

The Conscious Mind The Mit Press Essential Knowledge Series

A new theory about the origins of consciousness that finds learning to be the driving force in the evolutionary transition to basic consciousness. What marked the evolutionary transition from organisms that lacked consciousness to those with consciousness—to minimal subjective experiencing, or, as Aristotle described it, “the sensitive soul”? In this book, Simona Ginsburg and Eva Jablonka propose a new theory about the origin of consciousness that finds learning to be the driving force in the transition to basic consciousness. Using a methodology similar to that used by scientists when they identified the transition from non-life to life, Ginsburg and Jablonka suggest a set of criteria, identify a marker for the transition to minimal consciousness, and explore the far-reaching biological, psychological, and philosophical implications. After presenting the historical, neurobiological, and philosophical foundations of their analysis, Ginsburg and Jablonka propose that the evolutionary marker of basic or minimal consciousness is a complex form of associative learning, which they term unlimited associative learning (UAL). UAL enables an organism to ascribe motivational value to a novel, compound, non-reflex-inducing stimulus or action, and use it as the basis for future learning. Associative learning, Ginsburg and Jablonka argue, drove the Cambrian explosion and its massive diversification of organisms. Finally, Ginsburg and Jablonka propose symbolic language as a similar type of marker for the evolutionary transition to human rationality—to Aristotle's “rational soul.”

An argument against neobehaviorism and for "naturalized Cartesianism," which couples a wholly materialist approach to the mind with a fully realist attitude to the phenomena of conscious experience. In *Mental Reality*, Galen Strawson argues that much contemporary philosophy of mind gives undue primacy of place to publicly observable phenomena, nonmental phenomena, and behavioral phenomena (understood as publicly observable phenomena) in its account of the nature of mind. It does so at the expense of the phenomena of conscious experience. Strawson describes an alternative position, "naturalized Cartesianism," which couples the materialist view that mind is entirely natural and wholly physical with a fully realist account of the nature of conscious experience. Naturalized Cartesianism is an adductive (as opposed to reductive) form of materialism. Adductive materialists don't claim that conscious experience is anything less than we ordinarily conceive it to be, in being wholly physical. They claim instead that the physical is something more than we ordinarily conceive it to be, given that many of the wholly physical goings on in the brain constitute—literally are—conscious experiences as we ordinarily conceive them. Since naturalized Cartesianism downgrades the place of reference to nonmental and publicly observable phenomena in an adequate account of mental phenomena, Strawson considers in detail the question of what part such reference still has to play. He argues that it is a mistake to think that all behavioral phenomena are publicly observable phenomena. This revised and expanded edition of *Mental Reality* includes a new appendix, which thoroughly revises the account of intentionality given in chapter 7.

Despite recent strides in neuroscience and psychology that have deepened understanding of the brain, consciousness remains one of the greatest philosophical and scientific puzzles. The second edition of *Theories of Consciousness: An Introduction and*

Assessment provides a fresh and up-to-date introduction to a variety of approaches to consciousness, and contributes to the current lively debate about the nature of consciousness and whether a scientific understanding of it is possible. After an initial overview of the status and prospects of physicalism in the face of the problem of consciousness, William Seager explores key themes from Descartes - the founder of the modern problem of consciousness. He then turns to the most important theories of consciousness: identity theories and the generation problem higher-order thought theories of consciousness self-representational theories of consciousness Daniel Dennett's theory of consciousness attention-based theories of consciousness representational theories of consciousness conscious intentionality panpsychism neutral monism. Thoroughly revised and expanded throughout, this second edition includes new chapters on animal consciousness, reflexive consciousness, combinatorial forms of panpsychism and neutral monism, as well as a significant new chapter on physicalism, emergence and consciousness. The book's broad scope, depth of coverage and focus on key philosophical positions and arguments make it an indispensable text for those teaching or studying philosophy of mind and psychology. It is also an excellent resource for those working in related fields such as cognitive science and the neuroscience of consciousness.

A defense of a version of the higher-order thought (HOT) theory of consciousness with special attention to such topics as concepts and animal consciousness. Consciousness is arguably the most important area within contemporary philosophy of mind and perhaps the most puzzling aspect of the world. Despite an explosion of research from philosophers, psychologists, and scientists, attempts to explain consciousness in neurophysiological, or even cognitive, terms are often met with great resistance. In *The Consciousness Paradox*, Rocco Gennaro aims to solve an underlying paradox, namely, how it is possible to hold a number of seemingly inconsistent views, including higher-order thought (HOT) theory, conceptualism, infant and animal consciousness, concept acquisition, and what he calls the HOT-brain thesis. He defends and further develops a metapsychological reductive representational theory of consciousness and applies it to several importantly related problems. Gennaro proposes a version of the HOT theory of consciousness that he calls the "wide intrinsicity view" and shows why it is superior to various alternatives, such as self-representationalism and first-order representationalism. HOT theory says that what makes a mental state conscious is that a suitable higher-order thought is directed at that mental state. Thus Gennaro argues for an overall philosophical theory of consciousness while applying it to other significant issues not usually addressed in the philosophical literature on consciousness. Most cognitive science and empirical works on such topics as concepts and animal consciousness do not address central philosophical theories of consciousness. Gennaro's integration of empirical and philosophical concerns will make his argument of interest to both philosophers and nonphilosophers.

