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Remaking the Science of Mind
Psychology as Natural Science
Gary Hatfield

Let us agree that "psychology" may be defined as the science of the mind or of mental phenomena, and that the subject matter of this science includes sense perception, imagination, memory, understanding or reasoning, feeling, and will. If we then interpret the term "natural science" (or "natural philosophy") as it was understood in the early modern period, psychology considered as a natural science already had a long history as the eighteenth century began. The prescribed domain of subject matter was investigated by Aristotle under the name “logos perit es psyche,” or which it formed a proper part. This Aristotelian discipline was widely studied and taught in the early modern period under the title of “de anima,” or, with some frequency, “psychology.”

Aristotelian textbooks of philosophy placed the study of the soul, including the rational soul and intellect, under the rubric of physics or natural philosophy, together with the study of basic physical principles, body in general, and the heavens. Although the “new philosophers” of the seventeenth century uniformly rejected (in their various ways) the Aristotelian theory of the soul as the substantial form of the body, they did not always derive from the Aristotelian conception of physics as the science of nature in general, including the human mind. As the eighteenth century opened, then, it was an academic commonplace that the science of the mind or soul belonged to physics or the science of nature.

Eighteenth-century writers made many proposals for changing or newly founding the study of the human mind. A few contended that the study of the mind could not be made sufficiently rigorous to rank as a science. The most famous was Immanuel Kant, though he nonetheless put empirical psychology under the rubric of physics (physiology) and remained committed to the applicability of the law of cause to all psychological phenomena. But many authors, British, French, Swiss, and especially German, proposed and sought to practice an "experimental"—that is, an "empirical" and "observational"—"science of the mind," a scientific psychology. Quantitative study, though rare, was not entirely absent, and there was a large body of systematic theorizing based on appeals to immediate experience and to observations of ordinary behavior. This activity was surveyed by E. A. Carus in his Geschichte der Psychologie of 1868, in which he discussed more than 145 eighteenth-century authors, mostly German, but also British, French, Swiss, Italian, Spanish, and Swedish, who wrote psychological works of some type, the majority placing psychology under the rubric of natural science. Max Dessoir, writing a century later in his history of modern German psychology, maintained that "in the eighteenth century psychology assumed the same position as natural science in the seventeenth century and epistemology in the sixteenth," that is, the position as the central "philosophical" discipline. The psychologies of the eighteenth century retained vitality, especially in Britain and Germany, into the second half of the nineteenth century, when a "new psychology" was proclaimed.

This description of psychology in the seventeenth and eighteenth centuries contradicts received historiography. Recent general histories of psychology, written by psychologists, agree that natural scientific psychology arose only in the second half of the nineteenth century. Other historians, taking their cue from this historiography, have sought to explain why psychology did not arise in the previous centuries. Only a few recent studies treat the earlier calls for a "natural scientific psychology" as anything but empty rhetoric. And I have found no recent author who acknowledges that psychology was considered a natural science as the eighteenth century opened, that it had been so considered in Europe for several centuries, and that offshoots of the tradition in which it was so considered remained vital, even among figures deemed important in the standard historiography, into the second half of the eighteenth century.

The contradiction between my description of eighteenth-century psychology and the traditional historiography arises partly from differing understandings of the concepts psychology and natural science. In the past half-century, since the writings of E. G. Boring, there has been a decided tendency to equate "natural scientific psychology" with "quantitative, experimental psychology," and to contrast the "scientific" character of this psychology with the "metaphysical" character of its earlier namesake. This tendency is not surprising; the growth of psychology as a scientific discipline has been built on its claim to have applied quantitative experimen
tal rigor to subject matters about which philosophers and metaphysicians only talked and speculated. If one equates modern science with quantitative science, then there seemingly was no scientific psychology prior to
the well-known uses of quantitative experimental techniques after 1850. If one attempts to confirm modern science in its ostensibly nonmetaphysical moment, then patently metaphysical theories and concepts must be excluded, or their work must be "sanitized" of the offending content. These two constraints on legitimacy conjointly explain why the great body of eighteenth-century literature claiming to found a natural scientific psychology has been ignored by historians of psychology, despite the historical continuity between the eighteenth and nineteenth centuries in the faculty tradition in Germany, and in fact, other continent traditions in both Germany and Britain.

The equation of natural science with antimetaphysical, quantitative experimentation is problematic on two counts. As an approach to history, it partakes of the worst failings of "presentism" or "Whig" history: it ignores the self-understanding of earlier figures who considered themselves practitioners of natural science, and it redescribes their cognitive activity and intellectual product from the standpoint of the presently ruling party. In this case, the community of experimental psychologists and their historians and apologists. Philosophically, it makes a crude positivist assumption that all progress in science is progress in the quantitative description of natural phenomena. This philosophical position should be resisted: not all natural scientific achievements are fundamentally quantitative, including achievements in two sciences that are closely related to psychology, namely, physiology and biology (consider the discovery of neurons, or the development of the theory of evolution). Moreover, in the early history of physics an important role was played by conceptual innovation as opposed to quantitative prediction or modeling, as exemplified in Descartes's contribution to the development of the concept of a unified celestial and terrestrial physics. (metaphysically) grounded on a small set of basic concepts, laws, and patterns of explanation. One should not rule out the possibility that in psychology, too, important conceptual work preceded quantitative experimentation. Moreover, we may well find that although quantitative, experimental psychology became widespread under that name only in the second half of the nineteenth century, a continuous tradition of quantitative observation in sensory physiology and psychology stands behind that development.

A CONTEXTUALIST APPROACH TO THE ORIGIN OF "NATURAL SCIENTIFIC" PSYCHOLOGY

My approach to the historical question of whether there was an eighteenth-century scientific psychology is in line with the concepts of psychology and natural science as they were understood in that century. During that time, psychology was the science of mind or soul, or of mental phenomena; as such, it was known under many names, deriving from "psyche," "anima," "soul," "mind," and their cognates. Mind and soul were often, but not always, equated. The mind or soul was considered by many to be a natural being, a thing in nature. "Science" was applied to any systematic body of thought, and need not have connoted an empirical basis. "Natural science" was equated with "physics," in the epistemological sense of that term: it was the science of nature. In the seventeenth and throughout much of the eighteenth centuries this science included the whole of nature, comprising a subject matter that we would now range under the headings of physics, physical astronomy, chemistry, biology, physiology, and psychology. It might or might not have been ascribed metaphysical foundations by its practitioners.

Given these understandings of the term and the areas of study they denote, psychology was considered by a great many eighteenth-century authors to be a science. This was so whether psychology was treated as a science of mental phenomena or of mental substance. Many considered it to be a natural science based on experience, including those who considered themselves to be studying an immaterial substance. A minority of the last group followed Christian Wolff in placing psychology under the rubric of metaphysics rather than physics. This fact, however, requires careful interpretation: for Wolff also placed cosmology (general physics, including planetary astronomy and the laws of motion) under metaphysics, and he allowed that metaphysical principles could and should be established empirically. Thus, if one takes eighteenth-century conceptions of psychology seriously across the board, as I intend to do, one is committed to allowing immaterial substances as (putative) objects of empirical study.

This last observation, even cushioned as it is by the surrounding contextualist historical methodology, is likely to shock modern sensibilities. This shock is another manifestation of our use of present standards (and methodologies) to judge past materials. Immaterial substances are not in the list of likely theoretical topics in current psychology and physiology. One way of interpreting this fact is to think that such topics were part of a religious worldview that was overcome with the Enlightenment rejection of superstition and authority. "Reason," so the story often goes, has shown us that rationalism and other mind-position ontologies are empty or incoherent.

This way of understanding the Enlightenment and the dictates of reason is itself unfree and simplistic. It is true that many an Enlightenment philosopher is justly portrayed as rejecting God and the soul on rational grounds, in opposition to tradition and authority. But one should not leap to the converse conclusion, for it is not true that all those who posited immaterial substances were blind followers of tradition and authority. Indeed, a chief characteristic of many who were metaphysical realists about the soul was their appeal to reason or intellect in establishing
their ontologies: Descartes is the most notorious example. In any event, if one believes that immaterial entities exist and that some of them inhabit human bodies, it makes good sense to seek to determine the powers and capacities of these entities empirically, by studying the manifestations of the mind in the behavior of others and in one’s own experience of mental phenomena. From this point of view, taking an empirical approach to immaterial substances is an extremely rational undertaking. How else is one to determine their powers?29

My thesis in this chapter is that psychology as a natural science was not formed during the eighteenth century, but remade. As the century opened, the science of the mind included several dimensions: charting the "faculties"—the capacities and powers—of mind was foremost. Associated with this task were metaphysical questions about the ontology of the mind and its faculties, and about their relation to body and to specific bodily organs, especially the brain. These questions were posed within various metaphysical frameworks; the three most widely discussed were the Aristotelian, Cartesian, and Leibnizian. As the century proceeded, new conceptions of psychology were proposed or implicitly adopted. The Aristotelian ontology of form and matter faded; most psychological authors adopted some version of mind-matter dualism. But the faculty-based approach continued to dominate the most prevalent form of dualistic psychology, "Erklärungsgenseelelehre," or the empirical doctrine of the soul or mind. Ontological questions were bracketed in order to concentrate on study of mental faculties through their empirical manifestations in mental phenomena and external behavior. This approach arose prior to mid-century in Britain, Switzerland, France, and Germany. It was pursued most extensively in the latter, where there were numerous calls for an autonomous empirical psychology. Psychological theorizing was only rarely pursued as part of an attempt to cast doubt on (or to secure) the existence of immaterial souls or their connection with things divine.

