

## CHAPTER 4

## *Evolution, Science, and the New Philosophy*

The metaphysician must enter the physiological field. He must, if he can, conduct researches; he must at least master the ascertained facts. He must not give up the study of the nervous system and brain to those who cannot comprehend anything beyond.

—James McCosh  
*Christianity and Positivism* (1871)

Physical science is becoming so speculative and audacious in its constructions, and at the same time so authoritative, that all doctrines find themselves, willy-nilly, compelled to settle their accounts and make new treaties with it.

—William James  
"The Teaching of Philosophy in Our Colleges," *Nation* (1876)

"Darwinism," wrote James Rowland Angell in 1909, "has never been a really vital issue in psychology."<sup>1</sup> Coming from one of the founders of Chicago functionalism, this statement at first sounds perplexing. Two years earlier he had urged his colleagues to view consciousness—then the focal point of psychology—as a biological adaption to novel environmental situations. In 1909, as if to counsel future historians against interpretive excess, Angell was merely asserting that, long before Darwin had published *On the Origin of Species* (1859), *The*

*Descent of Man* (1871), and *The Expression of Emotions in Man and Animals* (1872), sense physiology, psychophysics, and neuroanatomy were well-developed fields. But not, of course, in America. To explain the origins of psychology as an academic discipline in the United States, we must appreciate that "psychology" was always an intrinsic part of the American college's philosophic curriculum and that for philosophy evolution was the key issue of the 1860s and 1870s. Only when the "old psychology" proved incapable of meeting the philosophic challenges implicit in evolutionary naturalism was the "new psychology" readily admitted into the curriculum. Darwin, as one recent student of American philosophy has indicated, "changed the structure of problems that philosophers tried to solve."<sup>2</sup> As the structure of intellectual problem solving changed, so too did the shape of institutions.

What remained the same was the essential intellectual function of philosophy as mediator between science and religion. The intent of the nineteenth-century liberal arts college, says Stow Persons, "was to organize all knowledge, including knowledge of the cosmos, of man, and of society, into a consistent and intelligible whole."<sup>3</sup> This endeavor, which Persons calls Protestant Scholasticism,<sup>4</sup> attempted to reconcile faith and reason, Christian belief and Enlightenment empiricism. The organization of knowledge thus represented the institutionalization of ideals. Undoubtedly the dissemination and advancement of knowledge (less rare than ordinarily depicted) serviced the practical needs of an emerging industrial nation. We must not, however, allow our own secularity to distort our appraisal of the social vision of those Victorians for whom one of the most practical needs of the age was the inculcation of belief.

Moral science or moral philosophy was the discipline (in both senses of the word) that instructed men in their obligations to civilization. This form of ethical didactics encompassed those subjects which would later emerge as the specialized social sciences. Precursor of the social sciences, moral philosophy was also "successor of theology."<sup>5</sup> Taught to seniors as the culmination of their liberal educations, moral philosophy sought to provide a rational basis for religious and social precepts independent of revealed theology. Assuming that Truth is one, academic moralists argued from analogy that the natural and moral worlds were in perfect accord. Thus, one could infer that the natural har-

mony of the solar system suggested, indeed required, a corresponding harmony in the social system.<sup>6</sup>

Mental science or mental philosophy constituted the psychological linchpin that made plausible arguments from analogy that joined the natural and moral universes. It endeavored to prove that man's non-material mind was capable of comprehending natural and moral laws both intuitively and inductively. This epistemological dualism of sense and intellect maintained the ontological dualism of matter and spirit that every right thinking individual considered essential to belief in God, in an ordered society, and in the evidence of a theologically serviceable natural science. Protestant Scholasticism therefore depended ultimately upon a fundamentally conservative psychology. Should psychology identify mind with matter, it would discredit man's spirituality and undermine the basis of religious belief. Should psychology slip into subjective intuitionism in order to affirm that spirituality, it might condone an ethical individualism incompatible with social order and political authority. In the American colleges, it was the business of the moral philosopher to provide an intellectual defense of these religious and moral values.<sup>7</sup> These academic moralists underwrote their philosophy of science and their ethics with the psychological theories of the Scottish Common Sense Realists.

