Myth and Narrative in Macroscopic Physical Science

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A Preliminary Summary in the Form of Some Claims

Macroscopic physical science is pervaded by ***myth*** *—we take the* ***basic abstractions*** *of the human mind that have evolved a long time ago and have served humanity well and project them* ***metaphorically*** *upon diverse phenomena as we build science. This is proof of our* ***imagination*** *at work in science.*

When confronting ***nature at human scale****, we perceive a perceptual unit I call* ***Force of Nature*** *—* ***heat****,* ***water****,* ***wind****,* ***electricity****,* ***substances****,* ***motion****… are examples of forces of nature.*

Forces *are conceptualized as* ***agents acting in and suffering through events unfolding over time in story worlds****… We can, and should, tell* ***stories of forces of nature****—they are examples of* ***good science****.*

A Winter Story — An Example of Science and Myth

Polarity of HOT ↔ COLD as a driving force for a story…

As the last of the warmth of late Fall left the plain surrounding Little Hollow, cold found its way into the area and spread out. […] The cold of winter knew a good plae where it could do its job of making everything and everybody cold […] It could flow into the hollow where the town had been built. It could collect there and it knew it would not be driven out so easily by a little bit of wind […] The people of Little Hollow […] knew that the cold would find its way into their homes if they were not careful to close windows and doors. The cold could even sneak in through tiny cracks between walls and windows, so the people had learned to build their homes well to make it hard for cold to flow in. […] At times when much cold had collected in their town the fires in the furnaces had to work very hard to fight the cold. The people in their homes made sure that the heat produced by the furnaces would always balance the cold so that their homes felt comfortably warm.

Metaphorical Structure of Cold

Conceptual Metaphor	Linguistic Metaphoric Expression
COLD IS A (FLUID) (MOVING) SUBSTANCE/OBJECT	*The cold found its way into the area and spread out.* *Because the plain was so wide, the cold of winter had to spread pretty thinly,…* *It could flow into the hollow… it could collect there…* *The cold could even sneak in through tiny cracks between walls and windows…*
(THE DEGREE OF) COLD IS A THERMAL LANDSCAPE	*Winters in Little Hollow were harsh.* *So it was not all that cold up there.* *And it got colder and colder as the winter grew stronger. The temperature fell and fell.* *When it had become terribly cold and the temperature was very, very low…*
COLD IS A POWERFUL AGENT (MOVING FORCE)	*The cold of winter knew a good place where it could do its job of making everything and everybody cold…* *It went into the snow lying on the ground to make it very cold as well and this made the snow drier and harder to work with.* *It knew it would not be driven out so easily by a little bit of wind…* *The fires in the furnaces had to work very hard to fight the cold.*

How We Speak About Heat

Examples of expressions involving heat. There are ***no examples of literal use of language****:*

- All bodies ***contain heat****.…*
- How do you ***collect heat*** in a passive solar house?
- This means ***heat flows*** "downhill" from hot to cold.
- … ***heat is an agent*** of vast importance in chemical reactions and engineering processes
- Law of the dependence of the active ***force of heat*** upon the tempera… (Clausius)
- This exterior ***heat lets*** the crust become crispy
- ***Heat makes*** me dizzy…
- Clouds and storms follow the warm water, ***pumping heat*** and moisture high into the atmosphere…
- Heat must ***balance*** cold…

Expressions for heat use the following ***schematic constructs****:*

- Container, store, hold, accumulate; lack of, abundance of; collect
- Flow, transport, extract emit/absorb, exchange; heat moves
- Balance (law of balance of…)
- Use, produce, generate heat
- Heat as location, landscape; level, intensity, degree, scale of heat
- Balance of heat and cold, hot and cold; thermal tension
- **Power, force of heat**
- **Heat is an agent: Heat causes, drives, makes, counteracts, lets, balances**
- **Heat is a patient: Pump, force, make, counteract, block, hold (back), enable, prevent, oppose, let/allow heat**

Heat is a powerful agent…

Forces of Nature

In the previous examples, we recognize a recurring ***medium scale cognitive structure*** → ***Force of Nature***.

This structure has ***perceptual origin*** → the ***Gestalt of Force***.

Examples…

Heat as a force of nature

Very basically, we perceive HEAT as a unit/gestalt. We know when we have a thermal experience…

