serious problems they are known to present. He is silent, for example, on a utilitarian account of justice.

The virtues of Harman's book do not really lie in producing large theoretical results, but rather in presenting constructive ideas along the way. He is good on the point up to which, but not beyond which, we are willing to be relativists; on different senses of "ought" and of "moral observation"; on points of view from which we might justify a distinction between helping others and not harming them. He has a talent for reducing ideas and issues to manageable proportions, a classic example being his characterization of Kant's notion of a maxim, or "subjective principle of action": If you act so as to satisfy your desires, your basic principle or maxim is to act so as to satisfy your desires (73).

On the other hand, he can be outlandish too. His efforts on behalf of utilitarianism produce some very bad consequences, since they lead him to advertise against his own book; and he does not seem to see that he has placed himself in an untenable predicament. The *most* charitable thing he can find to say for your reading his book instead of working for famine relief is that "you are acting much as most people do, so there is probably little to be gained from blaming you for what you are doing"! (161).

With regard to the "problem with ethics," let me briefly make some general remarks: (1) The Humean "is"-"ought" dichotomy seems to be distinct from any crucially telling science-morality dichotomy. It might be that we could locate a fairly direct analogical relation between the scientific and the moral spheres, for example (moral rules being directly analogous to scientific laws, etc.); and this analogy might significantly increase our understanding of the fundamental workings of both science and morality. This would give the analogy a high degree of explanatory—or explicatory—power that, in turn, would provide strong support for the autonomy of morality, leaving the Humean "is"-"ought" dichotomy quite intact.

(2) I wonder if we know enough about the nature of "scientific method" to assume that if the moral sphere appears not amenable to this method, then there is a problem about *morality*. The nature of scientific laws seems as little understood as the nature of moral rules. The notion of causality seems as darkly mysterious as the notion of moral rightness. And what does a description of ideal gases *explain* about our observational experience of anything in the real, non-ideal world? How strong a defense, in short, do we

have against the charge that we are simply biased in favor of some "mysteries" and against others?

(3) If we have to live with skepticism about moral facts, we also have to live with skepticism about the external world. And to the extent that a science-morality dichotomy would serve to generate skepticism about moral facts, it would seem correspondingly to avoid external-world skepticism. The assumption is that skepticism in the moral case is a more pressing problem than skepticism in nonmoral cases, though I am not certain this assumption is justified. One causal explanation for it, perhaps, is that while we do not normally think people responsible for what they perceive, we do normally think them responsible for their own acts. And since responsibility often entails more pain than pleasure, there is philosophical and psychological incentive to *prefer* skepticism about moral facts, a situation we don't seem to find with other skepticisms.

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The Self and Its Brain: An Argument for Interactionism. KARL R. POPPER and JOHN C. ECCLES. Berlin: Springer Verlag, 1977. 597 p. $18.00.

The authors of this volume could not be more eminent; Sir Karl has a Schilpp volume, philosophy's highest honor for a living philosopher, and Sir John has a Nobel Prize for his research in neurophysiology. The credentials of the authors will no doubt lead many lay readers of the book to suppose that the arguments encountered represent the most advanced state of the art in the philosophy of mind and brain science, but the first thing that must be said about this book is that it fails to make serious contact with the best theoretical work of recent years. Conceived in Olympian isolation, it makes little attempt to address the issues, solve the problems, or rebut the arguments that most researchers take seriously today, and although there are discussions of some recent work, they are for the most part conducted at arms' length, and are so unspecific that I doubt that any writer whose work is criticized will feel obliged to respond.

