Church’s Reception of Turing’s 1936 Paper

a Philosophical Angle

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Turing’s Human Computer (not his analysis)

(1) behaviorist psychology

(2) & (3) step-by-step account
Turing’s Human Computer (*not his* analysis)

(1) behaviorist psychology [empirical]

(2) & (3) step-by-step account [mathematical]

(2) propositional language [non causal]

(3) performative language [causal]
Turing’s Human Computer (not his analysis)

(1) behaviorist psychology [empirical]
(2) & (3) step-by-step account [mathematical]
(2) propositional language [non causal]
(3) performative language [causal]

All of this is mathematical for an idealist, i.e., for Turing
Turing’s Human Computer (*not his* analysis)

(1) What human computers accomplish as a result

(2) & (3) step-by-step account [mathematical]

(2) propositional language [non causal]

(3) performative language [causal]
Turing’s Human Computer (not his analysis)

(1) What human computers accomplish as a result

(2) & (3) step-by-step account [mathematical]

(2) What they are doing when they compute

(3) What they are supposed (or commanded) to do when they compute
Turing’s Human Computer (*not his* analysis)

(1) What human computers accomplish as a result

(2) & (3) step-by-step account [mathematical]

(2) What they *are* doing *when* they compute

(3) What they *are supposed* (or *commanded*) to do *when* they compute

(1) <-> (2) [Schüttpelz 2020, private correspondence]

(1) <-> (3) [Hodges 1983, footnote on p.107]
We may now construct a machine to do the work of this computer. To each state of mind of the computer corresponds an “m-configuration” of the machine...

Turing ... inconspicuously ... slipped into describing ‘a machine to do the work of this computer’ in exactly the same language that was earlier used to characterize the operations of the human computer ...

[Schmidt 2011, p.401]
from Human to Machine (not his analysis)

[Shanker 1987, p.637]

[Schmidt 2011, p.402]
from Human to Machine (not his analysis)

[The] shift from *encoding* to *embodying* marks a categorical departure to causal domains from which there can be no return to normativity

[Shanker 1987, p.637]

... whoever does the calculation **understands** the rules of the calculus in question

... the **calculator** has the ability to apply the rules and can **justify** the procedure and the result with reference to the rules

[Schmidt 2011, p.402]
from Human to Machine (not his analysis)

Turing was guilty ... either of

- the illicit assumption that the concept of following a rule can be regarded as a cybernetic mechanism
- of presenting the steps of a Turing machine program in completely misleading form

[Shanker 1987, p.638]
from Human to Machine (not his analysis)

Turing [and computer science at large] are flickering between

• the normative concept of following a rule
• the causal concept of machinery

[Schmidt 2011, p.408]
Turing → idealism

Schmidt ← dualism

Shanker
Turing

idealism

dualism

instrumentalism
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Church ... at least until 1937

• Denying the reality of mathematical & logical entities
• Espousing a kind of instrumentalism or fictionalism
• Mathematical entities [Turing’s machines] are
  ❑ fictions,
  ❑ part of an abstract structure constructed by us to enable us to understand reality

[Anderson 1998, p.137-38]
Church’s 1937 comments

... it shall be possible to devise a computing machine, occupying a finite space and with working parts of finite size, which will write down the sequence to any desired number of terms if ...
Turing

Everything is mathematical

Church

Nothing is mathematical

dualism
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Turing 1936

- Axiom of choice
- Modern physics
- "Machine" metaphor
- Philosophy
Describable in the symbolism of physics?

- Rainbow
- Humour

[Eddington 1928, p.322, 328]
J.M.E. McTaggart (1866-1925)

An *idealist* philosopher in the tradition of

- Hegel
- Bradley

The perception of changing time is an *illusion*
“Souls act according to the laws of final causes, through appetitions, ends, and means.

Bodies act according to the laws of efficient causes or of motions.

And these two kingdoms ... are in harmony with each other.”
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Turing did not categorically distinguish between a mathematical machine & a physical machine.

What, then, did Turing take to be a `Turing machine’ in 1937, in 1948?
Thank you