New essays on the philosophy of Ned Block, with substantive and wide-ranging responses by Block. Perhaps more than any other philosopher of mind, Ned Block synthesizes philosophical and scientific approaches to the mind; he is unique in moving back and forth across this divide, doing so with creativity and intensity. Over the course of his career, Block has made groundbreaking contributions to our understanding of intelligence, representation, and consciousness. *Blockheads!* (the title refers to Block's

imaginary counterexample to the Turing test—and to the Block-enthusiast contributors) offers eighteen new essays on Block's work along with substantive and wide-ranging replies by Block. The essays and responses not only address Block's past contributions but are rich with new ideas and argument. They importantly clarify many key elements of Block's work, including his pessimism concerning such thought experiments as Commander Data and the Nation of China; his more general pessimism about intuitions and introspection in the philosophy of mind; the empirical case for an antifunctionalist, biological theory of phenomenal consciousness; the fading qualia problem for a biological theory; the link between phenomenal consciousness and representation (especially spatial representation); and the reducibility of phenomenal representation. Many of the contributors to *Blockheads!* are prominent philosophers themselves, including Tyler Burge, David Chalmers, Frank Jackson, and Hilary Putnam. Contributors Ned Block, Bill Brewer, Richard Brown, Tyler Burge, Marisa Carrasco, David Chalmers, Frank Jackson, Hakwan Lau, Geoffrey Lee, Janet Levin, Joseph Levine, William G. Lycan, Brian P. McLaughlin, Adam Pautz, Hilary Putnam, Sydney Shoemaker, Susanna Siegel, Nicholas Silins, Daniel Stoljar, Michael Tye, Sebastian Watzl

According to Thomas Metzinger, no such things as selves exist in the world: nobody ever had or was a self. All that exists are phenomenal selves, as they appear in conscious experience. The phenomenal self, however, is not a thing but an ongoing process; it is the content of a "transparent self-model." In *Being No One*, Metzinger, a German philosopher, draws strongly on neuroscientific research to present a representationalist and functional analysis of what a consciously experienced first-person perspective actually is. Building a bridge between the humanities and the empirical sciences of the mind, he develops new conceptual toolkits and metaphors; uses case studies of unusual states of mind such as agnosia, neglect, blindsight, and hallucinations; and offers new sets of multilevel constraints for the concept of consciousness. Metzinger's central question is: How exactly does strong, consciously experienced subjectivity emerge out of objective events in the natural world? His epistemic goal is to determine whether conscious experience, in particular the experience of being someone that results from the emergence of a phenomenal self, can be analyzed on subpersonal levels of description. He also asks if and how our Cartesian intuitions that subjective experiences as such can never be reductively explained are themselves ultimately rooted in the deeper representational structure of our conscious minds.

An interdisciplinary and comprehensive treatment of bodily self-consciousness, considering representation of the body, the sense of bodily ownership, and representation of the self. The body may be the object we know the best. It is the only object from which we constantly receive a flow of information through sight and touch; and it is the only object we can experience from the inside, through our proprioceptive, vestibular, and visceral senses. Yet there have been very few books that have attempted to consolidate our understanding of the body as it figures in our experience and self-awareness. This volume offers an interdisciplinary and comprehensive treatment of bodily self-awareness, the first book to do so since the landmark 1995 collection *The Body and the Self*, edited by José Bermúdez, Naomi Eilan, and Anthony Marcel (MIT Press). Since 1995, the study of the body in such psychological disciplines as cognitive psychology, cognitive neuroscience, psychiatry, and neuropsychology has

advanced dramatically, accompanied by a resurgence of philosophical interest in the significance of the body in our mental life. The sixteen specially commissioned essays in this book reflect the advances in these fields. The book is divided into three parts, each part covering a topic central to an explanation of bodily self-awareness: representation of the body; the sense of bodily ownership; and representation of the self. Contributors Adrian Alsmith, Brianna Beck, José Luis Bermúdez, Anna Berti, Alexandre Billon, Andrew J. Bremner, Lucilla Cardinali, Tony Cheng, Frédérique de Vignemont, Francesca Fardo, Alessandro Farnè, Carlotta Fossataro, Shaun Gallagher, Francesca Garbarini, Patrick Haggard, Jakob Hohwy, Matthew R. Longo, Tamar Makin, Marie Martel, Melvin Mezure, John Michael, Christopher Peacocke, Lorenzo Pia, Louise Richardson, Alice C. Roy, Manos Tsakiris, Hong Yu Wong

An accessible and engaging account of the mind and its connection to the brain. The mind encompasses everything we experience, and these experiences are created by the brain—often without our awareness. Experience is private; we can't know the minds of others. But we also don't know what is happening in our own minds. In this book, E. Bruce Goldstein offers an accessible and engaging account of the mind and its connection to the brain. He takes as his starting point two central questions—what is the mind? and what is consciousness?—and leads readers through topics that range from conceptions of the mind in popular culture to the wiring system of the brain. Throughout, he draws on the latest research, explaining its significance and relevance. Goldstein discusses how the mind has been described and studied since the nineteenth century, and surveys modern approaches to studying mind–brain connections; considers consciousness and how the nervous system creates experience; and explores the hidden mechanisms of the brain. Then, in the heart of the book, he focuses on one principle that holds across a wide range of the mind's functions: prediction. All the behaviors and physiological processes associated with prediction—including eye movements, tactile sensation, language, music, memory, and social processes—involve communication between different places in the brain. The mind emerges not from the firing of neurons in one specialized area but from communications that travel across what Goldstein calls “highways of the mind.”

