learning. The inclusion of a broader range of psychologists might also have helped the learning theorists to evaluate the new clothes being offered to them and to judge whether another audience might still perceive them as in a state of undress.

Finally, there is the matter of the title. Why the *biology* of learning? Why not the psychobiology (or biopsychology) of learning? The title is noteworthy in that, although biologists have come, often grudgingly, to recognize the importance of learning, they have been unable to formulate theories as to its nature, although this may be because they have not really tried. Perhaps, then, the importance of this Dahlem conference is in providing the incentive and instruction for beginning to formulate what an actual biology of learning might look like. Serious attention to history and to the many approaches to the study of behavior is called for if biologists wish to avoid recapitulating the past of the very discipline whose future they came to debate.

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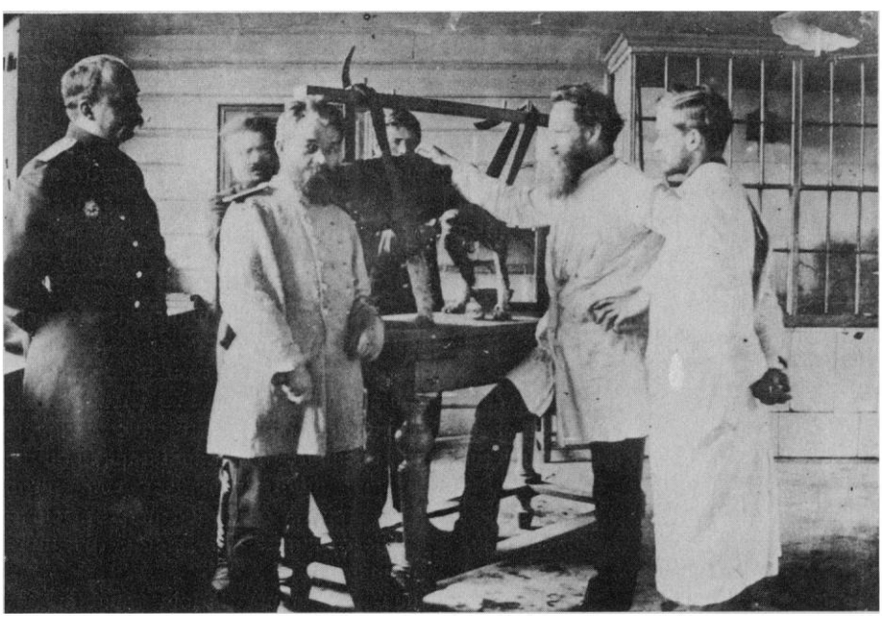
Animal Psychology: A Historical View

From Darwin to Behaviourism. Psychology and the Minds of Animals. ROBERT BOAKES. Cambridge University Press, New York, 1984. xiv, 279 pp., illus. $69.50; paper, $19.95.

Francis Bacon—that maître d'hotel of intellectual fare—recommended that some books were to be tasted, others to be swallowed, and some few to be chewed and digested. This volume goes down easy, without much chewing. Boakes, an experimental psychologist at the University of Sussex, concentrates on the history of ideas about animal mind and behavior, though he gives some attention to their application in the case of humans. For his purposes, the focus is proper. He is interested in delineating the historical foundations of the more stable contributions to contemporary psychological science (especially in the areas of physiology, ethology, and learning theory). He surpasses in depth and color the treatments given in other general histories of such important scientists as the Darwinians Romanes and Lloyd Morgan, the Russian physiologists Sechenov, Pavlov, and Bechterev, and the comparative psychologists and learning theorists Thorndike, Yerkes, and Watson. Boakes tries to plump our interest with wonderful photographs and select portions of the biographies of the scientists whose theories he considers, including some tasty bits of scandal (such as James Mark Baldwin's dalliance in a Baltimore brothel). He is sensitive to questions of institutional surroundings, recognizing the shape that such constraints often give the development of scientific ideas. Yet there is something a bit flat about the whole thing. Despite the intellectual possibilities the material offers and the seemingly capable hands working it, this history neither delights by rich subtlety nor ignites fire in the belly. It has been prepared and served up in the style of a textbook.



Laboratory of the Russian physiologist Sergei Botkin. Ivan Pavlov "is second from the right with his hand resting on the dog. The dog's harness shown here is essentially identical to that used in Pavlov's conditioning experiments, even though this photograph was taken almost twenty years before Pavlov became interested in the conditioned reflex." [Babkin Collection, Osler Library, McGill University; from *From Darwin to Behaviourism*]

Textbooks, of course, have their value, especially in science and mathematics courses. But this genre of literature cannot well sustain even the neophyte in history. Good science textbooks will convey the austere beauty of a structure of ideas, suggest the ways innovative theories dissolve resistant problems, and instruct in the techniques for validating hypotheses. Textbook writers in the natural and social sciences will cite some observational evidence, some facts in support of the theories under consideration, but will quickly dispense with the chore, except when the observations involve (as they often do today) interesting technical problems and auxiliary theories that help secure the data. But even in good history textbooks such as this one, the chronology of facts—the march of men and their ideas—dominates. Missing are overt theory and illuminating explanation to connect the facts. The beauty of a historical explanation can be every bit as alluring as that of a scientific explanation. In science, the resolution of one set of problems often suggests another interesting set. It is that way in history too: a striking explanation of one historical perplexity leads to the recognition of and attack on others. And I do not mean here a large historical theory lurking in the shadow of Hegel or Marx; but small theoretical reconstructions, say, of how Darwin came to apply natural selection theory to behavior, or how William James came to use Darwinian theory in an argument for human freedom. Explanations of this sort also require the historian to specify, at least in passing, a causal theory of idea transformation and development. But such causal accounts and their historiographic justification are not often to be found in textbooks. The history textbook usually fails, in fine, to introduce the novice to historical thinking.

