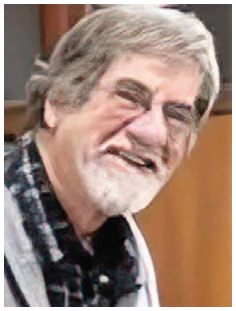
Auguste Comte's Classification of the Sciences†

Garry W. Trompf

Faculty of Arts and Social Sciences, University of Sydney, Australia 2006
<garry.trompf@sydney.edu.au>



Garry W. Trompf is Emeritus Professor in the History of Ideas and Adjunct Professor in Peace and Conflict Studies, Faculty of Arts and Social Sciences, University of Sydney, Australia. He was formerly Professor of History at the University of Papua New Guinea, and has held visiting professorships at the Universities of California, Utrecht, Edinburgh, Warsaw and at the Carl Jung Institute, Zürich. He is the author of The Idea of Historical Recurrence in Western Thought and produced over twenty other volumes. Among his various articles on the history of social science and quests for the unity of human knowledge, note "The Classification of the Sciences and the Quest for Interdisciplinarity: A Brief History of Ideas from Ancient Philosophy to Contemporary Environmental Science", *Environmental Conservation* (CUP) 38, no. 2, 2011: 113-126.

Trompf, Garry. 2023. "Comte's Classification of the Sciences." *Knowledge Organization* 50(2): 128-152. 177 references. DOI:10.5771/0943-7444-2023-2-128.

Abstract: Auguste Comte is ostensibly the world's most famous classifier of the sciences in modern history. His whole life was dedicated to establishing a classification that conformed to the 'positivist' (non-theological and non-metaphysical) principles he settled on after working with early nineteenth-century French social reformer Henri de Saint-Simon. This article first probes the background to Comte's classifying of the sciences, discussing French and German influences, and the effect of the phrenological movement on his special attitude to psychology and social life. Central sections of the article concern the basic and most mature ordering of the sciences according to his fundamental *Course* of lectures on classification (1830-42), the development of a tableau to cover psychological issues, and attempts at tables to synthesize his ordering and draw out their implications for socio-political reform and the Church of Humanity he founded. Concluding sections cover key binding principles of his classificatory work, as well as matters of reception, influence, and critical response.

Received: 21 April 2023; Accepted: 22 April 2023

Keywords: history of science, philosophy of science, classification of science

† Derived from the article titled "Comte's Classification of the Sciences" in the *ISKO Encyclopedia of Knowledge Organization*, Version 1.0 published 2023-01-17. Article category: History of classification and KO

1.0 The foundations of Comte's classificatory thought

1.1 Personal background

It may be said of Isidore-Auguste-Marie-François-Xavier Comte (1798-1857) that he was the only scholar whose whole life was devoted to classifying the sciences, even to the extent of creating a secular religion out of his magnificent obsession. He was a child of the French Revolution. Enthused by Republican idealism to regenerate France socially and spiritually, he grew up rejecting the suppression of popular revolutionary impetuses under Napoleon's militarism and the Restoration of the Bourbon royals, feuding with his "eminently Catholic and monarchical family" at Montpellier (Pickering 1993, 7-34). In school and at the prestigious École Polytechnique in Paris, where Comte gained a scholarship, mathematics became his favourite subject, first inspired in him by Daniel Encontre, the esteemed Republican Calvinist polymath who was visiting professor at his *lycée*, and then by Louis Poinsot, inventor of geometrical mechanics, at the Polytechnique. Mathematics, as the "science of pure relations", was to become Comte's starting point for classifying other branches of study, with theology and metaphysics and studies affected by them not in view because many leading intellectuals under the new Republic deemed these contrary to social reform (Gouhier 1933, vol. 1, 94, 127-9, 268-70, 230-47, 268-70). "Positive" science was often taken as that opposed to "metaphysical" orientations, a distinction traceable to Juvenel de Carlenças (1757). Establishing the purport and defending the credentials of his own version of positivism, and to do so by methodical classification of scientific disciplines and a progressive programme of social reform, was to become Comte's over-charged life goal.

Comte lived most of his life in very insecure economic circumstances. He only enjoyed a solid personal income and

consistent public notice when Secretary to wealthy social theorist Henri de Rouvroy, Comte de Saint-Simon (1760-1825), and the rupture of their short collaboration (1817-24) had very much to do with Comte's uncompromising views about the methods and ranking of scientific disciplines and their uses for his own desired political programme (Comte 1822; 1830, 466). By 1826 he had started a teaching course in his so-named "positive philosophy (*Cours de philosophie positive*), which, after each part had been taught to his satisfaction, was published in six volumes (1830, 1835, 1838, 1839, 1841 and 1842a). Comte's personal finances remained insecure, however, and his disaffection with his rather badly-off parents kept him in Paris, away from his hometown Montpellier. In turn, and apart from his teaching fees, he relied on the immoral earnings of his wife Caroline Massin (who also cared for him when he suffered mental illness during the early period of his lecture Course, 1826-8), on donations (such as the generous one organized by John Stuart Mill in 1846), on the benefits of a Platonic relationship with the Catholic aristocrat divorcee Clotilde de Vaux (1844-6), on subscriptions to his lecturing and writing by followers of his new Religion of Humanity (from 1846), and on his own self-committed austerity (Fuchs-Heinritz 1998, 14-84; Pickering 2009a, 62-116, 227; Rouvre 1920, 69-280; Ostwald 1914).

1.2 Saint-Simon and French influences

With regard to previous theorists ordering the branches of knowledge, Comte encountered the issue of classification mainly with Saint-Simon (and sources of influence behind him). Very significantly, Saint-Simon recognized that the sciences were becoming more "positive", that is, they had been passing through three stages (*étages*), from their "conjectural" (largely ancient) phase, through a half-conjectural, half-positive (basically mediaeval) transition, into the emergent "positive stage", one thoroughly based on "observed facts". Assuming mathematics to be basic for their effectiveness, Saint-Simon held that four sciences (astronomy, physics, chemistry and physiology) "had become positive", and though physiology awaited complete fulfilment, its potentiality was there to be "encompassed by a philosophy that became truly positive as well" (Saint-Simon 1811, 108-109; [1813] 1858, 17; and see Pickering 1993, 79-82, 187 on physician Jean Burdin's frame: conjectural > half-conjectural/half-positive > positive as an influence from *ca*. 1800). Older disciplinary categories such as natural history, philology, law, and history were thus considered redundant, and such new usages as *biologie* (Lamarck 1802; Stafleu 1971) and *psychologie* (*à la* Charles Bonnet [1760, 12]) side-lined (the latter at a time when Mesmerism and Vitalism prevailed) (Sziede and Zander 2015). Provocatively, Saint-Simon proposed as fundamental that "the science of man", distinct from the inorganic sciences, was "a branch of *physiologie*" (or "the science of organic phenomena"), a conceptualization affected by current concerns for social therapy and not simply individual medical remedies (Haines 1978). Just as chemistry, among the 'positive sciences, had replaced alchemy, a new psychological physiology could expel "the philosophers, moralists and metaphysicians" from educational programs for their unscientific explanations of human behaviour (Saint-Simon [1802] 1832, 38; cf. Olson 1982, 241; König 2000). Given young Comte's initial grounding in mathematics, one can readily sense how Saint-Simon inspired in him the will to achieve a corrected range of true scientific endeavours, in what he himself called "positivist" modes that surpassed those of "theological" and "metaphysical" stages, "the Arabs" having introduced "the positive sciences into Europe" and created the germ of this important revolution. But his mentor's proposal that "physiology and psychology" would conjointly "become positive" deeply dissatisfied him. Instead of a final science of (psychological) physiology, he vehemently pressed for consummation in a "social physiology" to secure an ideally united Europe (Saint-Simon [1813] 1966, esp. 187; Comte [1820] 1998, 8; cf. McDonald 1993, 244-7), a difference that brought rupture between them and yet ignited Comte's own creative *raison d'être*.

Apart from Saint-Simon, other stimulants of Comte's classificatory enterprise need recognition. Close to hand, in the ferment of French thought, we note the continuing influence of Enlightenment encyclopaedism into the nineteenth century, and the attractions of a proper ordering of phenomena as a "whole chain of knowledge". In the famed *Encyclopédie* (Diderot and D'Alembert 1751-72) this organization was around "Memory" (through "*Belles-Lettres*" [history, geography, literature, etc.]); "Reason" (through the "sciences" (ontology, theology, pneumatology [science of the soul], with such human sciences as logical "arts" and morals, and natural sciences as arithmetic, astronomy, zoology, chemistry, anatomy, etc.); and "Imagination" (poetry, drama, etc.), and with some allowance also made for Astrology and Natural Magic as skills (Diderot and D'Alembert 1751, vol. 1, viii-ix [Table marked "Système figuré"/ "Entendement"]; 1755, vol. 5, 635-6). But for Comte, although Diderot showed clear preference for mathematics and natural sciences over classical studies in universities (e.g., 1751, vol. 1, 497), such a collaborative mix, along with the alphabetic ordering of the whole grand affair, was "philosophically empty", and the pre-revolutionary rationalist stress on individual rights in the varied entries seemed "anarchic", even subversive to social order for being higgledy piggledy in organization (Wernick 2006, 29-30). As he was to put it as an educator, how can "720 classifications" work if those of "utter difference" or incommensurable in value just turn out to be treated side-by-side? (Comte [1830-42] 1852a, vol. 1, 69).

More relevant for Comte's approach was a rampant preoccupation among French intellectuals that, after the turbulence of Revolution, solutions to social order could come through placing the studied constituents of the world in the right *series*. Saint-Simonians started with a solitary unifying principle of Newtonian gravitation and its mathematized and hierarchized formulations, from the *moléculaire* to industrial technology. For them it was now possible that *histoire* as humanity's "collective development", through a "classification of the facts", including achievements in fine arts, could be plotted by "a successive table (*tableau*)" of the physiological states in a science as rigorous as "the exact sciences" (Barrault et al. 1830, 82-120, esp. 105, 107, 117). Charles Fourier (1772-1837) derived a competing *séries* from such Newtonianism, with the material, organic, animal and social movements as successive progressive mechanisms in the universe (Fourier [1808] 1841, 13-15); and such a serialization of arenas of science and overall (cosmo-historical) development was to be echoed in Comte's approach (Tresch 2010). Young Comte was thoroughly imbedded in France's Restoration context, when planning organizationally to fulfil human progress (i.e., utopianism) reached its highest ferment, with *communisme*, *socialisme* and *anarchisme* renowned among differing enunciated goals to which humanity was heading or needed to return (Charlton 1963). In the conceptual series of founder socialist Pierre Théroux and his *Encyclopédie Nouvelle* (1833-47), the hierarchy was animal, man, society, and above all these *humanité* as complete mutuality between individuals and the traditions bringing them together, recognized through his "true philosophy", "revelation" or "religion" (Alexandrian 1974, 243-60).

1.3 German precedents in classifying sciences

Beyond France and aside from this penchant for seriation, two German theorists, naturalist Lorenz Oken (1779-1851) and philosopher Georg Wilhelm Hegel (1770-1831), had already put forward widely noticed systematic classifications of the sciences, both of which were known to Comte. Oken, who dedicated his important 1809 *Lehrbuch der Naturphilosophie to* Friedrich Wilhelm Schelling, Hegel's sparring partner, ordered matters partly in response to Schelling's philosophical system. His primary division was mathesis, which if read simply as mathematical foundations suited Comte, but it meant a doctrinal priority of wholeness (*Ganz*) in the wisdom of God (*Theosophie*) and in mathematically expressible primordialities (gravity, matter, light, etc.) (*Hylogenie*) that are involved in the origination of everything (Oken 1809, 14-52). Ontology is then addressed as a better name for astronomy, because the study of heavenly bodies must involve exploring their constituents or elements (thus stoichiology), before probing natural "kingdoms", first of minerals (mineralogy, geology) and second of biology (life forms as organic and pneumatic) sub-sectioned as phytology, physiology, zoology and psychology, with social and human-historical issues left untouched (Oken 1809, 75-268). Here, unlike Saint-Simon's modelling, physics and chemistry are not the preferred classifiers, and (unlike Saint-Simon's dogma) physiology does not swallow up everything that is left after studies of 'inert nature'.