An alternative to faculty psychology began to be widely discussed in the middle of the eighteenth century: the associationist theory of mind. Hume, David Hartley, and others attempted to explain many or all phenomena of soul by appeal to laws of association. The organization of their discussions largely followed the faculty-based division of psychological phenomena into sense perception, imagination, memory, and will, but a new explanatory framework was applied to these phenomena, one that promised explanatory unification under a few basic laws. Associationists reduced the powers of the mind to one, the ability to receive impressions, and they sought to explain the interactions among these impressions by appeal to the laws of association (which often numbered three). At first pursued most vigorously in Britain and France, with the translation of associationist works into German this approach came to be acknowledged in German psychology and found several German adherents. A variant of the associationist approach found a vigorous German proponent just after the turn of the century in a quantitative statement by J. F. Herbart.30 In support of my thesis I first describe the state of psychology as the eighteenth century opened, and then chart the development of various new or modified natural scientific conceptions of or approaches to psychology and its subject matter.

PSYCHOLOGY CIRCA 1700

The science of the soul in its De anima—inspired form was discussed in four literatures in the seventeenth century: it constituted a considerable chunk of the typical seventeenth-century university textbook in Aristotelian physics, occupying from a fourth to a third of the total number of pages; it was the subject of numerous commentaries on Aristotle’s De anima; it was found in separate treatises labeled "psychologia," which might or might not be closely tied to an exposition of Aristotle’s De anima; and it constituted one part of works on "human nature" or "anthropology" intended for the natural philosophy curriculum, which part was sometimes labeled "psychology," by contrast with anatomy or "somatomonia."31 "Soul" or "soul" was, in the Aristotelian tradition, understood quite broadly, to include the principles of growth and development, or the "substantial forms," of both plants and animals, including the human animal. The Aristotelian physics textbook began with a discussion of general physical principles, such as the four causes, and the general properties of bodies, including their constitution from form and matter. It then divided all bodies into "specific kinds": first, into celestial and terrestrial, terrestrial into simple (namely, the four elements) and mixed; mixed into inanimate and animate. Inanimate beings were then divided according to the type of soul, which was denominated by its highest power. Thus, plants have only a vegetative soul, while nonhuman animals have sensitive souls (also possessed of vegetative powers), and human animals have rational or intellective souls (also possessed of sensitive and vegetative powers).

As is apparent, the Aristotelian concept of soul did not entail consciousness or rationality; at its most general, it required only life. For this reason, the seventeenth-century Aristotelian discipline named "de anima" cannot strictly be equated with the "science of mind," and hence with "psychology" as defined herein. But the science of the phenomena that we now denominate as "mental" dominated this discipline. In standard textbooks and commentaries, the "vegetative soul" received comparatively brief coverage; much greater space was given to the sensitive and rational souls. More importantly, the activities of the sensitive and rational souls were grouped together under the denomination "cognitive," and the
sensitive and intellectual faculties were seen as cooperating in the process of cognition. Indicative of their close relation, their modes of operation were often compared and contrasted. So although the Aristotelian discipline of the soul is broader than the science of the mind, effectively it maintained the study of the cognitive faculties as a subdiscipline.

The treatment of the sensitive and rational souls, exclusive of certain general (and significant) ontological questions, was organized so that the reader followed the chain of cognition according to the famous Aristotelian dictum "nothing in the intellect that was not first in the senses." Under the rubric of the sensitive soul, the five external senses were discussed first and as greatest length, including the transmission of color via light, its reception in the sense organ and the subsequent transmission along the optic nerve, and the discriminative acts of the sensitive power. Then came discussion of the internal senses, including the "common sense," imagination, memory, and the estimative power (the latter explained the vulnerable, though limited, abilities of nonhuman animals to learn and to anticipate), followed by discussions of appetite and the motive power (which controls locomotion). Under the rubric of the rational soul, considerable discussion often was devoted to problems about the spirituality and immortality of the soul; other questions concerned the production of the rational soul at the time of conception. Especially in the commentaries, the role of the intellectual faculty in cognition was analyzed extensively, focusing on its power to extract intelligible species (common natures, universals) from phantasms present in the internal senses. The power of abstraction was attributed to the "agent intellect," which, together with the phantasms, produces an intelligible species that is received in the "patient intellect," completing the act of intellectualization. All of these discussions were considered to pertain to the physics or natural science of the soul, with the exception that some authors assigned to metaphysics the study of the spirituality and immortality of the human soul. Accordingly, most authors contended that the study of the soul could be approached through "natural human reason" alone, without appeal to scriptural authority or divine inspiration. The subject matter belonged in "natural science" on the simple grounds that it pertains to "natural things, or things possessed of natures, that is, intrinsic principles of motion and change. The class of "sensitive" was somewhat wider than we now include within the proper scope of the terms "natural" and "physical," because it included the rational soul. At the same time, throughout the eighteenth century, many authors included the soul, conceived as an immaterial substance distinct from the body, to be a thing in nature.

We would now classify the material covered in Aristotelian psychology under biological, including physiology, psychology, metaphysics, and epistemology. The discussion of the external senses included the ma-
Cartesian theory becomes apparent when we recall that in his Leviathan of 1651 he had reduced understanding or intellect to imagination: "The imagination is not only the mind, but any creature imbued with the faculty of imagining," by words, or other voluntary signs, that we generically call Understanding: and is common to Man and Beast. The only major exception is that it is not limited as in other creatures by its matter, and is therefore not limited by the laws of matter, and is therefore not limited by the laws of matter. The soul is the seat of understanding, and is therefore not limited by the laws of matter, and is therefore not limited by the laws of matter.

Further, in his De Principiis, Descartes examined the physical processes and mental judgments involved in the perception of size, shape, distance, and motion. Further, in his De Principiis, Descartes examined the physical processes and mental judgments involved in the perception of size, shape, distance, and motion. Further, in his De Principiis, Descartes examined the physical processes and mental judgments involved in the perception of size, shape, distance, and motion. Further, in his De Principiis, Descartes examined the physical processes and mental judgments involved in the perception of size, shape, distance, and motion. Further, in his De Principiis, Descartes examined the physical processes and mental judgments involved in the perception of size, shape, distance, and motion.

Jacques Rohault produced the most widely distributed textbook of Car- tesian physics, which was used well into the eighteenth century. He followed the extant Principia in limiting physics primarily to the material world, though he included discussion of both the bodily and mental as- pects of sensory perception in treating the qualities of bodies. Among the senses, he again followed Descartes (and tradition) in treating vision most extensively, including the perception of color, size, and distance, the production of an "intentional Image" in the soul through brain activity, and the "judgments," based on that image which result in size and distance perception. Antoine Le Grand produced the first comprehensive ren- dering of Descartes's philosophy. Within physics, he followed scholastic practice in dividing physics into general and special, and inanimate and living. Following the Aristotelian order, Le Grand included the whole of what he termed the science of "man" in his physics, divided into two parts, considering first the human body, then the mind (agreeing with the usual division in the literature on "anthropology"). The part on the body cov- ered various bodily functions as well as the operations of the senses, includ- ing the production of sensations, or "Spiritual Images," in the soul. The chapter on "mind" proper covered the essential nature of the mind, its union with the body, and its faculties, taking care to observe that its acts of intelligence can be exercised independently of brain processes. In aca- demically orthodox fashion, Le Grand classified these discussions under the rubric of natural, or physical, or physiological, or metaphysical, or moral. Five or seven volumes were devoted to physics, and of these, two and one-half to listing things, of which more than one full volume was devoted to the senses, the other cognitive fac- ulties, and the passions. He emphasized especially the brain processes—or as he put it, the "causes physiques"—associated with sense, imagination, judgment, reason, and memory. Of these topics, Regis devoted the great- est attention to vision, including extensive discussion of color perception, the formation of a "spiritual image," the basis of binocular single vision, size and distance perception, and the so-called moon illusion. He treated
all of these "psychological" topics under physics; he reserved discussion of the existence and nature of mind (and body), and the mind-body union, for metaphysics (three-fourths of one volume).

Cartesian textbook philosophy fostered the development of psychology as the science of the mind in two ways. Implicitly, its dualistic ontology abetted the perception that the phenomena of mind form a single disciplinary unit. Descartes's starkly drawn dualism grouped the phenomena of sensation and intellect (and feeling, and willing) together as "thought" or "mental" states, joined by virtue of their common containment in "conscience," and united ontologically as modifications of thinking substance. Although most of these phenomena were associated in Aristotelian metaphysics under the rubric of "cognitive operations," they were not ontologically divorced from other bodily functions. Second, Cartesian textbook physics reinforced the inclusion of at least portions of the science of the mind within natural science by including the study of the corporeal and bodily conditions of sense perception, and especially vision, within the "physics" part of the curriculum. In the Aristotelian curriculum, optics was a "mixed mathematical" science (which meant that it applied mathematical principles to physical subject matter); although optical treatises themselves typically included extensive discussion of the "psychological" portions of the theory of vision (such as size, shape, and distance perception), very little discussion of such topics was included when the senses were examined in De anima commentaries and the corresponding portions of the physics textbook, which focused on the ontology of sensible species and of the act of sensing. By contrast, all three of the major Cartesian textbooks placed the psychology of vision—which would later be the mainstay of the new experimental psychology—squarely within physics or natural science. This second contribution stands in tension with the first, because it mixed the discussion of a purely mental subject matter (perceptual experience itself) with the discussion of brain processes. This fact can serve to remind us that despite substance dualism, Cartesian physics treated those mental processes that depend on the bodily processes in the chapters on body.