Common Sense represented an eighteenth-century attempt to restore to philosophy an empirical tradition without the epistemological difficulties that had confronted John Locke.<sup>8</sup> Most important for our purposes, Common Sense underwrote the pursuits of scientists at work in the great laboratory of nature. Scottish philosophy, assuming that sense perception is usually veridical, certified the validity of natural science and assured naturalists of the essential compatibility of their findings with religion. The auspices of the Realists encouraged the development of science within the American college.

#### *The Evolution of Science*

Between 1820 and the publication of Charles Darwin's *On the Origin of Species* in 1859 college students in the United States studied proportionally more science than at any time before or since. During this period, says Stanley M. Gurrhnick,

colleges upgraded the level of those sciences already taught, such as mathematics, physics, and astronomy, and added many more, such as chemistry, geology, and biology. Graduate students, who in 1815 could not solve algebraic equations of two unknowns or distinguish between Newton's fluxional notation and fly spots, were by 1840 dealing with ordinary differential equations, all in the course of a single generation. More professors were hired to concentrate on more narrowly defined scientific areas. . . . Scientific apparatus at the average college increased in value from a few hundred dollars in 1825 to many thousands by mid-century, and this was concurrent with the building of laboratories and astronomical observatories to house the new acquisitions.<sup>9</sup>

Robert V. Bruce's statistical study of scientists listed in the *Dictionary of American Biography* between 1846 and 1876 shows that 44.5 percent of the individuals who received income as scientists were supported by educational institutions.<sup>10</sup> Colleges were becoming the appropriate centers of scientific activity in America.

In part, the growth of collegiate science reflected the increasing need of an industrializing nation for technical and scientific personnel.<sup>11</sup> Already by the third decade of the century calls for curricular revision along scientific and technological lines had become sufficiently strident to provoke formalized defenses of the traditional disciplinary purposes of the liberal curriculum, such as the Yale Report of 1828.<sup>12</sup> Significantly, however (and contrary to the usual interpretation), this noted document explicitly and vigorously upheld the cultural and pedagogical values of science.<sup>13</sup> Academic conservatives as well as reformers stressed science as an essential mode of knowledge.

Pedagogically, classical languages had always occupied an unrivaled position in the liberal arts college. The sheer drudgery of conjugating Latin verbs or of Greek "gerund-grinding" purportedly trained the intellect and strengthened the will and hence enhanced the student's ability to master those intellectual tasks he would confront in later life.<sup>14</sup> In the meantime, this formal discipline cultivated the mental faculties by which the undergraduate apprehended those moral truths which it was the college's business to instill. In the second quarter of the nineteenth century, science challenged the prerogatives of classical studies.<sup>15</sup> To their delight, Protestant pedagogues found that chemical formulas and mathematical equations could strain mental muscles as well as any ancient hortatory subjunctive. To the satisfaction of the practically

minded, these acquisitions also led to useful knowledge. Elaborated after mid-century by such British university scientists as Thomas Huxley, the argument that science could be both disciplinary and handy had broad appeal in American colleges.<sup>16</sup> Its employment suggests that Americans did not need to depend on the German ideal of *Wissenschaft* to countenance scientific activity within higher education.

Culturally, science supplied vital philosophic and religious benefits to the academic syllabus, benefits even more essential to its ascendancy than the foregoing argument: "Having seen that there are *a priori* truths in mathematics," reasoned James McCosh, "the mind will be better prepared to admit that there are eternal and unchangeable principles lying at the basis of morality and religion, and guaranteeing to us the immutable character of law and of the justice of God."<sup>17</sup> Astronomy attested to the harmony, balance, and order of the heavens, as did political economy closer to home. And if the principles of Newtonian mechanics rendered plausible the Utilitarian philosopher William Paley's unsettling vision of the deity as a celestial clockmaker who constructed his cosmic apparatus but no longer serviced it, the evidences of geology and paleontology indicated that divine interposition occurred subsequent to creation, that God was close at hand.<sup>18</sup> To Americans the greatest scientists appeared also to be the greatest idealists and the most plausible, if not the most ardent, religionists. The president of Amherst College, Edward Hitchcock, recalled in 1863 that "The Title of Professor of Chemistry and Natural History, which I had for twenty years, conveys but an imperfect idea of what I attempted to teach, or rather of the grand object I had in view. That object was to illustrate, by the scientific facts which I taught, the principles of natural theology."<sup>19</sup> Without this essential compatibility of science and religion it is doubtful that the colleges would have invested such huge amounts of money in supporting scientific pursuits. Science's institutional expansion was a product of ideological commitment. Science provided the quintessential method for uncovering truth. Naturalistic explanations of phenomena were becoming increasingly self-sufficient guides to the way the world worked, and not only scientists but philosophers too disparaged recourse to supernatural explanations. Thus, when Darwin published his *Origin of Species* in 1859, the academic philosophers, committed to empirical methods of argu-

