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Myers/James Filter Theory and Contemporary Science: Toward Reconciliation

Up to this point I have been arguing on behalf of the Myers/James picture as a purely psychological theory, urging its provisional acceptance as a useful working model of the overall structure and organization of the human psyche. I have also tentatively endorsed the reality of post-mortem survival as an empirical phenomenon, while reserving judgment on Myers's generalized evolutionary doctrine pending further information.[16]

The appeal of Myers's theory derives for me from two principal factors: First, it encompasses an enormous range of empirical phenomena, including a variety of phenomena which lie beyond the reach of mainstream materialist views. One aim of this book has been to show that many such "rogue" phenomena exist, as Myers and James both firmly believed, and that the evidence for them has in general become far stronger during the subsequent century. Furthermore, these empirical phenomena—both "normal" and "supernormal"—are interconnected in such a way that one cannot provide an empirically satisfactory treatment of any one of them without necessarily becoming entangled with others as well. One cannot deal adequately with psi phenomena, for example, without recognizing and somehow accommodating their deep associations with topics such as dreaming, genius, and mysticism. The power of Myers's theory derives not so much from an incontrovertible superiority in explaining any of these phenomena individually as in providing a coherent and plausible scheme of interpretation for all of them at once. And this is a great virtue of Myers's theory, as pointed out by Schiller (1905): "A synthesis which embraces such a multitude of facts does not rest solely on any one set of them, and in a sense grows independent of them all. That is, the mere coherence of the interpretation becomes a great point in its favour as against a variety of unconnected alternatives" (p. 70).

Myers's theory also has predictive value, at least in the sense of directing our attention toward additional types of phenomena that might be expected both to exist and to be accessible to empirical investigation. Myers himself, for example, seems to have anticipated both NDEs in general (see our Chapter 6) and the "mindsight" phenomenon reported tentatively by Ring and Cooper (1997, 1999), in which congenitally blind persons undergoing NDEs report a kind of quasi-visual awareness of their physical surroundings (Myers, 1891c, pp. 126–127). The demonstrated association of psi with altered states such as dreaming, hypnagogia, and twilight states emerging under Ganzfeld conditions also is broadly consistent with his general principle that subliminal functions emerge in proportion to the abeyance of normal supraliminal functioning. Similarly, his concept of a "permeable" boundary between the supraliminal and subliminal regions implies that

16. This applies especially to a part of his doctrine I did not discuss—namely, his conviction that individual human personalities may continue to develop or "evolve" in the post-mortem state. To my knowledge, there is presently little or no credible evidence for such a view.

persons whose boundaries are demonstrably more permeable, as measured for example by the scales of Thalbourne (1998; Thalbourne & Delin, 1994) and Hartmann (1991), should show more evidence of subliminal functioning, such as creativity, psi, involuntary imagery and other automatisms, and recall of dreams and early childhood events, all of which have been at least tentatively confirmed. Another such implication, which is rumored to be true but to my knowledge has not yet been seriously investigated, is that psi phenomena should be prominently associated with dissociative disorders such as MPD/DID, and perhaps especially with those "alters" that are deepest or most comprehensive. Many other examples have been provided in earlier chapters, and more will be supplied below.

But are these considerations sufficient to *justify* Myers's theory? The "correct" answer here ultimately depends on one's answer to the prior philosophical question as to precisely what criteria are appropriate for justification of a psychological theory of this sort. This general and very difficult problem is the subject of ongoing discussion within our Esalen theory group, and I will certainly not attempt to resolve it here. However, the basic issues come into sharper focus in the context of a less favorable appraisal of Myers's theory by Gauld (1992):

> The broad framework is not one that can be used to derive the details of the phenomena that are used to support it. It may "make sense" of the phenomena, but it does not enable us unequivocally to predict any particular phenomenon. This situation obtains commonly enough in psychology, but it would generally be thought undesirable in the "hard" sciences and by philosophers. A partial parallel, however, is provided by the Darwinian theory of evolution. Here too we have a broad and abstract hypothesis which "makes sense" of a great mass of observations; yet it would be hard to maintain that the details of the data can be directly derived from the theory. Of course since Darwin's time certain paths have been established which fill some of the space between the theory and particular features of the phenomena. Nothing similar has been accomplished in respect of Myers's theory of the subliminal self [*sic*]. If it had been, Myers would perhaps now be as famous as Darwin. (pp. 399–400)

I will make just two main comments on this relatively negative assessment. First, I think the demand for derivation of phenomena in all details is too strong a requirement for justification of large-scale psychological theories, although I will not attempt to argue this point here. I also think, as indicated above, that Myers's theory does in fact have significant predictive value, albeit of a weaker sort than that characteristic of the "hard" sciences. Second, although Gauld certainly is correct in pointing to the subsequent "filling in" of Darwin's theory as having contributed in major ways to its justification, I think he overstates the contrast between Darwin and Myers in this respect. In the first place, as indicated above, a good deal of descriptive filling-in has already occurred, in the sense of more and better documentation for phenomena already utilized by Myers himself in developing his scheme, and the discovery of additional phenomena consistent with it.

One major gap remains, however. It was specifically the rise of new scientific disciplines such as population genetics and molecular biology that did more than anything else to fill in and buttress the original Darwinian theory. Similarly, a psychological theory of the sort advanced by Myers and James cannot be sustained unless it can somehow be reconciled with the enormous advances of the ensuing century in what we know about the brain. The central task of this section, therefore, is to demonstrate that such reconciliation may in fact be possible.

We believe that the empirical evidence marshaled in this book is sufficient to falsify all forms of biological naturalism, the current physicalist consensus on mind-brain relations.[17] The mind is "irreducible" in a stronger sense than that intended by epiphenomenalists, including Chalmers,[18] or even by those like Searle who are at least committed to salvaging mind and consciousness as causal factors in behavior, but cannot explain how to do so in conventional physicalist terms. There is apparently at least one fundamental bifurcation in nature that cannot be accounted for in these terms, and we therefore seem driven toward *some* sort of animist or pluralist alternative.

Although the primary purpose and merit of our book consist in the marshaling of the evidence itself, we also think it is now possible to see at least dimly how a psychological "filter" theory of the Myers/James sort can be adapted to the framework of contemporary science, and we wish to provide at least in outline some more positive characterization of these possibilities. We emphasize at the outset that this account is necessarily provisional and very incomplete; our goal is simply to suggest a variety of potentially fruitful directions for further investigation. We also urge readers to bear in mind as they work through this section, as we have in developing it, the wise counsel of H. H. Price (1939): "We may safely predict that it will be the timidity of our hypotheses, and not their extravagance, which will provoke the derision of posterity" (p. 341).

We must begin by making clearer what we mean by "a psychological filter theory of the Myers/James sort." In the first place, in lumping Myers and James together in this way we do not mean to imply that they hold

17. From here on I will speak more consistently in the first person plural, reflecting the fact that what follows is to a much greater extent the product of very extensive discussions involving all authors of the present book and many additional parties as well. The opinions stated are in all cases strong majority positions, but I am primarily responsible for details of their formulation, and not all of us are in full accord on all points. We *are*, however, unanimous in regard to certain more general attitudes, including in particular an admiration for Myers and his synoptic naturalism, skepticism about the current received wisdom in psychology and neuroscience, openness to unorthodox findings where properly evidenced, and a conviction that the world is at bottom a much more puzzling place than contemporary mainstream science admits. Individual authors are of course responsible for opinions expressed in their own chapters.

18. That Chalmers is an epiphenomenalist follows from his arguments for the conceivability of "zombies," creatures that lack consciousness but nonetheless are equivalent to us cognitively. We reject both the epiphenomenalism and his endorsement of strong artificial intelligence.

identical views on all subjects, but only that their overall conceptions of the psyche are far more similar to each other than to any materialist/reductionist theory past or present.

We also need to specify more carefully our interpretation of James's "transmission" or "filter" theory, originally introduced in Chapter 1 and recurring intermittently thereafter throughout this book.[19] As invoked informally and loosely so far, this amounts only to a family of related but somewhat cloudy metaphors bearing a variety of unexamined connotations and implications regarding the role of the brain in our mental life. "Transmission," for example, suggests faithful conveyance from one place to another, but this is certainly *not* what Myers had in mind with his theory of the Subliminal Self and its relations with the supraliminal self. The related term "filter," which like Aldous Huxley's "reducing valve" suggests selection, narrowing, and loss, is much more appropriate to that relationship, and for that reason we greatly prefer it as a shorthand description of Myers's theory.

But how does this relate to the brain? Myers's theory as he himself developed it is entirely psychological, not philosophical, and he also says extremely little about the brain. It is rather James, the psychologist and philosopher, who explicitly links these notions of transmission and filtering with the brain. James in fact suggests a variety of metaphors, but the one that has most commonly been seized upon by others is that of optical devices such as colored glass, lenses, and prisms. The common feature is that a beam of integral white light presented to such devices comes out the other side filtered, reduced, focused, redirected, or otherwise altered in some systematic fashion.

Subsequent advocates of transmission or filter models have tended naturally to update this basic picture with reference to emerging technologies such as radio and television. Thus for example we find Strassman (2001) comparing the brain to a TV receiver, and likening entry into the altered states produced by psychedelics to changing the channel. There are two generic problems with accounts of this sort, however, that we must attempt to avoid. First, all metaphors of the radio and TV variety clearly engender homunculus problems of the sorts described in Chapter 1; after all, who is it that is watching Strassman's TV and changing the channels? More gener-

19. There is a strangely incomplete or asymmetric pattern of connections among James, Myers, Schiller, and Bergson—all early advocates of filter-type theories—which invites further historical investigation. James (1898/1900) is usually given primary credit for formulating the transmission theory, yet he himself acknowledged that Schiller (1891/1894) had already worked it out in greater detail. James's formulation relies heavily on Fechner's concept of the psychophysical threshold or limen, but he does not point out the close parallel with Myers's ideas, invoking Myers only as an investigator of supernormal phenomena. Myers, meanwhile, makes no explicit reference to transmission theory as formulated by either James, Schiller, or Bergson, and references Schiller and Bergson only in regard to a single case study each. Nonetheless Schiller (1905, p. 66) explicitly identifies Myers's general theory as a splendid example of transmission theory and laments that Myers himself did not describe it in those terms. Yet James corresponded extensively with both Myers and Schiller around the time of the Ingersoll lecture, and with Bergson later on (Perry, 1935), and all four were members of the SPR.

ally, we must not endow the "filter" with all the properties we are trying to account for in the mind itself—properties such as high-level thinking, memory, imagination, conceptual grasp, and so on.

The common feature of these metaphors, and the root of their conceptual problems, is the idea of passage *through* the filter. There is a way around this, however. Recall that the central goal of James's original analysis was to show that even perfect correlation between brain events and mental events entails neither the impossibility of post-mortem survival nor the truth of the conventional materialist production theory of brain-mind relations. Those views derive from interpreting the admitted facts of functional dependence—mind-brain correlations—in one particular way. Other possibilities exist, however: "When we think of the law that thought is a function of the brain, we are not required to think of productive function only; *we are entitled also to consider permissive or transmissive function*. And this the ordinary psychophysiologist leaves out of his account" (James, 1898/1900, p. 15).

Most subsequent advocates of James's analysis, as we have seen, have invoked its "transmission" thread, so much so that the whole picture is now widely known by that name alone. We think this unfortunate, because it is actually the other thread—permission—that is theoretically the more promising. More generally, we wish now to argue that by thinking of the brain as an organ which somehow constrains, regulates, restricts, limits, and enables or permits expression of the mind in its full generality, we can obtain an account of mind-brain relations which potentially reconciles Myers's theory of the Subliminal Self with the observed correlations between mind and brain, while circumventing the conceptual difficulties identified above in transmission models. We in fact see a spectrum of potentially viable theoretical possibilities of this sort. We will next canvas these under two broad headings—non-Cartesian dualist-interactionist models and neutral-monist models—that seem to us to bracket the range.

Non-Cartesian Dualist-Interactionist Models

When theories need to be changed in order to accommodate discordant observations, it usually makes sense, as a matter of scientific policy, to change them in ways that seem to do the least possible violence to the existing theories, while enabling us to explain those additional observations. This attitude leads in the present case to the family of what we are calling "non-Cartesian dualist-interactionist models," and more specifically to a subset of such models corresponding to the psychological filter theory elaborated by Myers (Chapter 2) and carried forward by James (Chapter 8), which can be viewed as the most highly developed example so far among

models of this sort.[20] The driving idea is that associated with each human organism, a physical thing in the ordinary sense, is a second thing, a mind or psyche, which interacts in some way with that organism. Based upon the evidence summarized in this book, we will also presume for the sake of discussion that the psyche has the kind of internal organization and dynamics assigned to it by Myers and James, and that it may under various circumstances, including circumstances involving serious bodily injury or death, be able to function in some manner on its own. What we want to focus on here is how we can conceive of its *normal* interactions with the associated organism.

