

BRITISH ROMANTICISM  
AND THE SCIENCE OF  
THE MIND

ALAN RICHARDSON

*Boston College*



CAMBRIDGE  
UNIVERSITY PRESS

PUBLISHED BY THE PRESS SYNDICATE OF THE UNIVERSITY OF CAMBRIDGE  
The Pitt Building, Trumpington Street, Cambridge, United Kingdom

CAMBRIDGE UNIVERSITY PRESS  
The Edinburgh Building, Cambridge CB2 2RU, UK  
40 West 20th Street, New York, NY 10011-4211, USA  
10 Stamford Road, Oakleigh, VIC 3166, Australia  
Ruiz de Alarcón 13, 28014 Madrid, Spain  
Dock House, The Waterfront, Cape Town 8001, South Africa  
<http://www.cambridge.org>

© Alan Richardson 2001

This book is in copyright. Subject to statutory exception  
and to the provisions of relevant collective licensing agreements,  
no reproduction of any part may take place without  
the written permission of Cambridge University Press.

First published 2001

Printed in the United Kingdom at the University Press, Cambridge

*Typeface* Monotype Baskerville 11/12.5 *System* QuarkXPress™ [SE]

*A catalogue record for this book is available from the British Library*

*Library of Congress Cataloguing in Publication data*

Richardson, Alan, 1955–  
British Romanticism and the science of the mind / Alan Richardson.  
p. cm. – (Cambridge studies in Romanticism ; 47)  
Includes bibliographical references and index.

ISBN 0 521 78191 4 (hardback)

1. English literature – 19th century – History and criticism.
  2. Literature and science – Great Britain – History – 19th century.
  3. Brain – Research – Great Britain – History – 19th century.
  4. Neurosciences – Great Britain – History – 19th century.
  5. Romanticism – Great Britain.
  6. Mind and body in literature.
  7. Psychology in literature.
- i. Title. ii. Series.

PR468.s34 R53 2001  
820.9'356 – dc21 00-050356

ISBN 0 521 78191 4 hardback

## Contents

<i>List of illustrations</i>	page xii
<i>Preface</i>	xiii
<i>List of abbreviations</i>	xix
1. Introduction: neural Romanticism	i
2. Coleridge and the new unconscious	39
3. A beating mind: Wordsworth's poetics and the "science of feelings"	66
4. Of heartache and head injury: minds, brains, and the subject of <i>Persuasion</i>	93
5. Keats and the glories of the brain	114
6. Embodied universalism, Romantic discourse, and the anthropological imagination	151
7. Epilogue	181
<i>Notes</i>	186
<i>Bibliography</i>	219
<i>Index</i>	237

## *Illustrations*

Charles Bell, <i>Anatomy of the Brain, Explained in a Series of Engravings</i> (London, 1802), plate I.	<i>frontispiece</i>
1 F. J. Gall and J. G. Spurzheim, <i>Atlas</i> accompanying the “large work,” <i>Anatomie et Physiologie du Système nerveux en général</i> (Paris, 1810), plate IV (ventral surface).	page 20
2 Gall and Spurzheim, <i>Atlas</i> , plate VI (midline dissection).	22
3 Bell, <i>Anatomy</i> , plate VII (sagittal view).	30
4 Gall and Spurzheim, <i>Atlas</i> , plate XI (median section).	42
5 Bell, “On the Nerves,” <i>Philosophical Transactions</i> 111 (1821), plate XXXI (the facial nerves).	78
6 Gall and Spurzheim, <i>Atlas</i> , plate IX (superior surface – Keats’s “globed brain”).	98
7 Bell, “Of the Nerves which associate the muscles of the Chest, in the actions of breathing, speaking, and expression,” <i>Philosophical Transactions</i> 112 (1822), plate XXX.	115
8 Gall and Spurzheim, <i>Atlas</i> , plate V (horizontal section, showing convolutions, “arbor vitae,” and pyramidal tract).	123
9 Spurzheim, “Frontispiece” to <i>Phrenology, or, The Doctrine of the Mind; and of the Relations Between Its Manifestations and the Body</i> (1825; Boston, 1832).	155

## CHAPTER ONE

### *Introduction: neural Romanticism*

This is a book about Romantic literary culture and the brain in Great Britain, from the 1790s to around 1830. It argues both that the pioneering neuroscience of the era manifests a “Romantic” character, and that literary Romanticism intersects in numerous and significant ways with the physiological psychology of the time. It aims, in short, to give the brain a central place in the history of the Romantic mind. But what, you may already be wondering, could the brain have to do with British Romanticism? To look at the relevant literary and cultural histories, not much. Fifty years ago one could publish a book reducing the psychological thought of the era to “the psychology of the association of ideas,” Hartleyan associationism stripped of the neural substrate Hartley had welded to it.<sup>1</sup> Things are not much different now, although a half-century of psychoanalytically inspired literary analysis has piqued scholarly interest in Mesmerism and other Romantic-era anticipations of depth psychology.<sup>2</sup> Most work on the Romantic mind continues to be informed by a disembodied version of associationism, by psychoanalysis, or by epistemological issues that link Romantic literary figures to a philosophical tradition running from German idealism to phenomenology and its deconstruction.<sup>3</sup> The Romantic brain, however, has been left almost wholly out of account.

The history of science and medicine tells quite a different story. Historians of neuroscience, of biological psychology, and of neurology concur in viewing the late eighteenth and early nineteenth centuries as a crucial period for the emergence of an unprecedented series of hypotheses and discoveries concerning the brain and nervous system.<sup>4</sup> Only in the Romantic era, in fact, was the brain definitively established as the organ of thought, although this seemingly inevitable notion would continue to be challenged on religious and other grounds well into the 1820s. Equally important – and controversial – developments included the rise of comparative neuroanatomy, the framing of adaptationist and

functionalist analyses of specific features of the mind and brain, a fundamental redefinition of the brain as an assemblage of parts or “organs” rather than an undifferentiated whole, and anti-dualistic psychological models founded on the mind’s embodiment, placing novel emphases on automatic and unconscious mental processes and on body–mind interaction. Sociological approaches to the history of brain science have only intensified interest in the period, detailing how widely disseminated, politically charged, and ideologically suspect were the new materialist and naturalistic models of mind in a period of revolution and reaction, when to challenge orthodox notions of the mind and soul meant implicitly to challenge the social order.<sup>5</sup> If the Romantic period can indeed be seen as an age of revolution, its iconoclastic brain science played a major role in the ideological ferment of the time.

