

CYBERNETICS (WIENER, 1948-61)

STATISTICAL INFO/CONTROL

FEEDBACK - ENGIN. + BIOLOGY

Bio.

xii Bio-molecular, GENETIC

LEARNING MACHINES AS OLD AS CYBERNETICS

xv LIVING MACHINES: BIO-CYBERNETICS

1 HARVARD MEDICAL = BEGINNINGS

- MULTI-DISCIPLINARY

MODERN SPECIALIZATION = BAD → PROPRIETARIAN

Bio-Computer

Q → 3 NEED FOR ACQUAINTANCE IN OTHER FIELDS

- KNOWLEDGE OF CUSTOM KNOWLEDGE

6 FEEDBACK: VOLUNTARY ACTIVITY

8 CONTROL + COMMUN. ENGIN. PROBLEMS = INSOLVABLE

- MESSAGE: DISCRETE / CONTIN. SEQUENCE
OVER TIME (∴ STATISTICS)

ENGINEERING: ~ ART '10 SCIENCE → SCIENCE

10 - NOISE

- STATISTICAL MECHANICS (LIKE PHYSICS)

ENTROPY: AMOUNT OF DISORG.

- MAXWELL

12 CYBERNETICS: 1947

- LOGIC: LEIBNIZ - UNIVERSAL SYMBOLS, CALCULUS OF REASONING
- DIRECT LEAD TO MECH. OF THOUGHT

: RUSSELL

- McCulloch / PITTS: NERVES - CYCLES + DELAYS

*14 ALL-OR-NOTHING NEURON = COMPUTER

ASSUMPTION

17 MACY MEETINGS ('46)

* → 21 - PURPOSE OF PUBLIC DIFFUSION

Rhetoric / PR

* → 24 UNIFYING ASPECTS:

- E.G. THERMODYNAMICS

SOCIAL SYSTEM

- ECONOMICS

- ~ help FOR TROUBLED TIMES

27 AUTOMATION: GOOD/EVIL

Q → MORAL POSITION = BEGINNING OF CYBERNETICS

- public UNDERSTANDING

35 w/in any world which we can communicate - DIRECTION OF TIME = UNIFORM

37 STATISTICS: INVADES NEWTONIAN IDEAS

Gibbsian TIME: IRREVERSIBLE (% NEWTON)

- EVOLUTION

Q₂ THOUGHT OF EVERY AGE = TECHNIQUE:

- NEWTON: NAVIGATION

- NOW: COMMUN. + CONTROL

- GAUSS → TELEGRAPH → COMPUTER

42 - NEW AUTOMATA = COMMUNICATION ENGINEERING

44 AUTOMATON = SAME MODE OF FUNCTIONING AS BIOLOGICAL

57 MAXWELL'S DEMON: INFO. = REQUIRED: NEG. ENTROPY

92 Gibbs: QUASI-NEWTONIAN → HEISENBERG

96 FEEDBACK:

- MAXWELL = GOVERNOR

CNS + COMPUTING MACHINES:

118 problems w/BASE 10 ∴ ~ REMOVE HUMAN ELEMENT

CONTINGENCY RULES: BEST = BOOLEAN: YES/NO

120 - NERVE CELL COMPARISON

LOGICAL MACHINE

127 STATIC IDEAS → PAVLOV

*> 132 INFO. = INFO NOT MATER OF ENERGY

144 NEW APPROACHES TO Ψ

Colby

VIII. INFO., LANGUAGE + SOCIETY:

155 HIERARCHIES OF ORGANIZATIONS: POLITICAL / Ø PRECEDENTS

157 POSSIBLE TO MEASURE 'race-AVAILABLE' INFO.

*> - 'racial' [public] v PRIVATE TEST: AFFECT ACTIVITY

- COMMUNAL INFO.

Q₂ BELIEF: FREE (MARKET) COMPETITION = HOMEOSTATIC PROCESS

- "COMFORTING VIEW" - SELF-INTEREST = PUBLIC BENEFIT

= SIMPLE-MINDED THEORY

160 High homeostasis = small communities

* > - Control of anti-homeostasis = communication

* > info. = holds together any organism.

- communication + profit

162 Larger ≠ more intelligent

FALSE HOPES FOR SOCIAL BIO CYBERNETICS:

≠ solve power / control

164 - Social sciences + separation