We will begin by briefly noting that there have been previous efforts along dualist lines by modern scientists, including some very distinguished 20th-century neuroscientists.[21] One group includes Charles Sherrington and two of his students, John Eccles and Wilder Penfield. All three expressed the conviction that the properties of minds cannot be reduced to or identified with those of brains, and all attempted to support that conviction by reference to empirical data of various kinds. In all cases, however, the evidence marshaled, although readily *interpretable* within a dualist-interactionist framework, was insufficient to *establish* it, since alternative explanations based on the conventional viewpoint were nowhere decisively excluded. Popper and Eccles (1977) suffered the additional liability that their attacks were directed mainly at associationist-type theories that had already largely disappeared from cognitive psychology.[22] In Eccles's case it was also clear, as shown for example by his last (1994) book, that he had embraced dualism early in life and for largely non-scientific reasons (his Catholicism, possibly supplemented by an OBE), and had sought throughout his career simply to tell this unchanging dualist story in the most up-to-date neurophysiological language. The net result, in any case, was that the dualistic views of all three have largely been ignored by mainstream psychologists and neuroscientists.

Next comes another major neuroscientist, Roger Sperry (e.g., 1980, 1993), who also sought to salvage the mind but in a slightly different way, essentially by splitting the difference between mainstream physicalist views

20. In an unpublished essay on Myers that he was still developing at the time of his death, C. D. Broad concluded that this was Myers's own philosophic position. This unfinished essay, "The Life and Work of F. W. H. Myers," can be found among Broad's papers in the archives of Trinity College, Cambridge.

21. There has recently been a modest revival of interest in dualism among philosophers as well; see for example J. Foster (1991), E. J. Lowe (1996), Madell (1988), and Smythies and Beloff (1989). Unfortunately, these philosophic discussions often fail to make contact with relevant empirical literature; in Corcoran (2001), for example, the possibility of post-mortem survival is assessed almost exclusively in light of the apparent *a priori* viability of philosophical theories that seem to permit it, and without reference to the available empirical evidence.

22. See Mandler (1978). Of course associationist theories have subsequently revived in the form of "connectionism," as described in Chapter 1. Note the irony here that the anti-associationist arguments of Popper and Eccles, as well as those of William James and numerous other early critics including in particular the Gestalt psychologists, have once again become relevant. See also J. Fodor (2001).

and an outright dualism. He undoubtedly took note of the hostile reception accorded his fellow Nobel prize winner Eccles, and hoped to avoid a similar fate. His compromise position, "monistic dualism," holds that mind and consciousness "emerge" from brain processes when these processes reach a certain threshold of complexity. The emergent properties are said then to seize control of lower-level aspects of brain function, much as, for example, an eddy generated by the turbulent flow of a stream "enslaves" the leaves that circulate within it. The problem is that Sperry essentially *stipulates* the emergence without really accounting for it in physicalist terms; both the emergent and the enslaved phenomena are unambiguously physical in all his analogies.[23] His emergent consciousness appears miraculously and then takes on a life of its own, so to speak; but this radical kind of emergence has been specifically rejected as incoherent by more consistent physicalists such as Searle (1992) and Kim (1998). McDougall (1911/1961) had also rejected such views, which already existed at the end of the 19th century, as "animism of the lowest or most meagre degree" (p. 357); they seemed to him to sacrifice the advantages of the mainstream materialist doctrine, and to introduce all the problems of dualism without any of its potentially compensating advantages. In sum, Sperry's attempted compromise also failed to take hold.

Preceding chapters of this book have already shown that a much stronger *empirical* case for some sort of interactive dualism can now be made. But before attempting to move any further in this theoretical direction we must next deal with several conceptual issues that have seemed to many observers to constitute serious or even fatal *a priori* obstacles to doing so. To begin, we reject categorically the apparent presumption of most contemporary scientists and philosophers that any departure from the currently fashionable materialist monism is necessarily antiscientific, and that to move toward pluralism in any form is in and of itself inescapably tantamount to abandoning several centuries of scientific achievement, releasing the black flood of occultism, and reverting to primitive supernaturalist beliefs characteristic of bygone times. As John Searle (1992) correctly observes, only this prevailing terror of dualism can explain the mainstream's willingness to put forward, and to tolerate, the various kinds of patently unsatisfactory materialist accounts of mind-brain relations that we have seen over the past hundred years. We agree with Searle's diagnosis, of course, but not with his solution. We think, and will attempt to show, that Myers-like theories can be framed in ways that not only can potentially accommodate most or all of the relevant psychological and neurophysiological data, but also are fully compatible with front-line physical science itself.

We certainly do *not* advocate return to an unmodified Cartesianism. We can immediately abandon the most controversial parts of the Cartesian conceptual apparatus, including in particular the notion of mind and body as ontologically distinct "substances" with essential or criterial attributes of

23. Note that similar analogies are regularly invoked by dynamic systems theorists such as W. J. Freeman (1999, 2000).

thinking and extension, respectively. A conceptual distinction can be made between mind and brain without presupposing this kind of ontological division, as recognized clearly by McDougall (1911/1961). The absolute dichotomy set up by Descartes between mind and body has been substantially undermined, historically. For one thing, the phenomenological solidity of matter has proved evanescent in the face of advances on the physical side. Furthermore, at least some forms of mental activity such as perception and visual imagery inherently have quasi-spatial phenomenological properties, as emphasized particularly by writers such as Brann (1991), Price (1953), Smythies (1994), and Velmans (1996). As Myers himself clearly recognized (Chapter 2), the Cartesian gulf has already narrowed and may be bridged, or bridgeable, by further advances from either or both sides; thus, "It is no longer safe to assume any sharply-defined distinction of mind and matter.…Our notions of mind and matter must pass through many a phase as yet unimagined" (Myers, 1886c, pp. 178–179). Myers himself anticipated the possible eventual discovery of a single common something, a Tertium Quid, that would bring the two poles together, while others have imagined a whole series of intermediate levels, still in some sense "physical," that could serve as "vehicles of consciousness" (Poortman, 1954/1978).

These developments have immediate impact on the argument that has most commonly been made against interactive dualism, the causal argument. Once Descartes had made mind and body so utterly different, it is alleged, there is no longer any way for them to interact causally, and therefore dualism must be false. Searle (1992) takes this line. However, whatever force this argument ever had certainly has been diminished by the subsequent blurring of the supposed ontological divide between mind and body. Moreover, it is not apparent to us that the argument had any real force to begin with. Descartes himself took psychophysical interaction as a given, an explanatory primitive, and resisted attempts to construe it on the contact-interaction model of classical physical causation (Richardson, 1982). Causal relations are not necessarily transparent, and ever since Hume we have tended to interpret them in terms of consistent covariation. Hume's argument has in fact recently been embraced by arch-skeptic Paul Edwards (1996, chap. 17) in support of his "brain-dependence" thesis—the claim that brain processes unilaterally generate conscious mental experience. But surely if causality can work in *that* direction, it might in principle work in the other as well (Broad, 1925/1960).

The other common argument against dualism appeals to energy conservation laws and their supposed violation by mental causation. As noted in Chapter 2 this was especially popular in the 19th century, the heyday of classical physics, but it is also implicit in many modern discussions and resurfaces explicitly in Dennett (1991). However, Broad (1925/1960, pp. 103–109) had already shown that even in the context of classical physics, which Dennett mistakenly describes as "standard" physics, such arguments are inconclusive.

Even when the issues are framed in conventional physicalist terms, therefore, the main traditional arguments against interactive dualism appear to us less than compelling. Furthermore, and more fundamentally, it is no longer scientifically appropriate even to frame the issues in this way. Although a principle of causal closure of the physical world *as classically conceived* is assumed as the starting point of practically all contemporary scientific and philosophic discussions of mind-brain issues, it is hardly self-evident that this principle applies without restriction to a world that also contains minds. It assumes precisely what we are challenging, that classical physicalism is correct and complete, and can fully explain both brains and minds. But that classical conception of the physical world has long since been shattered by developments within physics itself, particularly by the advent of quantum theory in the early years of the 20th century.[24]

Among the small but growing number of systematic attempts to understand the implications of these developments for mind-brain theory, we regard as especially promising, and will summarize here, the work of quantum physicist Henry Stapp. There are several reasons for this choice. First, unlike many more popular writers Stapp knows the physics inside out. Second, he is consistently conservative and orthodox in his use of quantum theory, staying as close as possible to its empirically proven foundations and postulating no exotic quantum states or processes. Third, he is serious about establishing connections with mainline psychology and neuroscience. Finally, he has provided useful comments on a variety of related quantum-theoretic proposals (including those of Bohm, Eccles, and Penrose and Hameroff), which tend in broadly similar directions but are less satisfactory on various technical grounds (Stapp, 2005a, 2005b, in press a, in press b).

Few working psychologists and neuroscientists, let alone the public at large, have any conception of the fundamental significance of quantum theory. Classical concepts and approximations are often sufficient to support the concerns of the special physical sciences, and quantum mechanics is scarcely mentioned in the context of general education even at the college level. Yet it cannot be emphasized too strongly that the classical physics consensus that underwrites practically everything now going on in psychology, neuroscience, and philosophy of mind has in fact been completely undermined by this tectonic shift in the foundations of physics.

This is one of Stapp's main points. He describes vividly how the founders of quantum mechanics discovered, to their extreme discomfiture, that the fundamental ideas of classical physics were not just limited but *wrong*, leading repeatedly to clear predictions that were falsified by experiment. The theory they were driven to in response, quantum theory, is a more fundamental and better physical theory that explains everything explainable in classical terms, and a vast number of additional things as well, often to extraordinary levels of accuracy. No experimental outcome predicted by it has ever been falsified.

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24. For authoritative but readable surveys see for example Capek (1961), Whitehead (1925/1953, 1938/1968), and Stapp (2004a, 2005a).

Furthermore, it is crucial to appreciate that human consciousness, which had deliberately been excluded from the classical physics of the three preceding centuries, plays an essential role in this improved physical theory. Orthodox quantum theory is intrinsically a *psychophysical* theory, "a weaving of psychologically described realities into the framework of mathematical physics" (Stapp, 2005a). "The founders of quantum mechanics made the revolutionary move of bringing conscious human experiences into the basic physical theory in a fundamental way. In the words of Niels Bohr the key innovation was to recognize that 'in the great drama of existence we ourselves are both actors and spectators'" (Stapp, 2005a).[25]

Quantum theory also is necessarily relevant to brain science, for according to the principles of contemporary physics it *must* be used to explain the behaviors of all macroscopic systems that depend sensitively on the behavior of their atomic constituents, and brains are certainly systems of this kind.[26] Stapp himself has identified and carefully analyzed one particular element of brain dynamics to which quantum theory certainly applies. This is the process of *exocytosis*, in which neurotransmitter molecules are released into the synaptic cleft. The release is triggered by arrival of calcium ions at critical sites in the transmitter storage areas, the vesicles. But as these small ions pass through their membrane channels (diameter circa 1 nanometer) their positions become nearly fixed; hence, by Heisenberg's uncertainty relation, what happens next must be represented as a cloud of possible trajectories in the vicinity of the vesicle. This injection of a true quantum uncertainty—that is, an uncertainty involving more than incomplete knowledge of classically conceived details—goes on constantly at every one of the trillions of active synapses in the waking human brain, and this by itself is sufficient to establish that the brain is subject to quantum principles. This necessary entry of quantum uncertainties is also consistent with the findings of dynamic system theorists, who emphasize that in the waking state the brain operates continually on the edge of instability, with small changes in input potentially leading to large changes in overall behavior.[27]

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25. Eugene Wigner (1962, p. 285) similarly remarked that the laws of quantum mechanics cannot be formulated consistently without recourse to the concept of consciousness. Although Wigner himself subsequently retreated from this position, Stapp (2004a) shows that his reasons for doing so are not compelling.

26. Physicist and brain theorist Paul Nunez (1995) remarks that "an appreciation of the grand conceptual leap required in the transition from classical to quantum systems may give us some vague feeling for how far from current views neuroscience may eventually lead. Such humbling recognition will perhaps make us especially skeptical of attempts to 'explain away' (that is with tautology) data that do not merge with common notions about consciousness, such as multiple conscious entities in a single brain, hypnosis, and so on" (p. 158).

27. Eccles had originally proposed that this dynamic instability might be exploited by "triggering" certain "critically poised" neurons, using the quantum indeterminacy associated with neurotransmitter molecules in the synaptic cleft itself to effect the triggering without violation of conservation laws. It soon became evident, however, that these molecules are too large, and the distances too long. Eccles himself subsequently settled on the exocytosis mechanism as a critical site (Beck & Eccles, 1992; Eccles, 1994).

