

Chapter 1.1

The advent of mechanism



If you find it strange that I make no use of the qualities one calls heat, cold, moistness, and dryness..., as the philosophers [of the schools] do, I tell you that these qualities appear to me to be in need of explanation, and if I am not mistaken, not only these four qualities, but also all the others, and even all of the forms of inanimate bodies can be explained without having to assume anything else for this in their matter but motion, size, shape, and the arrangement of their parts (AT XI 25–26).



Motion

Size

Shape

Arrangement of parts

**The Greek notion of Psuché
was very different from our
current view of a soul or even
a mind.**

**Plants had a Psuché
as did animals.**

Psuché is what animates or sustains living things so the word ‘soul’ as a translation isn’t really adequate. These animators are sets of capacities or faculties;
skill.

Teleological Explanations

A teleological explanation is one that accounts for an event or object by assuming in advance that there must be some ultimate purpose or final cause responsible for its design.

Examples

I gave you a gift in order to make you feel good.

I studied to do well in the exam.

Fish developed fins so that they could swim well.

Aristotle's theories of natural phenomena were full of teleological explanations.

Nature was directed by goals or purposeful outcomes.

Teleological

Ducks evolved webbed feet *in order to* allow them to swim better.

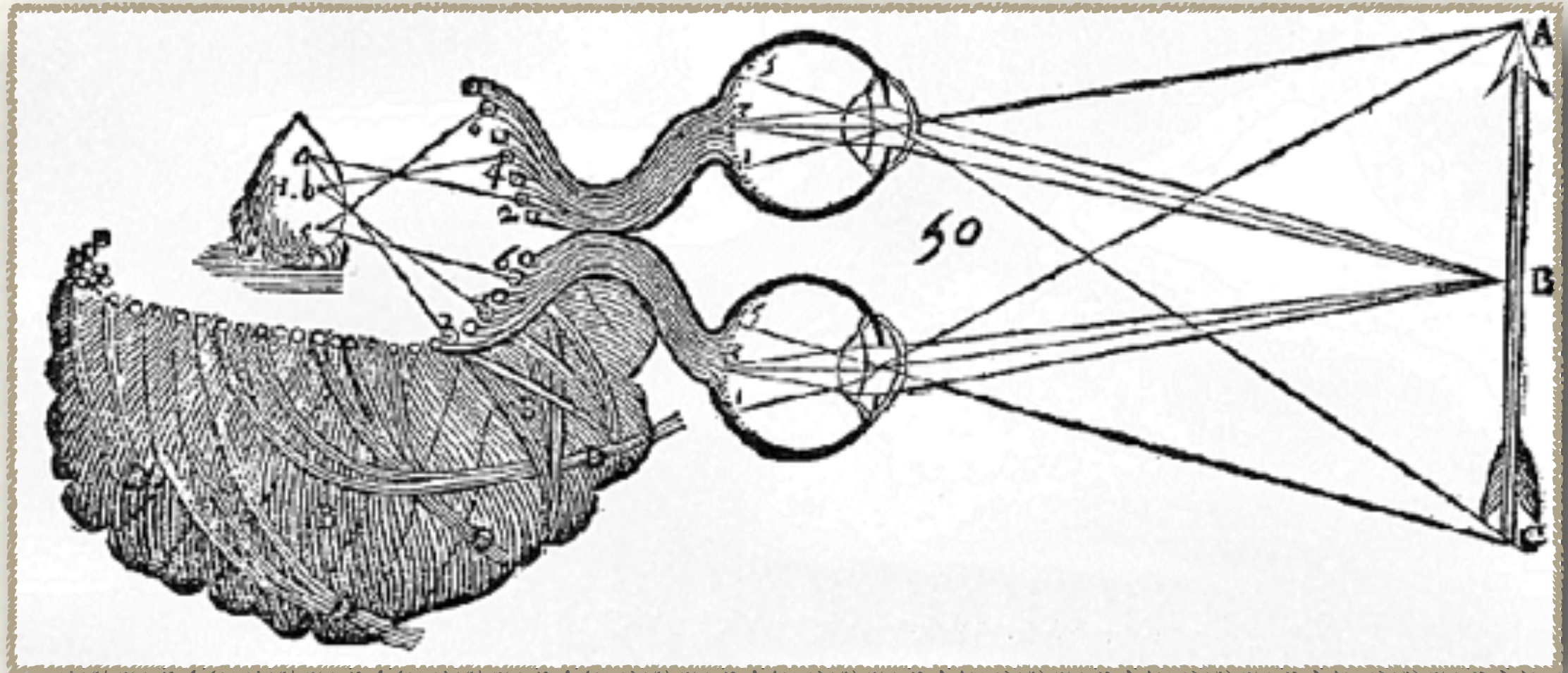
Human beings have hands because they are intelligent.

