MIT Technology Review

Peering Inside the Workings of the Brain

Once the realm of philosophy, neuroscience has taken the lead in the search to find the true nature of the human mind.

By Jason Pontin on June 17, 2014

Ludwig Wittgenstein was not technologically illiterate: he had studied aeronautical engineering at the University of Manchester before World War I, researching the behavior of kites and designing a propeller with little rockets at its tips. But the philosopher was violently opposed to *scientism*, which Trenton Jerde, in his review of James Klagge's *Wittgenstein in Exile,* describes as "a preoccupation with the scientific method, the appeal to the sciences to solve problems that are beyond their reach, and a misuse of scientific terminology." The philosopher insisted on an unbridgeable divide between philosophy and science, which Klagge calls "Wittgenstein's insulation thesis," one of whose consequences was that science cannot resolve philosophical problems.

Wittgenstein would have been especially derisive of the claims of neuroscientists to meaningfully explain mental phenomena. In his *Zettel* (or posthumously collected remarks), he writes about the psychology of his own time: "No supposition seems to me more natural than that there is no process in the brain correlated ... with thinking; so that it would be impossible to read off thought processes from brain-processes."

Wittgenstein's interdiction is now a commonplace among philosophers. Many argue that understanding the causes of events in our brains cannot tell us much about the mind, because inferring anything about the latter from the former is a kind of "category mistake." But the attitude is becoming a rearguard defense against the encroachments of an advancing explanatory method. Questions such as "What is consciousness?" or "Do we have free will?" or "How do we ethically reason?" are of abiding interest, and because philosophers have made little progress in answering them, neuroscientists have felt at liberty to try. Thinking, feeling, and deciding are the most intimately human of all things, and yet we understand them hardly at all.

That neuroscientists can make the attempt is the result of recent technological advances, including (but not limited to) new kinds of brain imaging and the emerging field of optogenetics. This issue of *MIT Technology Review* describes those emerging technologies (see "Neuroscience's New Toolbox," by Stephen S. Hall, and "Cracking the Brain's Codes," by Christof Koch and Gary Marcus) and explains some of the surprising early insights they have suggested (see "Searching for the 'Free Will' Neuron," by David Talbot, and interviews with the neuroscientists Joseph LeDoux on memory, Antonio Damasio on emotions, and Rebecca Saxe on empathy). Finally, we report on the interventions the new technologies

may make possible, including treatments for intractable mental illnesses such as schizophrenia (see "Shining Light on Madness," by David Rotman) and the use of brain-machine interfaces to help paralyzed patients ("The Thought Experiment," by Antonio Regalado).

Are the philosophers convinced by any of this? Not really. Responding to Gabriel Kreiman's research into decision-making, Hilary Bok, a philosopher at Johns Hopkins, is reserved: "I love these experiments and think they are really interesting, but I'm less convinced whether they have shown anything crucial about free will." But they are intrigued. Patricia Churchland, a philosopher at the University of California, San Diego, says of the same experiments, "Self-control is an entirely real brain phenomenon. Insofar as self-control is a key component of free choice, we do in fact have free choice."

But perhaps it doesn't matter much what professional philosophers think. They've had 2,000 years to answer these questions in their own way. The power of an explanation is its capacity to satisfyingly illuminate something hitherto obscure and to allow us to do things we could not before (here, effectively treat mental illnesses and build brain prosthetics). Insofar as traditional philosophy has an important role in understanding the mind, it may be to pose questions and parse answers, and the questions we ask will become more interesting because of the conceptual breakthroughs of neuroscience. But write to me at jason.pontin@technologyreview.com and tell me what you think.

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