

## Approximation Works

### *Ronald Green*

Of all the important questions asked about the world, one that all-too-often surreptitiously slides beneath the bar is: how do we get along in the world? How do we thread our acts together into a common narrative that makes sense to us as individuals while at the same time allowing us to interact with others? It is a mystery, when we consider that with different types of sensory information (hearing, seeing, touch, and more) coming at us, our brains have to process them at different speeds through different neural structures. To that must be added the significance of information streaming in from different locations, each person thus perceiving bits at a (slightly) different time from everyone else. If the mind didn't sort all of that out, we would be part of a constant cacophony of incoherent sights, sounds, smells, thoughts and images.

Yet we do cope with such a world, and we do so not necessarily because of everything being seemingly crystal clear and exact, but due to approximation. When an orchestra begins and ends together to our satisfaction, there are in fact differences—albeit unperceived—in the timings of each instrument. Because the differences are too small to be discerned by the human ear (unless it's an extremely bad orchestra) in a concert hall, what we hear is a perfectly timed performance.

On a person-to-person level, Graham Greene posed a question and answered it in his way:

Time has its revenges, but revenge seems so often sour. Wouldn't we all do better not trying to understand, accepting the fact that no human being will ever understand another, not a wife with a husband, nor a parent a child?<sup>1</sup>

Yet we *do* understand each other. But we do so approximately only. Well enough for day-to-day communication. Never one hundred percent, but generally enough. We get along with others by tacitly accepting the approximate meaning of the words we use.

An example is how we relate to colors. The majority of us can point to red and agree that it is red. But we as individuals don't know whether anyone else sees that red exactly as we do. We can't know. Whether it is seen by someone as lighter or darker

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<sup>1</sup> G. Green, *The Quiet American* (London: William Heinemann, 1915), p. 72, also available online at URL = <https://archive.org/details/in.ernet.dli.2015.462196/mode/2up>.

(according to how their brain interprets the light wavelength hitting their eyes), we will agree on “red” to describe what we each see because it is close enough for it not to matter. And neither does it matter that we accept the possibility that others see it differently. Language, which puts expression to our senses, is close enough for us to understand others.

This can turn out to be an advantage for lawyers who make their living from striving for accuracy. When they draw up contracts, every word is weighed and agreed upon, so that when a contract is signed, all sides are sure of its meaning. All is well and good; but if problems arise later—be they personal or commercial—it’s back to the contract, which suddenly is put under a microscope because both sides no longer agree on what the words and phrases mean. Subsequently in court, it is the judge who decides what the meaning is—only to possibly be shot down on appeal when another judge (or judges) makes a decision on a meaning that has to be accepted, but which, although final by authority, cannot in all honesty be deemed the “real” (objective) meaning.

There was certainly something in John Stuart Mill’s statement that “There is no such thing as absolute certainty, but there is assurance sufficient for the purposes of human life.”<sup>2</sup> His view was that of a radical empiricist—that there was no absolute certainty—yet it doesn’t obviate the notion of ubiquitous approximation. Just as there is no real or proper, objective color red “out there,” outside of one’s perspective, there is no certain, objective, meaning. Or a real, objective anything. Subjectivity is per se approximate, since everyone’s viewpoint is necessarily different from everyone else’s. So while each person is certain as to what they see as red, any attempt at describing it can be only a reflection of their perception.

As with language, so with feelings. You cannot *feel* someone else’s pain, however close you are to them and however graphically they describe it. While we can empathize with another’s pain, all one can do is to relate to one’s own pain by imaginatively simulating it in ourselves, but which is no more than as an approximation of pain in general. The same applies to taste and smell. How does one describe the sensation gleaned from a familiar object, such as the taste of coffee? Or describe the taste of something you have never eaten (say, alligator meat)? How would you do it? “It’s like chicken,” (or “fishy chicken”) is a popular and humorous way to express it approximately, since everyone is presumed to know what chicken tastes like.

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<sup>2</sup> J.S. Mill, *On Liberty* (Indianapolis, IN: Hackett, 1978), p. 18.

If someone claimed to be happy, then it would be understood only in relation to what others feel as happiness. Or let's take "fair"; what could that mean in the sense of "I bring my children up to be fair"? The word 'fair' is often so open to interpretation as to be almost meaningless by any standard. Is it fair for a municipality to charge for water? How much money would be fair? If two nations dispute a piece of land, which is the fair solution? There is no objective meaning of fairness; any principles or rules of "fairness" break down as soon as the "real" meaning is attempted.

