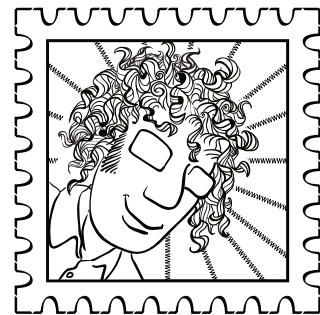
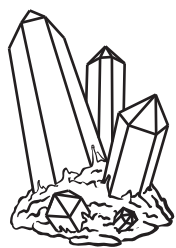


# WILL A MACHINE

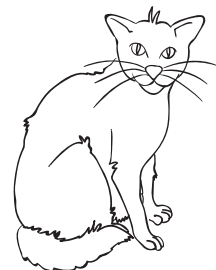


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# EVER BE CONSCIOUS?



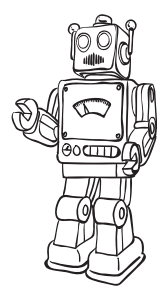
name: rock  
genre: inorganic  
living: no  
intelligent: no  
conscious: no



name: Lucky  
genre: animal  
living: yes  
intelligent: enough  
conscious: yes

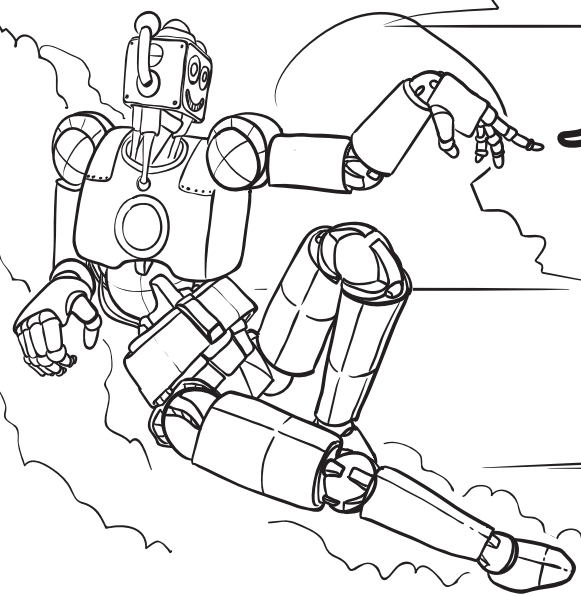


name: Rick  
genre: human  
living: yes  
intelligent: ?  
