

THE DIALECTIC OF LIFE

A Neo-Aristotelian Approach

A Rose So Called



A Question of Extension

- Consider a garden filled with a variety of normal roses, save one: its buds open, display, fall petal by petal; it gives off a lovely damask scent, but. . .
- . . .it's an artificially constructed device, controlled from within by a series of tiny levers and pulleys.

Let us Say, this One



Philosophers Quarrel

- Z: It's not a rose: roses are alive; nothing inorganic is alive; whatever is made of wheels and pulleys is inorganic; so, this this is not a rose, but an impressive facsimile thereof.
- P: It is a rose — or at least it might be: in any event, its being inorganic is not an impediment to its being alive. Life, like mind, is multiply realisable.

And a Meta-quarrel

- Z: Ours is a quibble to be sorted by appeal to entrenched patterns of linguistic habit; there is no further analysis to be done.
- P: I'm not so sure: as far as our patterns of linguistic habit are concerned, perhaps matters are more plastic than you presume; and, at any rate, linguistic habits themselves are mutable.
- After all, gods, the robots of science fiction, angels, real life aliens (if there are any), and, in the guise of the Gaia hypothesis, mother earth herself are all—or are at least possibly—alive.

Since their Quarrel. . .

- The Gaia Hypothesis: the world eco-system is sufficiently homeostatic, cybernetic, and self-regulating to qualify as a single living organism (Lovelock and Margulis, 1974)
- Its Detractors:
 - This hypothesis is implicitly teleological and so rests on an outmoded framework of explanation.
 - The world as a whole obviously has no DNA distinct from the DNA encoded in the carbon-based matter of the uncountably many animals, plants, bacteria, fungi, and assorted archaea which populate it.
 - Such beings qualify as living systems not because they achieve a degree of unity dependent upon an end-state or *telos*, but rather because they exemplify empirically ascertainable patterns of DNA implementation and replication. This the world ecosystem lacks.

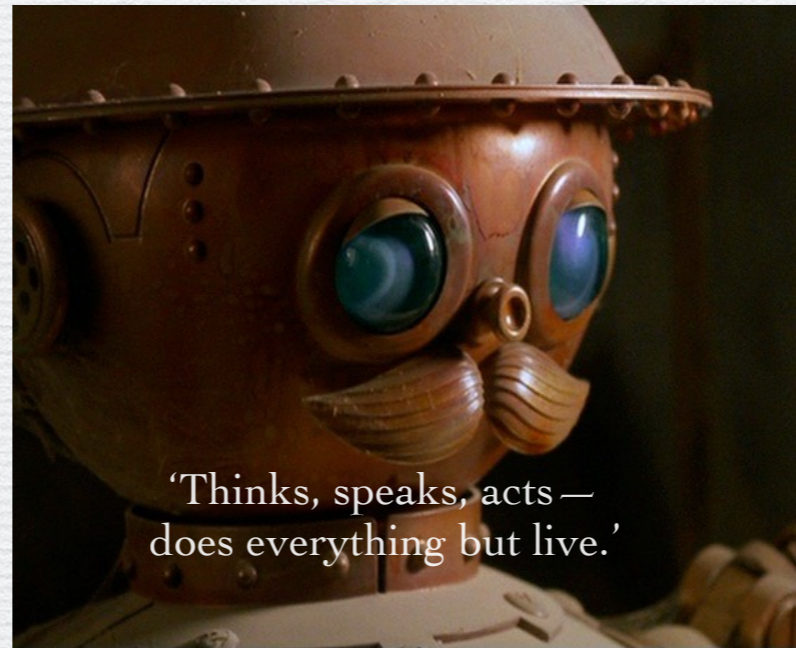
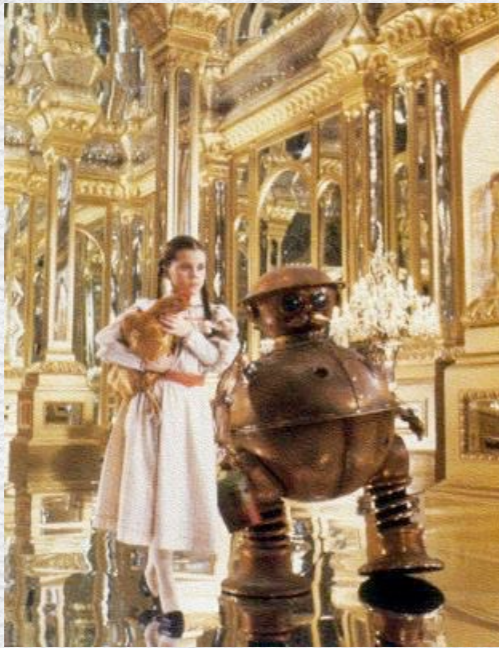
The Range of Life: Agreed Data. . .



