

Information Was Born Contested: The Refutation the AI Debate Forgot

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Information theory was born twice in 1948 and attacked at its root in 1954. Shannon's meaning-free definition won on engineering convenience; Ruyer's objection, that no machine operation can gain information, was never answered, only buried. Every claim that an LLM understands takes a side in this dispute without knowing it.

Ask what information is and the textbook answer is Shannon, 1948: bits, entropy, channel capacity. That answer is correct, and it is also incomplete in a way the textbooks do not record. Information theory was born twice in 1948, in two incompatible versions, and in 1954 the French philosopher Raymond Ruyer attacked the assumption both versions shared. The objection was never answered. It was set aside, and the engineering kept going without it. Three-quarters of a century later, every confident sentence about what a language model "understands" or "creates" takes a side in that unfinished dispute, usually without knowing the dispute exists. This essay reconstructs the fork and argues that it still decides how the AI question should be posed.

TWO BIRTHS

Shannon's version is the one that won. His founding move is stated with total candor on the first page: the fundamental problem of communication is "reproducing at one point either exactly or approximately a message selected at another point," and the semantic aspects of communication "are irrelevant to the engineering problem." Information, for Shannon, measures selection from a set of possible messages: he treats the transmission of information as inseparable from a transmission of alternatives, since a message with only one possible content has zero entropy and, in his own terms, needs no channel to transmit it at all. Information attaches to the distribution, never to the meaning. The bit was defined; meaning was excluded by design.

Wiener, the same year, built the other version. In *Cybernetics*, "the amount of information in a system

is a measure of its degree of organization," entropy a measure of its disorganization, "and the one is simply the negative of the other." Negentropy: order purchased against the thermodynamic tide, and purchased by somebody. Wiener's information is embodied. It is what an organism (or a servo-mechanism standing in for one) maintains itself with, a time series anchored in feedback loops and living stakes. And he insisted the new quantity was a third thing in the universe's inventory: "information is information, not matter or energy. No materialism which does not admit this can survive at the present day." Shannon's information is a property of a code. Wiener's is closer to a property of a metabolism, and his sentence about materialism is a metaphysical claim stated in an engineer's vocabulary. So the same word carried two definitions from the start, one about codes and one about living organization, and the difference was not cosmetic.

THE DEMON IN THE DOORWAY

The two versions share an ancestor, and it explains why the fight was always going to happen. In 1867 Maxwell imagined a doorkeeper between two chambers of gas, sorting fast molecules from slow ones, apparently creating a temperature difference from nothing and cheating the second law of thermodynamics. The demon occupied physicists for eighty years because the trick could be felt before it could be named: sorting is not free. The doorkeeper has to *see* the molecules, decide, act. The resolution that crystallized alongside cybernetics, and that James Gleick traces as the connecting thread from Maxwell to Shannon, was that the demon pays for its sorting in information: measurement has a thermodynamic price, and the books balance once

the demon's knowledge is counted as a physical quantity.

Both 1948 theories are children of that resolution, and each takes a different inheritance. Shannon takes the accounting: information as a measurable quantity with lawful limits, indifferent to what is being sorted or why. Wiener takes the demon itself: the interesting thing in nature is the local sorter, the pocket of order that measures its environment and spends information to stave off decay, of which organisms are the great example. Same ancestor, two estates. Neither estate settled the question the demon leaves open. The demon *uses* information to sort. Where did a universe of noise get a doorkeeper in the first place?

THE ANNEXATION ATTEMPT

The gap between the two versions was covered over almost immediately, and the cover has a name: Warren Weaver. His interpretive essay, bound with Shannon's papers in the 1949 volume, proposed three levels of the communication problem: the technical (Shannon's level A), the semantic (level B), and the effectiveness of meaning on conduct (level C). And he made a bet that has organized the field's self-understanding ever since: "the theory of Level A is, at least to a significant degree, also a theory of levels B and C," because the analysis at the technical level "overlaps the other levels more than one could possibly naively suspect." He even sketched machinery: a "semantic receiver" interposed after Shannon's receiver, performing a second decoding that matches the message to the audience's semantic capacities, and a corresponding "semantic noise" the theory would someday subtract.