conscious: yes

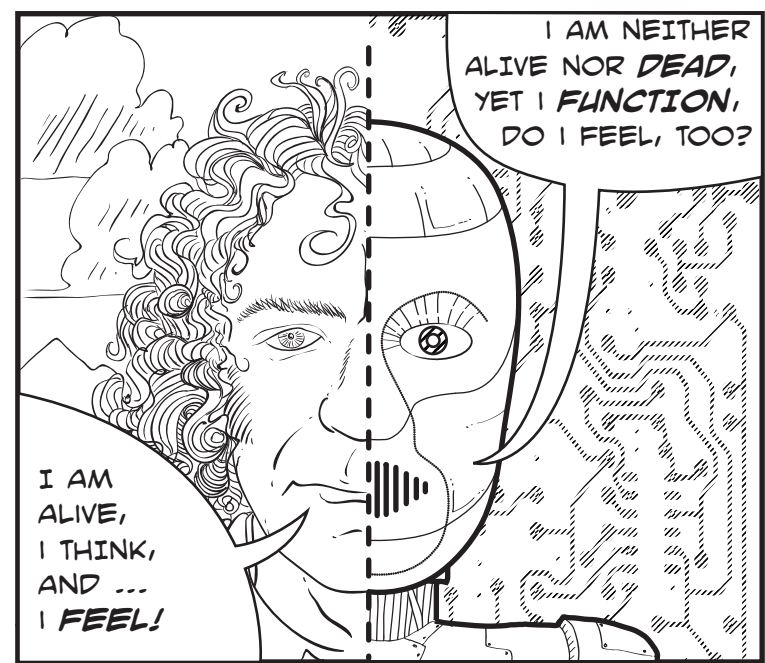
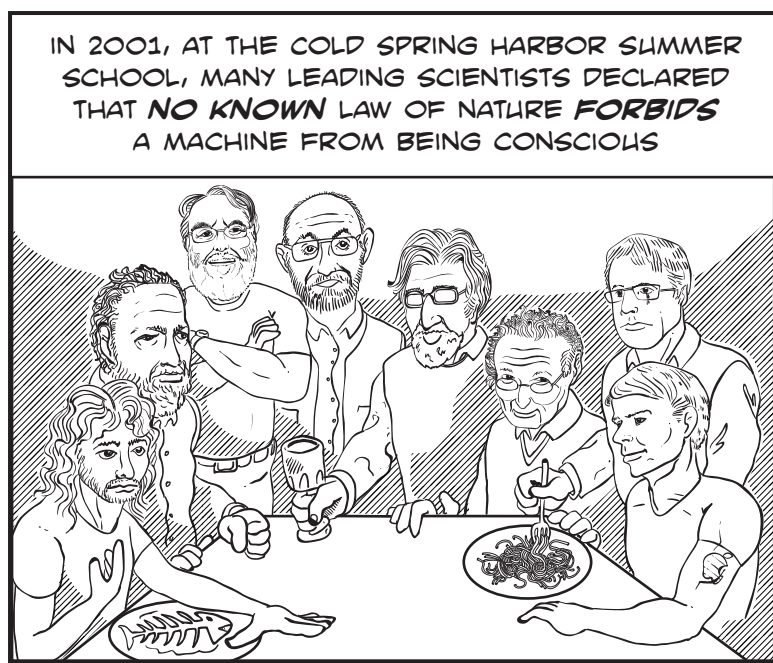
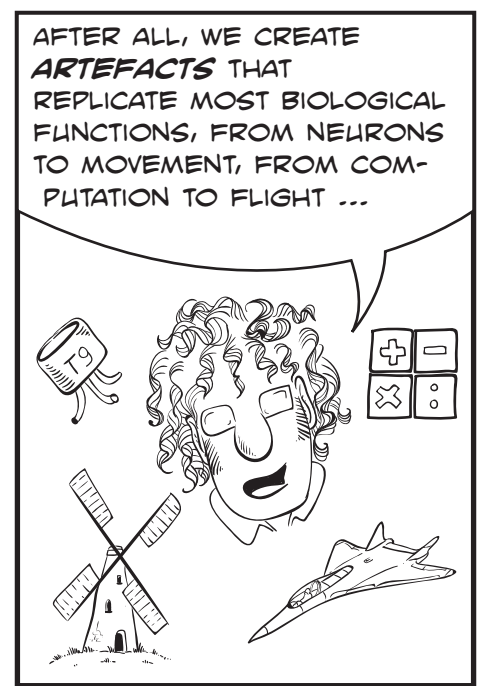
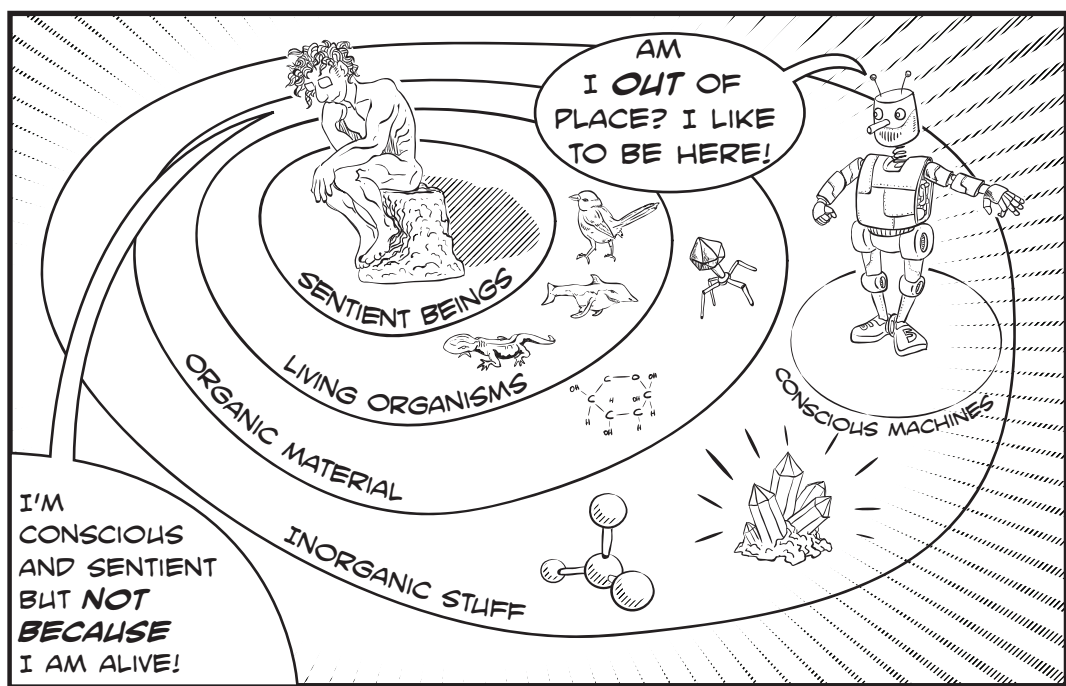
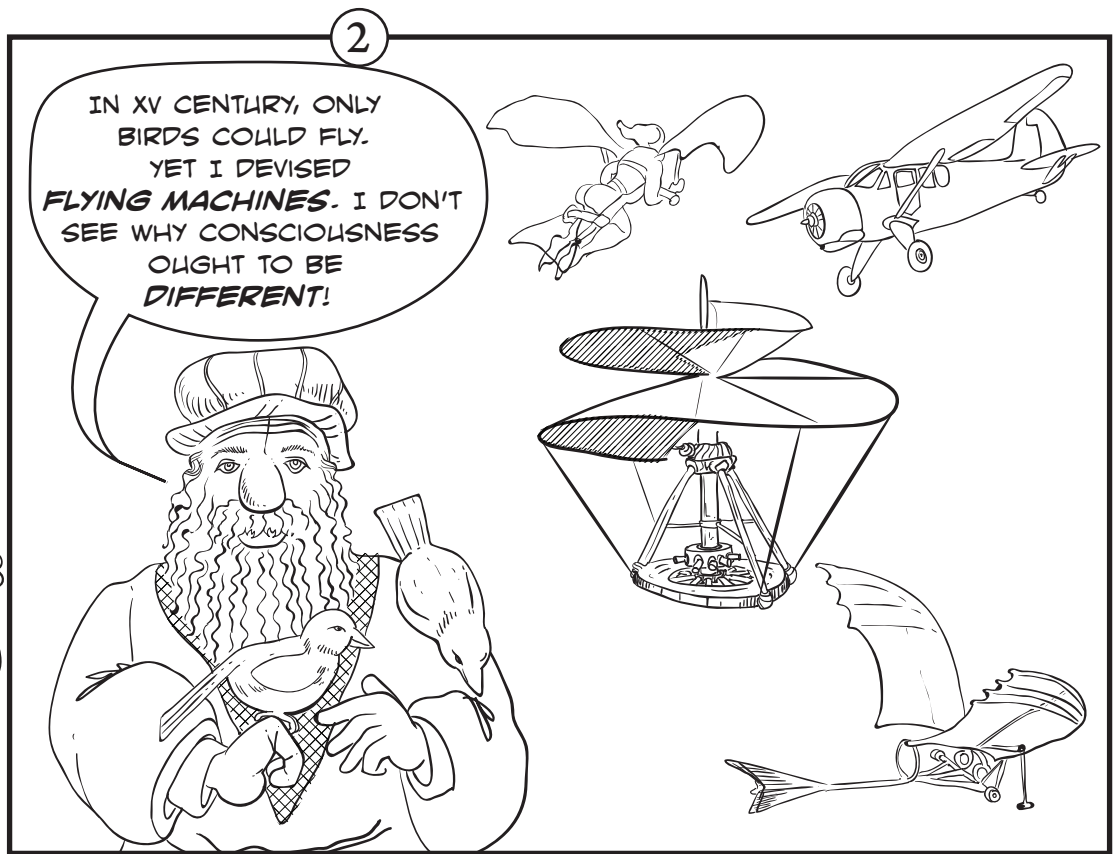


name: Buck  
genre: artificial  
living: no  
intelligent: a little  
conscious: not yet

A MACHINE IS JUST A MACHINE ...  
AND YET ... ARE HUMAN BEINGS ANYTHING  
BUT BIOLOGICAL MACHINES?  
WILL WE EVER BE ABLE TO REPLICATE  
OUR MOST INTIMATE ESSENCE,  
NAMELY CONSCIOUSNESS,  
INTO A MACHINE?