An interdisciplinary examination of the evolutionary breakthroughs that rendered the brain accessible to itself. In *The Crucible of Consciousness*, Zoltan Torey offers a theory of the mind and its central role in evolution. He traces the evolutionary breakthrough that rendered the brain accessible to itself and shows how the mind-boosted brain works. He identifies what it is that separates the human's self-reflective consciousness from mere animal awareness, and he maps its neural and linguistic underpinnings. And he argues, controversially, that the neural technicalities of reflective awareness can be neither algorithmic nor spiritual—neither a computer nor a ghost in the machine. The human mind is unique; it is not only the epicenter of our knowledge but also the outer limit of our intellectual reach. Not to solve the riddle of the self-aware mind, writes Torey, goes against the evolutionary thrust that created it. Torey proposes a model that brings into a single focus all the elements that make up the puzzle: how the brain works, its functional components and their interactions; how language evolved and how syntax evolved out of the semantic substrate by way of neural transactions; and why the mind-endowed brain deceives itself with entelechy-type impressions. Torey first traces the

language-linked emergence of the mind, the subsystem of the brain that enables it to be aware of itself. He then explores this system: how consciousness works, why it is not transparent to introspection, and what sense it makes in the context of evolution. The “consciousness revolution” and the integrative focus of neuroscience have made it possible to make concrete formerly mysterious ideas about the human mind. Torey's model of the mind is the logical outcome of this, highlighting a coherent and meaningful role for a reflectively aware humanity.

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A rigorous analysis of current empirical and theoretical work supporting the argument that consciousness and attention are largely dissociated. In this book, Carlos Montemayor and Harry Haladjian consider the relationship between consciousness and attention. The cognitive mechanism of attention has often been compared to consciousness, because attention and consciousness appear to share similar qualities. But, Montemayor and Haladjian point out, attention is defined functionally, whereas consciousness is generally defined in terms of its phenomenal character without a clear functional purpose. They offer new insights and proposals about how best to understand and study the relationship between consciousness and attention by examining their functional aspects. The book's ultimate conclusion is that consciousness and attention are largely dissociated. Undertaking a rigorous analysis of current empirical and theoretical work on attention and consciousness, Montemayor and Haladjian propose a spectrum of dissociation—a framework that identifies the levels of dissociation between consciousness and attention—ranging from identity to full dissociation. They argue that conscious attention, the focusing of attention on the contents of awareness, is constituted by overlapping but distinct processes of consciousness and attention. Conscious attention, they claim, evolved after the basic forms of attention, increasing access to the richest kinds of cognitive contents. Montemayor and Haladjian's goal is to help unify the study of consciousness and attention across the disciplines. A focused examination of conscious attention will, they believe, enable theoretical progress that will further our understanding of the human mind.

An account of the emergence of the mind: how the brain acquired self-awareness, functional autonomy, the ability to think, and the power of speech. How did the human mind emerge from the collection of neurons that makes up the brain? How did the brain acquire self-awareness, functional autonomy, language, and the ability to think, to understand itself and the world? In this volume in the Essential Knowledge series, Zoltan Torey offers an accessible and concise description of the evolutionary breakthrough that created the human mind. Drawing on insights from evolutionary biology, neuroscience, and linguistics, Torey reconstructs the sequence of events by which *Homo erectus* became *Homo sapiens*. He describes the augmented functioning that underpins the emergent mind—a new (“off-line”) internal response system with which the brain accesses itself and then forms a selection mechanism for mentally generated behavior

options. This functional breakthrough, Torey argues, explains how the animal brain's "awareness" became self-accessible and reflective—that is, how the human brain acquired a conscious mind. Consciousness, unlike animal awareness, is not a unitary phenomenon but a composite process. Torey's account shows how protolanguage evolved into language, how a brain subsystem for the emergent mind was built, and why these developments are opaque to introspection. We experience the brain's functional autonomy, he argues, as free will. Torey proposes that once life began, consciousness had to emerge—because consciousness is the informational source of the brain's behavioral response. Consciousness, he argues, is not a newly acquired "quality," "cosmic principle," "circuitry arrangement," or "epiphenomenon," as others have argued, but an indispensable working component of the living system's manner of functioning.

In *Matter and Consciousness*, Paul Churchland clearly presents the advantages and disadvantages of such difficult issues in philosophy of mind as behaviorism, reductive materialism, functionalism, and eliminative materialism. This new edition incorporates the striking developments that have taken place in neuroscience, cognitive science, and artificial intelligence and notes their expanding relevance to philosophical issues. Churchland organizes and clarifies the new theoretical and experimental results of the natural sciences for a wider philosophical audience, observing that this research bears directly on questions concerning the basic elements of cognitive activity and their implementation in real physical systems. (How is it, he asks, that living creatures perform some cognitive tasks so swiftly and easily, where computers do them only badly or not at all?) Most significant for philosophy, Churchland asserts, is the support these results tend to give to the reductive and the eliminative versions of materialism. A Bradford Book

