

Mind-Body

STS.003

Fall 2010



SAVING THE BEST FOR LAST

- Everything discussed so far in the course is a product of the human mind
- The brain represents a scientific problem of unprecedented complexity
- The mind is that which makes us human?

Photos of Einstein's Brain removed due to copyright restrictions.

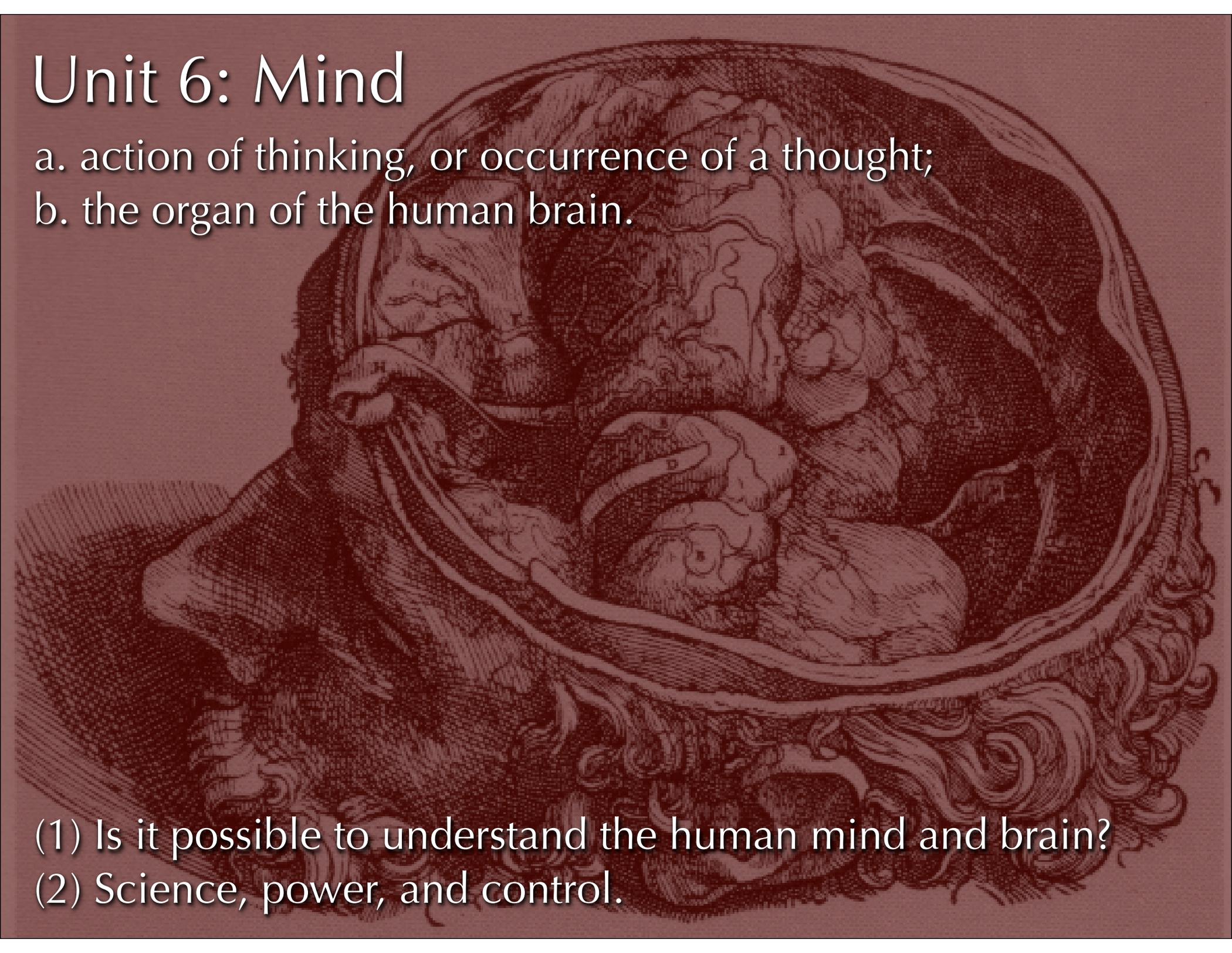
See: http://en.wikipedia.org/wiki/Albert_Einstein's_brain

Einstein's Mind?

Unit 6: Mind

- a. action of thinking, or occurrence of a thought;
- b. the organ of the human brain.

- (1) Is it possible to understand the human mind and brain?
- (2) Science, power, and control.



Today: The role of the brain, ancients to Darwin

- 11/29: Madness
- 12/01: Psychology
- 12/06: Control
- 12/08: Finale

How can we
learn what
ancient people
thought about
the brain?

Image of Dr. Finklestein from "The
Nightmare Before Christmas" (1993)
removed due to copyright restrictions.

Human Ancestors

Evidence of Weapon Inflicted Skull Fractures



Photo courtesy of [missmareck](#) on Flickr.

Trephination

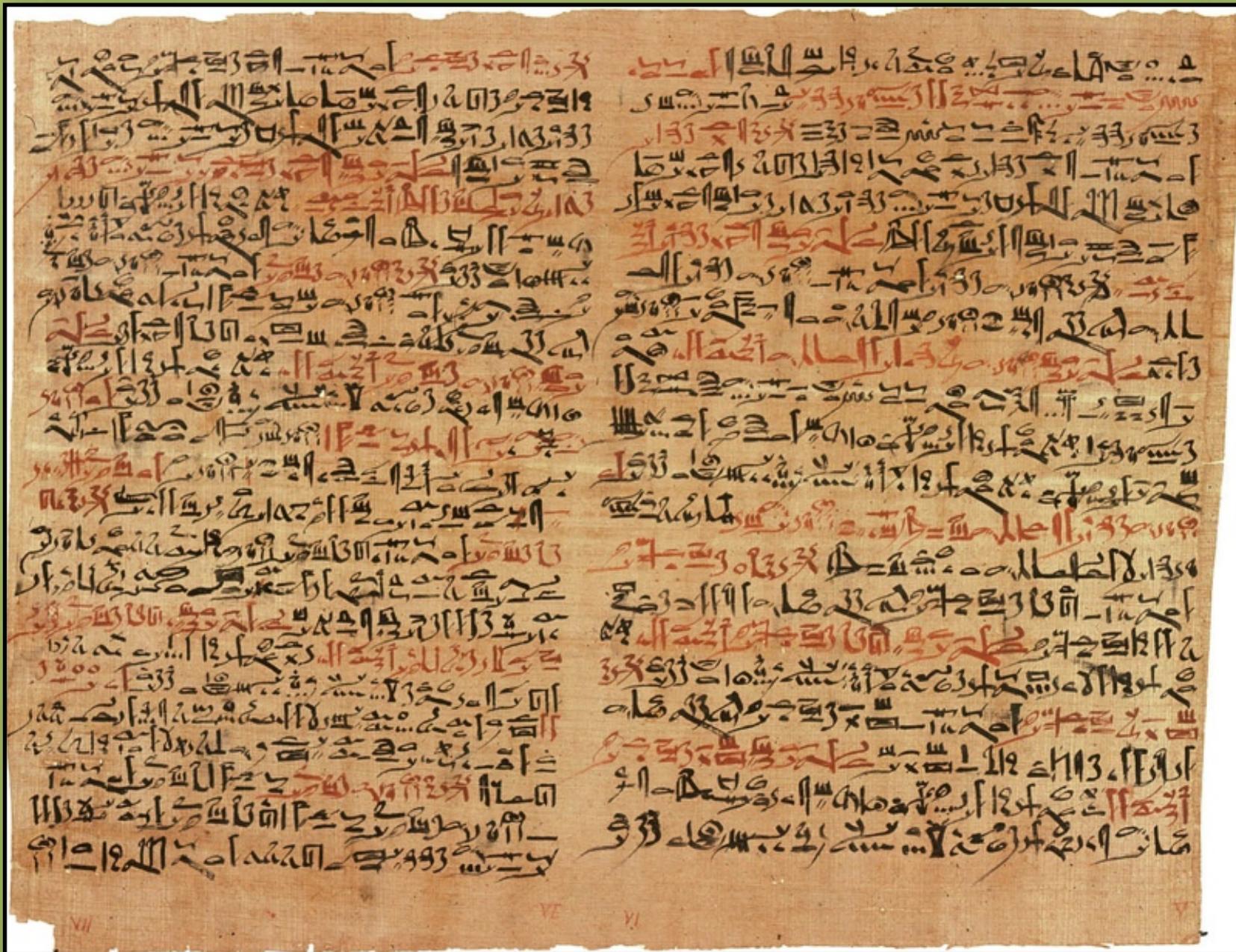


Photo courtesy of akseabird on Flickr.

Photo courtesy of NeuroWoah on Flickr.

Edwin Smith Papyrus, c. 2700/1650 BCE

48 case reports, including head injuries



The Book of the Dead Weighing the Heart

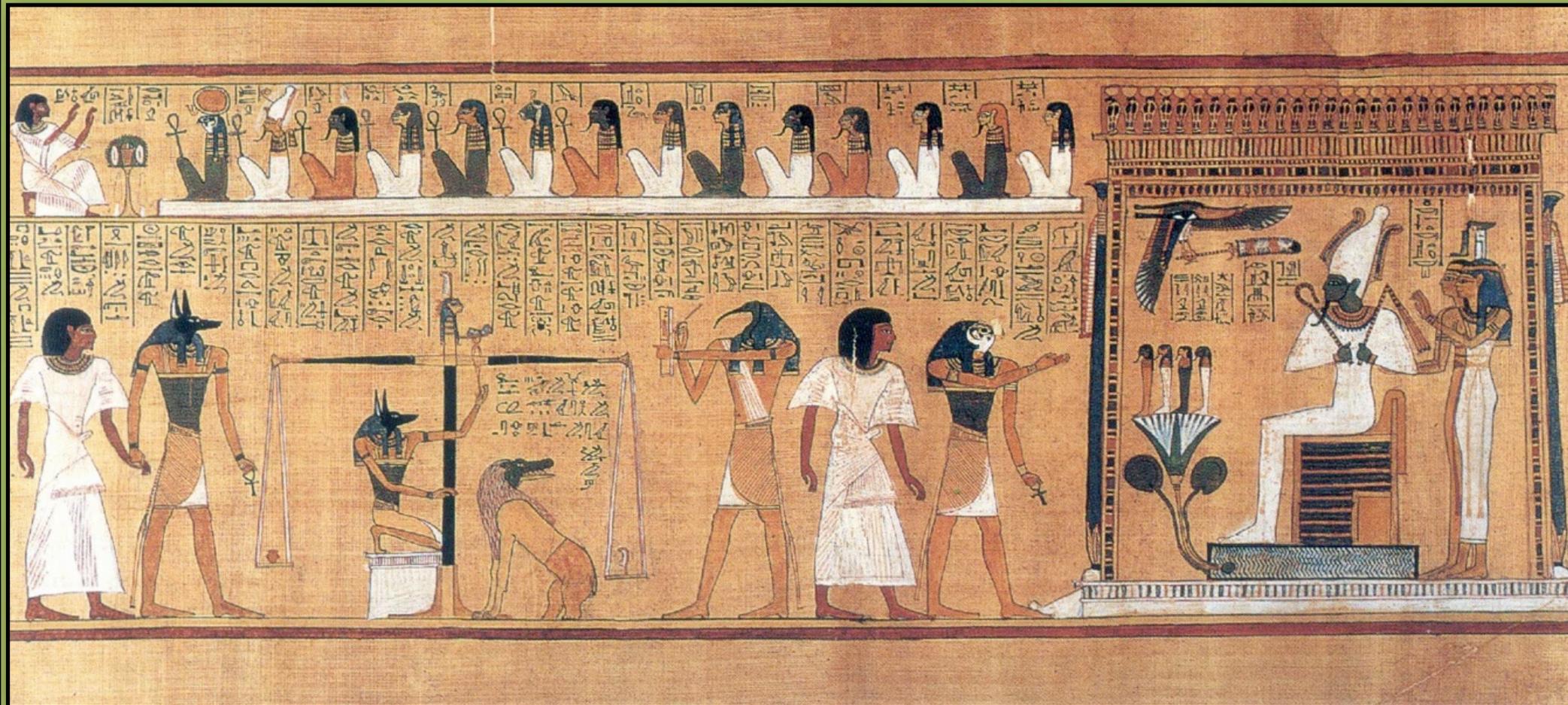




Photo courtesy of [Blaž Vizjak](#) on Flickr.