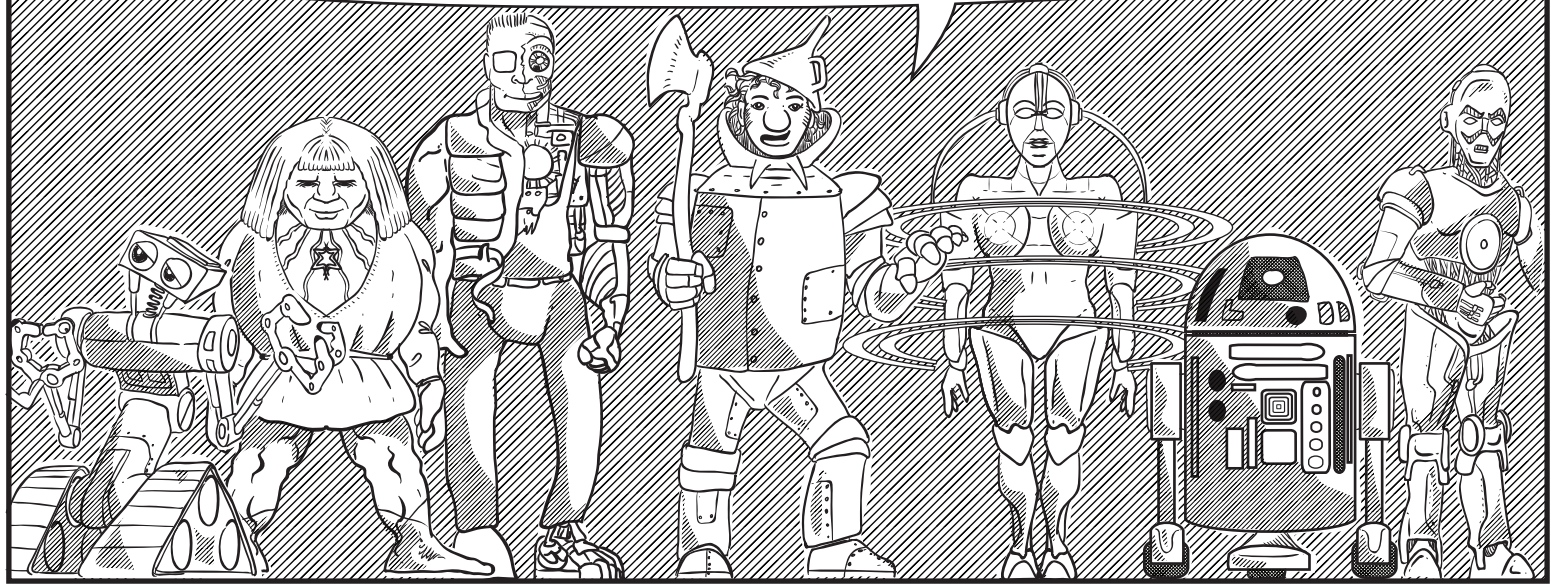


WILL THE BIOLOGICAL BRAIN  
EVER BE ABLE TO CREATE  
AN ARTIFICIAL BRAIN WITH A MIND?  
WILL A MACHINE EVER BE  
CONSCIOUS?



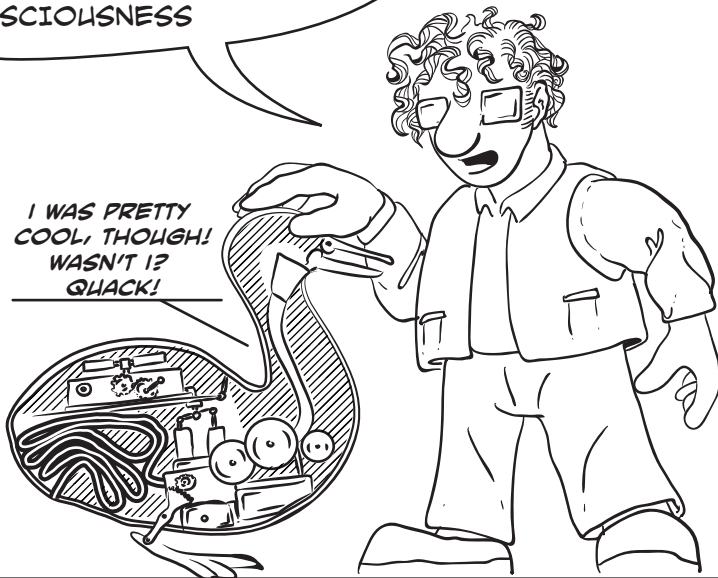


IN FICTION IT HAS BEEN A PLATITUDE <sup>3</sup> THAT, AS SOON AS, AN ARTIFICIAL CREATURE BECOMES INTELLIGENT AND **AUTONOMOUS**, IT ALSO BECOMES ABLE TO **FEEL** AND TO STRIVE FOR ITS OWN **GOALS** AND PURPOSES ...