mentation and to scientific modes of thinking, were compelled to await the verdict of scientific specialists on the evolutionary issue. By the 1870s most American scientists had become committed evolutionists.<sup>20</sup> Philosophers were forced to follow.

### *The Science of Evolution*

Though natural theologians and natural scientists allied in finding order in nature, the nature of the order was of crucial concern. In biology the problem of order was particularly troublesome. One plausible argument for the failure to decipher a biological order was that the species were not fixed. Evolutionary theories long antedated 1859 but were never buttressed with the overwhelming documentation that Darwin provided. The *Origin* presented, not simply a theory to be confounded by an alternatively plausible hypothesis, but also a massive empirical compilation of evidence that had to be taken into account.

Darwin's data seemed to support two interrelated principles: fortuitous variation and natural selection. According to the first principle, descendants randomly deviated in form from their progenitors. These fortuitous structural variations were in turn inheritable, thus producing a theoretically infinite diversity of life forms. In order to explain why this proliferation, though abundant, was not inchoate and undating, Darwin proposed the principle of natural selection. Indebted to Thomas Malthus's demographic explanation of famine, Darwin postulated a struggle for existence between similar varieties of animals for a limited supply of vital necessities. This conception of natural order possessed religiously intolerable implications:

In place of the perfect order and economy of the Newtonian world, Darwin postulated an incredibly wasteful process of random proliferation and ruthless extinction. In place of the benevolent harmony in which all nature conspires to be the happiness of the creation, Darwin presented "nature red in tooth and claw." If indeed order bespeaks an orderer, if like produces like, if natural law is but a mode of divine action, if all effects are intended, what conclusions follow respecting a deity who would design a world on the model of a slaughterhouse where most perished horribly, where the "saving remnant" was saved by chance adaption alone, and where the meek would never live to inherit anything? For those who had made the natural theology the foundation of their

reconciliation of religion and science, the Darwinian theory suddenly opened the abyss beneath their feet.<sup>21</sup>

In 1859 Darwin had deliberately excluded *Homo sapiens* from his account. In 1871, when the Darwinians had already carried the day, he published *The Descent of Man*, extending his theory to the development of the species once fixed halfway between beast and angel. Cosmological placement aside, the crucial issue for philosophers now centered on the verification of man's spirituality. The concept of soul had always been identified with man's rational faculties; the distinctive quality that separated man from brute was his possession of conscious mind. Religion could forsake biblical literalism and arguments from design and still survive; it could not, however, afford to deny that man was categorically different from the rest of the animal kingdom.<sup>22</sup> To deny man's soul, to deny his conscious rationality, was to forsake the concepts of free will and of ethical responsibility and hence to undermine the basis of social morality. The fundamental task of philosophy after Darwin was therefore psychological; it had to offer convincing proof for the evolution of consciousness in order to extricate mind from the implications of mechanistic determinism and then to allow ethics to be rewritten in evolutionary style. Thus, when McCosh, a Presbyterian liberal who had accepted evolution, called upon the metaphysician to get himself to the physiological laboratory, the metaphysician knew what it was he was sent there to find.

#### *Psychology and Evolution*

"Psychology," the arch-Realist McCosh announced with etymological precision, "is the science of the soul." "Soul" he defined as "that self of which everyone is conscious." Psychology, therefore, is no more and no less than "that science which inquires into the operations of the conscious self with the view of discovering laws."<sup>23</sup> As far as it went, this definition would not have troubled Wundt; as far as the "new" psychology appeared to be going philosophically, Wundt's program did not trouble the Scottish Realist. American academic philosophers came to physiological psychology with less emotional apprehension than the heroic histories of scientific psychology admit.