Unfortunately, most brain researchers have not yet recognized the relevance of quantum-theoretic considerations to their science. A few others have considered the possibility but dismissed it out of hand for wholly inadequate reasons. For example, E. Roy John (2001) asserts that: "There is no evidence that quantum mechanical processes can apply to the slow processes which transpire in the brain in times on the order of milliseconds and involve many cubic centimeters of cells at body temperature" (p. 200). These statements are simply incorrect, as Stapp (2005a) explains. Body temperature has a negative bearing only on proposals which, unlike his own, postulate creation and maintenance of large-scale quantum coherence or other exotic physical states under the normal conditions of brain operation. Stapp's proposal, moreover, is entirely consistent with the observed spatial and temporal scales of brain activity in relation to experience and behavior. Most fundamentally, in light of the demonstration that the behavior of low-level brain constituents is necessarily saturated with quantum effects, combined with the revolution that has occurred at the foundations of physics, the burden of proof here falls upon those who deny, not those who affirm, the relevance of quantum theory to brain science.

Stapp further argues that of the various formulations of quantum theory the one that most naturally applies to neuroscience, and indeed *must* be applied in that setting, is that of mathematician John von Neumann (1932/1955). The basic reason for this is straightforward: In the course of developing his rigorous formalization of quantum mechanics, von Neumann (1932/1955, chap. 6) proved that the separation originally introduced by the founders of quantum theory between a very small observed physical system described in mathematical language and an observing system described in empirical/phenomenal terms can be progressively shifted in such a way that the physical, mathematically described part ultimately includes the entire body and brain of an observing human agent, while the empirical/phenomenal part becomes that agent's stream of conscious experience. In this restructured framework, identified by Wigner as the "orthodox" interpretation of quantum mechanics, the operations of the complete mind-brain system necessarily involve more than the deterministic, locally-acting, bottom-up mechanical processes described by classical physics. There continue to be bottom-up and locally-acting mechanical processes (which von Neumann calls Process 2), but these now take the form prescribed by quantum-mechanical generalizations of the laws of classical mechanics and incorporate all of the uncertainties entailed by the quantum principles. Operating alone, Process 2 would rapidly generate a vast proliferation of possible brain states, simultaneously existing in a state of "potentiality." What actually happens, according to the quantum principles, is determined at least in part by a second process (Process 1) of fundamentally different character, which von Neumann (1932/1955) himself specifically characterized as arising from, or leading into, the human mind, "the intellectual inner life of the individual" (p. 418). These influences are entirely free, in the sense of not being determined by anything in the physics itself. Consciousness itself, in short, is needed to complete the quantum dynamics.

In Stapp's minimal and physically justified elaboration of this basic scheme, the conscious mental activity of the observer is portrayed as operating top-down, and in an inherently non-local manner, to select or enforce large-scale, quasi-stable patterns of oscillatory brain activity from the multitude of possible patterns generated by Process 2. Note that these sorts of global activity patterns, expected in light of Stapp's physics-based theory, correspond in a natural way to neural correlates of mental activity, as conventionally conceived.

For fuller explanations of all aspects of the theory, interested readers should consult the original sources. The net effect of these quantum-theoretic developments, we emphasize, is to bring consciousness back into *both* physical science *and* brain theory at the foundational level. As Stapp (2004a) remarks, his model "makes consciousness causally effective, yet it is compatible with all known laws of physics, including the law of conservation of energy" (p. 23). This totally deflates the main arguments, summarized above, that have routinely been advanced against interactive dualism. Indeed, far from *ruling out* dualism, as alleged by Dennett (1991) and numerous others, "*Contemporary physical theory allows, and in its orthodox von Neumann form entails, an interactive dualism*" (Stapp, 2005a, italics added).

Stapp's theory as described so far remains abstract and mathematical, grounded most securely at the physics end. Certainly a great deal remains to be done to flesh it out in psychological and neuroscientific detail, particularly on the perceptual/cognitive (versus motor) side. Nevertheless, Stapp himself has already identified a variety of important psychological phenomena that he thinks his model can successfully explain, and in a manner uniquely consistent with these basic-physics considerations. The key factor here is the ability of Process 1 to hold a conscious mental intention in place despite the strong disruptive tendencies inherent in the mechanical Process 2. This is accomplished, in accordance with a well-studied physical phenomenon known as the quantum Zeno effect, by allowing the relevant Process 1 "intentions" or "permissions" to be issued repeatedly, as needed, but only up to some maximum possible rate. Stapp correctly points out the striking consistency between this picture and William James's vivid phenomenological descriptions of attention as the essential phenomenon of will. The model also potentially explains in a natural way certain other characteristic features of conscious experience, such as the attentional "bottleneck" of Pashler (1998) and the properties of the "global workspace" as conceived by many contemporary brain theorists—broadly, the fact that a serial, integrated, and very limited stream of consciousness somehow emerges in association with a nervous system that is distributed, massively parallel, and of huge capacity (Baars, 1993). Top-down effects of the sort emphasized in Chapter 1 also fall directly and naturally out of such a model: "Quantum theory, unlike classical physics, can yield mathematically specified top-down effects of mind on brain that are *not determined* by the bot-

tom-up local-deterministic process" (Stapp, 2005a).[28] For examples of such top-down effects Stapp mainly relies upon recent clinical research on "self-directed neuroplasticity," in which psychiatric patients are taught to modify, voluntarily, their maladaptive psychological (and neurophysiological) responses to emotionally challenging stimuli (J. Schwartz, Stapp, & Beauregard, 2003, 2005). Additional relevant studies would presumably include those showing that by voluntarily altering their perceptual interpretation of an ambiguous visual stimulus, subjects can systematically alter patterns of brain activity even as "early" as primary visual cortex (e.g., Kamitani & Tong, 2005).

We are sympathetic to these empirical arguments, but we doubt whether many psychologists and neuroscientists will find them compelling in themselves. Up to this point Stapp's *empirical* case for his interactive-dualist model appears to us to suffer essentially the same liabilities as the evidence marshaled by Popper and Eccles (1977) in support of theirs. That is, his interpretations may well be correct, but none of the empirical phenomena he has adduced so far are clearly or decisively beyond the reach of more conventional types of explanation. In particular, the neurophysiological global workspace models of people such as Damasio, Dehaene, Edelman, Llinás, and others are as relentlessly conventional and classical as anything else in mainstream cognitive neuroscience; adherents of such models would certainly take the view that at least in principle they can explain *all* top-down effects, including the results on self-directed neuroplasticity, in terms of the dense reciprocal connections that are known to link cortical elements of the global workspace directly or indirectly to all other parts of the brain.

The situation changes, however, when Stapp's theoretical model is combined with the kinds of "rogue" phenomena catalogued in the present book. We must first acknowledge that in making this move we are going beyond anything Stapp himself has yet suggested or embraced in his published work. He does not explicitly characterize the relationship he conceives as holding between the source of Process 1 events, the conscious mind of the individual, and the bodily processes with which it interacts, and it is not clear to what degree he himself regards them as actually or potentially separable. Nevertheless, we see no objection in principle to extending his basic model in this way, provided that the extension is empirically justified.

A natural starting point is provided by the phenomena of extreme psychophysical influence, such as geometric blisters and skin-writing, that we have shown cannot be produced *directly* by mechanisms under the control of the brain and nervous system (Chapter 3). Process 1 is inherently non-local, and therefore it can plausibly be imagined as enabling control of events in the skin that lie beyond the reach of mechanisms known to conventional

28. We note in passing that the received causal doctrine of conventional neuroscience, that system-level properties of the brain are produced by bottom-up local interactions of its constituent microentities, is the one-dimensional historical residue of a much richer causal doctrine dating back to the Greeks, one that specifically incorporates downward mental or "ontic" causation. For a sustained philosophic argument in support of ontic causation, informed by modern developments in cognitive neuroscience, see Pols (1998).

present-day neuroscience. In this case the relevant events would also be quantum-level events of the same type as those Stapp has already shown are subject to quantum effects and fundamental to CNS dynamics—namely, that is, passage of calcium and other small ions through their membrane channels, resulting in a spatially patterned local release of inflammatory or vasoactive substances from structures in the skin and its vasculature. Learning to do this could be viewed as analogous, perhaps, to the situation in early development, which Stapp portrays as consisting in substantial part of the child's gradually learning how to bring mental events or intentions into proper correspondence with environmental events by selecting the appropriate large-scale patterns of brain activity. Analogous special situations can perhaps also be identified in adult life, as for example in the conscious use of feedback signals to develop exquisitely detailed voluntary control of single motor units (Basmajian, 1977). It is interesting in this regard, and consistent with Stapp's general outlook, that rare phenomena such as the formation of hypnotic blisters of specific geometric shape seem to occur mainly under conditions of extreme attention to, or preoccupation with, the relevant psychological material. The same sort of explanation might extend naturally to other phenomena of extreme psychophysical influence discussed in Chapters 3 and 8, including stigmata and allied phenomena, transitional phenomena such as the "maternal impression" cases, and perhaps even PK-type events occurring further outside one's own body.[29] We will give additional examples as we proceed.

To summarize the argument so far: Although many important issues clearly remain to be resolved, Stapp and his quantum-theoretic allies have already successfully undermined the basic-science foundations of present-day materialist-monist psychology and neuroscience. In so doing they also have opened a path toward alternative mind-brain theories of dualist-interactionist character that are more consistent both with fundamental science and with everyday experience, and that have the potential to explain at least some of the critical empirical phenomena catalogued in this book. Surely these are enormous theoretical virtues. There seems to be no insuperable obstacle to moving further in this direction, and we will now attempt to do so.

The basic pathway for reconciling the Myers/James filter theory with neuroscience seems clear enough in principle: Brain processes somehow shape the manner in which the associated psychic entity variably manifests its intrinsic properties and capabilities in the form of our ordinary or "supra-

29. Clearly on this view the occurrence of such phenomena depends partly on conditions within the mind or consciousness of the agent, partly on conditions having to do with the character of the targeted physical system itself, and partly, perhaps, on the availability of appropriate feedback. This invites further work, both theoretical and experimental, to delineate more precisely what the relevant conditions are, and how they can be instantiated or exploited experimentally. We also note in passing that this sort of view seems to us preferable to the view apparently held by Myers (*HP,* vol. 2, pp. 505–554), according to which the Subliminal Self *consciously* manipulates all necessary low-level details of the neural and biochemical machinery in order to produce the targeted effects.

liminal" conscious mental life. The "permeability" of the "membrane" that Myers conceptualized in psychological terms as modulating supraliminal expression of the Subliminal Self would thus have its neurophysiological counterpart in some aspect or aspects of brain activity. Effects of evolution, development, fatigue, fasting, psychedelics, meditation, thumps on the head, electrical brain stimulation, and the like all seem potentially interpretable in such terms.[30] But the broad and abstract justification deriving from James's (1898/1900) original argument (that such correlations can be interpreted in terms of *permission* or *transmission* rather than *production* theories) is not sufficient for our present purposes. We want now to get at least in outline a more detailed positive characterization of how such a mind-brain system might normally operate, and try to reconcile that with a broad range of existing neuroscientific data. The ultimate goal would be to explain in a quite specific way, for example, why it is that conscious experience of such-and-such types should be correlated with the patterns of brain activation revealed by functional neuroimaging studies, and why specific types of brain injury produce the kinds of alterations of mental functioning that they do. The following pages suggest possible elements of such a reconciliation.

We will start by rejecting the extreme localizationism characteristic of much recent research and theory in cognitive neuroscience. Functional neuroimaging and neuropsychological studies are commonly regarded, especially by cognitive psychologists, as providing conclusive and unqualified support for the view that the mind is entirely "modular" in its constitution and generated by corresponding structures and processes in the nervous system. The brain itself is typically conceived by such persons as a functionally complete system of "organs of computation" developed over the course of biological evolution for performance of particular, highly specialized, computational tasks. The postulated organs or modules thus represent the neurophysiological implementation of some cognitive model or models of the box-and-arrow variety, where the boxes represent supposed cognitive components and the arrows represent relations among them, directions of "information flow," and the like (J. Fodor, 1983; Pinker, 1997; see Chapter 1). It is further presumed that brain activities portrayed in the model give rise to, or in some sense are, the associated mental activities and experiences.

The confidence that many scientists apparently have in such a picture, however, is quite unwarranted: In the first place, James's (1898/1900) original argument does show that even if the correlations between brain activity and mental activity were as detailed, clear, and compelling as many people imagine them to be, that would not of itself be sufficient to *establish* the production model as against a permission or transmission model. Furthermore, things are in fact anything but that clear, and they become less so as we move toward the more central attributes of the mind.

30. Following Myers, we presume that the intelligence which determines precisely what products of subliminal activity achieve supraliminal expression under particular brain conditions is itself subliminal.

