

A Skeptical Look at Karl Popper

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by Martin Gardner

"Sir Karl Popper / Perpetrated a whopper / When he boasted to the world that he
and he alone / Had toppled Rudolf Carnap from his Vienna Circle throne." —a
clerihew by Armand T. Ringer

Sir Karl Popper, who died in 1994, was widely regarded as England's greatest philosopher of science since Bertrand Russell. Indeed a philosopher of worldwide eminence. Today his followers among philosophers of science are a diminishing minority, convinced that Popper's vast reputation is enormously inflated. I agree. I believe that Popper's reputation was based mainly on this persistent but misguided efforts to restate common-sense views in a novel language that is rapidly becoming out of fashion. Consider Popper's best known claim: that science does not proceed by "induction"—that is, by finding confirming instances of a conjecture — but rather by falsifying bold, risky conjectures. Conformation, he argued, is slow and never certain. By contrast, a falsification can be sudden and definitive. Moreover, it lies at the heart of the scientific method.

A familiar example of falsification concerns the assertion that all crows are black. Every find of another black crow obviously confirms the theory, but there is always the possibility that a non-black crow will turn up. If this happens, the conjecture is instantly discredited. The more often a conjecture passes efforts to falsify it, Popper maintained, the greater becomes its "corroboration," although corroboration is also uncertain and can never be quantified by degree of probability. Popper's critics insist that "corroboration" is a form of induction, and Popper has simply sneaked induction in through a back door by giving it a new name. David Hume's famous question was "How can induction be justified?" It can't be, said Popper, because there *is* no such thing as induction!

There are many objections to this startling claim. One is that falsifications are much

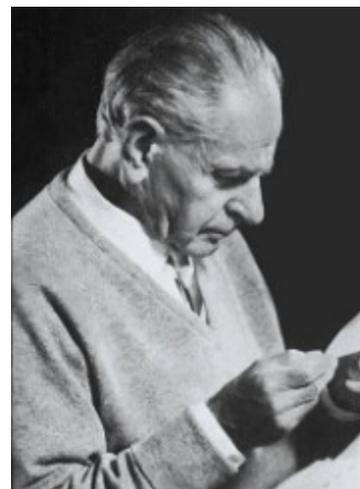
rarer in science than searches for confirming instances. Astronomers look for signs of water on Mars. They do not think they are making efforts to falsify the conjecture that Mars never had water.

Falsifications can be as fuzzy and elusive as confirmations. Einstein's first cosmological model was a universe as static and unchanging as Aristotle's. Unfortunately, the gravity of suns would make such a universe unstable. It would collapse. To prevent this, Einstein, out of thin air, proposed the bold conjecture that the universe, on its pre-atomic level, harbored a mysterious, undetected repulsive force he called the "cosmological constant." When it was discovered that the universe is expanding, Einstein considered his conjecture falsified. Indeed, he called it "the greatest blunder of my life." Today, his conjecture is back in favor as a way of explaining why the universe seems to be expanding faster than it should. Astronomers are not trying to falsify it; they are looking for confirmations.

Falsification may be based on faulty observation. A man who claims he saw a white crow could be mistaken or even lying. As long as observation of black crows continue, it can be taken in two ways; as confirmations of "all crows are black," or disconfirmations of "some crows are not black." Popper recognized — but dismissed as unimportant — that every falsification of a conjecture is simultaneously a confirmation of an opposite conjecture, and every conforming instance of a conjecture is a falsification of an opposite conjecture.

Consider the current hypothesis that there is a quantum field called the Higgs field, with its quantized particle. If a giant atom smasher some day, perhaps soon, detects a Higgs, it will confirm the conjecture that the field exist. At the same time it will falsify the opinion of some top physicists, Oxford's Roger Penrose for one, that there *is* no Higgs field.

To scientists and philosophers outside the Popperian fold, science operates mainly by induction (confirmation), and also and less often by disconfirmation (falsification). Its language is almost always one of induction. If Popper bet on a certain horse to win a race, and



Sir Karl Popper (1902-1994)

the horse won, you would not expect him to shout, "Great! My horse failed to lose!"

Astronomers are now finding compelling evidence that smaller and smaller planets orbit distant suns. Surely this is inductive evidence that there may be Earth-sized planets out there. Why bother to say, as each new and smaller planet is discovered, that it tends to falsify the conjecture that there are no small planets beyond our solar system? Why scratch your left ear with your right hand? Astronomers are looking for small planets. They are not trying to refute a theory any more than physicists are trying to refute the conjecture that there is no Higgs field. Scientists seldom attempt to falsify. They are inductivists who seek positive conformations.

At the moment the widest of all speculations in physics is superstring theory. It conjectures that all basic particles are different vibrations of extremely tiny loops of great tensile strength. No superstring has yet been observed, but the theory has great explanatory power. Gravity, for example, is implied as the simplest vibration of a superstring. Like prediction, explanation is an important aspect of induction. Relativity, for instance, not only made rafts of successful predictions but explained data previously unexplained. The same is true of quantum mechanics. In both fields researchers used classical induction procedures. Few physicists say they are looking for ways to falsify superstring theory. They are instead looking for confirmations. Ernest Nagel, Columbia University's famous philosopher of science, in his *Teleology Revisited and Other Essays in the Philosophy and History of Science* (1979), summed it up this way: "[Popper's] conception of the role of falsification . . . is an oversimplification that is close to being a caricature of scientific procedures."