Students of Romantic literature and culture have much to gain by looking to the era’s revolutionary science of the mind, however underappreciated it has been to date. To begin with, no account of Romantic subjectivity can be complete without noting how contemporary understandings of psychology were either grounded in, deeply marked by, or tacitly (when not explicitly) opposed to the brain-based models of mind being developed concurrently in the medical sciences. Moreover, a whole range of topics and concerns typically associated with Romanticism – the relation of mind to body, the relation of human beings to the natural world, the new emphasis on human difference and individuality, the environmental role in shaping mind and behavior, the status of various materialist ideologies, even such staples as sensibility and the creative imagination – reveal unsuspected facets and interconnections when placed in the context of contemporary work on the brain and nerves. Exploring some of the many connections between the brain science and literary culture of the period in detail constitutes the main task of this book. This chapter will sketch out some of the more important figures and developments in Romantic-era brain science, particularly those most relevant to the literary culture of the time, and pose some fundamental links and working assumptions along the way.

#### THE RETURN OF THE BRAIN-MIND

It is no coincidence that the history of neuroscience has rediscovered the Romantic era at a time when biological approaches to psychology and materialist models of the mind have seen a major revival, from the “cognitive revolution” beginning in the 1950s to the recent “decade of the

brain.” A figure like F. J. Gall seems a good deal less quaint, his thought a good deal more intriguing, once a prominent cognitive scientist has proclaimed an “honored” place for Gall in the history of psychology – a sentiment that has become almost standard in popular expositions of recent neuroscience.<sup>6</sup> This is not to suggest, of course, that historians of medicine and psychology have been remaking the early history of brain science in the image of current research. The best studies exhibit an exemplary wariness of false parallels, forced connections, misplaced emphases, and imaginary lines of descent between then and now. But recent work on the brain has been instrumental in throwing Romantic-era developments into new relief and in restoring a certain cultural weight – one certainly felt widely at the time – to figures and ideas that had long seemed of antiquarian interest at best. As Anne Harrington has written, a “lively interest in the sciences of mind and brain in one’s own era” does not license the use of history as a “vehicle to hunt for the present in an earlier age,” but it may legitimately inspire a renewed interest in the “cognitive goals” of an earlier era’s scientific culture.<sup>7</sup>

In relation to the Romantic era, recent work on the brain and mind can help scholars to perceive distinctions, register nuances, and appreciate moral and philosophical repercussions that might have seemed non-existent, elusive, or simply not worth pursuing a few decades ago. It can also help reveal how certain issues and questions hung together for Romantic-era writers, but not because these issues and questions are identical to those that have come to occupy cognitive scientists at the turn of the twentieth century. How could they be? Rather, the connections between, say, adaptationist accounts of mind and the hypothesis of a modular brain, or anti-dualistic cognitive theories and an emphasis on the unconscious and emotive aspects of rational thought, have returned in a different but comparable manner. I have not hesitated to point to such parallels and recurrences when they seem needful to sharpen the lineaments or convey the richness of an issue that might otherwise remain murky or undervalued. Indeed, I have become convinced that informed comparison with models, findings, and controversies from the present are needed to help bring certain Romantic-era developments and debates into focus. It is less a matter of insisting on resemblance than of listening for resonance, and allowing that resonance to help reopen avenues for scholarly investigation that have long remained untrodden.

Let me illustrate by quoting from a letter that Coleridge sent to Godwin in September of 1800:

I wish you to write a book on the power of words, and the process by which human feelings form affinities with them – in short, I wish you to *philosophize* Horne Tooke’s System, and to solve the great Questions – whether there be reason to hold, that an action bearing all the *semblance* of pre-designing Consciousness may yet be simply organic, & whether a *series* of such actions are possible – and close on the heels of this question would follow the old “Is Logic the *Essence* of Thinking?” in other words – is *Thinking* impossible without arbitrary signs? & – how far is the word “arbitrary” a misnomer? Are not words & c part and germinations of the Plant? And what is the Law of their Growth? – In something of this order I would endeavor to destroy the old antithesis of *Words* and *Things*, elevating, as it were, words into Things, & living Things too. (*STCL* 1: 625–26)

Already “often-quoted” when William Keach analyzed it so tellingly in his essay “Words Are Things,” Coleridge’s letter has informed a great deal of important speculation on Romantic theories of language and on the difficulties of Coleridge’s various theories of mind.<sup>8</sup> Until a few years ago, however, it remained difficult to fully appreciate the important links between the quite astounding series of tasks blithely set by Coleridge for Godwin and the “great Questions” being posed by the brain scientists of their day – questions that have again become prominent within the cognitive neuroscience of the past decade. Can a conscious act of volition be reduced, as the Churchlands, Crick, and others have argued, to organic brain activity at the neuronal level, and is it possible to theorize and empirically validate a working model of consciousness along such lines? Is the mind, as first-generation cognitive scientists proposed, best understood as a computational device and thinking as the processing of arbitrary symbolic representations? Is it, as cognitive linguists in both the Chomskian and Lakoffian traditions have suggested, misleading to call linguistic signs entirely “arbitrary”? What do models like Edelman’s “neuronal group selection” theory tell us about how words and conceptual categories might be reconceived along organic and dynamic lines, and can neuroscience yield us rules for their development? And, to return to Coleridge’s initial question, what does work like that of the Damasio on the role of the limbic system in linguistic production and comprehension reveal about the process by which human feelings form affinities with words?