The widely cited views of J. Fodor (1983) concerning "modularity" are much more subtle than most of those who casually cite him realize. Fodor himself attributed modularity (as defined by most or all of nine specific criteria) only to the hierarchically organized and relatively hardwired perceptual (and presumably motor) systems, and he in fact specifically *denied* that the central domains of the mental have these characteristics. For these more crucial general-purpose or "horizontal" capacities, such as memory, thinking, and imagination, the association with brain activity seemed to Fodor himself relatively global and nonspecific. Furthermore, in his judgment the failure of cognitive science to deal adequately with these capacities over decades of work had been "pretty nearly absolute" (p. 126)—indeed, so much so that he gloomily concluded: "The ghost has been pushed further back into the machine, but it has not been exorcised" (p. 127). Hardcore adherents of the CTM have of course berated Fodor for not attributing modularity to the mind itself (see, e.g., Cain, 2002, pp. 194–208), but his own more recent statements have become if anything even stronger. For example, in Fodor (2001) he explicitly repudiates the CTM in both its classical/symbolic and connectionist forms, and declares in conclusion: "So far, what our cognitive science has found out about the mind is mostly that we don't know how it works" (p. 100).

Fodor's original characterization remains largely applicable today, despite two further decades of work supported by the advent of the new functional neuroimaging technologies. In cognitive neuroscience generally and in functional neuroimaging studies in particular, the modularity doctrine has held up best with regard to early-stage sensory functions and the like, and relatively poorly with regard to the mind proper. This pessimistic view of the situation is argued forcefully in an important critical book by psychologist William Uttal (2001), which should be required reading for anyone interested in these issues.[31] Most of the mind-imaging industry, Uttal argues, consists of attempts to correlate poorly defined psychological constructs with poorly defined and indirect measures of neural activity. On the psychological side, for example, there is theoretical chaos. Many workers have sought to identify "components" of the mind, supposedly distinct cognitive functions potentially identifiable with particular brain regions or structures. However, there is little or no evidence of progress toward agreement as to how many such components exist or what they do. The numbers of components proposed by different investigators mainly reflect their personal interests, industriousness, methodological commitments, and so on, and have ranged from a few to literally hundreds. Both Uttal (2001) and Pols (1998) argue for the contrasting view, which we share, that mind proper has a fundamentally unitary character underlying the diversity of its appearances as mind-in-action. That is, existing taxonomies of supposed mental "com-

31. We refer here especially to Uttal's discussion of experimental and logical issues in neuroimaging research; better introductions to the imaging techniques themselves can be found elsewhere. Related diatribes regarding problems in neuroimaging research can be found at http://www.human-brain.org.

ponents" mainly reify aspects or properties of the mind that are brought into action under particular task conditions or circumstances.[32]

Things are hardly better on the neurophysiological side, despite the sophistication and elegance of the new functional neuroimaging technologies. The dramatic and modular-looking "brain activation" pictures now routinely displayed in fMRI/PET imaging articles in our journals and news media are often seriously misleading. The brain does not neatly decompose either anatomically or functionally, especially at the cortical level, into well-delineated structures or regions that are identifiable with specific components of mind and whose contributions to cognitive performances can be inserted or removed without influence on the rest of the system. The *appearances* of modularity in these images in fact result to a considerable and insufficiently appreciated degree from the complex processes involved in image acquisition and analysis itself.

Measuring brain "activation" is not a simple or standardized process like reading a meter on a physical instrument or performing routine assays of blood chemistry. The intrinsic resolution of the imaging hardware is compromised by preliminary data-conditioning operations such as spatial and temporal smoothing or filtering, and there are deep statistical issues, with no fully satisfactory solutions, related to control of Type 1 and Type 2 errors (false positives and false negatives) in final images that may still contain hundreds or even thousands of correlated elements. Small variations in a long sequence of analytical decisions can result in strikingly different-looking final maps, each portraying well-demarcated regions that ostensibly contain all the physiologically "significant" activation, from the same raw image data. Attempts to overcome the high variability of anatomical and functional organization across subjects by mapping their individual data onto standardized brains or coordinate systems can result in spurious "localizations" existing in none of them. The mechanisms of neurovascular coupling that underlie the measured responses are extremely complex and only partly understood, involve multiple layers of interdependent mechanism operating on different spatial and temporal scales, and may differ in detail from region to region and even across layers of the cortex. The measured responses themselves are spatially and temporally imprecise, relate only indirectly to the neural activity of primary interest, and correlate well only in limiting cases with more direct measures of neuroelectrical activity such as EEG and MEG (Huettell et al., 2004; Nunez & Silberstein, 2000; Wikswo et al., 1993). PET and fMRI also have little capacity at present to distinguish between excitatory and inhibitory neural activity within a given brain area

32. Analogous comments certainly apply to our presently impoverished means for describing and differentiating states of consciousness in general. Similar positions as to the unitary character of mind were staked out much earlier by commentators such as James (1890b), McDougall (1911/1961), and Broad (1925/1960). Uttal himself concludes that we should fall back to a more sophisticated form of behaviorism (p. 206); however, his working list of the great questions of scientific psychology (his Appendix A) suggests that he may also be open to more radical theoretical options of the sort we are advocating here, at least if they are forced upon us by data (as we believe they are).

or to track the rapidly changing patterns of functional interaction between areas. As pointed out in Chapter 4, the widely-used "subtraction" methodology (Kosslyn, 1994; Posner & Raichle, 1994) is both logically unsound and neurophysiologically implausible, and "double-dissociation" imaging studies suffer from logical problems similar to those previously identified in the context of neuropsychological investigations of the effects of brain injury (Shallice, 1988). Replicability of imaging results is also far lower than commonly assumed, and not only *between* but also *within* subjects. Many of these concerns, we must add, apply even in the realm of early-stage sensory processes, where the localizationist picture is most nearly correct.

Despite the great promise of the new functional neuroimaging techniques, we are still on a steep learning curve and a long way from having them under full control. Meanwhile, the overall state of evidence supporting localizationist views of the mind is far less clear and compelling than typical journal articles and textbook accounts suggest. Chapter 4, for example, demonstrated in some detail that this generalization holds even in relation to the representation of *linguistic* functions, historically the primary inspiration for such views. Furthermore, what evidence remains for modularity often can be accounted for equally well by distributed network models that are potentially consistent with our more "global" view of mind-brain interaction (Farah, 1994; Plaut & Farah, 1990; Van Orden, Jansen op de Haar, & Bosman, 1997). Some additional imaging findings also seem conspicuously more consistent with such a view—for example, recent findings on binocular rivalry, switching of response patterns to ambiguous figures such as the Necker cube, and the work on self-directed neuroplasticity. The key feature common to these is that massive changes occur in the *overall* patterns of brain response to an unchanging stimulus, changes that reflect the subject's altered perception or judgment.

Neurophysiological studies of the consequences of brain injury point, we think, in similar directions. It is certainly true that deficits resulting from similar injuries tend to be more alike, and in characteristic ways, than deficits resulting from very dissimilar ones, but this generalization again holds best for injuries to relatively peripheral parts of the sensory and motor systems. Although the whole subject is clouded by difficulties related to precise specification of the brain injuries that have actually occurred, together with their local and distant sequelae in space and time, the higher mental functions seem rarely if ever to be totally destroyed (short, that is, of death or permanent vegetative states), and there is enormous and largely unexplained variability both between and within individuals who have suffered serious injuries of any particular type. Indeed, as indicated in Chapter 4, in the relatively few cases in which the overall condition of such persons has been investigated or reported in adequate depth, it is hard not to be impressed by the degree to which the core of self and mind can sometimes be preserved,

even in combination with catastrophic brain injuries including separation of the hemispheres (H. Gardner, 1976).[33]

In sum, far from supporting the idea that cognition is entirely and extremely modular in its organization, with patterns of brain activity directly reflecting that modularity, modern neuroimaging and neuropsychological studies have instead provided evidence that the association between conscious, effortful mental activity and brain activity is more global in character. The broad consensus that has recently emerged around the family of neurophysiological "global workspace" theories in part reflects an increasing recognition that this is the case.

The anatomical makeup of the global workspace varies to some extent dynamically, in accord with the demands imposed by ongoing activity, but it is noteworthy that by all accounts it invariably includes areas such as frontal cortex and posterior parietal cortex whose total volume has greatly increased in the course of mammalian evolution—that is, areas of "uncommitted," "association," or "intrinsic" cortex above and beyond those specifically dedicated to the more modular and hard-wired pathways and mechanisms associated with more peripheral parts of the sensory and motor systems. The functional architecture of this tissue is substantially uniform, with the same cell types, patterns of microconnectivity, neurotransmitter/receptor mechanisms, and columnar organization repeated everywhere (Edelman & Mountcastle, 1982). It seems clear that the normal supraliminal expression of mind proper depends strongly, in a manner like that suggested by global workspace theories, on the total amount and functional status of this more general-purpose tissue. General intelligence, for example, has long been known to correlate modestly (around .4) with overall brain size, and recent work has shown this relationship to be driven primarily by the volume of areas belonging to the global workspace, especially frontal cortex (Haier et al., 2004). In this respect, global workspace theories in fact match up rather well with the views of Myers and Bergson, who viewed the brain as predominantly a sensorimotor device, the "organ of attention to life," an instrument adapted by evolution to enable the mind to gain information about, and to act upon, the everyday physical environment. Mainstream global-workspace theorists themselves of course invariably accept the more fundamental orthodox conception that the underlying brain activity itself, *whatever* its form, *produces* or in some sense *is* the corresponding mental activity. Rejection of that deeper view, however, we regard as necessitated by the other lines of evidence marshaled earlier in this book.

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33. James (1890b, vol. 1, pp. 141–142) went so far as to suggest that the preserved concept of a lost or diminished mental function may somehow participate directly in the recovery of that function through appropriate repairs or modifications of the associated brain activity. We think this idea has merit, as did Myers (1891c, p. 116), but Myers was also certainly correct in cautioning as to the practical difficulties in evaluating it (see also Finger, LeVere, Almli, & Stein, 1988).

We think this modified-holist view of mind-brain relations is substantially correct.[34] Before taking it further in a dualist-interactionist direction, however, we must first deal with another possible conceptual obstacle. At the time of the *Principles* William James (1890b) was very sympathetic to pictures of this general sort. In describing the generic dualist-interactionist or "soul" theory, the sort of view unhesitatingly endorsed both by virtually all ordinary persons and by the scholastic philosophers, he said:

> If there be such entities…they may possibly be affected by the manifold occurrences that go on in the nervous centers. To the state of the entire brain at a given moment they may respond by inward modifications of their own. These changes of state may be pulses of consciousness, cognitive of objects few or many, simple or complex.…I confess, therefore, that to posit a soul influenced in some mysterious way by the brain-states and responding to them by conscious affections of its own, seems to me the line of least logical resistance, so far as we have yet attained. (vol. 1, p. 181)

Despite the appeal that such a theory clearly held for him, James declined to accept it, offering instead his famous doctrine of the stream of consciousness, according to which the only thinker that psychology needed to recognize became the thought itself. Only much later did James give full expression to the logical scruple that had prevented him from endorsing dualism, a difficulty whose seriousness is underscored by the fact that George Mandler (1978) made it the centerpiece of his hostile commentary on the dualism of Popper and Eccles (1977). Here is James's (1909/1971) statement:

> It is not for idle or fantastical reasons that the notion of the substantial soul, so freely used by common men and the more popular philosophies, has fallen upon such evil days, and has no prestige in the eyes of critical thinkers. It only shares the fate of other unrepresentable substances and principles. They are without exception all so barren that to sincere inquirers they appear as little more than names masquerading—*Wo die Begriffe fehlen da stellt ein Wort zur rechten Zeit sich ein.* You see no deeper into the fact that a hundred sensations get compounded or known together by thinking that a "soul" does the compounding than you see into a man's living eighty years by thinking of him as an octogenarian, or into our having five fingers by calling us pentadactyls. Souls have worn out both themselves and their welcome, that is the plain truth. Philosophy ought to get the manifolds of experience unified on principles less empty. Like the word

34. "Holism," according to which the brain acts as an undifferentiated whole, goes back to antiquity and has waned and waxed and waned again in popularity across the history of modern neuroscience. The 19th century witnessed an upsurge of localization driven by the early discoveries of people like Fritsch and Hitzig, Broca, and Wernicke, but this produced an extreme holistic backlash in the 20th at the hands of Pierre Marie, Kurt Goldstein, Henry Head, and Karl Lashley. Lashley's famously unsuccessful effort to locate "engrams" (memory traces) in animal brains was particularly influential in American psychology during the behaviorist period, but localizationists regained the ascendancy during the cognitive revolution. Current global workspace theories thus represent a compromise position, with partial reversion toward holism.

> "cause," the word "soul" is but a theoretic stopgap—it marks a place and claims it for a future explanation to occupy. (p. 221)

The problem is essentially that in taking a dualistic-interactionist position on the mind we may seem simply to be giving up, in effect moving things that we might have hoped to explain in terms of brain processes and the like into an inaccessible inner realm. We do not accept this objection, however: In the first place, it seems to us clear that the conventional physicalist approaches themselves are not adequate to the task, and that the richness of the conscious human mind simply cannot be explained by homunculus-free computational models or by classical mechanical brain-processes operating alone. Like McDougall (1911/1961, p. 362), who specifically rebuked James for giving up the idea of a psychic being or soul, we think that psychology must postulate *minds* or *psyches* to explain some of its most significant mental and behavioral phenomena (including "rogue" phenomena of the sorts catalogued in this book), just as physics postulates unobservable entities and processes to help explain *its* observable phenomena. The work of Henry Stapp and allied quantum theorists provides strong additional warrant for this attitude (and see also Braude, 2003, chap. 9).