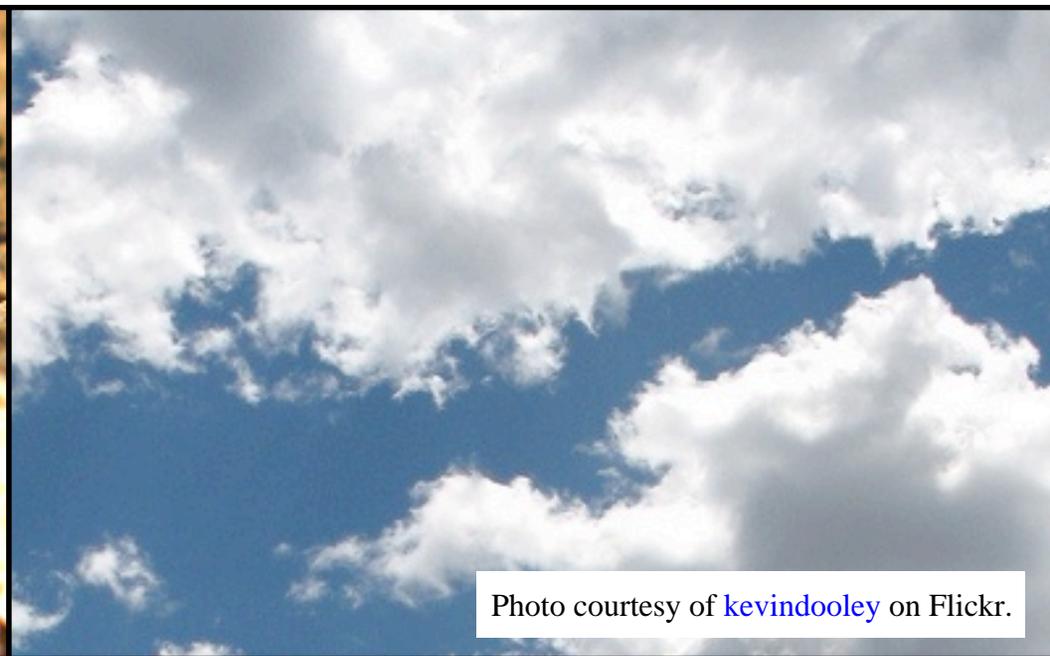


Photo courtesy of [kevindooley](#) on Flickr.

Pre-Socratics and the Elements

Alcmaeon and Anaxagoras: brain is organ of mind



Photo courtesy of [Snap®](#) on Flickr.



Photo courtesy of [Loving Earth](#) on Flickr.



Hippocrates, on the Brain

“Men ought to know that from nothing else but the brain come joys, delights, laughter and sports, and sorrows, griefs, despondency, and lamentations. And by this, in an especial manner, we acquire wisdom and knowledge, and see and hear and know what are foul and what are fair, what are bad and what are good, what are sweet, and what are unsavory. ... And by the same organ we become mad and delirious, and fears and terrors assail us. ... All these things we endure from the brain, when it is not healthy. ... In these ways I am of the opinion that the brain exercises the greatest power in man. This is the interpreter to us of those things which emanate from the air, when the brain happens to be in a sound state.” *On the Sacred Disease*

Humoral Medicine



Air / Blood / Spring / Child

WET

Water / Phlegm / Winter / Old



Fire / Cholera / Summer / Youth

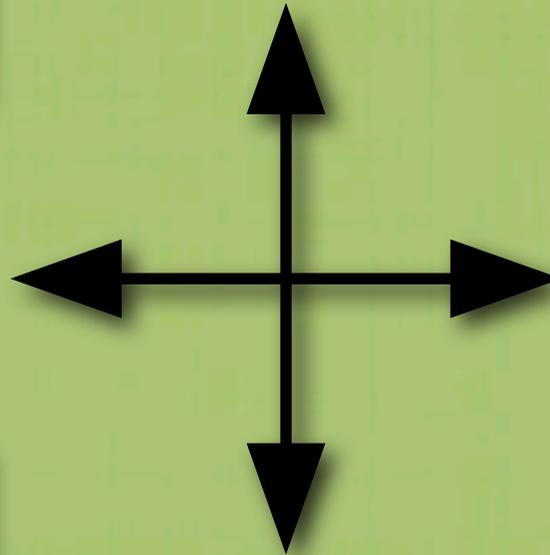
DRY

Earth / Black Bile / Fall / Adult



HOT

COLD



Alexandria:

Herophilus (330-260 BCE)

Erasistratus (330-255 BCE)



Dissection
And
Vivisection

Plato, on the Soul

- Nutritive: liver
- Sensitive: heart
- Rational: brain





Aristotle

Heart as the source
of heat and life, and
seat of intellect

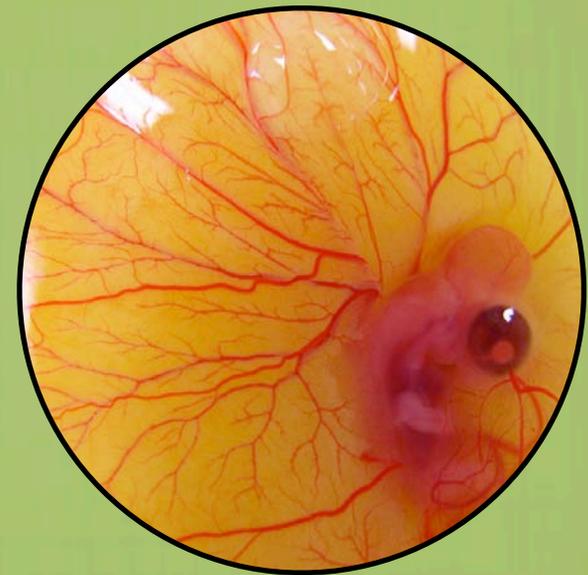
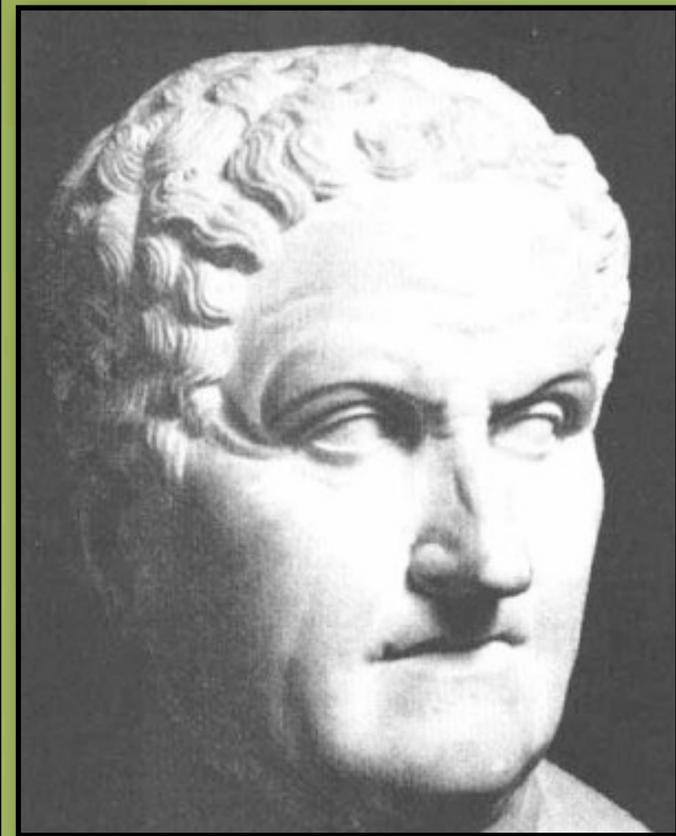


Photo courtesy of [davidjthomas](#) on Flickr.