Near the end of the seventeenth century, Newton's new mechanics presented itself as a rival to Cartesian physics. It would be several decades before it clearly displaced the Cartesian physics, and several more (until near the century's end) before the older conception of physics as the science of nature in general, including psychology, was displaced by the narrower conception of experimental, mathematical physics familiar to us now. Newton himself wrote as if his work in mechanics and optics were just two instances of a new approach that could be extended to other areas of the science of nature. He promoted this extension of physiology in the Queries to the Opticks, where he speculated on the vibratory character of both sensory and motor nervous transmission. Also in the Queries, he expressed a commitment to a "sensitive substance" that he implicitly characterized as "incorporeal." Newton thus opted for mind-matter dualism. The most prolific textbook writers among his followers, G. G. van Hooft and M. van Hooft, developed more elaborate variations of philosophy, which included the logic, metaphysics, physics (limited to space and body), and moral philosophy of the traditional curriculum, augmented by teleology and by pneumatism, or the science of spirits. Unlike scholastic Aristotelian psychology, pneumatism comprehended all spirits, finite and infinite. It also comprehended the union of spirit with body, which Cartesian dualism had sometimes placed in physics, sometimes in metaphysics.

In displacing the reigning Aristotelian natural philosophy, the Cartesi an and Newtonian systems affected psychology in two ways. First, they ushered in dualism as the reigning ontology of the mind-matter relation. Second, they disrupted the traditional classification of mental phenomena under physics, creating uncertainty about where the study of the mind fit into the system of sciences; some placed it within physics, while others distributed the discussion between physics and metaphysics, and still others subsumed the human mind under pneumatism. Substance dualism thus did not necessarily lead to the divorce of psychology from its previous position within natural science: it did among the close followers of Newton, but not among all Cartesianists.

The physics curriculum proper was not the only locus for discussion of the mind or mental phenomena. Throughout the seventeenth century and into the eighteenth these phenomena were discussed in a great many disciplinary contexts. In the traditional philosophical curriculum, moral philosophy applied the physics of mind in moral psychology; logic (Aristotelian and non-Aristotelian) discussed the faculties or powers of the mind in relation to their proper use, including especially the cognitive faculties relevant to the logical acts of conception, judgment, and reasoning. In other contexts, the mind and mental phenomena were studied empirically as part of the domain of nature, but the relation to physics proper was indeterminate or secondary. Optics, which was classically defined as the theory of vision, was throughout the eighteenth century considered by many to be a branch of applied mathematics. Long after Newton published his own Opticks, which focused narrowly on the physics of light, optics continued to be pursued as a complete theory of vision, including perceptual phenomena and the mind's contribution to perception. Further, medical
psychology had long included discussion of the operation of the senses and other cognitive faculties. Others studied the mind in order to deter-
mine the grounds and limits of knowledge. Locke's Essay is the most
cited example of an empirically based ('plain, historical') approach to
the human mind considered as a cognitive power. Although his project
has often been characterized as an early attempt at natural scientific psy-
chology, Locke himself clearly distinguished his inquiry into the "Original,
Certainty, and Extent of humane Knowledge" from a "Physical Consider-
ation of the Mind," or all from the (metaphysical) consideration of the
mind's essence and its interaction with body. More generally, Descartes
had called for an investigation of the knowing power in the Regulae (circu-
lated in manuscripts and published in 1710), without implying that this
was a "physical" or "natural philosophical" investigation.85

PSYCHOLOGICAL LOGIC IN THE EIGHTEENTH CENTURY

The study of the mind, displaced from its subordinate status in the
Aristotelian curriculum, was refounded and pursued along many lines in
the eighteenth century. A Christian apologetic approach was pursued in
works by gentlemen and divines on the soul.86 In discussions of Enlight-
enment psychology, the diametrically opposed materialism of the Philo-
osophers and their Scottish counterparts—including Diderot, d'Holbach, Hel-
véas, Priestley, and Bentham—has received recent attention, as part of
the conventional story of the Enlightenment banishment of spirits and
the alliance of materialism with progressive thought and politics.87

Between those two extremes lay the largest and richest body of litera-
ture, that of the manifold programs for adopting an empirical approach to
mind and its relation to body. There was not one program for study-
ing the mind empirically, and there was not a single disciplinary result
for doing so. Rather, in diverse established, relocated, and newly created
disciplinary matrices, the empirical study of mental phenomena was pro-
posed, prototyped from books, attempted for real, and sometimes
achieved. The disciplinary matrices included the traditional Aristotel-
ian structure and the various replacements for it, including the study of
the mind as an artifact or as the basis of human knowledge; the newly
founded and widely influential Wolffian matrix in Germany; various
midcentury projects to bring new methods to the study of the soul, includ-
ing that of the Swiss naturalist Charles Bonnet and those of the French
physician Guillaume-Lambert Godart and the German physician Johann
Gottlob Krüger; the "science of the mind" allied with Scottish moral phi-
losophy; the narrowly metaphysical "Erkennungsmechanik"; and treatmens of mind in the established contexts of medical physiology, op-
tics, and -anthropology. The contexts in which new empirical or concep-
tual results were achieved included medical physiology and optics, appeals
to common experience organized by new theoretical structures, and dem-
scription of mental states; and the language often levied in arguments for
the usage and the importance of naturalistic language. The most
important result of Locke's Essay is the sharp distinction it set up between
"natural" and "empirical" methods of scientific inquiry, and the empha-
sis on the method of observation as the fundamental method of scientific
research. This was a new way of doing science, and it was the method
that was to be used in the subsequent development of natural science.

The eighteenth century was a time of great scientific and philosophical
inquiry, and the study of the mind was one of the most important areas of
investigation. The work of Locke, David Hume, and Thomas Reid, among
others, provided the foundation for the development of modern psychology.

The Enlightenment period was a time of great intellectual ferment, and
the study of the mind was one of the most important areas of inquiry.
Locke's Essay set the stage for future developments in psychology, and
his work was a key influence on the development of modern psychological
theory.
mathematical, or knowledge of the quantities of things. According to Wolff, philosophy is located in the other two sorts of knowledge in the following way: it is grounded in reasoning like that of mathematics. Wolff's works are organized according to a highly articulated division of the sciences (or the branches of demonstrative knowledge). Most generally, he retained the Aristotelian division between "philosophical" disciplines, which in his case included "physics," and "mathematical" disciplines, in which he included "mechanics" (taken as the theory of machines). Central components of the philosophical disciplines included "logic" (or "the science of directing the faculty of cognition in cognizing truths"), metaphysics, physics, and practical philosophy. Physics was the science of corporal things, general and included general physics, empirical cosmology, psychology (science of fossils), hydrology, physiology, psychology and pathology, and teleology. Metaphysics was much expanded over its Aristotelian and Cartesian counterparts, to include ontology, general cosmology, psychology, and natural theology (the latter two constituting pneumatology). General cosmology extended to the nature of body and of the elements, the four elements, and the distinction between natural and supernatural. Ontology, general cosmology, and psychology, although classed as divisions of metaphysics, were nonetheless advertised as empirically based. Metaphysics did not imply for Wolff, as it had for Descartes and would for Kant, a body of knowledge known through reason alone, independent of experience. Rather, it was defined by its subject matter, as "the science of being, of the world in general, and of spirits." Meta-
physics, as all philosophical knowledge, is based in "historical cognition," that is, in the cognition of facts. Wundt's jest about the intermixture of empirical and metaphysical content, as clever as it may seem, betrays a total lack of comprehension of Wolff's position, simply repeating an earlier and mistaken interpretation that most likely resulted from reading Kantian terminology (regarding metaphysics and the pure a priori) back onto Wolff. Thus, although Wolff placed psychology within metaphysics rather than physics, he nonetheless held it to be an empirical science. Indeed, contrary to later interpretations of his work, Wolff maintained that empirical was more basic than rational psychology, because it provided the first principles from which the latter constructed its demonstrative arguments. Within empirical psychology, the chief problem was to chart the faculties of the soul. Rational psychology then sought to find principles in empirical psychology such as could guide demonstrative explanations of the phenomena. Thus, where empirical psychology established that the soul or mind perceives or represents external objects, it fell to rational psychology to give an account of the representational relation, which Wolff explained in terms of similitude (drawing liberally on other portions of empirical psychology and on ontology). And where empirical psychology estab-
lished that sensations arise through alterations in the sense organs and that light causes alterations in the organ of sight, rational psychology explained the basis of spatial representation in general, gave an account of the means by which external objects affect the sense organs, and sought to explain vision by appealing to the relation between such effects and the consequences for sight (drawing on optics). Psychological topics per-
taining to individual mental faculties and their empirical characteristics were considered under other divisions of Wolffian philosophy. Wolff's phys-
ics provided a summary discussion of the senses, as did his experimental
d's selected problems. His optics examined the theory of vision, in-
cluding optical anatomy; color; the perception of size, shape, position, and motion; and single vision with two eyes. His physiology, understood as the study of the uses of the parts of living things, discussed the construc-
tion of the senses, nerves, and brain and their service as instruments of sensation.76

Wolff's psychology is paradigmatic of the allegedly regressive tenden-
cies of prescientific, speculative or metaphysical psychology: it is organized around the study of mental faculties, and it adopts a realistic attitude to-
ward the soul considered as an immaterial substance. Histories of psy-
chology typically take a dismissive attitude toward faculty psychology, an attitude that usually stands without argumentative backing, except as con-
voyed through allusions to Molinos's joke about the dormitive virtue of opium. Such histories are also openly dismissive of the post of immaterial substances, sometimes "explaining" such posts by mentioning the assumed religious convictions of past thinkers. In each case, historians have failed to take a properly empirical and contextualist approach to past thinkers.