As for Hegel, as an idealist philosopher his basic divisions have to do with the concentration of ideas. In the latest and most complete version of his classification system, Hegel (1830) divided philosophy (and the sciences) into three parts with further subdivisions:

- Logic (thinking about thinking and a kind of science of science)
  - Being
  - Essence
  - Concept
- Nature
  - Mechanics
  - Physics with chemistry
  - Organics/life
    - sub-classified into: Geology, Botany, Animal nature
- Spirit/mind
  - The subjective spirit
  - The objective spirit
  - The absolute spirit

Thus, in Hegel's ordering we find: (1) *Logik*, the science (*Wissenschaft*) of the idea or ideas in themselves, logical forms (being, essence, concept, etc.) holding a foundational position comparable to Oken's Mathesis. (2) *Philosophie der Natur*, or the science of the idea in its other forms (all things the mind/spirit sees outside of itself) is divided into six natural sciences, taking mathematics in first, then inorganic physics (as mechanics, elementary physics, and the physics of singularities) and organic physics (geological, vegetal and animal natures, with the last one carrying implications for psychology). (3) *Philosophie des Geistes (Geist* indistinguishably mind/spirit), as the idea returning to itself in reflection on human thought and history, i.e., on individual consciousness and as subjective *Geist* (psychology proper) and on law and moral and social life as objective *Geist*, this reflective returning also involving an eventual (re-)awareness of true freedom as being-in-God (absolute spirit), following German mystic Jakob Boehme's neo-Gnostic picturing (Hegel [1807] 1830, [start with sect. 18]); cf. [1821-31] 1895, vol. 1, 279; vol. 3, 32; cf. also Flint 1905, 155-156).

As background to Comte, note that Hegel separates organic and inorganic objects of science under the purview of

physics, not chemistry, while any discourse of biology (in contrast to Oken) dissolves into organic physics, with the implication of an overlap of concern in the arena of *Psychologie*, basically devolving around the brain/mind distinction, but with no mention of physiology (Ikaheimo 2017). Hegel's ontological distinctions did not apply with Oken and Schelling, because for them "a single universal force ... animated the moral and physical universe, ... any distinction between the inorganic and organic" losing relevance (to quote Comte's own insightful realization, 1830, 764-5). Hegel and Schelling agree, though, on treating social wholes in history and the nature of the human spirit as *organic*, a German inheritance from Immanuel Kant, Johann Herder and Wolfgang Goethe (Trompf 1979-2023, vol. 2, [chs. 7-8, Excurs. 8]).

Hegel's system will not be further described in this article. The reader is referred to the literature about Hegel, for which Froeb (2002-2020) will be useful. It should be said, however, that Hegel's classification is not primarily important for its influence on Comte, but because for many researchers who opposed positivism it provided a better point of departure, and it has been suggested that "Hegel was an innovative knowledge organizer, the most systematic organizer of knowledge in the history of philosophy" (Kislev 2021, 41). The criticism against Comte's classification raised by thinkers inspired by Hegel will be addressed in Section 5.

While these German exercises undoubtedly affected young Comte simply because they were seminal attempts at classifying the sciences, and thus relevant to his greatest interest (Pickering 1989; 1993, 296-301, 583, 595, 668), he considered them only in the light of French debates and contacts. We find that three questions were important for him in his developing position: 1. what to do with biology, as well as 2. psychology, and 3. how to classify social science independently of Saint-Simon's umbrella use of physiology. And his answers came from French sources. The man who introduced him to biology was Henri Ducrotay de Blainville (1777-1850), whose courses on biology and "the animal series" Comte attended in Paris, 1829-32, and who convinced him that biology should cover the study of all life: the "vegetal and animal series" (concentrated upon by Lamarck) and the study of individual human physiology (Pickering 1993, 589; Mourgue 1909, 829-30; Appel 1980). De Blainville, who can be considered both "positivist and Christian", seriously questioned evidence for an independent life force permeating all strata of (living) things, worried that a kind of pantheism apparently was lurking. Comte concurred with the suspicion. And when the claim came up that free-swimming larvae bridged plants and animals, the vitalists, in train with the French Marie-François-Xavier Bichat and Paul-Joseph Barthez, or the German Oken, were enthused; yet we find Lamarck, a Deist always stressing the unity of life as he pre-imaged it, significantly demurring, and reinforcing Comte's tendency of thought (Packard 1901, 79-179; Gouhier 1941; Costa 2017, 6-7. 62-63).

1.4 The phrenological movement and socio-physical factors

Apropos psychology, like many others Comte came at it through phrenology, the emergent movement claiming personality and character could be interpreted from the shape and divided functions of the brain, and from facial features (*physionomie*). Founded by Germans Franz Gall (1758-1828) and his disciple Johann Spurzheim (1776-1832), phrenological texts were available in French from 1808 and very popular (Bruyères 1847, 3). In the phrenologists, via physician François Broussais's championing of "physiological medicine" as a positive science against spiritualistic and sensationist theories, Comte found the means to supplant unsatisfactory psychologies by a superior "phrenological physiology". By not overplaying the intellect, phrenological analysis looked to account for all human affections, proclivities, moral and social dispositions, and (considering his own prior insanity) allowed that the inner mechanisms of "the nervous system" and "cerebral phenomena" worked themselves out toward normalcy, with much less need to impose external stimulants (Broussais 1828 [1839], vol. 1, 79, 514-609; Pickering 1993, 406-12, 597). In phrenology's heyday during the 1820s, moreover, Comte felt empowered to embrace a sense of Spirit (*esprit* [spirit/mind]) independent of Theology and Moral Philosophy, bolstered by the series principle of Broussais (1772-1832), an atheist phrenologist, that *psychologie* follows and arises from *physiologie* but "physiological medicine" cannot be reduced to biological mechanisms (Broussais 1821; [1828] 1839, vol. 1, 513-7; Canguilhem 1978; Pickering 1993, 5, 334). Those were the days when such confusing combinations as "electrophysiology" in its older guise, "vital materialism", and "philosophical anatomy", were in vogue (Toulmin and Goodfield 1965, 366-84; Costa 2017, 3).

The social implications of all this disentangling were always on the younger Comte's mind. Since he is renowned for popularizing the usage *sociologie*, we should give some background to his choice of terminology. First of all, his use of the phrase *la science sociale* (social science) goes back mostly to the Marquis Nicolas de Condorcet (1743-94), who in his *tableau* of history ruled that humanity, after proceeding through an "eternal chain" of ten *époques*, would never relapse into barbarism as it advanced towards social perfection and true equality (1795, 4, 339-42, 377-84; cf. also Iggers 1959). When Comte talks of a *séries*, especially "the social series" 1842a, 458), this is probably most affected by Broussais, while Comte's acceptance of social bodies as "organic" clearly derives from his young Jewish disciple and former Saint-Simonian Gustave d'Eichtal (1804-86), who relayed what he was reading of influential German scholars

(from 1822) (Pickering 1993, esp. 221-2, 290-302). Comte can fairly be said to have coined the phrase "social physics", and then the term "sociology". If the first printed appearance of his terminological phrase coincided with a sub-title by founder statistician Adolphe Quételet in 1833 (cf. Varenne 2011, 23-34), Comte had lectured on *la physique sociale* in the late 1810s, probably under the influence of Saint-Simon (1802); and if the daring neologism *sociologie* derives from revolutionary reformer Emmanuel-Joseph Sieyès, his usage lay unpublished in a 1780 manuscript for almost two centuries after Comte's 1838 first promotions of it (Fauré and Guilhaumou 2006). It seems strange that political economy did not have greater attraction for Comte, since it loomed as a virtual equivalent to Saint-Simon's *physiologie* socially expressed (Jacoud 2019) and had a venerable place in French general social theory (Panichi 1989). By mid-century, however, matters moved toward specialization. Notice how young German Wilhelm Roscher ([1854] 1878, 104-18), for instance, came to place *politische Ökonome* within the "circle of knowledge" beside the "related disciplines" of politics, economics, law, military studies, navigation and "psychology without physiology", and together with art, language and religion (and thus apparently among the humanities). Comte belongs in an earlier and special phase of totalist enthusiasms (cf. Iggers 1958): he was in pursuit of truly unitary social science, albeit at the time when others were engaged in the same dream, if opting as they did for different choices or nomenclatures (Trompf 1977, 114-25). His social physics had the potential to eclipse political economy, yet perhaps initiate social psychology.

2.0 Comte's system of classification

The two great masterpieces were published in Comte's maturity:

- *Cours de Philosophie Positive* (*Course of Positive Philosophy*) in 6 vols: Comte 1830, 1835, 1838, 1839, 1841 and 1842a (2 Ed. vol. 1 cited as 1852a).[1]
- *Système de Politique Positive, ou Traité de Sociologie, Instituant la Religion de l'Humanité* (*System of Positive Polity, or, Treatise of Sociology, instituting the Religion of Humanity*) in 4 vols: Comte 1851, 1852b, 1853 and 1854).[2]

One of his editors has quipped that Comte spent the first half of his life trying to be "a new Aristotle", an orderer of sciences, and the second "a new [St] Paul!" as founder of a faith (Fetscher 1956, xix). This makes sense considering that he started teaching the *Cours* in the mid-1820s, although given that his two *magna opera* generally bifurcated into theory and practice, the objective and subjective, philosophy and religion, his last important work was to be an unfinished, determined *Synthèse* ([1856] 1886) and this huge effort kept him wrestling with questions of classificatory terminology. In the *Synthèse* his basic science of mathematics, significantly, definitively became "logic" (or *Logique positive*), probably due to the publication of his English supporter Mill's *System of Logic* (3rd ed. 1851 [French ed. not until 1866]; Comte 1877; Pickering 2009b, 488), certainly not in consideration of Hegel's *Logik* (see esp. Comte [1856] 1886, 26-54). This serves as a useful note of caution for researchers to be aware of Comte's *continuing* quest for a perfect framing of objective knowledge while he developed a religion that safeguarded the "superiority of the subjective life" (1854, 34-6, 84-159 [32-33, 76-141]) and that trained "the mind to minister to the heart" (Bourdeau 2000).

2.1 The basic order

Following the *Cours*, most specialist historians of science present his basic ordering of the sciences in the following order (Figure 1).

This order reveals the last grand queen-like science of society being founded as *positif* on the bases of the more scientifically secure ones (e.g., Oldroyd 1986, 170). Comte's classificatory listing was first compared to those of Hegel

Mathematics (later settled as Logic)
Astronomy
Physics
Chemistry
Physiology (also to be called Biological Science)
Social Physics (or Sociology, in the *Politique* basically meaning the proper realizing or applying of Comte's social program)

Figure 1. Auguste Comte's Classification of the Fundamental Sciences following Spencer 1907; Oldroyd 1986; et al., and cf. Šamurin 1967, 54-62 for a schematized comparison with Saint-Simon's classification.

and Oken by English evolutionary philosopher Herbert Spencer.[3] Significantly, Spencer (1820-1903) put forward his own competing arrangement: first principles; mathematics (including mechanics); astronomy (with geology); physics; chemistry; biology, psychology, sociology ([1864] 1891, 103) and later ethics, all approached in a *Synthetic Philosophy* (pub. 1862-92 [unfinished]). The comparison immediately raises the question as to where geology and psychology fit into Comte's scheme, while leading us to a fair surmise that he covers ethics in both his 'practical' *Politique* and his basically 'subjective' *Synthèse*.

It is preferable to unravel matters by starting with Comte's first chapters on the *Aims* and *Plan* of his *Cours* (from lectures delivered in 1829). We first focus on his ordering, and then on early stated principles governing his choices. He claims that the "*fundamental* sciences" cannot be "reduced to less than six", those listed above (Comte 1852a, vol. 1, 68 [52], 88 [64]), leaving us to query what *sub*-classifications are to come. Out of the "fundamental six", because he has to lecture educationally on them in order, with an expected "encyclopaedic ladder" (*échelle encyclopédique*) or *serie*s, or "single trunk" or "ladder", even "hierarchy", in mind, he must find a "rational point of departure", and a crucial purpose of his *Plan* is to establish that this springboard lies with Mathematics (68 [51], 88 [64], with 26-29 [27-28], 40 [35], 67-70 [51-53]). *Pace* the late terminological preference for *Logique*, he already realizes that a "science of logic" is presumed here (37 [34]) as he seeks a beginning with astronomy as "the most general, simplest, and most independent of all others", which underpins "terrestrial physics, chemistry and finally physiology" (24 [26]). Comte soon makes it clear that the fundamental "natural sciences (*sciences naturelles*)" are abstract as against concrete and therefore more general than "particular descriptive". This allows us to see that there are other disciplines to be classed: inorganic and organic physics are distinguished, for instance, zoology and botany apparently positioned as particular branches of *physiologie générale*, while agriculture is considered a practical *art* which demands a combination of knowledge from the first five basic or abstract sciences (58-9 [46-7], 69 [54-5]). Apart from pragmatic reasons, in any case, sciences should not only be treated in independence or relationship (whether hierarchically or not) since each advanced by a combinatorial method, and "multiple problems" can therefore be solved when we "organize such combinations on a permanent footing" (44 [37], cf. 68 [57]). Positivism collapses, however, if such combining entails mixtures with non-positive studies, that is to say, those contaminated by theological and metaphysical agendas (45-46 [38]). Psychology is singled out as a culprit here because "for a thousand years it has been cultivated by metaphysicians" trying to tap "the intimate [esoteric] *nature* of any entity" [its soul [*l'âme*] as a *Ding an Sich* in Kantian language], about which positive philosophy can only express total ignorance", and should even be deemed "illusory", residually supernaturalist, certainly "metaphysical" (31-2 [33-4], 71 [54]; 1838, 454, 456). Only laws of physiology can satisfy the case for the human individual scientifically, and "social physics", no "mere appendix" to it, encompasses the collective (vol. 1, 74-5 [56]).