Brain as a radiator
to cool the blood

Galen of Pergamon (c. 129-217)

Experimental studies of nerves
and spinal cord
Brain controls functions



Early Christian
Writers:

Brain's
Ventricles as
the Site of
Cognition

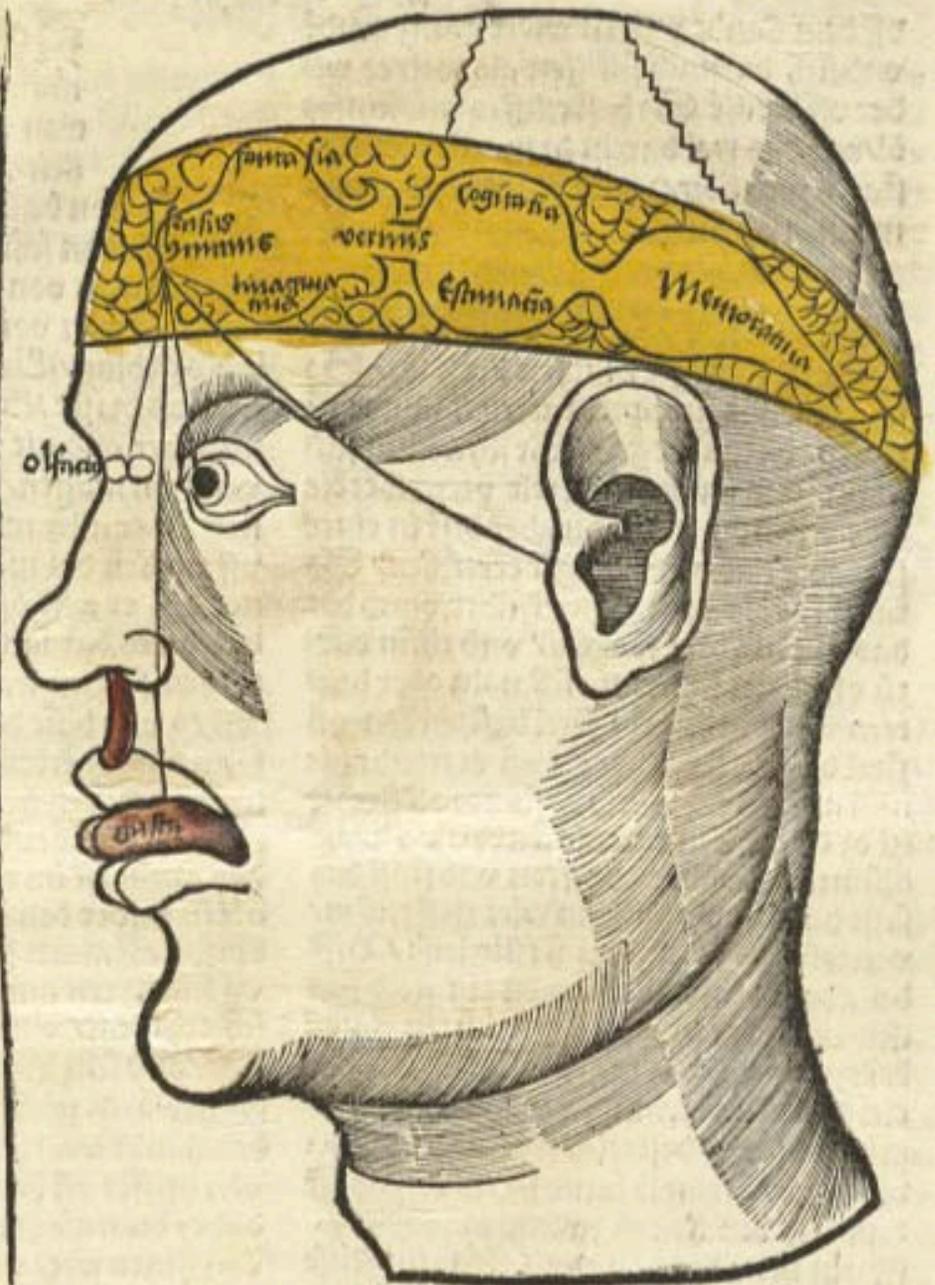
Das erst Cap:
dis fünffte büch die
offenbaren exercere ist
von de har des haubt/
tes vñ synē zū geeigte

Allopicia ist
ein sal der har mit ge
schweren schiepen vñ
furfures dz seint kley/
gen des haubtes

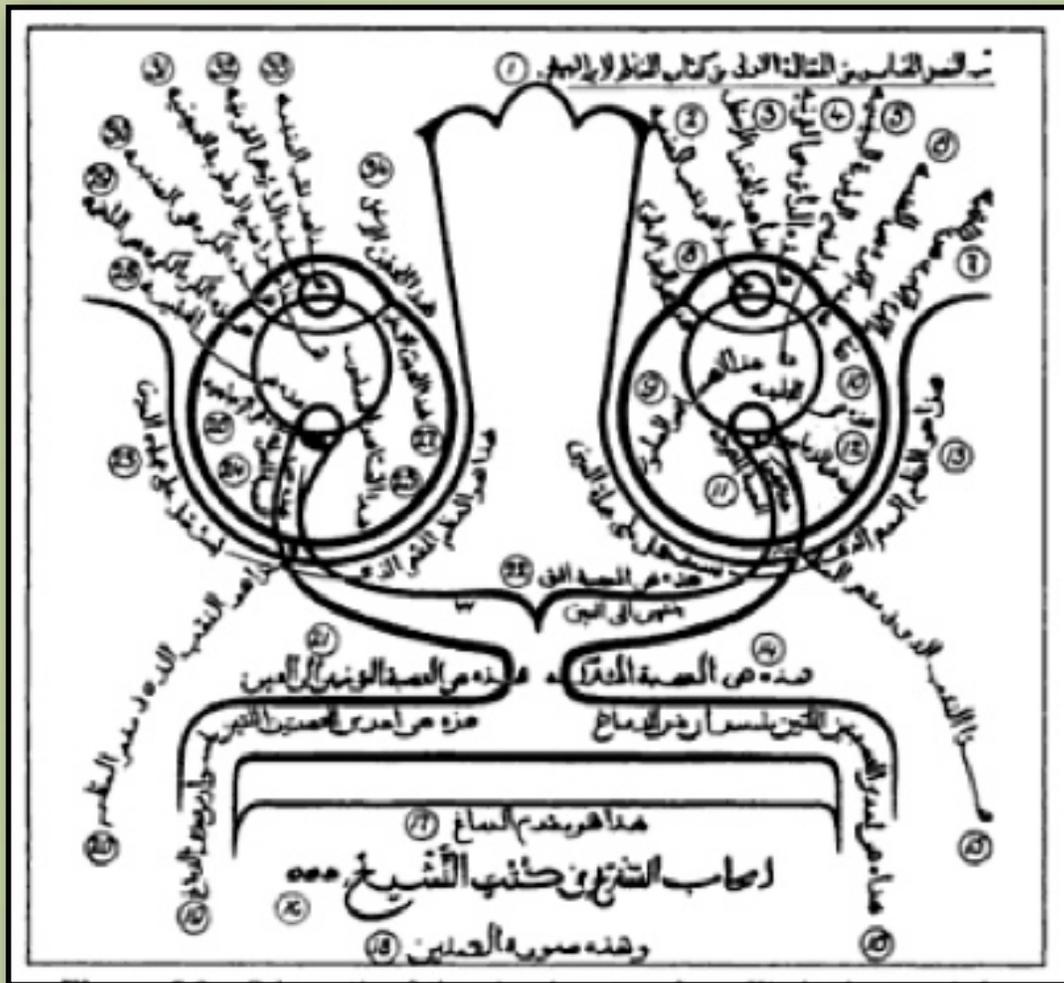
Für das vß fallen der
har auff dem haubte
mach ein lang vß der
eschen welch gebrant
ist vß danben lat vñ
zwise das haubt dar
mit/ das ist ein experi
ment Petrus Hispani

So du aber
nit haben magst tau
ben lat/ so nym blet
ter von ein eichbom
vñ die mirtel rinde sei
de die in wasser vñnd
wesch daz haubt dar
mit vñ thū dz offte vñ
lass vō im selber truck
en werdē dz hilfft wol
Aber für die furfures
vñ kleigen vñ schiepe
des haubtes/ seind die

wurzel von Papau in wasser vñnd wesch
darmit das haubt/ thū dz dñc sie fallen



das da nit heilen wolt So nym milch s. 8
maltz von milross d dñc ist/ schmier im dr

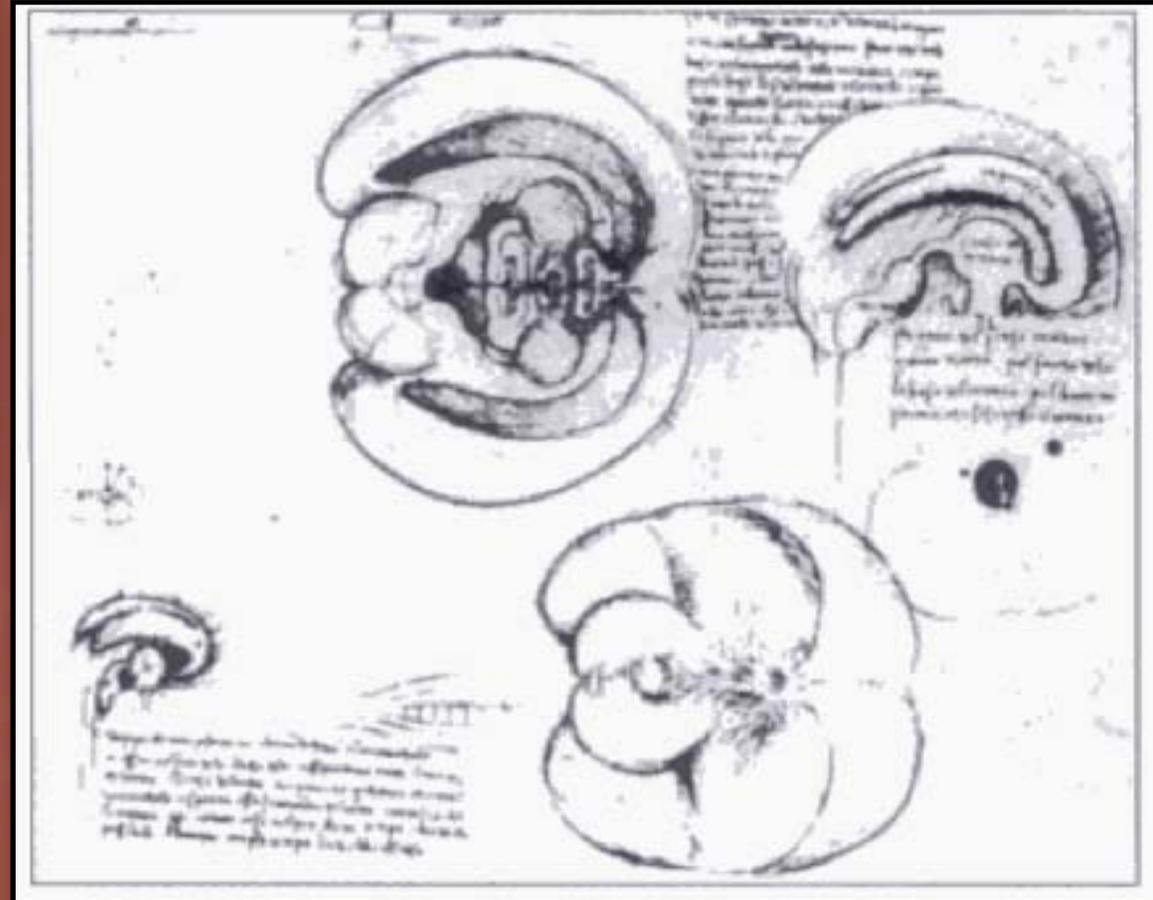
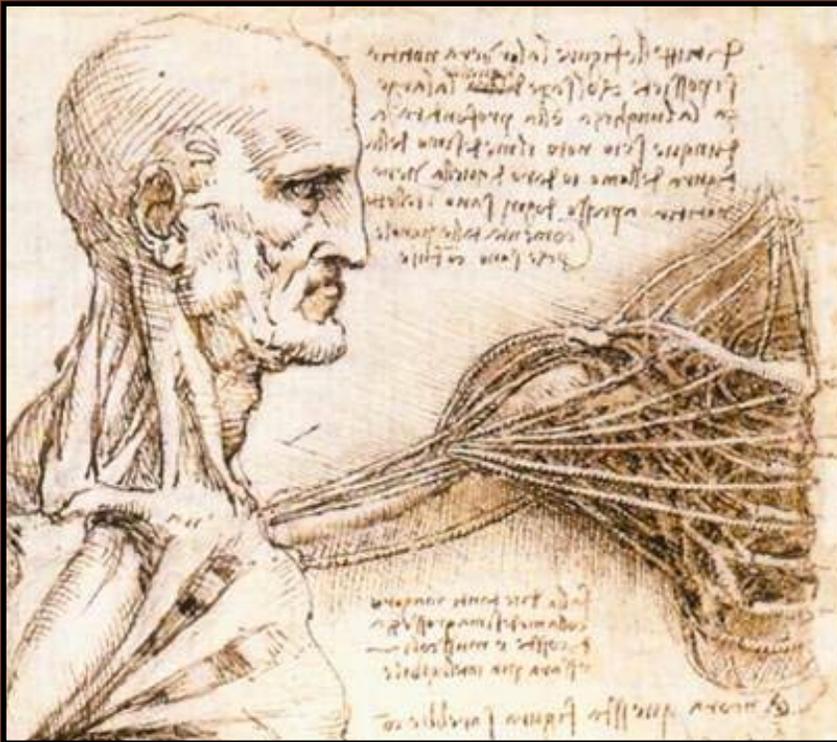