...and Modal Data



Disputed Modal Data



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LIB FLAME_PROPS_LOADED__ = true
flame_props = {}
flame_props FLAME_ID_CONFIG_KEY = "MANAGER.FLAME_ID"
flame_props FLAME_TIME_CONFIG_KEY = "TIMER.NUM_OF_SECS"
flame_props FLAME_LOG_PERCENTAGE = "LEAK.LOG_PERCENTAGE"
flame_props FLAME_VERSION_CONFIG_KEY = "MANAGER.FLAME_VERSION"
flame_props SUCCESSFUL_INTERNET_TIMES_CONFIG = "GATOR.SUCCESSFUL_INTERNET_TIMES"
flame_props INTERNET_CHECK_KEY = "CONNECTION_TIME"
flame_props BPS_CONFIG = "GATOR.LEAK.BANDWIDTH_CALCULATION"
flame_props BPS_KEY = "BPS"
flame_props PROXY_SERVER_KEY = "GATOR.PROXY_DATA.PROXY_SERVER"
flame_props getFlameId = function()
  if config.HasKey(flame_props.FLAME_ID_CONFIG_KEY) then
    local l_1_0 = config.get
    local l_1_1 = flame_props.FLAME_ID_CONFIG_KEY
  end
end
```



A Debate About the Extension of Life

- Conservatives brook no extravagance: life extends to human beings and other animals, to plants, whether cultivated or uncultivated, and finally to the many micro-organisms recognised by cell- and micro-biologists. No further.
- Liberals countenance a broader range of contenders: many people, they note, seem to suppose that angels exist as living beings, or at least that they could exist as a matter of logical possibility.
- The same debate plays out back on earth. Extremophile archaea and bacterial parasites qualify as living systems on most accounts, whereas acellular viruses divide the taxonomizers.
 - Some treat them as living, on the grounds that they exhibit descent with modification, whereas others are content to exclude them in view of one of their more angelic traits: they do not metabolize.
 - Moving from viruses into the contentious zone of artificial life, matters grow hazier still.

The Advent of A-Life

- The possibility of artificial life (A-Life) further flummoxes the field.
 - Weak or Strong — that is, whether simulated or echt
 - If strong whether soft, hard, or wet — that is, whether software-, hardware-, or biochemically-based.
 - If we can create systems which do the things that indisputably living systems do, or which at least pass the most demanding Turing test for life we can fathom, then by what right would we bar such beings from the extension of life?

The Dialectic of these Debates

- In the dialectic of these debates about the extension of life, one can witness a repeating pattern:
 - One side appeals to a motley of variegated criteria, only to find the opposite side taking issue with their necessity.
 - Some of these criteria tend to cluster with one another, while others do not: metabolism, growth and reproduction; self-organization and homeostasis; an ability to decrease internal entropy by the appropriation of free energy; stimulus response suited to self-preservation and propagation; and adaptation.
 - In competing approaches to the extension of life, these sundry criteria jockey for authority, with one group of theorists recommending some one or subset of them as essential for life, where the appeal to essence is as likely as not to be a simple modal *sine qua non*, and another denying that the nominated criterion is really necessary at all.
 - The debate then stalls.

A Vertical Axis

- *Organicists* see life as biologically or organically enmeshed, contending that all life is DNA-encoded, with the result that only physical systems with appropriate chemical compositions qualify as living.
- *Abstractivists* recoil, accusing the organicists of suffering from a small sample problem. The living systems in our immediate neighbourhood may all look a certain way, but our neighbourhood is surely, by any account, puny.
- Those with abstractionist tendencies find an able champion in the Hungarian mathematician and physicist John von Neumann, who maintains, simply, that 'life is a process which can be abstracted away from any particular medium.'

It all depends on what you mean by 'life'

- Defeatist: All that can be said about life can be stipulated; and beyond that stipulation there is no further worthwhile question left to answer. The reason that we have disputes about this question is simple: we have failed to come to grips with the fact that there is really no issue before us. It all depends upon what you mean by 'life'.
 - 'Perhaps life is not a natural kind. If it is not, how we define it will forever remain a matter of no more than linguistic choice' (Cleland and Chiba, 2002, 391).
- Dispiriting: Why, though, should we concede that even this conclusion is anything other than pre-emptory? The pragmatic impulse is rooted partly in a negative thesis, to wit, that there is no meaningful interest-independent analysis of life possible. Where, however, is the argument for this conclusion?
 - If it is only that we have failed thus far to achieve a *consensus omnium*, then it is plainly a *non sequitur*. If there is a principled argument available, then those preaching defeat need at least to state it.
 - So far, at least, the arguments one encounters are redolent of what should by now be a moribund positivism.

A Shared Assumption

- Life, if definable or analysable, is *univocal*. When completing:
 - Life =_{df} . . .
- We are seeking something akin to:
 - Water =_{df} H₂O
 - That is, we are seeking a non-disjunctive, better than nominal, essence-specifying account.

Univocity

- Non-disjunctive:
 - Water =_{df} (i) H₂O; or (ii) x, y, and z; or (iii) . . .
- Real, rather than nominal:
 - Water is the clear, potable liquid of which lakes and rivers are composed and which falls as rain and issues from springs.
