

Psychology and Classifications of the Sciences

Fernando Vidal

ICREA (Catalan Institution for Research and Advanced Studies)

Translated by Jacob Krell

Psychologie: piste l'homme et, close et figée, lui inflige une autopsie.

— Michel Leiris, *Langage tangage*¹

THE HISTORY OF PSYCHOLOGY AS AN AUTONOMOUS DISCIPLINE is driven not only by its theoretical, methodological, and institutional developments but also by the elaboration of the concept of psychology itself and by theorizations of its position among other domains of knowledge. Classificatory schemes of the sciences have a preeminent function in such a context. They imply a reflection that exceeds the problems proper to any one discipline, and precisely because they both reflect situations of fact and embody metascientific ideals, they contribute not only to the project of identifying domains of knowledge but also to the process of defining them. This is what Francis Bacon (1561–1626) noted in the *Novum Organum* (1620) when he observed that “[t]he received division of the sciences [is] suitable only for the received totality of the sciences,” and that “we find in the intellectual as in the terrestrial globe cultivated tracts and wilderness side by side.”²

¹ Michel Leiris, *Langage, tangage ou ce que les mots me disent* (Paris: Gallimard, 1995).

² Francis Bacon, *Novum Organum*, in *The Instauration Magna, Part II: Novum Organum and Associated Texts*, ed. Graham Rees with Maria Wakely (Oxford: Clarendon Press, 2004), 27. A good introduction to the topic of



For psychology, classifications of the sciences have had a twofold significance.³ On the one hand, from the moment psychology sought to institute itself as an autonomous science, it began to conceptualize its inclusion within the general order of the sciences, and this process turned out to be one of its best modes of self-legitimation. This prolonged late Renaissance discussions about the status of the “science of the soul.” Later, however, the same process also gave rise to debates about the definition of psychology itself, and these debates contributed to shape views about the discipline’s contents, methods, structure, and significance. It is for this reason that, on the other hand, classifications of the sciences provide a privileged perspective on the entire history of psychology. They bring to light the conceptual roots of the field and reflect both its initial elevation to the rank of “science of the sciences” and its later integration into the general system of knowledge.

Transformations in ideas of the place of psychology in the order of the sciences offer a fruitful locus through which to structure a history of the discipline and its conceptualization since the early-modern period. Paradoxically, such a history involves relatively few individuals with a primary professional identity rooted in psychology itself. This is because the classification of the sciences is by its very nature an epistemic practice that remains external to any particular discipline, and is generally embedded in encyclopedic projects aimed at offering a coherent view of the totality of knowledge or even at providing a language or logic common to all its possible forms. Yet, because psychology embraces the study of the faculties that enable the production of knowledge, it has always been afforded special consideration. Studying its function in classifications of the sciences thus sheds light on the principles upon which each classification is based. Reciprocally, the question of psychology’s borders and its relationships to other disciplines,

the classification of the sciences can be found in Pierre Speziali, “Classification of the Sciences,” in *Dictionary of the History of Ideas*, ed. P. P. Weiner (New York: Charles Scribner’s Sons, 1973), vol. 1. For a more panoramic historical overview, see Robert Collison, *Encyclopaedias: Their History throughout the Ages* (New York: Hafner, 1966); and for the period from Bacon to Kant, see Robert F. McRae, *The Problem of the Unity of Knowledge: From Bacon to Kant* (Toronto: University of Toronto Press, 1961). Boniface Kédrov’s *La classification des sciences*, 2 vols. (Moscow: Editions du Progrès, 1977–80), is the most complete study (though with some surprising omissions) and sketches an original classification inspired by dialectical materialism. See also the special issue “La classification des sciences,” *Revue de synthèse* 115, nos. 1–2 (1994); R. G. A. Dolby, “Classification of the Sciences: The Nineteenth-Century Tradition,” in *Classifications in Their Social Contexts*, ed. Roy F. Ellen and David Reason (New York: Academic Press, 1979); Richard Yeo, “Classifying the Sciences,” in *The Cambridge History of Science*, vol. 4, *Eighteenth-Century Science* (Cambridge: Cambridge University Press, 2003), 241–67; and the broad-ranging dissertation Andreas Rotzer, “Die Einteilung der Wissenschaften: Analyse und Typologisierung von Wissenschaftsklassifikationen” (PhD diss., Universität Passau, 2003). Even with lacunae, the most useful work from the documentary point of view remains Ernest Cushing Richardson, *Classification, Theoretical and Practical* (Hambridge, CT: Shoe String Press, 1964), which provides a chronological and bibliographical list, sometimes with summaries, of almost 150 classificatory systems from Plato to the beginning of the twentieth century. I have left out taxonomies that explicitly serve only evaluation or information management—“practical usefulness,” as Melvil Dewey put it in the first edition of his *Classification and Subject Index* (Amherst, MA: n.p., 1876)—such as those developed by the Organisation for Economic Co-operation and Development, Web of Science, granting agencies, major libraries, and various scholars. See, e.g., Wolfgang Glänzel and András Schubert, “A New Classification Scheme of Science Fields and Subfields Designed for Scientometric Evaluation Purposes,” *Scientometrics* 56 (2003): 357–67. Henry E. Bliss, the New York librarian who opposed the “subject-index illusion,” also subordinated his well-informed discussion of systems of the sciences to the development of a bibliographic classification that would be not only practical but also “logically and historically authentic.” See Henry Evelyn Bliss, “The System of the Sciences and the Organization of Knowledge,” *Philosophy of Science* 2 (1935): 86–103.

³ While there is certainly a danger that employing a personification of psychology might exclude certain concerns proper to concrete history, I use it here to highlight the metascientific function of classificatory discourses.

which taxonomies of science incorporate, is intimately connected to the central problems of the field’s epistemology. Beyond epistemology, moreover, this question implicates the conceptions of the human that every psychological approach necessarily assumes and embodies.⁴ Within the discipline, discussions about the “crisis” of psychology have been a particularly powerful self-reflexive mechanism.⁵ From the outside, classifications of the sciences have performed an analogous role by bringing to the fore the concept of psychology itself.

FROM THE RENAISSANCE TO THE IDÉOLOGUES

Ancient, medieval, and Renaissance classifications of the sciences include, without exception, matters that could be qualified as “psychological.” Bacon’s model, which would become the obligatory point of departure for subsequent attempts, relates each category of knowledge—history, poetry, and philosophy—to memory, the imagination, and reason, respectively. In philosophy, Bacon proposed the creation of a “general science of the nature and state of man,” of which one part would consider man’s “miserics” and “prerogatives” and the other, the “alliance” of the soul and the body. This second part contains certain psychological themes, but they are not treated in a unified fashion. “Religion,” rather, deals with the rational soul; an unnamed natural science examines the soul as a corporeal substance; and logic and morality concern themselves with the understanding, reason, imagination, memory, will, and desire.⁶

The Baconian schema, like those that precede it, highlights scattered psychological material without carving out a separate domain for its investigation. To refer to this phenomenon as “scattered” in no way contradicts the superior position within the science of nature that Aristotle (*De anima* 1.4.02a.1–9) attributed to the study of the soul as a principle of living beings. In his 1492 *Apologeticus de Ratione Poeticae Artis*, for example, the Dominican religious and political reformer Girolamo Savonarola (1452–98) held that treatises on the soul must precede all others in natural philosophy on account of the greater nobility of their object, a position that echoed that of Aristotle as well as Aquinas and Albert the Great. Since the intellect is immaterial, it falls in the domain of the metaphysician. In turn, the *physicus*, or natural philosopher, treats the intellectual soul, not as a separate entity, but as united with the body.⁷ This is the same division that Bacon later adopted and that appears in the greatest French Aristotelian manual of the late Renaissance,

⁴ To my knowledge the only published work that focuses specifically on the place of psychology in classificatory schemes of the sciences is Claude Braun and Jacinthe Baribeau, “The Classification of Psychology among the Sciences from Francis Bacon to Boniface Kedrov,” *Journal of Mind and Behavior* 5 (1984): 245–60. Braun and Baribeau sketch the principles of classification from Bacon to Engels and summarize the position of psychology within such classifications, additionally focusing particular attention on Piaget’s and Kédrov’s ideas. Their sketch and summary, in fact, seem largely indebted to Kédrov. Birger Hjørland, “The Classification of Psychology: A Case Study in the Classification of a Knowledge Field,” *Knowledge Organization* 25 (1998): 162–201, though historically and philosophically informed, focuses on the classification of psychological specialties and subject matter from a LIS (Library and Information Science) perspective.