Arabic Science:

Expanding the
Greco-Roman
Legacy

e.g., optics and
vision

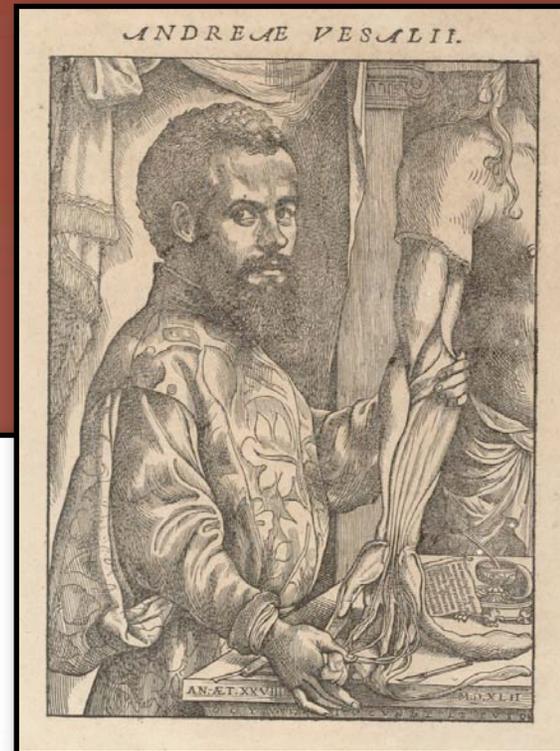
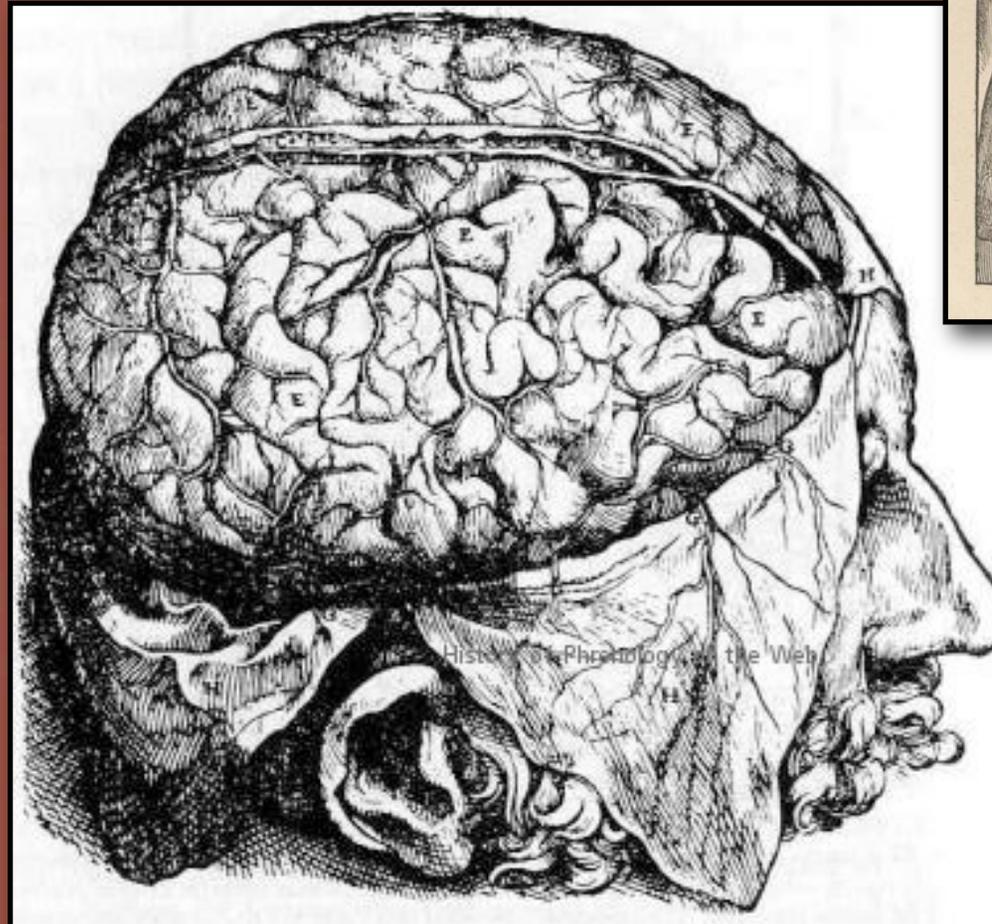
Brain and Ventricles



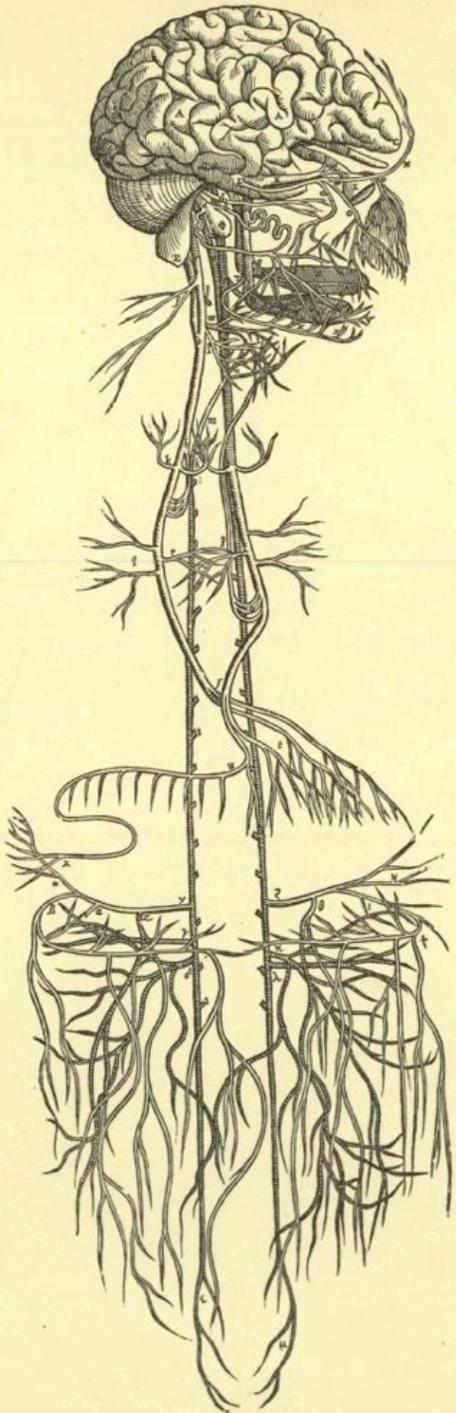
Leonardo da Vinci

Studies of Human
Anatomy

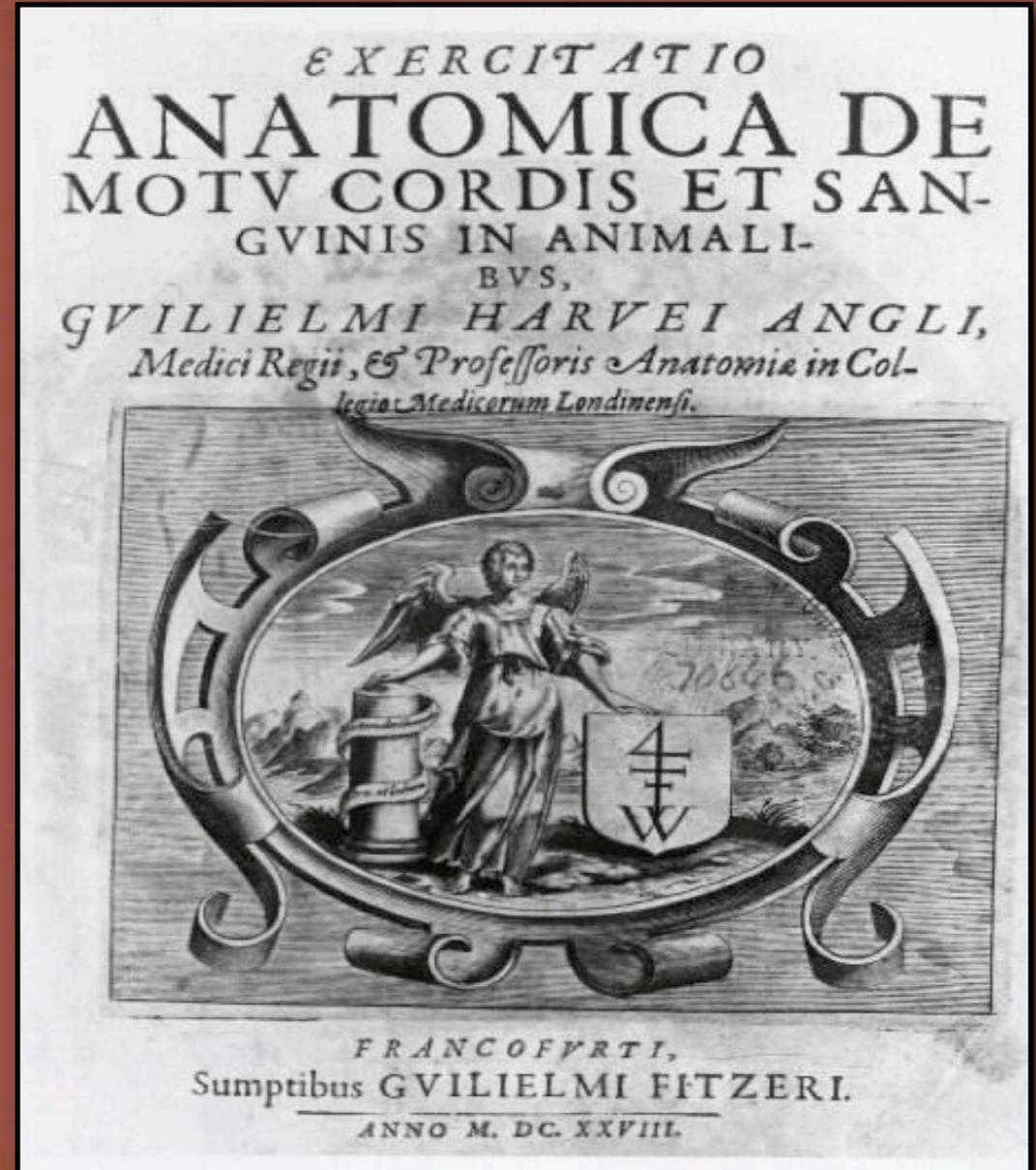
Andreas Vesalius



De Humani Corporis Fabrica, 1543



William Harvey (1578-1657), *De Motu Cordis*, 1628



Heart as center -- or just a pump?