The picture we are moving to is thus that the main dispositional properties or capabilities of the mind (J. Fodor, 1983) reside in the associated psychic entity, which is at least in part outside the brain as conventionally conceived. We normally experience these capabilities as they express themselves in conjunction with our organism, in a manner determined at least in part by its ongoing states and processes, as suggested above and discussed in greater detail below. The capabilities in question specifically include memory, thinking, and the cosmogonic imagination or "virtual-reality" system. More elaborate inventories of the attributes of mind have been presented by McDougall (1911/1961), Broad (1925/1960,1962), Stevenson (1981), and Pols (1998), along with a half-dozen or so of the psychologists and neuroscientists canvassed by Uttal (2001). Pols (1998), for example, building upon the inventory given by Descartes in book II of the *Meditations*, says:

> Here, then, is a list of the mind's functions, not perhaps as comprehensive as it could be, but more comprehensive than most such lists; mind knows, makes (that is, forms, produces, creates), understands, thinks, conceives, perceives, remembers, anticipates, believes, doubts, attends, intends, affirms, denies, wills, refuses, imagines, values, judges, and feels. (p. 98)

Pols emphasizes that these attributes, though *distinguishable*, are overlapping and interconnected rather than discrete or separable, and can be viewed for the most part as modes of operation of a more pervasive conscious unity. He is close to McDougall (1911/1961) in this, though much more detailed.

The normal mind-brain relationship is certainly one of peculiar mutual dependence and intimacy. That was very clear to Descartes himself: "Nature…teaches me by these sensations of pain, hunger, thirst, etc., that I am not only lodged in my body as a pilot in a vessel, but that I am very

closely united to it, and so to speak so intermingled with it that I seem to compose with it one whole" (Haldane & Ross, 1931, vol. 1, p. 192). This intimacy unfortunately disappeared from many later dualistic accounts including in particular that of Eccles, who often speaks in terms of a completely disembodied "self-conscious mind" that stands apart from and inspects or influences the activity of cortical columns, rather like an immaterial pianoplayer playing the keys of the bodily piano. That sort of picture is clearly no good, because except by way of very indirect technical arrangements we normally have no *conscious* contact whatsoever with low-level physiological events occurring in our brains. Eccles's picture also seems inconsistent with many neuropsychological phenomena such as the confusion that typically accompanies hemineglect due to parietal-lobe injuries (Stapp, 2004a, p. 167).

Problems of this sort can probably be circumvented, however. Gauld (1968) points out that a person can be conceived as relating to his brain in more intimate fashion, perhaps in a manner somewhat analogous to that of a parasite to its host, and that such a picture could potentially accommodate many relevant facts of neuropsychology: "Malfunctioning of a host may cause malfunctioning of a parasite, and vice-versa; none the less, malfunctioning host and malfunctioning parasite might regain their health if they were separated. Similarly, could a person disengage himself from his damaged brain, he might once more function properly" (at least temporarily, we might add) (p. 348). Something very much like the latter in fact appears to happen in the case of NDEs occurring under conditions of cardiac arrest or general anesthesia (Chapter 6). Philosopher C. D. Broad (1925/1960, 1962) repeatedly invoked the somewhat similar metaphor of a chemical compound, which in some respects seems slightly better: In the formation of table salt from sodium and chlorine, for example, a unique entity, something distinctly new, emerges. The components may also give up something in forming the compound, but they retain their separate identities and the potential to revert to their previous dissociated state. That is, there is also a dynamic aspect, with the components able to exist either conjoined or apart, and a sort of "energy hump" in between so that they tend to do one or the other depending on whatever conditions are relevant.

The very biological-looking critical-period aspect of cases of the reincarnation type (Stevenson, 1997, 2001), in which pre-existing memories of a previous life seem to get progressively overlaid by the subsequent learning of the new personality, appears consistent with such a metaphor. Here it looks as though what otherwise might normally be a fast and automatic forgetting process is somehow getting interrupted or delayed. The high incidence in such cases of violent death in the previous personality is especially intriguing in this regard.[35] More generally, the notion that we begin neonatal life

35. See especially Stevenson (1997). There may also be a parallel here with trance mediumship, in that a number of the really successful communicators such as "G.P." (see Gauld, 1968, 1982) have also suffered violent or sudden death. Perhaps "unfinished business" is somehow conducive to remembering, as in the well-known "Zeigarnik" effect.

with a great deal of our personality already in place is broadly consistent with recent trends in developmental psychology, and Stevenson (2000) has pointed out a variety of ways in which the reincarnation hypothesis could potentially explain residual variability not otherwise explainable in terms of "normal" genetic or environmental factors.

Taking the "entry" metaphor seriously requires us to predict that corresponding phenomena of "withdrawal" may sometimes occur. For example, in persons suffering from progressive senile dementias it may sometimes happen that the mind of the dying person becomes disengaged sufficiently from the diseased brain, near the point of death, that relatively normal functioning briefly reappears (provided that suitable expressive capacities are still available). Phenomena of this type were already being reported by early observers such as de Boismont (1859), Flournoy (1903), and Rush (1812), as mentioned in Chapter 6, and recent interactions between several of the authors of the present book and medical personnel at several hospices and clinics strongly suggest that such phenomena are still occurring and potentially accessible to systematic study. Severe Alzheimer-type neuropathology has also sometimes been found in autopsies of persons exhibiting normal or even above-normal pre-mortem mental function (Davis, Schmitt, Wekstein, & Markesberg, 1999). Mental revivals in the context of severe neurodegenerative disease clearly merit further research, not least because materialist critics such as Edwards (1996, chap. 17) have emphatically denied that they can occur.

The everyday or supraliminal self as we normally experience it comes into conscious action in conjunction with the associated brain, whenever that brain achieves some threshold level of overall activation or "arousal" characterized by the predominance of intrinsic electrical rhythms of roughly 8–12 Hz and higher. All the major proposals regarding neurophysiological correlates of normal conscious experience point to the importance of synchronous (or at least coherent) neural oscillations in the gamma frequency range, oscillations that link and perhaps somehow "bind" the electrical activity of widely distributed regions of the brain. In the context of the non-Cartesian dualist-interactionist model this suggests that there is normally some sort of mutually constraining or resonant linkage between this large-scale brain activity and the associated psyche which limits, focuses, funnels, unifies, and stabilizes the supraliminal mental life, while whatever additional strata of mental or psychic organization may be present, per Myers and James, remain active behind the scenes. The stabilization or mutual-constraint aspect is revealed, perhaps, by the fact that in NDE cases involving life-threatening injury, the subject often initially remains at least briefly in a more or less normal state of consciousness before beginning to experience the more drastic alterations associated with a full-blown NDE (Chapter 6). One can also readily imagine, as explicitly suggested by James (1898/1900), that the normal ongoing interactions between mind and brain might result in modifications on *both* sides, although the details of how this could work again remain obscure.

The patterns of brain activity accompanying normal conscious experience also seem to have an overall functional architecture that in a meaningful sense is parallel to, or isomorphic with, the characteristic perceiver/perceived or knower/known phenomenological structure of that experience. At least two proposals from recent mainstream literature in neurophysiology are consistent with this basic idea. Crick and Koch (2003) explicitly acknowledge this universal phenomenological property, which they call the "homuncular" structure of experience, and suggest that it probably reflects some large-scale feature of brain organization. They themselves think it may reflect the fact that the front of the brain, more involved in executive functions and the like, is "looking at" activity in the back of the brain, which contains the main sensory systems. This rough and metaphorical way of formulating the basic idea seems broadly consistent with most current consciousness theories of the global workspace type. A more elaborate and neurophysiologically justified model, however, flows from the specific variant of workspace theory deriving from Penfield (1975), Newman and Baars (1993), and especially Llinás et al. (1998), which emphasizes the role of the extended reticular activating system and the massive reciprocal connections linking the thalamus with the cerebral cortex. Llinás's group has discovered a thalamocortical "scanning" rhythm, in the neighborhood of 40 Hz, which sweeps repeatedly across the cortex in a front-to-back direction (Joliot, Ribary, & Llinás, 1994). They interpret this as a process by which a thalamus-driven readout mechanism periodically interrogates the cortex and synthesizes or binds the various processes going on there into the momentary global state. Apart from the physiological evidence directly supporting it, this proposal, unlike that of Crick and Koch (2003), is also consistent with a large body of clinical evidence showing that small lesions in the upper brainstem and thalamus completely abolish ordinary consciousness itself, whereas cortical lesions, even large ones, typically abolish or alter only relatively specific elements of its phenomenological content.

The Llinás model also maps fairly well onto a sizeable body of data regarding "the psychological moment" (Stroud, 1955). In simple reaction-time experiments, for example, the within-subject distribution across trials of the time it takes to press a button in response to a flash or tone turns out not to be continuous, as initially expected, but to consist instead of multiple discrete peaks separated by intervals of a few tens of milliseconds (Dehaene, 1993). Another example is provided by the "wagon-wheel" illusion often seen in movies, in which the wheels of the stagecoach seem to turn erratically, or even in the wrong direction. This previously had been thought due entirely to "aliasing" effects associated with the varying relations between the rate of rotation of the wheel and the fixed presentation rate of the movie frames, but it turns out to occur even with wheel-like visual objects that rotate continuously under continuous illumination (Purves, Paydartar, & Andrews, 1996). The conclusion appears inescapable that there is an inherent *discreteness* in sensorimotor activity, corresponding in a striking way to James's notion of "pulses of consciousness." Note also that effects of this

sort, variable between individuals and tasks, are inherent in Stapp's model, inasmuch as Process 1 in itself imposes a task-dependent framing on the otherwise continuous evolution of Process 2.[36]

Even when the normal, ongoing adult engagement of mind and brain is in force (whatever that relationship amounts to in detail), the mind appears to retain at least a limited ability to operate more independently, and potentially in very different ways, when that engagement is altered or ruptured in various ways by changes in the functional status of the brain. The dramatic and rapid within-subject fluctuations in mental status often observed in brain-damaged patients (H. Gardner, 1976), for example, might reflect corresponding fluctuations in patients' capacities to interact normally with their malfunctioning brains. Sleep and dreams also can clearly be thought about in this way—a kind of regulated quasi-periodic "stretching" or other modification of the normal linkage—and certainly the lack of satisfactory progress on these subjects despite a century or so of serious scientific effort provides motivation to try thinking about them in a new and different way. Slow-wave sleep, for example, involves significant modifications in the overall level and pattern of brain activity, modifications that partially mimic those produced by general anesthesia, and these non-REM sleep states are already known to be accompanied by fragmentary mental activity very different in character from that of ordinary dreams (Foulkes, 1962). Vivid REM-sleep dreaming itself, interestingly, has recently been shown in both imaging (A. R. Braun et al., 1998) and neuropsychological (Solms, 1997) studies to be associated with *reduced* activity in prefrontal and occipital cortex, consistent with Myers's principle that the subliminal is liberated by the abeyance of the supraliminal and its associated forms of outwardly directed activity. Recently identified phenomena of "paradoxical function facilitation," in which previously unrecognized skills or abilities emerge following brain injury (Kapur, 1996; B. L. Miller et al., 1998), may in some cases merit a similar interpretation.

The "dreams" that are sometimes reported as occurring in connection with general anesthesia itself also deserve more careful study than they have received to date, to characterize more precisely their phenomenological properties and physiological conditions of occurrence. For these to occur at all under conditions of deep general anesthesia would conflict—like the occurrence of NDEs (Chapter 6)—with current neuroscientific opinion regarding conditions necessary for conscious experience. They would be expected, however, from the Myers/James point of view, and especially in persons open to subliminal influence, such as persons of high "transliminality," with thin or permeable "boundaries." An observation consistent

36. Another possible manifestation of this "framing" process is the EEG "microstates" discovered by Dietrich Lehmann and colleagues (Lehmann, Ozaki, & Pal, 1987; Pascual-Marqui, Michel, & Lehmann, 1995). These are brief episodes of relatively stable topography in the scalp-recorded potential field, lasting on the order of 50–150 milliseconds and separated by sharp transitions. The manner and degree to which such segmentation of scalp potential fields corresponds to the rapidly changing structure of conscious experience remains to be determined, however.

with this expectation is provided by Hejja and Galloon (1975), who showed that "dreaming" in conjunction with ketamine anesthesia occurred overwhelmingly among patients who also recalled dreaming at home. A full 50 of their reported ketamine dreams occurred among the 68 patients who also reported dreaming at home, while only two others were reported by an additional 82 patients who did not.

