Why humans and their fur parted ways
Wade 2003
Heating, cooling and the human body

The changing relation between indoors and out
In Europe primary energy consumption by buildings is around 50% of total energy consumption.

Almost 50% of this energy is used in the provision of indoor climate control for occupant comfort.

The costs of “comfort”

How come 22 degrees C?

physical parameters and cultural concerns

sea breeze or mountain air

what climate to provide?
Defining comfort
Standardising comfort, sweat and smell: the clo and the olf

The standard amount of insulation required to keep a resting person warm in a windless room at 70 °F (21.1°C) is equal to one Clo.

Units were chosen so that 1 clo would be roughly the insulating value afforded by a man’s underwear and a lightweight suit, or “a heavy top coat alone.”

The Olf is a unit used to measure the scent emission of people and objects.

One olf is defined as the scent emission of an "average person", a sitting adult that takes an average of 0.7 baths per day and whose skin has a total area of 1.8 square metres; the scent emission of an object or person is measured by trained personnel comparing it to normed scents.

Professor Fanger in his "Doctor-dress" at a reception at DTU, June 14, 2001

Standardising science also matters for ventilation rates and energy consumption.
Outdoors
Indoors: where people spend their time
Geels 2002.
Different refrigerated regimes

USA: post war house building, 1950s onwards

Japan: symbol of westernisation, 1980s

Australia: retrofitting existing stock, 2000

Diversity between and within countries
Air conditioning as normal

Technology already established

Disappearing sociotechnical systems: vernacular cooling

Geels 2002.
Mechanical cooling
Changing ideas and conventions of comfort: space, body, building?

6 to 30 degrees C; 20 to 28 degrees C; 22 degrees C.
New commercial opportunities
Climate Control Clothing
by Snowgum

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TOKYO -- Late last month, the presidents of Japan's three biggest banks gathered to make an important announcement: They were abandoning formal attire for the rest of the summer -- and insisting that their 1,630 branches nationwide keep office temperatures at a steamy 82 degrees Fahrenheit in order to conserve energy.

Satoshi Iue, Sanyo Electric chairman and CEO, poses during a 'Cool Biz' fashion show.
Sweat and smell

Two types of sweat glands:

Eccrine - the most numerous type that are found all over the body, particularly on the palms of the hands, soles of the feet and forehead – basically water+salt

Apocrine - mostly confined to the armpits (axilla) and the anal-genital area. They typically end in hair follicles rather than pores. – include fatty acids and protein
Changing conventions; modifying technologies; re-defining the role of the building itself.
The air conditioned man: The great economical idea of the age. The ventilating costume, cool in summer, warm in winter. 1877.