In fact, until the last quarter of the nineteenth century there was

little repudiation in collegiate circles over physiology itself. To Americans the history of neurophysiology—the findings of Pierre Flourens, Magendie, Bell, and Müller—constituted a reassuring documentation of the sequestration of sensorimotor experiments from the analysis of brain as "the organ of the mind."<sup>24</sup> The standard British text from which Americans drew their physiological precepts, William Carpenter's *Principles of Mental Physiology*, viewed the cerebral cortex as "a unitary organ 'superadded' to the sensory-motor centers."<sup>25</sup> As Robert Young has shown, "Between 1822 and 1870 numerous experimental tests provided no evidence for localization of functions in the brain or for the production of purposive movements by artificial stimulation of the cerebral cortex, and the interpretation placed on these experiments was that they supported the autonomy of an indivisible mental substance and belief in free will."<sup>26</sup> By the 1870s, however, Gustav Fritsch and Eduard Hitzig had demonstrated cortical excitability by means of electrical stimulation, and David Ferrier had refined, elaborated, and conclusively reinforced their findings.<sup>27</sup> Since evolutionary theory seemed to rule out the miraculous "superaddition" of mind to biological organism, the new physiology of the brain suddenly appeared damaging to philosophic assumptions about freedom and will. Physiological psychology appeared in the 1870s as a safeguard against the eventual elimination by physiologists of consciousness as epiphenomenal.

American academic moralists correctly realized that Wundt's physiological psychology implied not a concession to physiology but an exemption from it. As Stratton maintained, Wundt had rescued psychology from subjection to the science upon which it was styled. At a time when physiologists, according to Ladd, "are denying the reality, unity, and possibility of a permanent existence of the human mind, and are resolving its entire being into a stream of mechanically associated 'epiphenomena,' thrown off from the molecular machinery of the cerebral hemispheres," psychology came to mind's rescue by maintaining "an uncritical, common-sense Dualism."<sup>28</sup> Yale's laboratory director, at odds with Ladd on so many matters, at least agreed with him on this. Scripture asserted that his laboratory training with Wundt had taught him "to treat mental facts as mental facts and not to represent thoughts and emotions as nerve cells tickling one an-

other."<sup>29</sup> To be sure, many proponents of liberal culture would deplore what, in Baldwin's words, they depicted as "the 'soul' confined in a laboratory."<sup>30</sup> But to many this confinement "proved" the existence of mind and soul. Could so many avowed scientists be measuring a mirage? To write metaphysical textbooks affirming the reality of consciousness was one thing; to establish laboratories, to devise sophisticated instrumentation, to publish results in scientific journals was quite another. For those who required the testimony of science in behalf of philosophic and religious belief, the brass instrument was mightier than the pen. Cartesian dualism, elegantly ensconced in the doctrine of psychophysical parallelism, permitted psychologists to appear ontologically agnostic and scientifically respectable. As philosophy mediated between science and religion, psychology mediated between physiology and philosophy in an age of positivism.

Positivism was not without its philosophic consolations. Contrary to their usual depiction as reactionary dogmatists, philosophers who always considered themselves good scientists, generally applauded the introduction of rigorous scientific methods into psychology. The evolutionary doctrine had broken open a hornet's nest of philosophical hypotheses about the nature of mind and about man's place in nature and society. Positivism implied the suspension of speculation pending lengthy experimental deliberations.<sup>31</sup> James Mark Baldwin expressed the positivistic "tendency of the day in philosophy" in terms of a familiar chemical metaphor:

We are endeavoring, and successfully too, [ ] to throw all questions capable of such treatment to the bottom, as a precipitate—a psychological precipitate—and are then handing them over to the psychologist for positive treatment. As long as our data remained in a solution of ninety parts water (which, being interpreted, means speculation), it was difficult to handle them scientifically. . . . [W]henver we can secure a sediment, a residuum, a deposit, apart from a speculative solvent, this is so much gain for positive science and to truth.<sup>32</sup>

Such an operation would take time, as James noted in his *Principles of Psychology*: On the same page that he berated the sheer drudgery of experimentalism—"the method of patience, starving out, and harassing to death" of facts—he urged that the sole safeguard against error "is in the final consensus of our farther knowledge about the thing in question, later views correcting earlier ones, until at last the harmony

of a consistent system is reached."<sup>33</sup> Until their "farther knowledge" was perfected, positivism afforded the philosophically cautious with an ideology for confounding mechanistic and spiritualistic dogmatists alike.

