sudatorium is a vaulted sweating-room (sudor, “sweat”) of the Roman baths or thermae.

In order to obtain the great heat required, the whole wall was lined with vertical terracotta flue pipes through which hot air and smoke from the suspensura passed to an exit in the roof.

When Arabs and Turks overran the Eastern Roman Empire, they adopted and developed this feature in their baths and hammams.

The room was sometimes surmounted by a dome with a circular opening, closed by a bronze disc suspended by chains. The bather regulated the heat by moving the disc closer to or further away from the opening. [26]

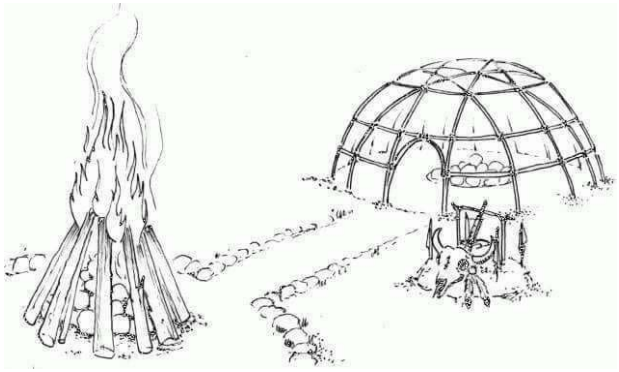


Sudatorium
Ancient Rome
50 BC

9. heat as cleanser

A sweat lodge is a low profile hut, typically dome-shaped or oblong, and made with natural materials. The structure is the lodge, and the ceremony performed within the structure may be called by some cultures a purification ceremony or simply a sweat. Traditionally the structure is simple, constructed of saplings covered with blankets and sometimes animal skins. Originally, it was only used by some of the Indigenous peoples of the Americas, notably the Plains Indians.

A fire would bring big stones to a very high temperature. Therse were then placed in the middle of the sweat lodge.[27]



Sweat Lodge
Indigenous people of the Americas
date unknown

9. heat as cleanser

One of the most important social centers for the Japanese are the hot baths. For the poorest rice farmer and the meanest sevant, just as for the rich aristocrat, the daily soak in superlatively heated water is part of the routine of every late afternoon. Every village and every neighborhood in a city traditionally has its own communal hot baths where the residents come to bathe together every night. Not to go to the baths means one is sick or angry or antisocial. It is a social occasion, a time to relax after the day's work and enjoy one another's company.

Although each household has its own bathhouse, with a tub just big enough for one person, the bath was still a community occasion. [29]

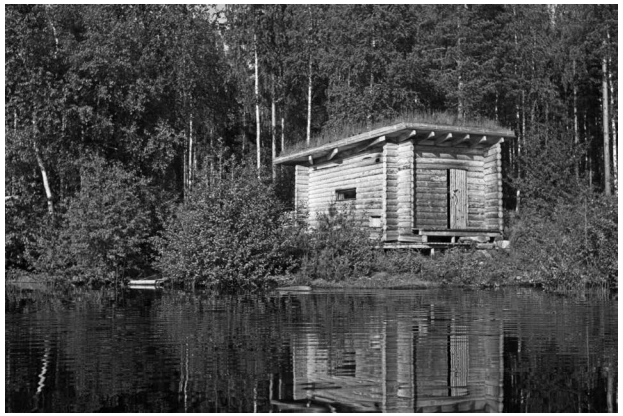
Sento
Japan
Edo period (1603–1867)

9. heat as cleanser

The sauna presents an example rather closely related to the hearth. In Finland it has a very important place in national custom. The present-day rituals surrounding the sauna are similar to those of the Japanese bath. Although the Finns usually go to the sauna only once a week, in contrast to the daily visits of the Japanese, the sauna remains important as the place and the time for the family to relax together.

The sauna was involved in the religion of the Finns: it was a place for the worship of the dead, who were supposed to return gladly, even after death to so pleasant a place. Some people believed that the throwing of water over the stones was a form of sacrificial ceremony. The Finnish word “loyly”, meaning the “steam which rises from the stones” originally signified the spirit, or even life. “In the sauna one must conduct oneself as one would in a church,” according to an old Finnish saying.

