

**CONVERSATION** ■ Patricia Churchland of the University of California at San Diego is attempting to blend the findings of brain science with philosophy. She is the author of *Neurophilosophy*

## Philosophy in the age of neuroscience

**F**or a long, long time, people have puzzled about what makes us the way we are: How it is possible for us to be aware of things, to be conscious, to learn and perceive.

We have this rather time-honored and ancient feeling about ourselves that we have a will that is free and that we make choices that emanate from our free will. But in the end, all of that has to come from the brain.

What is exciting about the new era is that real inroads are being made into what used to be thought of as philosophical questions that would never, ever be answered by science. It looks possible now that we are going to understand some very basic things about the nature of how our brains work. And my hunch is that we are in for some real surprises. We are going to come to think of ourselves very differently—and I think that is immensely exciting.

There is already psychological data showing that the conventional wisdom on rationality—that it's pretty much deduction—is clearly not right. It's much more complicated and messy and sophisticated—and, if you like, powerful—than logic.

We think of ourselves as mulling over a decision such as "Should I do this?" or "Should I maybe not do that?" It may very well turn out that decision making and problem solving will look much more like the way neural networks function. The neurons in the networks are interacting and interacting—and finally they relax into a stable configuration, and that's your answer. Then, introspectively, we say to ourselves, "Ah, I've decided I will, after all, go to Hawaii."

That isn't how we're accustomed to thinking about how we make decisions. We'll have to think of choice and responsibility in a very different way. Like all new ideas, it's a little bit frightening. The old ideas are especially near and dear to us because, after all, this isn't a theory about whether the earth is flat or whether the sun goes around the earth; this is about us—about what we are and how we work and what makes us the way we are. And people sometimes find it rather upsetting.

### Ignoring science

I was inspired by a comment made by [the late physicist] Richard Feynman in an interview in *Playboy* magazine, of all things. He made this very intemperate—but very accurate—remark that if philosophers are going to ignore the science of their day, they can't hope to understand the things they want to understand.

Philosophers used to speculate and think about memory—laying down the boundary conditions for what they thought would be a useful answer and so forth—but it was always in terms of behavior. By and large, philosophers didn't pay any real attention to the meat itself. Neuroscience was not interesting. Now, the puzzle of memory is being solved scientifically by neuroscientists and neural-network modelers. They've

got us to the point where the metaphors we used to have as a kind of crutch we can now throw away and say, "Let's understand the brain itself."

Philosophers have to admit that they were wrong about certain things. We thought memory was a single kind of process, but we now see that there are probably four or five kinds of ways that memories get stored. It seemed to me that the traditional style of doing philosophy was not going anywhere, and that I really had to look at the brain.

Philosophers traditionally have been the ones who try to introduce some order and organization into areas that have not yet become sciences. Now that physics, chemistry and biology are sciences, philosophy has mostly to do with the nature of the mind. And my feeling is that as the mind/brain becomes

more and more understood scientifically, philosophers will have less and less to think of as uniquely their own.

### A model of the world

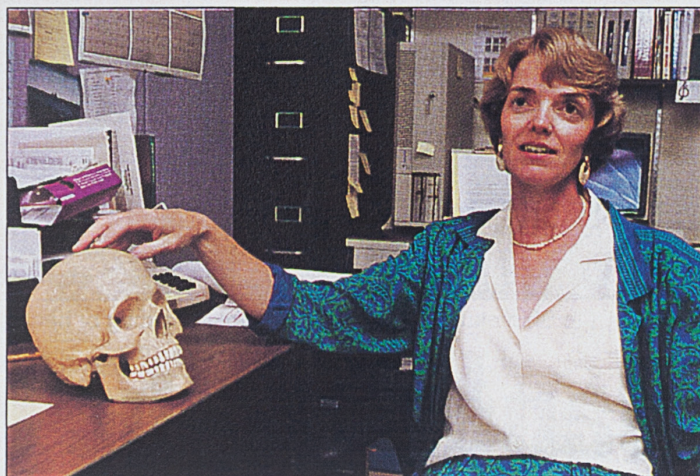
The critical question, and one that both philosophers and neuroscientists can collaborate on, is how you can represent a model of the world in your brain—not only the world of space and time and other people and objects and trees and mountains but your own internal world, too: Your model of yourself as a being that is extended through time, that has a certain personality, that has

certain desires and a memory store that can be tapped.

Immanuel Kant made the argument that perception is not likely to be just a passive process—that, in some sense, the brain *builds* the model of the world; it doesn't just passively receive an image in the way that a piece of film just passively receives an image. So the big questions are: How do brains use representations to make these models of the external and the internal worlds? And what does that mean for how we think of ourselves?

The whole field of ethics is something that philosophers may need to rethink quite thoroughly in the light of developments in both neuroscience and psychology. You don't want to say that what is right is simply what most people think is right. The norms in ethics in a sense come from us because of the kind of evolutionary history we have and because of the kinds of brains we have. It's not that a child has it imprinted on his brain that certain things are right and certain things aren't; somehow or other, we generate these conceptions of what is right and what is not right. And we probably do that in the same way we learn everything else, the way that neural networks often learn things—and that is by being presented with examples.

And all those conceptions are always evolving. At my ripe old age, I am still presumably evolving my understanding of how to interact with other humans.



JAMES COCCANO—PICTURE GROUP FOR USM&A

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