The NDE literature (Chapter 6) further indicates that the normal linkage can sometimes be so severely stretched or otherwise modified that the mental system spontaneously begins to operate in radically different ways. It seems especially significant in this regard that NDEs involving subjectively enhanced cognitive functioning tend to occur more commonly in persons who in fact are closer to death physiologically (Owens et al., 1990). But NDEs can also occur in persons who are continuously and fully conscious, as for example in mountain climbers during serious falls, and similar experiences also can arise following ingestion of various psychedelic agents, and in connection with transformative practices such as meditation, where their physiological accompaniments are surely very different and can more readily be studied in detail and across time (Chapter 8). The sheer diversity of circumstances under which similar kinds of experience can occur itself suggests that their common cause may involve some overall alteration of the normal mind-brain relationship, rather than engagement of specific neurophysiological final common pathways or mechanisms.

The strength of mind-brain coupling may also vary systematically between *persons* in ways that could be measured, and that might again shed light on the nature of the coupling itself. Successful trance mediums like Mrs. Piper, for example, might be viewed (and were viewed by Myers) as persons in whom the coupling is unusually "loose," permitting the psyche to disengage partially or wholly from its customary entanglements and thus to provide temporary access for potential "communicators."[37] Unfortunately, practically nothing of significance is presently known about the great trance mediums (or for that matter about exceptional psi subjects of any other kind) in terms of relevant characteristics of physiological function, personality, or cognitive style.

Our basic functional picture of the normal waking situation, like that of most neuroscientists including Crick and Koch (2003) in their discussion of "zombie modes," is that mind and consciousness get involved in ongoing activity only to the extent they need to, while things that are simple, or fully learned or overlearned, can run on more or less automatically via brain processes. Such a division of labor can readily be accommodated within the basic framework of Stapp's model, because to the degree that the proliferation of possible brain states by Process 2 is directly constrained by interactions between the organism and its environment, the need for Pro-

37. Conversely, aphasia-like phenomena which often accompany the emergence of a new communicator (such as difficulties in speaking or writing the right words) might be viewed as expressions of the difficulties that psyche encounters in "operating" a partly unfamiliar organism. See Myers (*HP*, vol. 2, p. 254) for some interesting remarks on this subject.

cess 1 contributions would be correspondingly reduced. Such a picture is consistent not only with everyday experiences such as driving a car while carrying on a conversation, but also with neuroimaging results showing that the numerous and widely distributed brain territories initially engaged by a complex task massively deactivate and contract as the task is progressively mastered (e.g., Haier et al., 1992; John, 1976). Consistent with our modified-holist view, this looks more like changing degrees of engagement of one large, common structure than all-or-none selective engagement/disengagement of highly localized and specific computational "modules." Similarly, human cortical neurons involved in working-memory tasks have recently been shown to produce gamma-band EEG activity under *all* the task conditions, but in amounts proportional to the overall memory "load" associated with each task (Howard et al., 2003). Another relevant observation involves electrical stimulation of the small thalamic regions that produce petit mal epileptic "absences"; Penfield (1975, pp. 37–43) interpreted this as reversibly disrupting the connection of mind to brain and releasing the brain as a kind of sensorimotor automaton to operate temporarily on its own, for example in playing the piano or driving a car (both poorly, in the absence of the normal conscious fine-tuning).

We have now said about as much as we need to, or at this point usefully can, in terms of justifying the non-Cartesian dualist-interactionist model and fleshing it out in neurophysiological terms. Although we have perhaps made some progress in this regard, it is only candid to acknowledge that we ourselves remain less than fully satisfied with this approach. The traditional dualist problems regarding mental causation and energy conservation seem to be overcome, but there remain further deep problems with no good solutions in sight. We still have no real understanding of the ultimate nature of the relationship between brain processes and mental activity, and certainly no solution of Chalmers's "hard problem"—why conscious experiences with their specific qualitative characteristics should arise at all in connection with the associated patterns of brain activity. It is not clear which aspects of the "cognitive unconscious" go with the brain, which with the associated psyche, and how their respective contributions get coordinated. We have talked about mind-brain relations primarily in relation to the functioning of an adult human, presuming the existence of an associated psyche, but where do these psyches come from in the course of individual human development, or in the evolution of species? Where and how, exactly, does consciousness enter the picture? These are difficult problems, to say the least (and see Griffin, 1997, chap. 3, for related discussion). Finally, we have said practically nothing about further difficult problems having to do with the properties of that adult psyche itself. We conceive that the psyche or at least some part of it may be capable of operating in some fashion on its own, independent of the brain, but what could be the character or mode of subsistence of such an entity? Broad (1962, Epilogue), who discusses this problem in considerable depth, ultimately adopts the conventional scientific view (disputed by Braude, 2003, pp. 294–301) that any dispositional properties of a mind must

be grounded in or explained by minute structure and processes in *some* sort of material substrate. From this viewpoint, post-mortem survival of human personality or consciousness would necessarily occur in conjunction with some sort of "subtle" physical body or bodies, perhaps of the types conceived by the wisdom traditions and summarized by Poortman (1954/1978). Although such a picture does not seem to be ruled out by our present knowledge of physics, and deserves further investigation, we suspect that a more fundamentally novel way of approaching the problems *may* in the end yield a better solution. We turn next to this.

Neutral-Monist Models

The key to moving in this more radical direction is to recognize that our entire discussion of non-Cartesian dualist-interactionist models has implicitly, and perhaps mistakenly, taken the classical "matter" side of the Cartesian bifurcation for granted. To recapitulate: The body conceived conventionally as a physiological machine has proven unable to account for all the properties of minds, and so we must try to find a different theory that can better account for the empirical data. In a first attempt to do so we proceeded in what probably seems the most natural and conservative direction, at least to most persons reared like ourselves in the intellectual tradition of Western reductionist science. Specifically, following the main lead suggested by James (1898/1900), we left the Cartesian body in place but re-introduced the psyche, conceived as a second and distinct type of existent (itself possibly at least in part physical in some extended sense) with which that body is somehow associated. This approach, however, gave rise to difficulties analogous to those of the traditional Cartesian causal dilemma. In particular, we have struggled with only limited success to understand how and why these two species of existents normally interact in the production of conscious mental life. We want now to take a different approach, by examining more closely the *body* side of the mind-body relation.

We have all grown accustomed to the idea that the phenomenological table that we see and touch is not the "real" table, as described by physics. In this case we have no difficulty accepting that ordinary perceptual experience is not a reliable guide to the ultimate nature of things. Yet it is extremely difficult if not impossible for most of us to adopt that same attitude with respect to the phenomenological solidity, the felt presence, of our own bodies. They seem just inescapably there, brute facts, existing on their own as classical Cartesian objects. It is this intuition, however, that we will now challenge.[38]

To begin, consider the character of what we experience in dreams. Those of us who dream vividly encounter a phenomenological world similar in

38. For additional help in this regard, see the all-out assault on this everyday intuition by Harrison (1989).

many salient respects to the world we all experience in the waking state. We experience ourselves as embodied, and we move purposefully among other solid, three-dimensional objects, including at times other persons, that seem to exist independently of ourselves and that also behave for the most part in more or less customary ways. Both we and the persons we encounter seem to have both an "outside" and an "inside." If we smash violently into something, we may appear to bleed, and it usually hurts. Those other persons act as though they have their own thoughts and motivations, and they sometimes tell us things that we ourselves do not consciously know. Yet all this vivid dream-world experience, so like what we experience in ordinary waking life, occurs in the near-total absence of corresponding sensory input (Globus, 1987).

The seeming reality of the dream of course evaporates, for most of us anyway, when we awaken in the ordinary way to the phenomenologically similar world presented in everyday experience. *This* world seems to most of us unquestionably real, existing "out there" and independently of ourselves. Yet as we saw in Chapter 8, great mystics of all traditions have reported entering states of consciousness relative to which that everyday reality itself proves evanescent in the same way as a dream. The material world given in everyday experience, they declare, is not what it seems. Matter as we customarily experience it does not exist, at least not in the way we naively believe it to exist.

In our attempt to develop the non-Cartesian dualist-interactionist model we relied heavily on a first major consequence of quantum theory, that it brings consciousness back into physics at the foundational level and in a causally effective manner. There is a second major consequence, however, no less profound but even less widely appreciated. It is this: There is no such thing as matter as classically conceived. Physics is not ultimately about an independently existing objective world of classically conceived material entities, but rather about our knowledge, and about relationships among experiences. Thus our *ontology*, our conception of the basic "stuff" of which the universe is composed, also must undergo fundamental revision. Stapp (2004a) summarizes the situation this way:

> The physical world thus becomes an evolving structure of information, and of propensities for experiences to occur, rather than a mechanically evolving mindless material structure. The new conception essentially fulfills the age-old philosophical idea that nature should be made out of a kind of stuff that combines in an integrated and natural way certain mind-like and matter-like qualities, without being reduced to either classically conceived mind or classically conceived matter. (p. 268)

Before proceeding further in this direction we will briefly digress, for reasons that are both historically and conceptually significant. We are acutely aware that many scientifically minded readers, even among those who have stayed with us to this point, may have gagged at our emphasis on the word "ontology." Ontology is a branch of metaphysics, and scientists

tend to pride themselves on having nothing to do with such arcane matters. William James himself clearly shared that attitude at the time he was writing the *Principles;* in his preface and elsewhere he declares that the proper business of psychology as a natural science consists simply in ascertaining the correlations that ordinarily hold between states of mind and brain-states, and that to attempt to explain these correlations in terms of anything more fundamental would be to trespass into metaphysics. But Myers (1891c), in his remarkable review of the *Principles*, chided James for taking this narrow view, and for failing to recognize the degree to which more penetrating empirical investigations of the mind-brain connection might be able to shed light on its ultimate character. Undoubtedly influenced in considerable part by Myers, James (1892) by the time of his *Briefer Course* had already abandoned the position adopted in the *Principles* and concluded that there can in fact be no such thing as a metaphysics-free science of psychology:

> When, then, we talk of "psychology as a natural science" we must not assume that we mean a sort of psychology that stands at last on solid ground. It means just the reverse: it means a psychology particularly fragile, and into which the waters of metaphysical criticism leak at every joint, a psychology all of whose elementary assumptions and data must be reconsidered in wider connections and translated into other terms. (pp. 467–468)

So far we have "only the hope of a science," and its actual state of development requires us "to understand how great is the darkness in which we grope, and never to forget that the natural-science assumptions with which we started are provisional and revisable things" (James, 1892, p. 468). In his Presidential Address to the American Psychological Association in December 1894 James again stated flatly: "I have become convinced…that no conventional restrictions *can* keep metaphysical and so-called epistemological inquiries out of the psychology-books" (James, 1895/1978, p. 88; see also E. Taylor, 1996, chap. 7). The real issue, in short, is not whether we will have metaphysics, but whether we will have good metaphysics or bad.

This of course marks the point at which behavioristically oriented historians of psychology characteristically portray James as ceasing to be a psychologist and becoming instead a "mere" philosopher. But there can be no doubt that James himself did *not* see things this way. We have already shown (Chapter 8) that much of James's later work, especially *The Varieties of Religious Experience* (1902/1958) and *A Pluralistic Universe* (1909/1971), can be understood in considerable part as direct applications of Myers's model of the psyche to problems in religion and philosophy. What we have not yet emphasized, however, is that there is a further dimension of James's later work that connects directly with the matters now before us.

Our account of the non-Cartesian dualist-interactionist model rested directly upon the formulation of "transmission" theory by James (1898/1900). Yet even at that early date James was already searching for a way to get beyond dualism. In a crucial footnote he remarks:

> The philosophically instructed reader will notice that I have all along been placing myself at the ordinary dualistic point of view of natural science and of common sense. From this point of view mental facts like feelings are made of one kind of stuff or substance, physical facts of another. An absolute phenomenalism, not believing such a dualism to be ultimate, may possibly end by solving some of the problems that are insoluble when propounded in dualist terms. (pp. 50–51)

This brief statement encapsulates and foreshadows the doctrine of "radical empiricism" that James was systematically developing during the last years of his life. This involved far more than the methodological principle (which he also endorsed) that we must be willing to look at all relevant data in approaching any scientific problem. Rather, James was driving toward a comprehensive metaphysical system grounded wholly and directly in actual human experience, experience of all forms up to and including mystical experience (see Perry, 1935, vol. 2, Part 6).