At the risk of anachronism, I have tried to provoke a new sense of the interpretive possibilities for this letter, and by extension for Coleridge’s thought on the mind and language more broadly, by updating his provocative series of questions in the language of recent neuroscience. My point is not to claim Coleridge as a poet-prophet of late twentieth-



century work on the brain and mind, but rather to elicit several initial hunches from the consonance we can hear between his questions and ours. One is that these questions are linked for Coleridge by an “organic” or embodied notion of mind, however fitfully or anxiously he may have entertained it.<sup>9</sup> A second is that Coleridge here, as elsewhere, is more deeply engaged with the brain science of his era than has generally been acknowledged and is in this way representative of any number of writers we now call “Romantic.” A third, perhaps the most important, is that noting how questions of language, volition, logic, organic development, and non-“arbitrary” elements of linguistic and cultural activity have become linked in recent cognitive science can help us to follow comparable links in the nascent psychology of Coleridge’s day, while taking care to avoid simply conflating his era’s science with our own. Language, free will, the connections among ideas, the organic development of the mind both in the human species and in each human individual, and the constraints that a shared physiology and anatomy might place on linguistic difference: these were all profoundly related issues for various Romantic-era thinkers. They had become closely intertwined through a whole set of postulates, theories, and research agendas that came to prominence in the work of a handful of influential writers on the brain-mind in the late eighteenth and early nineteenth centuries who collectively established the precedent for a biological psychology.

#### ROMANTICISM IN A NEUROSCIENTIFIC CONTEXT

The group of brain scientists whose work challenged and helped transform the psychological thinking of their time includes, most prominently, F. J. Gall in Austria, Pierre-Jean-George Cabanis in France, and Erasmus Darwin and Charles Bell in England. As particularly important popularizers of a brain-based psychology (especially for Great Britain) Sir William Lawrence, J. G. Spurzheim (Gall’s errant disciple), and George Combe also demand new attention. And certain postulates and lines of investigation had been established earlier in the eighteenth century by David Hartley, Denis Diderot, Julien Offray de La Mettrie, and J. G. von Herder, among others. Significantly, all of the writers just mentioned, with the exception of Herder and Diderot, were medical doctors; all were committed to the biological account of the mind and its functioning that was becoming standard in medical education.<sup>10</sup> Although anything but a coherent movement – the list includes detractors as well as advocates of phrenology, vitalists as well as materialists,

avowed skeptics and devout Christians – these doctors, philosophers, and proto-psychologists together altered the terms and changed the terrain for theorizing about the mind. Their work not only provided new directions for medical research, but helped fundamentally to recast the great questions on the mind in terms of new theoretical and scientific work on the brain.

From their varied writings one can abstract not a consensus but a constellation of roughly affiliated theoretical positions, each held by most of the Romantic-era figures, a few by all of them, but the whole set by no one thinker. There is enough overlap, however, that one can meaningfully group them together under the rubric of “Romantic psychologies,” a shorthand expression I will use at times in relation to Darwin, Gall, Cabanis, Bell, and their associates, built though it is from two terms rarely used in their modern sense at the time.<sup>11</sup> All of them agree in locating the mind in the brain, the “cerebral organ” or organ of thought. They all emphasize that the mind is an active processor, rather than passive register, of experience, holding this in common with German idealist philosophy and with Scottish “common sense” psychology but uniquely seeking to elucidate the active mind in neurological terms.<sup>12</sup> Most posit the constant activity of the brain, even during sleep. They also share a biological rather than mechanistic conception of physiological and mental functioning, here (as in their active conception of mind) departing from Hartley and Locke (another doctor–philosopher important in the eighteenth-century background). They all stress the complexity of the brain, often envisioning it as a collection of “organs,” and exhibit a cautious fascination with the role of electricity in neural transmission. Other common assumptions include the continuity between human beings and other animals (with a corresponding penchant for comparative anatomy and physiology), an ecological approach to studying humans in their natural and social environments, and a ruling interest in human development. This last broadens into a concern with the development of the human species, often giving rise to evolutionary or proto-evolutionary speculation and always involving adaptationist explanations for anatomical features and psychological functions, which in turn inspire a novel biological understanding of human universals. All develop anti-dualistic accounts of the brain-mind, though Bell does so in his own pious fashion, and all but Bell were attacked as “materialists,” though only Lawrence willingly accepted the charge – until forced to recant.

A series of stunning scientific developments helped to fuel speculation on the brain and to inspire widespread fascination with the new biolog-

ical accounts of mind. Most important in establishing the new climate was Galvani's demonstration of "animal electricity," which he described in print first in 1791.<sup>13</sup> Although the criticism Galvani received from Volta kept fellow scientists wary, it also kept his theory of electrical nerve transmission, with its far-reaching implications for biological psychologies, in the public mind. As John F. W. Herschel wrote in his popular Romantic-era exposition of science, with the "principle once established, that there exists in the animal economy a power of determining the development of electric excitement, capable of being transmitted along the nerves . . . it became an easy step after that to refer the origin of muscular motion in the living brain to a similar cause; and look to the brain, a wonderfully constituted organ, for which no mode of action possessing the least plausibility had ever been devised, as the source of the required electrical power."<sup>14</sup> Spurzheim's flair for publicity – including his popular neuroanatomy demonstrations – helped disseminate a second important development, the pioneering brain dissection techniques that he and Gall had perfected in the 1780s and 1790s. Their anatomical methods and discoveries won praise even from their critics, revealing neural structures in unprecedented clarity and complexity and eventually finding their way into Hazlitt's art criticism and Keats's "Ode to Psyche." A series of pathbreaking neurological discoveries included Soemmerring's tracing of the cranial nerves in 1778, Vicq D'Azir's description of the cerebral convolutions in 1786, and the roughly contemporaneous discovery, by Bell in England and Magendie in France, of the basic distinction between sensory and motor nerves, first described by Bell in a privately printed work of 1811. Neurological research and speculation was carried out in the context of a distinctively international scientific culture, one that seeped readily into the philosophical and literary discourses of the age. Not only national borders, but the equally conventional boundaries between the sciences and the humanities, between legitimate and "pseudo" science, and between intellectual and popular culture all need to be bracketed in order to develop a feeling for the intellectual climate of the Romantic era. It was a time when poets (like Coleridge) consorted with laboratory scientists and when philosophical doctors (like Darwin) gave point to their scientific theories in verse, when phrenology and mesmerism gained adherents across the medical community, when Bell could work out his physiological psychology in a series of lectures to London artists, scientists could perform as showmen, and Galvani's experiments with "animal electricity" could be replicated by an eager public "wherever frogs were to be found."<sup>15</sup>

