

N. Katherine Hayles : *How We Became Posthuman* (Chapter Three) “Contesting for the Body of Information: The Macy Conferences on Cybernetics”

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I. Overview (50-51)

- A. Macy Conferences (1946-53) as “crossroads for the traffic in cybernetic models and artifacts”
 - 1. humans and machines viewed as “brothers under the skin”
 - 2. three arguments for conflation of human & machines, and information as above materiality
 - a. information is a theoretical entity
 - b. human neural structures defined as flows of information
 - c. construction of artifacts that translate information flows into observable phenomena
 - 3. reification of artifacts & information flows triumphed: information is more important than matter or energy
- B. Conference: open discussion among numerous fields integrated various approaches to information technology
 - 1. metaphor tied information to its various specialized fields of application
 - a. metaphor & mechanism morphed into network “constellations”
 - b. “constellations” were seen as acting homeostatically
 - 2. chapter’s focus
 - a. binding of reflexivity & subjectivity: the reflexive as non-science
 - b. reflexivity redefined as scientific by second wave of cybernetics

II. The Meaning(lessness) of Information

- A. information triumphs over energy in the man-machine relationship
 - 1. Von Neumann: of import is how much and how fast information could move through a system
 - 2. Wiener: energy transmutes into information
 - a. idea is message and message engenders human decisions
 - b. decisions produce information and power, not material goods
- B. Wiener saw information as a choice of one from a range of messages, ex. code to bookie (53)
 - 1. binary code, probability theory gives formula for number of necessary choices (C) as equal to log squared times n
 - 2. information (I) is the log of number n of elements in the message set
 - 3. engineers are more interested in the average of information from a source than in specific events
- C. information is stable only when divorced from meaning because each new context causes a shift in values of binary code
 - 1. engineers need to simplify information to enable it to flow among substrates
 - 2. reification of information as non-contextual becomes ideology that contradicts complexity of human thought
 - a. Shannon “brackets semantics” (54) to keep information flow efficient
 - b. Shannon: info in mind as “subjective probabilities” (54) w/o regard to defining and calculating them
- D. Donald MacKay’s Solution
 - 1. “subjective” qualities of human mind/contexts as “selective information”: selecting message elements from a set
 - 2. “structural information”: message about how to interpret a message (metacommunication) which engenders semantics
 - 3. representations in human mind have a “double valence” (55)
 - a. they contain information about the world
 - b. they are interactive and point back to changes in the observer’s mind
 - i. only another perceiver can determine and read these changes
 - ii. above is infinitely regressive and hence is reflexivity
 - 4. form and content are thus taken into account, enabling information and meaning to be connected
 - 5. quantifying MacKay’s model was a problem engineers could not yet face
- E. Standard Conceptualization of Information
 - 1. USA: Shannon-Wiener definition
 - 2. GB: MacKay’s definition
- F. 1968: Nicolas S. Tzannes attempts to make MacKay practical through Kotelly’s context algebra
 - 1. recognizes that Shannon-Weiner’s information is what is (homeostasis) and MacKay’s is what does (reflexivity)
 - 2. homeostasis basis of 1st wave information theory because manageable; reflexivity would dominate the second wave
- G. McCulloch-Pitts neuron model fit information theory/binary code applications
 - 1. theory’s binary nature as metaphor without tying it complexities of experience and psychology
 - 2. tension btw logic and embodiment complicated when cybernetics becomes integrated w/ human neural

functioning

III. Neural Nets as Logical Operators

A. McCulloch-Pitts neuron theory

1. neurons are either inhibitory or excitatory
2. neurons fire only after a threshold has been met
3. neurons work in nets
4. McCulloch: neuron nets can signify logical propositions (A & B must fire for C to respond: A & B are true, C is true)
5. Pitts: neural nets can calculate any number derived by a Turing machine
6. Congruence between neuron nets and Turing machine: brains don't secrete thought, they calculate it

B. McCulloch and Complexity of Human Thought

1. two types of neural firing
 - a. "signals": firing neurons triggered by external stimuli
 - b. "signs": firing neurons as reverberating loops w/o immediate temporal reference [history or memory]

C. McCulloch-Teuber Letters

1. McCulloch's assumption that embodied reality comes from logical process
2. Teuber: robots may ape men, but information triggers in each can operate differently
3. Cybernetic mechanisms don't signify until they mimic human perception.
4. Like Shannon, McCulloch ignored context to access universal form.

D. McCulloch Strives to Bind Information Model to Flesh

1. abstractions are multilayered
 - a. what is is not what does
 - b. neither is nor does is necessarily corporeal
2. Congruencies between neural paths and robotic circuits are coincidental:
 - a. neural tissue is medium
 - b. vacuum tubes or silicon chips are medium
 - c. There is a great difference between thought and binary code.
3. McCulloch-Pitt neuron is a liminal object, abstract and actualized, showing cybernetic principles in action.