BUT IN THE REAL WORLD, MECHANICAL AUTOMATA ARE STILL **A FAR CRY** FROM ANY KIND OF CONSCIOUSNESS

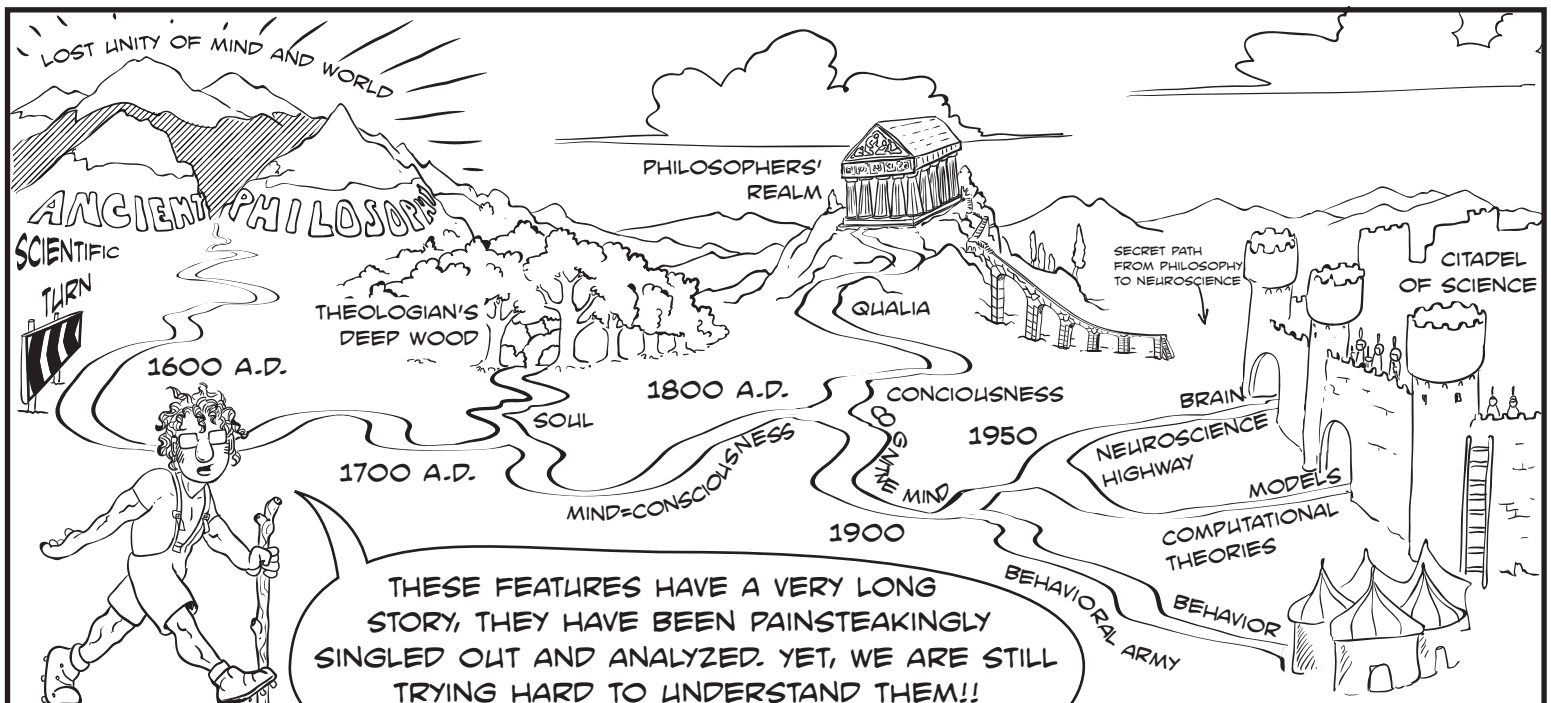
I WAS PRETTY COOL, THOUGH! WASN'T I? QUACK!



### CHECKLIST

- 1) QUALIA (TO FEEL)
- 2) INTENTIONALITY
- 3) UNITY
- 4) INTEGRATION
- 5) AUTONOMY
- 6) EMBODIMENT

WHAT ARE THE RELEVANT FEATURES OF CONSCIOUSNESS? I SUGGEST A SET OF CORE PROPERTIES, IN ORDER OF IMPORTANCE



IF WE COMPARE  
BIOLOGICAL BRAINS  
WITH MACHINES  
THERE IS NO  
**MAGIC** THRESHOLD

A TRANSISTOR LOOKS  
AS FAR FROM  
CONSCIOUSNESS  
AS IT MAY BE

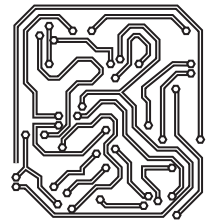
4

BITS DON'T HAVE  
ANY SUBJECTIVE  
FEELINGS

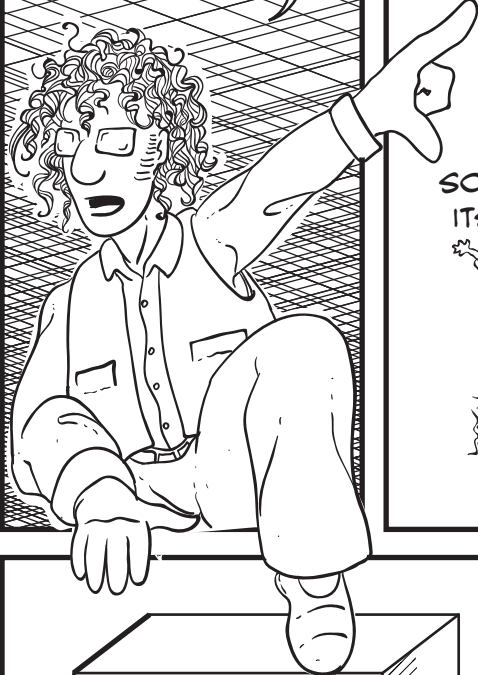
0010100101010111  
1101001000101010

NEITHER NEURAL  
FIRINGS DO

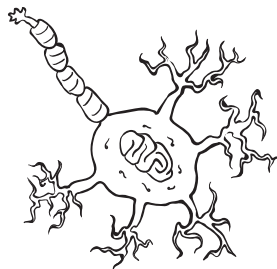
A PRINTED CIRCUIT  
BOARD APPEARS  
TO BE COLD



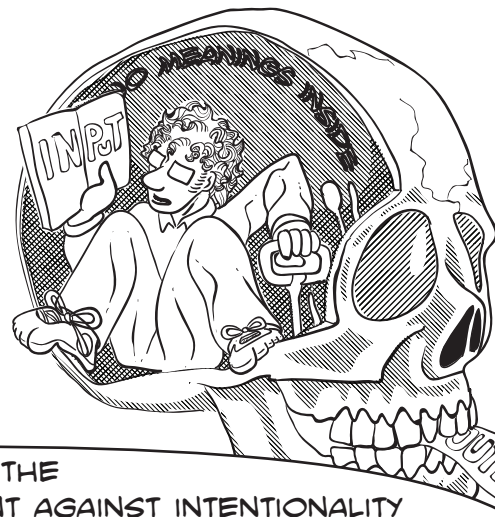
BUT NEURAL CIRCUITS  
ARE NO BETTER



SO A NEURON AND  
ITS SYNAPSES DO



I REPRESENT  
THE WORLD



I REPRESENT  
THE WORLD,  
TOO!