⁵ Thomas Sturm and Annette Mülberger, “Crisis Discussions in Psychology—New Historical and Philosophical Perspectives,” in “Psychology, a Science in Crisis? A Century of Reflections and Debates,” ed. Annette Mülberger and Thomas Sturm, special issue, *Studies in History and Philosophy of Biological and Biomedical Sciences* 43, no. 2 (2012): 425–33.

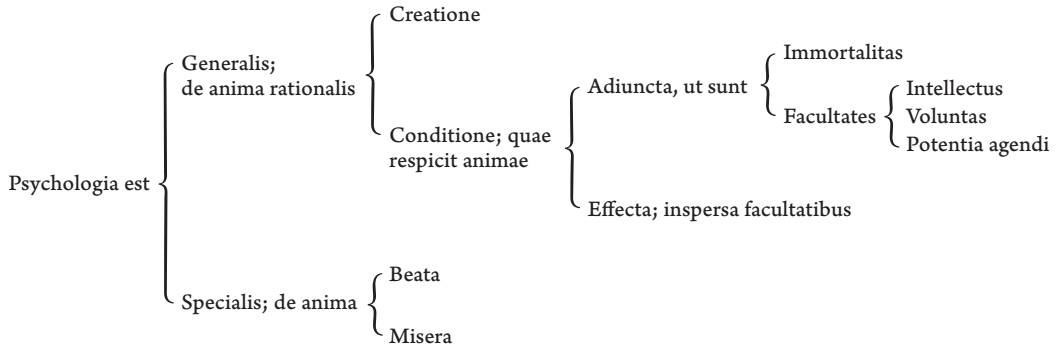
⁶ See Francis Bacon, *De Dignitate et Augmentis Scientiarum* (1623), bk. 4, chap. 1 (on the science of man in general) and chap. 3 (on the science of the human soul).

⁷ See bk. 1, “On the Division of the Sciences,” and bk. 2, “On the Order and Dignity of Each Science.” The original title is *Apologeticus de Ratione Poetica Artis*, but in certain editions it is *Opus Perutile de Divisione Ordine ac Utilitate Omnium Scientiarum*, which is more accurate. In editions that use *Opus*, the *Apologeticus* appears as part of a collection entitled *Compendium Totius Philosophiae tam Naturalis Quam Moralis*. Several books of natural

Scipion Du Pleix's (1569–1661) *Corps de philosophie*, as well as in many other texts. Here, the study of the soul united with the body belongs to “physics,” or the science of nature, while that of the soul considered as a separable substance belongs to metaphysics, or “supernatural science.”⁸

The common distinction between a science of the rational soul and a science of the corporeal soul became integral to the concept of *psychologia*. At the time of its first documented usages in the last decade of the sixteenth century, “psychology” primarily designated the doctrine of the *animus* or *mens* (mind, the “separable,” immortal, immaterial soul), not of the *anima* (the soul as vital principle of living beings).⁹ This is why, initially, a book entitled *Psychologia* was not the same thing as one entitled *De anima*. The differences, however, quickly blurred. Already in the seventeenth century, lexicons, encyclopedias, textbooks, and commentaries situated psychology within pneumatology (the doctrine of spiritual substances whose other branches were theology and angelography), but also alongside anatomy at the heart of “anthropology,” or the science of man qua composite of soul and body. Very early, then, lexical unity masked a diversity of projects.

In 1630, Johann Heinrich Alsted (1588–1638), a theologian and commentator on Lull, and close to Ramus in his understanding of method, articulated the distinction between the physical and the metaphysical sciences of the soul with a formulation that was at once significant and ephemeral. In his widely known *Encyclopaedia Universa*, he situated pneumatology in theoretical philosophy, between metaphysics and physics, and related it to psychology, the science of the nature and faculties of the rational soul.¹⁰



From Johann Heinrich Alsted, *Scientiarum Omnium Encyclopaedia* (1649), bk. 2, p. 96.

philosophy concern the soul. See Girolamo Savonarole, *Scritti filosofici*, ed. G. Garfagnini and E. Garin (Rome: A. Berlardetti, 1982–88), *Apologeticus* in vol. 1, *Compendium* in vol. 2.

⁸ Scipion Du Pleix, *La métaphysique ou Science des choses surnaturelles* (Paris: Fayard, 1992), bk. 8; Scipion Du Pleix, *La physique ou science des choses naturelles* (Paris: Fayard, 1990), bk. 5.

⁹ Fernando Vidal, *The Sciences of the Soul: The Early Modern Origins of Psychology*, trans. Saskia Brown (Chicago: University of Chicago Press, 2011).

¹⁰ Johann Heinrich Alsted, *Scientiarum Omnium Encyclopaedia* (Lugduni: J. A. Huguetan filii & M. A. Ravaud, 1649), bk. 2, p. 96.

In fact, Alsted thought that *psychologia* belonged not only to metaphysics but also to physics, and he used the term *empsychologia* to name the natural science of the soul.¹¹ The word, which had been used at least once earlier in the seventeenth century, derived from the Greek adjective *empsychos*, which in Aristotle qualified the body animated by the *psuchē*. *Empsychologia* was thus the study of the soul as animating principle of the body, with its vital, vegetative, and sensitive faculties.¹² The word *empsychologia* would not endure. Alsted himself excluded it from a diagram in which the study of the soul's organic functions appears as one of the divisions of *psychologia*. In extending *psychologia*, the study of *anima*, to encompass the science of *animus*, he thus contributed to the formation of the double allegiance that has durably marked the concept of psychology.

Nonetheless, the presence of *psychology* in early-modern treatises, lexicons, and encyclopedias does not imply that it was definitively established within the order of knowledge. For example, in "Of Man," the first part of the *Leviathan*, Thomas Hobbes (1588–1679) divided knowledge into knowledge of facts and knowledge of consequences. The former was for him absolute and led to "history"; the second was conditional and led to "science" or "philosophy." Hobbes further divided books of philosophy according to their subject matter; the study of the consequences of the qualities of animals in general and of man in particular belonged in works of optics, music, ethics, poetry, rhetoric, and logic. Psychological material in Hobbes thus remained scattered across disciplines, and there was no science that corresponded to an *empsychologia*.¹³

In a fragment written just after 1696, Gottfried Wilhelm Leibniz (1646–1716), who was well acquainted with Alsted's encyclopedia, defined psychology as the science of monads and divided it into the doctrines *de percipientibus in genere* and *de intelligentibus seu spiritibus* (pneumatology). Inverting traditional partitions, he described pneumatology as one of the branches of psychology.¹⁴ The idiosyncratic meaning he gave to *psychologia* underlines the wavering semantics of the word and the largely nonpsychological character of the original concept.

While John Locke (1632–1704) has been widely celebrated since the Enlightenment as one of the founders of psychology, it is unlikely that he would have used the word himself had he taken to naming the disciplines in the sketch of classification placed at the end of the *Essay Concerning Human Understanding*.¹⁵ Locke divided the sciences into natural philosophy, ethics, and the doctrine of signs. Natural philosophy aimed at a speculative knowledge of both material bodies and spiritual substances (God, angels, and spirits). It thus included the science of the soul, though not what Locke would have considered "psychology." Indeed, the *psychologia* that was familiar to him defended the doctrine of the immaterial and immortal soul by way of arguments that represented for Locke precisely the kind of metaphysics his philosophy was designed to oppose.¹⁶

This understanding of *psychologia* as a combination of a natural science of the soul and the metaphysics of an immaterial substance was far from ephemeral. It is for this reason that, during

¹¹ Ibid., bk. 2 (*Philosophia Theoretica*); bk. 12 (*Pneumatico*), pt. 4 (*Psychologia*); bk. 13 (*Physica*), pt. 5 (*Empsychologia and Phythologia*).

¹² See Vidal, *Sciences of the Soul*, chaps. 2–3.

¹³ Thomas Hobbes, *Leviathan*, ed. Richard Tuck (Cambridge: Cambridge University Press, 1991), 60–61.

¹⁴ Louis Couturat, *Opuscules et fragments inédits de Leibniz* (Hildesheim: Olms, 1966), 524–29.

¹⁵ John Locke, *An Essay Concerning Human Understanding* (New York: Dover, 1959), 2:460–67.

¹⁶ I am referring to John Broughton, *Psychologia: or, an Account of the Nature of the Rational Soul* (London: T. Bennet, 1703). Locke, who was criticized in Broughton's work, expressed his opinion in a letter of June 30, 1703, to Anthony Collins.

the eighteenth century, the project of an empirical science of the mental faculties took the name “psychology” mainly when accompanied with metaphysical and religious ambitions.¹⁷

For Christian Wolff (1679–1754), the most influential German philosopher between Leibniz and Kant, psychology was at once an empirical a posteriori science of the faculties and a deductive, “rational,” a priori discourse on the nature of the soul. The Genevan naturalist and philosopher Charles Bonnet (1720–93) approached psychology as a natural science of sensualist inspiration and excluded from it considerations about the ultimate nature of the soul. Yet he also believed that psychology was consistent with the Christian definition of the human as a composite of body and soul and even corroborated such an essential Christian doctrine as that of the resurrection of the flesh.¹⁸ For both Wolff and Bonnet, psychology was endowed with intellectual and pedagogical preeminence: Bonnet considered it the foundation of philosophy, and Wolff saw it as providing the principles of natural law, natural theology, practical philosophy, and logic.