In the context of the eighteenth century, Wolffian psychology was a progressive research program. It broadened an empirical approach to the mind, a kind of empiricism in Hume. It was "realistic" in that it took seri-
ously its theoretical postulate: it was empiricist in that it claimed to base its posts on repeatable observation or "tangible experience." In organization, the general framework of Wolffian empirical psychology was similar to that of Cartesian psychology: it divided the faculties of the soul into cogni-
tive and appetitive and distinguished "higher" and "lower" species of each. In content, however, it was closer to Aristotelian theory, because it treated vision as a species of cognition rather than as a separate mental power. Its basic conformity to the Aristotelian and Cartesian denunciation of faculties, including sense, imagination, memory, and intellect, does not conflict with the empirical nature of Wolff's psychology; the attribution of these faculties to humans is surely based on experience. But this much empirical content was shared by many discussions of the soul or mind from Adamic onward. What, then, was new with Wolff?
Wolff's psychology had novel features in both content and methodology. Its major methodological innovation was the explicit engjoiay to adopt a metaphysically modest empiricist attitude toward mental faculties and phenomena: they were to be studied by attending to their operations while holding metaphysical speculation in abeyance. When rational psychology seeks to explain the facts thus attained, it draws upon empirically established generalizations rather than allegedly pure a priori metaphysical insights into the essences of things in order to determine appropriate explanatory (we would say "theoretical") principles. Within this scheme, the empirically based attribution of mental faculties to human cognizers is not intended to be explanatory (as was the dormitive virtue of Molière's joke), but to be descriptive of a unified capacity of the mind. Such descriptions, being classificatory, are not atheoretical, but because they were not intended to be explanatory, they are not subject to Molière's joke (any more than are current psychological investigations of cognitive and perceptual capacities). Within his empiricist program, Wolff claimed that psychologists should particularly concern themselves with pleasure and pain, and subject to quantitative measurement and mathematical laws, although he did not himself formulate a calculus of pleasure. He also suggested that the general laws can be estimated by the temporal latency of response to a memory demand, from the number of times it takes to retrieve from memory, and from the number of acts it takes to fix an item in memory. He suggested a corresponding quantitative estimate for the size of memory.

In content, the Wolffian psychology was noteworthy for its analysis and discussion of the faculties of imagination, attention, and reflection. Wolff distinguished imagination proper, which simply reproduces memory images, from the faculty of "framing" or producing new representations (facies augunita). He described the "law of imagination," a law of association through simultaneity. And he discussed attention and its subspecies, "re-flection" (or attention to the contents of one's perceiving), including impedimenta to its exercise.

The Wolffian system was widely influential on the Continent, where it displaced Cartesian and Cartesian school philosophies. Its influence was strongest in Germany, where Wolff's works or the numerous textbooks that arose in their wake were used even by authors who no longer cited Wolff explicitly, including Immanuel Kant. The system was rendered into French by the Berlin Wolffian, Jean Deschamps. Wolff's psychology was discussed with appreciation in the article on the soul (Dame in the Encyclopedia) and his classification of psychology under metaphysics and his division of the discipline into empirical and rational features were featured prominently in the article on "Psychology."
observation. Is the soul observable? Certainly not by the senses, in the manner of external objects: we do not see, hear, taste the soul. Yet, Krüger maintained, we can become aware of the states of our soul through "inner sense." We can also know the soul through its connection with the body, as when we come to know someone's mental states through their reflection in her countenance.65

Krüger distinguished experiment from observation, and he did not intend to rely merely on observations of the soul's natural expression in inner experience and outer comportment; he was proposing a genuinely experimental study of the soul. Experiment, as he understood the term, differed from mere observation in the following way: observation requires only the possession of working sense organs and a willingness to pay attention, while true experiment requires that we "put things into circumstances which would not otherwise come to be, and thereby ask Nature to show us, what she had resolved to conceal from our eyes." Again, the link between soul and body makes it reasonable to seek such experiments: from changes in the soul, changes in the body are known (in perception), and from changes in the body, changes in the soul are known. There is also the close relation between mind and brain. Krüger allowed that the open human head and selectively invasive brain to see what happens, but he remarked that such experiments could be undertaken with animals, and also that physicians have a chance to observe the effects of natural "experiments" in patients who have suffered brain damage.66

An "experimental" science did not imply for Krüger, or for other eighteenth-century thinkers, an atheoretical collecting of facts, or the piecewise construction of theory from facts. In good empiricist fashion, Krüger held that all knowledge and all concepts derive from sensory experience. They arise, through, through the operation of reason.67 Krüger did not develop a theory of scientific method to account for the interaction of sensory experience and reason in the development of scientific theory. From his practice, it is clear that he drew heavily on currently accepted theory in interpreting experimental results. In psychology, he drew on a physical understanding of external objects and their effects on the senses, on physiological knowledge of the nerves and brain as interpreted in accordance with a "mechanical" approach to nature, and on the theoretical framework available in previous work in psychology, including that of Wolff.

Krüger's debt to Wolff and his ability to press beyond his senior colleagues are both evident in one of Krüger's applications of mathematical reasoning to a sensory conception of nerve activity, supporting his position with experimental results obtained by Giorgio Baglioli in experiments on dogs.68 Given that sensations depend on the activity of nerve fibers, he postulated that the strength or liveliness of the sensation will vary with the force produced by the vibrating nerve fibers. This force in turn will vary with the force of the external object. One might then suppose that the liveliness of the sensation will vary directly with the force of the external object, and this in fact is what Wolff had proposed, based on his own assumption about the vibratory nature of nerve activity.69 Krüger, however, went beyond Wolff in the depth of his theoretical analysis (articulated most fully in his Nautioche of Appalling to the physics of vibrations, he contended that the action of external bodies on individual nerve fibers will depend on the "tension" (tensione, Spannung) of those fibers. The liveliness of the sensation will therefore depend on both the force of the external object and the tension of the nerve. He formulated the relation as a mathematical proportion: allowing and to represent the liveliness of two sensations, and the action of the external object, and and the tension of each nerve fiber, then, in Krüger's formulation, : = . But if three times and is twice , will be six times livelier than if individual differences in -values might be found in the sensory apparatus of a single observer or in comparisons between or among perceivers. While he had clear conceptions of how might be determined (based on the physics of light and sound), he gave no indication of how was to be measured or how sensations were to be compared to establish one as "six times" livelier than another, other than through the determination of and assumptions about .70 As Krüger acknowledged in the preface of his Experimental-Demonstration, it did not contain much that was new. Most of the experimental results he reported were extant in the literature: his real contribution was to introduce medical observations and mathematical formulations to psychology. He did not, however, accept the mathematical formulations of others critically: he used experience to evaluate extant theoretical claims. In his treatment of vision in the Nautioche, Krüger initially followed a tradition in the optical literature—rendered with mathematical rigor by Wolff—according to which the apparent sizes, horizontal distances, and motions of objects vary directly with visual angle or angular velocity.71 Although this definition of "apparent" magnitudes was found in many technical works in optics, those writers with a keen sense of visual experience—including Descartes, George Berkeley, and Krüger's French contemporary, Claude Niculae Le Cat—observed that objects often do not seem to have the sizes, horizontal distances, and velocities assigned by this theoretical formulation, and so they introduced additional psychological considerations, including unnoticed judgments or associative connections, to explain the character of perceptual phenomena.72 Krüger knew at least the portion of this literature that discussed the horizon moon (the so-called "moon illusion").
does not follow visual angle but is influenced by apparent distance, such that
two of objects falling under the same angle, that judged to be further
away is judged to be and appears larger than the other.85