2.2 Exclusions, with the apparent rejection of psychology

In his macroscopic framing, Comte reasoned that human knowledge has to reach the time when, by "a fundamental law", and by "invariable necessity", the human mind or "understanding" (*intelligence*) attains its "positive" stage, leaving "theological" and "metaphysical" phases behind (1852a, vol. 1, 14-16 [19-21]). This was a broad structuring inherited early from Saint-Simon's strictures against metaphysicians, but also clinched by progressivist readings of Giambattista Vico's *The New Science* (*La Scienza nuova* [1744]) after the Revolution, especially by Saint-Simonians and such eminent French *savants* as Jules Michelet and Pierre-Simon Ballanche ([Barrault et al.] 1830, 111n.; McCalla 1994). The triadic framing of "ages" of the gods, heroes and humans presented by the great Neapolitan (1668-1744), was eventually taken by Comte (1973-90, vol. 2, 289-90 ([letter to Mill 1844]) as foreshadowing his own philosophy and presenting the "true [r]evolution" of social phenomena by "natural laws" (cf. Lonchampt 1889, 73; Pickering 2009a, 297-8). Instead of honouring and thus valuing the classical and biblical curricula like Vico (Trompf 1994, 59-60, 67-72, 83-5), though, Comte wanted them completely supplanted, with the study of "dead languages" being unproductive for science (Comte 1852a, vol. 1, 85 [62]), and he suspected metaphysics lurked in all the sciences even down to the Encyclopaedists (in Saint-Simon 1821, 144). What we will call the curricula of (the liberal) arts and humane studies, which were being refined in European universities in his time (e.g., Smith 1991; Brockliss 1997) were of no use to future applications of knowledge, or as "science". The shadow of Condorcet's project to do away with extant universities lies heavily behind Comte's project (cf. Palmer 1985).

His privative orientation demands that we will always have to contend with a logical problem in Comte's thinking, and inevitably affecting our own, when trying to represent and comprehend his tabulations. He was classifying only sciences he *wanted and chose to defend* as positive or capable of being fully positive, while recognizing that there were other disciplines in the history of the human episteme or scientific endeavour which *still existed* in circles of higher learning.[4] These studies were all well known to him yet never make it to worthy status; they even deserved rejection

as sullied by pre-positive conceptions, and thus would never fit into his rigorous body of science even if we (as interpreters) might want to classify them somewhere and place them in a unified vision of how we grasp the world (the humanities along with the social sciences, for example). In this light, his agenda concerns "*philosophic* classifications", that is to say, the drawing out of "perfect scientific combinations" through "the decisive application of the *true* theory of classifying" that *has to* replace all prior and inadequate ones (Comte 1838, 447-50 [116-18]).

This is where Comte's macroscopic picture of humanity's 'general education' has its effect. Unlike Vico (or for that matter Gotthold Lessing [(1780) 1831], Comte insists we must strenuously shed our received misconceptions from the past rather than arrive at and incorporate mature insights that have been built on old ones or traditions we ought to remember and keep reflecting on 'just in case'. In his fundamental dictum: "The starting point in the education of the individual is necessarily the same as that of the species, and the principal phases of the individual represent the epochs (*époche*s) of the species", he assumes the discipline of education, but it now amounts to his whole up-to-date *Cours* (which is a practical project, not just theoretical construct) (Comte 1852a: vol. 1, 33 [35]; cf. Leboyer 2014). He assumes epochal succession is recognizable as the subject matter of history, individual development (*le développement de l'intelligence individuelle*) as cerebral process, and both as the history of the human mind (*esprit*) (or ideas/consciousness), yet "the laws" of all these need reformulating in his physiology and social physics that, yes, lie in what is called a *Philosophi*e (that *has to be* a positive one) (14, 16-17 [20-21]), a distinctly "single tree" (gradually detaching from the "parent tree" of so-called "universal knowledge") grown by "natural destiny" (rather than the "providence" stressed by Vico) (27-30 [28-9]; cf. 15-16 [20] 21 [24]). As a result, all attempts at science are not excluded historically, yet they are only capable of fulfilling their destinies in the final blossoming of true epistemological methodology and organization.

A preliminary assessment of what Comte does with psychology is required here, because psychology seems to disappear into physiology, or the study of the brain (*cerveau*) (Comte 1870, 89), or else looks absorbed within a newly established science of society, as the outcome of humanity's great intellectual adventures, "mental science" perhaps even forming "the largest part of sociology" (Bodenhafer 1923, 16). That Comte grounded brain activity of both animals and humans in physiological processes was a Saint-Simonian move lending itself to comparative zoology, with higher animals and humans sharing "tendencies really innate" (Comte 1851, 672 [543]), but Comte looked to Broussais to sort out the issues. Even if Broussais was a phrenologist, Comte became increasingly less happy with this epithet and never accepted the teaching that identified 27-35 parts of the skull as corresponding with psychological traits (674 [545]); but he honoured Broussais's role in rejecting such linkages as "empty", "illusory", all-too "mystical" and "pretentious" speculations, and in firmly comprehending "the study of the intellectual and moral functions as inseparably connected with ... all other physiological phenomena", so as to found "positive pathology" (1854, 220, 223 in *Appendice générale* [646, 649]). It followed that the processes of mental activity or the soul supposedly uncovered by "the psychologists" (*psychologues*) were forever closed to any "*scientifi*c internal observation" (219 [465]; 1851, 12-15 [9-11]; 1853 [1895], with Cardno 1958, 424). As we shall see, though, it did not follow that the social presentations of mental life, even of the passions, could not become valued objects of positivist research.

2.3 The mature arrangement

The *Cours*, then, is of great interest for what will be *retained* in it from the pre-existing corpus of academic pursuits (at the very least by nomenclature). What we need to show, then, are the *sub*-disciplines belonging to the six fundamental sciences, to see what is left of old classes of scholarship and thereafter make comparisons to the other great classifiers of his time (especially Oken, Hegel and Spencer). This is not a completely straightforward task: Comte did have his whole project in mind close to beginning it (1830, opposite p. 15), yet his first attempt at a full classification does not straightforwardly square with the text of his ongoing lessons, their sections and various tableaux of the *Cours*, so it can only be done by carefully plotting his nomenclature choices, including occasional capitalizations of positive science's "branches" and/or "departments" from 1830 to the posthumous augmented fourth edition. Besides, by the 1850s, in his *Système*, there developed a "Second System" of classification in Gertrud Lenzer's terms (see under Comte 2017), which should be read alongside editions of the *Cours.* We can represent the whole framing as in Figure 2.

The rendering calls for various comments. In his *Système*, Comte (1851, 457-60, 464-5 [371, 373, 375]) agrees to acknowledge that *cosmologie céléste* can be adopted as the concept embracing *both* mathematics and astronomy, the first confirming "the simplest and most general laws of nature" or "logical laws" of the "harmonious" cosmos (*le monde* most generally), while astronomy is subordinate because it has "no rational basis" without mathematics, which stands in splendid "independence" (cf. also Comte 1844). Concerning mathematics, Comte does not make any clear distinction between pure and applied mathematics because pressure to make the demarcation in Western scholarship was only strongly felt after the creation of the Sadleirian Chair of Pure Mathematics at Cambridge in 1869, and even Göttingen's great Carl Friedrich Gauss (1777-1855), who

[System of Abstract and Positive Sciences]

"Natural Philosophy"
"Cosmology" (as compared to "the Science of Life" or "Biology" generally conceived)
"Celestial Cosmology" [= Branches of Sciences 1 and 2]

1. Mathematics (or Logic, or Abstract Cosmology) (Lessons [5] 5-18, esp. 3-4)
    - i. Calculus
        - (a) Concrete: measuring actual objects (primitive)
        - (b) Abstract: purely numerical or Arithmetical, and "derivative" or Algebraic
    - ii. Geometry
        - (a) General and analytical (involving Algebra)
        - (b) General for two dimensions
        - (c) General for three dimensions (including Trigonometry)
    - iii. Mechanics
        - (a) General and Rational
        - (b) Static
        - (c) Dynamic
2. Astronomy (or Celestial Physics, or Concrete Cosmology) (Lessons 19-27)
    - i. Static or Geometric
    - ii. Dynamic or Dynamic
    - iii. Cosmogonic (and Sidereal)
3. Physics (Terrestrial) (Lessons 29-34, esp. 28)
    - i. Barology
        - (a) static
        - (b) dynamic
    - ii. Thermology
        - (a) physical
        - (b) mathematical
    - iii. Acoustics
    - iv. Optics
    - v. Electrology
        - (a) static
        - (b) dynamic
4. Chemistry (Lessons 36-39, esp. 35 [and also see 2])
    - i. Inorganic
        - (a) proportionate (atomic [molecules]; Mineralogical)
        - (b) electrological

      ["Science of Life" hereafter] [28] (*Cours* 1835, 405[88]) in some contexts "Biology" (*Système* 1851, 438[355])
    - ii. Organic
        - (a) "Living Bodies"/organic substances (e.g., acids, "primordial cellulism")
        - (b) vegetal
        - (c) "Animal Chemistry"
5. Physiology (or Biology) (Lessons 40-45)
   Abstract (educational study) and Concrete (Medicine as Practical Art)
    - i. Anatomical (including Pathology)
    - ii. Taxonomic
    - iii. Vegetative (or Organic) (including Agricultural Art)
    - iv. Animal (Zoological) (including Pathology)

      ["The Study of Humanity" or "Social Philosophy"
      hereafter]
    - v. Cerebral/Phrenological (Intellectual and Moral/Affective)
6. Social Philosophy: Social Science or Social Physics and Sociology (Lessons 46-56, esp. 49-51)
   [background: politics (*politique*); political philosophy and political economy; social science; study of social phenomena
    - i. Social Physics (abstract, general, educative or dogmatic)
        - (a) Social statics/"structure"
        - (b) Social dynamics/"development" (in stages)
    - ii. Sociology or Politics (i.e., applied, ameliorative and moral, institutionalizing)

      [future realization: positively planned politics and economics; flourishing of aesthetic life]

Figure 2. Mature Classification of the Sciences by Auguste Comte from Textual Analysis. Trompf, improving upon Comte, *Cours*, 1830, opposite p. 17, and involving editions up to the 1864 augmented 2nd (Littré) ed., and the *Système*, esp. 1851. N o t e : All listed denotations in italics above, as will be made clear, do not appear in earlier formulations of Comte in his *Cours* (1830, even 1852a, vol. 1), but show up as subsequent reflection on his structuring. Also for some intricacies regarding biology, see below n. 6.

lorded purely mathematical thinking over application, never imagined the difference should be institutionalized (cf. Rassias 1991: 6-7). Italian-born Joseph-Louis Lagrange (1736-1813), Comte's greatest inspirer in the mathematical field (Comte 1852a, esp. vol. 1, 90 [65]; 1839, 268 [165]) is usually ranked with Gauss as focused on improving measurements of actualities (Crombie 1994, vol. 2, 1400), and it was appropriate, given Comte's revolutionary impetuses, that he would stress handling real-world problems first as prefatorial to treating other sciences, only coming in time to value logical power for its own sake (after absorbing Mill's *System of Logic* [1843]) (Pickering 1993, 521, 536-8). The pure/applied distinction, though, soon came close to affecting his classificatory mode in 1835, when he wrote concerning physics that "mathematical theorums and formulae are rarely applicable to the study of natural phenomena; ... the true spirit of mathematics, [is] so distinct from algebra, ... which is always to be applied (*applicable*)" (restated in Comte 1852a, vol. 1, 418-19 [93]), His subdivisional formulations for mathematics basically remained satisfying for him, reinforced as they were to be in his *Système* (1851, 461 [376], and in any case his adoption of Lagrange's distinction between *statique* and *dynamique* from *Mécanique analytique* (1811), affected the rest of his system (see astronomy [for which Lagrange was also famous], physics, biology [Lagrange's terms affecting Blainville on Anatomy] and social physics) (see Fig. 2, sects: 1.iii.b-c; 2.i-ii; 3.i.a-b; v.a-b; 6.i.a-b).