The concept of shape is so simple, wrote Descartes, that it is involved in everything perceivable by the senses. For example, whatever you may suppose colour to be, you will not deny that it is extended and so has shape.

How did Descartes arrive at this idea?

If you find it strange that I make no use of the qualities one calls heat, cold, moistness, and dryness..., as the philosophers [of the schools] do, I tell you that these qualities appear to me to be in need of explanation, and if I am not mistaken, not only these four qualities, but also all the others, and even all of the forms of inanimate bodies can be explained without having to assume anything else for this in their matter but motion, size shape, and the arrangement of their parts (AT XI 25–26).

- (i) The image on the retina is a two-dimensional geometrical object, and the best way to mathematically represent a two-dimensional image is in terms of lines and their lengths.
- (ii) Lines and their length (or in other words, their physical magnitude) are both clear and distinct ideas.
- (iii) Finally, perception is the result of a physical mechanism in the brain, and this mechanism actually functions by representing three dimensional objects in terms of line lengths.



Descartes' drawing of the visual system

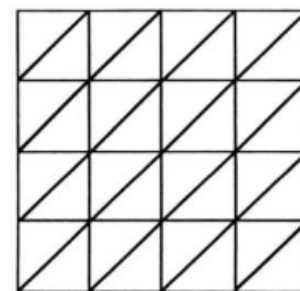
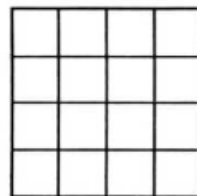
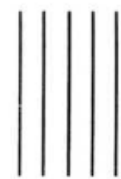
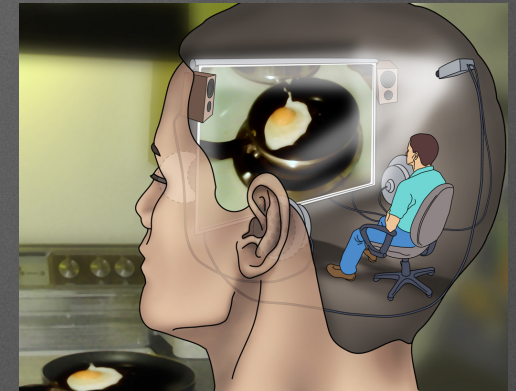


FIG. 5.6

The Homunculus Fallacy

Wikipedia:



The **homunculus argument** is a fallacy arising most commonly in the theory of vision.

One may explain (human) vision by noting that light from the outside world forms an image on the retinas in the eyes and something (or someone) in the brain looks at these images as if they are images on a movie screen.

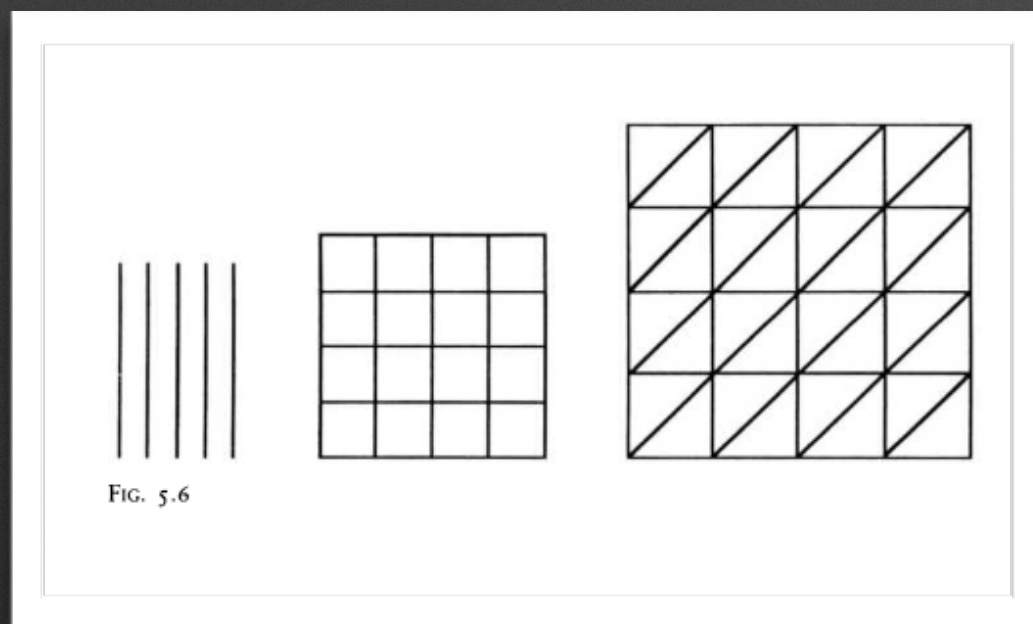
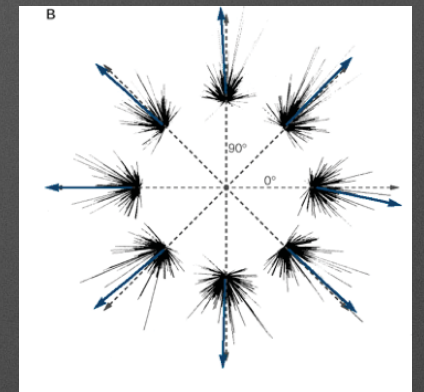
The question arises as to the nature of this internal viewer. The assumption here is that there is a 'little man' or 'homunculus' inside the brain 'looking at' the movie.