By established practice, if not by definition of their trade, textbook writers do not yield up their own firsthand work, at least not on every subject they cover.

They rely on journal literature and specialized monographs. In science, the writer will at the same time be wary of this resource, since highly refined theories have short lives. In history, however, there is the residual notion that once facts—which are supposed independent of theory—are established, well, there's an end to it. Boakes sails with this presumption, especially in his first chapter, which he charts from Loren Eiseley's *Darwin's Century* (1958) and Gertrude Himmelfarb's *Darwin and the Darwinian Revolution* (1959). These older studies have definite biases (for example, Himmelfarb's Circean transformation of Darwin into a muddled thinker with a confused theory) and make insupportable claims, which Boakes repeats: for instance, that Darwin did not attempt to explain variation, or that he anchored his explanation of man's high intelligence on Lamarckian heredity and sexual selection. Lack of firsthand, close examination of the *Origin of Species* and *The Descent of Man* and failure to consult the several more recent historical analyses render invisible Darwin's distinctive, natural-selection account of human reason and moral sense. Dependence on a small sample of historical studies, moreover, produces gaps in the narrative. Apparently because of scanty secondary literature in English, Boakes claims that "German evolutionists were far less interested in psychology than their British counterparts." He then offers only a very jejune sketch of Haeckel's ideas and a few words about Wundt. He seems completely unaware of the many German thinkers who employed evolutionary theory in psychological areas, for example: Georg Schneider (*Der thierische Wille*), August Schleicher (*Die Darwinische Theorie und die Sprachwissenschaft*), Erich Wasmann (*Vergleichende Studien über das Seelenleben der Ameisen und der höhern Thiere*), Otto zur Strassen (*Die neuere Tierpsychologie*), August Pauly (*Darwinismus und Lamarckismus: Entwurf einer psychophysichen Teleologie*), and Heinrich Ziegler (*Der Begriff des Instinktes einst und jetzt*). In the case of Wundt, he has consulted only the English translation of the second edition (1892) of the *Vorlesungen über die Menschen- und Thierseele*; the vastly different first edition (1863) would have revealed a German psychologist who devoted considerable energy to a phylogenetic analysis of animal mind and who found that while "the principle of natural selection lightens the considerable darkness engulfing the natural history of physical organisms, it serves no less to illuminate puzzles of psychic development."

John B. Watson "testing the grasp reflex of a new born baby; this is a still from a film Watson made in 1919, hence the poor quality of the print." [Ferdinand Hamburger Jr. Archives, Johns Hopkins University; from *From Darwin to Behaviourism*]

Textbooks are gross sieves. They filter the past in large, unrefined clumps. Consider the texture of Boakes's treatment of George Romanes, Darwin's protégé and a pioneer in comparative psychology. Boakes justifiably allots Romanes considerably more space than is usually reserved for him in histories of psychology. The reader is furnished a survey that captures the general contours of Romanes's thought, but telling details escape and important facets do not emerge. Boakes, for instance, mentions that Romanes wrote a prize essay in 1873 on Christian prayer. We never learn of his next essay, written within a few months of the first, which argues for agnosticism, or of Romanes's lifelong struggle with religion. It is within this context that Darwin's personality—as much as his theories—hovers over his disciple's turn to evolutionary psychology. Or again, consider Boakes's remark that "Romanes rejected the Huxleyan notion of animals, and man, as automata." In the book he cites, however, Romanes objected not to Huxley's hypothesis but to Descartes's view that animals were machines without minds. And when he lumps Romanes among the dualists, asserting that "in Romanes' system the physical actions of our bodies can be directly governed by mental processes," he remains quite in the dark about his subject's monistic metaphysics according to which it is " 'nonsense' to speak of mind causing cerebral action, or of cerebral action causing mind." Attention to Romanes's Victorian obsession with religion would have supplied a context rendering intelligible his metaphysics and his concern to use psychological study to reveal another access to the divine.

Grande, chimpanzee studied by Wolfgang Koehler, "achieving a four-storey structure." [Reproduced in *From Darwin to Behaviourism* from Koehler's *The Mentality of Apes* (1925; first German edition, 1917)]

It may seem ungenerous to emphasize deficiencies in a work that stem largely from limitations of the genre, especially when the representative displays virtues far beyond the average of its kind. But the essence of the historical enterprise is to explain and to seek out God in the details. Textbooks serve as clumsy instruments for this purpose.

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