An argument that consciousness, more widespread than previously assumed, is the feeling of being alive, not a type of computation or a clever hack. In *The Feeling of Life Itself*, Christof Koch offers a straightforward definition of consciousness as any subjective experience, from the most mundane to the most exalted—the feeling of being alive. Psychologists study which cognitive operations underpin a given conscious perception. Neuroscientists track the neural correlates of consciousness in the brain, the organ of the mind. But why the brain and not, say, the liver? How can the brain, three pounds of highly excitable matter, a piece of furniture in the universe, subject to the same laws of physics as any other piece, give rise to subjective experience? Koch argues that what is needed to answer these questions is a quantitative theory that starts with experience and proceeds to the brain. In *The Feeling of Life Itself*, Koch outlines such a theory, based on integrated information. Koch describes how the theory explains many facts about the neurology of consciousness and how it has been used to build a clinically useful consciousness meter. The theory predicts that many, and perhaps all, animals experience the sights and sounds of life; consciousness is much more widespread than

conventionally assumed. Contrary to received wisdom, however, Koch argues that programmable computers will not have consciousness. Even a perfect software model of the brain is not conscious. Its simulation is fake consciousness. Consciousness is not a special type of computation—it is not a clever hack. Consciousness is about being.

A novel contribution to the age-old debate about free will versus determinism. Do we consciously cause our actions, or do they happen to us? Philosophers, psychologists, neuroscientists, theologians, and lawyers have long debated the existence of free will versus determinism. In this book Daniel Wegner offers a novel understanding of the issue. Like actions, he argues, the feeling of conscious will is created by the mind and brain. Yet if psychological and neural mechanisms are responsible for all human behavior, how could we have conscious will? The feeling of conscious will, Wegner shows, helps us to appreciate and remember our authorship of the things our minds and bodies do. Yes, we feel that we consciously will our actions, Wegner says, but at the same time, our actions happen to us. Although conscious will is an illusion, it serves as a guide to understanding ourselves and to developing a sense of responsibility and morality. Approaching conscious will as a topic of psychological study, Wegner examines the issue from a variety of angles. He looks at illusions of the will—those cases where people feel that they are willing an act that they are not doing or, conversely, are not willing an act that they in fact are doing. He explores conscious will in hypnosis, Ouija board spelling, automatic writing, and facilitated communication, as well as in such phenomena as spirit possession, dissociative identity disorder, and trance channeling. The result is a book that sidesteps endless debates to focus, more fruitfully, on the impact on our lives of the illusion of conscious will.

In which a scientist searches for an empirical explanation for phenomenal experience, spurred by his instinctual belief that life is meaningful. What links conscious experience of pain, joy, color, and smell to bioelectrical activity in the brain? How can anything physical give rise to nonphysical, subjective, conscious states? Christof Koch has devoted much of his career to bridging the seemingly unbridgeable gap between the physics of the brain and phenomenal experience. This engaging book—part scientific overview, part memoir, part futurist speculation—describes Koch's search for an empirical explanation for consciousness. Koch recounts not only the birth of the modern science of consciousness but also the subterranean motivation for his quest—his instinctual (if "romantic") belief that life is meaningful. Koch describes his own groundbreaking work with Francis Crick in the 1990s and 2000s and the gradual emergence of consciousness (once considered a "fringy" subject) as a legitimate topic for scientific investigation. Present at this paradigm shift were Koch and a handful of colleagues, including Ned Block, David Chalmers, Stanislas Dehaene, Giulio Tononi, Wolf Singer, and others. Aiding and abetting it were new techniques to listen in on the activity of individual nerve cells, clinical studies, and brain-imaging technologies that allowed safe and noninvasive study of the human brain in action. Koch gives us stories

from the front lines of modern research into the neurobiology of consciousness as well as his own reflections on a variety of topics, including the distinction between attention and awareness, the unconscious, how neurons respond to Homer Simpson, the physics and biology of free will, dogs, *Der Ring des Nibelungen*, sentient machines, the loss of his belief in a personal God, and sadness. All of them are signposts in the pursuit of his life's work—to uncover the roots of consciousness.

Scholars from many different disciplines examine consciousness through the lens of intellectual approaches and cultures ranging from cosmology research and cell biophysics laboratories to pre-Columbian Mesoamerica and Tibetan Tantric Buddhism in a volume that extends consciousness studies beyond the limits of current neuroscience research.

Writing in a rigorous, thought-provoking style, the author takes us on a far-reaching tour through the philosophical ramifications of consciousness, offering provocative insights into the relationship between mind and brain.

What altered states of consciousness—the dissolution of feelings of time and self—can tell us about the mystery of consciousness. During extraordinary moments of consciousness—shock, meditative states and sudden mystical revelations, out-of-body experiences, or drug intoxication—our senses of time and self are altered; we may even feel time and self dissolving. These experiences have long been ignored by mainstream science, or considered crazy fantasies. Recent research, however, has located the neural underpinnings of these altered states of mind. In this book, neuropsychologist Marc Wittmann shows how experiences that disturb or widen our everyday understanding of the self can help solve the mystery of consciousness. Wittmann explains that the relationship between consciousness of time and consciousness of self is close; in extreme circumstances, the experiences of space and self intensify and weaken together. He considers the emergence of the self in waking life and dreams; how our sense of time is distorted by extreme situations ranging from terror to mystical enlightenment; the experience of the moment; and the loss of time and self in such disorders as depression, schizophrenia, and epilepsy. Dostoyevsky reported godly bliss during epileptic seizures; neurologists are now investigating the phenomenon of the epileptic aura. Wittmann describes new studies of psychedelics that show how the brain builds consciousness of self and time, and discusses pilot programs that use hallucinogens to treat severe depression, anxiety, and addiction. If we want to understand our consciousness, our subjectivity, Wittmann argues, we must not be afraid to break new ground. Studying altered states of consciousness leads us directly to the heart of the matter: time and self, the foundations of consciousness.