“Now, when this picture [originating in the eyes] thus passes to the inside of our head, it still bears some resemblance to the objects from which it proceeds.

As I have amply shown already, however, we must not think that it is by means of this resemblance that the picture... (directly)....causes our sensory perception of these objects—as if there were yet other eyes within our brain with which we could perceive it.

Instead we must hold that it is the movements composing this picture which, acting directly upon our soul in so far as it is united to our body, are ordained by nature to make it have such sensations.”

Descartes believed (incorrectly) that neurons were etching patterns made up of simple line segments on the pineal gland. The **covariation between different patterns was responsible for representing differently shaped objects, or different colours, etc.**



From perception to action

A reflex arc

Action without cognition



This type of movement takes place without the pineal gland.

Figures traced on the pineal gland represent ideas.



“figures traced in the spirits on the pineal gland, where the seat of imagination and common sense is, should be taken to be *ideas*” (page 9).

Therefore — this form of movement involves action without cognition.

**The interpretation that
Descartes offered is very close
to the modern concept of a reflex arc.**



This idea came close to the modern view of a reflex developed by Sherrington, awarded the Nobel prize in neurophysiology in 1932. Sherrington conclusively demonstrated the existence of sensory-motor neural pathways that bypass the cortex. These are *reflex arcs-- direct connections between a stimulus and a response via the spinal cord*. For example, Sherrington observed that in a decorticated dog (i.e. the spinal cord was surgically isolated from the cortex), ‘....a feeble electric current on the shoulder brings the hind paw of that side to the place, and performs a rhythmic grooming of the hairy coat there. If a foot treads on a thorn that foot is held up from the ground while the other legs limp away. Milk placed in the mouth is swallowed; acid solution is rejected. The dog shakes its coat dry after immersion in water’.

What is noteworthy about spinal reflexes is that they are limited in important ways. As Sherrington pointed out in his classic textbook published in 1906 (*The Integrative Action of the Nervous System*) :

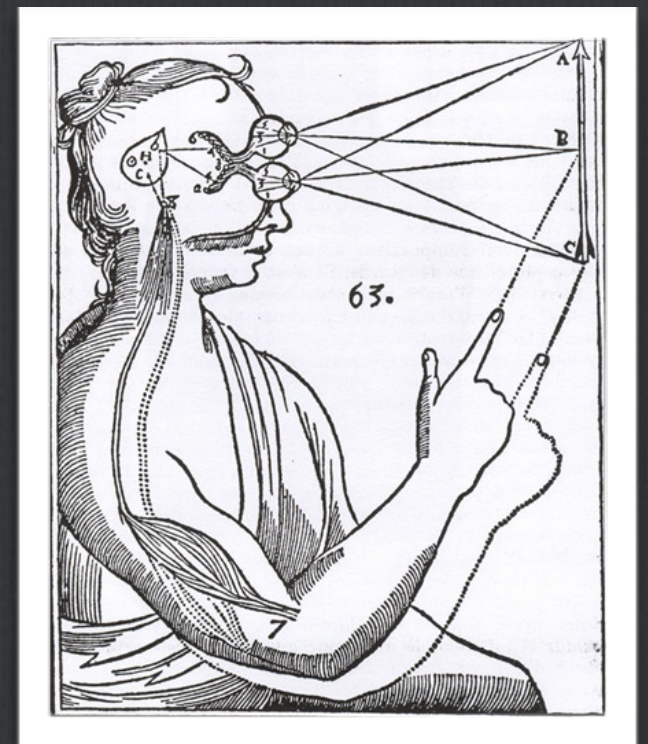
...when all is said, if we compare such a list (of spinal reflexes) with the range of situations to which the normal dog or cat reacts appropriately, it is extremely poverty stricken. It (the dog or cat) contains no social reactions, it fails to recognize food as food. It shows no memory, it cannot be trained or learn, it cannot be taught its name. The mindless body reacts with the fatality of a penny-in-the slot machine.