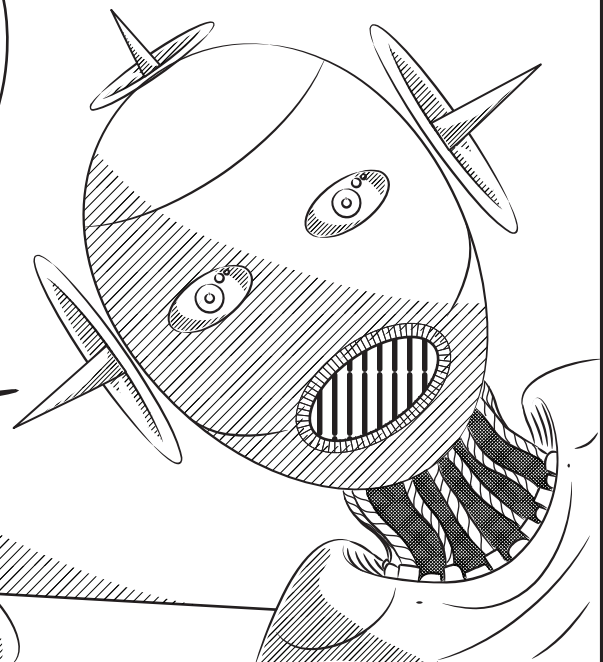


EVEN THE  
TRADITIONAL SEARLE'S ARGUMENT AGAINST INTENTIONALITY  
AND SEMANTICS IN MACHINES MAY EQUALLY WELL BE APPLIED TO  
BIOLOGICAL BRAINS THAT, AS FAR AS WE KNOW AND PACE SEARLE,  
DON'T SHOW ANY INTRINSIC BIOLOGICAL INTENTIONALITY! NO SEMANTICS INSIDE!

THE INESCAPABLE CONCLUSION IS THAT  
ANY A PRIORI ARGUMENT **AGAINST** MACHINE  
CONSCIOUSNESS IS ALSO AN ARGUMENT  
AGAINST CONSCIOUSNESS IN HUMAN  
BEINGS SINCE BRAINS ARE  
**BIOLOGICAL MACHINES!**

ARGUMENTS AGAINST  
MACHINE  
CONSCIOUSNESS

CONSCIOUS  
BRAIN

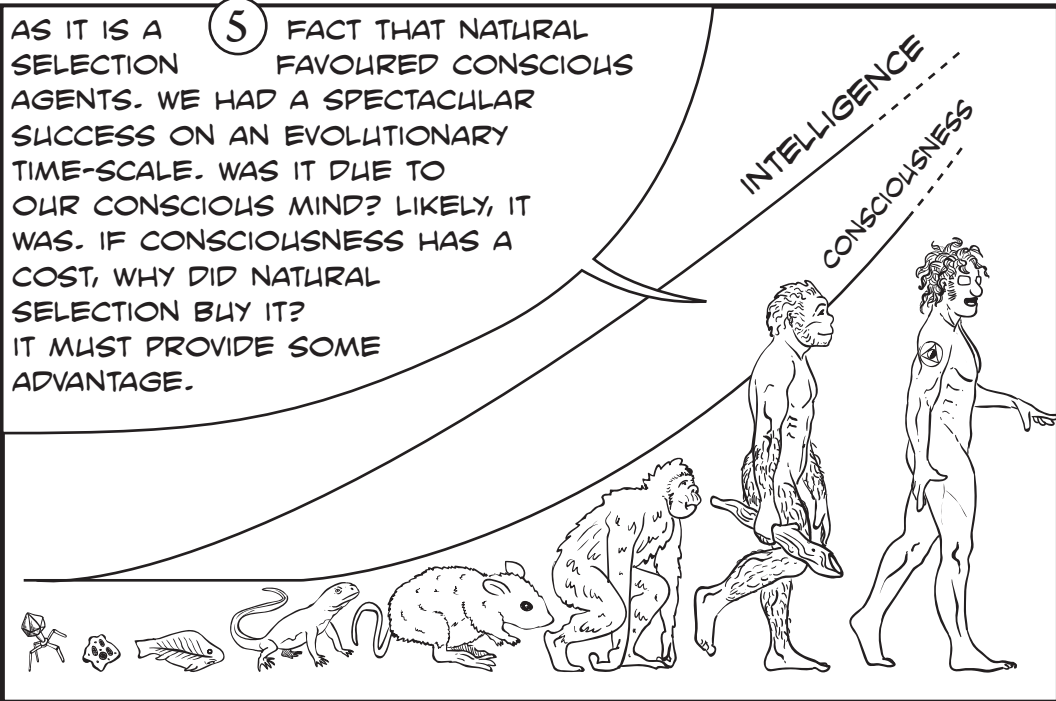




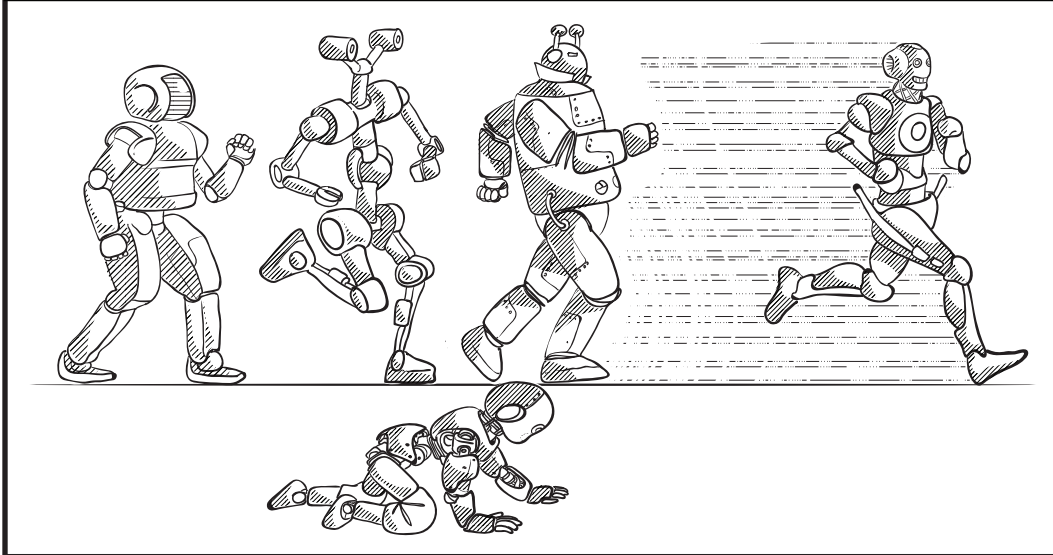
IT'S A FACT THAT WE **FEEL** POSITIVE AND NEGATIVE SENSATIONS. WE ARE CONSCIOUS ... NO DOUBT ABOUT IT