Although many of the old customs are no longer observed, the sauna continues to be regarded by the Finns with a certain reverence, a reflection of the ancient traditions. [30]



Sauna
Finland
around 2’000 BC

Special little thermal places now seem rather quaint and old-fashioned because they have been out-moded by a technology that enables us to keep whole buildings at a uniform temperature. We no longer need to create the one special place that will have just the right thermal qualities, for every place can now be just right. Yet the lingering fondness we have for such places suggests they served some need especially well. Each one provided a setting for the activities associated with a specific set of thermal conditions. People's daily habits and spatial patterns were in large part determined by the availability of desirable thermal qualities.

In (the western world), our tendency has been to get away from thermal conditions as a determinant of behavior. Instead, we have used our technology to keep entire living and working complexes at a uniformly comfortable temperature. As a result, our spatial habits have become diffused, and activities that were once localized by thermal conditions have spread out over a while house or building. We forget, unless the system breaks down, that such wide-ranging use of space is extremely dependent upon the available heating and cooling equipment.

Lisa Heschong, *Thermal Delight in Architecture*, 1979, p. 40-41

The How to Stay Warm Guide aims at opening up new ways of viewing thermal comfort, liberated from homogenous heating systems that are used nowadays, regarding localized heating as a richness and taking advantage of the different temerature-generated environments. It is a starting point to continue to question the use of heating in buildings in the western world and its behavioural impact and to start to consider alternatives.

What would a space that follows thermal logic look like nowadays?

How could some of the heat-producing or -conserving objects in the catalogue be integrated in the architecture?

image credits

Heat capacity	https://www.pinterest.com/pin/500814421033156176/
Korsi	https://de.wikipedia.org/wiki/Korsi/media/Datei:Korsi.jpg
Mesa camilla	https://www.mueblesmodesto.es/blog/la—mesa—camilla
Kotatsu	https://www.metmuseum.org/art/collection/search/55802 Two Young Women Seated by a Kotatsu Playing Cat's Cradle ca. 1765, Suzuki Harunobu Japanese.
Four-poster bed	https://en.wikipedia.org/wiki/Four-poster—bed□/media/File:Compiègne—-—palais,—musée—du—Second—Empire—19.jpg
Yurt	https://www.nomads.org/assets/images/kyrgyzstan-yurts-5-1200x675.jpg
Carpet	https://en.wikipedia.org/wiki/Carpet□/media/File:Pazyryk—carpet.jpg
Tapestry	https://en.wikipedia.org/wiki/Carpet□/media/File:Pazyryk—carpet.jpg
Draught stopper	https://www.amara.com/us/products/tweed-draught-excluder-16x80cm-blue-moon
Movement	https://simplifaster.com/articles/movement-variability-strategies-interventions/
Nutrition	https://www.nordiskashop.com/shop/glass-vases-bowls-drinkware/22
Samovar	https://www.britannica.com/topic/samovar
Housebarn	https://en.wikipedia.org/wiki/Housebarn
Foot Stove	https://en.wikipedia.org/wiki/The—Milkmaid—(Vermeer)□/media/File:Johannes—Vermeer—-—Het—melkmeisje—-—Google—Art—Project.jpg Johannes Vermeer, The Milkmaid, detail, c. 1660
Soap Stone	https://content.mpl.org/digital/collection/MHS/id/125/
Hot Water Bottle	https://en.wikipedia.org/wiki/Hot—water—bottle□/media/File:Bed—warmer—(AM—16513-2).jpg
Körnerkissen	https://www.giraffenland.de/kirschkernkissen-40x60cm-mit-reissverschluss-rohweiss
Masonry Heater	https://en.wikipedia.org/wiki/Carl—Johan—Cronstedt□/media/File:Kakelugn1767.jpg
Kachelbank	Verband schweizerischer Kachelofenfabrikanten, Keramik: Cheminée Kachelofen, Verband schweizerischer Kachelofenfabrikanten, Zurich, 1973.
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Sudadorium	https://aquaplan.co.rs/wellness/kaldarijum/
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Sento	https://commons.wikimedia.org/wiki/File:Men—and—women—in—a—communal—Japanese—bath—house—Wellcome—V0046647.jpg
Sauna	https://www.alvaraalto.fi/en/architecture/muuratsalo-experimental-house/

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Ileana Crim & Marius Mildner
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d

heat

5.
dri

6.

consume appropriate foods an
inks

stay close to others and share

store and package heat

reuse produced heat