Thus, spinal reflexes are: (i) relatively inflexible, (ii) not based on conscious recognition of a stimulus (for example, some reflexes can be triggered even in comatose patients), (iii) not altered by learning; and (iv) are too simple to enable social interactions

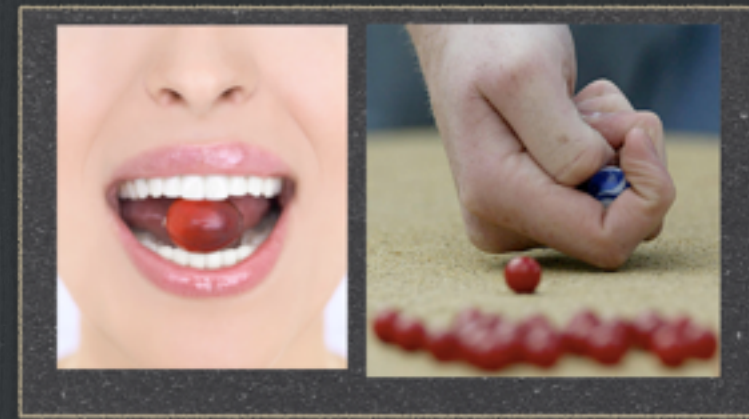
Animals and Human beings

A second way of moving

Responding to an object or event after it is recognized and interpreted. For example, a dog wags his tail when you show him a ball that he has played with in the past.



Perceptual representations leading to action have the form of etched lines on a two-dimensional surface (the pineal gland).



But how do very similar objects (say, a grape and a marble) lead to very different actions?

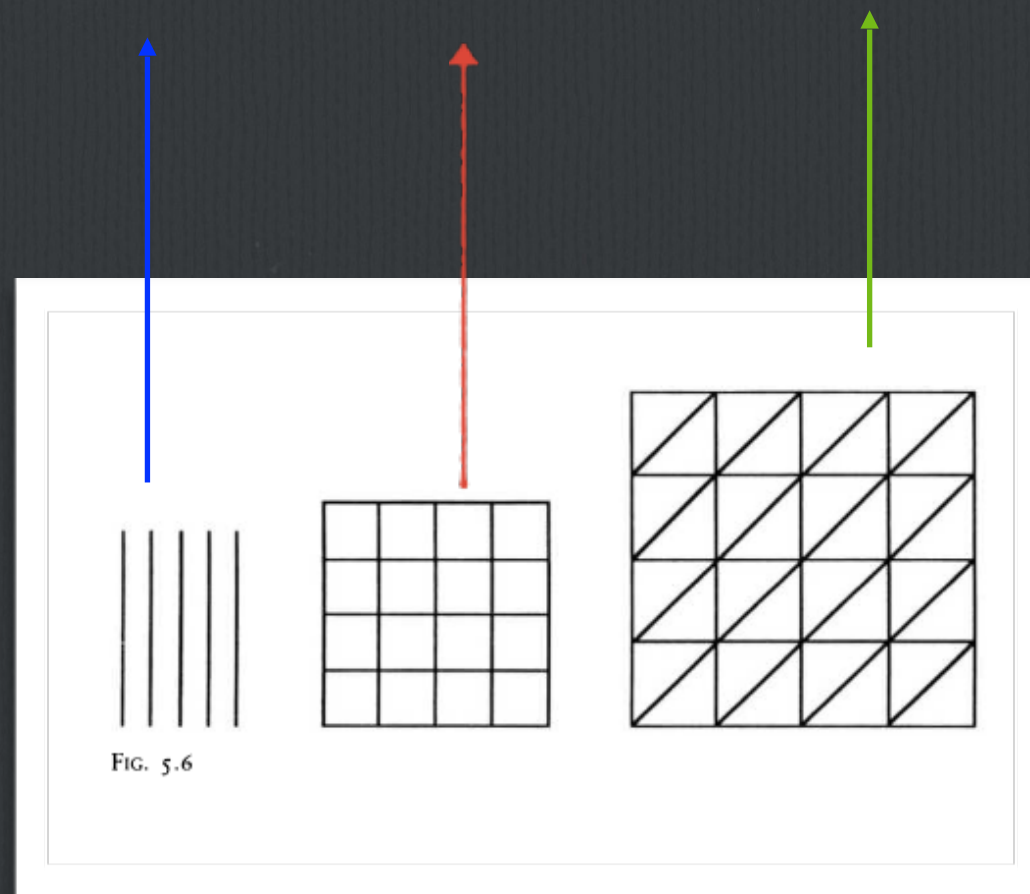
**Descartes' sign theory.
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These associations are innate; we possess them at birth.