The format of the book reveals that it is not, as one might have

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hoped, the hard-won product of a major effort of cross-disciplinary collaboration, but rather a coincidental duet. The first third is an essay by Popper, setting out his version of the history of the philosophy of mind and presenting and defending the philosophical aspects of their shared interactionistic theory. The middle third is an essay by Eccles setting out what he takes to be the empirical support from brain science for the shared theory, and providing a more detailed account of the proposed interaction between brain and "self-conscious mind." The last third is a lightly edited transcript of twelve conversations Popper and Eccles had at the Villa Serbelloni at the outset of the project. The result, not surprisingly, is ungainly and poorly unified. Worse still, the theory of mind that emerges is not really one theory, since there are unresolved differences between Popper's and Eccles' versions. These men are not really co-authors, but co-contributors to an unedited anthology; they have not hammered out a joint theory, nor does it appear that they have been tough critics of each other's contributions.

Popper's essay is a remarkable mixture of misplaced emphases and largely gratuitous scholarship. Roughly equal time is devoted to rebutting the views of panpsychists, occasionalists, epiphenomenalists, and contemporary materialists, and nearly as much scholarship is devoted to "the prehistoric discovery of the self" as to Descartes. The point of much of the historical scholarship is to establish that "All thinkers of whom we know enough to say anything definite on their position, up to and including Descartes, were dualist interactionists" (152). Even if this were true (and Popper's case must rest, of course, on a great deal of anachronistic reconstruction), all it would show was that some form of bare-bones interactionism is the default opinion of people who haven't thought all that much about it, or had the benefit of modern discoveries to aid their thinking. Flat-earthers could probably marshall a similar majority through history in favor of their doctrine. Popper's commentary on the history of the issues does, however, repay the reader with unusual perspectives and insights, but *caveat lector*: Popper writes history *à la* Russell, with bold but unmarked unorthodoxies amidst the standard fare.

Popper eloquently expresses his reverence for the complexity of the universe—and his concomitant contempt for all reductionists and oversimplifiers—but does not usually manage to extend his appreciation of depth and intricacy to the works of other authors, who almost invariably are drastically underestimated by him. Popper operates by forced dichotomy and large-scale classification

of views. Few subtleties are permitted. "If this Laplacean determinism is accepted, nothing whatever can be unpredictable in principle. So evolution cannot be emergent" (22). So much for Laplacean determinism, but interesting varieties of emergence compatible with interesting varieties of determinism are apparently unimagined by Popper.

The brandishing of isms is a familiar and not entirely useless pursuit. Sometimes important economies of analysis and argument can be obtained by it. For instance, 'interactionism' in the vocabulary of most modern materialists names a species of insane views that no one is presumed to hold; it simply refers to a particular region of theoretical perdition one always wants to avoid and often wants to warn about: the region in which little mental poltergeists pound away miraculously on the synapses. Popper calls himself an interactionist, but of course he is not *that* sort of interactionist, but something apparently much more sophisticated. Popper, in mirror image, uses 'materialism' and 'physicalism' as the names of an equally daft group of theories, but there is an asymmetry: Popper seems really to believe that the many people who call themselves materialists or physicalists these days hold the silly views he attacks. Certainly any philosopher who held the views he discusses would deserve the short shrift he gives them. "Climbing high mountains, climbing Everest for example, always seemed to me a striking refutation of the physicalist view of man. To overcome difficulties, just for the sake of doing so . . . how can these ways of fighting all our natural inclinations be explained by physicalism or behaviorism?" (146) Popper's physicalists apparently never read the sports page. At first I was inclined to suppose that his unflattering portrayal of modern materialists was due to unfamiliarity with the recent literature—that he had simply imagined an upstart tribe of benighted theorists not worth his detailed attention—but he shows evidence of having read at least the major books of recent years, and he is equally ready to attribute simple-minded views to the greats of yore. "When Kant suggests that the thought 'I think' must be able to accompany all our perceptions and experiences, he does not seem to have thought of a child (or himself) in his prelinguistic or prephilosophical state" (49/50). End of refutation. Poor absent-minded old Kant. If great philosophers were that easily shown wrong, why would anyone think philosophy worth studying?