James's colleague at Cambridge's Metaphysical Club, Chauncey Wright, illustrated the usefulness of this ideology when he invoked it against the American academic moralists' most pestiferous wasp, the Englishman Herbert Spencer. The most popular public philosopher in America during the Gilded Age, Spencer constructed a "synthetic philosophy" by fusing a deterministic evolutionary biology to an anti-formalist sociology with the solder of mechanistic psychology.<sup>34</sup> Wright, an ardent religionist and the man to whom Darwin himself looked to solve the problem of the evolution of self-consciousness, attacked Spencer's deterministic psychological system for its tendency to employ premature scientific generalizations in an attempt to decipher final truths. Such a procedure, Wright argued,

a positivist would regard as correct only on the supposition that the materials of truth have all been collected, and that the research of science is no longer for the enlargement of our experience or for the informing of the mind. Until these conditions be realized, the positivist regards such attempts as Mr. Spencer's as not only faulty, but positively pernicious and misleading.<sup>35</sup>

This was a safer sort of reductionism, this curtailment of the controversial. The roots of the research ideal are many and deep. But in philosophy this ideal might not have blossomed so fruitfully in American soil had it not been fertilized by the need to disparage unsound ponderings.

G. Stanley Hall recognized the widespread appeal of exact and extended research. Master of homespun rhetoric, Hall ingratiatingly declared that although experiment "involves more labor with details and is plainer and humbler" than deductive speculation, it was nevertheless

this method of self-control and subordination [to sound philosophical principles] . . . that has commended the scientific method in psychology to the confidence of conservative administrative boards, and by which its recent remarkable academic extension in the universities and colleges of this country have [sic] been made. It is premature speculative views that these boards justly fear.<sup>36</sup>

Science, like the universities themselves, welcomed new ideas, but cautiously, deliberately and conservatively. Academic philosophers, together with their patrons and sponsors, had witnessed the crumbling of natural theology's seemingly impregnable fortress. They were not about to be misled again. Better a sturdy tentativeness than a fragile complacency.

By defining the science of psychology as the study of consciousness, by insisting that the principal method of psychology was introspection (an ornate version of the Realists' favorite approach), and by adopting the axiom of psychophysical parallelism, the new psychologists had assumed in principle what they feared more radical reductionists would deny in fact. Far from trembling before the materialistic implications of the new psychology, university and college administrators welcomed the novel venture. It was first domesticated at Harvard, where Common Sense philosophy had upheld the values of Utilitarianism, "the most intact survival of the Moderate Enlightenment," which, under the influence of Newton and Locke, preached balance, religious compromise, and political conservatism.<sup>37</sup> Harvard's overseers realized in the early 1870s that the "ignoring by philosophers of the physical side of mental phenomena has had the natural effect of exaggerating the importance of materialistic views."<sup>38</sup> They urged the enlargement of psychological courses to right the balance, and James was quick to capitalize on their fears. At a time when physiology was tending toward materialistic explanation, he was able to remind potential patrons of the new psychology that philosophy, including psychology, "means the habit of always seeing the alternative."<sup>39</sup> As the pages of such periodicals as E. L. Youmans's *Popular Science Monthly* brimmed over with accolades to Spencerian psychology, James persuaded Harvard President Charles W. Eliot to allow him to present the new psychology in the classroom by asking rhetorically, "shall the students be left to the magazines [which were] publishing extremely crude and pretentious psychological speculations under the name of 'science'?"<sup>40</sup> Or, suggested James, echoing Princeton's President McCosh,

shall the College employ a man whose scientific training fits him fully to realize the force of all the natural history arguments, whilst his concomitant familiarity with writers of a more introspective kind preserves him from certain

crudities of reasoning which are extremely common in men of the [physiological] laboratory pure and simple.<sup>40</sup>

James knew Eliot's response to his question before he asked it.