the sensation blue

the sensation red

the sensation green



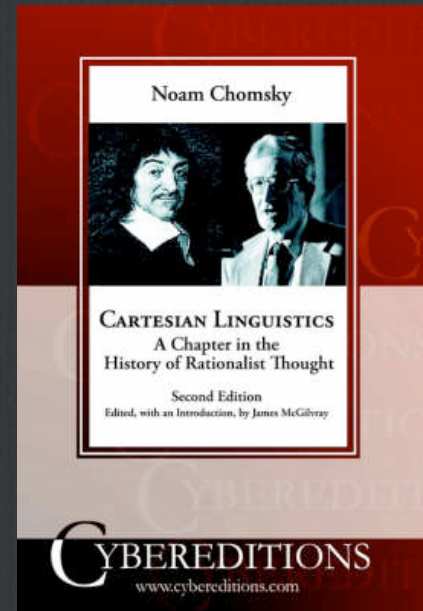
Humans have a third way of moving

**We have the ability to reflect on our
own mental representations.**

What does this mean?

contains a soul with thoughts, with the exception of words, or other signs that are relevant to particular topics without expressing any passion.

The Importance of Language



In fact, none of our external actions can show anyone who examines them that our body is not just a self-moving machine but contains a soul with thoughts, with the exception of words, or other signs that are relevant to particular topics without expressing any passion.

I say words or other signs, because deaf-mutes use signs as we use spoken words

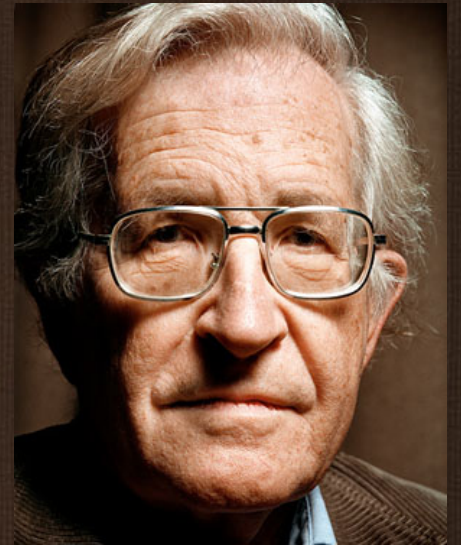
I say that these signs must be relevant, to exclude the speech of parrots, without excluding the speech of madmen, which is relevant to particular topics even though it does not follow reason.

I add also that these words or signs must not express any passion, to rule out not only cries of joy or sadness and the like, but also whatever can be taught by training to animals.

In the 17th century, the meaning of *passion* was quite different than the meaning of *emotion*.

A *passion* was *passively* experienced. It was always caused by an object external to the person or animal that was experiencing the feeling.

An *emotion*, by contrast, can be generated spontaneously, without any external cause.



The Cartesian theory of language production (Chomsky).

“...one fundamental contribution of what we have been calling 'Cartesian linguistics' is the observation that human language, in its normal use, is free from the control of independently identifiable external stimuli and is not restricted to any practical communicative function, in contrast, for example, to the pseudo language of animals”.

"In short, animal 'language' remains completely within the bounds of mechanical explanation as this was conceived by Descartes.... and the creative aspect of language is what separates humans and animals.