Popper's allotment of space would better have been used to clarify the central novelties of his position; for after providing a host of mostly familiar observations with which few materialists would

want to quarrel—about holistic or mass-action effects in the brain, our susceptibility to illusions, creativity in perception, the unity of self, the folly of (simple-minded) reductionism—he leaps to an explicitly nonmaterialistic, dualistic interactionism supported by one curious and insufficiently developed argument about interaction between items in "World 3" (essentially a platonic world of abstract entities, such as theories, hypotheses, undiscovered mathematical theorems) and items in "World 2" (mental events such as thoughts, images, conjecturings, and wonderings). The argument runs straightforwardly: World 3 objects are real (and irreducible to objects in World 2 or World 1—unproblematic physical objects); World 3 objects have their effect via World 2 interactions (to *grasp* a *concept*, for example, is for there to be a *causal* interaction between a mental event and an abstract entity in World 3); World 2 cannot be a proper part of World 1 because of this interaction of World 2 with World 3, and hence mental events are not physical events. What kind of causal interaction can this be between a thinking and a theory? We are not told. Popper waves his hands about how modern physics has vacated all the old-fashioned philosophical ideas about causation, but does not give a positive account of this new kind of causation; so no reasons are given for supposing that such interaction, if it does occur, could not just as well occur between World 3 objects and World 1 objects. It seems just as apt to say that when I put a Z brace on a gate to keep it from sagging, I bring about a causal interaction between theorems of Euclid and the pine boards, as it does to say that there is a causal interaction between my thinking and these theorems. That is, in the absence of much more detailed persuasions, both views appear ludicrous. Nor is the nature of the *second* variety of interaction in Popper's theory, the interaction between World 2 and World 1 objects, positively characterized. We are given examples of "downward causation" and "levels of emergence," but the extrapolation of principles from diffraction gratings and wedges (items exhibiting downward causation) to mind-brain effects is left to the reader, together with the assurance that what is proposed is *not* just poor old Descartes's action-by-impulse, but something "holistic." Does Popper in the end succeed in inventing a sophisticated theory that does not tumble into the scrap heap of earlier interactionistic theories? One cannot say, but there are signs that Popper underestimates the dangers: commenting in defense of Descartes's version of interactionism, he writes

> If, in addition, we interpret Descartes's mechanical 'animal spirits' not mechanically, but physicalistically as electrical phenomena, then this particular difficulty [conservation of momentum] becomes altogether negligible since the mass of the deflected electrical current is almost equal to zero so that there is no problem in compensating for a switch which changes the direction of the current (180).

The contribution by Eccles exhibits parallel shortcomings. It consists in the main of a survey of results in brain science—neural cytoarchitecture, what little is known about anatomical localization of functions, the effects of commissurotomy and various lesions —but no thread ties the parts together, because Eccles simply has no overarching *psychological* theory at all. His interactionism, which he touts as a "radical hypothesis . . . that is essentially a new philosophy of perception" (271), is an unrivaled example of the invocation of a *deus ex machina*. Whenever a truly difficult theoretical issue arises, such as the "integration" or "interpretation" of the multifarious neural "signals," Eccles passes the buck to "the self-conscious mind," about whose apparently wonderful powers he is conveniently silent. Most of what is well understood today in brain science concerns the peripheries: peripheral "preprocessing" of perceptual stimulation and peripheral "implementation" of motor-nerve activity. By declaring the brain to be nothing but a preprocessor and implementer for the mind, a sort of physical doughnut round the mind's hole, Eccles excuses himself from further theoretical obligations.

Since I am not a trained neurophysiologist, my judgment of Eccles' survey of the field must be indirect and guarded. Like many other recent surveys, Eccles' essay consists of a mixture of textbook verities, challenging data from recent experimental and clinical work, and currently untestable speculations and conjectures about how the parts might go together. Every surveyor has his favorite set of speculations, and I cannot see that Eccles' are any more plausible, or better wedded to the data, than those of others, and Eccles' account has the disadvantage of being poorly written. It is neither good science writing nor good popular writing. It is unsatisfactory science writing because experiments apparently crucial to his case, e.g., Libet's work (256–259), are so underdescribed that equally plausible alternative interpretations of their results *as recounted* cannot be assessed, let alone dismissed. It is unsatisfactory popular writing because Eccles makes almost no attempt to recast the compact language of the specialist for lay readers. Most terms

