Useful gatekeepers

Proposition

The more one understands a subject, the more precisely one is able to delineate the subject from what it is not. Conversely, without a well-defined method for recognising what does not belong to a subject, it is hard to grasp it.

In what follows, I identify possible "gatekeepers" of disciplines, making cases for their importance and utility.

1. The project of mathematics is the discovery of statements which follow from axioms under a system of deduction. The test of mathematics is the **proof**: a statement is not mathematics if it is not attainable by strictly mathematical reasoning. The ability to recognise what is not mathematics is an important defence for the mathematician against "nonsense claims." This does not mean non-mathematical statements are false; just that mathematics has no say over them.
2. The endeavour of the hard sciences is the construction of models of reality that predict the outcomes of physical measurement. In physics and chemistry, models are largely mathematical and concern themselves with the measurable properties of matter. In softer sciences, the models may not be as mathematical, but are still predictive. The judge of science is **falsifiability**: a theory is not scientific if it does not offer testable predictions that are consistent with observation. The ability to falsify is science's defence against pseudoscientific statements. This does not mean unfalsifiable claims are untrue; just that science has no say over them.
3. The craft of art — literary, visual, musical, theatrical — appears to be to elicit emotions, experiences, or (for lack of better words) a mental state in between direct perception and abstract thought. Imagine the feeling of beholding beautiful artwork, laughing at a comedy, being engrossed in a story, or moved by music. These feelings are higher than direct perception (art is not only perceived, it "speaks to" and "moves" you), yet are more tangible than abstract thought (hypothetical art does not compare to the experience of it). The yardstick by which art may be measured is its **ability to elicit** these perceptual-emotional responses. A craft is generally not art if it does not generally affect a willing participant in this way. The ability to so judge art rejects things that are valuable to one person, but which lack any "universal" element, and defends against the corruption of art into the "pretentious, elitist, self-aggrandising, and self-absorbed rhetoric" of bad critics or marketers. This does not mean that does not elicit is of no value, but rather that such work ought not to be realised as an artistic project.

Question for the reader

Can a tune of this theme be played for theology? What is the aspiration of theology? What is its gatekeeper? How does one wisely dispense with what does not belong, to ensure survival of "good" theological work?

Materialist definitions of sentience and consciousness

This essay presents a materialist point of view on sentience, consciousness, and other ideas of life-like things. To emphasise that the ideas are the author's, rather than being authoritatively "materialist", the ideas are personified through the character Materia (Latin for material).

Organisms as computers

Living organisms process data. This is meant literally, not as a technological metaphor. Plants and animals receive stimuli (vision in animals, photoreceptors in plants), and can also affect change in the local environment (muscle movement, tropisms like flowers following the sun). To state the obvious, we observe a causal relationship between the responses of a plant or animal and specific stimuli. From this, Materia infers that the organism has a faculty to process information.

Notably, it is *not* the existence of a healthy brain or nervous system that indicates information processing ability — it is the the causal relationship between actions and stimuli. The biological sciences later inform us that brain is indeed where the vast majority of information processing occurs (in animals), but this is in a sense incidental. Not all responsive organisms have brains, after all.

Materia proceeds to define *sentience* as the capacity to process information. While a dictionary definition usually involves the ability to experience "feelings" or "sensations", Materia does not find these words useful. Whether "sensations" are involved or not, Materia doesn't see any difference, because she cannot devise an experiment to distinguish them. Thus, she defines sentience in terms of senses and responsiveness alone.

When asked whether she calls a kettle 'sentient', Materia replies "yes, a little." An electric kettle, like any machine, receives stimuli through controls or inputs (the on switch) and translates this information into an effect on the local environment (heat from the electric coil). However, even if you do agree that a kettle processes data in this way, it is surely not very much. There is clearly an issue of degree.

Information can be quantified. We might say that the state space of the kettle's senses are one bit of information: as far as the kettle's responses are concerned, the world is represented wholly by "on" or "off". A sunflower processes more than one bit: it responds to the direction of sunlight (bearing and attitude, with a few degrees of angular precision, say), atmospheric conditions (temperature and humidity on crude scales), and perhaps a few other things. Humans process yet more data: our vision alone constitutes a dense cluster of colours, analogous to pixels in an image (transmitting an estimated 10 megabytes per second to the brain).

Extending this idea, Materia devises an experiment using a lab which can simulate any environment. Materia adjusts the direction of sunlight, and observes how the sunflower turns its head. Then, she writes a program which sets the sunlight direction in her lab from some numbers as input. She tries to make the input data

- We evolved thoughts so our thoughts could die instead of us
- The intentional stance is a term coined by philosopher Daniel Dennett for the level of abstraction in which we view the behavior of an entity in terms of mental properties.
  - we think of an entity as being an agent if we can more easily predict it by treating it as having some beliefs and desires which guide its actions
  - an agent is something that can "choose", in the sense that it feels right to use the word

Invented versus discovered

Every mathematician has an opinion on whether the field is invented or rather discovered. My take is thus.

Mathematics, as a tool and language, is invented; but mathematics, as a set of theorems, is discovered.

By way of analogy, the eye has evolved many times in animals. Each instance of convergent evolution to produce eyes is a new invention, but with the resulting sense of sight, the visible world is discovered.