In suggesting that the cultural tendencies we associate with “Romanticism” bear a significant relation to speculation on the central nervous system, I am picking up the thread of an argument posed some years ago by G. S. Rousseau. In “Nerves, Spirits, and Fibres: Towards Defining the Origins of Sensibility,” Rousseau located a paradigm shift in European accounts of mind – a “revolution in sensibility” – set in motion by the work of the seventeenth-century physiologist Thomas Willis, the “first scientist clearly and loudly to posit that the seat of the soul is strictly limited to the brain, nowhere else.”<sup>16</sup> This “brain-nerve revolution,” with its daring reduction of the “totality of human feeling” to “motion in the nerves,” led, via the sensationalism of Locke (Willis’s student at Oxford) and an ensuing succession of “cults of sensibility,” at last to “that most puzzling of modern enigmas, Romanticism,” now to be reconsidered in terms of its “specific neurological legacy.”<sup>17</sup> Although scholars of Romanticism did not rush to take up his challenge, recent criticism has circled back to some of the connections Rousseau posited some thirty years ago. Isobel Armstrong, for example, suggests that the “speculations on the nervous system” of early nineteenth-century physiologists share with certain texts by Romantic-era women poets a model of sensibility as “action in the body” – “We must feel to think” as Letitia Landon puts it.<sup>18</sup> And Jerome McGann, in *The Poetics of Sensibility*, has described how writers from Locke to Priestley, from Montagu to Robinson, register in increasingly dramatic ways the “stakes involved in overturning the traditional understanding of the relations of mind and body.”<sup>19</sup> Romantic-era developments in brain science, however, greatly intensified the revolution in understanding mind–body relations outlined by Rousseau, bringing Romantic writers into a productive (though not always explicit) creative and critical dialogue with the neuroscientific thinking of their time. Knowledge of these developments was readily available not only to literary figures like Coleridge (with his scientific connections), Joanna Baillie (born into a celebrated medical family), and John Keats (trained as a surgeon), but to a surprisingly wide and diverse audience. Male and female writers alike, of a broad stripe of ideological and philosophical allegiances, can often be found making common cause with contemporary speculation on the brain and nerves. Particularly in its association with materialism, however, brain science also inspired a good deal of hostility and anxiety, remaining open throughout the period not only to the embrace of literary writers but to their attacks as well.

A CHAOS OF ASSOCIATION: COLERIDGE, HARTLEY, AND THE  
CORPOREAL MIND

When Coleridge sets out to discredit a brain-based account of mind in the *Biographia Literaria*, he chooses as his foil not Gall or Darwin – though he had studied the ideas of both – but Hartley. This fits the narrative trajectory of Coleridge’s literary autobiography nicely: Hartley’s early attempt (often considered the first) to frame a physiological psychology is presented as a youthful intellectual infatuation that must be left behind for Coleridge’s mature philosophy of mind to develop.<sup>20</sup> The extended attack on Hartley serves the polemical aims of the book just as well, however, by allowing Coleridge to evade the full weight of the challenge posed by contemporary biological accounts of mind while using the weaknesses of Hartley’s dated materialist psychology to discredit any such speculation in advance. Hartley’s theory of mind, and Coleridge’s critique, together convey a good sense of the intellectual ground that Romantic psychologies would occupy, some of the major challenges they had to overcome, and the ideological stakes they would raise. In the *Observations* (1749) Hartley attempted no less than to explode post-Cartesian dualism and reground philosophy of mind in the brain and nervous system. Building on sensationalist and associationist principles derived from Hobbes and Locke, he attempted to reduce all mental functioning to the single principle of association. Drawing on hints in the second edition of Newton’s *Principia* and in the works of early neurologists like Willis, he simultaneously proposed a material process of “vibrations” in the brain and nerves that undergirded the workings of association and provided a physiological explanation for psychological phenomena. “Motions” from the external environment, Hartley proposed, bombard the senses in such a way as to cause vibrations, which run along the “medullary substance” of the nerves, solid but porous cords with “infinitesimally small particles” of Newtonian ether diffused throughout. These vibrations or oscillations then trigger corresponding tiny vibrations (“vibratiuncles”) in the medullary substance of the brain. (By “medullary substance” Hartley means what is now called the “white” or axonal matter of the brain, a common usage throughout the period.) Vibratiuncles could persist in the brain as “dispositions,” particularly if reinforced directly (by repeated exposure to the sensory data) or indirectly (by association).<sup>21</sup>

Although Hartley claimed both that his theory could be reconciled with Scriptural authority and that the doctrine of vibrations was

ultimately expendable (viii, 416), he nevertheless speaks throughout the work of the “corporeal” nature of thought and even posits a “material” soul, pointing out that there is no necessary connection between the soul’s immortality and its immateriality (511–12). Like Diderot, La Mettrie, and other eighteenth-century thinkers then widely considered “materialists,” Hartley argues for the material embodiment of the mind in the brain, the “Organ of Organs” (62), pointing to the mental effects of intoxicating substances like alcohol and opium, the relation between neurological insults (like concussion) and disrupted mental functioning, and citing more exotic phenomena like phantom limb pains that seemed to demand a brain-based theory of mind (7–9, 32, 374). He anticipates the anti-dualistic psychology of the Romantic era in stressing the importance of unconscious mental functioning and hinting at the salient role of “internal” sensations (sensations from within the body) in mental life, both areas all but entirely neglected within earlier accounts of associationism developed by Hobbes and Locke. Hartley touches as well on the lessons to be learned from visual illusions (9–10) and the continuities among the “nervous Systems of Animals of all Kinds,” including human beings (404), topics that will become standard in expositions of brain science in the Romantic era (and in the present one). Throughout Hartley advances what would now be termed a “medical model” psychology, one aimed at securing the “common Consent of Physicians and Philosophers” (33).