It is clear, then, that when language alone is not adequate, it works in an approximate way in its role as a communicative device. Looking for "accurate meanings" is fraught with problems. There are no "objective meanings" that we could simply look up; if there were, notions such as "consciousness," "self," "free will," or "time," would be simply about how language works within a logical or semantic system.

It was Ludwig Wittgenstein, who famously and paradoxically placed language in that position, hence depleting it of meaning, claiming in his *Tractatus Logico-Philosophicus*, that beyond the strictly delimited domain of natural science, empirical facts, and classical logic in the mode of Russell and Whitehead's *Principia Mathematica*, philosophy boils down to nothing more than a series of linguistic puzzles. It is what people nowadays mean when they stop a discussion with "define your terms," or triumphantly clinch an argument with "it's all a matter of semantics." Fortunately, it isn't. It can't be. Replacing philosophy with linguistics is not the answer, since, as we have noticed, language is approximate, fuzzy, and dissonant—like everything else, in fact.

Approximation of language is significantly pervasive, and keeps whole organizations in business: lawyers, judges, court officials, philosophy and language departments with their critical reasoning classes at universities and colleges, writers, journalists, not to mention politicians, whose every word has to be measured and is thereafter re-measured.

Approximation and simplicity are bed-fellows. Approximation necessarily leads away from focus and exactness, so that the greater the approximation, the wider the message. It is the simplicity of President Trump's language that resonates with his audiences, and that supposedly legitimize their separation from the supposed elite. Umberto Eco had made similar comments about another TV personality, popular game show host Mike Bongiorno, in the early 1960s in Italy. For in him, Eco argued, "the

spectator sees his own limitations glorified and supported by national authority.”<sup>3</sup> Who knows, though? Perhaps a TV personality-turned-politician is an example of how, as Talleyrand once cynically put it, language was invented so that we could conceal our thoughts from each other.<sup>4</sup>

Language, an integral part of what it is to be human, is infused with ambiguity and fuzziness. Let’s face it: humans are not simple, and language must necessarily encompass a way of reflecting the multitudinous aspects of the self.

It so happens, that even Wittgenstein changed his opinion about his earlier conclusions, admitting in his *Philosophical Investigations* that perhaps the ideas in the *Tractatus* had been over-simplified, and that problems within philosophy need to be solved through looking at how language is actually used, its ambiguity, and how meanings change. No more immune than events and humans who participate in them, a word does not have a fixed definition, but instead its use is an evolving human practice that carries its own history with it through time, picking up new nuances and discarding old ones through its pragmatic day-to-day usage, rather than semantic meaning.

Yet approximation itself spirals down into its own approximation when an attempt is made to define elements that are an integral part of their own existence. Instructive here are Gödel’s 1931 incompleteness theorems in mathematical logic, that demonstrate the inherent limitations of every formal axiomatic system capable of modelling basic arithmetic. Even in mathematics, then, it cannot be proved that a self-contained system is consistent and does not contain contradictions. These theorems have implications wider than their original application to mathematics, i.e., that a system of logic cannot demonstrate the truth of its own assumptions. Truth is a many-splendored thing, it seems.

The brilliance of the principle taken from Gödel is its simplicity. (But then everything seems simple once it’s been stated/discovered.) Its beauty is its application within a wider context. It explains why, for example, we cannot have a complete logical analysis of consciousness, since the truth of such an analysis requires a definition of truth that’s outside what we attempt to analyze logically; anything we say about it

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<sup>3</sup> U. Eco, “The Phenomenology of Mike Buongiorno,” in U. Eco, *Misreadings* (New York: Harcourt, 1993), pp. 156-164.

<sup>4</sup> R. Dawkins and J. Krebs, “Animal Signals Information and Manipulation,” in J.R. Krebs and N.B. Davies (eds.), *Behavioral Ecology* (Oxford: Blackwell, 1978), pp. 282-309.

presupposes that definition of truth, and is not provable within the analytical logical system itself.

So while we can provisionally analyze or stipulatively define an object, say a tree, a house, water, or any object that is not us, within a range of approximation that allows it to be understood by others, we have no way of doing this in a logically complete way about our inner self. We cannot, in other words, stand outside ourselves and provide even provisional or stipulative analyses. For consciousness or anything else at least as informationally rich as Peano arithmetic, there is no absolute, definitive viewpoint and no “view from nowhere,” as Thomas Nagel puts it.<sup>5</sup> There is, in other words, always a view from where we are—a view, not *the* view.