This split, information severed from meaning, is the one N. Katherine Hayles made the hinge of *How We Became Posthuman* (1999), her account of how the postwar sciences learned to treat information as "weightless," abstracted from any body that carries it. Reading now, Weaver's 1949 essay reads as an early alignment proposal. An engineering theory that explicitly excludes meaning, plus a proposed add-on component that will reconcile the engineered signal with what humans actually understand and do. Seventy-five years later the field is still building semantic receivers and still calling the residue by other names. Shannon, for his part, wanted none of it; the exclusion of meaning was his theory's precision, not its embarrassment. But Weaver's annexation stuck in the culture. Meaning-free mathematics, dressed in meaning-soaked vocabulary, spread everywhere. The word "information" now does both jobs and admits to neither.

ONE REFUTATION

Then, 1954. Raymond Ruyer, *La Cybernétique et l'origine de l'information*, a book whose title states the attack: cybernetics and the *origin* of information, the question the new science had skipped.

Ruyer's move borrows its premise from the enemy. Cybernetics itself held, in a principle Ruyer quotes from Wiener's own school, that "no operation by a machine on a message can gain information." Machines transmit, filter, degrade; they never add. Ruyer makes the consequence explicit and general: "any machine, no matter how sophisticated, including calculating machines or feedback automata, can only increase entropy, as they operate according to the principles of thermodynamics; it is evident that they can only decrease information." He then works through the machine taxonomy of his day, calculating machines, reasoning machines, feedback automata, and finds the verdict uniform: "there is obviously no way that calculating machines, whether arithmetic or logical, can increase information." His image for the alternative is deliberately plain: "a telephone receiver can no more start to talk on its own than a wheel could start to move on its own simply because it has been attached to an axle."

So he asks the question in the title. If organisms are machines, as Wiener held, and machines cannot originate information, then where did the information come from? An informational system that manufactured its own information from nothing would be, in Ruyer's phrase, perpetual motion "of the third kind," as impossible as the first two: "chance cannot account for anti-chance." His positive account names the non-machine. "Connections are the only rational anti-chance," and "all connection derives from consciousness": consciousness as the *framing activity*, "that improviser of connections," of which any machine "is never more than an ensemble of auxiliary connections." Every mechanism is set up; the setting-up is not itself mechanical. The frame feeds the mechanism. The mechanism, alone, only spends. And he closes off the epiphenomenalist escape with unusual bluntness: "consciousness cannot be explained. One can deny it practically by granting it a mere ghostly reality, or, on the contrary, by making it the effective principle of all connection and information."

Whatever one makes of that metaphysics, the reception is the historical fact that matters: nobody answered it. Wiener's book predated the objection and he never rebuilt around it; the field kept the organism-as-machine and the conservation principle

both, and let the contradiction between them sink out of sight under the engineering success of Shannon's theory. Ruyer went untranslated into English until 2024. The dispute was not settled, only shelved, and its edges stayed sharp.

THE DISSOLUTION THAT REOPENED

There is a subtler layer to the fight, and it concerns time. Wiener's proudest philosophical claim for cybernetics was that it dissolved the old war between mechanists and vitalists. The nineteenth century had opposed dead clockwork to living purpose; cybernetics, Wiener argued, showed both sides obsolete, because the modern automaton and the organism inhabit the same kind of time, the irreversible, statistical time he called Bergsonian, as against the reversible time of Newton's planets. A feedback machine has a history; it learns; its future differs from its past. On this ground, "the whole mechanist-vitalist controversy has been relegated to the limbo of badly posed questions."

Ruyer's reply concedes the physics and denies the conclusion. Irreversible time gives you decay, drift, and statistics; it does not, by itself, give you *orientation*, the asymmetry in which a system holds a theme and works toward it. That asymmetry, he argues, is the framing activity again, smuggled in with the word "learning." His summary of what cybernetics had actually done is the sharpest sentence in the book: Wiener's picture is "exactly the reverse of the mystical ideal; the duality of the communicators is resorbed in the mechanical, instead of being resorbed in the mind." The dissolution of the mechanist-vitalist controversy, on Ruyer's reading, was performed by definitional capture: define the organism as a machine-in-Bergsonian-time and the controversy indeed disappears, taking the question of origin with it.

WHY THIS IS AN AI ESSAY

Run today's sentences through the buried fork. "The model creates text." "The model understands context." "It's just statistics." Each of these takes a side in the 1948 dispute and the 1954 objection, silently.