As for the four sciences succeeding mathematics, aside from already inheriting from Saint-Simon their basic sequencing as fundamental and already positive, the inorganic/organic distinction and the penchant for *physiologie*, remain marked. Comte admits influences especially from Lagrange, Pierre-Simon Laplace and William Herschel (over and above Kepler and Newton) on astronomy (or "concrete cosmology"), and the division between celestial statics and dynamics. Comte's classified headings of inorganic or terrestrial physics (Fig. 2, sect. 3) relate to achievements by such particular greats as William Cavendish (barology [including laws of gravitation]), Jean-Baptiste Fourier (thermology), Daniel Bernouilli (acoustics), Leonhard Euler (optics and light) and Hans Christian Ørsted (electrology [including magnetism]), and for the first and last fields (barology and electrology) he once again distinguished statics and dynamics. In an intriguing omission, reference to mechanics has no classified place under physics, as it did for Hegel and then Spencer (who followed the tabulation of William Whewell [1840, 157-207]). And the big absence is geology, which straddles astronomy, mineralogy (sometimes called in French *géognosie*) and *paléontologie* of fossilized life forms (coined in French, 1822) (cf. Littré (1873-8) 1958: vol. 4, 58; vol. 5, 1274), the last class not listed in Comte either. The intense British discussions generated around geology by Charles Lyell's masterwork (1830-35) unfortunately escaped Comte during the excitations of his own reformulations, as did the obscure German classification of the *Wissenschaften* (sciences broadly conceived) by Karl Wollgraff (*flor.* 1840s) prefaced by macroscopic 'Geo' study: geogony (study of outer space); geology (covering the beginnings of the earth and of organic life on it); and geognosy (knowledge of the sources of the earth's components), before biology and different studies of human activity (especially law and politics) (1864: 35).

It turns out that for Comte there are "extensive and multitudinous subjects", which include geology, along with zoology, meteorology and it would seem agriculture, which are unworthy "concrete sciences", of little value beside his chosen abstract ones. Each, on his assessment, cannot be conducted without knowledge of other sciences, as we noticed of agriculture (see above). How could a meterologist do without physics, chemistry, etc., even sociology, and thus the crucial "filiation" of his select abstractions? For Comte concrete sciences are narrow specialist "workings" (*travaux*) from the sterile old Academy; without filial connection and not even meriting consideration "even as an appendage to the abstract system". Although he has to allow their spheres of concern some secondary places in his classification, these specialties lack purpose and moral potentiality. Indeed, "properly speaking there is no such thing as Concrete Science", because science is about "theory", not the "practice" of these particularised subjects, for no one can ever get to the bottom of the objects of any so-called concrete science, any more than one can get to 'the thing in itself' (in Kantian terms) (Comte 1851, 431-4 [349-51]). In his ongoing probing, we find, Comte has to steer his way through the maintenance of his own principles and the realities of developing disciplines in the scientific world. Maintaining consistency was not easy for him.

With the two major sciences of chemistry and physiology, the divisions of the former (Fig. 2, sect. 4.i-ii) were associated with one impressive *cluster* of scientific greats (Claude-Louis Berthollet, Torbern Bergmann, Joseph Priestly, Antoine Lavoisier. etc.), while each of physiology's branches, divided by somewhat idiosyncratic epithets (sect. 5.i-iv), are mostly connected to modern specialist achievers behind his own discipline-mapping (some of whom actually attended the *Cours*) (Comte [Andreski] 1974a: 238). What Comte calls "anatomical philosophy" is generated especially by Blainville, "Biotaxic Philosophy" by zoologist George Cuvier and biologist Lamarck, the positive study of "Organic or Vegetative Life" by botanists Carl von Linnaeus and Antoine Jussieu, and of "Animal Life" by Bichat as general anatomist (see the overall view Comte [Martineau] 1853, vol. 1, 186-205, 232-40, 283-8; 399-442; cf. also Comte, 1851, 529-31 [428-30]). The opus of Albrecht Haller is known (Comte 1838, 682 [115]), but pharmacology,

as connecting organic chemistry and medicine, gets overlooked (cf. Simon 2005). Again, Comte had been missing out on British research into the interface between plant and animal life, including relevant publications by the young Darwin on mould, crustations, corals, zoophites, etc. (e.g., 1839; 1842), but already the tendency in Cuvier and Lamarck to fix the demarcation suited his liking for clean structuring. Any criticism that might be made, though, that he was not (ready to be) evolutionist enough is not appropriate: even when Spencer framed his classification to better his French predecessor's, this was prior to Darwin's *Origin of Species* (1859), and he had decided no such "linear arrangement" held "any basis in Nature and History", and thus his ordering of scientific activity should not be expected to square with the great cosmic Law of Evolution (Spencer 1907, 74). Still, Comte did share with Spencer a sense of increasing heterogeneity of Life (*complication*; *plus compliqué*) from the simple-celled to humans (Comte 1838, 275 [112], 661-6, 697) and a reckoning of the "great phenomenon of 'progressive development' (*développement*)", especially in society, as "the most wondrous of real spectacles" (1851, 435 [352-3]). As for embryology, so important for Darwin (Rachootin 1985), its apparent absence in Comte can be put down to a general hesitancy about the field (then called developmental mechanics) among French scientists, as against the Germans and Britons (Fischer 1990, 11).

In a synoptic evaluation of his early outlined *Plan* of 1830 Comte reads astronomy, physics and chemistry together as sciences of *corps bruts* ('gross bodies' [as distinct from refined living ones?]) (see 1974a, 238). In another more significant one (of 1838) he rates astronomy and biology/physiology as the two great poles of natural philosophy. Astronomy displays "the rational harmony" of the cosmic "general system", with physics "complementing" it; biology is clearly fundamental for the study of Life, chemistry being "preliminary" to it. And if in studying Man we do find matters "unaffected" by laws of the "general system", humans are so obviously "subordinate" to biology that old theological and metaphysical accounts of them become "infantine", "youthful", and thus "irrational" (see 1838, 210-11, 446). With chemistry, Comte steadily realizes the distinction between inorganic and organic involves a difficult "confusion" because the study of *organismes* would seem "the task of physiologists", and Comte comes to follow the views of Bichat and Blainville that "organic life" in general involves both whole organisms and component organisms thereof, leaving physiology/biology to wholes and organic chemistry to parts (vol. 3, pp. 118-22). In other encompassing generalizations, Comte divides "Natural Philosophy" as cosmology and biology from "Social Philosophy", or "Natural Philosophy into Cosmology and Biology" with both "preparing" for "Social Philosophy", which is "the great final study, that of Humanity" (1851, 438; cf. 444 [355; cf. 360]). Yet elsewhere his "whole Organic Philosophy" (or science of life) encompasses social physics *along with* physiology, for we have to accept a "systematic subordination of the Study of Man to the Study of the World" (1839, 401), otherwise the positive (truly scientific) goal cannot be achieved. This is patently different in its orientation from classifications stressing the mind above nature (Hegel 1830) or the "noological" above the "cosmological" (Ampère 1834).

2.4 The "Systematic View of the Soul" (Tableau cérébral)

Now, Comte's last physiological sub-classification (Fig. 2, sect. 5.v), to do with mental faculties as "Cerebral Physiology" (Intellectual and Moral) or "Phrenology" (pp. 438), was the most controversial one. He uses the "indispensable" preliminary work of phrenologists Gall and Spurzheim ([1855] 1966, 32) to develop a "purely physiological analysis" of "harmonized" parts of the brain, rather than labour the separate functions of brain components, hypostatize faculties connected to these parts, and thus go too far in "multiplying elementary functions" (1838, 421-42, 433), and thereby lapsing into a concrete science. This is where the exclusion of psychology is entailed: Comte basically wanted to ground human behaviour in physiological inheritances, including the great deal we shared with animals. Not only was the very supposition that people could "see themselves think"[7] absurd, but "psychological theories have split" over the possible extents to which animals share affective and intellectual attributes with humans. And phrenology's over-complexity had to undergo serious *operations* (Broussais helping on mental normalcy and pathology), for this school of cerebral physiology had too many defecting offshoots, with "German Psychology" and studies of the idea-forming or "Ideology" resulting from it (410, 418, 437-8, 440).

These maneuvers brought criticism. Mill wanted rapprochement: he was suspicious of conceding too much to phrenology's crudeness, though wondered whether positivism might help in the development of the (moral) "Science of Human Nature", or what he then called ethology (Pickering 1993, 529-31, with Mill [1843] 1851, vol. 2, 414-48). English ex-phrenologist Spencer held psychology should be in the classification, and he was actually quickest publishing about the matter. His *Principles of Psychology* (1855) came earliest of any of the volumes in his synthetic collection, a testament that he was already not a Comtist and realizing that Comte was not engaged with British evolutionists' debates (into which Darwin was soon to be thrust) (Spencer [1864] 1891: 118-44). Mill eventually decided Comte was vacuous on "psychology" and preferred deferring to Spencer and his Scottish associationist friend Alexander Bain (Mill 1866, 66-7). Bain

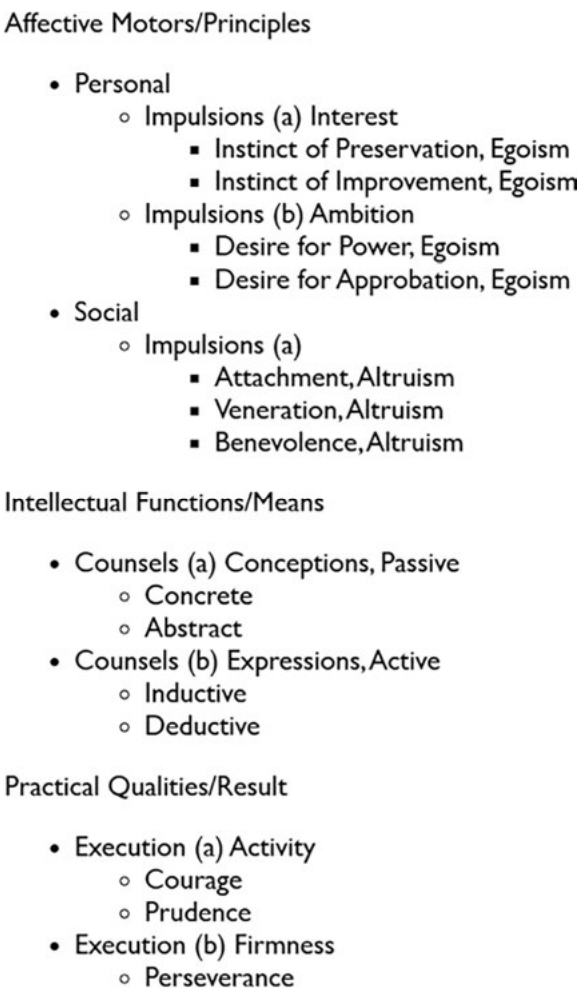


Figure 3. Comte's Subdivisions for "Cerebral Theory" (or psychology): following Comte [1842b] 1858 or 1855 (1966); 1851, with Aron 1865: 87-91.

(1810-77) could not see how any classification of knowledge could be adequate without the study of human sensations, intellect and emotions (Bain [1843] in Shearer 1974, 59-61); and on expounding Comte's classification for Anglophone readers, George Lewes (1817-78) held discoveries of the physical basis of the mind made psychology scientifically positive ([1853] 1878, 213-30; and see later, Georges 1908).

Comte handled the critical pressure by asserting psychology really only "emanates from sociological suggestion" and sociology alone can give it its "full validity" (1851, 673-4 [549-50]), but before we can say Comte has founded social psychology, we should appreciate that sociology (as distinct from social physics) becomes so increasingly entwined with the positivist "dogma" and "politics" of his new church that it includes all the human propensities that relate to moral life, enabling people "to love, to think, to act". This last quotation heads the so-called *Tableau cérébral* or "Systematic View of the Soul" schematized toward the ends of both his *Catéchisme Positive* ([1842b] 1858, opposite 428), a summary of all religions' fulfilment in that of Humanity, and the first volume of his *Politique positive* (1851, opposite 727 [594]). Thus, the divisions for the study of "the theory of the soul" (Figure 3) are at the most general level threefold: to do with the Heart (impulsion), *Conseil* or Consideration (intellect) and Execution (reflecting an individual's character); and insofar as Comte dealt with issues of "cognition, affection and conation" he was handling subdivisions "familiar" to psychologists of his time (Cardno 1958: 415).

Comte divides the functions of the soul (*l'âme*) triadically, (1) as Impulsion (to do with impulses of the *Heart*); (2) as Counsel (to do with the thinking and vocalizations of the *Intellect*); and (3) as Execution (or the after-effects in *Character*). The movements of the *Heart* produce moral qualities (either towards or away from selfishness); those of the *Intellect* produce modes of thought; and *Execution* or overall practical consequences appear in the strengths or weaknesses of character.