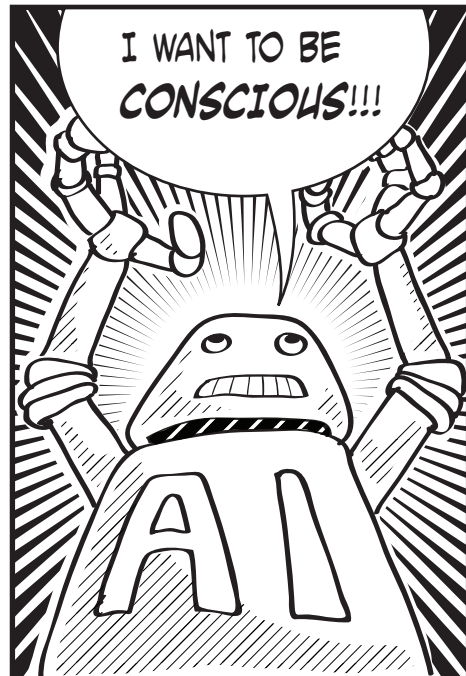
AS IT IS A **5** FACT THAT NATURAL SELECTION FAVOURED CONSCIOUS AGENTS. WE HAD A SPECTACULAR SUCCESS ON AN EVOLUTIONARY TIME-SCALE. WAS IT DUE TO OUR CONSCIOUS MIND? LIKELY, IT WAS. IF CONSCIOUSNESS HAS A COST, WHY DID NATURAL SELECTION BUY IT? IT MUST PROVIDE SOME ADVANTAGE.



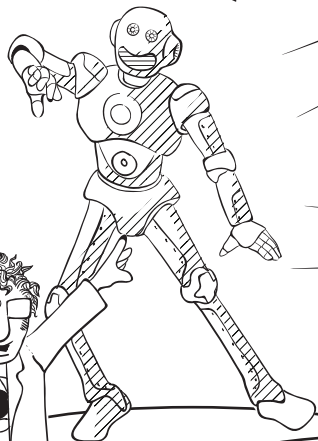
PERHAPS CONSCIOUSNESS MAY **BOOST** ROBOTS' SKILLS AND CAPACITIES IN SOME TOTALLY NEW DIRECTIONS THAT MAY PROVIDE SOME **COMPETITIVE ADVANTAGE** AS TO EVERYDAY LIFE!



I WANT TO BE **CONSCIOUS!!!**



**CONSCIOUS MACHINE**



IF WE COULD SELL **CONSCIOUS** MACHINES WHAT WOULD THEY OFFER THAT **AI** CANNOT?

**MC BASE**  
AUTONOMY  
INTEGRATION  
ADAPTABILITY

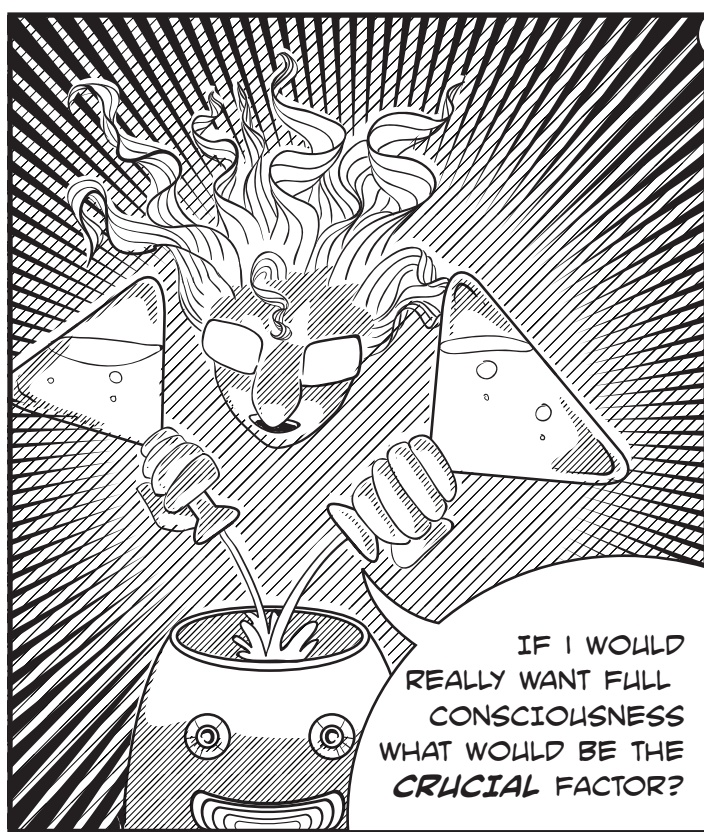
**MC PRO**  
QUALIA  
INTENTIONALITY  
FREE WILL\*