Conceived as such, psychology could be easily adopted by Christians committed to placing science and philosophy in the service of religion. The tiny entry “Psychologie” in Diderot and d’Alembert’s *Encyclopédie* (1751–72) was purely Wolffian. But the editors were in fact extremely critical of Wolff, and they did not include psychology in their influential “Figurative System of Human Knowledge.” In contrast, the revisionist *Encyclopédie* of the Swiss Protestant Yverdon (1770–80) devoted an important article to psychology, explicitly associating it with an array of topics culled from the “science of man” and claiming that it encompassed knowledge of crucial relevance for metaphysics, philosophy, pneumatology, anthropology, physiology, and animal economy.¹⁹

Those who claimed Locke’s legacy sought to rebuild logic and philosophy upon foundations that were in large part psychological. David Hume (1771–76) stated it clearly at the outset of *A Treatise of Human Nature* (1739–40). His “attempt to introduce the experimental method of reasoning into moral subjects” (as per his subtitle) aimed at elucidating the principles of human nature and refounding all sciences upon a “science of man” that included the science of the mind as an essential discipline.²⁰ Hume neither used the word “psychology” nor explained its exclusion, yet his reasons are hardly obscure in light of the word’s metaphysical and religious connotations, Wolffian or otherwise.

It is precisely on account of such connotations that the abbé de Condillac (1715–80) explicitly rejected the term. A “first science,” he explained, should undertake an “analysis,” or decomposition, of ideas in order to determine their origin and generation; and he added that he would call such science “psychology” if he knew a single “good work” by that title.²¹ Condillac’s comment is a good example of the conceptual and ideological situation in which the preeminence acquired by the empirical science of the soul (and of the cognitive faculties in particular) must be distinguished from the formation of the discipline that would ultimately be named “psychology.”

¹⁷ See Vidal, *Sciences of the Soul*.

¹⁸ See *ibid.*; and Fernando Vidal, “Brains, Bodies, Selves, and Science: Anthropologies of Identity and the Resurrection of the Body,” *Critical Inquiry* 28 (2002): 930–74.

¹⁹ Vidal, *Sciences of the Soul*, chaps. 7–8.

²⁰ David Hume, *A Treatise of Human Nature*, ed. David Fate Norton and Mary J. Norton (Oxford: Oxford University Press, 2006), 1.

²¹ Étienne Bonnot de Condillac, “Des progrès de l’art de raisonner,” in *Cours d’étude pour l’instruction du Prince de Parme*, vol. 2 of *Oeuvres philosophiques de Condillac*, ed. G. Le Roy (Paris: Presses Universitaires de France, 1947–51), 299.

The French Revolution introduced new political stakes into the classification of the sciences. The traces of the ancien régime had to be erased. A number of emergent bibliographical systems shared a desire to reduce the status of theology or to replace it with a completely revamped metaphysics.²² Destutt de Tracy (1754–1836), who had much to say on the matter of bibliography, rejected the term “psychology” because, he explained, it referred to a “science of the soul” and therefore implied the “vague quest for first causes.” However, when he proposed to arrange the disciplines according to their mutual dependence, he placed “ideology” (his neologism for “analysis of thought”) at the top.²³ Resisting the word “psychology” was in such a context a way of transforming the concept. And where the word propagated, the concept prospered. This was especially the case with “empirical psychology” in Germany at the end of the eighteenth century.²⁴

NATURPHILOSOPHIE, UTILITARIANISM, KANTIANISM: HEGEL, BENTHAM, AMPÈRE

The place attributed to any science among the disciplines always derives from and in turn reflects particular metaphysical and epistemological views. As the previous sketch has already suggested, however, the place attributed to psychology in particular additionally embodies notions about how knowledge itself (and knowledge about knowledge) is produced, and therefore about the very conditions that enable systematic orderings of the sciences. According to Hegel (1770–1831), for example, psychology belonged to the philosophy of spirit/mind (*Geist*), which dealt with subjective *Geist* (the seat of elementary psychological phenomena), objective *Geist* (which manifests itself in customs, laws, morality, the sciences), and absolute *Geist* (expressed in art, religion, and philosophy). Psychology was here the third part of the study of subjective *Geist*, which also encompassed anthropology and phenomenology.

Hegel’s anthropology was concerned with *Geist* in itself, in its “immediate” nature as Hegel termed it—in other words, with the natural soul, the sensible soul, and the real soul (which manifested itself and acted through the body). Phenomenology, in turn, treated *Geist* for itself or as mediated, and its object was consciousness as it evolved from sensation to reason. Psychology, finally, conceptualized *Geist* (now in the narrower or more usual sense of “mind”) as self-determining, as a subject for itself. It consisted in the description of theoretical *Geist* (i.e., functions such as imagination, memory, and thought) and of practical *Geist* (i.e., tendencies, passions, and desires). The place of psychology in Hegel’s work, as developed in his 1817 *Encyclopedia of the Philosophical Sciences*, was determined by the triadic rhythm of his thought and certainly reflects that rhythm’s obscurities.²⁵ In a fragment from 1798–99, Hegel’s contemporary Novalis noted no less cryptically—albeit more poetically—that psychology and physiology could only be one science: “Physiologie überhaupt wäre Welt-Psychologie, und Natur und Seele auch eins” (Physiology in general would be the psychology of the world, and nature and soul would equally be one).²⁶

²² Jacques-Charles Brunet, *Manuel du libraire et de l’amateur de livres* (Paris: Firmin Didot, 1865), bk. 5, columns ix–xii.

²³ Destutt de Tracy, *Mémoire sur la faculté de penser* (1798) and *Sur un système méthodique de bibliographie* (1797), both in Antoine-Louis-Claude Destutt de Tracy, *Mémoire sur la faculté de penser et autres textes* (Paris: Fayard, 1992).

²⁴ See Max Dessoir, *Geschichte der neueren deutschen Psychologie* (Amsterdam: E. J. Bonset, 1964); and Vidal, *Sciences of the Soul*.

²⁵ See Willem A. de Vries, *Hegel’s Theory of Mental Activity* (Ithaca, NY: Cornell University Press, 1988), chap. 2.

²⁶ Novalis, *Fragmente*, bk. 3 of *Novalis Schriften* (Jena: Eugen Diederichs, 1907), chap. 6.

Utilitarianism was perhaps more conducive to advancing psychology's disciplinary development. Consistent with his principle of utility as well as his reformist goals, Jeremy Bentham (1748–1832) subordinated all sciences to “eudemonics,” a general science intended to maximize humanity's well-being. He believed that the doctrine of well-being was the true ontology, and he divided it into a “coenosopic” science of that which is common to all beings and an “idioscopic” science of that which is unique to each class. Idioscopic ontology could be “somatoscopic,” concerned with the objects of the mathematical and natural sciences, or “pneumatoscopic,” concerned with the objects of pneumatology. By means of successive bifurcations of disciplines and their objects, pneumatology was made to comprise logic, grammar, rhetoric, aesthetics, and ethics; further dichotomies lead to politics and legislation. While Bentham did not include psychology in his scheme of the sciences, he elsewhere identified it with pneumatology and described it as one of the two branches of ontology (the other being somatology). From these two branches, he claimed, eudemonics derived its understanding of the phenomena of human life relative to its ultimate goal.²⁷ Psychology, although not graphically represented at the pinnacle of the system, was in fact preeminent, since it provided the foundation for the techniques of social management aimed at securing society's well-being. It is thus not surprising to see the importance of psychological considerations in Bentham's thought, particularly as regards motifs of action.