2.5 Sociology and the synthesis

Comte spilt more ink on his last listed science than all the others put together. This was because social physics/sociology bore a "double status", at least (Bourdeau 2018). It is the science of society (or just social science, or the philosophy of society [Machlup 1982, 67-8]), treating society as an "organism in the hard naturalistic sense" (Von Kempski 1974, xxxi). It was handled in its static and dynamic aspects in the way mathematical mechanics, astronomy and physics had been (Comte 1839. 537-736), despite an apparent forgetfulness to explicate and classify the statics and dynamics of biology (cf. 1838, 477), and sociology in particular usually denotes its political and ameliorative application (see Fig. 2, sect. 6.ii). All facts for Comte are "social facts" (Richards 1992, 380), and though humans each amount to individual physiologies we are integral to higher organs of sociality, and this is what makes social scientific/sociological thinking very different from doing history (with its biographical elements and stress on prominent agents, and personally embodied ideals) and thus in his view a social science was needed to surpass it (cf. Ludz 1972, 11-20). Nothing is more foreign to Comte's thinking than Mill's dictum ([1859] 1910, 124-5, 170) that society is "an aggregate of the individuals who comprise it".[8] In contrast to Condorcet, certainly an inspirer for Saint-Simon and himself for interpreting the past (Pickering 1993, 50-51, 66, 101, 165), Comte rarely highlights individual actions and historical events for their own sake: details are forever locked within processual stages of thinking, religion and arts, and positivism itself is nothing if it is not a "social movement" as part of revolutionary change (Comte 1974a: 164, 199-209) and a "great new philosophical movement" rather than just Comte's personal cause (1842a, 876). Positive methods and findings must be "historical" (*historique*), then, only in conforming to laws of nature and evolution rather than a confusion of incidents (1839, 287-470), and Comte does use the classifier "Historical Theory" (1842a, 880), stressing the need for "historical appreciation" and "exposition" (877; 1830, 66). Political economy and also "Political Philosophy" were subsumed by sociology (e.g., 1839, 236-7 [150], 247 [155]), his whole project resulting in "positive Politics and Economics" (1842a, 875); while geography and ethnology (pretending disciplines before ethnography and anthropology) stand neglected, for they had been weak on the French (as against German) scientific agenda (e.g., Botting 2011; cf. Antoine-Augustin Cournot [1801-1877] listing anthropology and ethnology under natural history [1851: 267-8] with a positivist touch). But emergent social physics is also touted by Comte as our final and coordinating body of knowledge, the "Social Philosophy" that achieves all the solutions to humanity's aspirations and problems; and so moral direction resides within its uncovered principles, abolishing the false ancient Greek distinction between natural and moral philosophy (Comte 1842, 853-62) to become "*la philosophie finale*" both for history and in capping off his series (876; cf. vol. 1, 365). And, as is well known, *la physique sociale* it is still more in its distinctly practical guise as *sociologie*. The politics/polity (*politique*) applying its scientific truth is the "final Religion", and its subject, humanity, is to be worshipped (through "Sociolatry") (Comte 1851, 435-6 [352-3]), so that Society is renewed and the "primordial [too often hidden] metaphysics" recovered, which is "positive' in the sense of not "negative", and not to be destructively "dismantled" or relativized by Voltaire and the failed eighteenth-century *philosophe*s (1841, esp. 759-75).

In the 1856 *Synthesis*, Comte's finally distilled classification is quite a curiosity, first because of its over-simplification, but then on account of his peremptory move to forge scientific method with his religion. We see a foretaste of his distillation in the *Catechism* ([1842b] 1858: post 428, Table B). There in a diagram showing a "Theoretical Hierarchy of Human Conceptions", he demarcates the study of the earth or cosmology and the study of Man or sociology (now not social physics), and under cosmology he lists mathematics (as "fundamental"); physics (as celestial and terrestrial, with the later bifurcated into general (= physics) and special (= chemistry); and biology (with no mention of physiology). All this is "Natural Philosophy" in a general picture. Deriving from but different from Comte's 1838 overview (see above sect. 2.3), and acknowledging he approached this big division in the *Système* (1851, 339-41 [270-1], all is "Preliminary" to the "Final Science of Moral Philosophy", that of the Study of Humanity, divided into sociology (more Comte's original totalistic meaning, and called "proper") and now set beside morals (this being for individuals, as sociology is for society). The *Synthesis* is still more quirkish, looking offensive towards the mature classification (1856, vol. 2, 752-3). Here Comte divides the inorganic and organic sciences (or the latter as "the Science of Life"), sticking with his decision in the *Catechism* for simplicity's sake to devolve all chemistry back into the inorganic, but he now also joins mathematics and astronomy together "in his scientific doctrine" (Pickering 1993, 686). Physiology (named such instead of biology) finally gets wedded to sociology within the study of "Humanity" (one as the individualistic and the other as the social aspect), and if distinguished from the study of the "General Milieu", a third great component, a would-be 'lived-out Positive method', lies in the collective and practical expression of Comte's religion of humanity, or devotion to society (*sociolâtrie*) ([1842b] 1858, opposite p. 128, Table A). The *Catechism* prefaces this, as it is largely about the "History of Religions", from Fetishism onwards ([1842b] 1858, 368-428), and when in the *Synthesis* (Figure 4) Comte strangely represents his entire practised system as "the Great Fetish" it is because for him everything has devolved back into an original beginning principle that history was meant to recover (Trompf 1979-2023, vol. 2

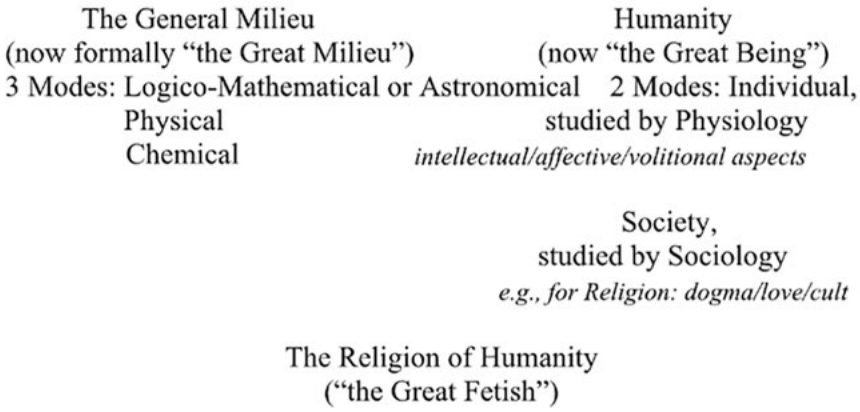


Figure 4. Comte's final broad classification (Comte, *Synthèse* [1856] 1886, 107).

[ch. 9]). At least a separating of general environment and society allows them to be treated for objective study, while the third, highly axiological sphere is kept distinct: yet Comte idealized *évolution intellectuelle* or the perfection of our "intellectual and moral powers" as "the next science" (1852a, vol. 3, 368, 371; vol. 4, 712). The study of humanity may have been subjected to the study of the world (sect. 2.3), but part of his understanding about 'hierarchizing' sciences involves animals being superior to plants and humans as the decidedly superior animal (vol. 4, 709; vol. 6, 857).

3.0 Binding the classificatory framework

Readers can already intuit from the strange use of "the Great Fetish" that Comte's classificatory procedures are affected by his patent quest for symmetry. As a whole compass his arrangement runs from the primitive to a final Primordium. Spencer wrongly assumed (1907, 15-17) that, to be consistent with his approach to the other natural sciences, Comte began with abstract calculus not concrete; but it was the reverse, because for Comte primitive numeracy is the very beginning point of scientific activity, just as, in the history of the education of the human race, religio-conceptual exertions start with fetishism, the black African indigenous practice of carrying small objects allegedly imbued with supernatural power described in the popular French theory of Charles de Brosses (1709-99) (1760). Fetish worship thus marked the beginning of the first of three great stages (*États*) of "human intellectual *évolution*", the one which was theological or "Fictive" (*fictif*) ([1844] 1956, 5, 7). The law of the three stages, theological/ metaphysical /positive was for Comte a "fundamental doctrine" (5) also binding his classificatory system together, because for positivism to be accepted, whether as philosophy or religion, we must embrace an educative programme, indeed one conforming to the macrohistorical "education of the human race", explaining how what must be known from past yet surpassed knowledge validated new established positive truths. For this reason, Comte had to address the whole history of conceptual modes as recognizably ordered and as a progress, and as such also commensurate with his step-by-step ordering of the sciences, their unfolded logical interrelationships, and their processual, organically branched or ladder-like structuration through his taught *Cours* (Comte 1974a, 20, 51-7, 59-60). Such parallelisms and inverse relations he took to confirm that his departmentalizations were "right" (1853, vol. 1, 21-3). If the whole evolutionary process did not leave in its train some kind of 'good match' for his classed sciences, the evolving of thought did.

The history of ideas, framed very Eurocentrically, was said to progress *pari passu* with social conditions: ancient civilization was based on slave labour, and not unlike the unadulterated Karl Marx (1818-83) Comte put in good words for the (Western) Middle Ages for largely diminishing slavery; yet rather than condemning modern arrangements as a 'new slavery' of capitalism (as in Communist critiques), he welcomes industrialism, hoping it would be humanized and demilitarized for being based on positivist scientific principles and their instrumental potential (as Saint-Simon envisaged). Women's uninhibited engagement in society was to be enhanced; and the horrors of overseas imperialism were to be mollified by his church's worldwide mission.[9] Comte's classification, then, is socio-political, or part of a turn towards a totally new view and way of life. In religion, mediaeval monotheism improved on polytheism, and according to the law of the three stages, metaphysical thought, prepared by Catholic philosophers of the Middle Ages but rampant in modern societies and their *époche critique* (Comte 1864 vol. 5, 544), greatly improved on theological and fictive attributions of events to superhuman powers and deities, by replacing them with "abstract forces" (such as Nature), though "veritable entities" in "various types of being". Theologians and metaphysicians shared the same mistake of pretending to "absolute knowledge",

whereas by sensible progression positivism gives up aspiring to "absolute concepts", final causes and "inner causes", and confines itself to the discovery, through reason and observation combined, of the actual laws that govern the succession and similarity of phenomena. The explanation of facts, now reduced to its real terms, consists in the establishment of a link between various particular phenomena and a few general facts, which diminish in number with the progress of science (Comte 1830, 3-4 [20]).

Conceptual life starts with simple ideas, but in a paradox proceeds from greater to less confabulation of ideas, which is at the same time a development from less mature ideas to ones more refined and complex, yet simpler in demystifying explanations. Comte's classification of the sciences is for him the apex of this overall progression, and a reflection of high modernity and techno-scientific achievements. In itself the classification also stands as the progress of thought from the simple to greater complexity of phenomena studied, from less explorable outer space (needing more mathematics) to greater experientialism in social study (needing less), from the basic and more measurable (in mathematics) to less determinate social data (and thus inevitably from a greater to a less degree of generality, and with the instruments for research growing less complex). Abstract mathematics, "the true foundation of all natural philosophy" and both the "oldest and most perfect science" initiated a trajectory of scientific ideas from the most abstract, ostensibly the science most completely liberated from theology and metaphysics, to the most concrete, given the specificity (yet contentiousness) of human facts (e.g., Comte 1853, vol. 1, 26-7; 1974a: 65, 78-80, etc.). The sciences thus developed as the laws of nature themselves indicated they should, up a "ladder" rung-by-rung, working everything out "bionomically" or through a special "biological hierarchy" (1852a vol. 3, 289, 368-9, 663, 694) and in intricate logical relationships since all sciences connect to each other in filiation (e.g., 410-44), and (with mathematics) "the five great groups of phenomena" considered by the positive sciences (from astronomy to social physics) are "of equal classificatory value". This equality does not mean that dependency does not apply, and thus a principle of subordination, because, as Comte stated it in key formulations (e.g., 1851, 456-77 [371-87]), the study of individual man (with emotions and morals) is dependent on the study of humanity (sociology), which in turn is dependent on biology, which cannot do without physics nor it without astronomy, the whole scale implying a mathematical basis (Pearson 1909, 509). Through the six basic abstract sciences in the complexity of phenomena handled increases, with the last fundamental science constituting the highest goal of scientific achievement, not an appendage of lost causes. At the crown, then, sociology has the most complicated phenomena to address, and cannot be a positive science without dependence on all the preceding five fundamental sciences, even though it has the least power of generality and mathematics the most, for being simple, and independent (e.g., Balaban and Klein 2006, 617-8; Priya [2015]; Bourdeau 2018). Yet sociology is the worthiest outcome of his system, for humanity can be best regulated, indeed saved, by perfecting this science.

Above all, as Comte reiterates tirelessly (indeed ponderously and verbosely), the unravelling of his classification reveals a *harmonie fundamentale* that inspires awe in humanity's glories (1838, 351; Comte and Ward 1898, 7). Why, eminent minds of the past are even classified into the equivalent of a calendar of the saints to venerate human heights (Comte [1842b] 1858: post 428, Table D). There is a lot of rhetorical flourish protruding from all this, and one wonders whether some of these generalizations could be substantiated from across his whole board. Even if he does admit early on that there is a problem of being forced into an arbitrary starting-point, of choosing one rational categorization out of a host of possibilities, as Spencer respectfully notes (1907, 45), Comte remains the utterly committed guide to his own organizational pre-eminence and of course "Pope" of the highest religion, and, if sometimes showing awareness of difficulties to be better tackled, he would hardly want to leave anyone with the impression that he had made wrong classificatory choices (cf. Pickering 2009a, 453-580).