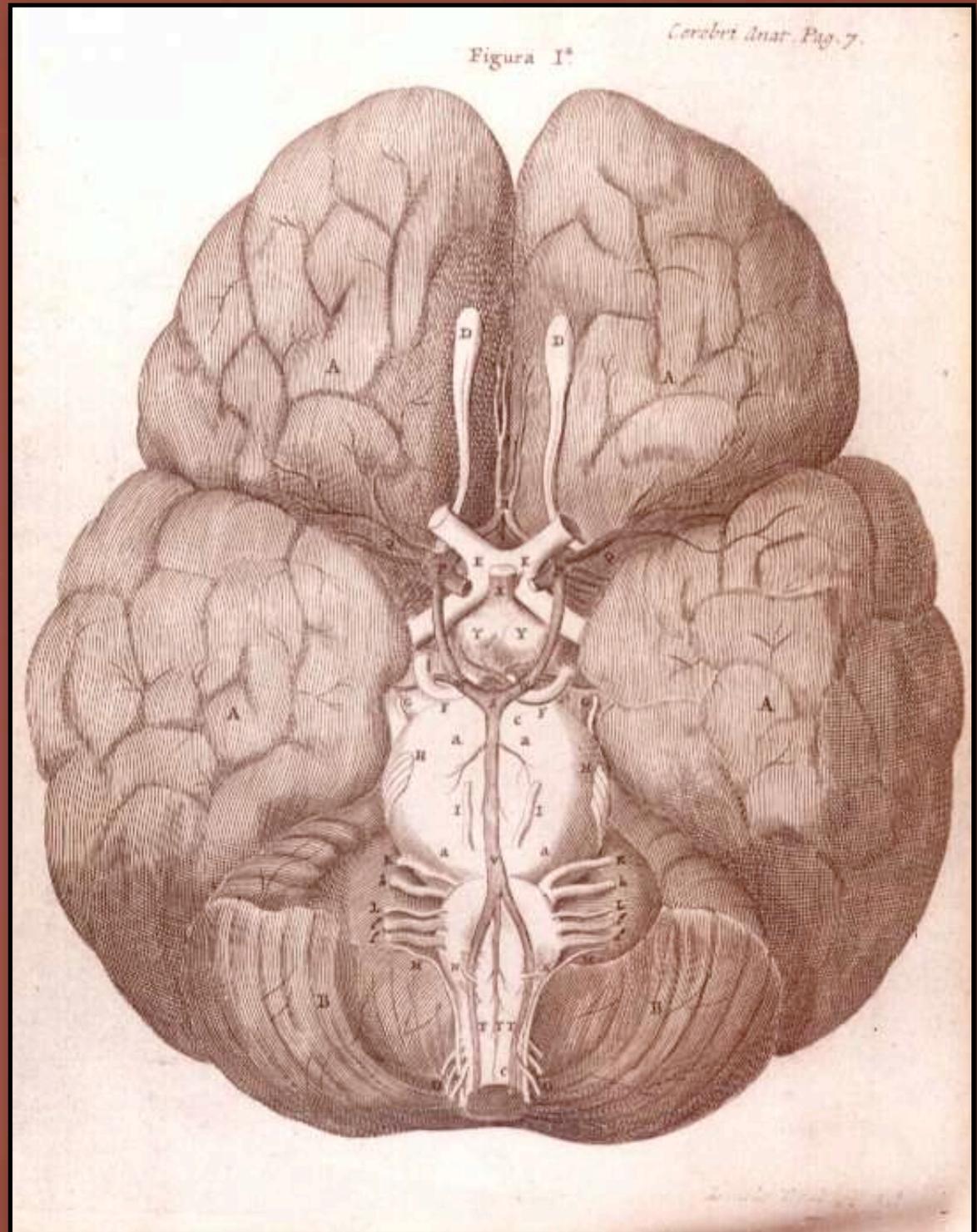


“this lax pith or marrow in man’s head shows no more capacity for thought than a cake of suet or bowl of curds.”

-- Henry More, c. 1660



Thomas Willis,
Cerebri anatome (1664)



Thomas Willis

*Two Discourses Concerning
the Soul of Brutes, 1683*

“an account of the workings of
the human soul as a
compound of a rational,
immaterial substance nested
within a swarm of chemical
spirits traveling along pathways
through the brain into the
nerves”





Robert Boyle,
*Experimenta et
observations physicae*

A very Tall and well Set Gentleman, Aged about 24 years, by a Fall from his Horse, had his Skull broken in several places, and being a Person of good Estate, had several Chirurgeons to attend him in the course of his Sickness, during which he was divers times Trepan'd, and had several pieces of Skull taken off, which left great Chasms . . . between the remaining parts. Within about three days after his Fall, this Knight . . . was taken with a Dead Palsy on his Right side, which did not equally affect his Arm and his Leg; The use of the latter being sometimes suddenly Restor'd to him in some measure. . . . But his Arm and Head were constantly Paralytical, being wholly depriv'd of Motion; and having so little Sense, that it would sometimes lye under his Body without his Feeling it. . . . And when the Chirurgeons were going to close up his Head, as having no more to do; one of them . . . (alleged) that, if they did no more, the Gentelman would lead a Useless and very Melancholy Life; and that he was confident, the Palsey was in some way or other occasion'd by the Fall, which had left something in the Head that they had not yet discover'd. And the Knight himself agreeing to this Man's notion, his Head was further laid open; and at length, under a piece of proud Flesh, they found, with much ado, a Splinter, or rather Flake of Bone, that bore hard upon the dura matter, and was not pull'd out without great Hemorrhage, and at such a stretch of the Parts, as made the Patient think his Brain itself was tearing out. But this Mischief was soon Remedy'd, and his Hurts securely Heal'd up; and he is now a Strong Healthy Man. (1691, 67-73)

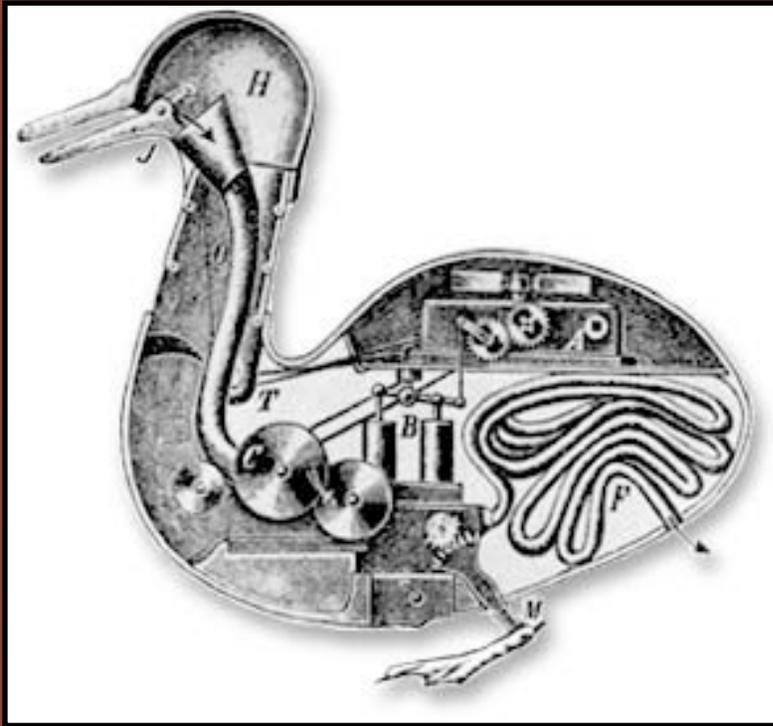
Rene Descartes: Mechanical Universe?

