

# Hot Standing

Francis McKee

Humans exist within very narrow bands of sensation. The full range of human hearing extends from 20 to 20,000 hertz. A typical human eye will respond to wavelengths from about 390 to 700 nanometres. The human body can only remain alive within the extremes of 46 F and 115 F and generally hovers around 98.6 F. Our senses seem designed to filter information out than to let it in. In a world of mega spawning digital info ballooning we sit tight, resisting the deluge, gripping the sides of our chairs as it rains down upon us.

It was Cornelius Drebbel who devised the first thermostat – or at least the first to be documented. He used a column of mercury, and a series of floats and levers, to regulate heat in a furnace. Then he adapted the technique to regulate the temperature of eggs in an incubator. *He was able, by means of a strange and amusing device, to hatch duck and chicken eggs all the years round, yes, even in the middle of winter, without using ducks or chickens for this.* That was 1620. Six years later Sir Francis Bacon died from pneumonia after stuffing a bird with snow to test a theory of refrigeration. *The Snow so chilled him that he immediately fell so extremely ill... they put him into... a damp bed... which gave him such a cold that in 2 or 3 days he died of Suffocation.*

There’s more: a history of the thermostat and its evolution through the industrial revolution; its use in car engines; its use in shower units; the part it plays in central heating... Maybe the dummy thermostat is the most interesting footnote to this history. Companies found that employees complaining about office temperatures could be satisfied with the installation of a fake control unit. Once the illusion of control was given, employee complaints disappeared. While they are not changing the temperature in any way, their bodies achieve homeostasis in the environment by subtly adjusting their physical operating levels. It is a placebo response, but it also reveals a more intimate, and complex, feedback loop between human and unit that underlines how much we want to communicate with our machines.

In 1979 the American computer scientist John McCarthy began to consider how thermostats think and he told this story:

Recently it was too hot upstairs, and the question arose as to whether the upstairs thermostat mistakenly believed it was too cold upstairs or whether the furnace thermostat mistakenly believed the water was too cold. It turned out that neither mistake was made; the downstairs controller tried to turn off the flow of water but couldn’t, because the valve was stuck. The plumber came once and found the trouble, and came again when a replacement valve was ordered. Since the services of plumbers are increasingly expensive, and microcomputers are increasingly cheap, one is led to design a temperature control system that would know a lot more about the thermal state of the house and its own state of health.

Earlier in this account, McCarthy had already ascribed simple thoughts and beliefs to thermostats. And here, he is looking into the future to imagine how those thermostats could evolve: to become more self-conscious.

McCarthy reckoned we would confront such issues in the 21<sup>st</sup> century. In 2008 Tony Fadell, creator of the iPod, left Apple and in 2010 co-founded Nest Labs in a garage in Palo Alto. The first product he launched was the Nest Learning Thermostat. *Just turn it up and turn it down. The Nest Thermostat learns what temperatures you like and builds a personalized schedule. Teach it efficient temperatures for a few days and, within a week, it'll start setting them on its own.* The machine can be contacted remotely via apps and temperature can be modified from anywhere.

How to negotiate this transaction? Smalltalk. The human-computer symbiosis isn’t an epic moment, it’s a constant stream of little exchanges.

*It's getting cold here, I'm going to increase the temperature.* That’s fine.  
*Tomorrow morning I'll heat the water from 6am – it should be good by the time you get up, ready for a bath.*

You really know heat, don’t you? *Hot and cold, yes.*

Tell me about thermals...

*Not now.*

This is limited, primitive. But the nest thermostat can communicate with smoke detectors too, so they can scan a house and heat the rooms that are still occupied. They can also link to us via apps and Apple continue to develop Siri in conjunction with Wolfram Alpha, a computational knowledge engine. That creates the potential to take the conversation to another, more interesting, level.

As if to prove that point, it’s well known that if you ask ‘what is July 27’ Siri will say that on 27 July 2014 the gates of Hades will open. Reword the question and she will correct herself and tell you we have been living in hell since May 14, 2005. Prophecy thrives in a bodiless voice.

Siri may be a harbinger of doom, or a dubious data conflator, but it’s possible that she is also the next great medium - allowing messages to flow through to us from a host of machine entities beyond. And as Nest and Siri begin to measure and analyse the environment around them they will also start to pass on messages from nature itself. In *Angels: A Modern Myth* (1995), Michel Serres describes the all-enveloping system of coded messages already in circulation:

Each flux breaks down into myriad single particles, but they all go to make up the world. Each of them bears little bits which, when put together, make the larger whole...At any given moment of the day, the breeze plays on your cheek, and since it carries codes from everywhere, it’s telling you about the state of the body of the world. If it is able to construct a universe in this way, it follows, conversely, that a universal reason blows in tiny particles...

If winds, currents, glaciers, volcanoes etc., carry subtle messages that are so difficult to read that it takes us absolutely ages trying to decipher them, wouldn’t it be appropriate to call them intelligent? What human could ever presume to speak a language that was so precise, refined and exquisitely coded?

As the little thoughts of thinking machines become subtler and more attuned to the natural world around them our ability to interpret nature’s micro-packets of information should increase exponentially. Whether we can converse with nature is yet another question. There are precedents in culture: shamans talk of sensing the frequency of a mountain or the flow of energy through natural objects. There are chemical, acoustical and electrical channels of communication between most plants and animals. Scientists have recently shown the quantum character of light transport in photosynthesis while quantum computing is slowly emerging from the shadows of the laboratory.

The danger of such randomly accumulated points is that they quickly spawn a utopian vision, a reheated version of the global hive mind posited by the rise of the web. Humans, however, have a poor record of talking to nature. The shaman is marginalised, an exotic organism in a rational world. The scientific exploration of data transmission is purely practical and without concern for the quality of the communication. Humans like to command nature rather than open up a dialogue with it. Not only do we want to tell nature what to do, we tend to teach machines to imitate our most competitive traits. McCarthy points out how this has distorted the development of artificial intelligence, using computer chess programs as an example:

Alexander Kronrod, a Russian AI researcher, said 'Chess is the Drosophila of AI.' He was making an analogy with geneticists' use of that fruit fly to study inheritance. Playing chess requires certain intellectual mechanisms and not others. Chess programs now play at grandmaster level, but they do it with limited intellectual mechanisms compared to those used by a human chess player, substituting large amounts of computation for understanding. Once we understand these mechanisms better, we can build human-level chess programs that do far less computation than do present programs. Unfortunately, the competitive and commercial aspects of making computers play chess have taken precedence over using chess as a scientific domain. It is as if the geneticists after 1910 had organized fruit fly races and concentrated their efforts on breeding fruit flies that could win these races.

And so, while scientists observe the thermal death kinetics of fruit flies and, like wayward hothouse parents, compel machines to play better, faster chess, McCarthy suggests that we are missing the real point. Quality time with our machines may be what’s needed: to surrender the command line and start a conversation.

Deep in the underbelly of the internet, machines are now initiating their own dialogues, as they are linked together to create much wider, accurate, systems of information that will form an underlying industrial internet: energy, transport, health care, and security are already advanced in this process. Perhaps Siri was right: the gates of Hades have opened and we must enter this underworld and beseech Persephone for an ear of corn in silence reaped.