James's ambitious program remained unfinished at his death in 1910, but it was subsequently taken up and integrated with emerging developments in physics by the Anglo-American mathematician, philosopher of science, and metaphysician Alfred North Whitehead. It is no accident, in this light, that in his last book Whitehead (1938/1968, p. 2) identified James as one of the four greatest thinkers of the Western tradition, along with Plato, Aristotle, and Leibniz. But Whitehead also had a profound understanding of emerging developments in physics and clearly recognized their ontological implications. His work in fact represents the most systematic effort to date to elaborate a comprehensive metaphysical system specifically intended to be compatible *both* with the new basic science *and* with all available facts of human experience.[39]

Whitehead's system is provisional, unfinished, open-ended, and vast in scope, but altogether naturalistic in spirit and character. It is far too complex and difficult to present here in any detail, but we can quickly summarize its central, driving ideas. The root cause of our present mind-brain difficulties, Whitehead argues, is the ontological bifurcation originally imposed on nature by Descartes and his 17th-century supernaturalist allies. Classical physics, as it evolved over subsequent centuries in the work of Galileo, Newton, Laplace, and their successors, dealt only with the "matter" side of this Cartesian ontology. But its core concept of lifeless mechanical matter has now proven to be a vicious abstraction, vitiated by what was left out at the very beginning. Modern physical theory invites us instead to conceive of nature as in some sense alive throughout, with even its lowest-level con-

39. Just as we have not taken Henry Stapp to be any sort of final or ultimate authority but rather as the primary representative of a group of quantum theorists whom we see as moving in broadly similar directions in regard to mind-brain relations, we are here taking Whitehead as representative of a larger group of "process" theorists working in what we are calling the neutral-monist tradition. Among these we include (in addition to Leibniz, the later James, and Whitehead himself in his Harvard period) major figures such as Charles Sanders Peirce, Henri Bergson, Bertrand Russell, Charles Hartshorne, and David Ray Griffin. We thank Eric Weiss for particularly helpful comments on this section.

stituents having both exterior/objective and interior/subjective aspects. The fundamental stuff of the universe, on this view, is not lifeless bits of classically conceived matter moving in fields of force, but "occasions of experience." These occasions, from the point of view of other such occasions, appear as "events." But Whitehead's analysis of events suggests that every event to *some* degree "feels" causes from the past, "imagines" possibilities for the future, and "makes decisions" as to what it will become.[40] Thus the definiteness and particularity that distinguish each event from all others are precisely a result of its "mental pole," however rudimentary.

Whitehead's fundamental move is thus to re-situate mind in matter as the fundamental factor by which determinate events emerge out of a background of possibilities. The behavior of the lowest or most matter-like occasions is determined almost completely by efficient causes from the past; such an event is influenced by or "feels" its past but engages in an absolute minimum of "imagination" or "decision." There is, however, a creative evolutionary drive inherent in nature which leads to the progressive elaboration, across time, of more complex events associated with correspondingly more complex, sophisticated, and self-determining experiential interiors. Events are interdependent, moreover, in ways more subtle and complex than those contemplated by Descartes and his modern successors. The classical conception of matter arose predominantly in association with the most recently evolved forms of perceptual experience, especially vision and hearing, but these are secondary or derivative acquisitions that do not fully disclose the nature of the ways in which events can potentially affect each other. They in fact conceal a profound continuity between ourselves and lower forms of organization in terms of more primitive forms of interrelatedness and experience which reflect a global interconnectedness that is fundamental to nature: "Any local agitation shakes the whole universe. The distant effects are minute, but they are there" (Whitehead, 1938/1968, p. 138).[41] The fundamental concepts in this "organismic" view of nature are process, activity, transition, and change, all orchestrated in service of "creative advance."[42]

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40. The scare quotes in this sentence are meant to emphasize that the mentalistic terms employed here are being used broadly and metaphorically, and not as they would normally apply to the mental activity of a conscious human being. How far down nature can plausibly be viewed as manifesting such "mentalistic" properties remains an open question, but the threshold, if one exists, is undoubtedly much further down than most of us commonly assume. McDougall (1911/1969, pp. 258–260) found signs of unified and purposive behavior even in one-celled organisms such as the Amoeba and the Paramecium, and Seager (1998) has advanced somewhat similar arguments in regard to elemental units of inanimate nature itself.

41. Recall that very similar ideas in regard to "panaesthesia" as a more fundamental or primitive capacity for experience were expressed by Myers (Chapter 2).

42. Whitehead's magnum opus, *Process and Reality* (1929/1978), is an extremely difficult book, but an excellent and readable introduction to his main ideas can be found in his last book (Whitehead, 1938/1968), especially Chapters 7 and 8. Griffin (1997, 1998, 2000) and Hosinski (1993) provide accurate and readable secondary sources, and G. R. Lucas (1989) and Griffin, Cobb, Ford, Gunter, and Ochs (1993) situate his work within the larger philosophic tradition.

It would carry us far beyond the purposes and scope of the present book to present or discuss Whitehead's views here in greater depth. We certainly do not mean to endorse his views wholesale, but we do wish to record here our collective sense that he was moving in a direction that is both theoretically promising and fundamentally consistent with the ontological implications of quantum theory. The latter is perhaps especially surprising and impressive in that Whitehead apparently arrived at his ontological ideas mainly by generalizing from his own earlier work on relativity theory and foundational concepts of physics such as space, time, motion, and causality, rather than by way of quantum theory itself. He was certainly familiar with emerging developments in quantum theory, but he apparently saw these primarily as illustrating or confirming ideas that he had arrived at on his own and from a different direction (V. Lowe, 1951, p. 90). Many quantum physicists including Henry Stapp (2004b) apparently agree with this judgment, finding Whitehead's general outlook intuitively appealing and at least potentially compatible with their understanding of the physics. There also appears to be growing interest among such physicists in exploring and deepening these connections, through a process of cross-fertilization and mutual adjustment in which Whitehead's original philosophical system is being progressively "modernized" in light of continuing developments in physics, while serving as a fruitful source of suggestions toward rounding out the ontological side of quantum theory itself (Shimony, 1993; Eastman & Keeton, 2004).[43]

In addition to being deeply compatible with basic science, a Whitehead-like neutral-monist outlook seems to afford new possibilities for progress on substantive issues relevant to mind-brain relations. First, as argued in particular by Griffin (1997, chap. 3; 1998) one can readily appreciate at least in principle how a neutral-monist solution *might* overcome the unresolved problems—common to both materialism and dualism as traditionally conceived, and probably unresolvable in those terms—of accounting for the emergence of mind and consciousness in the course of biological evolution and individual human development. Griffin (1993, 1994, 1997, 1998, 2000) has also made serious and generally well-received efforts to accommodate the data of psychical research, including survival data, within his basically Whiteheadian framework.[44] We ourselves can also glimpse at least in general

43. See Eastman and Keeton's on-line resource guide to physics and Whitehead, which is available at http://www.ctr4process.org/publications/PSS. It is also worth noting here that a similar neutral-monist position has tentatively been reached, from still another direction, by Chalmers (1996); see also his and other contributions to Shear (1998). Chalmers hardly mentions Whitehead at all, anchoring his neutral-monist sympathies instead in the work of Russell (1927). For critical comparative analysis of the neutral monisms of Russell and Whitehead, see Lovejoy (1930/1960) and G. R. Lucas (1989, chap. 7).

44. Parenthetically, physicist Oliver Lodge (1929) was probably the first to recognize the relevance of Whitehead's metaphysics to the survival problem. Affinities between psi phenomena and the picture of "entangled" reality revealed by quantum theory have been carefully drawn out by Radin (2006), and Stapp (in press a), in his discussion of the Libet experiments, provides a potential solution for Griffin's problems concerning precognition.

terms how such a framework *might* ultimately provide viable explanations of allied phenomena such as NDEs occurring under conditions of general anesthesia and cardiac arrest (Chapter 6) and the various still-unexplained properties of human memory (Chapter 4).[45]

Whitehead's original theory has problems of its own, however. Some of his most central technical notions and terms, such as "prehension" and "concrescence," remain for us extremely difficult and obscure. The precise manner in which lower-grade "actual entities" combine to form higher-grade entities with new, emergent properties seems particularly in need of further explication, and the importance of this can readily be appreciated from a testy exchange between Searle and Chalmers recorded in Searle (1997). Chalmers (1996) had unwisely mused at length regarding the possible mental life of thermostats, but Searle ridiculed these "panpsychist" speculations on grounds that thermostats lack the kind of biological organization that he thinks we know to be necessary for any form of conscious experience. This kind of attempted *reductio ad absurdum* has been a common response to the views of Whitehead and the other neutral monists, but as emphasized especially by Griffin (1998, chap. 9) it ignores a long tradition, extending from Leibniz to Whitehead, Hartshorne, and Griffin himself, that attempts to distinguish systematically between mere "aggregates" (such as rocks and thermostats) and "compounds" (such as earthworms and ourselves) in terms of their respective levels and types of organization. Clearly, to the degree that these distinctions can be grounded in an adequate understanding of the process of composition, the Searle-type *reductio* can be circumvented. Previous philosophic attempts to accomplish this, however, including Griffin's, seem to us mainly *descriptive* rather than *explanatory*.[46]

Even if the composition problem can be successfully resolved, further difficulties are already in sight. For example, it is not clear to us at present whether neutral monism is truly distinguishable from an interactive dualism

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45. Related suggestions regarding NDEs and memory have recently been offered by Romijn (1997), who draws upon the generically similar quantum-mechanical theory of consciousness developed by David Bohm in his later years. Bohm himself attempted to use that same theory to explain psi phenomena, which he evidently took seriously (Bohm, 1986), and his neutral-monist conception of the "implicate order" has also been enlisted by Karl Pribram (1979, 1986, 1991) in support of "holonomic" explanations of brain function, perception, and (receptive) psi, though with only limited success (Braude, 1979; Draaisma, 2000; see also Stapp, in press a, in press b, regarding technical problems in Bohm's quantum mechanics).

46. A possible way forward is suggested by physicist and philosopher of science Abner Shimony in his critical response to Roger Penrose (1997) from the point of view of a "modernized Whiteheadianism" which "applies the framework of quantum theory to an ontology that is *ab initio* mentalistic" (Shimony, 1997, p. 154). Shimony portrays the emergence of conscious states from an ensemble of neurons, for example, as due to large-scale quantum entanglement, analogous to the demonstrated emergence in relatively small quantum systems of novel properties transcending those of their constituents. Quantum theory, that is, already encompasses a mode of composition that has no analogue in classical physics. Penrose himself subsequently endorsed these suggestions, stating that "although I had not explicitly asserted, in either *Emperor* or *Shadows*, the need for mentality to be 'ontologically fundamental in the universe', I think that something of this nature is indeed necessary" (1997, pp. 175–176). See also Seager (1998).

of the sort sketched earlier. This is the central theme of Lovejoy's (1930/1960) examination of the doctrines advanced by Russell and Whitehead, and Griffin's descriptive term for his own position, "nondualist interactionism," seems perilously close to an oxymoron. In addition, Whitehead's theory as described so far is a purely bottom-up theory in which our normal, supraliminal consciousness emerges at the apex of a hierarchy of lesser integrations. This picture is similar to the monadic theories of McDougall and Balfour, and we have already argued that such theories deal poorly with the fully-developed phenomena of psychological automatism and secondary personality, as well as genius and mysticism (Chapters 5, 7, 8). More generally, they cannot easily accommodate any of the evidence assembled by Myers, James, and their colleagues for the existence in all or at least some of us of normally hidden levels of psychic organization characterized by increasing scope, precision, speed, and complexity of mental function. It appears possible in principle, however, to accommodate such phenomena, while remaining within the basic neutral-monist framework, by incorporating elements of a complementary top-down tradition (represented in the West by historical figures such as Plato, Plotinus, and the German idealists, and in the East by the higher schools of Hindu philosophy and the wisdom traditions) that sees consciousness itself as the fundamental reality in nature, flowing outward or downward to its most matter-like aspects, and then back up again in the course of cosmic evolution (Poortman, 1954/1978). Whitehead's own system in its full development incorporates such ideas in a form having much in common with James's vision of an unfinished pluralistic universe (see our Chapter 8). It is also worth mentioning, perhaps, that considerable sympathy for views of this general type has been expressed by theoretical physicists such as Schrödinger (1959, Epilogue), d'Espagnat (1976), and Haag (1996).

Within such a top-down neutral-monist framework, human personality would be pictured as a complex system made up of the same kind of "stuff" throughout. The system consists of a hierarchy of levels or strata of the types recognized in particular by Myers, James, and the wisdom traditions. Each level is characterized by its own form of psychophysical organization and has both interior and exterior aspects that allow it to participate in some form of experienced world appropriate to itself. The activities of these different strata are somehow interconnected, and coordinated in greater or lesser degree, by something like Myers's Subliminal Self, or by a consciousness that somehow underlies or pervades the whole structure. The fundamental cleavage in nature suggested in particular by the survival evidence would on such a view be interpreted not *ontologically*, as the separation of an entire "psyche" from its associated "body," but *functionally*, as a shift within that complex system, following dissolution of its outermost psychophysical shell, to a different mode of operation based on whatever levels remain. Such a picture would be theoretically attractive in that it incorporates *both* of the fundamental insights of quantum theory and overcomes the residual dualism of the non-Cartesian dualist-interactionist model, while also potentially

accommodating all of the relevant empirical data. To what degree it is actually correct, and can be fleshed out in both empirical and theoretical detail, remains to be seen.