Coleridge had read the *Observations* in the 1790s with great enthusiasm, naming his first son after Hartley and claiming (in a letter to Southey) to “go farther than Hartley and believe the corporeality of *thought* – namely, that it is motion” (*STCL* 1: 137). This was by no means an idiosyncratic stance at the time, especially among the radical set that Coleridge ran with. Coleridge’s friend John Thelwall, for example, gave a lecture in 1793 on “The Origin of Sensation,” purporting to explain the “phenomena of mind . . . upon principles *purely Physical*.”<sup>22</sup> Priestley, in his 1775 and 1790 expositions of Hartley’s thought, had jettisoned the vibration theory not because he opposed materialist accounts of mind but because he thought a better one was at hand, with the emergent dynamic conception of matter and the new physiology together suggesting a more powerful model of thought as a “property of the *nervous system*, or rather of the *brain*.”<sup>23</sup> Galvani’s electrophysiological experiments had suggested a credible model of rapid neural transmission much superior to Hartley’s vague sense of (possibly electric) vibrations and oscillations, and Darwin was updating key notions derived from Hartley and supple-

menting them with the new physiological research and biological thinking of the time in *Zoonomia* (1794–96).<sup>24</sup> Coleridge was in good company in the 1790s in finding Hartley to have been right in principle but held back by the limitations of his era's science. Within a few years, however, Coleridge would begin turning from Locke and Hartley and, by 1817 in the *Biographia*, would note with obvious satisfaction that "It is fashionable to smile at Hartley's vibrations and vibratiuncles," with only the vaguest reference to the more recent developments that might have been used to buttress and update his belief in the corporeality of mind (*BL* 1: 110). Hartley's theory, with its canny anticipation of Donald Hebb's "reverberating cell-assemblies" in "vibrations" and of "long-term potentiation" in its brain "dispositions" seems less risible today, but for Coleridge in 1817 the notion of a "disposition in a material nerve" had become patently "absurd" (*BL* 1: 109).<sup>25</sup> At best it was purely "hypothetical" (*BL* 1: 106) – a charge posed by Thomas Reid as well, who noted that the "infinitesimal particles of the brain and nerves" described by Hartley had to be taken on faith, remaining well out of reach of the limited microscopes then available.<sup>26</sup>

Some of Coleridge's criticisms hit harder, and pointed to the same impasses in Hartley's theory that his Romantic-era heirs were attempting to move beyond. Hartley's system suffered, first, from the "passive" and mechanical approach to perception and other mental acts that limited associationist accounts generally; Hartley's formulations implied a "senseless and passive memory," a cognitive process characterized by "mere lawlessness."<sup>27</sup> Because Hartley, in Coleridge's view, saw the brain as a complex but functionally undifferentiated organ (an understandable but somewhat misleading reading of his theory), Coleridge argued that it also would have no way of organizing perceptions and memories, no way of successfully functioning, but would instead be characterized by a "phantasmal chaos of association" (*BL* 1: 111, 116).<sup>28</sup> Because his commitment to sensationalism left Hartley with no recourse to innate faculties, it could not account for functions like willing and reasoning, neither of which, Coleridge claimed, could be generated from a passive, mechanical, and insufficiently differentiated process of association (*BL* 1: 128). These were fundamental flaws that would reduce mental functioning to a "blind mechanism" and leave the mind devoid of "distinct powers" (*BL* 1: 116).

Coleridge also condemned Hartley on moral and ideological grounds, advancing a series of related criticisms that would recur throughout the Romantic period in attacks on Gall, on Lawrence, and on brain-based

psychology generally. For all Hartley's avowed (and undoubtedly sincere) piety, his system, in Coleridge's view, left no necessary function or identifiable locus for the soul, reducing it to a "mere ens logicum" and failing to account for the "imperishable" nature of human thought (*BL* 1: 114, 117). In its mechanistic and materialistic account of mental life, it left no room for the intervention of an "infinite spirit, an intelligent and holy will," no appeal to divine agency (*BL* 1: 120). Nor did it provide a convincing account of human agency or even of stable identity, implying that the conscious will would be constantly overridden by blindly working unconscious processes and ultimately exposing the conscious self as an illusion, the "poor worthless I" stripped down to physical relations of "*extension, motion, degrees of velocity*," and their "*copies*" in the brain (*BL* 1: 90, 119). One readily begins to see how high indeed were the stakes of neuroscientific speculation in the era: no less than the existence of the soul, the necessity of God, and the integrity of the self were in question. This is the ground that Coleridge's theory of imagination would set out to reclaim, implicitly taking up the challenge posed by a resurgent physiological tradition in psychology building upon Hartley but moving beyond his mechanistic approach.

#### ERASMUS DARWIN AND THE ORGANIC MIND

On at least one major issue, Coleridge could have made common cause with the innovative brain science of his own time: the fundamental postulate of an "active" mind that "by perceiving, creates" the phenomenal world around it (*BL* 1: 118). Darwin had in fact advanced such a conception in 1794, meeting one of the major objections to Hartley's brain-based, associationist psychology head on. In the first volume of *Zoonomia*, dedicated to "all those who study the Operations of the Mind as a Science," Darwin begins by exhibiting the brain as an "active organ," functionally differentiated through its complex links with the various "sensory organs," internal as well as external (*Z* 1: 16). He demonstrates the active character of perception much as do popular works on neuroscience today, by confronting the reader with a series of visual illusions (inserting colored plates into the text for this purpose) that together suggest how much active – and unconscious – processing must take place for the brain to produce the images we consciously see. In addition to providing the means for a series of visual afterimage effects ("ocular spectra"), he invites the reader to experience a related illusion by spinning around until dizzy, and then noticing how the "spectra of the



ambient objects continue to present themselves in rotation” (Z 1: 20) due to the brain’s briefly continuing efforts to compensate for the body’s movement. Wordsworth, another proponent of the active mind, might well have found something familiar in these perceptual experiments when he, like Coleridge, read *Zoonomia* in the 1790s. He describes a related practice of his own in *The Prelude*, when he would skate rapidly and then suddenly stop short to watch the “sweeping” scenery on either side continue to “wheel” by, “even as if the earth had rolled / With visible motion her diurnal round” (1: 481–86). Such self-experiments, along with more exotic phenomena like phantom limb pains, demonstrate for Darwin that “all our ideas are excited in the brain, and not in the organs of the sense” (Z 1: 28), although our sense organs are crucial in gathering and translating sensory data into cognizable information. Because the brain receives not “mechanical” impressions (as in Hartley and earlier associationist psychology) but actively processes “animal motions or configurations of our organs of sense,” it is subject neither to the “lawlessness” nor the “chaos of association” that Coleridge saw as inherent in Hartley’s theory. Percepts do not flow directly into sensory channels to be automatically processed, but are gathered and translated into various kinds of “sensory motions” (neural impulses) by highly specialized organs to be selected and arranged and further transformed by a dynamic and functionally designed brain.