Kruger often made good use of the extant natural philosophical, physi-
ological, and clinical literature in discussing the relation between nerve
activity and sensations or the role of experience in the development of
perceptual abilities. He presented the experiment of the natural philoso-
pher Edmé Mariotte, who used two white dots on a black wall to demon-
strate the existence of the retina. He wrote: "At a point where the optic
nerve enters the eye, Mariotte had interpreted his results as showing that
the choroid, rather than the retina, is the seat of optical sensation, on
the grounds that the choroid is not involved in the sense of vision. He
argued, contains nerve fiber but not nerve membranes. However,
although Kruger adopted a vitreous conception of the effect of objects on
the retina, he did not believe that such vibrations would be carried by
delicate nerve membranes along the circulatory path to the brain. More-
over, he held that the nerve fluid or animal spirits are necessary for sen-
sations. He thus concluded that sensations arise at the focus of the vibra-
tions, when the latter set the animal spirits in motion. In support of this
conclusion, he cited the observations of John Woodward on decapitated,
decapitata, decapitated, or otherwise vitrified pigeons, chickens, eels,
snakes, frogs, flies, wasps, and spiders. He used Woodward to support his
conclusion that "sensibility" is found in the parts of animals themselves,
even if separated from the brain, and that this sensibility is lost when the
nerves dry out (and hence could not depend on vibrations of membranes
alone, but requires the presence of nerve fluid). At the same time, he held
that in ordinary circumstances perceptions depend on the conveyance of
motion to the brain via the animal spirits in the medulla of each nerve,
with those attending the speed of transmission, which he thought
likely to be equal to the speed of sound, was too rapid for investigators to
be able to detect any noticeable difference between reports of sensations
originating in the foot and in the head.86 Kruger also reported the famous
Cheselden case, to support the point that if newborns saw things inverted
because of the inverted retinal image, they could soon learn through ex-
perience to see things upright. Finally, in discussing the imagination, he
reported as a generally accepted "law of imagination" the regularity with
which, in imagining one thing, we come to imagine things that we previ-
ously experienced simultaneously with that thing, or things that are simi-
lar to that thing. As an example, he offered the case of a microscopist who
formed an aversion to cheese through the action of this law: having std-
ied cheese nates under the microscope, he could not help but imagine
those nates when eating cheese, an image that spoiled his appetite.88
Not long after Kruger had completed his dissertation on the senses at
Halle, Guillaume-Lambert Godart submitted a medical dissertation at
Rennes entitled Spectre animalis medicus (1753), which he later devel-
oped under the title Le Phisique de l'ame (1755).89 The framework of
Godart's thought was largely Aristotelian; he contributed to humans a "ra-
tional soul" that is a "dividing principle" that accounts both for the life
functions of the body and for its power of thought.90 After considering
the nature and seat of the soul (in part 1), he successively treated (in part
2) the "nervous functions" (section 1), including nutrition and generation,
and the "animal" and "intellectual" functions (section 2), including sen-
sation, perception, imagination, judgment, the passions, memory, sleep,
dreams, and the "metamorphosis" of man through his terrestrial, spiritual,
and eternal stages of life. But he approached this subject matter with
the empirical attitude and metaphysical chagrin characteristic of many
eighteenth-century natural philosophers and natural historians: he aban-
donned any attempt to know the nature of the soul, admitting that we have
no more conception of it than we have of that of master.91
Further, he devoted special attention to his use of the word "physical" in
the title of his book: "although the word physic comes from physics which
signifies nature and nothing more, a book that treats of the nature of the
soul may receive the name of physics." Indeed, he allowed, etymologically
the word suggests the treatment of corruptible things, but natural philos-
ophers treat of incorruptible atoms, so he may be allowed to consider
the incorruptible soul under the same title. In any event:

that which seems to me principally to authorize that name, is the manner
in which I consider my object: my subject is neither phytological nor
moral, but physical. It concerns, it is true, a spirit, but this spirit is not con-
sidered according to its substance, but in the physical relation it has with
the body, and when it comes to its actions, which concerns merits and de-
merits is left to the morals.92

His chief "physical" contribution was his discussion of the seat of the soul,
which, relying on observations made by François de la Peyronie, he
located in the corpora colloids.93

The Swiss naturalist Charles Bonnet was more prolific and more influ-
ential than either Kruger or Godart. Although his early years were devoted
to the natural history of insects, during which time he had little patience
with metaphysics, around 1750 he came to see the interest in turning
the techniques of natural history to the principal object of study for human
beings, human beings themselves; his first psychological work, the Essai de
psychologie, appeared anonymously in 1754, followed by the Essai analytique
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his heavy emphasis on the role of brain fibers in all thought processes, Bonnet's work raised a suspicion of materialism: he was by no means a materialist, having devoted considerable effort to showing that the mind must be immaterial. At the same time, he placed questions about the substance of the soul and its ideas, and about the mode of interaction between mind and body, beyond the pale of human reason.

The newly sounded call for a "physical" science of the mind, or for the application of the methods of natural history and natural philosophy to the subject matter of mind, was not lost on generations subsequent to Kröger, Godart, and Bonnet. Especially in Germany, their work was incorporated as part of the founding literature of the Erkennungswissenschaften and empirical anthropology that developed in the second half of the eighteenth century and continued through the following century, conditioning and being continued by philosophical and natural-scientific psychology and the self-proclaimed "new" experimental psychology of Wundt and others. We will return to these developments in Germany after examining the Scottish scene, which itself strongly influenced nineteenth-century developments in psychology in both Britain and Germany.

SCOTTISH SCIENCES OF MAN AND MIND

In the Scottish Universities of the first half of the eighteenth century the mind was studied in three areas of the revised Aristotelian curriculum: logic, metaphysics, and moral philosophy (which discussed appetites). By midcentury, a peculiarly Scottish phenomenon had occurred: within the university arts curriculum, the study of the mind in general became the special preserve of moral philosophy (as might be expected of the "moral sense" school). Thomas Reid, professor of moral philosophy at Glasgow, transformed moral philosophy into the examination of the "powers" or "faculties" of the mind. At Edinburgh, the connection between mind and morals had been forged even earlier: from 1708, the University had reserved a chair for the professor of moral philosophy and pseumasies; while the duties of his office were more specific, some aspects of his thought were more particular: he developed the "mechanics" (brain-fiber physiology) of each sense with special thoroughness; he developed the theory of association extensively, using it as a key to understanding the course of thought, and dwelling on the "mechanics" of association with an intensity similar to that of Hartley's slightly earlier treatise; he analyzed the role of attention in strengthening ideas by "reacting" on nerve fibers in the brain; he held that the formation of intellectual ideas depends on language, and that exposure of language results in the formation of "intellectual fibers" that are the bodily counterpart to abstract notions; and he explored the implications of his psychology with respect to the power of education in the cognitive development of each person. Because of...
by appeal to experience.118 Home signaled his naturalistic intensions in the subtitle to his Treatise of Human Nature: Being an Attempt to Introduce the Experimental Method of Reasoning into Human Subjects; in the introduction to the work, he explicitly compared his methods and modes of explanation to those of Newton. By the "experimental method" he meant no more and no less than an appeal to experience in support of his claims; by "moral subjects" he included not only the study of the passions and of moral, proper (virtue and vice) but also, and fundamentally, the 'science of human nature.'119 Home portrayed his analysis of perceptible laws of impro-

vations and ideas, simple and complex, and his appeal to the laws of associa-

tion in explaining their interrelations, as having revealed the basic elements and laws of the human mind.

Hume was not claiming to be the Newton of the mind; he shared invocation of Newton with David Hartley, Reid, and Ferguson.120

Hegel, like Home, was not a university professor; like Krüger and Cusanus, he was a physician. He shared with the other Scottish naturalists the di-

vision of phenomena pertaining to human beings into two realms: bodily and mental. His major work, The Philosophy of Mind, was an attempt to

ground the operation of the mind in association, and to explain associa-
tion as the result of sympathetic vibrations among nerve fibers in the brain.121

Reid, who was a physician as well as professor of moral philos-


cally of mind or spirit;' the branch of pneumatics pertaining to human

mind is designated simply as the "theory of mind." It is equated with "the

knowledge of physical laws colliding from Subject; and, applicable to explain-

appearing.122 Examples of the law of mind include the facts that we

are conscious of our existence, operation, and will; and this perception

takes place via media that do not resemble the object of perception.123

To these Scottish doctrines of mind must be added Erasmus Darwin, whose Human, or the Laws of Crystallization of 1795, was dedicated, among oth-

ers, to those who "stand the Opinions of the Mind as a Science."124 In

this work, Darwin presented a sophisticated version of the associationist

theory, recapitulating much of the empirical information, including some

famous ones on sleep-images. Darwin signals out several of the Scottish authors named thus far for their materialistic theory of mind. He allowed that the whole of

nature may be "supposed to consist of "two substances or substrates, namely, "spirit and "matter." Spirit possesses the power to commence or produce

motion, nature to receive and communicate it." Living and sentient

things possess a "spirit ofanimation," which is a vital principle residing in the

brain and nerves, and subject to "general or partial diminution or accu-

mulation" (and hence material).125 Darwin's treatment of sensory per-

ception and associative learning were particularly acute. His works were

translated into German and republished often, helping to introduce a sophis-
ticated associationism into German psychological writings. He is virtu-

ally singular as an eighteenth-century materialist (even if idealist) who ac-

tually contributed to the development of psychological theory.

Although the theory of the mind, or psychology, was pursued vigorously by Scottish philosophers and physiologists, Scottish writers came regularly to
denominate this branch of knowledge "psychology"—as opposed to pne-

umatics, theory of mind, science of mind, or philosophy of mind—only in

the nineteenth century. Dugald Stewart, who undertook an introductory
textbook on the subject, chose the title Elements of the Philosophy of the Hu-

man Mind.126 He dedicated his work to Reid, and drew upon the main-

stream Scottish tradition. He placed himself in opposition to Erasmus

Darwin and Joseph Priestley, whom he classified as materialists. Priestley himself did not contribute to psychology, but brought out an abridgment of

Hartley's Observations.