According to Bentham, the psychologization of foundational concepts ultimately concerned the domain of government. André-Marie Ampère's (1775–1836) oeuvre illustrates how this process took shape in the realm of theories of knowledge. Alongside his celebrated works in physics and mathematics, Ampère left an unfinished essay on the “natural classification of all human knowledge.” Under Kant's influence, he posited the existence of two worlds: a phenomenal world, which we know by means of our impressions and where, for example, “colors are on objects,” and a hypothetical noumenal world where “colors are sensations excited in the sentient being by certain rays and therefore exist only in this being.” Ampère explained that the noumenal world of astronomers and physicists depended on intuitions of relations (of duration, movement, and number) that were independent of sensory impressions. These considerations were the basis for the taxonomy of psychological phenomena and thus the classification of the sciences that he developed in letters to Maine de Biran and in his lectures at the Collège de France.²⁸

Ampère divided scientific knowledge into two “realms”: that of the sciences of the world, or cosmological sciences; and that of the sciences of thought, or “noological” sciences. As is almost always the case with classifications of knowledge, he devised his system by way of successive bifurcations. Noological sciences were philosophical or dialegmatic, the latter referring to those sciences that studied the signs that served to transmit ideas, sentiments, and passions. Noological sciences were divided into the moral and the properly philosophical, to which metaphysics and psychology belonged. Psychology was concerned with what could be known about “thought considered in itself.”²⁹

Ampère further classified the sciences according to four points of view, which he called autoptic, cryptoristic, troponomic, and cryptological. They concerned, respectively, the description of

²⁷ Jeremy Bentham, *Chrestomathia* (1816), table V; “Appendix Four: Essay on Nomenclature and Classification,” 84; “Fragment on Ontology,” 195; “Logic,” 289. All in Jeremy Bentham, *Works*, ed. J. Bowring (New York: Russell and Russell, 1962).

²⁸ Emile Bréhier, *Histoire de la philosophie* (Paris: Presses Universitaires de France, 1986), 3:561–657.

²⁹ André-Marie Ampère, *Essai sur la philosophie des sciences, ou exposition analytique d'une classification naturelle de toutes les connaissances humaines*, pt. 2 (Paris: Bachelier, 1843), 15.

phenomena, their causal explanation in terms of noumena (herein associated with theoretical entities such as the atom), the formulation of laws governing the relations between phenomena, and the elucidation of these laws on the basis of relations between noumena. Among the philosophical sciences, psychology represented the autoptic point of view. As he did with all sciences, Ampère in turn divided psychology into four points of view: psychography described the "intellectual facts," logic sought to understand "the circumstances and reasons" that determined judgments, methodology focused on the arrangement of knowledge (including methods for classifying, inferring, and teaching), and ideogeny examined "the sources and the origin of our ideas."³⁰

Even though Ampère did not explicitly depict psychology as a general propaedeutic or a science of the sciences, the science of mind was, in practice, the foundation of his epistemology. Indeed, beyond the philosophical distinction between the phenomenal and the noumenal worlds, the order of knowledge in his system was determined by the means whereby the mind apprehends these two worlds, and that is the ultimate reason why Ampère considered his classification of the sciences "natural."

POSITIVISM

In the nineteenth century, the conceptualization of psychology became a major topic of philosophical debate, and the place attributed to psychology in the order of the sciences became emblematic of deeper confrontations in the realm of epistemology. As the case of positivism demonstrates, these confrontations were a product of a belief in the possibility of founding a new cognitive and social order upon the scientific study of mental functions.

The early socialist thinker Henri de Saint-Simon (1760–1825) claimed that just as philosophers of the eighteenth century had "created an encyclopedia in order to overthrow the theological and feudal system," so must those of the nineteenth century begin the project anew "in order to create the industrial and scientific system."³¹ One of his theoretical contributions to this system-to-come was the "encyclopedic tree" included in his *Introduction to the Scientific Studies of the Nineteenth Century* (1807–8). In the foliage near the top, he placed "primitive sensations" and the "establishment of the initial signs of conventions." On the main trunk (general science), of which the upper third is lost in the foliage, different epochs appear from top to bottom: idolatry, the era of the arts and crafts; polytheism, the era of the fine arts; deism, the era of the moral and political sciences; and physicism, the era of the mathematical and physical sciences. The two parent branches of the mathematical and physical sciences grow upward almost vertically from the base of the trunk and served as the foundation for further horizontal branches. The branch of the physical sciences engenders those of natural history, celestial physics, chemistry, and the two parallel branches of the science of man and physiology. These branches, angling upward, are connected by a banderole inscribed *On the Relations between the Physical and Moral Aspects of Man*.³² Saint-Simon's choice of Pierre-Jean-George Cabanis's famous 1802 materialist work was consistent with his belief that physiologists needed to banish philosophers, moralists, and

³⁰ Ibid., 9–18.

³¹ Henri de Saint-Simon, "Sur la nécessité de faire une nouvelle Encyclopédie pour préparer la réorganisation sociale," in *Opinions littéraires, philosophiques et industrielles* (1825), cinquième opinion. In Henri de Saint-Simon, *Oeuvres choisies* (Hildesheim: G. Olms, 1973), 3:259.

³² This is found on a foldout placed at the end of book 1 of the *Introduction aux travaux scientifiques du dix-neuvième siècle* (1807–8), in Saint-Simon, *Oeuvres choisies*, vol. 1.

metaphysicians in the same way that astronomers and chemists had once expelled astrologists and alchemists from the realm of legitimate knowledge.³³

The position Saint-Simon afforded Cabanis suggests the location that psychology could have occupied in the “encyclopedic scale” of his disciple Auguste Comte (1798–1857) had it appeared therein. Comte organized the positive, fundamental sciences according to an order of increasing complexity and decreasing generality. The result was the following sequence: mathematics, astronomy, physics, chemistry, biology, and sociology.³⁴ This order was in Comte’s view less historical than “dogmatic”; it represented “the system of ideas as it could be designed today by a single mind that, placed at the appropriate point of view and provided with sufficient knowledge, could concern itself with remaking science in its entirety.”³⁵ It also embodied a didactic master plan, which is why Friedrich Engels (1820–95), in a note in his unfinished *Dialectics of Nature*, wrote that Comte’s system “[leads] to the crazy *enseignement intégral*, where each and every science is exhausted before another is even broached, where a basically correct idea is mathematically exaggerated to the point of absurdity.”³⁶ For a similar reason, Charles Renouvier (1815–1903), the French thinker whose *personnalisme* considered the study of the human being as the foundation of all knowledge, felt that Comte’s system of the sciences put an end to “the era of exploration



From Henri de Saint-Simon, *Introduction aux travaux scientifiques du dix-neuvième siècle* (1807–8), bk. 1.

³³ *Lettres d'un habitant de Genève à ses contemporains* (1802), in Saint-Simon, *Oeuvres choisies*, 1:24.

³⁴ These sciences are “fundamental” to the extent that they provide the theoretical bases of particular descriptive sciences. Chemistry, for example, is the basis of mineralogy.

³⁵ Auguste Comte, *Auguste Comte: Philosophie des sciences. Textes choisis*, ed. Jean Laubier (Paris: Presses Universitaires de France, 1974), 34.

³⁶ Friedrich Engels, *Dialektik der Natur*, in Karl Marx and Friedrich Engels, *Werke* (Berlin: Dietz, 1962), 20:515.

and research" and was nothing more than "a fiction and an appeal to faith, with a view toward negating every critique and placing the human spirit in chains."³⁷

Psychology was absent from the encyclopedic scale that Comte developed in the second lesson of the *Course of Positive Philosophy* (1830–42). The reason for that exclusion lies in the philosopher's conception of the mechanisms of knowledge and a possible science of mind. In the first lesson of the *Course*, taking up certain ideas that had preoccupied him during his youth, Comte declared the mind incapable of observing itself. In the forty-fifth lesson, he explained that positive psychology must limit itself to investigating the productions of the human mind and the organic foundations of physical phenomena, and in his *Catéchisme positiviste* (*Catechism of Positive Religion*, 1852), he provided a "systematic view of the soul" under the title "Positive Classification of the Eighteen Internal Functions of the Brain." Comte's science of mind was, as he put it, a "positive cerebral theory," but it became increasingly sociological between the *Course of Positive Philosophy* and the *System of Positive Polity* of 1851–54.³⁸ The nature and operation of the faculties, according to Comte, were the same for the individual and the species. Ultimately, however, since only species were in his view "real enough and developed enough" to allow for a proper description of those faculties, the motto of the cerebral theory became "Sociological inspiration mediated by zoological appreciation."³⁹

Positivists such as Émile Littré (1801–81), remembered principally for his *Dictionnaire de la langue française* and his edition of Hippocrates, proposed, in his essay "De quelques points de physiologie psychique" ("On Certain Points in Psychological Physiology," 1860), the word *psychophysologie*, not to deny the possibility of psychology, but to highlight certain principles: "Today it can no longer be doubted that intellectual and moral phenomena are phenomena that belong to nervous tissue; that the human case is but one link ... of a chain that extends, without precise limits, to the most inferior animals; and that ... one is a physiologist provided one employs the method of description, observation, and experience."⁴⁰

The oscillation between affirming and denying the possibility of a specifically psychological science of mind became an integral part of the philosophical landscape of the post-Comtian nineteenth century. In *On the Logic of the Moral Sciences*, John Stuart Mill (1805–73) asserted the possibility of introspection and of a properly psychological science.⁴¹ He would later refer ironically to Comte's embrace of phrenology and further insist on the need for psychology if relations were to be established "between mental functions and cerebral conformations."⁴² In his "Reasons for Dissenting from the Philosophy of M. Comte" (1869), Herbert Spencer detected a contradiction between the premises of the Comtian system, within which all knowledge is relative to and derives from experience, and the rejection of the only science that would allow Comte to demonstrate such premises. Later, Edmond Goblot (1858–1935) and Adrien Naville (1845–1930) attempted to overcome Comte's apparent refusal of a genuine science of mind, the former by highlighting the

³⁷ Charles Renouvier, "De la certitude des sciences et de leur classification rationnelle," in *Traité de psychologie rationnelle d'après les principes du criticisme: Essais de critique générale; Deuxième essai* (Paris: A. Colin, 1912), 2:358.