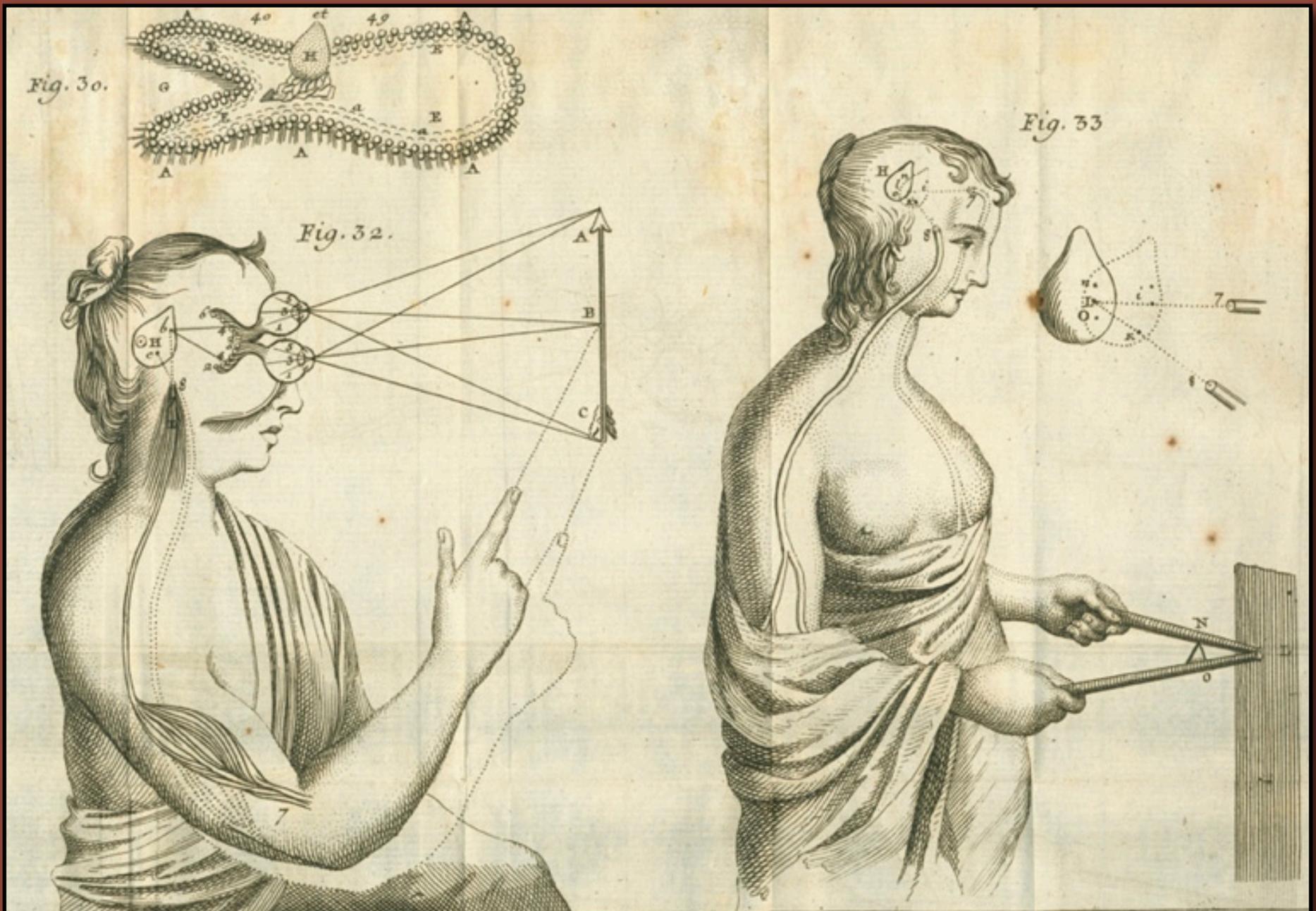


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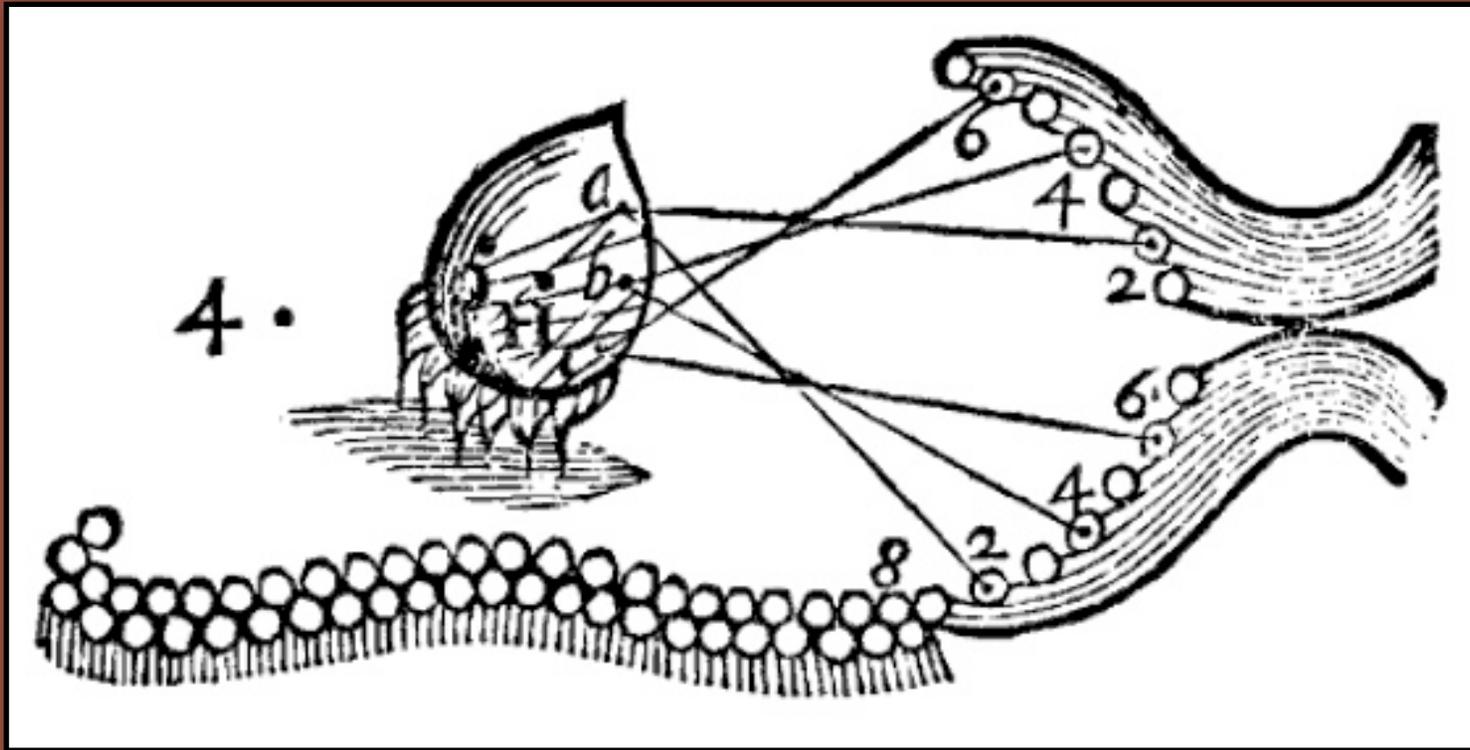


Life as Reflex Action?





The Pineal Gland and the Rational Soul



Mechanisms of Pineal Control

Pivot to open/close valves to control
flow of animal spirits

David Hartley: Vibrations and Associations

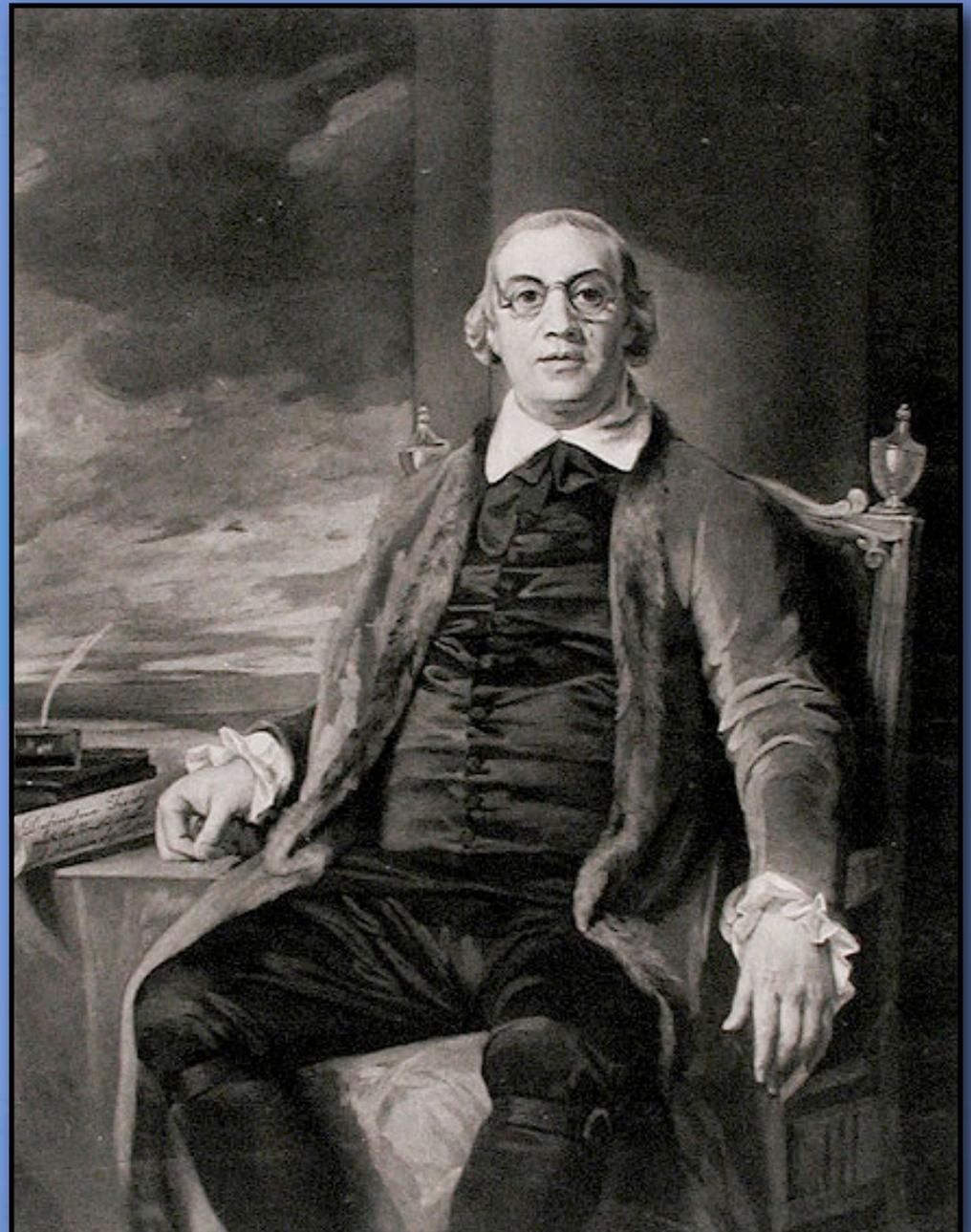
OBSERVATIONS
ON
M A N,
HIS
F R A M E,
HIS
D U T Y,
AND HIS
EXPECTATIONS.