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While in the Scottish context investigators sought to make the mind an object of empirical investigation and to discover as "physical laws" as a

prolegomena to morals, in Germany the science of the soul (or mind) was treated as an autonomous discipline—i.e., as a subdiscipline of the

science of man—within the theoretical (as opposed to moral) sciences. The
frames of "Seelenlehre," "Erfahrungsseelenlehre," and "empatische Psychologie" aspired to such an empirical approach to the soul or mind. Developed in the work of J. F. Abel and K. C. E. Schmid. Abel and Schmid placed empirical psychology within the natural science proper, distinct from metaphysics, they considered psychology to be the branch of anthropology or Menschlehre that scrutinizes the general laws of the mind and its relation to the body. Abel's book exhibits a typical psychological textbook organization, with roots in the De anima tradition. After brief preliminary methodological remarks, it considers first the nature of the mind, its basic powers and organs, and especially its relation to the body, and then it systematically surveys the chief faculties of mind: sense, imagination, attention, thought, feeling, and bodily movement. Throughout, Abel attempts to show how all of the various powers and capacities of the mind can be reduced to one basic power, the power of representation, and how the materials on which the power of representation operates must all derive from sensory ideas around the sense organs. As had become common in the eighteenth century, he showed an interest in quantitative measures where these were available; indeed, he gave quantitative values for the "briefest still perceivable duration" of an impression on the sense organs. But the primary theoretical interest of the work was the discovery of "laws" governing the various faculties, including laws of association and attention. The laws of attention assumed an all-or-none "conquest" (siegen) of attention by one or another representation. Originally, the currently liveliest or most pleasant representation wins out, but through experience it may happen that a less lively or pleasant representation that has in the past been followed by more pleasant representations will win out; the attentional faculty then comes to be guided by means-ends considerations in choosing which representations to enhance through its own power. Many of the topics of Abel's textbook, such as the perception of size, shape, location, and distance, and intentional "conquests," are found in nineteenth- and early- and late-twentieth-century textbooks. But one set of questions would no longer be found after circa 1930: those pertaining to the existence and nature of the soul. The framers of Seelenlehre typically argued that the soul is a separate substance from the body, and they did so on philosophical as opposed to religious grounds. Abel repeated the widespread view that the unity of consciousness requires a unified substance as a vehicle; but body is essentially conglomerate; hence, the simple substance that is mind must be distinct from body. He took this argument to be an example of empirical investigation. He divested his investigation from "metaphysical" considerations that transcend experience, for example, about mind-body interaction. Historians of psychology typically bump together talk of a separate thinking substance and of mind-body interaction as "metaphysics." Here, an eighteenth-century author asserts a different dividing point. He holds that empirical considerations can be brought to bear on the existence and nature of the soul. He does not mean that one can simply introspect and discover the simple substance of the soul. An argument is required: a theoretical structure must be fit to the "data" of inner sense. But he considered these questions on the soul to be empirically tractable, by contrast with the problem of mind-body interaction, which admits of multiple hypotheses that "lave" the phenomena without differing empirically. He excluded the latter, empirically undecidable problem from his Seelenlehre. Schmid's Derpiniische Psychologie is a more advanced textbook than Abel's, and in particular it is filled with rich and detailed methodological discussions that are informed by previous writings, including those of Wolff and Kant. These discussions include a precise delineation of the disciplinary boundaries and relations of empirical psychology to anthropology more generally, a discussion of the empirical object and form of explanation of psychological laws, and a division of psychology itself into distinct subareas. Schmid observed that some would limit the subject matter of psychology to the data of inner sense alone (as in fact Kant had done), but he argued that it should be defined more broadly, to include those "outwardly observable phenomena of body that have a lawful relation with inner sense. He thus included not only the introspective data of inner sense but observations of the behavior of other humans and indeed the historical record of human behavior within the subject matter of psychology. Again, he acknowledged that some would limit a science "in the strict sense" to those fields that could derive their main conclusions a priori (as Kant had maintained), but he chose to employ a concept of science "in the wide sense," as "a systematic body of knowledge, that is, one ordered according to principles" when the concept of science is so understood. Seelenlehre can be a science. It seeks empirical generalizations (Regeln) and universal laws (Gesetze) of mental life, which, Schmid is careful to observe, are to be regarded as theoretical laws of nature governing the operation of the mind, and not as the moral laws by which we seek to guide our behavior. Schmid drew the boundaries of the empirical more narrowly than had Abel. He followed Kant in removing questions pertaining to the substantiality and simplicity of the soul from the domain of empirical investigation and relegating them to "dogmatic" metaphysics—for which he reserved the names "transcendental" or "pure" psychology, or "pneumato- logy," thereby deviating from Kant's terminology. Included here were questions pertaining to the independence, simplicity, personalhood, spirituality, immortality, and immortality of the soul, as well as those pertaining to its real causal relation to body. He used the terms "empirical" and "rational" psychology as Wolff had, to denote disciplines that are based
directly on experience (or are a posteriori) and those that are based on the analysis of concepts (that themselves are drawn from experience and hence are "comparatively a priori"). The rationalists agreed that the empirical constitution of the human being, the behavior of animals, and the empirical constitution of the human being reflect the substance of the natural mind to the domain of dogmatic metaphysics. Schmid adopted a position of "empirical dualism." Empirical dualism distinguishes soul and body on the grounds that the phenomena revealed through outer and inner sense cannot be united under a single set of concepts. Experience shows that the phenomena of each are lawfully related. Empirical psychology charts lawful relations within the domain of soul, spirit, or mind, and between that domain and bodily processes. Schmid's work is particularly impressive for its detailed analytical treatment of psychological concepts informed by a thorough acquaintance with the psychological, anthropological, and medical literatures.

PSYCHOLOGY IN THE ANTHROPOLOGICAL, MEDICAL, AND OPTICAL LITERATURES

This is not the place to survey the diverse set of works in anthropology, or the "Science of Man," that appeared in the eighteenth century. However, two general points will help place the natural scientific approach to psychology with respect to the anthropological tradition. First, anthropology was considered by many to be a more encompassing discipline than psychology; whereas the latter pertained to mind, anthropology considered the whole human: mind, body, and their union. (Of course, anthropology was also narrower than psychology, in that the latter might treat of animal as well as human souls.) Consequently, one trend in anthropological treatises, so denominated, was to focus on problems of mind-body union, giving only a summary treatment of bodily functions (which were discussed in medical psychology) and mental functions (which were discussed in psychology), a description that fits Johann Karl Westphal's Versuch über die Kenntniss des Menschen (1784–85). Secondly, even those, such as Kant and Blumenbach, who took the science of man to pertain to human-kind in its full empirical diversity—to include various individual, national, and racial types—began their anthropologies with an overview of what is common to all humans, or at least to all human minds. Kant placed anthropology among the empirically based investigations of nature. He considered its evidence to come from self-observation, observation of others, and reports of others' behavior, as found in fiction, travel literature, and history. Yet the most extensive portion of his anthropological lectures concerned the properties and operations of the cognitive faculties in diverse empirical circumstances, including a discussion of the roles of vision and touch in the perception of three-dimensional solid shapes.

Medical physiology had long included examination of the mental powers of humans and the physiological structure of the sense organs, nerves, and brain that serve them. This practice continued through the eighteenth century, and into the nineteenth and twentieth. Albrecht von Haller's physiological lectures are noteworthy for the extensive discussion and wealth of the citation in the six books (filling one large volume) devoted to the external and internal senses. These discussions referred to a great deal of literature, but were of mixed quality from a psychological perspective. Thus, like Wolff, Haller simply equated apparent size with the visual angle subtended by an object in the field of view, whereas many of the authors he cited, including Berkeley and Le Céz, recognized that perceived size may take into account the perceived distance of an object. Beyond the five external senses, Haller discussed the "internal sensorium," under which he grouped intellect, will, and sleep. In the section on intellect, he also discussed the faculties of memory and imagination, the cognitive acts of judgment, will, and abstraction, and the conditions leading to truth and error, delirium, and foolishness. His discussion of the intellect focused especially on the status of mental representations. In particular, he advised that four different things must be kept distinct in discussing mental representations such as perceptions: (1) the external object, (2) its impressions on the sense organs, (3) the effects of those impressions as transmitted to the cerebrum, and (4) the representation of this effect in the mind.

Finally, the optical literature, which had long included psychological topics as part of a complete theory of vision, flourished under this description in the eighteenth century, even if some authors adopted the narrower Newtonian conception of optics. The theory of vision addressed the act of seeing itself, especially the perception of size, shape, distance, motion, and color. Berkeley's New Theory of Vision, for instance, was widely known and often admired in the eighteenth century. It introduced a new psychological theory into the theory of vision, by accounting for the connection among visual and tactual ideas via the mechanism of "suggestion" (associa
tion), which Berkeley opposed to the posited unnoticed judgments of previ
tious visual writers, including Descartes. Berkeley's theory that touch ed
uates vision through a process of learning was widely discussed in the eighteenth century; Berkeley and others claimed empirical support for his position from observations on the newly-sighted blind. Beyond these theoretical disputes, many authors engaged in geometri
cal modelling and empirical investigation of the phenomena of size, shape, and distance perception. Because it was descended from optics, a mixed mathematical science, the theory of vision inherited geometrical model
ing, and as the other mixed mathematical sciences appealed ever more to
experiment, optics and theory of vision became experimental disciplines. It is in optics and theory of vision, before and during the eighteenth century, that the first significant body of mathematical constructions and quantitative measurements were applied to mental phenomena. It is here that we should look for the first success in quantitative, experimental psychology, though this work in sensory psychology was not credited to the name of "psychology" until the nineteenth century.

**EMPIRICALLY AND THEORETICALLY PROGRESSIVE RESEARCH PROGRAMS**

According to the usual sociological measure of progressiveness, psychology was a progressive discipline during the eighteenth century: academic appointments in psychology were made, courses were taught, the number of textbooks published per decade increased, and, near the end of the century, journals were founded (even if they failed within a decade). In Britain the "theory of mind," conceived as a branch of natural science, was firmly entrenched by the end of the century, and it continued into the next. In Germany, "psychology" as so-called was even more firmly entrenched and continued to be taught throughout the next century. There were competing conceptions, of course, and in the second half of the nineteenth century some entrepreneurs proclaimed the founding of a "new" psychology, meaning thereby to distinguish themselves from the extant discipline. This claim of novelty rested on a comparison with the old psychology, portraying it as "merely metaphysical," which meant metaphysical and not experimental (i.e., not empirically based).

