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A formal technical text

## “Thermal Phenomena and Energy Transformations: From Temperature Effects to Heat Management in Engineering Systems”

The **temperature of saturation** of a substance can be influenced by its **junction temperature**, often measured in **centigrade**. For example, the **ice melting point** is a fundamental reference in the study of **temperature dependence** of materials. Different measurement systems, such as the **Reaumur temperature scale**, **Kelvin scale**, and **Fahrenheit temperature scale**, allow scientists to report temperatures accurately in various contexts.

Changes in temperature can cause **temperature volume expansion**, while differences between regions or components generate **temperature difference** and may induce **temperature stress** within a system. In engineering applications, **temperature pressure** effects are significant, as is **thermal head** in heat transfer studies. Understanding the **solidification temperature** or **solidification point** of a material is essential for processing, especially when approaching the **Curie temperature** of ferromagnetic substances. The **ice point** remains a crucial reference, and phenomena such as **temperature inversion** can impact atmospheric and material behavior.

In designing a **thermal engine** or **heat engine**, it is essential to consider the **state heat balance** to ensure efficient operation. Critical components often require **heat protection**, including **heat shields**, to prevent overheating and damage during high-temperature processes. The **heat capacity at constant volume** and **specific heat at constant volume** are key parameters for calculating energy storage and release, while a **heat battery** can store thermal energy for later use.

Effective **heat insulation**, **thermal insulation**, and **heat isolation** are necessary to minimize energy losses. The **thermal conductivity** of materials, especially the **thermal conductivity of metals**, determines how quickly heat is transferred, and **convective heat transfer** must also be accounted for in fluid systems. Accurate assessment of **heat content**, **thermal functions**, **enthalpy**, **calorific value**, and **caloricity** allows engineers to quantify energy transformations, including the **heat of phase transformation** and the **calorific value of combustible** materials.

Finally, the efficiency and output of a **heat power plant** depend on a careful balance of all these thermal and temperature-dependent properties to maximize energy conversion while minimizing losses.

## A informal technical text

(an excerpt from Greg Egan's text *Permutation cities*)

Maria Deluca had ridden past the stinking hole in Pymont Bridge Road for six days running, certain each time, as she'd approached, that she'd be greeted by the reassuring sight of a work team putting things right. She knew that there was no money for road works or drainage repairs this year, but a burst sewage main was a serious health risk; she couldn't believe it would be neglected for long.

On the seventh day, the stench was so bad from half a kilometer away that she turned into a side street, determined to find a detour. Close up, the mural was unimpressive, the brushstrokes

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clearly visible, the perspective obviously false. Maria backed away—and she didn't have to retreat far to see why she'd been fooled. At a distance of twenty meters or so, the painted sky suddenly seemed to merge with the real thing; with a conscious effort, she could make the border reappear, but it was hard work keeping the slight difference in hue from being smoothed out of existence before her eyes—as if some subsystem deep in her visual cortex had shrugged off the unlikely notion of a sky-blue wall and was actively collaborating in the deception. Further back, the grass and statues began to lose their two-dimensional, painted look—and at the corner where she'd turned into the cul-de-sac, every element of the composition fell into place, the mural's central avenue now apparently converging toward the very same vanishing point as the interrupted road.

Having found the perfect viewing position, she stood there awhile, propping up her cycle. Sweat on the back of her neck cooled in the faint breeze, then the morning sun began to bite. The vision was entrancing—and it was heartening to think that the local artists had gone to so much trouble to relieve the monotony of the neighborhood. At the same time, Maria couldn't help feeling cheated. She didn't mind having been taken in, briefly; what she resented was not being able to be fooled again. She could stand there admiring the artistry of the illusion for as long as she liked, but nothing could bring back the surge of elation she'd felt when she'd been deceived.

She turned away.

Home, Maria unpacked the day's food, then lifted her cycle and hooked it into its frame on the living-room ceiling. The terrace house, one hundred and forty years old, was shaped like a cereal box; two stories high, but scarcely wide enough for a staircase. It had originally been part of a row of eight;

four on one side had been gutted and remodeled into offices for a firm of architects; the other three had been demolished at the turn of the century to make way for a road that had never been built. The lone survivor was now untouchable under

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some bizarre piece of heritage legislation, and Maria had bought it for a quarter of the price of the cheapest modern flats. She liked the odd proportions—and with more space, she was certain, she would have felt less in control. She had as clear a mental image of the layout and contents of the house as she had of her own body, and she couldn't recall ever misplacing even the smallest object. She couldn't have

shared the place with anyone, but having it to herself seemed to strike the right balance between her territorial and organizational needs. Besides, she believed that houses were meant to be thought of as

This end of Pymont was a depressing sight; not every warehouse was empty, not every factory abandoned, but they all displayed the same neglected look, the same peeling paint and crumbling brickwork. Half a dozen blocks west, she turned again—to be confronted

Upstairs, in the bedroom that doubled as an office, Maria switched on her terminal and glanced at a summary of the twenty-one items of mail which had arrived since she'd last checked. All were classified as "Junk"; there was nothing from anyone she knew—and nothing remotely like an offer of paid work. Camel's Eye, her screening software, had identified six pleas for donations from charities (all worthy causes, but Maria hardened her heart); five invitations to enter lotteries and competitions; seven retail catalogues (all of which boasted that they'd been tailored to her personality and "current lifestyle requirements"—but Camel's Eye had assessed their contents and found nothing of interest); and three inter-actives.

The "dumb" audio-visual mail was all in standard transparent data formats, but interactives were executable programs, machine code with heavily encrypted data, intentionally designed to be easier for a human to talk to than for screening software to examine and summarize. Camel's Eye had run all three interactives (on a doubly quarantined virtual machine— a simulation of a computer running a simulation of a computer) and tried to fool them into thinking that they were making their pitch to the real Maria Deluca. Two sales programs—superannuation and health insurance—had fallen for it, but the third had somehow deduced its true environment and clammed up before disclosing anything. In theory, it was

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possible for Camel's Eye to analyze the program and figure out exactly what it would have said if it had been fooled; in practice, that could take weeks. The choice came down to trashing it blind, or talking to it in person.

Maria ran the interactive. A man's face appeared on the terminal; "he" met her gaze and smiled warmly, and she suddenly realized that "he" bore a slight resemblance to Aden. Close enough to elicit a flicker of recognition which the mask of herself she'd set up for Camel's Eye would not have exhibited? Maria felt a mixture of annoyance and grudging admiration. She'd never shared an address with Aden—but no doubt the data analysis agencies correlated credit card use in restaurants, or whatever, to pick up relationships which didn't involve cohabitation.