The brain is intimately connected not only to the sensory organs, however, but to the body as a whole via the nervous system. Darwin sees the mind as fundamentally embodied, a “*sensorium*” denoting “not only the medullary part of the brain, spinal marrow, nerves, organs of sense, and of the muscles; but also at the same time that living principle, or spirit of animation, which resides throughout the body, without being cognizable to our senses, except by its effects” (Z 1: 10). This “spirit of animation” is made not of transcendental mind-stuff but of “matter of a finer kind” that we “possess in common with brutes” (Z 1: 109), analogous to electricity or magnetism and perhaps an “electric fluid” as Galvani’s researches had suggested (Z 1: 64, 10).<sup>29</sup> Indivisible from the sensorium through which it flows, the spirit of animation is a bodily energy expressed in the four primary “sensorial powers” of irritation, sensation, volition, and association. Its materiality, its habitation in the brain and nervous system, and its functional differentiation (demonstrated by visual illusions and the like) keyed to various bodily organs breaks down the distinction between body and mind. Ideas are not immaterial, immutable entities (as Coleridge insists in the *Biographia*) but

“animal motions of the organs of sense” processed in the brain. Because mind and body interpenetrate one another, ideas are in turn manifested bodily, as in heart palpitations from fear, salivating at the sight of food, or the “glow of skin in those who are ashamed” (Z I: 23, 39).

This intimate connection between the brain-mind and organs such as the stomach, the heart, and the skin works in both directions. The mind receives “sensory motions” not only from the organs attuned to the external world, but from organs located *within* the body as well. Darwin’s discussion of the senses therefore includes the internal senses or “appetites”: hunger, thirst, the “want of fresh Air, animal Love, and the Suckling of children” (Z I: 124–25). The behaviors generated by these “appetites” are not instinctive, but rather a matter of habit (“*repeated efforts of our muscles under the conduct of our sensations or volitions*”); however, the “*sensations or desires*” that ultimately drive those behaviors are “*natural or connate*” (Z I: 136–39). Despite his debt to Hartley in particular (largely unacknowledged but evident throughout the book) and to the Lockean tradition in general, Darwin here departs from Locke in several important ways: by granting a salient role to the *internal* senses, by the opening thus made to *innate* desires with a profound (though not direct) effect on behavior, and by a related emphasis on *unconscious* mental processes guided by habit and “natural” desire. These ideas are not incompatible with sensationalist psychology and in fact comprise key aspects of David Hume’s critique of Locke from within sensationalist and associationist principles. Darwin’s revision of the Lockean tradition differs significantly, however, in its physiological and organic commitments and in the optimistic rather than skeptical attitude with which Darwin regards the mind’s literal incarnation in the body.

Darwin’s equanimity regarding the mind’s corporeality, its subjection to “*connate*” desires, and indeed its success in organizing the flow of sensory data into a reasonable approximation of the external world all stem from his embrace of an adaptationist and evolutionary view of nature. “Our senses are not given us to discover the essences of things,” he writes, quoting Malebranche, “but to acquaint us with the means of preserving our existence” (Z I: 108). But who gave us our senses? An evolutionary process reaching back to the beginnings of life and guided by the “general efforts of nature to provide for the continuation of her species of animals” (Z I: 485), relying both on sexual reproduction (which weeds out harmful traits) and on Lamarckian-style inheritance (which preserves helpful ones) (Z I: 480). All living forms, he writes in *The Temple of Nature* (1802), “Arose from rudiments of form and sense / An embryon point, or microscopic ens” (Canto 1: 13–14). Unlike mechani-

cal creatures (“Self-moving Engines”), the robots of their time, which can function but not adapt, living animals improve over the ages: “Each new Descendant with superior powers / Of sense and motion speeds the transient hours” (Canto II: 21, 33–34). Grafting (asexual reproduction) and inbreeding, in their failure to weed out “hereditary” diseases, underscore the virtue of “connubial powers”; the poem proceeds to hail the “DEITIES OF SEXUAL LOVE” and its presiding genius is Eros (Canto II: 175–80, 244). Charles Darwin would minimize the intellectual debt he owed to his grandfather (whose evolutionary theory seems crude enough by comparison), but there is no doubt that the elder Darwin’s science of mind was undergirded by his sketchy notions of inheritance and adaptation. Guided by the “firm immutable immortal laws” of nature, “Organic Life began beneath the waves” and embarked on a gradual, inevitable course of improvement (Canto I: 234). It is this natural process, not some divine fiat, that ultimately produced the marvels of human cognition: “the fine nerve to move and feel assign’d, / Contractile fibre, and etherial mind” (Canto I: 217–18).

Darwin’s answer to the problem of mental function and design, then, was a materialist one, or at least one thoroughly compatible with materialism, and it was attacked as such. Although Darwin had prudently begun *Zoonomia* by stating his belief in “two essences or substances,” spirit and matter (*Z* I: 5), his theory of mind struck contemporaries as unorthodox, materialistic, and all too much in keeping with his other avant-garde and radical views, duly pilloried by the *Anti-Jacobin* in “The Loves of the Triangles” in 1798.<sup>30</sup> Thomas Brown’s critical *Observations on the Zoonomia of Erasmus Darwin, M.D.*, published the same year, was more genteel, even collegial, in tone, yet still arraigned Darwin’s system as “materialist” in tendency, opposed to the author’s (and the establishment’s) “mentalist” allegiances.<sup>31</sup> The Church and King riots of 1791, in which a “loyalist” mob had invaded Priestley’s home and destroyed his scientific equipment, had demonstrated a connection even in the popular mind between political radicalism and unorthodox science at the very beginning of the period of anti-jacobin reaction. By the early nineteenth century, any theory that “so much as hinted” that the mind arose from “corporeal organization” was branded as “atheistical and politically subversive,” in other words, “French-inspired.”<sup>32</sup> Darwin’s psychological views had accompanied him into dangerous ideological territory, and his reputation suffered greatly as a result.<sup>33</sup>