I would like to make a stronger claim for the progressiveness of various eighteenth-century research programs that took a natural scientific attitude toward the mind or mental phenomena. I propose as a working historical thesis that eighteenth-century work made a threshold contribution to the psychology of the nineteenth century. First, eighteenth-century faculty psychology yielded a conceptual framework that was more fine-grained than that of earlier centuries and that benefited nineteenth-century investigations. Second, eighteenth-century association psychology provided the theoretical framework that dominated much nineteenth-century psychology, the associationist framework. Third, eighteenth-century experimental work, especially in vision, provided a tradition of experimental practice that, although not often counted as part of "psychology" as so-called during the eighteenth century, was incorporated into the "new" experimental mental discipline of psychology during the nineteenth century. Further development of the long-standing tradition of experimental work on vi

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sion provided the primary foundation for the claims to found a new, experimental psychology. A survey of that subset of popular late-nineteenth- and early-twentieth-century psychology textbooks that treat psychology as a natural science would reveal that the structure of these books has much in common with scholastic textbooks of the seventeenth century: the external senses, their organs and associated nervous processes, are treated first; the "internal senses" (usually not so called) are treated further on, including memory and imagination; higher cognitive faculties, including reasoning, further on; bodily motion, somewhere along the way; and appetite and will, near the end. We can discover the specifically eighteenth-century contribution by finding those new chapters in these textbooks that have origins in that century. The new chapters include those on attention, conception or abstraction, and association. Attention was brought into psychology by the faculty tradition, particularly by Wolff and his followers, and was further addressed in Einführung in die Lehre, which proposed empirically discovered constraints on the scope and direction of attention. The chapters on discrimination and on conception or abstraction, though rooted in ancient Greek philosophy, were introduced into eighteenth-century psychology books by those developing the faculty approach. The added chapter on association was due largely to attempts by authors such as Hume and Hartley to make the laws of association the fundamental explanatory principles of mind.

Thus far my analysis of the "progressive" sensor of eighteenth-century psychology has been restricted to changes in psychological textbooks, which may or may not have claimed novel conceptual and theoretical results, and which only sometimes claimed to present original observations. One might concede that this older tradition contributed conceptual frameworks to research programs that took a natural scientific attitude toward the mind or mental phenomena, without accepting that the eighteenth century contributed to the rise of quantitative experimental psychology. In point of fact, the strongest eighteenth-century contribution to the rise of quantitative experimenta

Optics was a "mathematical" science in virtue of its use of geometrical constructions, especially in the tracing of "visual rays." As regards vision proper, these rays were used in the analysis of the perception of size, shape, distance, and motion. Mathematical (geometrical) regularities, such as that among visual angle, apparent distance, and perceived size, were typically expressed as proportions. There were few numerical values in optics (indices of refraction being one). In the seventeenth century Descartes gave estimates of the range within which accommodation and convergence could provide accurate information for the perception of distance, though
he did not say how he had arrived at the values. Berkeley, who introduced a conceptual revolution into the theory of vision with his doctrine of suggestion, did not employ quantitative observational ratios. The eighteenth century was replete with novel observations of sensory phenomena, including afterimages and color blindness, which were not quantitative but more important for that.

Nonetheless, these were quantitative studies of visual perception in the eighteenth century, among which I give three examples. Patrick D'Arcy measured the persistence of impressions by devising an apparatus for presenting to an observer a luminous object (a live coal) with a circular motion whose diameter, velocity, and distance from the observer could be varied. By observing how rapidly the coal must turn in order to result in the perception of a closed circle under a constantly fixed gaze, he concluded that the impression lasts for "8 seconds." Pierre Bouguer examined the question of how long a point must be rendered in perspective to yield an appearance of being parallel, which was a problem addressed by several mathematical theorists. He introduced into the problem the notion of the apparent (as opposed to real) inclination of the ground plane, and measured the latter. Robert Smith undertook a thorough study of the moon illusion, which he explained in accordance with the hypothesis that for a given visual angle varies with apparent distance. He concluded that the moon appears larger at the horizon because it seems further away than when it is overhead. In support of this hypothesis, he undertook to measure the perceived curvature of the vault of the heavens, which informal observation suggested is flattened. He obtained numerical values by comparing the known position of the stars with the apparent bisections by visible stars of the angle between the horizon and straight overhead.

The practice of seeking precise measurements in testing theories of perception became more common in the nineteenth century and was particularly highly developed in German sensory physiology and psychology. Wundt and Helmholtz drew upon earlier work when they brought sensory psychology into a position of scientific prominence, and not solely with respect to experiments; equally or more importantly, their theoretical writings were inherited from the highly developed theories of spatial perception that arose in the eighteenth and early nineteenth centuries.

CONCLUSIONS

Psychology or the science of the mind was conceived as a natural science in the seventeenth, eighteenth, and nineteenth centuries. The notions of psychology and natural science underwent significant change along the way.

At first "psychology" was the science of the Aristotelian soul, and covered vegetative as well as sensory and intellectual powers; study of the latter, "cognitive," powers was an (dominating) subdiscipline in Aristotelian psy-

510 chology. Wundt made psychology a part of metaphysics, coordinate with cosmology. Scott placed psychology within moral philosophy, but distinguished its "physical" laws from other moral laws (for guiding conduct). Several Germans sought to establish an autonomous empirical psychology. Meanwhile, British and French visual theorists developed sophisti-

144 cated theories of spatial perception and mathematically precise theories of size and distance perceptions; they created instruments to test these theories, and to measure other visual phenomena, such as the duration of visual impressions. Nearly all of these investigators were dualists of one sort or another. From early to late, the trend was to bracket metaphysical questions in favor of the search for empirical regularities and empirically based systems of classification. These empirical studies were directed at mental phenomena considered as distinct from material phenomena.

This being the case, psychology was not "invented" in the eighteenth century, but remade. Subsequently, a historical narrative according to which genuinely natural scientific psychology came into existence only in the second half of the nineteenth century has been invented. It would be interesting to look into the historical conditions that gave rise to it. Wundt in the first edition of his Grundriss admitted considerable continuity between the old, empirical and observational psychology and the new experimental psychology that drew upon the methods of physiopsychics, though he tuned down the talk of continuity and stressed the differences in later editions. My guess is that the story of the invention of the new psychology will lead well into the twentieth century, and will include the narrative of experimentalists such as Edward Scripture and the Harvard experimental psychologist turned historian (and, perhaps in fact, founder), Edwin Boring.

My sketch of the early history of psychology challenges not only the usual historiography but also the usual conception of Enlightenment prog-

146 ress. In the standard narrative, the heroes of the Enlightenment are ma-

terialists. If psychology is to be made a science, the story goes, mind must be equated with matter and thereby rendered subject to empirical inves-

147 tigation. The problem is that no one bothered to tell the early prac-

148 tioners of natural scientific psychology that they had to be materialists in order to be natural scientific psychologists. In point of fact, all of the major eighteenth-century authors who made contributions to the devel-

opment of psychology, only Erasmus Darwin allowed that mind might be material; nineteenth-century founders of psychology, including Wundt, Helmholz, R. H. Lotze, Hermann Ebbinghaus, William James, Hugo Munsterberg, and Alfred Binet, banished the very question from scientific
psychology. These authors conceived psychology as natural scientific without seeing the need to adopt the metaphysical position of materialism. In so doing, they would seem to be proceeding quite rationally, by studying what can be studied on its own terms and avoiding an unnecessary commitment to the unsupported claim that mental phenomena can be reduced to material processes. The old equation of Enlightenment reason with materialism turns out to have been so much prejudice. It would be interesting to discover the historical conditions in which this version of history became entrenched. In the meantime, there is much work to be done investigating the history of psychology considered as the science of mental phenomena, a history in which faculty psychology is no joke, and in which materialism is virtually nowhere to be found.

ACKNOWLEDGMENTS

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NOTES


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1. The history of psychology may be told from different perspectives depending on the current understanding of psychology itself: cognitive or mentalistic models are differently valued in histories written by behaviorists as opposed to cognitivists: e.g., compare J. R. Kantor, Scientific Evolution of Psychology, 2nd ed. (Chicago: Principia Press, 1926-28), with Robinson, Intellectual History of Psychology. 13. L. B. Cohen, Neutonian Revolution (Cambridge: Cambridge University Press,

14. In essence, I am asking about the presence of the discipline of psychology. The term "psychology" is used in several ways, e.g. as the profession of psychologists, members of a professional society, as the province of the United States. This institution and methodology. Here I am emphasizing the latter two senses of the word.

15. For example, including Volta's helpful "Psychological in the Encyclopedia," have focused on the origin of the word "psychology." As opposed to the origin of the psychology as a discipline. But the etymology of the concept must be distinguished from the historical word usage. The science of the mind was known under many titles in the eighteenth century, including "the science of the mind," "the science of the mind," "the science of the mind," "the science of the mind." Related disciplines included "anthropology," "the science of man," which often included "psychology," as a subdiscipline, and "psychiatry," the science of the mind, the science of the mind, the science of the mind, the science of the mind.

16. For eighteenth-century definitions (explicit and implicit) of the term in question, see Thomas Wright (1754), Euphrasis Chamerion, Capitula, and a Universal Dictionary of Arts and Sciences, ed. (London: 1758), p. 142; Kant, 56th ed. of "Kant's Vorspiele," Methodological, part 3 (Kant uses the Latin term "psychology" for the science of nature).

17. Christian Wolff, Philosophia rationalis, 4th ed. (Frankfurt am Main/Leipzig, 1746); philosophical cognition requires "historical" cognition of facts (1:6) and metaphysics is a species of philosophy (1:7). Further, psychology is a part of metaphysics, and it requires cognition of facts from experience in both "empirical and rational branches." "Psychology empirica," 4th ed. (Frankfurt am Main/Leipzig, 1783), §§1–4.