**WEAK MACHINE CONSCIOUSNESS**  
BUILDING A MACHINE THAT BEHAVES **AS IF** IT WOULD FEEL SOMETHING

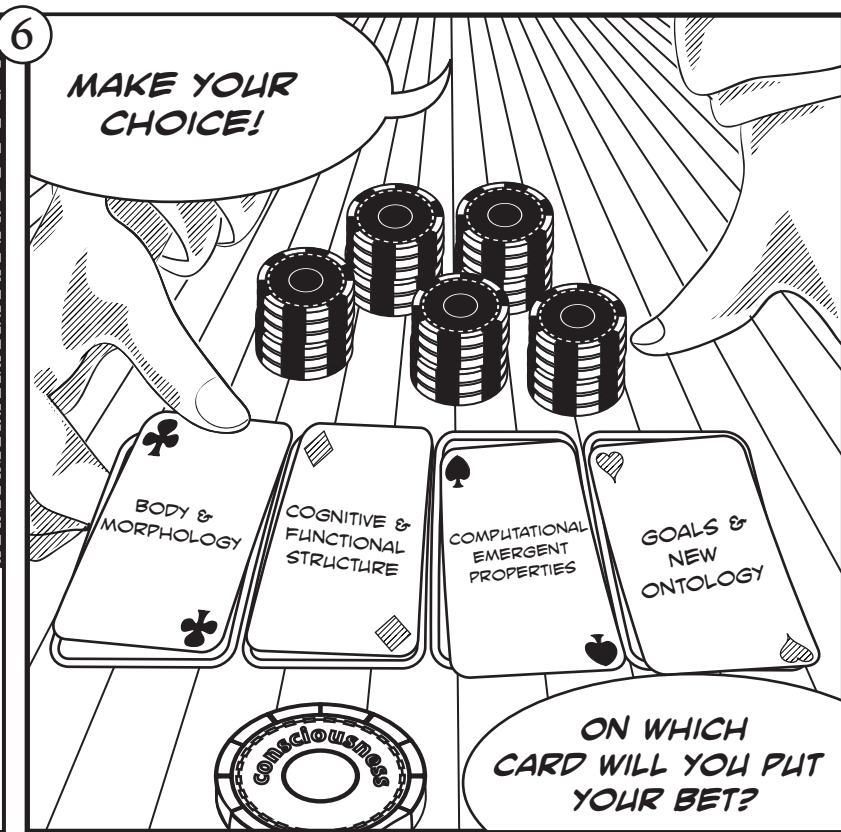
**STRONG MACHINE CONSCIOUSNESS**  
BUILDING A MACHINE THAT FEELS SOMETHING

ROUGHLY, THE TWO SETS OF SPECS CORRESPOND TO TWO **DIFFERENT** APPROACHES TO MACHINE CONSCIOUSNESS: STRONG AND WEAK MACHINE CONSCIOUSNESS

\*WARNING: ON SOME MODEL, IT MAY PRODUCE UNDESIRABLE BEHAVIOURS



IF I WOULD  
REALLY WANT FULL  
CONSCIOUSNESS  
WHAT WOULD BE THE  
**CRUCIAL** FACTOR?



MAKE YOUR  
CHOICE!

BODY &  
MORPHOLOGY

COGNITIVE &  
FUNCTIONAL  
STRUCTURE

COMPUTATIONAL  
EMERGENT  
PROPERTIES

GOALS &  
NEW  
ONTOLOGY

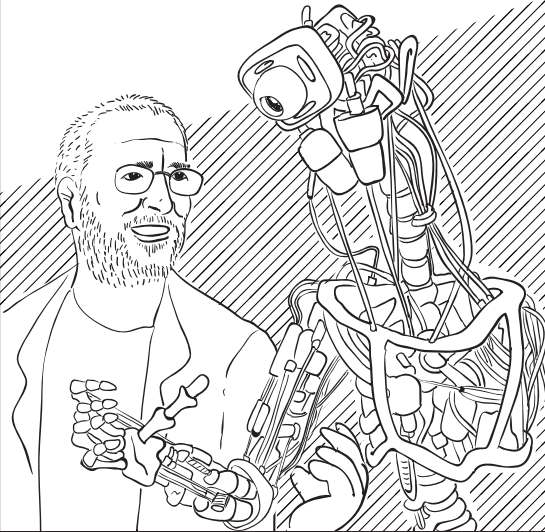


ON WHICH  
CARD WILL YOU PUT  
YOUR BET?

## BODY SHOP

LET'S  
CON-  
SIDER  
THE BODY,  
FIRST!

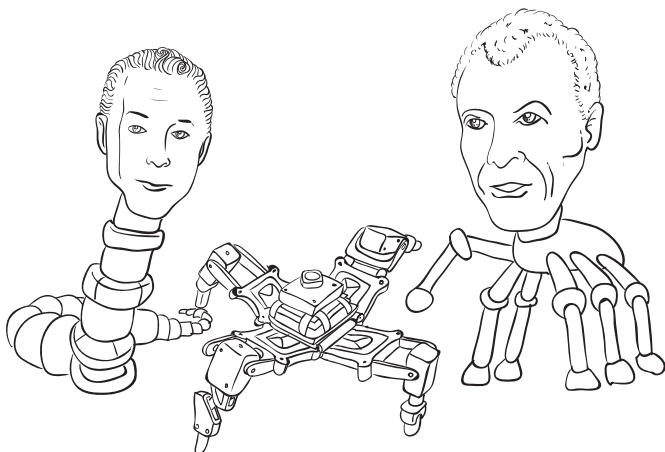
MANY RESEARCHERS HAVE TAKEN  
THE BODY VERY SERIOUSLY AND  
THEY TAKE EMBODIMENT TO BE A  
NECESSARY ELEMENT



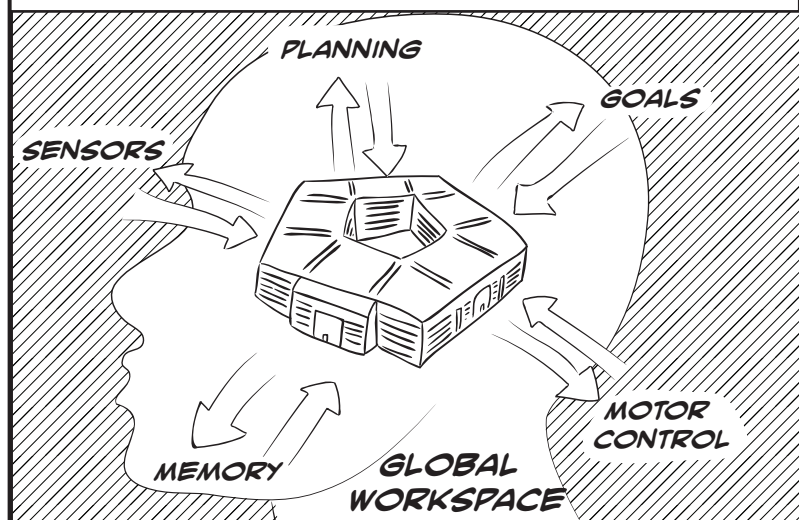
OTHER SCHOLARS ARE BUILDING  
INFANT ROBOTS SO TO STUDY DE-  
VELOPMENT AND GROWTH



HOWEVER, ALTHOUGH DIFFERENT BODIES  
WILL LEAD TO DIFFERENT EXPERIENCES,  
WHY THERE SHOULD BE ANYTHING LIKE  
CONSCIOUSNESS? MORPHOLOGY AND EM-  
BODIMENT DO NOT PROVIDE A SOLUTION