³⁸ Annie Petit, "Quelle place pour la psychologie dans le positivisme?," *Revue de synthèse*, 4e sér., nos. 3–4 (1994): 393–415.

³⁹ Comte, *Auguste Comte*, 133.

⁴⁰ Émile Littré, *La science au point de vue philosophique* (Paris: Didier, 1876), 307–8.

⁴¹ John Stuart Mill, *Book Six: On the Logic of the Moral Sciences*, in *A System of Logic Ratiocinative and Inductive, Part II*, in *The Collected Works of John Stuart Mill*, ed. John M. Robson (London: Routledge, 1974), vol. 8, chap. 4, §2.

⁴² John Stuart Mill, *Auguste Comte and Positivism*, 2nd ed. (London, N. Trübner, 1866), 65.

unity of psychology and biology and their continuity with sociology, the latter by insisting upon the interdependence of biology, psychology, and sociology.⁴³ However, as the philosopher and ethnologist Lucien Lévy-Bruhl pointed out, Comte did not reject in principle the possibility of a positive science of mind; rather, he reacted against the introspective method that seemed to him common to the *Idéologues*, the French eclectics, and the Scottish Common Sense philosophers.⁴⁴

While there is certainly no formal or specific place for psychology in his system, Comte's intense and sustained attention to psychological questions, along with the role he attributed to them in his plan for a "theoretical morality," suggests the importance he would have explicitly attributed to psychology had he lived to develop his system beyond the *System of Positive Polity*. The underlying problem, which is highlighted by Comte's apparent negation of psychology, is not to decide whether the science has the right to exist but to define its place among the disciplines in light of the history of science, the continuity and interdependence of phenomena, and the diversity of methods of knowing. Given that the objects of the human sciences seem continuous with each other, how can one give those sciences in general, and psychology in particular, real rather than merely nominal boundaries?

ENTWINEMENT AND CONTINUITY: COURNOT AND WHEWELL

In 1851, the same year in which Comte's *System of Positive Polity* began to appear, the philosopher and mathematician Antoine-Augustin Cournot (1801–77) published *An Essay on the Foundations of Our Knowledge*, one of the most significant epistemological works of the nineteenth century, which treated, in part, "the coordination of human knowledge" and "the scientific characteristics of psychology and its rank among the sciences."

Having critiqued the abuse of the method of bifurcation as used by Bentham and Ampère, as well as the linear nature of their classifications, Cournot constructed a double-entry table. He defined five "stages" or types of sciences conforming to Ampère's schema and ranked them, like Comte, in an order of increasing complexity. Along one axis, he ordered the disciplines in the following sequence: mathematical sciences, physical and cosmological sciences, biological sciences, noological and symbolic sciences, and political and historical sciences. He then combined these five groups of sciences with three "series." The theoretical series included the sciences that "rely upon systems of eternal truths or permanent laws of nature." The cosmological series encompassed the sciences "that work on a chain of facts that have successively generated one another and explain one another, going back to primordial facts that must be accepted without explanation." The technical series comprised the applied sciences.⁴⁵

Empirical psychology was situated at the frontier of the biological and noological sciences. The biological sciences, Cournot explained, presupposed the physical and cosmological ones and led, "by way of the natural history of man and empirical psychology (closely united with physiology)," to the border shared with those sciences that examine human understanding and moral nature. The passage from one discipline to the next took place by means of "continuous transitions" from "the study of the functions of the nervous system and animal sensibility to the

⁴³ See Edmond Goblot, *Essai sur la classification des sciences* (Paris: Alcan, 1898); and Adrien Naville, *Classification des sciences: Les idées maîtresses des sciences et leurs rapports* (Paris: Alcan, 1920).

⁴⁴ Lucien Lévy-Bruhl, *La philosophie d'Auguste Comte* (Paris: Alcan, 1900), chap. 5.

⁴⁵ Antoine-Augustin Cournot, *Essai sur les fondements de nos connaissances et sur les caractères de la critique philosophique* (Paris: Vrin, 1975), 408–9.

study of the superior faculties of intelligence." There were therefore no "sharp distinctions" in the series of psychological phenomena from physiology to logic. The biological and noological sciences together formed the following theoretical series: anatomy, embryology, teratology, physiology, phrenology, physiognomy, empirical psychology (the last biological science), ideology, logic, aesthetics, natural theology, and ethics.⁴⁶

Contrary to Comte, Cournot believed that the "superior psychology of man" implied sociology as much as sociology implied each individual's biology.⁴⁷ The continuity of the series embodied an *enchevêtrement*, an "entwinement" of phenomena rather than a "superimposition" of sciences. In virtue of the postulate of the continuity of phenomena, Cournot refused to grant a position of historical or epistemological preeminence to psychology or any other science, a point on which he was similar to the polymath William Whewell (1794–1866), author of one of the first general histories of the sciences.

Whewell believed that a taxonomy of the sciences should be founded upon the "ideas" or "conceptions" that reveal the principles of each science.⁴⁸ The ideas proper to one discipline gradually lead toward those of another. Thus, Whewell wrote, at the threshold of physiology we find the ideas of life, of sensation, and of the will, and "the pursuit of such conceptions and their consequences would lead us to the sciences (if we were allowed to call them sciences) which contemplate not only animal, but human principles of action, to Anthropology and Psychology."⁴⁹

Whewell's classificatory table⁵⁰ includes one column for fundamental ideas, another for the sciences, and a third for the encyclopedic order. The system begins with space (idea), geometry (science), and the pure mathematical sciences (a class geometry shares with arithmetic, algebra, and differential calculus). Following the physical and the classificatory natural sciences of taxonomy and comparative anatomy, the system concludes with the ideas of irritability, organization, and final cause (all proper to biology), of instinct, emotion, and thought (psychology), of historical causality (various sciences), and of first causes (natural theology). As with Cournot, it is ultimately the continuity of phenomena (from which the fundamental ideas of each science are derived by induction) that accounts for the place of psychology in Whewell's order of knowledge. If a psychological fact were found outside the series of phenomena, then psychology itself would have to be excluded from the system.

PSYCHOLOGY, A PEERLESS SCIENCE: SPENCER AND BAIN

In an 1854 essay on the genesis of science, Herbert Spencer (1820–1903) wrote that the sciences should not be ranked in a series. In his view, a series could not represent the logical or historical relations between the sciences, and it is thus no surprise that existing classifications fell into error concerning logic and history (Comte's classification in particular seemed to Spencer to conflate dogmatic order and historical order). Spencer's conceptualization at the time emphasized lateral relations among the disciplines and sought to carefully distinguish between the abstract and the general.⁵¹

⁴⁶ Ibid., 410–12, 408–9.

⁴⁷ Antoine-Augustin Cournot, *Matérialisme, vitalisme, rationalisme: Essai sur l'emploi des données de la science en philosophie* (Paris: Vrin, 1986), 112.

⁴⁸ William Whewell, *Novum Organon Renovatum* (London: John W. Parker and Son, 1858), chap. 9.

⁴⁹ Ibid., 138.

⁵⁰ Ibid., 140.

⁵¹ Herbert Spencer, "The Genesis of Science," in *Essays Scientific, Political, and Speculative* (New York: Appleton, 1907), vol. 2.