What makes us who we are? From a scientific viewpoint, any individual's existence is improbable at best. Consciousness as an actuality is inarguable; its nature, however, remains elusive. This work argues the view of self as a field of pure consciousness, debating the existence of a continuing self and drawing conclusions about this entity and its relation to the physical body and the physical world. Beginning with an exploration of the relationship between mind and matter, it discusses ostensible psi phenomena such as extra-sensory perception and psychokinesis and their implications for our understanding of the mind and the cosmos. Additional topics include the perennial mind-body problem; the role of consciousness in quantum mechanics (and conversely the role of quantum mechanics in the study of consciousness); the anthropic principle; and evidence for Intelligent Design. Quasi-religious questions such as the survival of consciousness after death are also addressed.

How consciousness appeared much earlier in evolutionary history than is commonly assumed, and why all vertebrates and perhaps even some invertebrates are conscious. How is consciousness created? When did it first appear on Earth, and how did it evolve? What constitutes consciousness, and which animals can be said to be sentient? In this book, Todd Feinberg and Jon Mallatt draw on recent scientific findings to answer these questions—and to tackle the most fundamental question about the nature of consciousness: how does the material brain create subjective experience? After assembling a list of the biological and neurobiological features that seem responsible for consciousness, and considering the fossil record of evolution, Feinberg and Mallatt argue that consciousness appeared much earlier in evolutionary history than is commonly assumed. About 520 to 560 million years ago, they explain, the great “Cambrian explosion” of animal diversity produced the first complex brains, which were accompanied by the first appearance of consciousness; simple reflexive behaviors evolved into a unified inner world of subjective experiences. From this they deduce that all vertebrates are and have always been conscious—not just humans and other mammals, but also every fish, reptile, amphibian, and bird. Considering invertebrates, they find that arthropods (including insects and probably crustaceans) and cephalopods (including the octopus) meet many of the criteria for consciousness. The obvious and conventional wisdom—shattering implication is that consciousness evolved simultaneously but independently in the first vertebrates and possibly arthropods more than half a billion years ago. Combining evolutionary, neurobiological, and philosophical approaches allows Feinberg and Mallatt to offer an original solution to the “hard problem” of consciousness.

The Cambridge Handbook of Consciousness is the first of its kind in the field, and its appearance marks a unique time in the history of intellectual inquiry on the topic. After decades during which consciousness was considered beyond the scope of legitimate scientific investigation, consciousness re-emerged as a popular focus of research towards the end of the last century, and it has remained so for nearly 20 years. There are now so many different lines of investigation on consciousness that the time has come when the field may finally benefit from a book that pulls them together and, by juxtaposing them, provides a comprehensive survey of this exciting field. An authoritative desk reference, which will also be suitable as an advanced textbook.

A new picture of the mind is emerging, and explanations now exist for what has so long seemed mysterious. This real understanding of how the biological brain works -- of how we work -- has generated a mood of excitement that is shared in a half-dozen intersecting disciplines. Philosopher Paul Churchland, who is widely known as a gifted teacher and expository writer, explains these scientific developments in a simple, authoritative, and pictorial fashion. He not only opens the door into the ongoing research of the neurobiological and connectionist communities but goes further, probing the social and moral dimensions of recent experimental results that assign consciousness to all but the very simplest forms of animals. In a fast-paced, entertaining narrative, replete with examples and numerous explanatory illustrations, Churchland brings together an exceptionally broad range of intellectual issues. He summarizes new results from neuroscience and recent work with artificial neural networks that together suggest a unified set of answers to questions about how the brain actually works; how it sustains a thinking, feeling, dreaming self; and how it sustains a self-conscious person. Churchland first explains the science -- the powerful role of vector coding in sensory representation and pattern recognition, artificial neural networks that imitate parts of the brain, recurrent networks, neural representation of the social world, and diagnostic technologies and therapies for the brain in trouble. He then explores the far-reaching consequences of the current neurocomputational understanding of mind for our philosophical convictions, and for our social, moral, legal, medical, and personal lives. Churchland's wry wit and skillful teaching style are evident throughout. He introduces the remarkable representational power of a single human brain, for instance, via a captivating brain/World-Trade-Tower TV screen analogy. "Who can be

watching this pixilated show?" Churchland queries; the answer is a provocative "no one." And he has included a folded stereoscopic viewer, attached to the inside back cover of the book, that readers can use to participate directly in several revealing experiments concerning stereo vision. A Bradford Book

An updated edition of a comprehensive study of the theory that mind exists, in some form, in all living and nonliving things. In Panpsychism in the West, the first comprehensive study of the subject, David Skrbina argues for the importance of panpsychism—the theory that mind exists, in some form, in all living and nonliving things—in consideration of the nature of consciousness and mind. Panpsychism, with its conception of mind as a general phenomenon of nature, uniquely links being and mind. More than a theory of mind, it is a meta-theory—a statement about theories of mind rather than a theory in itself. Panpsychism can parallel almost every current theory of mind; it simply holds that, no matter how one conceives of mind, such mind applies to all things. After a brief discussion of general issues surrounding philosophy of mind, Skrbina examines the panpsychist views of philosophers from the pre-Socratics to the post-structuralists. The original edition of Panpsychism in the West helped to reinvigorate a neglected and important aspect of philosophic thinking. This revised edition offers expanded and updated material that reflects the growth of panpsychism as a subdiscipline. It covers the problem of emergence of mind from a non-mental reality and the combination problem in greater detail. It offers expanded coverage of the pre-Socratics and Plato; a new section on Augustine; expanded discussions of Continental panpsychism, scientific arguments, Nietzsche, and Whitehead; and a new section on Russellian monism. With this edition, Panpsychism in the West will continue to be the standard work on the topic.