Examples of forces of nature

Water, wind, light, ***heat***, cold, food, motion, substances…

Psychological and social forces

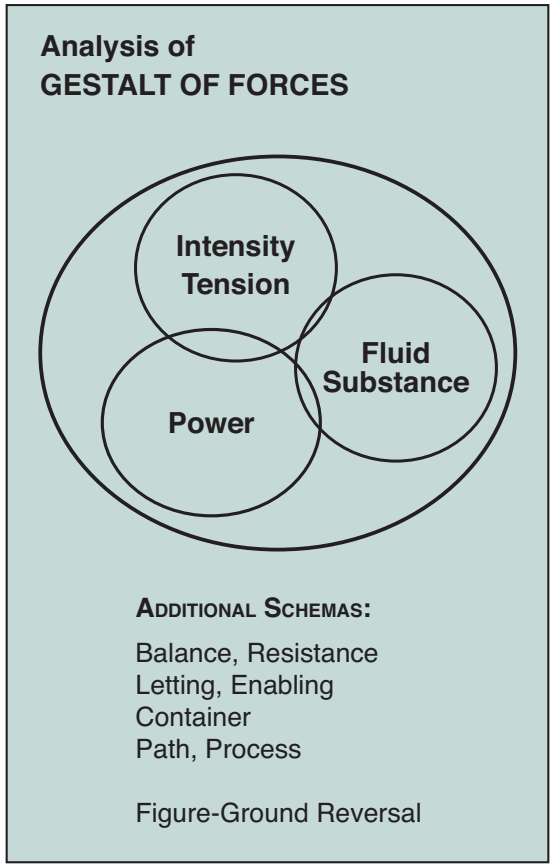
Justice, ***music***, knowledge, anger, love…

Music as a force…

Mark Johnson analyzed our experience of ***music*** *in terms of three groups of metaphors:* MUSIC AS A MOVING OBJECT, MUSICAL LANDSCAPE, MUSIC AS MOVING FORCE.

← Johnson, 2007, Chapter 11

Forces of Nature – Analysis of Gestalt of Force



Origin of the* ASPECTS *of the notion of force…

It appears that the ***perception of a polarity*** lies at the heart of the notion of a force. Polarity → ***tension***: difference of qualities/intensities conceptualized by the SCALE schema.

We further notice that ***phenomena/events/processes*** are associated with the occurrence of a polarity or tension → ***causal interaction*** between phenomena resulting from tensions.

The human mind then seems to construct the image of an associated ***agent of certain size*** (← Figure-Ground Reversal) ***and power***.

Aspects…

← **Intensity**

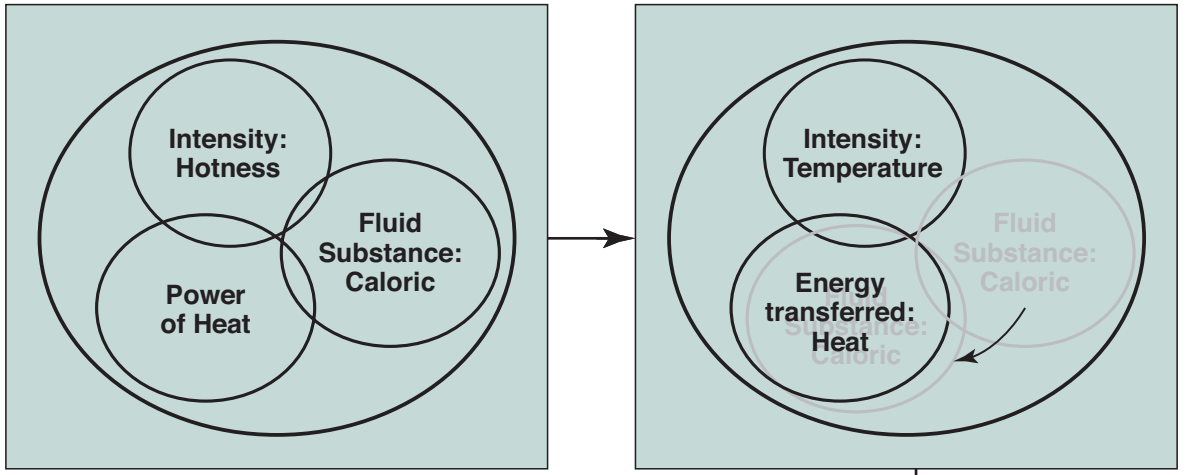
← **Power**

← **Quantity**

*These are the **basic concepts** used to model processes **continuum physics**.*

Analysis of the Gestalt of Force of Heat—Carnot to Clausius or "Loss of Myth"

Force of Heat → Dynamical theory of heat



Loss of fluid substance (conflation with power of heat)…

The thermal fluid substance is "rediscovered" as Entropy…

Loss of concept of power. Hotness becomes equilibrium temperature → statics of heat.

Summary — What We Lose if We "Lose Myth"

The foregoing is a story of ***loss of myth***.

We believe that the Gestalt of ***Force*** is a tool of thought that must have been present in early human history—it is ***mythic*** through and through.

What happened in the transition from Sadi Carnot (*caloric theory*) to Clausius and Kelvin (*mechanical theory of heat*) shows ***myth cannot be avoided*** (Clausius' appraoch starts with Carnot's theorem that derives from the gestalt of the *power of heat*) ***but it can be twisted and distorted***.

While Clausius' motivation for his conceptualization is rooted in non-mythic thought ("*… heat consists in the motion of the least particles…*"), getting to his result starting from mythic structures requires a formalistic approach that dissociates the concepts from images—we end up with a kind of "*dissociative identity disorder*"…

Our modern mind has the ***power of formalisms*** (formal languages) at its disposal. Making use of this power is the only way we can produce a result such as the one developed by Clausius and Kelvin in traditional thermodynamics. ***Myth has been replaced—or rather, distorted—by formalism, form is dissociated from content, images have become powerless…***

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