The conditions of physiological psychology's entry into the colleges and universities were similar elsewhere. At Yale, Ladd doubted that one could "pursue psychology as a 'natural science' without the posture of a soul," which he considered "as a great light at the end of our [scientific] pathway."<sup>41</sup> At Clark, Hall was careful to dismiss any tendency

to balance and foreclose accounts between brain and soul yet. Even to attempt this just now, when from the neural and also from the psychic side both [sic] change, progress and promise are greater than ever before, is worse than waste, it is philosophic and scientific precocity and lack of self-control.<sup>42</sup>

Attending to both "psychic" and "neural" aspects of mind and by proceeding incrementally to add facts to both scales, experimentalism assured the new psychology's patrons that its balance would not suddenly tip to either side. It was this essentially conservative aspect of positivism, as we shall later see, that launched Hall's career at Hopkins, just as it had done at Harvard for James.

It launched other careers too. Hall, for example, had met George Herbert Mead in Germany in 1888 and convinced him to study physiological psychology. Mead's traveling companion and closest friend, William Castle, wrote home about Mead's decision to study the topic as follows:

George thinks he must make a specialty of this branch, because in America where poor bated, unhappy Christianity, trembling for its life, claps the gag into the mouth of Free Thought and says, "Hush, hush, not a word, or nobody will believe in me anymore," he thinks it would be hard for him to get a chance to utter any ultimate philosophical opinions savoring of independence. In Physiological Psychology, on the other hand, he has a harmless territory in which he can work quietly.<sup>43</sup>

Mead realized that experimental psychology involved intellectual control. Scientific thinking was not free and independent thinking; it was ordered, disciplined by the "consensus of farther knowledge." Chronically of American psychology's emergence as an independent aca-

demetic discipline have tended to identify psychology with science and rather complacently to associate science with the liberal spirit of free inquiry.<sup>44</sup> Hence they have found it easy to attribute institutional resistance to psychology's development to the sterile dogmatism of philosophical orthodoxy.<sup>45</sup> In actuality, philosophers and their institutions were more "liberal" and the modalities of science more "conservative" than ordinarily depicted.

Could physiological psychology constitute "harmless territory" and philosophical promise at the same time? What did philosophers hope to gain from it? On one level, the answers are as many as the number of individuals who supplied them. But one general answer is that they hoped to gain a breathing space. The mandates of the "farther knowledge" provided time to refashion the intellectual foundations of the moral and social philosophy once based upon natural theology; time to clothe exposed and cherished beliefs with the garb of evolutionary naturalism. The task of the philosopher remained the same: to articulate the affinities between the natural order, the moral order, and the social order.<sup>46</sup> Since evolution had altered the way in which the natural order had customarily been perceived, the academic philosopher's problem became one of reconciling a new dynamic natural order of evolutionary biology to their traditional conceptions of the moral and social universes in such a way that the latter realms would remain recognizable.<sup>47</sup> Pragmatism, successor and in many respects lineal descendant of Realism in America, provided such an evolutionary philosophical basis for traditional belief.<sup>48</sup> The pragmatic theory of ideas, which conceived of beliefs as evolving responses to the environment, assumed that true ideas were those "that competed well, that survived and worked." Thus, for example, when James reasoned "that religious ideas enabled us to live well—that they were successful—he meant that they were true."<sup>49</sup>

The new psychology that underwrote the pragmatic theory of truth by portraying mind as the organ of adaption was functionalism. In the wake of evolutionary theory, the new psychologists justified their claims to academic recognition by importing a new philosophical method—experimentalism, a method that combined scientific authority and an ap-parent metaphysical modesty. To this approach they immediately brought the functional perspective, which was essentially a biological

metaphor. With this aid—what James Angell called "the biological compass"<sup>50</sup>—the philosopher as psychologist endeavored to cope with the problem of evolution. Philosophy imbued the laboratory with its essential meaning, while experimentalism was expected to bestow upon philosophy the imprimatur of scientific legitimacy. Naturally, when the conservative academic philosopher argued that experimentalism implied the suspension of speculation, he referred to the other fellow's speculation. By expropriating the latest and most scientific approaches to the study of mind, the American academic moralist hoped to disarm philosophical opposition. Identification with the new experimental psychology might lend his own theorizing legitimacy or merely the aura of legitimacy; either way, it conferred an advantage.