A further development of Tye's theory of phenomenal consciousness along with replies to common objections.

An argument that what makes consciousness wonderful is its intelligibility.

What is consciousness? How do physical processes in the brain give rise to the self-aware mind and to feelings as profoundly varied as love or hate, aesthetic pleasure or spiritual yearning? These questions today are among the most hotly debated issues among scientists and philosophers, and we have seen in recent years superb volumes by such eminent figures as Francis Crick, Daniel C. Dennett, Gerald Edelman, and Roger Penrose, all firing volleys in what has come to be called the consciousness wars. Now, in *The Conscious Mind*, philosopher David J. Chalmers offers a cogent analysis of this heated debate as he unveils a major new theory of consciousness, one that rejects the prevailing reductionist trend of science, while offering provocative insights into the relationship between mind and brain. Writing in a rigorous, thought-provoking style, the author takes us on a far-reaching tour through the philosophical ramifications of consciousness. Chalmers convincingly reveals how contemporary cognitive science and neurobiology have failed to explain how and why mental events emerge from physiological occurrences in the brain. He proposes instead that conscious experience must be understood in an entirely new light—as an irreducible entity (similar to such physical properties as time, mass, and space) that exists at a fundamental level and cannot be understood as the sum of its parts. And after suggesting some intriguing possibilities about the structure and laws of conscious experience, he details how his unique reinterpretation of the mind could be the focus of a new science. Throughout the book, Chalmers provides fascinating thought experiments that trenchantly illustrate his ideas. For example, in exploring the notion that consciousness could be experienced by machines as well as humans, Chalmers asks us to imagine a thinking brain in which neurons are slowly replaced by silicon chips that precisely duplicate their functions—as the neurons are replaced, will consciousness gradually fade away? The book also features thoughtful discussions of how the author's theories might be practically applied to subjects as diverse as artificial intelligence and the interpretation of quantum mechanics. All of us have pondered the nature and meaning of consciousness. Engaging and penetrating, *The*

Conscious Mind adds a fresh new perspective to the subject that is sure to spark debate about our understanding of the mind for years to come.

Since the 1970s the cognitive sciences have offered multidisciplinary ways of understanding the mind and cognition. The MIT Encyclopedia of the Cognitive Sciences (MITECS) is a landmark, comprehensive reference work that represents the methodological and theoretical diversity of this changing field. At the core of the encyclopedia are 471 concise entries, from Acquisition and Adaptationism to Wundt and X-bar Theory. Each article, written by a leading researcher in the field, provides an accessible introduction to an important concept in the cognitive sciences, as well as references or further readings. Six extended essays, which collectively serve as a roadmap to the articles, provide overviews of each of six major areas of cognitive science: Philosophy; Psychology; Neurosciences; Computational Intelligence; Linguistics and Language; and Culture, Cognition, and Evolution. For both students and researchers, MITECS will be an indispensable guide to the current state of the cognitive sciences.

Examining the role of implicit, unconscious thinking on reasoning, decision making, problem solving, creativity, and its neurocognitive basis, for a genuinely psychological conception of rationality. This volume contributes to a current debate within the psychology of thought that has wide implications for our ideas about creativity, decision making, and economic behavior. The essays focus on the role of implicit, unconscious thinking in creativity and problem solving, the interaction of intuition and analytic thinking, and the relationship between communicative heuristics and thought. The analyses move beyond the conventional conception of mind informed by extra-psychological theoretical models toward a genuinely psychological conception of rationality—a rationality no longer limited to conscious, explicit thought, but able to exploit the intentional implicit level. The contributors consider a new conception of human rationality that must cope with the uncertainty of the real world; the implications of abandoning the normative model of classic logic and adopting a probabilistic approach instead; the argumentative and linguistic aspects of reasoning; and the role of implicit thought in reasoning, creativity, and its neurological base. Contributors Maria Bagassi, Linden J. Ball, Jean Baratgin, Aron K. Barbey, Tilmann Betsch, Eric Billaut, Jean-François Bonnefon, Pierre Bonnier, Shira Elqayam, Keith Frankish, Gerd Gigerenzer, Ken Gilhooly, Denis Hilton, Anna Lang, Stefanie Lindow, Laura Macchi, Hugo Mercier, Giuseppe Mosconi, Ian R. Newman, Mike Oaksford, David Over, Guy Politzer, Johannes Ritter, Steven A. Sloman, Edward J. N. Stupple, Ron Sun, Nicole H. Theriault, Valerie A. Thompson, Emmanuel Trouche-Raymond, Riccardo Viale

An introduction to the mind–body problem, covering all the proposed solutions and offering a powerful new one.