FOR THIS REASON, MANY SCIENTISTS  
LOOKED FOR COGNITIVE STRUCTURES THAT  
WERE INVOLVED IN OUR CONSCIOUS MIND



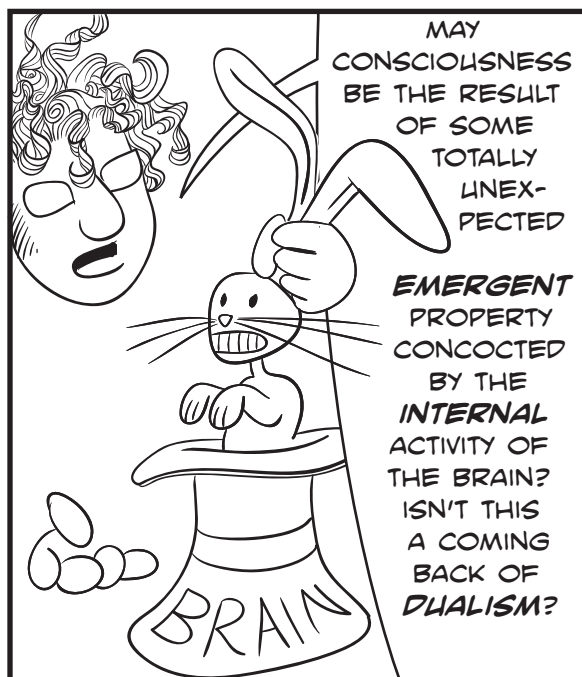
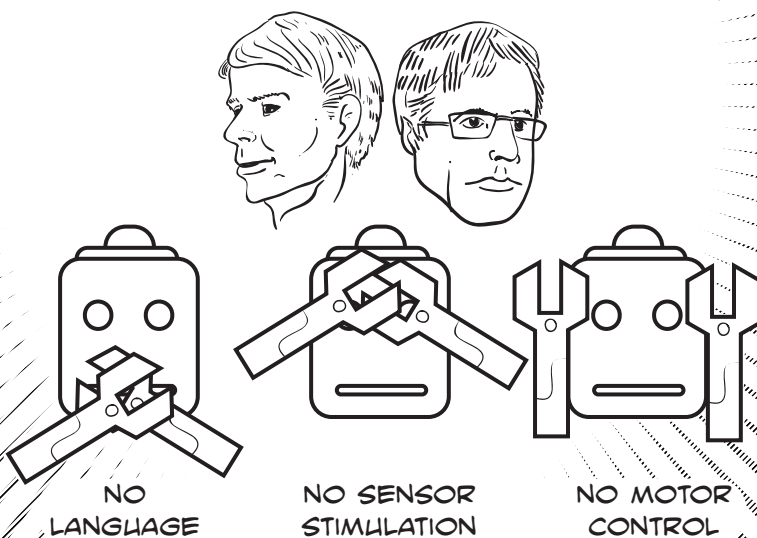


THE RELATION BETWEEN CONSCIOUSNESS AND EMBODIMENT IS UNCLEAR TO THE EXTENT THAT SOMEONE EVEN ARGUED THAT NEITHER LANGUAGE NOR SENSOR STIMULATION NOR MOTOR CONTROL IS NECESSARY FOR CONSCIOUSNESS

# CHECKLIST

- 1) QUALIA (TO FEEL)
- 2) INTENTIONALITY
- 3) UNITY
- 4) INTEGRATION
- 5) ~~AUTONOMY~~
- 6) ~~EMBODIMENT~~

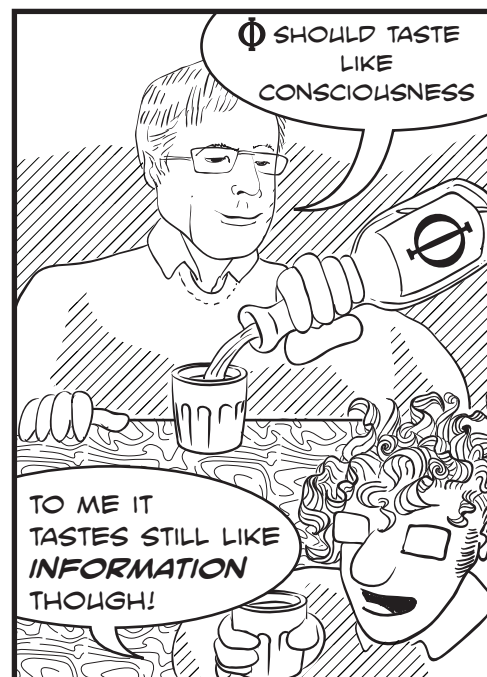
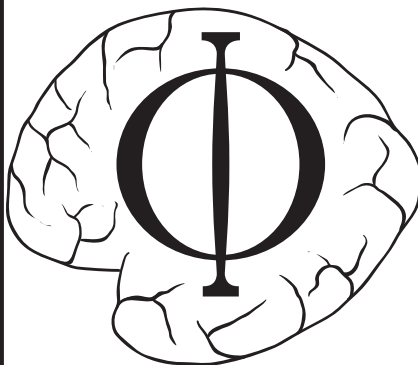
EMBODIMENT  
DOESN'T FILL THE  
LIST ... WHAT THEN?



MAY  
CONSCIOUSNESS  
BE THE RESULT  
OF SOME  
TOTALLY  
UNEX-  
PECTED

**EMERGENT**  
PROPERTY  
CONCOCTED  
BY THE  
**INTERNAL**  
ACTIVITY OF  
THE BRAIN?  
ISN'T THIS  
A COMING  
BACK OF  
**DUALISM?**

THIS IS THE RADICAL  
HYPOTHESIS OF INFOR-  
MATION INTEGRATION ( $\Phi$ ).  
CONSCIOUSNESS WOULD  
**EMERGE** OUT OF THIS  
QUANTITY IN THE BRAIN.



$\Phi$  SHOULD TASTE  
LIKE  
CONSCIOUSNESS

TO ME IT  
TASTES STILL LIKE  
**INFORMATION**  
THOUGH!

# CHECKLIST

- 1) QUALIA (TO FEEL)
- 2) INTENTIONALITY
- 3) ~~UNITY~~ ?
- 4) ~~INTEGRATION~~
- 5) ~~AUTONOMY~~
- 6) ~~EMBODIMENT~~

**INTENTIONALITY** AND  
**QUALIA** SEEMS TO  
RESIST TO OUR BETTER  
EFFORTS. WHAT MAKES  
OUR FEELINGS  
POSSIBLE?

AND THEN THERE IS THE DREADFUL ISSUE OF  
REPORTABILITY. HOW COULD I KNOW WHETHER  
DOES A MACHINE FEELS SOMETHING?