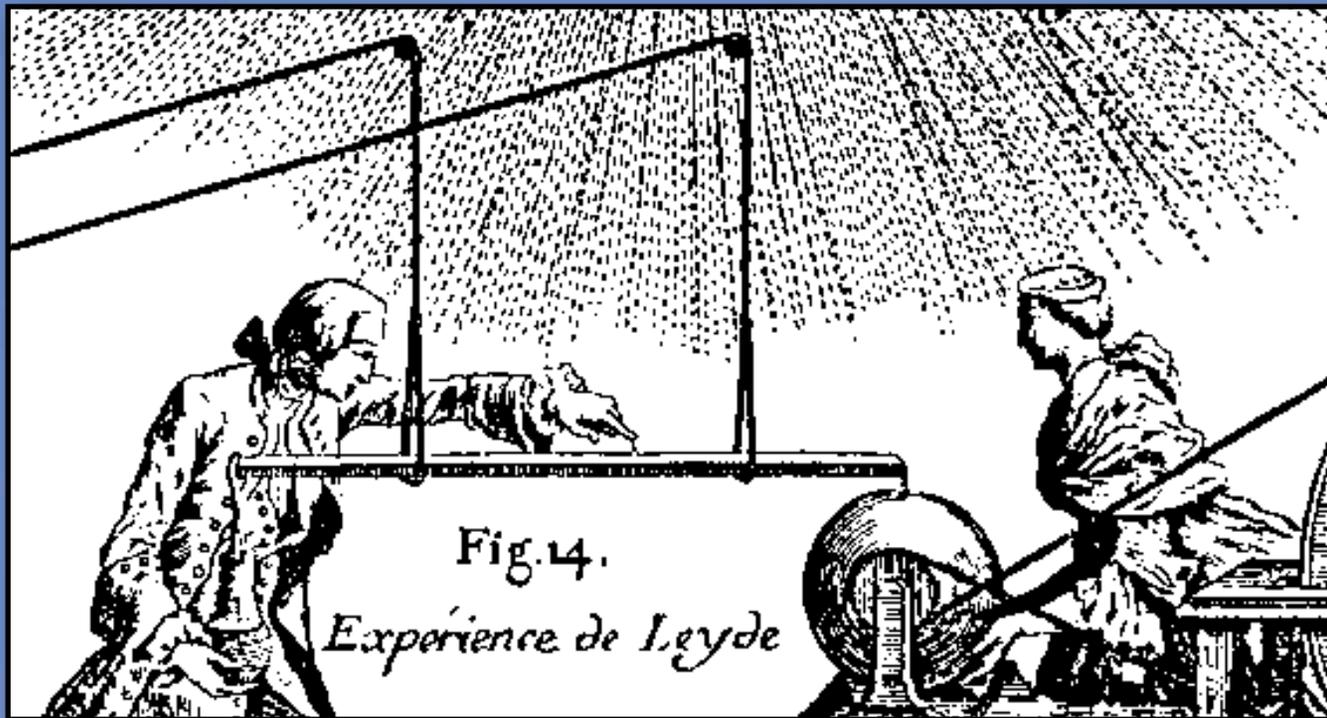
IN TWO PARTS.

By DAVID HARTLEY, M. A.

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Printed by S. RICHARDSON;
For JAMES LEAKE and WM. FREDERICK,
Bookellers in BATH:
And sold by CHARLES HITCH and STEPHEN ARSTEN,
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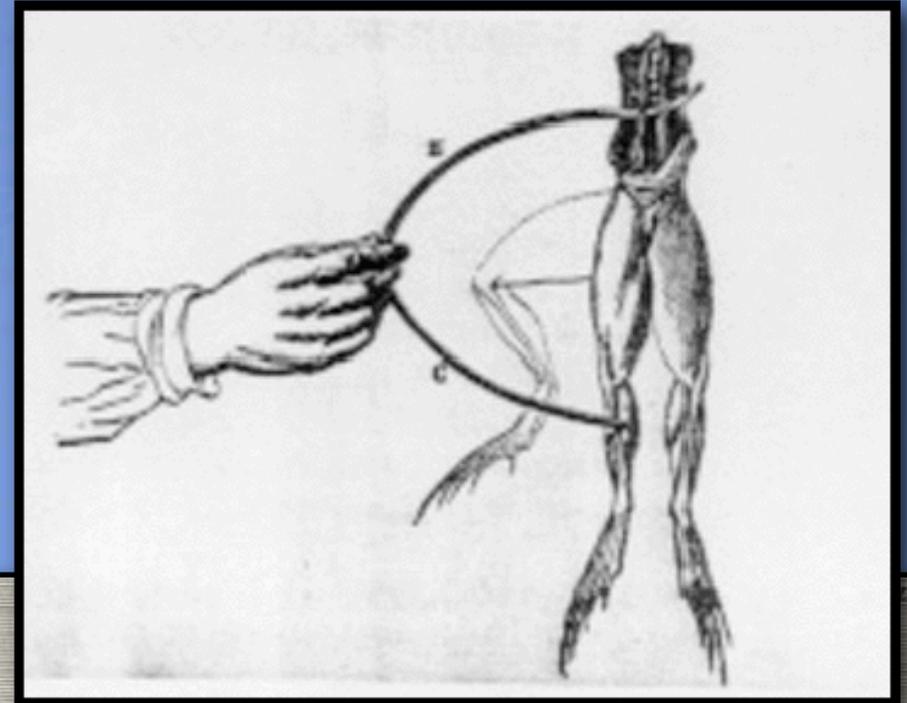
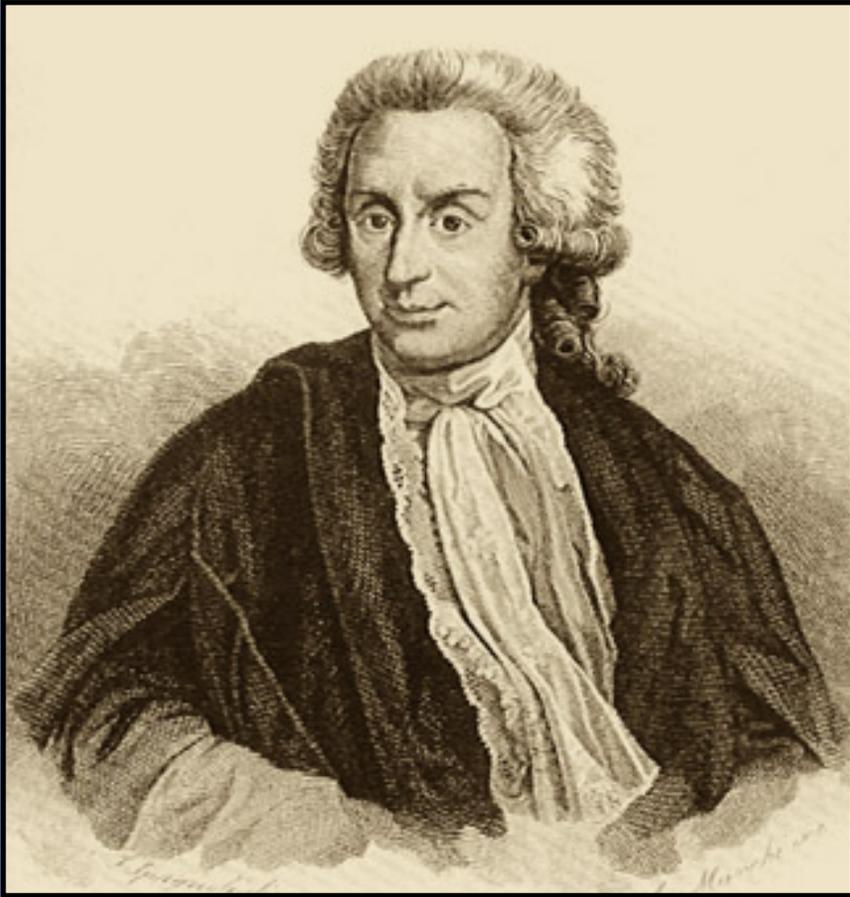


Leyden Jars: Electricity, Sensation, and Motion

“Suddenly I received in my right hand a shock of such violence that my whole body was shaken as by a lightning stroke. The vessel, although of glass, was not broken, nor was the hand displaced by the commotion: but the arm and body were affected in a manner more terrible than I can express. In a word, I believed that I was done for.”

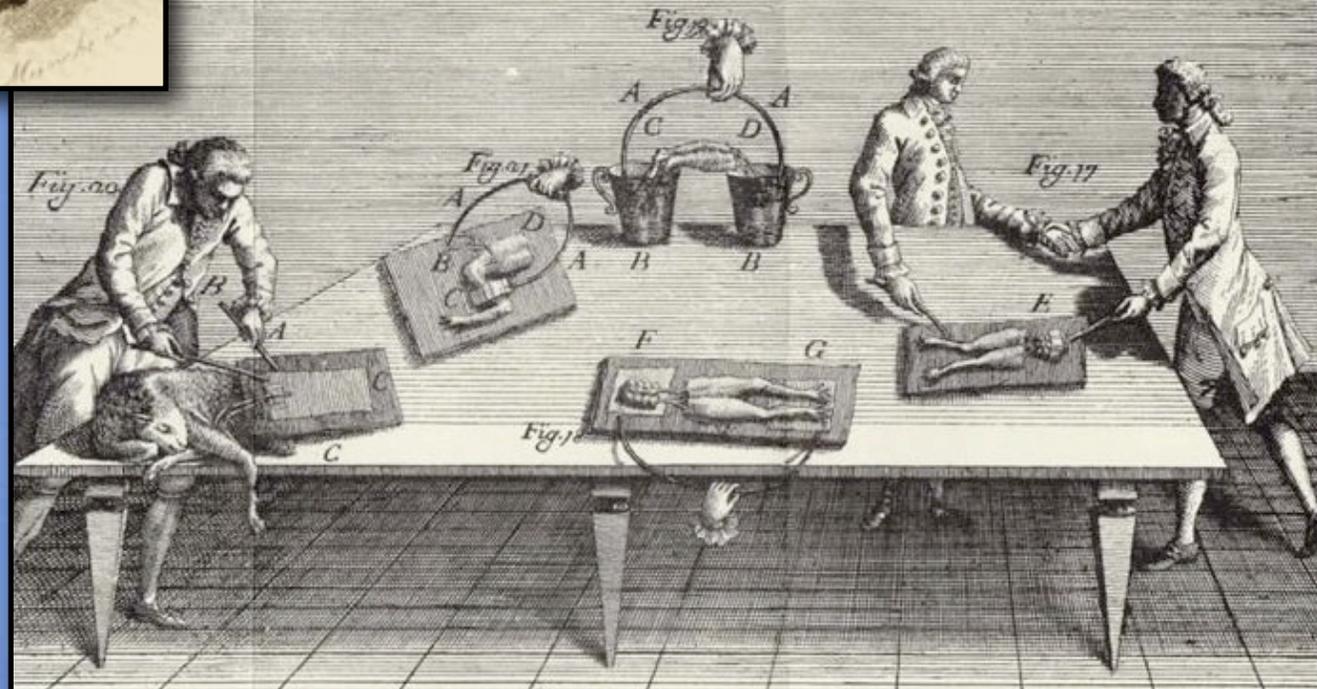
-- Pieter van Musschenbroek





Luigi Galvani

Studies of Biological
Electricity



What Is the Relation of Human and Animal?

Reason

Emotion

Passion



THE
EXPRESSION OF THE EMOTIONS

IN
MAN AND ANIMALS.