A decade later, in *The Classification of Sciences*, Spencer (1864) explained that the sciences known as “abstract” (logic, mathematics) deal with relations independently of the things between which such relations exist. The abstract-concrete sciences, on the other hand, abstract from concrete phenomena. Thus, the truths of mechanics, physics, and chemistry do not pertain to any material object in particular but instead concern matter and movement in general. The concrete sciences, finally, aim not at the “analytical explanation of phenomena,” as is the case of the abstract-concrete sciences, but rather at their “synthetic interpretation.” They attempt not to abstract or generalize from the constitutive elements of phenomena but rather to account for every phenomenon as the result of those elements. In a “Postscript, and response to the critics,” Spencer compared the distinction between the abstract and the concrete to that between fiction and biography, which, he claimed, were separated by an insurmountable chasm. Consequently, the three groups of sciences did not form a series. Each group furnished the material for that which followed, but the facts that each established could not provide answers to the questions posed by the others. There was no filiation, be it historical, genealogical, or logical, but rather parallelism.⁵²

In contrast, the phenomena investigated by the concrete sciences *did*, in fact, form a series. This series begins with the ways in which the laws of the redistribution of matter and movement affect the interactions of molecules, and it ends with organic phenomena. Psychology and physiology study the functional dimension of these phenomena, from the internal and the external point of view, respectively.⁵³ The Spencerian order of the sciences is therefore consistent with the famous definition given in the *First Principles* of 1867 (§145), according to which “[e]volution is an integration of matter and concomitant dissipation of movement; during which matter passes from an indefinite, incoherent homogeneity to a definite, coherent heterogeneity, and during which the retained motion undergoes a parallel transformation.”

For Spencer, evolution thus determined the place of psychology among the sciences. Renouvier accused him of betraying his own principles by ultimately restoring, with his classification, the reductive unity he allegedly wanted to avoid.⁵⁴ Indeed, according to Spencer, from astronomy to sociology, through geology, biology, and psychology, the sciences were concerned with increasingly special and heterogeneous “aggregates” that evolved from one another by way of imperceptible gradations, thereby forming a totality of interdependent phenomena. According to such a perspective, psychology was one of the concrete sciences, and its borders with biology and sociology are purely conventional. Yet in his *Principles of Psychology* (§56), first published in 1855, Spencer affirmed that “under its subjective aspect, Psychology is a totally unique science, independent of, and antithetically opposed to, all other sciences whatever.” From the vantage point of subjectivity, he explained, psychology studies *consciousness*, an entity that differs by its very nature from those proper to other sciences. Now, “objective psychology” could not exist without “subjective psychology.” Whereas other sciences treat the connections between phenomena that are internal or external to the organism, psychology studies the relations between these two connections. Its object follows the same evolution that determines the continuity of the sciences, and by virtue of their common element of consciousness, objective and subjective psychology form “a double science which, as a whole, is quite *sui generis*.” Moreover, insofar as

⁵² Herbert Spencer, *The Classification of the Sciences: To Which Are Added Reasons for Dissenting from the Philosophy of M. Comte*, 3rd ed. (London: Williams and Norgate, 1871).

⁵³ See *ibid.*, table III.

⁵⁴ Renouvier, “De la certitude des sciences et de leur classification rationnelle,” 185.

psychology describes and explains the processes by which we know and create science, it ends up being the foundation of every metascientific discourse.

The Scottish philosopher and psychologist Alexander Bain (1818–1903), founder of the journal *Mind*, devoted part of his career to elaborating anti-Spencerian classifications of the sciences.⁵⁵ For Spencer, the sciences could be either abstract or concrete. The abstract sciences preceded the concrete ones, as manifested in the historical and pedagogical sequence of logic, mathematics, mechanical physics, molecular physics, chemistry, biology, and psychology. Bain, on the contrary, believed that the relations between the sciences developed in every direction, not merely from the abstract to the concrete. He also held that the sciences blended the concrete with the abstract: psychology described and classified, but it also separated the mind into interrelated factors and functions (for Bain, sentiment, will, and thought).

Apart from their disagreement regarding the development and organization of the sciences, Spencer and Bain both recognized the singularity of psychology. For Bain, if psychology occupied the final position in the development of the sciences, it was because the mind is an extremely complex entity and because, despite the connections between the psychical and the physiological, subjective consciousness remains a *sui generis* phenomenon, absolutely unique and irreducible.⁵⁶ In virtue of the postulate of the continuity of phenomena, every science belongs to the system of knowledge; in becoming the exception that confirmed the rule, psychology found its position as the foundational science reinforced.

EMPIRICISM AND PRAGMATISM: PEARSON AND PEIRCE

In 1892, Karl Pearson (1857–1936) published *The Grammar of Science*. Mathematician, statistician, biometrician, advocate of eugenics, and philosopher, Pearson held a conception of science similar to Ernst Mach’s empiricist, antimetaphysical, and nominalist epistemology. For him, “the object of science is to describe in conceptual shorthand the routine of our past experience, with an eye toward predicting our future experience.”⁵⁷ This “routine” is that of sensations, understood in an associationist sense. Science can therefore be reduced to association, and scientific laws are mere formulas to assemble and summarize the phenomena obtained through the medium of perception. The sciences themselves evolve, are interdependent, and lack well-defined boundaries. The organisms studied by microbiologists, for example, prove very important for certain aspects of medicine that, in turn, have a great impact upon sociology. It was thus impossible, according to Pearson, to arrive at a complete, coherent system of the sciences.

Pearson divided the sciences into abstract and concrete, depending on whether they dealt with the processes or the contents of perception. The concrete sciences of organic phenomena treat either historical, nonrepetitive phenomena (such as the evolution of species, mental faculties, and social institutions) or biological phenomena. The branch of biology that investigates functions and behavior may consider physical facts (physiology) or mental ones (psychology). While general psychology focuses on, for example, the theory of the instincts, human psychology may be centered on the individual or the group.⁵⁸ In placing psychology at the heart of biol-

⁵⁵ Alexander Bain, *Logique déductive et inductive*, vol. 1, *Déduction*, trans. G. Compayré (Paris: Alcan, 1894), appendix A.

⁵⁶ *Ibid.*, 31–43.

⁵⁷ Karl Pearson, *The Grammar of Science* (London: Adam and Charles Black, 1900), 504.

⁵⁸ *Ibid.*, 526.

ogy, Pearson indicated the significance, for his classification, of a belief in the continuity of the physical and the mental. In this sense, psychology did not hold a privileged position. Yet it was from psychology that sociology and other social sciences, such as economics and jurisprudence, were derived. Moreover, from its crucial position at the center of the human sciences, psychology functioned as the ultimate foundation of epistemology. Pearson's entire classification stemmed from his empiricism, which itself rested upon psychological theory. According to the criteria of the philosopher himself, only psychology was capable of justifying his conception of science as a grammar.

While for Spencer and Bain, and less explicitly for Pearson, psychology was at once a science and a metascience, it does not play such a role in systems that follow from logical or otherwise nonpsychological principles. Thus, in his classification of the sciences, Charles Sanders Peirce (1839–1914), the founder of pragmatism, wished to exhibit the affinities among the sciences in accordance with Comte's idea "that one science depends upon another for fundamental principles, but does not furnish such principles to that other" (1:180).⁵⁹ There were, for Peirce, two types of sciences: theoretical and practical. The theoretical sciences consisted of the *sciences of discovery* (mathematics, philosophy, and idioscopy in Bentham's sense) and the *sciences of review*, which took shape in works such as Comte's *Positive Philosophy* and Spencer's *Synthetic Philosophy* that were intended to ground a philosophy of science.

Peirce divided idioscopy into the physical sciences (physiognosy) and the "psychical" sciences (psychognosy), each of which had nomological, classificatory, and descriptive branches. The nomological and classificatory domains of psychognosy encompass a diverse array of psychological disciplines: "nomological psychics," psychology itself, is made up of introspective, experimental, physiological, and child psychology; classificatory psychognosy encompasses individual, pathological, animal, and racial psychology.

On the basis of a criterion of hierarchical dependence among the disciplines, Peirce situated mathematics, which finds applications in all sciences, at the pinnacle of his system, followed by philosophy, which each particular science, in his view, had to take into consideration. The idioscopic sciences, he claimed, depend largely upon philosophy. For example, to the extent that psychognosy does not have direct access to the mind but must approach it inductively from corporeal states (1:250), it is indebted to logic. But even if psychology is partly based on physiognosy (1:253–55), the two do not overlap: "Very little psychology is needed by the biologist; and no very deep biology by the psychologist" (1:265). In short, the place of psychology in Peirce's system reflects the philosopher's opposition to psychologism in both logic and epistemology.