19. Aragonese also quite reasonably took an empirical attitude toward the powers of the body, considered as powers of an animistic principle. A similar point might be made about the study of an immaterial supreme being; hence, the extensive practices of "natural religion" during the eighteenth century. There is a tension between characteristics of the Enlightenment as "the Age of Reason" and as antireligious and secular." "Enlightenment" has two distinct connotations, one based on cognitive attitude or "method," another on content and conclusion. According to the first, it means "thinking for oneself"; to the second, it includes rejections of all supernatural beliefs and religious dogma found in many religious. Tension arises because supreme rationalists such as Descartes and Leibniz "thought for themselves" and claimed to establish the existence of God and the soul through reason. This apparent conflict should, I think, serve to sensitize us to the changing content assigned to reason or "the rational" in the modern period.

20. Too often the French materialists, including Diderot, La Mettrie, d'Holbach, and Helvetius, though their actual contribution to the development of psychological theory is questionable. Another exception is Samuel REMAKING THE SCIENCE OF MIND

Steven, whose A Philosophical Enquiry into the Physical Spring of Human Actions, and the Immediate Cause of Thinking (Leiden, 1745) argues that the only conceivable cause of motion in the human body is material.


22. In Britain, beyond Hume and Hume, associationism received a thorough statement by Erasmus Darwin, M.D. (1734–1802), in his Zoömetric or The Laws of Organic Life, 4 vols. (London, 1794–96), who used the more general term "habit," of which association formed a species (1794, p. 15), "the process ... through three German editions between 1793 and 1802. Charles Bonnet, Essai de psychologie (London, 1755 [1754]), chap. 4, 8, no. 39, pp. 17–19, 19–21, 45–49, 57–69, 77–87, 91–103, discussed a principle of sensation, under the title "Reproduction des idées," which he explained as an interaction between the soul and vibrating ethers in the brain; see also his Essay sur le génie de l'Amour, ed. 4 vols. (Cuvier, Hagen and Genève, 1796), chaps. 15–20, and his "Sur l'association des idées en général," preliminary essay to his Psychologie philosophique, in his Oeuvres d'histoire naturelles et de philosophie, 40 vols. (Neuchâtel, 1797–1803), 1:55–1:55: Johann Friedrich Herbst (1754–1817) published important works in psychology, Laban's Psychologie (Zöchberg and Leipzig, 1818) and Psychologie als Wissenschaft was Čekaläs výpravy, "Psychologie und Mathematik," 4, no. 6 (Königsberg, 1824–45); he sought to construct mental life using a "law of reproduction," which was itself derived from interactions among representations, on which see Gary Hatfield, The Natural and the Rational: Theoretical Speculations from Kant to Hume (Cambridge, Mass.: MIT Press, 1990), 128–132.


25. For the earliest surviving "psychology" see Rudolf Gottlieb Cotta (1547–1610), professor of physics, logic, and mathematics at Marburg), Psychologie, ou essai de l'esprit humain, animé (Marburg, 1544), which had little "psychological" (in our sense) content by comparison with the standard De anima animalis literature, being a collection of twelve disputations, each by a different author, ten of which discussed whether the soul is transferred from the father in the semen or is infused by God, one of which discussed the philosophical perfection of man in connection with an interpretation of Plato's Timaeus, and one of which discussed the seat of the
human soul, and particularly whether the whole is in the whole and in each part of the whole: similarly, Frontria Licet (1577–1657). Psychologia anthropica, eius de anima animalibus corporum, et de anima et corporibus animavit, et animativa, and reproductive state of the soul. While both of these works treat topics pertaining to the soul or "psyche," they are narrowly focused compared to the usual range of "psychology" topics such as was covered under the title of "psychology" in a dissertation by Johanni Conrad Dammesser (1653–1669); Lutheran theologian, professor of theology at Rostock (1665–1669): Colligere psychologiam, in quo maneat gressus psychologicae, sine aevo libri Aristotelis Animae, proponentes venturiam; de anatomia (Argentorat, 1653). Christoph Scheidler (1568–1635), Libri physici de hominum, in hoc Opera philosophia, a vol. (Frankfurt am Main, 1655), vol. 4, also discussed the usual range of Aristotelian topics on the soul. "Psychology" served as a doctrina topic, e.g., "physiologia," of the body, as well as "psychologia," of the soul. This practice arose early in developing "anthropology," treating body and soul, in physics texts: Johann Freig (1542–1598). Quantum physicorum (Basil, 1579), book 38, "De anthropologia et animantia" (pp. 1147–1157), book 58, "De anthropologia et hominum" (pp. 1397–1400). The relation between the sixteenth, seventeenth, and eighteenth-century discipline of "anthropology" and the physical and cultural anthropology of the nineteenth and twentieth centuries needs further study.

27. Tolstoy, Contraanima, devoted folios 694–702 to the vegetative soul, 792–795 to the sensitive, 802–809 to the instinctive, and 816–819 to the intellective, 830–835 to the intellective, 840–848 to appetite, will, and motion: Coimbra Collectanea, pars in librum De anima, devoted pp. 14–16 to the vegetative soul, 165–169 to the sensitive, 175–184 to the intellective, 206–210 to the intellective, 220–228 to appetite, will, and motion, with separate treatises on the vegetative soul (pp. 14–16) and on additional problems pertaining to the sensitive (pp. 165–169). Rubio, Commentarium in librum Aristotelis Animae, devoted pp. 778–793 to the vegetative soul, 803–812 to the sensitive, 813–817 to the vegetative, 826–827 to the sensitive, and 840–848 to the intellective, including will.


29. The material treated in De anima, III, III, which was covered in the text-books and commentaries mentioned in nos. 28 and 29.


31. Tolstoy, Contraanima, proem, quarto 4 (folio 4). subsumed the soul in all of its operations in Coimbra Collectanea, libri De anima, proem,
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53. E.g., Johann Samuel Traugott Gehler (1718–1799), Physikalisches Wörterbuch, new ed. 6 vols. (Leipzig, 1788–1801), "Opilii," 5385. Gehler was trained to include the study of vision in the optical portions of their physics books: "Gewissendes, Mathematische Elemente von Natur-Philosophie, durch Pflegmert's behandlung von optica aetherio Newton's narrow view, so that he treated sensation, perception, reflection, and reflection (vol. 6, book 5), nonetheless provided a summary discussion of visual perception (1:179–181). Machiavello, Essai de physique, discussed the properties of light, reflection, and refraction (chaps. 57–58), followed by a discussion of the eye and vision, including optical anatomy and physiology and visual judgment (chaps. 58–59), to which he added the traditional optical topics of disposition and sensation. Vision by means of refracted and reflected light (chaps. 54–55).

54. Simon Schaffner, "Theories of Understanding" (London, 1690), 1:4; further discussion in Hatfield, Natural and Normative, 18–21.


56. E.g., T.E. "a gentleman," Vicious menss: An Essay of the Being and Nature of Mind (London, 1724), and John Bragge (ca. 1653–1710; chaplain to the Duke of Marlborough), Psychagog: or, An Account of the Nature of the Rational Soul (London, 1703), which sought to show the immateriality and immortality of the soul by means of natural reason.


59. On Leibniz and Kant, see Hatfield, Natural and Normative, chap. 5.

60. Wolff, Philosophia naturalis, vol. 1, section 1, 3–9.

61. Dea, "a gentleman," Vicious menss: An Essay of the Being and Nature of Mind (London, 1724), and John Bragge (ca. 1653–1710; chaplain to the Duke of Marlborough), Psychagog: or, An Account of the Nature of the Rational Soul (London, 1703), which sought to show the immateriality and immortality of the soul by means of natural reason.

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67. Following the first textbooks follow Wolff in the discipline of psychology and the basic content of his empirical and rationalist psychology: Georg Bernhard Bilfinger, Dea, "a gentleman," Vicious menss: An Essay of the Being and Nature of Mind (London, 1724), and John Bragge (ca. 1653–1710; chaplain to the Duke of Marlborough), Psychagog: or, An Account of the Nature of the Rational Soul (London, 1703), which sought to show the immateriality and immortality of the soul by means of natural reason.


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84. Krüger, Experimental-Naturphilosophie, 2 vols., in which he said he had followed the Wolffian Baumeister in metaphysics.
86. Ibid., xiv-xv. Earlier Krüger spoke somewhat wishfully of the days when "experience," such as cutting members of the brain to see what happened, were performed on human "delinquents." Naturphilosophie, part 1, x, 365-373.
89. Wolff, Physiologie rationalis, §§56-1-41, pp. 299-311.
91. Ibid., xiv-xv.
100. Krüger, Naturphilosophie, part 2, §§36-89, x, 365-373.
101. Ibid., xiv-xv.
102. Ibid., xiv-xv.
103. Ibid., xiv-xv.
104. Ibid., xiv-xv.
105. Remy, Essays on the Power of Man (Edinburgh, 1797), Adam Ferguson (1732-1816), Institute of Mental Philosophy, ed. (Edinburg, 1915), part 2; the original version was entitled Analysis of Psychology and Mental Philosophy.
106. Francis Hutcheson, De natura humani societatis, orato inaugurali (Glasgow, 1770); Philosophiæ moralis (Glasgow, 1754), book 1, chap. 1.
109. The psychologist has "received great accessions from the labours of several modern authors, and perhaps were found more to exist in the name of a science, but to be purged of certain hypotheses, which have imposed on some of the most acute writers on this subject, and led them into downright scepticism" (ibid., Essay II, chap. 8-10).