Darwin’s response to some of the other problems that Coleridge identified in Hartley was no less distasteful to orthodox sensibilities. Human

identity (“the poor, worthless I”) consists not in divinely vouchsafed consciousness of self but in the sum of our unconscious sensations and routinized behaviors, “our acquired habits or catenated trains of ideas and muscular motions” (*Z* 1: 133). The fundamentally embodied nature of the mind also gives rise to our sense of location in the world and of its substantiality, literally fleshing out our sense of personal identity. “The medulla of the brain and nerves has a certain figure; which, as it is diffused through nearly the whole of the body, must have nearly the same figure of that body” (*Z* 1: 111). This “figure” and our lived experience of it forms our primary cognitive reference point for abstractions like solidity and motion, time and place, space and number; because the mind is known only in and through the body, the body informs the basic categories of perception and cognition.<sup>34</sup> In both *Zoonomia* and *The Temple of Nature* the will, which (as Coleridge argued) Hartley had failed to rescue from an avowedly mechanistic psychology, also finds its ground in the dynamic unity of body, nerves, and brain. Volition for Darwin, however, can be unconscious and episodic rather than the exertion of a unified conscious subject:

Next the long nerves unite their silver train  
 And young SENSATION permeates the brain;  
 Through each new sense the keen emotions dart,  
 Flush the young cheek, and swell the throbbing heart.  
 From pain and pleasure quick VOLITIONS rise,  
 Lift the strong arm, or point the inquiring eyes. (Canto II: 269–74)

Keats would do this sort of thing better. But Darwin’s poem on the adapted, organic, nervous, embodied mind and the “origin of society” made some of the key ideas of *Zoonomia* accessible to at least the avant-garde segment of the poetry-reading public. As Darwin’s seemingly materialist and vaguely French-sounding ideas became increasingly suspect, however, in the period of “anti-Jacobin” reaction and conservative retrenchment, naturalistic, brain-based accounts of mind began to take on a radical, even sinister cast. This could not have been helped by the independent development of a compatible theory of mind by Cabanis, one of the French “Ideologues” and a prominent supporter of the French Revolution.

#### CABANIS: SENSIBILITY AND THE EMBODIED MIND

Cabanis, like Darwin, had been schooled in the fine points of sensationalist and associationist philosophy, particularly as developed by

Condillac. He drew equally, however, on a French anti-dualist tradition, exemplified by Diderot, La Mettrie, and the Montparnasse physicians, that located the mind in the body and sought the explanation for its “wonderful and incomprehensible” abilities not in an intangible soul but in the “specific organisation of the brain and of the whole body.”<sup>35</sup> His major work, *On the Relations Between the Physical and Moral Aspects of Man* (*Rapports du physique et du moral de l’homme*), was read to the Revolutionary Institute in 1796–97 and published in 1798, with six further “memoirs” added in 1802. Cabanis, long unavailable in English, was not well known to the first generation of British Romantic writers, though a faithful sketch of his most important ideas had been published as early as 1801 in the *Monthly Review*. (The reviewer, no doubt thinking of Darwin in particular, remarks that few of Cabanis’ arguments and views “will be new to those who have studied the writings of the English materialists.”)<sup>36</sup> Cabanis would become an important source for Percy Shelley in the 1810s and his ideas would eventually reach a wide British public through William Lawrence’s notorious lectures on physiology and the “natural history of man.” Working independently, but from many of the same sources and with similar aims in mind, Cabanis developed a physiological psychology that overlapped significantly with that of Darwin.<sup>37</sup> The “First Memoir” begins, in fact, as does *Zoonomia*, by stressing the centrality of the “cerebral organ” as an active processor, rather than passive register, of sensory data (*R* 1: 50), a position that puts Cabanis at odds with Condillac and links him instead to Darwin, Gall, and the Romantic poets.

Cabanis’ most famous (or infamous) statement, in fact, that the brain “digests” impressions as the stomach digests food, is not the reductive analogy it was sometimes taken for, but rather makes part of his attempt to convey the active, complex, organic character of the brain-mind. The brain is the product of natural and adaptive (but not evolutionary) design, a “special organ designed to produce thought” as the “stomach and intestines are designed to operate the digestion” (*R* 1: 116). Cabanis’ inability to explain just how the brain accomplishes its task does not demand reference to an immaterial principle, since important aspects of digestion remain mysterious as well. Thinking will eventually be understood, however, as a complex and dynamic organic process rather than the passive and mechanical one implied by Condillac. “We also see the impressions arrive at the brain, through the nerves; they are then isolated and without coherence. The organ enters into action; it acts on them, and soon it sends them back changed into ideas, which the language of

physiognomy and gesture, or the signs of speech and writing, manifest outwardly. We conclude, with the same certainty, that the brain digests, as it were, the impressions, that is, that organically it makes the secretion of thought" (*R* 1: 117). Mind is not a thing apart but rather an expression of the "continuous activity" of the brain and nervous system, and cognitive performance can be altered by material substances like narcotics and alcohol or disrupted by brain lesions and other neurological insults (*R* 1: 96, 129, 138).