WUNDT, DILTHEY, AND THE *GEISTESWISSENSCHAFTEN*

Beginning in the last decade of the nineteenth century, the debate raised by Wilhelm Wundt's (1832–1920) understanding of the nature and position of psychology among the sciences proved

⁵⁹ Following the conventional manner of citing Peirce's *Collected Papers*, I provide the number of the volume followed by the paragraph. See Charles Sanders Peirce, "A Detailed Classification of the Sciences" and "A Detailed Classification of the Sciences," respectively the first and second chapters of the second volume of *Collected Papers of Charles Sanders Peirce*, ed. Charles Hartshorne and Paul Weiss (Cambridge, MA: Harvard University Press, 1960). The differences between these two texts are negligible for our purposes. On the place of logic, see "Why Study Logic?," in *ibid.*, 2:119–22.

decisive in the emergence of psychology as an autonomous discipline.⁶⁰ Wundt argued that psychology is not a natural science but a “human science,” a *Geisteswissenschaft*. Psychology is similar to the natural sciences only insofar as the use of experimentation is concerned. The experimental approach, however, is limited to the study of elementary psychological processes; more complex processes must be addressed by means of historical and social methods. In Wundt’s perspective, the very existence of psychology hinged on accepting a psychic causality irreducible to physical causality and on postulating the legitimacy of different types of scientific explanation.

Wundt saw psychology as a primordial science from the gnoseological point of view. First, the natural sciences construct their material starting from immediate psychological experience. Second, psychology serves as the foundation for the theories of knowledge, logic, and morality. Finally, the other *Geisteswissenschaften* are based upon psychological presuppositions. Thus, although Wundt thought psychology was barely beginning to detach itself from philosophy and to become one of the “individual sciences,” he situated it at the summit of the *Geisteswissenschaften*.⁶¹ His reason for doing so was that psychology, as a general theory of mental processes, seemed to him to embrace and ground all the other sciences that dealt with the productions of the mind.⁶²

Wundt divided the sciences into the formal (pure mathematics) and the “real,” or material and empirical, but considered that their practical applications did not lend themselves to any logical ordinance. The *reale Wissenschaften* consist of the natural sciences and the human sciences. They are “phenomenological” insofar as they concern processes (as does psychology), “systematic” insofar as they investigate the productions of nature or of the mind (e.g., law and economics), and “genetic” insofar as, like history, they study the formation and development of these productions.⁶³ Seen historically, the systematic sciences are the first to reach a certain level of elaboration, followed by the genetic and finally the phenomenological sciences.⁶⁴

In such a scheme, psychology mediates between the natural and the human sciences both on account of its methodology, since it uses the experimental method characteristic of the natural sciences, and in virtue of the purely methodological significance of the idea of “psychophysical parallelism.” According to Wundt, there is no mind-body dualism. Rather, psychology treats the processes that belong to the subject’s internal experience, while the natural sciences treat the processes external to the subject.

Wundt’s arrangement of the human sciences further highlights the epistemological preeminence of psychology.⁶⁵ Individual psychology, the science of mental processes in human consciousness, is the first of the phenomenological human sciences. It is followed by disciplines that study these processes in particular cases: animal psychology, *Völkerpsychologie*, psychophysics, anthropology, ethnology. After these branches of psychology come the systematic human sciences, namely philology, economics, the political sciences, the theory of law, systematic theology,

⁶⁰ See, e.g., Kurt Danziger, “The Positivist Repudiation of Wundt,” *Journal of the History of the Behavioral Sciences* 15 (1979): 205–30; David Leary, “Wundt and After: Psychology’s Shifting Relations with the Natural Sciences, Social Sciences, and Philosophy,” *Journal of the History of the Behavioral Sciences* 15 (1979): 231–41; Wolfgang Bringmann and Ryan D. Tweney, eds., *Wundt Studies* (Toronto: Hogrefe, 1980).

⁶¹ Wilhelm Wundt, *Einleitung in die Philosophie* (Leipzig: W. Engelmann, 1906), 77.

⁶² Wilhelm Wundt, “Ueber die Eintheilung der Wissenschaften,” *Philosophische Studien* 5 (1889): 44–45.

⁶³ Wundt, *Einleitung in die Philosophie*, §7; Wilhelm Wundt, *Logik der exakten Wissenschaften*, in *Logik* (Stuttgart: F. Enke, 1907), vol. 2, first part, chap. 3, §2.

⁶⁴ Wundt, *Einleitung in die Philosophie*, 76–77; Wundt, *Logik*, 99.

⁶⁵ Wundt, “Ueber die Eintheilung der Wissenschaften,” 47.

aesthetic theory, and scientific methodology. And these are in turn followed by the historical human sciences, from biography and universal history to the history of each class of mental productions, such as the histories of art and science.

Oswald Külpe (1862–1915), who had studied with Wundt, questioned his teacher’s position. He argued that all mental phenomena depend upon bodily processes, and that every subject of psychology, including the complex processes Wundt excluded from the laboratory, could be addressed experimentally. The debate between Wundt and Külpe opposed two conceptions of science: one assumed that the concepts of each science are irreducible to those of another science even if that other science is more general and more abstract; the other (Külpe’s, as inspired by Ernst Mach and Richard Avenarius) aimed at the unification of science by way of the generalized usage of the most abstract possible conceptualizations and reduced psychology to physiology. The controversy grew to involve, among others, Dilthey, for whom psychology was a *Geisteswissenschaft*, and the “positivists” Hermann Ebbinghaus and Edward B. Titchener.

According to Wilhelm Dilthey (1833–1911), Comte, along with Mill, Littré, and Spencer, had been unable to find that which linked the human sciences together. Their systematic activity was not accompanied by an understanding of historical reality, and only history, Dilthey claimed, enabled the apprehension of the process whereby humans had become aware of themselves as distinct from nature. For Dilthey, this awareness provides the foundation of the *Geisteswissenschaften*, whose goal is to understand the historical world in its totality.⁶⁶ Insofar as psychology investigates the elementary forms of historical and social reality, it is the basis for such understanding and is therefore the first and most basic of the human sciences.⁶⁷

The Vienna Circle attacked Dilthey head on. The proponents of logical empiricism considered the place of psychology among the sciences to be one of the central problems of epistemology and metaphysics and concluded that all psychological propositions are translatable and reducible to a “physicalist” language. Since there is only one language of science, the distinctions between disciplines could not be foundational but rather concern only practical aspects and particular contents.⁶⁸ At the other end of the spectrum stands one of the most influential figures of twentieth-century psychology, Jean Piaget (1896–1980). Piaget was convinced that epistemology would find in developmental (“genetic”) psychology the answer to many of its traditional questions about the origins and nature of scientific concepts and the relationship between knowledge and reality, and he held that psychology empirically invalidated logical positivists’ claims about the articulation of language, logic, and mathematics.⁶⁹

⁶⁶ See Wilhelm Dilthey, *Introduction to the Human Sciences*, trans. Rudolf A. Makkreel and Frihjf Rodi (Princeton, NJ: Princeton University Press, 1989); and Wilhelm Dilthey, *The Formation of the Historical World in the Human Sciences*, trans. Rudolf A. Makkreel and Frihjf Rodi (Princeton, NJ: Princeton University Press, 2002).

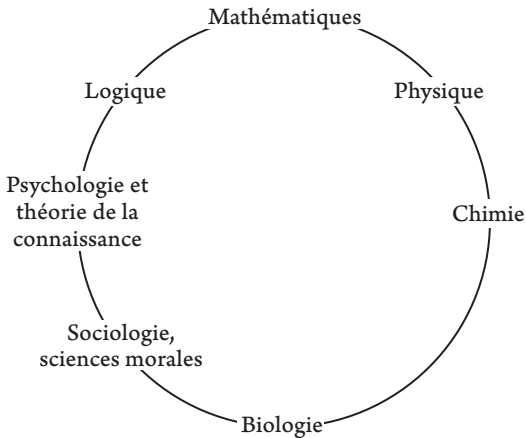
⁶⁷ Also see Paul Tillich, *The System of the Sciences according to Objects and Methods*, trans. P. Wiebe (London: Associated University Presses, 1981).

⁶⁸ See Carl G. Hempel, “Analyse logique de la psychologie,” *Revue de synthèse* 10 (April 1935): 27–42; Moritz Schlick, “De la relation entre les notions psychologiques et les notions physiques,” *Revue de synthèse* 10 (April 1935): 5–26.

⁶⁹ Jean Piaget, *Genetic Epistemology*, trans. Eleanor Duckworth (New York: Columbia University Press, 1968), chap. 1.

THE PIAGETIAN CIRCLE

Piaget’s entire oeuvre is accompanied by a reflection on the classification of the sciences. His first thoughts concerning the question appear in his early autobiographical novel, *Recherche*, published in 1918.⁷⁰ His classification at the time takes the form of a circle.⁷¹



Based on Jean Piaget, *Recherche* (1918), pt. 1, chap. 8.