4.0 Comtean influences

This article does not pretend to discuss the general influence of Comte; our focus will remain on his system of classification and its effects on other classifiers or protagonists for the need of researchers to reflect on knowledge organization. [10]

Five Anglophone figures stand out for giving immediate credit to Comte as a formidable classificationist (in the 1850s and 1860s). Starting with a trio of lesser importance, we acknowledge social novelist and political economist Harriet Martineau (1807-76), whose abridged translation of the *Cours* (Comte 1853[11]) helped establish her reputation as the first female sociologist; dilettantish historian of philosophy Lewes, who expatiated upon the *Cours* (1853, cf. Barrat 2005); and of course John Stuart Mill, who in his 1866 volume on *Positivism*, predicted that Comte's framework leading to Sociology was "not ... likely to be ever, in its general features, superseded" (1866, 124). The last two respondents, evolutionist Spencer and the American pragmatist Charles Peirce (1839-1914) are of greater significance in making use of Comte's classificatory activity for their own independent formulations.

Spencer (1907, 45), who compared Oken, Hegel and Comte, decided the last of the trio was the one most worthy of "respectful consideration", considering his "logically coordinated" steps, "the largeness of his views, the clearness of

his reasoning, and the values of his speculations", and Spencer concluded that, if one held a "serial arrangement of the sciences to be possible, that of M. Comte would certainly be the one we should adopt". It turns out, when the English philosopher outlines his own classification, he cannot avoid seriation of some kind. He is at pains to disagree that astronomy comes before physics both historically or logically, but in absorbing the former into the latter ([1864] 1891, 84-93), Spencer has simply modified rather than destroyed Comte's framing, and it meant little to Littré to say his master's frame might need perfecting a little (Spencer, 1891, 74-5, quoting Littré). Spencer needed to have his continual excuse to dissent and dissociate himself openly from Comtism when he was nonetheless close enough (Spencer 1884; cf. Gane 2017), as if that mattered anyway when neither Martineau nor Lewes, as expositors of Comtism, were committed to the whole ('ecclesial') system and Mill's defences of Comte were marginal to his own developing quasi-Unitarian position (Larsen 2018, 60-67; cf. Matz 2009). Patently, there are many similarities in order and rationale between Comte and Spencer, with the latter accepting the principle that knowledge acquisition should conform to the education of the human race, and his English (immediately pre-Darwinian) evolutionism subtly supplanting Comte's less formulated, less biologically associated enunciations of *évolution* (cf. Trompf 1971, 190-5). Like Comte, Spencer has nothing in common with earlier theorists who classified the sciences and arts in terms of physics and metaphysics (e.g., for Britain, Lane 1826: esp.10-20) and uses the term 'phenomena' as discovered facts of the external world devoid of the "universal illusions" of metaphysics (Spencer [1864] 1879: 158). This is not to gainsay that Spencer uses Comte to answer his own special and crucial question ("What is Science? [1864] 1891: 78]), as also Peirce did, usefully having knowledge of Comte's fast-disseminating classification in probing the logic of scientific discovery across the Atlantic ([1865] 1982, 304; [1903] 1998; cf. Midtgarden 2020). Again, Peirce's classifying does not leave Comte's unsalvageable; though he is the first to come up with an arrangement that makes metaphysics necessary for the preconceived tasks of science, a position not entirely absent from Comte but one he held either begrudgingly or idiosyncratically (Kent 1987; cf. Comte, e.g., 1854, 548 [566]).

Inasmuch as Comte's classification bore recognizable eccentricities with regard to particular fields, they also come into the story of influence. By not distinguishing pure from applied mathematics, for instance, and treating calculus and geometry only in terms of actualities, French mathematician Henri Poincaré (1902) 'liberalized' the Comtean approach by establishing that some axioms are quite removed from reality, other principles are pure conventions no longer necessary to verify by experience, and so classifications should better be likened to libraries that can add new books to their catalogue and should not be considered true or false (Schmaus 2019, with Oldroyd 1986, 190-1). For another turn-of-the-century example, when phrenological psychology had lost clout in Germany, positivists there wanted to ensure the discipline was not loosened from its bio-physiological moorings, opposing Wilhelm Wundt (1832-1920) when he argued for psychology as a separate science "on the basis of voluntarism, value and psychic causality" (Wundt [1896] 1922: 386-97; Danziger 1979: 205). But Comte's influence was not lost among Germans and other Continentals (e.g., Widad 2018).

In its most general effect over time, Comte's approach to classification lurks behind the well-nigh ubiquitous organizing of university curricula into faculties of sciences and social sciences, but without the humanities being wished away (though many positivistic antagonists prefer Arts faculties to be minimized, and funding cuts typically first hit disciplines outside the spheres of the 'six basic sciences', as Comte identified them). The clout of the classification best explains the rise of behaviourist approaches to human activity (e.g., Carrera 2018, 18-20), and eventually why many tertiary post-War psychology departments have sought membership in science faculties to secure themselves from old associations with pseudo-science (mesmerism, phrenology, etc.) and limit the pretensions of psychoanalysis (Dienes 2008). In the end, of course, physiology, brain science and psychology have come to play separate enough histories; and sociologists must needs be content with becoming one among a number of social sciences (anthropology, [social] psychology, economics, politics, and geography, which has the greatest chance of all to sit in among 'hard' sciences [Trompf 1977]). The claim that a social science can hold a 'queen-like' position *vis-à-vis* the natural (more accurate, precisely measurable) sciences has gone by the board, though that this regnal place can be taken by the history of ideas (including the history, and indeed psychology of science) (Vico [1744] 1961, 104, with Feist 2006, 3-157) is an important claim for ongoing philosophical debate, because all scientific undertaking is intellectual, and such work cannot be in evidence except by thinkers past and present.

5.0 Critique and conclusions

Criticism of Comte's classifying without taking into account his context would be inappropriate,[12] but still, even around his own day, Comte was impugned for leaving things out (thus Spencer on psychology; Ernest Haeckel [1834-1919] on embryology [1874, 9-13], etc.), and traditionalists were dismayed at his depreciation of inherited systems of discipline demarcation that were capable of reform (e.g., Humboldt [1852] 1969, 49-54; Arnold 1868) and of adding new subjects (e.g., Müller [1861] 1899 on compara-

tive philology, leading to linguistics; cf. Cournot 1851, 267-8). In the short run Comte's classification was too privative, and it had to complete against broader conceptions of science (the German *Wissenschaft* for a start). Lack of clarity and apparent inconsistency arose from conducting his *Cours* somewhat 'on the run', making adjustments along the way, and never quite summarizing or tabulating his matured classification in the way we have been able to present here (especially in Figure 2). In his lifetime his scientific enterprise also became increasingly overrun by his socio-political and religious project.

With alternative classificatory possibilities in view, there were accusations from the start that, despite his explorations of their "filiation" (e.g., Comte 1853, vol. 1, 29), his sciences were too hard edged or impermeably removed from each other, with Spencer ([1864] 1891, 22-6) reckoning that apprehensions of evolution offered a better chance of seeing how integrated all sciences should be. A major issue was reductionism: for any science to be part of his classification it had to conform to exclusion criteria that inhibited free talk about mind (as against brain), metaphysical concepts, metaphoric language and subjectivity being integral to scientific activity and description of findings (For contrary views to Comte's, e.g., Broad 1923; Fairbanks 1970; Polanyi 1962). And in increasingly stressing the distinction between abstract and concrete sciences, Comte made it harder for himself to include established or newly developing specialties, threatening his pretensions to thoroughness, engendering a look of self-contradiction, and falling into the questionable position of holding that concrete sciences (or the stages of them) are dependent on prior abstraction (start with Cogswell 1899 on this last matter).

Because Comte was not a (pure) empiricist (Høffding 1922, cf. Hjørland 2005, 150 n.2), he was not going to satisfy classifiers of empirical or inductive sciences/studies who (perhaps using Whewell or Mill) wanted to defend empirical history, ethnology or cultural configurations by methods that do not drive out qualitative considerations. We note Francis Bacon, the inductionist of crucial importance for the empirical tradition, was often honoured by Comte, but usually along with great French rationalist René Descartes, helping to explain why, for sciences to be positive, "reason and observation" had to be "combined" for the "discovery" of "actual laws that govern the succession and similarity of phenomena" (see Comte 1974a, 21, 26, 32, 34, 39, etc.) "Phenomena", of course, were just accepted as perceived happenings, without the concerns we find with phenomenologists as to how quickly observations are affected by interpretative presuppositions (e.g., Husserl [1931] 1960); and Comtists would be notorious for dismissing or explaining in their own way reports of events that do not fit their presumptions about natural laws. Intriguingly, Bacon and Descartes clearly subscribed to Christian theological views (Gaukroger 1995, 309-31, 354-60, etc.; Gascoigne 2010), and yet Comte was much more inclined to respect them over the sceptical Encyclopaedists; just as the Romantic Lord Byron was preferred over "anarchy" bearing revolutionaries whom Enlightenment sceptics ostensibly inspired (Pickering 1993, 665; cf. Comte 1864: vol. 5, 543; 1889). In his own pursuit of consistency, Comte was a non-theistic neo-dogmatist, and the self-imaged heroic, undeterred replacer of old religion in a 'cult of authority,' one arising out of Saint-Simon's *Nouveau Christianisme* but not unlike other rigorous experiments of the time (Iggers 1959; Manuel 1962). In the long run this authoritarianism unfortunately fuelled contemporary 'scientism'.

In due course, serious criticism of Comte's classificatory approach was to be made by latter-day, mainly twentieth-century, theorists who focused on knowledge organization. There has been a critique of Comte's classification of the sciences which connected the problems in his classification with his committed positivism. Thus, when Kurt Danziger (1979, 212) researched reactions to the psychology of Wilhelm Wundt (1832-1920), an important comparative assessment was drawn:

> Wundt recognized the close link between the concept of a hierarchy of sciences and positivist thought – he traced the concept to Comte and Herbert Spencer [n. 29: Wundt 1889]; further, he contrasted this concept with his own view according to which the relationship among the sciences involves a fundamental duality, expressed in the division, at one time used in England, between the natural and the moral sciences [as with Whewell], or in the German division between *Naturwissenschaft* and *Geisteswissenschaft*. Wundt traced the origins of the German division to the Hegelian distinction between the philosophy of nature and the philosophy of spirit (*Geist*). What is involved here is the principle of the nonreducibility of the concepts of either set of sciences to those of the other set.

Wundt therewith established a connection between conflicting epistemological positions (Comte's positivism and Hegel's historicism [13]) on the one side and different ways to classify the sciences on the other.[14] This conflict was not much recognized for a long time during the positivist dominance but became more influential in the wake of Thomas Kuhn's (1962) contribution to the philosophy of science (although at that time the interest in the classification of the sciences had waned very considerably).[15]

Another criticism has arisen out of Marxist scholarship, which, as is well known, also were deeply influenced by Hegelian concepts. The most relevant authority on the classification of the science (generally, not just from the Marxist perspective) is without doubt Bonifadij Kedrow (1975-

1976), whose major work, originally in Russian as *Klassifikatsiiya nauk*) (1961) is sadly unavailable in English. In volume 1, chapter 2, substantially devoted to Comte's classification, Saint-Simon, and Comte's contemporaries in France, Kedrow (1975, 103-186) found (opposed to Wundt and Danziger) that Comte's classification was independent of his positivism, of his sociological views, of his special non-theism and his metaphysics. Kedrow concluded that Comte's classification represented a necessary step forward, but its main problem was that it represented too static a view about the relations between the sciences. Later developments by Darwinists and others, however, enabled a dynamic view (and thereby, we may add, that after all it related to positivism rather than to historicism) (cf. also Dousa 2009). Post-modernists, of course, will undoubtedly want to demur that all classificatory work is in danger of reifying "facts" or "listed items" that are never stable either linguistically or within some proposed real world.[16]

Despite such criticism, Auguste Comte stands out as the father of the modern classification of the sciences as we know it in its various presentations over the last two centuries, and it is his systematic arrangement (albeit modified in the Anglophone world by Spencer) that would in its general features be most familiar, absorbed and popularized across the world of global learning today. His influence can be seen in the English word "science", which since the mid-nineteenth century was mostly constricted to natural science (as opposed to, for example, the German word *Wissenschaft*, which includes the humanities). This narrowing of the English word was, influenced by Comte's hierarchy of sciences, in which only some fields had reached the stage of "positive knowledge", as rightly perceived by Daston (2015, 241).[17]

For all his non-memorable details, unnecessary prolixity and largely abandoned indisputabilities, Comte still remains a central figure in the history of knowledge organization. One fears, though, that one progresses more by questioning than acquiescing to his persuasiveness, by getting past him as a "master of suspicion" (cf. Ricoeur 1970, 32-6), and then to purview and enjoy the immense riches of *scientia* under a less straight-jacketed rubric than his. As time passes, considering how much thinking in our time looks like a series of footnotes to greats from the nineteenth century,we should then feel free to decide (as with Marx, Spencer, Darwin, Freud, etc.) how beneficial Comte's classification is, indeed whether its effects have been 'good' or 'bad' over time, and in what different senses (cf. also Bourdeau et al. 2018).