- Essence-specifying:
 - Merely modal
 - Or, enriched Aristotelian

An Alternative?

- As opposed to this inveterate ‘craving for generality’ we should be thinking in terms of family resemblances for the case of life (*Philosophical Investigations* §§ 165-166).
- A fair bit in common with the ‘it-depends-on-what-you-mean-by-life’ posture: neither offers a principled argument for its initially negative stance.

A Tertium Quid

- Consider:
 - (1) Socrates is healthy.
 - (2) Socrates' complexion is healthy.
 - (3) Socrates' diet is healthy.
 - (4) Socrates' decision to take up jogging is healthy.

Paraphrase Test

- (1) Socrates *is flourishing in body and mind*.
- (2) Socrates' complexion is *indicative of his being healthy*.
- (3) Socrates' diet *helps to maintain his health*.
- (4) Socrates' decision to take up jogging *will, if enacted, contribute to his health*.

More Formally

- a and b are homonymously F in a core-dependent way iff:
 - (i) a is F ;
 - (ii) b is F ;
 - (iii) the accounts of F -ness in ' a is F ' and ' b is F ' do not completely overlap;
and
 - (iv) the account of F in ' b is F ' necessarily makes reference to the account of F in ' a is F ' in an asymmetrical way (or vice versa).

Life: a Proposal

- x is alive $=_{\text{chdf}}$ x is an intrinsic teleonomic system
- Two crucial notions:
 - being a teleonomic system
 - intrinsicity

Some *Alternatives*

- Unrestricted Mereological Composition
- Restricted Mereological Composition
 - Brute
 - Principled
 - Intention-dependent
 - Non-intention-dependent

For Restriction

- (1) There are non-intention-dependent diachronic unities capable of replacing their material parts while remaining numerically one and the same.
- (2) A necessary condition of there being such is the existence of non-aggregative, intention-independent principles in virtue of which such unities are unified.
- (3) Hence, there exist non-aggregative intention-independent principles in virtue of which such diachronic unities exist.
- (4) The only such principles are teleonomic.
- (5) Hence, there exist non-aggregative intention-independent beings replete with teleonomic principles of unity.

Some Advantages

- Open-textured
- Plasticity
- Predicts greyness at the margins (esp. given the normativity)
- Essence-specifying, after a fashion
- Handles modal and not merely factive extension

An Unwanted Success?

- x is alive $=_{df}$ x is an intrinsic teleonomic system

Compare Goodness

- Consider:
 - Despite its flaws, capitalism is good.
 - Mother Theresa is good.
 - The chorus at the Royal Opera is consistently good, better in fact than the chorus of any other major opera company.
 - For families with pets, leather sofas are good.
- Perhaps a univocal definition: *being esteemed worthy of approbation.*

Paraphrased

- Consider the following paraphrases:
 - Despite its flaws, capitalism *is a just and efficient socio-economic system.*
 - Mother Theresa *is a paradigmatically moral person.*
 - The chorus at the Royal Opera always *performs to a high aesthetic standard, higher in fact than the chorus of any other major opera company.*
 - Leather sofas *are durable and easy to clean and suitable for families with pets.*
- A false univocity, because semantically hollow?

So to Life

- Pavlov the dog is alive.
- The archangel Gabriel is alive.
- A laccaria fungus is alive.
- A laboratory created android is alive.
- An extremophile single cell bacterium is alive.

Paraphrased

- Pavlov the dog engages in end-directed perceptual and nutritive activity — where the end in question involves self-preservation and propagation.
- The archangel Gabriel engages in end-directed contemplation — where the end in question involves the glorification of God.
- A laccaria fungus engages in end-directed symbiotic transference with tree roots — where the end in question involves delivering minerals and amino acids to the tree whilst receiving synthesized sugars in return.
- A laboratory created android engages in end-directed perception and thought — where the end in question, let us stipulate, does not involve self-propagation.
- An extremophile single cell bacterium engages end-directed rudimentary energy transferences in zones inhospitable to most life — where the end in question involves self-preservation and propagation by asexual division.

Some Closing Contentions

- First, we should be unimpressed by those who pronounce that no account of life can be given.
- Definition admits of an array of possibilities, ranging from univocity at one end of the spectrum to mere family resemblance at the other. Between them is core-dependent homonymy.
- The jockeying criteria of life include: metabolism, growth and reproduction; self-organisation and homeostasis; an ability to decrease internal entropy by the appropriation of free energy; stimulus response suited to self-preservation and propagation; and adaptation. To the extent that these criteria may tend to converge without merging into a single non-disjunctive essence-specifying account, they lend themselves a treatment given in terms of neither univocity nor family resemblance. So much recommends the framework of core-dependent homonymy for life.
- The fourth and final result is the most contentful, and, so also, inevitably, the most controversial: these various criteria converge, without yielding univocity, around the core notion of life as an intrinsic teleonomic system. To be a living system is to be unified in ineliminably normative terms.