The criterion that guided the construction of this circle derived less from historical or logical relations among the disciplines than from the degree of dogmatism of the practitioners of each science. The young protagonist of *Recherche* criticized the entirety of European culture, and his circle of the sciences embodied the accusation of dogmatism he addressed to all scientists—and to biologists in particular. The sciences, Piaget argued, can be thought of as a continuous circle with two poles, one where dogmatism reaches its peak (biology), the other where it is at its lowest point (mathematics).⁷² The dogmatic mentality diminishes as we move, in whatever sense, from biology to mathematics.

Piaget would again consider the classification of the sciences in his 1929 inaugural lecture as professor of the history of scientific thought at the University of Geneva. The evolution of the sciences appeared to him to proceed in two distinct directions: one mathematical, the other biological. Insofar as the history of knowledge takes the form of a progressive reduction of reality to mathematics, the crucial challenge (he believed) is to find out how and why mathematics, a field where truth does not depend upon experience or experimentation, is so well adapted to knowing reality. Piaget’s solution appealed to biology. Thought, for him, must be explained with reference to the “laws of biological organization”; “the problem of the relations between thought and things” was for him “a particular case of the relations between the organism and the milieu.” Mathematics and biology therefore “form a circle.”⁷³ But this circle is not “absolute.” It will never be complete because the sciences are never fully realized; it thus transforms itself into a spiral—the form that, in Piaget’s view, best symbolizes the mutual construction of thought and reality.

⁷⁰ Fernando Vidal, *Piaget before Piaget* (Cambridge, MA: Harvard University Press, 1994), chap. 13.

⁷¹ Jean Piaget, *Recherche* (Lausanne: La Concorde, 1918), pt. 1, chap. 8.

⁷² *Ibid.*, 59.

⁷³ Jean Piaget, “Les deux directions de la pensée scientifique,” *Archives des sciences physiques et naturelles*, année 134, fifth period, vol. 11 (1929): 156, 159.

In 1950, in the conclusion to his *Introduction to Genetic Epistemology*, Piaget once again took up the image of the circle and the idea of the two directions of scientific thought:

All knowledge consists in an inseparable relation between subject and object such that the object is known solely through its assimilation to the activity of the subject, and the subject knows himself only by way of his own actions—in other words, of his accommodations to the object. It is therefore not surprising that this fundamental circle, inherent to the very activity of knowing, is found again in the body of knowledge that constitutes the total system of scientific thought.⁷⁴

Knowledge proceeds in a mathematical direction where the object is “reduced” to the subject who assimilates it into a logicomathematical framework, and in a biological direction where the subject is “reduced” to an object by way of physicochemical methods.

In Piaget’s later reflections, the circularity of the sciences became a “fundamental epistemological circle” derived from the “dialectical situation” in which subject and object find themselves relative to each other.⁷⁵ The sciences belong to four different classes: logicomathematical, physical, biological, or psychosociological. Each class in turn encompasses four domains: the material, the conceptual, the internal epistemological, and the derivative epistemological, with the last comprising the epistemological consequences of scientific results.

Domaines →	A. Matériel	B. Conceptuel	C. Epistémologique interne	D. Epistémologique dérivé
Sciences ↓				
I. Logico-mathématiques				
II. Physiques				
III. Biologiques				
IV. Psycho-sociologiques				

Based on “Le système cyclique des sciences,” part 2 of “Le système et la classification des sciences,” in Jean Piaget, *Logique et connaissance scientifique* (1967).

For Piaget, the circle linked the material and “derivative epistemological” domains of psychology and mathematics. As in 1929, he considered that the role of the interaction between subject and object in the production of knowledge demonstrated the epistemological primacy of psychology. He even claimed to “experience a certain pride in the key position that psychology occupies in the system of the sciences.”⁷⁶ On the one hand, he explained, psychology relies upon other sciences, insofar as it takes for granted that mental life is the product of factors studied by other disciplines. On the other hand, however, no science is possible without a “logicomathematical coordination” that, far from being innate, is constructed through the organism’s

⁷⁴ Jean Piaget, *Introduction à l’épistémologie génétique*, vol. 3, *La pensée biologique, la pensée psychologique et la pensée sociologique* (Paris: Presses Universitaires de France, 1950), 278.

⁷⁵ Jean Piaget, “Le système cyclique des sciences,” part 2 of “Le système et la classification des sciences,” in Jean Piaget, *Logique et connaissance scientifique* (Paris: Gallimard, 1967).

⁷⁶ Jean Piaget, “La psychologie, les relations interdisciplinaires et le système des sciences,” *Bulletin de psychologie* 20 (1966): 253.

interactions with the material world—interactions whose development is the proper research object of psychology.

The position that Piaget proudly attributed to psychology is typical of classifications based upon psychologistic presuppositions. When the epistemology governing the arrangement of the disciplines assumes that all forms of knowing are reducible to psychological processes or that these processes provide their ultimate foundations, psychology necessarily becomes the science of sciences. Such assumptions became historically central toward the end of the eighteenth century, when, in the encyclopedic discourses that provided psychology with a superior standing, the science of mind found a means of self-legitimation, of constructing itself as an autonomous domain, and eventually of sharing territories and borders not with spiritism or chiromancy but with sciences deemed legitimate. In short, as emphasized by the initial rejection of the word "psychology" by those who wished to reduce logic and philosophy to the empirical investigation of the origin of ideas, psychology earned its place among the sciences thanks to a psychologistic attitude.

The extreme example of this process is psychology's absorption of logic in the nineteenth century and the ensuing *Psychologismus-Streit* of 1890–1914. For Edmund Husserl (1859–1938), psychologism, or the grounding of logic on empirical psychology, was part of the "crisis" of European science and European humanity. This crisis was, at bottom, a crisis of psychology.⁷⁷ It resulted, in Husserl's view, from psychology's failure to conceptualize the notion of subjectivity, which in turn resulted from its exclusively naturalistic understanding of its subject matter. Now, psychology was for Husserl the most basic philosophical science, and what he wrote about logic applies to it as well and underscores the significance of metascientific practices: given that the definitions of a science follow its development, "successful work on a discipline" does not necessitate "a prior conceptual demarcation of its field"; at the same time, "the degree of adequacy of those definitions, or the view of the field they express, react on the progress of the science itself."⁷⁸



Despite the diversity of the doctrines upon which the systems sketched above are based, they all consider psychology as the link or transition between the physical and the biological sciences, on the one hand, and the historical and symbolic sciences, on the other. Such understanding of the place of psychology is independent of the hierarchical rank attributed to the discipline, as well as of the epistemic components (methods, objects, or concepts) on the basis of which the different sciences are compared and classified. Trying to arrange the totality of knowledge is no longer in fashion, and neither is discussing the place of psychology among the sciences. However, the neural turn in the human sciences, as well as the clinical, social, and existential consequences of reinterpreting mental illnesses as brain disorders, has implicitly renewed the questions that inspired such projects and given them a new lease of life as forms of self-exploration constitutive of the discipline.⁷⁹

⁷⁷ Uljana Feest, "Husserl's Crisis as a Crisis of Psychology," in "Psychology, a Science in Crisis? A Century of Reflections and Debates," ed. Annette Mülberger and Thomas Sturm, special issue, *Studies in History and Philosophy of Biological and Biomedical Sciences* 43, no. 2 (2012): 493–503.

⁷⁸ Edmund Husserl, *Logical Investigations*, trans. J. N. Findlay (London: Routledge and K. Paul, 1970), 54.

⁷⁹ On the neural turn, see Melissa M. Littlefield and Jenell M. Johnson, eds., *The Neuroscientific Turn:*

Transdisciplinarity in the Age of the Brain (Ann Arbor: University of Michigan Press, 2012); Wolf Feuerhahn and Rafael Mandressi, eds., "Les sciences de l'homme à l'âge du neurone," special issue, *Revue d'histoire des sciences*

Characterized by a hybrid identity and problems that straddle disciplinary borders, psychology remained throughout the nineteenth century and until at least the 1930s a controversial object of epistemology and methodology. That its own practitioners hotly debated its place in the order of the sciences is understandable. For the stakes of the debate were high: not merely the taxonomic place of a constituted science but the making of a science by means of its classification. It is therefore unlikely that the problem will go away. The *radius reflexus* of Francis Bacon's optical metaphor in *The Advancement of Learning* (2.8.6)—the reflected beam “whereby Man beholdeth and contemplateth himself”—leads our gaze at once toward the body and toward that which, despite the neural turn, seems perpetually to slip away. Psychology is thus characterized by a diversity of identities and projects, as well as by the mobility and permeability of its boundaries. Those features may be, in fact, intellectually and professionally beneficial. From a historical point of view, they keep alive the two origins of the discipline—its double birth as an *empsychologia* intimately connected to the sciences of the body and as a *psychologia* of persistent metaphysical and spiritual significance. A