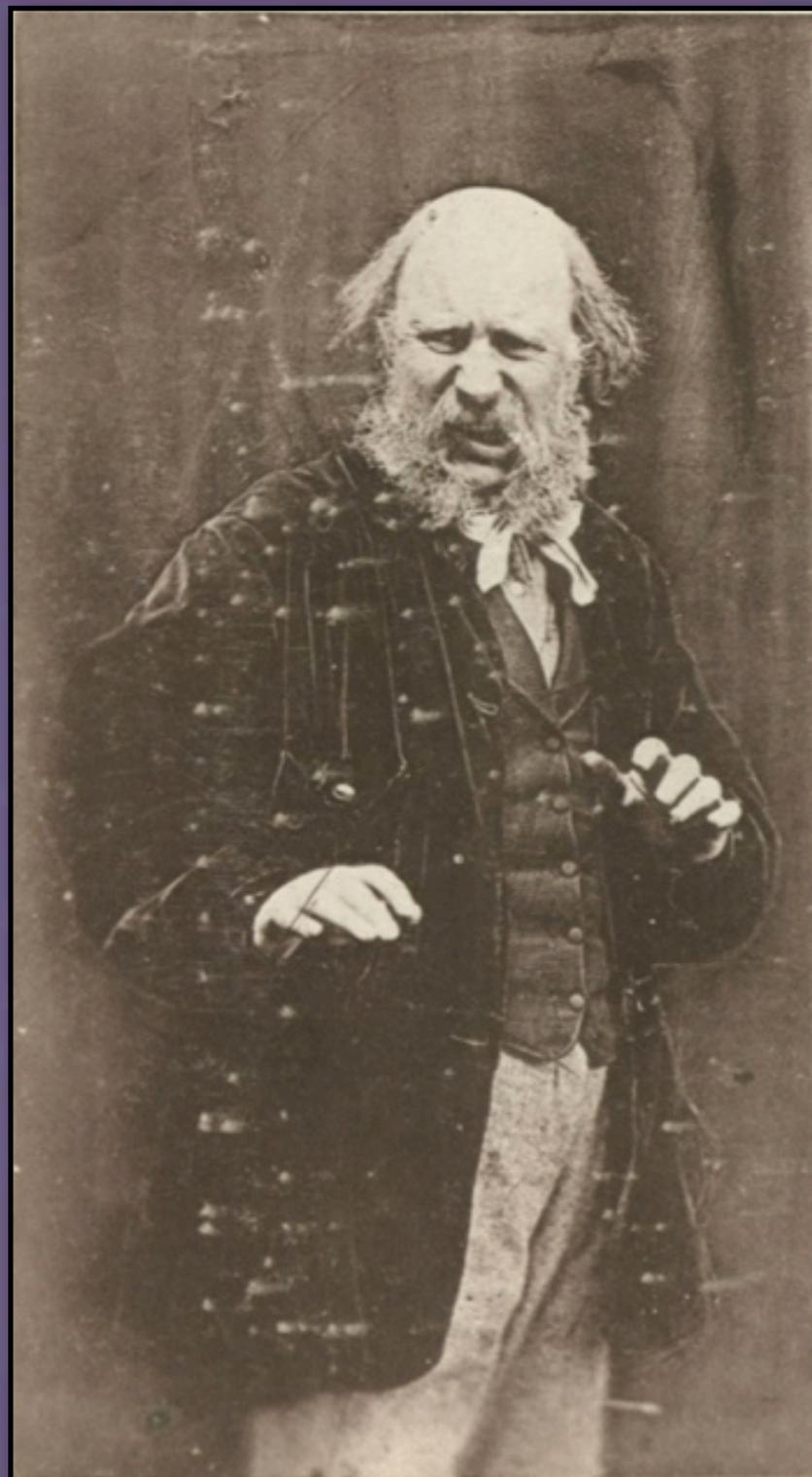
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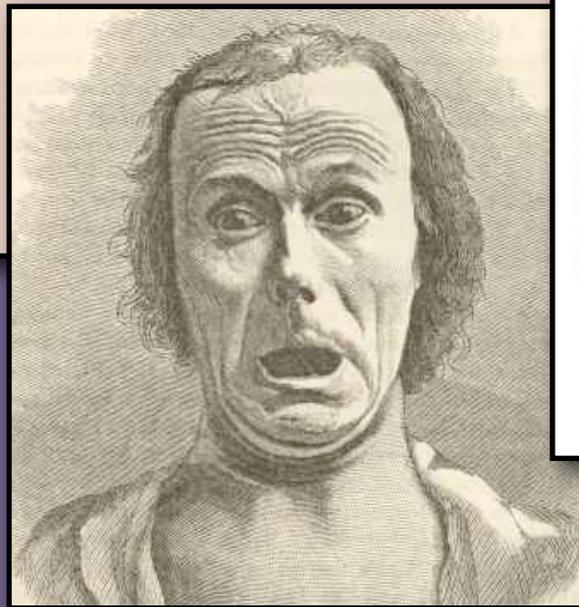
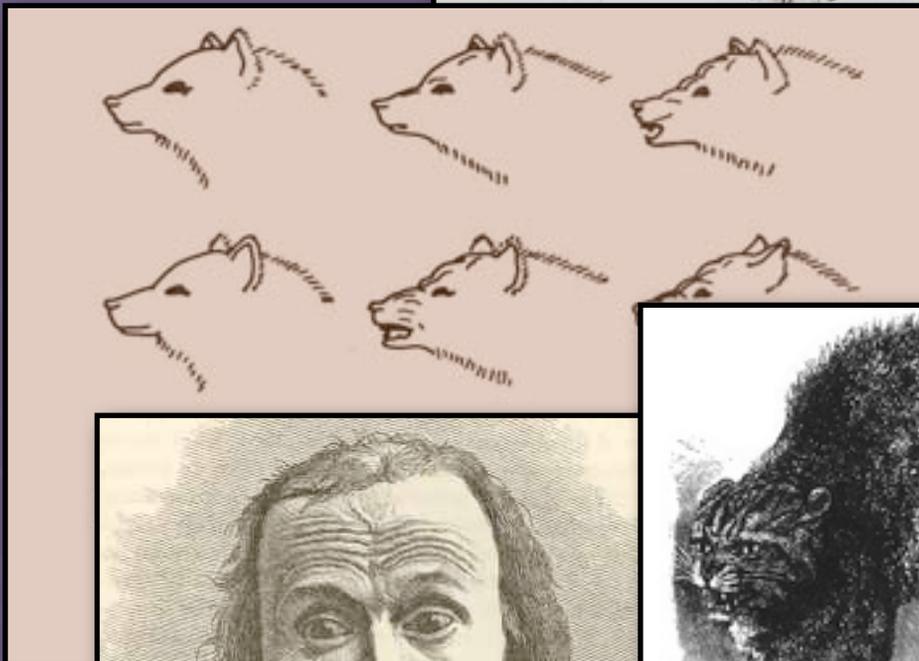
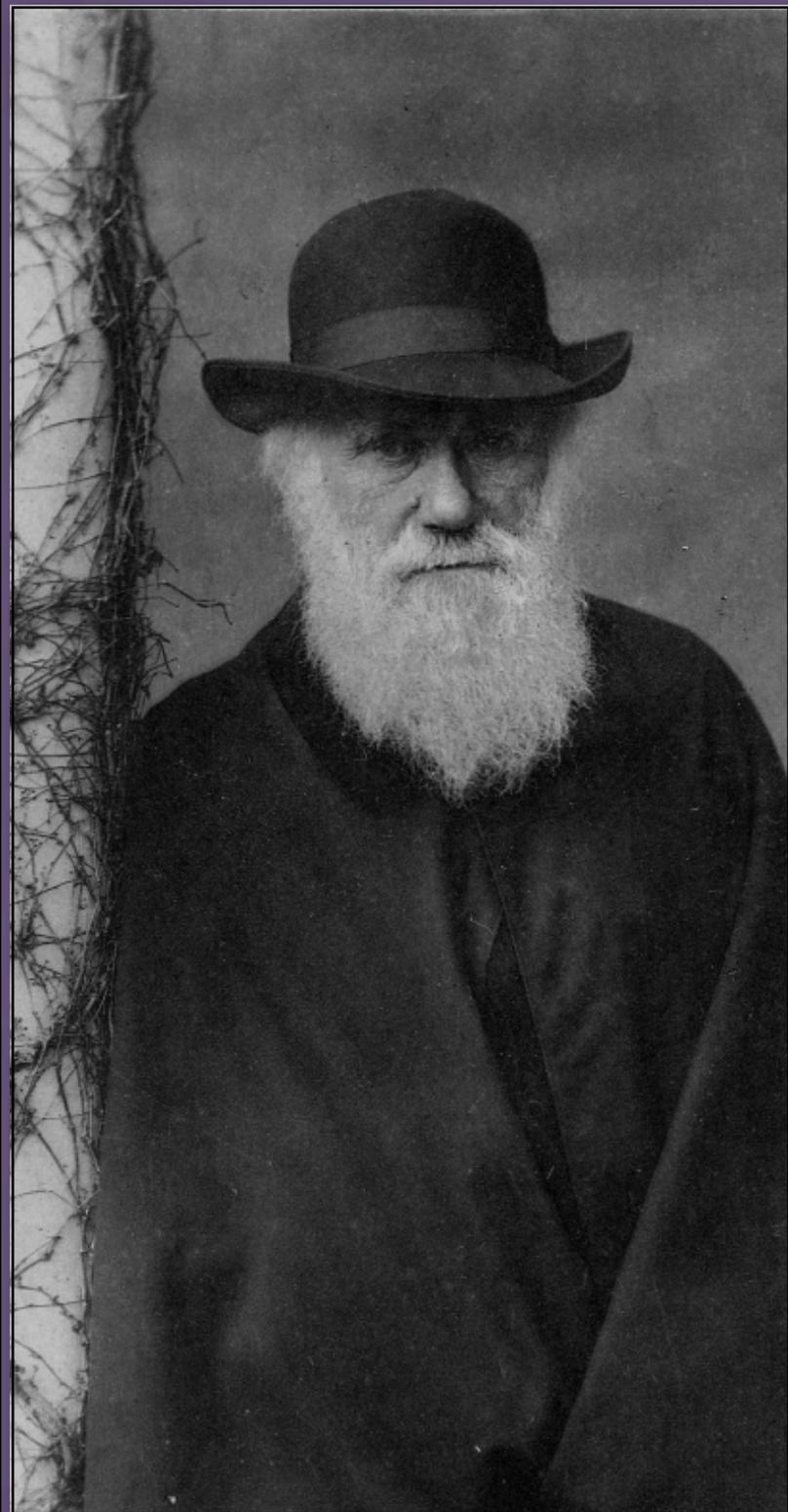
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LONDON:
JOHN MURRAY, ALBEMARLE STREET.

1872.

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“the indelible stamp of his lowly origin”

STS.003

The Rise of Modern Science

Fall 2010

Final Paper Proposal

Due Date: Monday, 22 November 2010. In class or via email to your TA.

Length: 1-2 double-spaced pages. You should use standard margins (1-inch to 1.25-inches on each side of the page), and a 12-point font.

Grade: Your grade on the final paper proposal will contribute 5% of your final course grade.

Your final paper for STS.003 will be due in December. To help you prepare for that project, you will hand in a brief proposal, due to your TA in class or via email not later than 1pm on Monday, 22 November 2010.

For the final paper assignment, you will choose one of three topics:

Option A, "Eclipse and emergence," involving Arthur Eddington's eclipse expedition to test Albert Einstein's general theory of relativity;

Option B, "In the flesh," involving Gunther von Hagens's controversial exhibition, *Body Worlds*;

Option C, Choose and research your own topic.

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STS.003 The Rise of Modern Science
Fall 2010

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