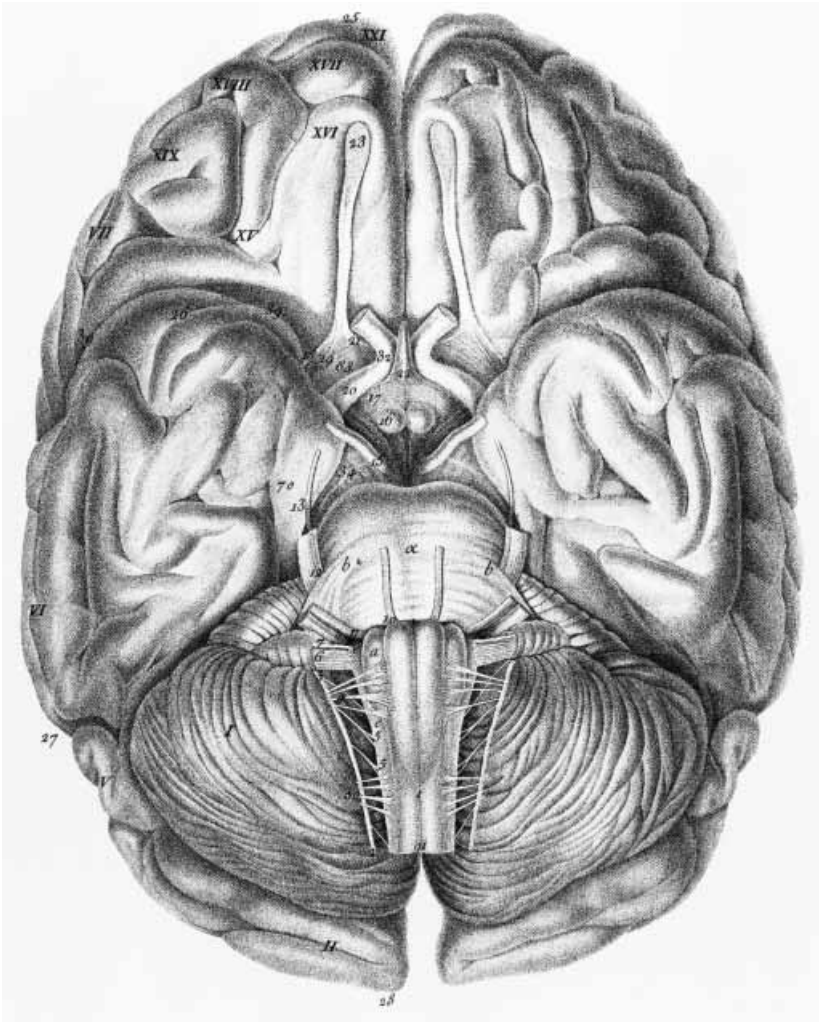
As it does for Darwin, however, the brain for Cabanis forms the center of a neural system dispersed throughout the body. In place of Darwin's notion of the "sensorium," Cabanis develops the analogous one of "sensitivity," a physical process (probably linked to "galvanism" or animal electricity) that "radiates" from the brain, "unceasingly traversing the nervous system" (*R* 1: 277, *R* 2: 547, 553). Sensibility is not limited to what we receive from the senses attuned to the external world (as in Locke and Condillac) but also involves "impressions received in the internal organs" (*R* 1: 92). The internal impressions remain largely unconscious, although they have an "extensive" (and usually unnoticed) effect on cognition (*R* 2: 568). The internal organs are instrumental in stimulating and modifying instinctive "tastes, inclinations, desires" (*R* 1: 101) that can be witnessed already in newborns and that "undoubtedly are engraved in the cerebral system at the very moment of the formation of the fetus" (*R* 2: 580). Wondering how the stomach or the "genital organs" can "transmit, or contribute to awakening" these innate inclinations, Cabanis leaves a space for what would eventually be called the neuro-endocrine system, though to him, of course, it remains mysterious, a pressing subject for "physiology and medicine" to pursue (*R* 1: 98). He can state with certainty, however, that the prevalence of unconscious and instinctive processes in mental life is "extremely favourable to the preservation and well-being of animals," including human beings. "Nature has exclusively reserved for herself the most complicated, the most delicate and the most necessary operations" (*R* 1: 98). Nurture is given a significant role in human development, but bodily self-regulation, nutrition, basic defenses, and propagation are too important to be left entirely or even mainly to socialization.

The mind is no less fundamentally embodied for Cabanis than for Darwin. Criticizing the mechanistic assumptions behind Condillac's supposition of an animated statue (a kind of thinking machine) to analyze distinct sensory impressions, Cabanis stresses instead both the embodied character of human cognition and its gradual development

in a living, desiring being. “How could these various operations be executed without the organs whose special action or cooperation is essential to the production of the simplest sensitive act, of the vaguest intellectual combination and desire, [or] be developed by degrees, unless they had already, by that sequence of movements that nascent life impresses on them, acquired the type of progressive instruction that alone makes them fit to fulfill their proper functions and to associate their efforts by directing them toward the common goal” (*R* 2: 568). Cognitive activities like perception and reason are adaptively shaped and constantly modified by innate inclinations (like the instinct for self-preservation), visceral feelings, and routinized behaviors: “How could the habits of the entire sensitive system, those of the internal organs or of the other main organs, and the nature of their sympathies with the cerebral center, remain foreign to that chain of coordinated and delicate movements that takes place within it for the formation of thought?” (*R* 2: 570).<sup>38</sup> Cabanis also agrees with Darwin in grounding identity in the body, distinguishing the sensibility from the *conscious* subject or “moi.” The moi resides in a “common center” where all sensations, including internal ones, converge, but it lacks access to many of those sensations. In this way autonomic functions may “very sensibly and quickly” modify one’s “entire realm of ideas and emotions” in the absence of any explicit awareness, and emotions and “unperceived judgments” can color ideas and thought processes via the body’s silent pathways to the brain (*R* 2: 547–8, 551, 590). Descartes was wrong in separating mind from body, reason from emotion, and in grounding identity on thought and not sensibility. “From the moment at which we feel, we are” (*R* 1: 51).

#### GALL’S ORGANOLGY

Gall shared a good deal of common ground with Cabanis, as Gall himself notes in his later works (*FB* 1: 111, 2: 20).<sup>39</sup> His own version of a brain-based psychology or “organology,” however, was developed independently in the 1780s and 1790s. Gall was struck already in adolescence by the different character types and cognitive strengths among his schoolmates, despite commonalities in education and social class. He became convinced that innate dispositions and propensities, rooted in the specific organization of the brain, accounted in large part for differences among human beings, while at the same time accounting for the basic “uniformity” of human nature found across cultures and throughout history (*FB* 1: 148). In Herder Gall found the outlines of an “*organic*”



1 F. J. Gall and J. G. Spurzheim, *Atlas* accompanying the “large work,” *Anatomie et Physiologie du Système nerveux en général* (Paris, 1810), plate iv (ventral surface).

approach to the mind, a defense of instinctive and unconsciously motivated behavior, an affirmation of the continuity between humans and other animals, and a recourse to comparative physiology and neuroanatomy for tracing the “various evolutions and changes” that culminated in the “structure of the brain” and the “elaboration of its parts,” Nature’s finest work (*Outlines* ix, 8, 76). But whereas Herder gives a primary role in