IV. The Rat and the Homeostat: Looping between Concept and Artifact

A. John Stroud: Shannon's signal/noise distinction privileged stasis over change.

1. exact replication of message may not be a desired result
2. As McKay's theory implied, change may not be deviation and deviation may not require correction.

B. Shannon's theory: homeostasis is privileged; the goal is stable and mechanism should attain/maintain stability

C. Foerster, Mead, Teuber: study animal, not machine; machine is tool to help understand organism

D. Shannon's "lost" rat acting reflexively, caught in a repeating loop is falsely likened to neurosis

1. such analogs are neutral heuristic devices, no more
2. man/machine analogy transports assumptions between different arenas

E. W. Ross Ashby's Homeostat: searched for steady state when environmental conditions were changed

1. Ashby's concern for effect of environment expressed post-WW II need for stable state in altered environment
2. Ashby's machine built to search for functions inverse to those that altered its environment
 - a. Macy participants can't see a solution to Ashby's homeostat's search or stasis in linear equations
 - b. statement of the problem, not search for solution was required
3. Macy Conferences: search for limiting factors of building machines that could mimic human tasks.

F. Linguistic Solutions

1. chunking
 - a. homeostasis attracts and employs instrumental language
 - b. reflexivity attracts and employs ambiguity, allusion, and metaphor
2. Asby's homeostat and Shannon's information theory and electronic rat intersected in assumptions about language, teleology, and human responses.

G. The Man in the Middle

1. Stroud states obvious: what kind of machine is man tied to radar on one side and machine gun on the other?
2. Is man's relation to machine only the result of men studying other men?
3. Is the man in the middle simply a black box or is he something reflexive?
4. Fremont-Smith's concludes that man must be appreciated as a complex psychological being.
5. Kubie interprets arguments as resistance: is science objective or subjective when carried out by men?

V. Kubie's Last Stand

A. Lawrence Kubie, neurophysiologist turned psychoanalyst

1. had rejected neurosis as reverberating loops for neurosis as dominated by unconscious motivations
2. Kubie resisted the reductive approaches of McCulloch

B. Kubie's Positions

1. 6th conference: neurosis is complex and subtle for description by mathematical or mechanistic models
2. 7th conference: humans possess two symbolic functions, language and neurosis
 - a. Fremont-Smith: language is double coding for external and internal events
 - b. conscious/unconscious split: statements about external world are pierced by reflections of speaker's internal state

C. McCulloch Responds

1. 1953 speech denounces Freud as opportunistically using subjectivism to build a career
2. Psychoanalysis's close coupling made it spurious and unscientific.
3. If science is subjective due to human frailties, it can go nowhere.
4. Kubie: McCulloch's vitriol indicates his displaced frustrations

D. McCulloch's speech instantiates Fremont-Smith's attempt to reconcile psychoanalysis and physical science

E. New Reflexivity Evolves

1. avoidance of associating reflexivity with the unconscious
2. Temple Burling: consciousness is the mystery to be solved
 - a. create models that account for observer's role
 - b. locate observer in system and vice versa

VI. Circling the Observer

A. contrasting tone: replies to Fremont-Smith's usefulness of conferences (affective) vs conference dialog (unemotional)

1. Acknowledging the scientist as observer was absent at the conferences.
2. Heinz von Foerster recognized inclusion of the observers as central to cybernetics.
 - a. acknowledge subject-object relationship so science can proceed
 - b. cybernetics is framework provided in part by the Macy Conferences to unify sciences that explain man and the scientists who study man

B. Whence Reflexivity?

1. reflexive conception of cybernetics did not emerge from May Conferences
2. 1968: Bateson organized conference to explore reflexive nature of cybernetics in search of a new epistemology
 - a. Bateson's daughter, Catherine's (anthropology of religion) report: Our Own Metaphor
 - b. The report gave fine objective detail with careful and ubiquitous attention to context.
 - c. Gregory Bateson's agenda, "three cybernetic or homeostatic systems":
 - i. individual
 - ii. society
3. global ecosystem each are a part of

C. Bateson: cness creates feedback across rest of mind so that there is systematic difference between conscious view of self and the world and the true self and true world

VII. Janet Freud/Freed, transcriptionist: "unconscious", subjective mediator between signifiers and encoded information

A. Printed words are not reality.

B. Context

1. gives symbols meaningful import: twenty-five people at the right time and place
2. where boundaries are "preamble, negotiable, and instantiated" (83), the post-WW II Macy Conferences