Philosophers from Descartes to Kripke have struggled with the glittering prize of modern and contemporary philosophy: the mind-body problem. The brain is physical. If the mind is physical, we cannot see how. If we cannot see how the mind

is physical, we cannot see how it can interact with the body. And if the mind is not physical, it cannot interact with the body. Or so it seems. In this book the philosopher Jonathan Westphal examines the mind-body problem in detail, laying out the reasoning behind the solutions that have been offered in the past and presenting his own proposal. The sharp focus on the mind-body problem, a problem that is not about the self, or consciousness, or the soul, or anything other than the mind and the body, helps clarify both problem and solutions. Westphal outlines the history of the mind-body problem, beginning with Descartes. He describes mind-body dualism, which claims that the mind and the body are two different and separate things, nonphysical and physical, and he also examines physicalist theories of mind; antimaterialism, which proposes limits to physicalism and introduces the idea of qualia; and scientific theories of consciousness. Finally, Westphal examines the largely forgotten neutral monist theories of mind and body, held by Ernst Mach, William James, and Bertrand Russell, which attempt neither to extract mind from matter nor to dissolve matter into mind. Westphal proposes his own version of neutral monism. This version is unique among neutral monist theories in offering an account of mind-body interaction.

A neuroscientifically informed theory arguing that the core of qualitative conscious experience arises from the integration of sensory and cognitive modalities. Although science has made considerable progress in discovering the neural basis of cognitive processes, how consciousness arises remains elusive. In this book, Cyriel Pennartz analyzes which aspects of conscious experience can be peeled away to access its core: the “hardest” aspect, the relationship between brain processes and the subjective, qualitative nature of consciousness. Pennartz traces the problem back to its historical roots in the foundations of neuroscience and connects early ideas on sensory processing to contemporary computational neuroscience. What can we learn from neural network models, and where do they fall short in bridging the gap between neural processes and conscious experience? Do neural models of cognition resemble inanimate systems, and how can this help us define requirements for conscious processing in the brain? These questions underlie Pennartz's examination of the brain's anatomy and neurophysiology. The perspective of his account is not limited to visual perception but broadened to include other sensory modalities and their integration. Formulating a representational theory of the neural basis of consciousness, Pennartz outlines properties that complex structures must express to process information consciously. This theoretical framework is constructed using empirical findings from neuropsychology and neuroscience as well as such theoretical arguments as the Cuneiform Room and the Wall Street Banker. Positing that qualitative experience is a multimodal and multilevel phenomenon at its very roots, Pennartz places this body of theory in the wider context of mind-brain philosophy, examining implications for our thinking about animal and robot consciousness. Demystifying consciousness: how subjective experience can be explained by natural brain and evolutionary processes.

Consciousness is often considered a mystery. How can the seemingly immaterial experience of consciousness be explained by the material neurons of the brain? There seems to be an unbridgeable gap between understanding the brain as an objectively observed biological organ and accounting for the subjective experiences that come from the brain (and life processes). In this book, Todd Feinberg and Jon Mallatt attempt to demystify consciousness—to naturalize it, by explaining that the subjective, experiencing aspects of consciousness are created by natural brain processes that evolved in natural ways. Although subjective experience is unique in nature, they argue, it is not necessarily mysterious. We need not invoke the unknown or unknowable to explain its creation. Feinberg and Mallatt flesh out their theory of neurobiological naturalism (after John Searle's biological naturalism) that recognizes the many features that brains share with other living things, lists the neural features unique to conscious brains, and explains the subjective–objective barrier naturally. They investigate common neural features among the diverse groups of animals that have primary consciousness—the type of consciousness that experiences both sensations received from the world and affects such as emotions. They map the evolutionary development of consciousness and find an uninterrupted progression over time, without inserting any mysterious forces or exotic physics. Finally, bridging the previously unbridgeable, they show how subjective experience, although different from objective observation, can be naturally explained.

A comprehensive proposal for a conceptual framework for describing conscious experience in dreams, integrating philosophy of mind, sleep and dream research, and interdisciplinary consciousness studies. Dreams, conceived as conscious experience or phenomenal states during sleep, offer an important contrast condition for theories of consciousness and the self. Yet, although there is a wealth of empirical research on sleep and dreaming, its potential contribution to consciousness research and philosophy of mind is largely overlooked. This might be due, in part, to a lack of conceptual clarity and an underlying disagreement about the nature of the phenomenon of dreaming itself. In *Dreaming*, Jennifer Windt lays the groundwork for solving this problem. She develops a conceptual framework describing not only what it means to say that dreams are conscious experiences but also how to locate dreams relative to such concepts as perception, hallucination, and imagination, as well as thinking, knowledge, belief, deception, and self-consciousness. Arguing that a conceptual framework must be not only conceptually sound but also phenomenologically plausible and carefully informed by neuroscientific research, Windt integrates her review of philosophical work on dreaming, both historical and contemporary, with a survey of the most important empirical findings. This allows her to work toward a systematic and comprehensive new theoretical understanding of dreaming informed by a critical reading of contemporary research findings. Windt's account demonstrates that a philosophical analysis of the concept of dreaming can provide an important enrichment and extension to the conceptual repertoire of discussions of consciousness and the

self and raises new questions for future research.

The contributions to this book are original articles, representing a cross-section of current philosophical work on consciousness and thereby allowing students and readers from other disciplines to acquaint themselves with the very latest debate, so that they can then pursue their own research interests more effectively. The volume includes a bibliography on consciousness in philosophy, cognitive science and brain research, covering the last 25 years and consisting of over 1000 entries in 18 thematic sections, compiled by David Chalmers and Thomas Metzinger.