Descartes:

..but there has never been known an animal so perfect as to use a sign to make other animals understand something which expressed no passion; and there is no human being so imperfect as not to do so, since even deaf-mutes invent special signs to express their thoughts. This seems to me a very strong argument to prove that the reason why animals do not speak as we do is not that they lack the organs but that they have no thoughts.

Animals have no thoughts!

yet, animals have a pineal gland.

“figures traced in the spirits on the pineal gland, where the seat of imagination and common sense is, should be taken to be *ideas*”. (page 9)

Animal are capable of some form of cognition but only driven by external or internal stimuli.

Examples: Pain, the sight of food, the desire for food (hunger), the sight of a threat, a stimulus that generates anticipation of a good or bad outcome, etc.

Human thoughts (and language that expresses them) are free from the control of independently identifiable stimuli.

Examples:

What a nice cat you have.

I doubt that your cat is nice.

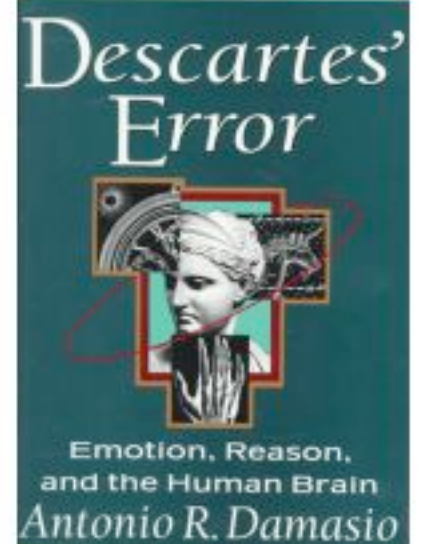
I believe that you have a nice cat.

I was thinking about that nice cat of yours.

Passions and the embodied mind

It is often assumed that Descartes wished to argue that our thinking has little to do with our bodies.

Descartes' error, Antonio Damasio tells us, was his belief in "the abyssal separation between body and mind . . . "





Nature teaches me through the sensations of hunger and thirst that I am not merely present in my body as a sailor is present in a ship, but that I am very closely joined and as it were intermingled with it, so that I and my body form a unity.

If this were not so, then I who am nothing but a thinking thing would not feel pain when the body was hurt, but rather the intellect would simply perceive the damage, just as a sailor perceives by sight when anything in his boat is broken.

Passions and the embodied mind.

Emotional conflict

Passions can arise from external objects or events acting on our senses, or they can be felt as occurring spontaneously within the mind itself, in which case they are “passions of the soul”.

These are triggered by the brain (*‘caused, maintained and strengthened by the movement of the spirits’*) and so unlike willed or voluntary thoughts or feelings, they do not have their origin in the soul, even though they are referred to as passions of the soul.

Conflict occurs in two ways:

(i) The spirits in the *brain* will move the pineal gland in a particular way, exciting a desire for something, and the will might oppose this feeling so that the *mind* can be impelled almost at the same time to desire and not desire something.

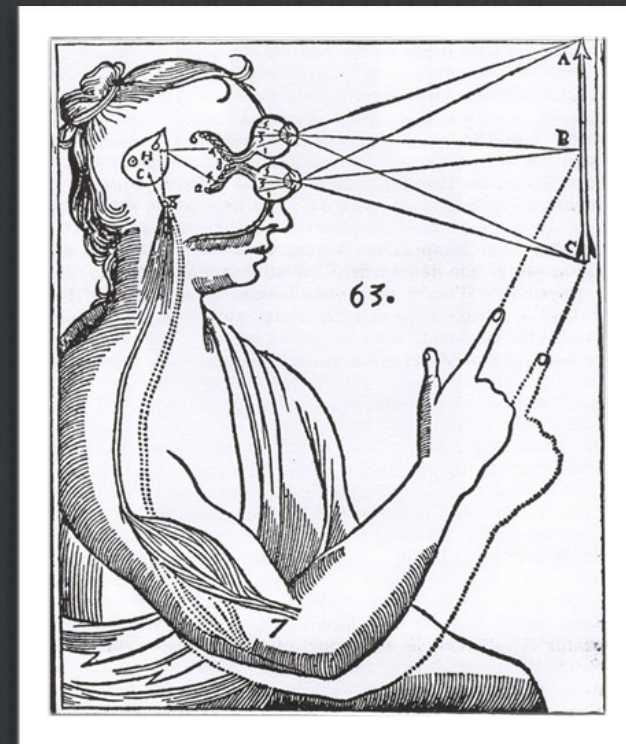
The phrase “almost at the same time” is important because the desire is occurring in spite of one’s conscious will which can represent an intention strongly enough to gradually halt the movement of the spirits.