For Popper, what his chief rival Rudolf Carnap called a "degree of confirmation"—a logical relation between a conjecture and all relevant evidence—is a useless concept. Instead, as I said earlier, the more tests for falsification a theory passes, the more it gains in "corroboration." It's as if someone claimed that deduction doesn't exist, but of course statements can logically imply other statements. Let's invent a new term for deduction, such as "justified inference." It's not so much that Popper disagreed with Carnap and other inductivists as that he restated their views in a bizarre and cumbersome terminology.

To Popper's credit he was, like Russell, and almost all philosophers, scientists, and ordinary people, a thoroughgoing realist in the sense that he believed the universe, with all its intricate and beautiful mathematical structures, was "out there,"

independent of our feeble minds, In no way can the laws of science be likened to traffic regulations or fashions in dress that vary with time and place. Popper would have been appalled as Russell by the crazy views of today's social constructivists and postmodernists, most of them French or American professors of literature who know almost nothing about science.

Scholars unacquainted with the history of philosophy often credit Popper for being the first to point out that science, unlike math and logic, is never absolutely certain. It is always corrigible, subject to perpetual modification. This notion of what the American philosopher Charles Peirce called the "fallibilism" of science goes back to ancient Greek skeptics, and is taken for granted by almost all later thinkers.

In *Quantum Theory and the Schism in Physics* (1982) Popper defends at length his "propensity theory" of probability. A perfect die, when tossed, has the propensity to show each face with equal probability. Basic particles, when measured, have a propensity to acquire, with specific probabilities, such properties as position, momentum, spin and so on. Here again Popper is introducing a new term which says nothing different from what can be better said in conventional terminology.

In my opinion Popper's most impressive work, certainly his best known, was his two-volume *The Open Society and Its Enemies* (1945). Its central theme, that open democratic societies are far superior to closed totalitarian regimes, especially Marxist ones, was hardly new, but Popper defends it with powerful arguments and awesome erudition. In later books he attacks what he calls "historicism," the belief that there are laws of historical change that enable one to predict humanity's future. The future is unpredictable, Popper argued, because we have free wills. Like William James, Popper was an indeterminist who saw history as a series of unforeseeable events. In later years he liked to distinguish between what he called three "worlds"—the external physical universe, the inner world of the mind, and the world of culture. Like Carnap and other members of the [Vienna Circle](#), he had no use for God or an afterlife.

Karl Raimund Popper was born in Vienna in 1902 where he was also educated. His parents were Jewish, his father a wealthy attorney, his mother a pianist. For twenty years he was a professor of logic and scientific method at the London School of Economics. In 1965 he was knighted by the Crown.

I am convinced that Popper, a man of enormous egotism, was motivated by an

intense jealousy of Carnap. It seems that every time Carnap expressed an opinion, Popper felt compelled to come forth with an opposing view, although it usually turned out to be the same as Carnap's but in different language. Carnap once said that the distance between him and Popper was not symmetrical. From Carnap to Popper it was small, but the other way around it appeared huge. Popper actually believed that the movement known as [logical positivism](#), of which Carnap was leader, had expired because he, Popper, had single-handedly killed it!

I have not read Popper's first and only biography, [Karl Popper: The Formative Years \(1902-1945\)](#), by Malachi Haim Hacoen (2000). Judging by the reviews it is an admirable work. David Papineau, a British philosopher, reviewed it for *The New York Times Book Review* (November 12, 2000). Here are his harsh words about Popper's character and work:

By Hacoen's own account, Popper was a monster, a moral prig. He continually accused others of plagiarism, but rarely acknowledged his own intellectual debts. He expected others to make every sacrifice for him, but did little in return. In Hacoen's words, "He remained to the end a spoiled child who threw temper tantrums when he did not get his way." Hacoen is ready to excuse all this as the prerogative of genius. Those who think Popper a relatively minor figure are likely to take a different view.

When Popper wrote "Logik der Forschung," he was barely thirty. Despite its flawed center, it was full of good ideas, from perhaps the most brilliant of the bright young philosophers associated with the Vienna Circle. But where the others continued to learn, develop and in time exert a lasting influence on the philosophical tradition, Popper knew better. He refused to revise his falsificationism, and so condemned himself to a lifetime in the service of a bad idea.

Popper's great and tireless efforts to expunge the word *induction* from scientific and philosophical discourse has utterly failed. Except for a small but noisy group of British Popperians, induction is just too firmly embedded in the way philosophers of science and even ordinary people talk and think.

Confirming instances underlie our beliefs that the Sun will rise tomorrow, that dropped objects will fall, that water will freeze and boil, and a million other events. It

is hard to think of another philosophical battle so decisively lost.

Readers interested in exploring Popper's eccentric views will find, in addition to his books and papers, most helpful the two-volume *Philosophy of Karl Popper* (1970), in the Library of Living Philosophers, edited by Paul Arthur Schilpp. The book contains essays by others, along with Popper's replies and an autobiography. For vigorous criticism of Popper, see David Stove's *Popper and After: Four Modern Irrationalists* (the other three are Imre Lakatos, Thomas Kuhn, and Paul Feyerabend), and Stove's chapter on Popper in his posthumous *Against the Idols of the Age* (1999) edited by Roger Kimball. See Also Carnap's reply to Popper in *The Philosophy of Rudolf Carnap* (1963), another volume in The Library of Living Philosophers. Of many books by Popperians, one of the best is *Critical Rationalism* (1994), a skillful defense of Popper by his top acolyte.

([Martin Gardner, "A Skeptical Look at Karl Popper," *Skeptical Inquirer*, 25\(4\):13-14, 72.](#))

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