Michael Tye discusses the unity of consciousness and answers these important questions: What exactly is the unity of consciousness? Can a single person have a divided consciousness? What is a single person?.

Research on natural and artificial brains is proceeding at a rapid pace. However, the understanding of the essence of consciousness has changed slightly over the millennia, and only the last decade has brought some progress to the area. Scientific ideas emerged that the soul could be a product of the material body and that calculating machines could imitate brain processes. However, the authors of this book reject the previously common dualism—the view that the material and spiritual-psychic processes are separate and require a completely different substance as their foundation. *Reductive Model of the Conscious Mind* is a forward-thinking book wherein the authors identify processes that are the essence of conscious thinking and place them in the imagined, simplified structure of cells able to memorize and transmit information in the form of impulses, which they call neurons. The purpose of the study is to explain the essence of consciousness to the degree of development of natural sciences, because only the latter can find a way to embed the concept of the conscious mind in material brains. The book is divided into three parts. Part 1 works to convince readers that the emergence of consciousness does not require detailed knowledge of the structure and morphology of the brain, with the exception of some specific properties of the neural network structure that the authors attempt to point out. Part 2 proves that the biological structure of many natural brains fulfills the necessary conditions for consciousness and intelligent thinking. Similarly, Part 3 shows the ways in which artificial creatures imitating natural brains can meet these conditions, which gives great hopes for building artificially intelligent beings endowed with consciousness. Covering topics that include cognitive architecture, the embodied mind, and machine learning, this book is ideal for cognitive scientists, philosophers of mind, neuroscientists, psychologists, researchers, academicians, and advanced-level students. The book can also help to focus the research of linguists, neurologists, and biophysicists on the biophysical basis of postulated information processing into knowledge structures.

Physicalism is the idea that if everything that goes on is physical, our consciousness and feelings must also be physical. This book defends a view called antecedent physicalism.

A philosopher offers a non-physicalist theory of mind, revisiting and defending a key doctrine of emergentism. The presence of sentience in a basically material reality is among the mysteries of existence. Many philosophers of mind argue that conscious states and properties are nothing beyond the matter that brings them about. Finding these arguments less than satisfactory, Gerald Vision offers a nonphysicalist theory of mind. Revisiting and defending a key doctrine of the once widely accepted school of philosophy known as emergentism, Vision proposes that conscious states are emergents, although they depend for their existence on their material bases. Although many previous emergentist theories have been decisively undermined, Vision argues that emergent options are still viable on some issues. In *Re-Emergence* he explores the question of conscious properties arising from brute, unthinking matter, making the case that there is no equally plausible non-emergent alternative. Vision defends emergentism even while conceding that conscious properties and states are realized by or strongly supervene on the physical. He argues, however, that conscious properties cannot be reduced to, identified with, or given the right kind of materialist explanation in terms of the physical reality on which they depend. Rather than use emergentism simply to assail the current physicalist orthodoxy, Vision views emergentism as a contribution to understanding conscious aspects. After describing and defending his version of emergentism, Vision reviews several varieties of physicalism and near-physicalism, finding that his emergent theory does a better job of coming to grips with these phenomena.

An updated edition of an authoritative text showing the relevance for philosophy of mind of theoretical and experimental results in the natural sciences. In *Matter and Consciousness*, Paul Churchland presents a concise and contemporary overview of the philosophical issues surrounding the mind and explains the main theories and philosophical positions that have been proposed to solve them. Making the case for the relevance of theoretical and experimental results in neuroscience, cognitive science, and artificial intelligence for the philosophy of mind, Churchland reviews current developments in the cognitive sciences and offers a clear and accessible account of the connections to philosophy of mind. For this third edition, the text has been updated and revised throughout. The changes range from references to the iPhone's "Siri" to expanded discussions of the work of such contemporary philosophers as David Chalmers, John Searle, and Thomas Nagel. Churchland describes new research in evolution, genetics, and visual neuroscience, among other areas, arguing that the philosophical significance of these new findings lies in the support they tend to give to the reductive and eliminative versions of materialism. *Matter and Consciousness*, written by the most distinguished theorist and commentator in the field, offers an authoritative summary and sourcebook for issues in philosophy of mind. It is suitable for use as an introductory undergraduate text.

Owen Flanagan argues that we are on the way to understanding consciousness and its place in the natural order.

A philosopher argues that we know little about our own inner lives. Do you dream in color? If you answer Yes, how can you be sure? Before you recount your vivid memory of a dream featuring all the colors of the rainbow, consider that in the 1950s researchers found that most people reported dreaming in black and white. In the 1960s, when most movies were in color and more people had color television sets, the vast majority of reported dreams contained color. The most likely explanation for this, according to the philosopher Eric Schwitzgebel, is not that exposure to black-and-white media made people misremember their dreams. It is that we simply don't know whether or not we dream in color. In *Perplexities of Consciousness*, Schwitzgebel examines various aspects of inner life (dreams, mental imagery, emotions, and other subjective phenomena) and argues that we know very little about our stream of conscious experience. Drawing broadly from historical and recent philosophy and psychology to examine such topics as visual perspective, and the unreliability of introspection, Schwitzgebel finds us singularly inept in our judgments about conscious experience.

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