Neurophilosophy at Work

In this collection of essays, Paul Churchland explores the unfolding impact of the several empirical sciences of the mind, especially cognitive neurobiology and computational neuroscience, on a variety of traditional issues central to the discipline of philosophy. Representing Churchland's most recent investigations, they continue his research program, launched more than thirty years ago, which has evolved into the field of neurophilosophy. Topics such as the nature of consciousness, the nature of cognition and intelligence, the nature of moral knowledge and moral reasoning, neurosemantics or "world representation" in the brain, the nature of our subjective sensory qualia and their relation to objective science, and the future of philosophy itself are here addressed in a lively, graphical, and accessible manner. Throughout the volume, Churchland's view that science is as important as philosophy is emphasized. Several of the colored figures in the volume will allow readers to perform some novel phenomenological experiments on their own visual system.

Paul Churchland holds the Valtz Chair of Philosophy at the University of California, San Diego. One of the most distinguished philosophers at work today, he has received fellowships from the Andrew Mellon Foundation, the Woodrow Wilson Center, the Canada Council, and the Institute for Advanced Study in Princeton. A former president of the American Philosophical Association (Pacific Division), he is the editor and author of many articles and books, most recently *The Engine of Reason, the Seat of the Soul: A Philosophical Journey into the Brain* and *On the Contrary: Critical Essays, 1987–1997* (with Patricia Churchland).

Neurophilosophy at Work

PAUL CHURCHLAND
University of California, San Diego

CAMBRIDGE
UNIVERSITY PRESS

CAMBRIDGE UNIVERSITY PRESS
Cambridge, New York, Melbourne, Madrid, Cape Town, Singapore, São Paulo

Cambridge University Press
32 Avenue of the Americas, New York, NY 10013-2473, USA

www.cambridge.org
Information on this title: www.cambridge.org/9780521864725

First published 2007

Printed in the United States of America

A catalog record for this publication is available from the British Library.

Library of Congress Cataloging in Publication Data

Churchland, Paul M., 1942–
Neurophilosophy / Paul Churchland.
p. cm.
Includes bibliographical references and index.
ISBN 0-521-86472-0 (hardback) – ISBN 0-521-69200-8 (pbk.)
1. Neurosciences – Philosophy. 2. Cognition – Philosophy.
3. Religion and science. I. Title.
QP356.C485 2007
612.801–dc22 2006014487

ISBN 978-0-521-86472-5 hardback
ISBN 978-0-521-69200-7 paperback

Contents

Preface

Any research program is rightly evaluated on its unfolding ability to address, to illuminate, and to solve a broad range of problems antecedently recognized by the professional community. The research program at issue in this volume is cognitive neurobiology, a broad-front scientific research program with potential relevance to a considerable variety of intellectual disciplines, including neuroanatomy, neurophysiology, neurochemistry, neuropathology, developmental neurobiology, psychiatry, psychology, artificial intelligence, and . . . philosophy. It is the antecedently recognized problems of this latter discipline in particular that constitute the explanatory challenges addressed in the present volume. My aim in what follows is to direct the light of computational neuroscience and cognitive neurobiology – or such light as they currently provide – onto a range of familiar philosophical problems, problems independently at the focus of much fevered philosophical attention.

Some of those focal problems go back at least to Plato, as illustrated in Chapter 8, where we confront the issue of how the mind grasps the timeless structure underlying the ephemeral phenomena of the perceivable world. And some go back at least to Aristotle, as illustrated in Chapters 3 and 4, where we confront the issue of how the mind embodies and deploys the moral wisdom that slowly develops during the social maturation of normal humans. Other problems have moved into the spotlight of professional attention only recently, as in Chapter 1, where we address the ground or nature of consciousness. Or as in Chapter 7, where we address the prospects of artificial intelligence. Or as in Chapter 9, where we confront the allegedly intractable problems posed by subjective sensory qualia. But all of these problems look interestingly different when viewed

from the perspective of recent developments in the empirical/theoretical research program of cognitive neurobiology. The low-dimensional 'box canyons', in which conventional philosophical approaches have become trapped, turn out to be embedded within higher dimensions of doctrinal possibility, dimensions in which specific directions of development appear both possible and promising. Once we have freed ourselves from the idea that cognition is basically a matter of manipulating sentence-like states (the various 'propositional attitudes' such as perceives-that-*P*, believes-that-*P*, suspects-that-*P*, and so on), according to rules of deductive and inductive inference, and once we have grasped the alternative modes of world representation, information coding, and information processing displayed in all terrestrial brains, each of the problems listed earlier appears newly tractable and potentially solvable.