are defined when they are introduced, but, for example, surely many readers will have to "translate" the following sentence to uncover its rather simple message: "All areas of the body surface from the extreme caudal to the extreme rostral lie in linear sequence along the postcentral gyrus from its dorso-medial end over the convex surface of the cerebral hemispheres" (255). In any case, only a small fraction of the physiological and anatomical detail provided is invoked in any important way in the arguments for interactionism.

When Eccles turns from summarizing to theorizing, his efforts are hampered by an extraordinary lacuna in his knowledge: he seems largely ignorant of work in psychology during the last twenty years—except for the hemisphere-specialization literature. About as close as he gets to cognitive psychology, for example, is quoting Bronowski's description (in an interview) of Roger Shepard's work with rotating mental images, and his accounts of perception and memory exhibit no familiarity with the sorts of theories attempted over the years by either behaviorists or cognitivists. His thinking about the fundamental problems of perception is so naive that he can repeatedly write of the "reconstitution" of the "visual picture" as the final outcome of visual perception, as if no problems attended such an idea. Since he has chosen to ignore the efforts of theoreticians in psychology, his own theoretical speculations gain little from his vast knowledge of the details of brain activity; he can't see the woods for the trees. As he himself observes, "We can only dimly imagine what is happening in the human cortex or indeed in the cortices of the higher mammals, but it is at a level of complexity, of dynamic complexity, unmeasurably greater than anything else that has ever been discovered in the universe or created in computer technology" (243). Suitably impressed by the utter inability of neurophysiological constructs *on their own* to explain the felicities of the mind's operations, he sees no recourse but a capitulation to interactionistic dualism, but only because he does not even look in the direction of cognitivistic theories. One might at least look at the attempts before declaring materialist psychology impossible.

The third segment of the book, the transcript of discussions, makes uncomfortable reading, for the deference and mutual congratulation that was probably appropriate in the salubrious atmosphere of the twilit gardens of the Villa Serbelloni looks faintly ridiculous in cold print. The learned knights keep noting each other's brilliance, marveling at their own "staggering hypotheses," citing the summings-up of their favorite sages (the inevitable Schrödinger, Einstein, Bronowski, Dobzhanski, Medawar), and generally egging each other on down the primrose path to dualism. Since the discussions took place before the major essays were composed, one looks in vain in them for important clarifications or reconciliations of their views.

Materialism in one form or another is the reigning orthodoxy among philosophers of mind, but neuroscientists are notorious for harboring staunch dualists in their fraternity. Do they know something that we don't know? Many philosophers must have conjured up visions of terribly technical considerations accessible only to neurophysiologists that incline the wise toward dualism—like the arguments of quantum physicists for indeterminism. Someday someone may come up with such an argument, but on the showing of this book materialist philosophers may breathe easily. Eccles' dualism is clearly revealed by his arguments to be the product of his philosophical and psychological naivete, not of his neurophysiological sophistication, and Popper's dualism has been composed as an alternative to a materialism no sane materialist holds. Might dualism nevertheless be true? No a priori refutation of all forms of dualism is possible—some coherent form of dualism *might* in the end be true so far as I can see—and no empirical disconfirmation of the dualism proposed is possible in view of the vagueness of the empirical claims made. But their view is, as the authors themselves repeatedly stress, an extravagant hypothesis, and insufficient motivation for it has been provided. No current theoretical perplexity has been shown to have an elegant solution in their terms; no chasm has been made to yawn, over which their view is our only bridge. Until the day arrives when dualism can thus be seen as theoretical salvation, materialism will deserve its orthodoxy because it is both a fruitful working hypothesis—in sharp contrast with Popper-Eccles interactionism—and a reasonable implication of mild principles of scientific unity.

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