(ii) A second way of experiencing conflict occurs in the *body* when passions force the limbs to behave in a certain way and the rational soul (mind) attempts to stop this action.

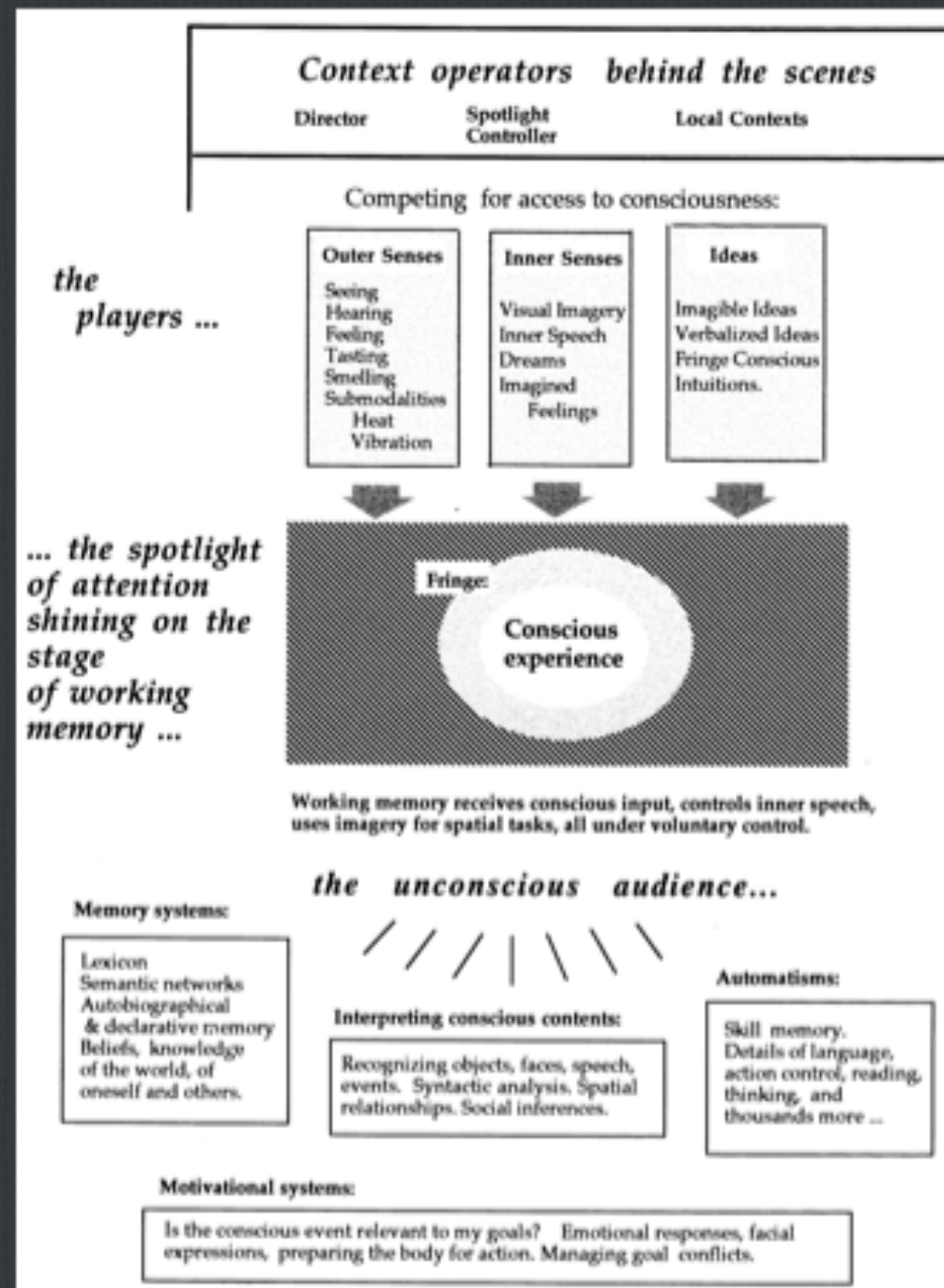
Despite common misconceptions that Descartes believed in the virtues of a passionless, analytic mind and that he considered emotions to be a disruptive influence on rational thought, he in fact argued that emotions played an important role in sustained acts of will and that certain passions, for example a feeling of wonder, were essential for intellectual development.