To recapitulate: Both Myers and James believed that the only way we can get consciousness out of a theory is to build it into the theory *somewhere* at the beginning.[47] The neutral-monist options identified here—strictly bottom-up, strictly top-down, or possibly some higher-level integration of the two—seem to bracket the possible ways of doing so. Our own collective sympathies tend currently, but less than unanimously, toward the last of these somewhat dizzying abstractions, which clearly has a great deal in common with the views held by Myers and James. We will not attempt to develop them further or adjudicate among them at the present time, however, for to do so is the central goal of our ongoing Esalen discussions and the expected subject of our next book.

Meanwhile, what we think will ultimately prove most helpful in catalyzing further theoretical progress will be thoroughgoing application—determined and disciplined, but also sympathetic and flexible—of Western-style scientific imagination to the phenomenological realities revealed by the great contemplative traditions, both East and West. We need to chart more fully and accurately the natural history of these "higher" or "deeper" subliminal realms. How many meaningfully distinguishable states or levels of consciousness actually or potentially exist within us, with what properties and what relationships to each other? Under what sorts of conditions do they occur, and what sorts of consequences do they have? Can we harness the benefits of potentially useful states by developing improved means of facilitating their occurrence? Partial or preliminary answers to some of these questions may be obtainable through careful and scientifically informed comparative study of the existing literature of the wisdom traditions themselves, but what will contribute most in the long run, in our opinion, is intensified experimental and phenomenological investigation of altered states of consciousness of *all* types, whether spontaneously occurring or induced by meditation, psychedelics, hypnosis, or other means. Only in this way, if ever, will we finally get to the bottom of what James called "Myers's problem." There are many lifetimes' worth of exciting and important science to be done here, work unlikely to be undertaken by persons immured in the current mainstream consensus.

47. James (1890b) remarks that "*if evolution is to work smoothly, consciousness in some shape must have been present at the very origin of things*" (vol. 1, p. 149). See also the critique by Griffin (1998) of conventional accounts by Dennett, Humphrey, and others of the supposed incremental "emergence" of consciousness in the course of evolution.

Summary and Prospectus

For an enlarged scientific picture of human mind and personality to emerge, two things need to happen: First, it must be demonstrated that the currently dominant physicalist theories of mind-brain relations are inadequate in principle; and second, an alternative theory must be found that remedies these defects.

The present volume has sought mainly to address the first of these tasks, by assembling in one place large amounts of credible evidence for a wide variety of empirical phenomena that appear difficult or impossible to explain in conventional physicalist terms. We find this evidence cumulatively overwhelming, and expect to have persuaded many open-minded readers that this is the case. At the same time, we are also acutely aware that the continuing scientific resistance to many of these phenomena derives in large part from their apparent conflict with current physicalist orthodoxy. Nothing would do more to hasten their wider recognition and acceptance, we believe, than identification of an alternative theoretical outlook that is scientifically defensible and that would permit and perhaps ultimately even explain them. In this concluding chapter, therefore, we have attempted to show at least in a provisional way that such theoretical expansion appears possible.

Our theoretical reconnaissance proceeded at two primary levels. In the first half of the chapter we argued that the psychological theory advanced by Myers and developed further by James in his late period has been considerably strengthened by many related scientific findings of the subsequent century. We ourselves strongly suspect that they were already approaching a more or less correct overall picture of the structure of the human psyche, but at the very least they provided a useful working model which brings the entire range of relevant empirical phenomena into intelligible relationship within a coherent descriptive framework, and which suggests a variety of potentially fruitful directions for further research.

This theory was not disproven but simply displaced, forgotten—a casualty of the changes wrought in scientific psychology by the advent of behaviorism. Its near-total absence from contemporary discussions of consciousness seems to us the worst yet among many unfortunate examples of scientific amnesia (Draaisma, 2000; Harrington, 1987; Koch & Leary, 1985), and to help overcome this amnesia has been one of the central objectives of our book.

In the second half of the chapter we attempted to go further by showing in a provisional way that more comprehensive psychological theories of the Myers/James type are also potentially reconcilable with the relevant aspects of present-day science. In this first stage of an ongoing theoretical effort we have attempted only to sketch out the main directions in which further progress seems possible, and is urgently needed. Theories of the types indicated share several major advantages relative to those that currently dominate mainstream science and philosophy: In particular, they

are more deeply compatible with leading-edge physical science itself; they appear potentially capable of explaining most and perhaps all of the "rogue" empirical phenomena catalogued in this book; and they ratify, rather than reject, our everyday experience of ourselves as purposeful, causally effective, conscious agents. We wish here to underscore this last point, because it brings out in perhaps the most dramatic and humanly relevant way the stark contrast between the sorts of theory we are advocating and those that dominate the current scene.

The self was absolutely central to the psychology of William James (Leary, 1990). In the *Principles* (1890b) he says: "The universal conscious fact is not 'feelings and thoughts exist' but 'I think' and 'I feel'. No psychology…can question the *existence* of personal selves. The worst a psychology can do is so to interpret the nature of these selves as to rob them of their worth" (vol. 1, p. 226). The self is something the presence of which we can feel almost constantly at the innermost subjective pole of our experience. Its ultimate origins remain mysterious, and as we saw in Chapter 8 James himself traced them into the recesses of the subliminal consciousness, and even to the hypothesis of a World-Soul as the ultimate foundation and root of our individualized conscious selves. But however it arises, the self is the active element in the stream of consciousness, expressing the dispositional basis of our conscious mental life:

> It is what welcomes or rejects. It presides over the perception of sensations, and by giving or withholding its assent it influences the movements they tend to arouse. It is the home of interest,—not the pleasant or the painful, nor even pleasure or pain as such, but that within us to which pleasure and pain, the pleasant and the painful, speak. It is the source of effort and attention, and the place from which appear to emanate the fiats of the will. (vol. 1, pp. 297–298)

This is essentially James's answer to Hume, who had famously declared that upon looking within he could only find particular sensations, images, feelings, and thoughts, and never his "self." But the dominant position in contemporary psychology, neuroscience, and philosophy derives from Hume, not from James. Particularly with the recent rise of connectionism and dynamic systems theory (Chapter 1), our experience of ourselves as causally effective agents has come increasingly to be portrayed as mere illusion, with consciousness itself at best a causally ineffectual by-product of the grinding of our neural machinery. There is in reality nobody in charge, no executive. We are nothing but self-organizing packs of neurons. "Subjectless processes" do all the work. Pronouncements of this general type abound, for example, in recent books and papers by prominent figures such as the Churchlands, Francis Crick, Daniel Dennett, Jean-Pierre Dupuy, Gerald Edelman, Walter Freeman, Douglas Hofstadter, Steven Pinker, and numerous others.

Possibly the most extreme specimen to date of this genre is the book by Harvard psychologist Daniel Wegner (2002). Having identified Dennett

in his preface as a primary intellectual influence, and having then quoted on page 1 Laplace's 1814 description of the mechanical clockwork universe as an epitome of the scientifically proper view of things, Wegner proceeds with no apparent sense of irony or paradox to generate some 400 pages of argument in support of Thomas Huxley's original claim that our experience of conscious will as causally efficacious is entirely illusory. Nothing could more aptly summarize our own estimation of such views than the caustic remark by Whitehead (1929/1958) that "scientists animated by the purpose of proving themselves purposeless constitute an interesting subject for study" (p. 16). Could anything possibly be more remote from the views of William James, for whom conscious will was a living and undeniable reality, and the active regulation of our conscious mental life its essential manifestation?[48]

We believe that these extraordinary mainstream conclusions, so deeply at odds with the most fundamental deliverances of everyday experience, result from correctly perceiving what are in fact necessary consequences of the classical materialist-monist premises from which practically all of contemporary psychology, neuroscience, and philosophy derive. We further contend that disastrous consequences of this magnitude ought to be recognized by everybody for what they really are, a *reductio ad absurdum* of those materialist-monist premises themselves. The only possible justification for clinging to results so monstrous must be the belief that there is no alternative, no scientifically legitimate way of avoiding them. But we have clearly shown, we submit, that this belief is mistaken.

In sum, then, to move in the theoretical directions outlined here seems to us both necessitated by a wide range of empirical data and scientifically justified at the foundational level of physics itself. Which of the main types of theory we have distinguished will ultimately prove most satisfactory, and indeed whether they *are* in the end meaningfully different types of theory, remains to be seen. But *something* along these lines seems to us sure to emerge, however long this may take, and we predict with high confidence that psychology will not end up, as many have feared, being cannibalized either by neurophysiology or by sociology.

Our theoretical suggestions are responsive to Chomsky's repeated pleas for "unification" between an empirically adequate psychology and a deepened conception of its physical basis (Introduction), and they restore the most mature concerns of our most luminous predecessor, William James—which have been systematically ignored by mainstream psychology for over a century—to the place which he himself believed they should rightfully occupy at the center of our science. In effect we seem to have come full circle, to a view of human nature much like that advanced by Myers, James, and their

48. This is not to say, of course, that *all* of our actions are *fully* under conscious supraliminal control. Both Myers and James recognized that aspects of experience and behavior are sometimes controlled in part or in whole by transmarginal influences of various kinds, whether automatic or "infrared" processes originating in the organism or "ultraviolet" influences exerted by a wider subliminal consciousness.

colleagues. But we emphatically do not see this as a matter of going backward to something already fully formed, already completed and perfected at their hands and ready to be adopted *as is*. It would be more accurate to say that we have reached the corresponding point on the next higher turn of a spiral. For their basic picture of the human psyche can now be anchored to physical science at a much deeper level, and the further development of that picture can surely capitalize on the tremendous methodological and technical advances that have been achieved in the intervening century.

The expanded scientific psychology that would result from such efforts can potentially overcome the great historical divisions within psychology, while also strengthening its principal domains individually. In general terms we can readily foresee, for example, a deepened cognitive mainstream in which the present elevation of the physical or physiological at the expense of consciousness and the mental has been essentially inverted. Computational modeling in all its forms would be downgraded from a general theory of the mind to a useful but limited applications technology (Searle, 1992). Consciousness would be more widely recognized as *the* constitutive problem of the field (G. A. Miller, 1985), and far greater resources and effort would be allocated than at present to research focused upon relationships between unusual states of consciousness and brain processes, as for example in psychophysiological and neuroimaging studies of OBEs and NDEs, psychedelics, meditation and related transformative practices, mystical experience, and other altered states. More penetrating investigations of psychophysical influence and psychological automatisms along lines suggested in Chapters 3 and 5 are surely in order, and there would also be greatly increased emphasis on currently unsolved problems in cognitive and personality theory—in particular, unsolved problems in regard to intentionality, meaning, symbolism, memory, personal identity, selfhood, and volition—that are deeply intertwined and central to our concerns as human beings.

We can also imagine a revitalization of dynamic psychiatry, complementary to the current vogue in biological psychiatry, that would result in development of new and potentially more effective forms of dynamic therapy, fuller exploration of the "mythopœtic" dimensions of human personality (Ellenberger, 1970), and more satisfactory approaches to socially and personally vital issues such as end-of-life care. Transpersonal psychology, similarly, can certainly be brought into better relationship with the mainstream, with its central impulses and concerns grounded primarily in real empirical knowledge rather than faith in the wisdom traditions. We also anticipate the development of a new generation of improved transformative practices, tools for refashioning ourselves in accordance with the enlarged psychology, that will enable many more of us to draw more efficiently and systematically upon normally inaccessible interior resources of imagination, creativity, and spirituality.

The key to this fundamentally optimistic vision, we repeat, is to build upon the foundation prepared by Myers and James. No other system of psychology has seriously rivaled its unique combination of unremitting

commitment to empirical rigor with courage to embrace the supernormal and transpersonal phenomena that are essential to a fuller understanding of human mind and personality. Not that it should be regarded as a finished product, of course—surely the last thing either of them would have imagined or wished. It is rather a working guide, a provisional map of the territory, to be fleshed out and further improved by the labors of coming generations. Indeed, we can do no better here, in concluding both this chapter and our book as a whole, than to appropriate one last statement from Myers himself, as relevant today as when he first wrote it:

> The research on which my friends and I are engaged is not the mere hobby of a few enthusiasts. Our opinions, of course, are individual and disputable; but the *facts* presented here and in the S.P.R. *Proceedings* are a very different matter. Neither the religious nor the scientific reader can longer afford to ignore them, to pass them by. They must be met, they must be understood, unless Science and Religion alike are to sink into mere obscurantism. And the one and only way to understand them is to learn more of them; to collect more evidence, to try more experiments, to bring to bear on this study a far more potent effort of the human mind than the small group who have thus far been at work can possibly furnish. Judged by this standard, the needed help has still to come. Never was there a harvest so plenteous with labourers so few. (*HP*, vol. 2, p. 80)