Say an LLM merely recombines and you have chosen Shannon: information as selection over a distribution, meaning irrelevant to the mechanism, in which case "understands" is a loan word the theory cannot repay. Say the model genuinely gains and originates as it learns, and you have chosen Wiener

against Wiener's own conservation principle, and you owe Ruyer an answer he never got: identify the operation by which mechanical transformation adds information rather than spending what training data, human feedback, and prompt supplied. Say, with Ruyer, that the framing is done by consciousness, and every model output is information only downstream of the humans who framed it, and "the model understands" becomes a category error rather than an open empirical question. The three positions make different predictions, assign credit for machine text to different places, and cannot all be true. Contemporary AI discourse does not adjudicate between them. It relies on the ambiguity of a single word, [the same layer-word this site's opening essay tracks](#) as it migrates from measure to metaphysics.

Ruyer even supplied a test case, decades early. Machine translation, he argued, would stall exactly where meaning lives: "everything takes place as if the translator must pass through the non-spatial region of meaning; it is impossible to materialize a transformation code that would conserve the meaning." Modern translation systems are the strongest apparent counterexample, and how one scores them is itself the fork in action. Either they falsify Ruyer by conserving meaning mechanically, or they vindicate Shannon by showing how far pure distribution-matching gets while meaning stays untouched, or they carry the human framing in through the training corpus, which is Ruyer's point restated in the vocabulary of the data center. The experiment has been run at planetary scale, and the three schools still read the result three ways.

ACCELERATION IS NOT AN ANSWER

One more turn, because the fight has a sequel that shapes how this site's theoretical neighborhood talks. In 1963 Magoroh Maruyama named a "second cybernetics": where Wiener's first cybernetics was the science of negative feedback, deviation *correction*, homeostasis, the second studies deviation *amplification*, the positive loops by which small differences compound into runaway structure. This is the cybernetics the CCRU and Land later seized as a cosmology, the runaway as the norm rather than the pathology, and it is the hinge on which a whole accelerationist literature turns.

The inversion does nothing to the buried question. Flip the sign of the feedback and you change how fast a system elaborates the information it has; you do not explain how there came to be information for it to elaborate. A runaway that originates nothing is still

sterile, only faster. If anything, Maruyama's second cybernetics makes Ruyer's question more urgent, because a civilization now runs deviation-amplifying loops at industrial scale, models feeding on model output, engagement optimizing engagement, and the whole spiral either concentrates a framing it borrowed from human beings or performs an origination that, by the field's own founding conservation principle, should be impossible. Which of those it is doing is the whole question, and it is Ruyer's 1954 question, still open, now running at scale.

WHAT THIS ESSAY DOES NOT ESTABLISH

This essay does not claim that Ruyer is right. The post-1954 science of self-organization, dissipative structures and their descendants, was built after his argument and may answer it; the sources here do not adjudicate that, and the question deserves its own treatment rather than a footnote's worth of confidence. Ruyer's positive metaphysics, consciousness as trans-spatial survey, a panpsychism in which even chemical bonding is a form of connection, is far more contestable than his negative argument, and the two should not be bought as a package: the framing-versus-framed distinction stands on its own even for a reader who declines the metaphysics behind it. The sharpest formal answer to Ruyer comes from Gregory Chaitin's algorithmic information theory, where a short deterministic program can generate output of far greater descriptive complexity than itself, which looks like machine-made information arising from nothing. It is a real challenge and a bounded one: Chaitin buys complexity, not meaning, and Ruyer's fork was cut at meaning, at the framing that decides a pattern is worth having. Whether complexity-without-a-framer is enough to close the gap is the live question the essay leaves standing rather than the settled refutation it is sometimes taken for. Wiener never endorsed and never rebutted Ruyer; he died in 1964 with the book untranslated. And the trilemma laid out above is this essay's construction, assembled from the three men's texts, not found stated in any of them.

The historical claim is what survives the caveats. The concept every AI argument leans on was contested at birth, attacked at the root six years later, and shelved rather than met. Which side you take is not forced by the mathematics; the mathematics is the shared part, exactly as [the criterion problem is the shared part](#) of every epistemology that then chooses its temperament. Two questions stay open. Whether the

post-1954 self-organization literature actually answers Ruyer's origin objection, or only reframes it, is a question of physics this essay does not decide. And whether machine text originates information or only redistributes a framing it received is a question the mathematics cannot settle, because both readings are consistent with the same equations. Until those are answered rather than forgotten, "the model understands" and "it's just statistics" name positions in a dispute the field stopped tracking in 1954.

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