The **Cartesian** Theater

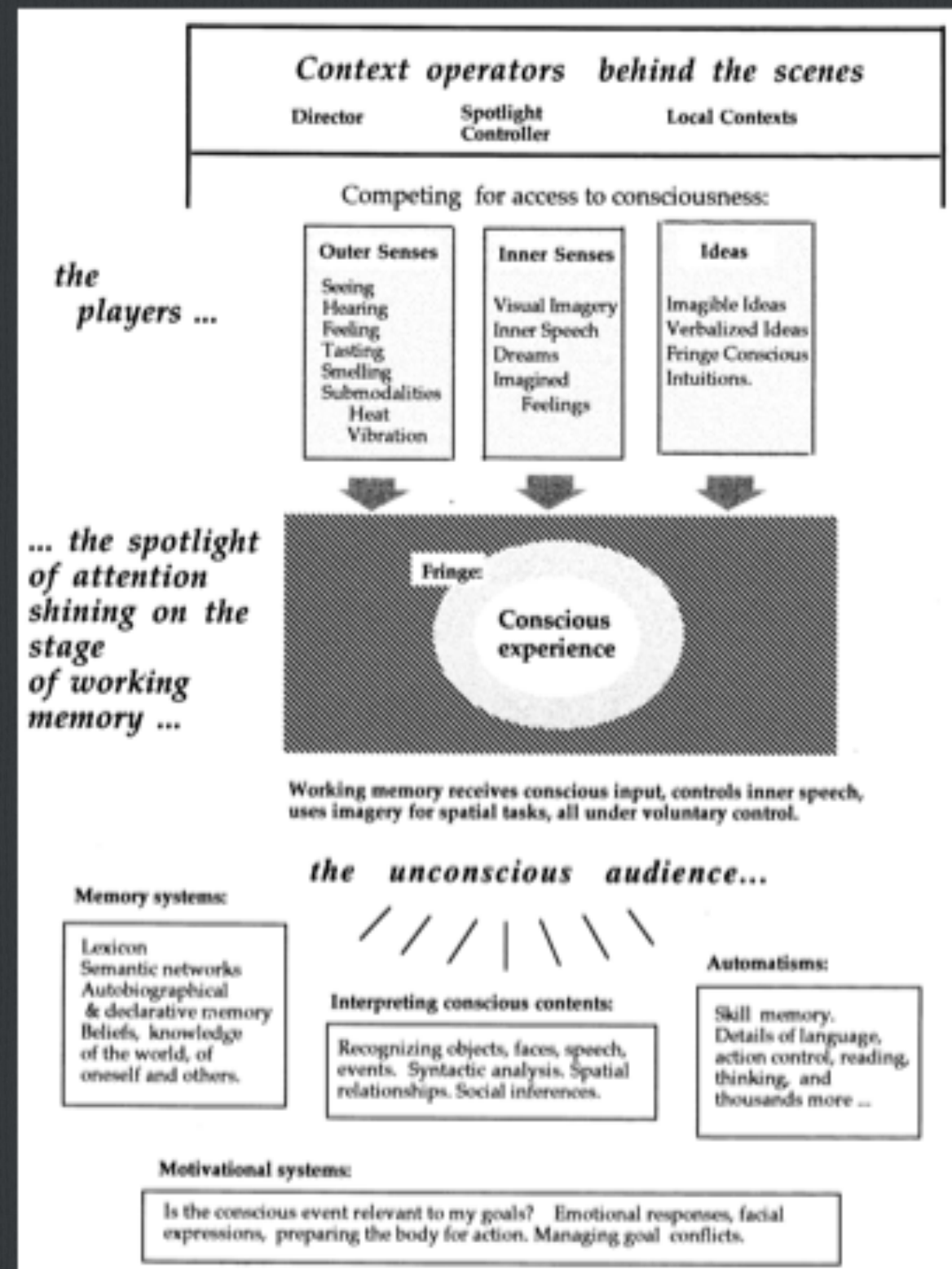
At some point during the processing of a stimulus or event, the inputs from many unconscious processing systems come together to enable consciousness.



Baars' Global Workspace Model of Consciousness



The theatre has a powerful spotlight of attention, and only events in the bright spot on stage are strictly conscious.



Psychologists have become convinced that the real work in navigating through the problem spaces of our lives is done unconsciously for most of us most of the time.