Notes

1. For this article, please note that, although the so-called 2nd edition of the *Cours*, published by Borrani and Droz between 1835 and 1852 (Paris, in 6 vols.) has probably been the most accessible and widely read, vols. 2-6 are just new imprints of the originals from the Bachelier first edition (1835-1842), and only vol. 1 of the second edition (Comte 1852a) substantially expands upon the original first volume (Comte 1830). It has been important in plotting Comte's maturing views to cite the 2nd edition of his opening volume on various occasions, and not always just the 1830 original, while the subsequent volumes of the *Cours* are always referred to individually (as Comte 1835, 1838, 1839, 1840 and 1842a, all first edition dates) since their pagination remains the same in both editions. The Baillière augmented 2nd edition, produced by Émile Littré (Paris, 6 vols.) is rarely used (as Comte 1864), and the 3rd edition (again Littré 1869) not at all. Importantly, Machlup (1982, 65 note 16) wrote: "Much confusion in research involving this work has been caused by the *Société Positiviste* in Paris by publishing in 1893 a 5th edition with the notation on the title page that it was identical with the 1st edition, without warning, however, that the reproduction was with a different typeface and completely different pagination. For example, the first appearance of the word "sociologie" and an explanatory footnote by Comte is in Volume IV of the 5th edition on pages 200-01, whereas in the original edition the word and the footnote were on page 252. Many hours of search have been wasted owing to the failure of a simple warning concerning the changes in the page numbers. Incidentally, later reproductions, for example, a *reimpression anastaltique* (1968-1969), are even more deceptive, because one thinks that the original edition of Comte's work has been so reproduced". As for English translations and abbreviations of the *Cours* (s.v Comte [1855] 1896; 1974a; 2017), only the efforts of Stanislav Andreski, though only covering selected portions, have been placed in square brackets where pertinent after French citations, but readers should be aware that he translates the 1830, not the 1852 2nd edition, even though equivalent passages were never hard to find.
2. While recognizing his 1822 commencement of this project (published for Saint-Simon in 1824 under the same name and a barely known publication [Comte 1824]), here we used the final French text of Comte's second masterwork, citing the French first edition of the *Système* in four volumes (as Comte 1851; 1852b; 1853; 1854), with page numbers of the English translation by John Bridges and others (1875-77, also as vols. 1-4), presented in square brackets.
3. See Spencer 1854, 109-34; 1891, 9-26, esp. 15; 1907, 45 (clearer); with 1864, 10-11; cf. Trompf 2011, 114-16.
4. One wonders if Comte's concept "science" is itself a metaphysical construction? Have positivists from

Comte to the logical positivists really succeeded in removing metaphysics, or have they rather built their own metaphysical systems, which they contradictorily claim not to be metaphysical? This question is beyond the present article, but is discussed in the literature, e.g., by Feibleman (1951) and also by Ghiselin (1997, 19), who found that "There is no way in which one can divorce science from metaphysics altogether: to deny metaphysics is itself a metaphysical thesis. One can no more have science without metaphysics than a drink without beverage: the only choice is that between good metaphysics and bad metaphysics, good science and bad science". Also, Comte's meaning of "positivism" and its opposition to theology and metaphysics needs to be examined from a contemporary epistemological point of view. Burdziej (2014, 191), for example, wrote: "In the wake of the constructivist turn on social sciences, social scholars much more ready to openly admit they are guided by a moral philosophy, their work is interpretation. Sociology of knowledge, especially, revealed the constructed character of the sociological project and undermined its claim to objectivism and neutrality. Yet much of sociological research is still done as if this turn never happened.. [...] If sociology wants to remain faithful to its original critical vocation, it is perhaps time that it seriously looks into various 'cryptotheologies' underlying sociological thinking".

5. "Lessons" refer to Comté (1830-)
6. As Machlup (1982, 68) reassesses it, "Comte realized that biology was underdeveloped relative to the "inorganic" sciences. He explained this by pointing to the greater complexity of the "organic sciences". No one can reasonably reproach Comte for not foreseeing the revolutions that were to come in this field during the next 125 years. He was bold enough to propose a new subdivision, "bionomy", which was to denote "dynamical biology". The three divisions he proposed for biology were "biotomy, biotaxy, and pure bionomy, or physiology proper". [Comte 1838, 476; Comte 1853 (Martineau) vol. I, 328.] Comte used "anatomic philosophy" as an alternative designation for biotomy, [Comte 1838, 487; Comte 1853 (Martineau), vol. I, 331] and "biotaxic philosophy" as an equivalent of biotaxy [Comte 1838, 537; Comte 1853 (Martineau), vol. I, 340]. Dynamical biology was treated in three lessons on "vegetative life", "animal life", and "cerebral", that is, "intellectual and moral, functions". Thus, any similarity to the biology of our days seems to be purely coincidental".
7. The phrase "see themselves think" is an expression of 'the introspective method'. For a historical survey on the views about introspectionism, including Comte's, see Danziger (2015).
8. Mill's dictum that society is "an aggregate of the individuals who comprise it" is often considered the "psychologistic" approach to history, cf., Trompf 1977, 119-20.
9. See Trompf 1979-2023: vol. 2, [ch. 8A]; cf. Marx (1867) 1967: vol. 1, 356-302, 332n, 741, 752.
10. Claims about Comte's influence include assertions that he was the founder figure of modern social science, sociology, even (paradoxically) social psychology (Ward 1898; Allport 1954; Aron 1968); appreciative defences that scientific investigators would be better oriented for reading him (physicists, for example [Serres 1972, 61], even anthropologists [Evans-Pritchard 1981, 41-60]); or estimates that he laid foundations for the methodology mostly adopted today by practitioners of both 'hard' and social sciences (e.g., Topisch 1972 for social scientists, Clauzade 2019 on polymath Ernst Mach; cf. Oldroyd 1986, 177-203 more generally); or eulogies from among Positivist Church leaders (from d'Eichtal, Émile Littré, Richard Congreve, Frederic Harrison, etc. onwards) that he had founded the finest world religion (Wright 2008, etc.; cf. Gilson and Levinson 2013, etc.).
11. Machlup (1982, 65-6): "Harriet Martineau, British classical economist, was brave enough to produce a free English translation and drastic condensation of *The Positive Philosophy*. She cut the work from six volumes to two, from 4,779 pages to 864. The abridged version was so much more popular than its portly parent that it was retranslated into French and became a preferred substitute for Comte's original".
12. When this author presented a preliminary listing of academic disciplines on a poster the size of a door for the Sixth International Conference for the Environmental Future (2011) ('Trompf's List'), the number far, far exceeded anything in Comte's apparent imagining, so advanced and more multiform is the contemporary research platform. My classificatory principle for this poster was hardly unaffected by Comte, basically running from the mathematical to the most general, interdisciplinary study.
13. Kedrow (1972, vol. 1, 4; translated from German) wrote: "Historicism as the key to any natural classification: of decisive importance for the analysis of the of the posed problem is the historical approach of its analysis and solving, or, with other words, *the principle of historicism*. This relates both to the history of the development of the object to be researched by the sciences and to the history of the development of scientific knowledge itself". Compare Darwin (1859, 420), when determining "... all true classification is genealogical ...").

14. See Danziger (1979, 228 n. 31): "In this respect Wundt's position is closer to certain modern approaches, for example, by Edwin A. Burtt (1925), Herbert Butterfield (1957), and Alexandre Koyré (1968). Wundt's emphasis on the fact that natural science is only possible by virtue of a prior abstraction from the immediate experience of the human observer sometimes receives extreme expression in the assertion that his psychology is much closer to being a strictly empirical discipline than the natural sciences, which "everywhere require the assistance of metaphysical concepts" (Wundt 1908 vol. 3, 250).
15. Miksa (1998, 48) wrote that a movement to classify the universe of knowledge in a new way first arose in the seventeenth century and became an activity of enormous proportions among a wide number of participants during the nineteenth century. But the movement to classify knowledge and the sciences ended just after the beginning of the twentieth century, a fact treated by R.G.A. Dolby. Dolby notes that apart from subsequent incidental mention of the knowledge movement in discussions about particular nineteenth-century philosophers who had been active in it, the topic has "become dispersed among the backwaters of intellectual thought". He concludes that one of the principal reasons for the movement's decline was the "increasing artificiality of the main lines of [its] discussion" (Dolby 1979, 167, 187-8).
16. Paradoxically, however, postmodernist paragon Jacques Derrida (1976, 74-93) writes of his grammatology as "a positive science".
17. However, a key problem lies in this principle being advocated too privatively by the former disciple Littré (Hirai n.d.; Petit 2016 on Comte 1864). In mature Comtean terms (and to Littré's chagrin) Positivism as "true science" (1851, 190 [153]), as "true rationality" (338-9 [271]), even the objective (sometimes "dogmatic") method carried through to the greatest extent, should not devalue human subjectivity in "the Study of Humanity" (as the "new Great Being" substituting for God) and thus produce "regenerated science, ... abolishing" the valueless, purposeless and narrow-minded old "academic system" through a universal socio-religious movement (Comte 1851, 190 [153]; 332, 337-40 [263, 267-7]).

References

Works by Comte

Comte, Auguste. [1820] 1998. "Summary Appraisal of the General Character of Modern History." In [Comte], *Early Political Writings*, edited and translated by Stuart Jones (Cambridge Texts in the History of Political Thought). Cambridge: Cambridge University Press, 5-46.

[Comte, Auguste] 1821. "III[e] Lettre". In *Du Système Industriel* by Claude Henri de Saint-Simon. Paris: Renguard, 122-53.

Comte, Auguste. 1822. "Plan de Travaux Scientifique Nécessaires pour Reorganiser la Société." In *Appendice Générale du Système De Politique Positive: Contentant Tous les Opuscules Primitifs ... Sur la Philosophie Sociale*. Paris: Thurnot, 1854, 63-136.

Comte, Auguste. 1824. "Système de Politique Positive." In *Catéchisme des Industriels*, edited by Claude de Saint-Simon [Cahier] 3, 3-189.

Comte, Auguste.1830-42. *Cours de Philosophie Positive*. Paris: Rouen [first] and [then] Bachelier, 6 vols. Using also 2nd ed. 1852, see Comte 1852a, and for 2nd augmented ed., see Comte 1864 below.

Comte, Auguste. 1830. *Cours de Philosophie Positive*. 1: *Les Préliminaires Généraux et la Philosophie Mathématique*. Paris: Rouen.

Comte, Auguste. 1835. *Cours de Philosophie Positive*. 2: *La Philosophie Astronomique et la Philosophie de la Physique*. Paris: Bachelier.

Comte, Auguste. 1838. *Cours de Philosophie Positive*. 3: *La Philosophie Chimique et la Philosophie Biologique*. Paris: Bachelier.

Comte, Auguste. 1839. *Cours de Philosophie Positive*. 4: *La Philosophie Sociale et les Conclusions Générales*. Paris: Bachelier.

Comte, Auguste. 1841. *Cours de Philosophie Positive*. 5: *La Partie Historique de la Philosophie Sociale*. Paris: Bachelier.

Comte, Auguste. 1842a. *Cours de Philosophie Positive*. 6: *Le Complément de la Philosophie Sociale, et les Conclusions Générales*. Paris: Bachelier

Comte, Auguste. [1842b] 1858. *The Catechism of Positive Religion*, translated by Richard Congreve. London: Chapman.

Comte, Auguste. 1844 *Traité Philosophique d'Astronomie Populaire: ou, Exposition Systématique de Toutes les Notions de Philosophie Astronomique, Soit Scientifiques, Soit Logiques, Qui Doivent Devenir Universellement Familières*. Paris: Carilian-Goeury & V. Daimont.

Comte, Auguste. [1844] 1956. *Discours sur l'Esprit Positif / Rede über den Geist des Positivismus*, German translated and edited by Iring Fetscher (Philosophische Bibliothek 244). Hamburg: Felix Meiner, 3-224

Comte, Auguste. 1851 *Système de Politique Positive, ou, Traité de Sociologie, Instituant aa Religion de l'Humanité*. 1. *Discours Préliminaire, et l'Introduction Fondamentale*. Paris: Mathias.

Comte, Auguste. 1852a. *Cours de Philosophie Positive.* 1: *Les Préliminaires Généraux et la Philosophie Mathématique*. 2nd ed. Paris: Borrani and Droz. [Note other volumes in this 2nd edition just reproduce the originals, but for the new publishers].