The distributed illumination here promised is additionally intriguing because it comes from a single source – the vector-coding and vector/matrix-processing account of the brain's cognitive activity – an empirically based account of how the brain represents the world, and of how it manipulates those representations. Such a 'consilience of inductions', as William Whewell would describe it, lends further credence to the integrity of the several solutions proposed. The solutions proposed are not 'independent' solutions: they will stand, or fall, together.

As the reader will discover, all but one of the essays here collected were written in response, either explicit or implicit, to the published researches of many of my distinguished academic colleagues,[1] and each embodies my attempts to exploit, expand, and extend the most noteworthy contributions of those colleagues, and (less often, but still occasionally) to resist, reconstruct, or subvert them. Though cognitive neurobiology hovers always in the near background, the overall result is less a concerted argument for a specific thesis, as in a standard monograph, but more a many-sided conversation in a parlor full of creative and resourceful interlocutors. To be sure, my voice will dominate the pages to follow, for these are my essays. But the voices of my colleagues will come through loud and clear even so, partly because of their intrinsic virtues, and partly because the point of these essays is to try to address and answer those voices, not to

[1] The exception is Chapter 5, the essay on American educational policy, specifically, on the antiscience initiatives recently imposed, and since rescinded, in Kansas. I had thought these issues to be safely behind us, but after the 2004 elections, fundamentalist initiatives are once again springing up all over rural America, including, once again, poor Kansas. The lessons of this particular essay are thus newly germane.

muffle them. Without those voices, there would have been no challenges to answer, and no essays to collect.

The result is also a journey through a considerable diversity of philosophical subdisciplines, for the voices here addressed are all in hot pursuit of diverse philosophical enthusiasms. In what follows, we shall explore contemporary issues in the nature of consciousness itself, the fortunes of nonreductive materialism (specifically, functionalism) in the philosophy of mind, the neuronal basis of our moral knowledge, the future of our moral consciousness, the roles of science and religion in our public schools, the proper cognitive kinematics for the epistemology of the twenty-first century, the basic nature of intelligence, the proper semantic theory for the representational states of terrestrial brains generally, the fortunes of scientific realism, recent arguments against the identity theory of the mind–brain relation, the fundamental differences between digital computers and biological brains, the neuronal basis of our subjective color qualia, the existence of novel – indeed, 'impossible' – color qualia, and the resurrection of objective colors from mere 'secondary' properties to real and important features of physical surfaces. What unites these scattered concerns is, once more, that they are all addressed from the standpoint of the emerging discipline of cognitive neurobiology. The exercise, as a whole, is thus a test of that discipline's systematic relevance to a broad spectrum of traditional philosophical issues. Whether, and how well, it passes this test is a matter for the reader to judge. My hopes, as always, are high, but the issue is now in your hands.

Provenances

"Catching Consciousness in a Recurrent Net," first appeared in A. Brook and D. Ross, eds., *Daniel Dennett: Contemporary Philosophy in Focus,* pp. 64–81 (Cambridge: Cambridge University Press, 2002).

"Functionalism at Forty: A Critical Retrospective," first appeared in *Journal of Philosophy* 102, no. 1 (2005): 33–50.

"Toward a Cognitive Neurobiology of the Moral Virtues," first appeared in *Topoi* 17 (1998): 1–14, a special issue on moral reasoning.

"Rules, Know-How, and the Future of Moral Cognition," first appeared in *Moral Epistemology Naturalized,* R. Campbell and B. Hunter, eds., *Canadian Journal of Philosophy*, suppl. vol. 26 (2000): 291–306.

"Science, Religion, and American Educational Policy," first appeared in *Public Affairs Quarterly* 14, no. 4 (2001): 279–91.

"What Happens to Reliabilism When It Is Liberated from the Propositional Attitudes?" first appeared in *Philosophical Topics,* 29, no. 1 and 2 (2001): 91–112, a special issue on the philosophy of Alvin Goldman.

"On the Nature of Intelligence: Turing, Church, von Neumann, and the Brain," first appeared in S. Epstein, ed., *A Turing-Test Sourcebook*, ch. 5 (The MIT Press 2006).

"Neurosemantics: On the Mapping of Minds and the Portrayal of Worlds," first appeared in K. E. White, ed., *The Emergence of Mind,* pp. 117–47 (Milan: Fondazione Carlo Elba, 2001).

"Chimerical Colors: Some Phenomenological Predictions from Cognitive Neuroscience," first appeared in *Philosophical Psychology* 18, no. 5 (2005).

"On the Reality (and Diversity) of Objective Colors: How Color-Qualia Space Is a Map of Reflectance-Profile Space," is currently in press at *Philosophy of Science* (2006).

"Into the Brain: Where Philosophy Should Go from Here," first appeared in *Topoi* 25 (2006): 29–32, a special issue on the future of philosophy.