The more we strive for accuracy, the further it moves away. Any line however straight it appears, reveals its fuzzy edge the closer we get. This phenomenon of approximate accuracy applies also to the most accurate measurements of what are accepted as fundamental physical limits in the universe. Take the speed of light (186,000 miles per second), which does seem to be an unbreakable boundary. But is it? What do we mean by stating that an object cannot exceed (in fact, reach) the speed of light? According to Einstein’s theory of special relativity, the faster an object travels, the greater its mass, so that when an object approaches the speed of light, its mass becomes infinite, as does the energy required to move it, and time stops. But at that point we are no longer referring to an object that is going incredibly fast, but rather to something that has ceased being an object in any ordinary sense, within time that has stopped. Similarly, the theoretical lowest possible temperature—absolute zero, which has a number (-273 degrees Celsius)—is falsely accurate, since at that point the oscillations of molecules would become as slow as they could possibly be, i.e., they stop moving, so that anything at that theoretical temperature is no longer an object in any ordinary sense. To claim, then, that there are limits within nature that are absolutely accurate is misleading; any theoretical limit leads to a change of the element originally being examined. This is in line with the uncertainty principle in physics, that proposes a fuzziness within our knowledge of nature, reflecting a fundamental limit to what we can know about the behavior of quantum particles and, therefore, about the smallest scales of nature. At these scales, all we can do is to calculate probabilities for where things are and how they will behave. Probabilities are approximations *par excellence*.

Approximation as a defining part of nature is a seeming oxymoron, but not in fact a paradox. That there is no intrinsic nature of matter can be demonstrated not only in science, but in practical examples, both large and small, in day-to-day happenings

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<sup>5</sup> T. Nagel, *The View from Nowhere* (Oxford: Oxford Univ. Press, 1989).

and in history, literature, art, mathematics, and logic.<sup>6</sup> Approximation manifests itself in the fact that we can't examine (or do) two things at once: our attention is divided so that every perceived point is fleetingly replaced by another perceived point. A similar effect can be shown in quantum physics, where the uncertainty principle mentioned above, says that focusing on measuring one property of an object more precisely will make measurements of other properties less precise. It prohibits us from seeing "the whole picture," in fact.

History, the relating of events that happened in the past, should seemingly be less accurate the further back in the past it is examined. Yet history is often no more accurate when referring to a closer past, since subjective interpretation, not to mention subjective propagation, play an overwhelming part at this juncture. This in turn is one reason why today's news is often the least accurate description of events – fake news, anyone?

Generally, we live comfortably with approximation. If we know that 15,200 km separates the USA and Australia, this is an approximate fact. Likewise, if we google the height of Everest, we are aware that whatever the information, it will be true only approximately. Borders between nations are set out on maps and on the ground, and are accurately measured – until a dispute arises, when zooming in for greater accuracy will make it clear that the figurative lines in the sand were only approximately accurate. Even scientists, whose business it is to aim for, and rely upon, extreme accuracy, know that measurements are accurate according to the measuring device used. They accept, and work with, the paradox of approximate perfection. Whether looking for the existence of ever smaller particles will result in an accurate description of the foundations of the universe is a moot point. In the meantime, it seems that the smaller the element that is being searched for, the larger the machine needed for doing so, as exemplified by supercolliders, which over time are discovering ever fewer new particles that "exist" theoretically. The reason may be not because current supercolliders are not large enough, but because the natural phenomenon of approximation is not taken into account as an increasing probability, inverse to the focus of intent. This is a challenge, not only for the physics of reality, but also for an understanding of the human mind.

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<sup>6</sup> Although not within the scope of this essay, it should be pointed out that "*a priori* necessary truths" in certain basic parts of mathematics e.g., " $2+2=4$ ," or logic, such as " $P \rightarrow Q$ ," are covered by my approximation theory. Numbers are approximate, yet exact enough within a required context to satisfy an assigned purpose. Although their validity is apparent (they work), their "truth" cannot be proved (see the Gödel reference above). Another aspect of approximation is the temporal element, that adds a causal dimension to the approximation of numbers. Formal logic is a human construct as a means of understanding the world. As such, logic represents a subjective truth. Any linguistically conditional implication, such as " $P \rightarrow Q$ ," is necessarily approximate and hence is not *a priori* necessarily valid or true.

## References

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