Comte, Auguste. 1852b. *Système de Politique Positive, ou, Traité de Sociologie, Instituant la Religion de l'Humanité*, 2: *La Statique Sociale et le Traité Abstrait de l'Ordre Humain*. Paris: Mathias.

Comte, Auguste. 1853. *Système de Politique Positive, ou, Traité de Sociologie, Instituant la Religion de l'Humanité*, 3: *La Dynamique Sociale ou le Traité du Progrès Humain*. Paris: Mathias.

Comte, Auguste. [1853] 1895 *The Positive Philosophy of Auguste Comte.* 3rd ed., translated and condensed by Harriet Martineau (Chapman's Quarterly Series 3-4). London: John Chapman.

Comte, Auguste. 1854. *Système de Politique Positive, ou, Traité de Sociologie, Instituant la Religion de l'Humanité*, 4: *Tableau Synthétique de l'Avenir Humain*. Paris: Mathias

Comte, Auguste. [1855] 1966. *Catéchisme Positive, ou Sommaire Exposition de la Religion Universelle etc*. Paris: Garnier-Flammarion.

Comte, Auguste. [1856] 1886 *Synthèse Subjective; ou, Système Universel des Conceptions Propres à l'État normal de l'Humanité*. 1. Paris: Victor Dalmont, [other volumes unfinished].

Comte, Auguste. 1864. *Cours de Philosophie Positive.* 2nd augmented ed., with a preface by Émile Littré and an alphabetical table of contents. Paris: Baillière, 6 vols.

Comte, Auguste. 1870. *Lettres d'Auguste Comte à M. Valat*. Paris: Dunod.

Comte, Auguste.1875-77. Auguste Comte, *System of Positive Polity: or, Treatise of Sociology, Instituting the Religion of Humanity*, translated by John Bridges, Frederic Harrison, Edward Beesly and Richard Congreve. London: Longmans, Green & Co.

Comte, Auguste. 1877. *Lettres d'Auguste Comte à John Stuart Mill, 1841-1846*. Paris: Ernest Leroux.

Comte, Auguste. [1889] 2003 *Appeal to the Conservatives (1889)*, translated by T.C. Donkin and Richard Congreve. Whitefish, MT: Kessinger.

Comte, Auguste. 1973-90. *Correspondence Générale et Confessions*, edited by Paulo Caneiro, Pierre Arnaud, Paul Arbousse-Bastide and Angèle Kremer-Marietti. Paris: École des Haute Études en Sciences Sociales.

Comte, Auguste. 1974a. *The Essential Comte*, edited by Stanislav Andreski and translated by Margaret Clarke. London: Croom Helm.

Comte, Auguste. 1974b. Auguste Comte, *Die Soziologie: Positive Philosophie*, edited and translated by Friedrich Blaschke. Stuttgart: Alfred Kröner.

Comte, Auguste. 2017 *Auguste Comte and Positivism: The Essential Writings*, edited by Gertrud Lenzer. New York: Routledge.

Other references

Alexandrian, Sarane. 1974. *Le Socialisme Romantique*. Paris: Seuil.

Allport, Gordon. 1954. "The Historical Background of Modern Social Psychology." In *Handbook of Social Psychology*, edited by Gardner Lindzey, Cambridge, MA: Addison-Wesley, vol. 1: 3-56.

Ampère, André-Marie. 1834. *Essai sur la Philosophie Naturelle de Toutes les Connaissances Humaines*. Paris: Bachelier.

Appel, Toby. 1980. "Henri de Blainville and the Animal Series: A Nineteenth-Century Chain of Being", *Journal of the History of Biology* 13, no. 2: 291-319.

Arnold, Matthew. 1868. *Schools and Universities on the Continent*. London: Macmillan.

Aron, Raymond. 1968. *Main Currents in Sociological Thought 1: Montesquieu, Comte, Marx. Tocqueville, the Sociologists and the Revolution of 1848*. Harmondsworth: Penguin.

Balaban, Alexandru and Douglas Klein 2006 "Is Chemistry 'The Central Science'? How are different Sciences related? Co-citations, Reductionism, Emergence and Posets." *Scientometrics* 69: 615-37.

Barrat, Alain. 2005. "George Henry Lewes's Comte's *Philosophy of the Sciences*: From Journalism to Science." *George Eliot – George Henry Lewes Studies* 48-9: 19-26.

[Barrault, Émile, Bazard, Henri, Enfantin, Prosper, Carnot, Hippolyte, Rodrigues, Olinde and Henri Fournel]. 1830 [2nd ed.]. *Doctrine de Saint-Simon: Exposition, Première Année 1829*. Paris: Mesnier.

Bodenhafer, Walter. 1923. "Comte and Psychology." *Papers and Proceedings of the American Sociological Society* 17: 15-26.

Bonnet, Charles. 1760. *Essai Analytique sur les Facultés de l'Âme*. Copenhagen: Philibert.

Botting, Douglas. 2011. *Humboldt and the Cosmos*. London: Methuen.

Bourdeau, Michel. 2000. "L'Esprit Ministre du Coeur." *Revue de Philosophie et de Théologie* 132: 175-92.

Bourdeau, Michel. 2018. "Auguste Comte." In *Stanford Encyclopedia of Philosophy.* Pasadena: Stanford University Press. Retrieved from https://plato.stanford.edu/entries/comte/

Bourdeau, Michel, Mary Pickering and Warren Schmaus (Eds.). 2018. *Love, Order, and Progress: The Science, Philosophy & Politics of Auguste Comte*. Pittsburgh: University of Pittsburgh Press.

Broad, Charl[es]. 1923. *The Mind and its Place in Nature*. London: Routledge & Kegan Paul.

Brockliss, Laurence. 1997. "The European University in the Age of Revolution, 1789-1850." In *The History of the University of* Oxford, vol. 6: *Nineteenth Century Oxford*. Part 1, edited by Michael G. Brock and Mark C. Curthoys. Oxford: Clarendon, 77-133.

Brosses, Charles de. 1760. *Du Culte des Dieux Fétiches ou Parallèle de l'Ancienne Religion de l'Égypte avec la Religion Actuelle de Nigritie*. Paris: n. pub.

Broussais, Francois. 1821. *Examen des Doctrines Médicales et des Systèmes de Nosologie*. Paris: Méquignon-Marvis.

Broussais, Francois. [1828] 1839. *De l'Irritation et de la Folie*. Paris: H. Baillière.

Bruères, Hippolyte. 1847. *La Phrénologie: Le Geste et la Physionomie*. Paris: Aubert.

Burdziej, Stanisław. 2014. "Sociological and Theological Imagination in a Post-secular Society." *Polish Sociological Review* 186: 179-93. https://polish-sociological-review.eu/pdf-125038-52963?filename=Sociologcal%20and.pdf

Burtt, Edwin A. 1925. *The Metaphysical Foundation of Modern Science*. London: Routledge and Kegan Paul.

Butterfield, Herbert. 1957. *The Origins of Modern Science 1300-1800*. London: Bell.

Canguilhem, Georges. 1978. "Auguste Comte and 'Broussais's Principle." In *On the Normal and the Pathological* (Studies in the History of Modern Science 3), by Georges Canguilhem. New York: Springer, 17-28.

Cardno, James. 1958. "Auguste Comte's Psychology." *Psychological Reports* 4: 423-30.

Carrera, Kester. 2018. *Radical Behaviorism and Cultural Analysis*. Cham: Springer.

Charlton, Donald. 1963. *Secular Religions in France, 1815-1870*. London: Oxford University Press.

Classen, Albrecht. 2021. *Freedom, Imprisonment, and Slavery in the Pre-Modern World* (Fundamentals of Medieval and Early Modern Culture 25). Berlin: De Gruyter.

Cogswell, G.A. 1899. "The Classification of the Sciences." *The Philosophical Review* 8: 494-512.

Condorcet, Nicolas de. 1795. *Esquisse d'un Tableau Historique des Progrès de l'Ésprit Humain*. Paris: Agasse.

Costa, James. 2017. *Darwin's Backyard: How Small Experiments Led to a Big Theory*. New York: W.W. Norton.

Cournot, Antoine-Augustin. 1851. *Essai sur les Fondements de nos Connaissances et sur les Caractères de la Critique Philosophique*s. Paris: L. Hachette.

Crombie, Alistair. 1994. *Styles of Scientific Thinking in the European Tradition*. London: Duckworth.

Danziger, Kurt. 1979. "The Positivist Repudiation of Wundt." *Journal of the History of the Behavioral Sciences* 15: 205-30.

Danziger, Kurt. 2015. "Introspection: History of the Concept." In *International Encyclopedia of the Social & Behavioural Sciences*, 2nd ed., edited by James D. Wright. Amsterdam: Elsevier, vol. 12, 702-04.

Darwin, Charles. 1839. *Journal of Researches into the Geology and Natural History of the Various Countries Visited by H.M.S. Beagle, etc*. London: H. Colburn.

Darwin, Charles. 1842. *The Structure and Distribution of Coral Reefs; Etc*. London: Smith, Elder & Co.

Darwin, Charles. 1859. *On the Origin of Species by Means of Natural Selection, or the Preservation of Favoured Races in the Struggle for Life*. London: John Murray.

Daston, Lorraine. 2015. "Science, History of". In *International Encyclopedia of the Social and Behavioral Sciences* 2nd ed., edited by James D. Wright. Amsterdam: Elsevier, 241-7.

Derrida, Jacques. 1976. *Of Grammatology*, translated by Gayatrri Spivak. Baltimore: Johns Hopkins University Press.

Diderot, Denis and Jean-Baptiste d'Alembert, eds. 1751-72. *Encyclopédie ou Dictionnaire Raisonné des Sciences, des Arts et des Métiers*. Berne: Sociétés Typographiques. (The French original can be found online at https://fr.wikisource.org/wiki/Encyclop%C3%A9die,_ou_Dictionnaire_raisonn%C3%A9_des_sciences,_des_arts_et_des_m%C3%A9tiers. An English translation can be reached at: https://quod.lib.umich.edu/d/did/

Dienes, Zoltan. 2008. *Understanding Psychology as Science: An Introduction to Scientific and Statistical Inference*. London: Palgrave Macmillan.

Dolby, R. G. A. 1979. "Classification of the Sciences: The Nineteenth Century Tradition." In *Classifications in their Social Context*, edited by Roy Ellen and David Reason. New York: Academic Press, 167-193.

Dousa, Thomas. 2009 "Evolutionary Order in the Theories of C.A. Cutter and E.C. Richardson: Its Nature and Limits." *Proceedings from the North American Symposium on Knowledge Organization* 2: 76-90.

Evans-Pritchard, Edward. 1981. *A History of Anthropological Thought*. London: Faber and Faber.

Fairbanks, Matthew. 1970. "Peirce and the Positivists on Knowledge." *Transactions of the Charles S. Peirce Society* 6, no. 2: 111-22.

Fauré, Christine and Jacques Guilhaumou. 2006. "Sieyès et le non-dit de la Sociologie: Du Mot à la Chose." *Revue d'histoire des sciences humaines* 15: 117-34.

Feibleman, James K. 1951. "The Metaphysics of Logical Positivism." *The Review of Metaphysics* 5, no. 1: 55-82.

Feist, Gregory. 2006. *The Psychology of Science and the Origins of the Scientific Mind*. New Haven, NJ: Yale University Press.

Fetscher, Iring. 1956. "Einleitung." In *Auguste Comte: Rede über den Geist des Positivismus* (Philosophische Bibliotek 244). Hamburg: Felix Meiner, xv-xlv.

Fischer, Jean-Louis. 1990. "Experimental Embryology in France (1887-1936)." *International Journal of Developmental Biology* 34: 11-23.

Flint, Robert. 1904. *Philosophy as Scientia Scientiarum, and a History of the Classification of the Sciences*. New York: Scribners.

Fourier, Charles. [1808] 1841 [2nd ed.] *Théorie des Quatres Mouvements et des Destinées Générales*. In *Oeuvres Complètes*. Vol. 1. Paris: Bureau de la Phalange.

Froeb, Kai. 2002-2020. *Hegel and his Philosophy*. https://hegel.net/en/e0.htm

Fuchs-Heinritz, Werner. 1998. *Auguste Comte: Einführung in Leben und Werk*. Wiesbaden: Westdeutscher Verlag.

Gascoigne, John. 2010. "The Religious Thought of Francis Bacon." In *Religion and Retributive Logic: Essays in Honour of Professor Garry W. Trompf*, edited by Carole Cusack and Christopher Hartney (Numen Book Series 126). Leiden: Brill, 209-28.

Gane, Michael. 2017. "Comte and his Liberal Critics from Spencer to Hayek." In *Anthem Companion to Auguste Comte*, edited by Andrew Wernick. London: Anthem, 205-26.

Gaukroger, Stephen. 1995. *Descartes: An Intellectual Biography.* Oxford: Clarendon.

Georges, Aug[uste]. 1908. *Le Système Psychologistique d'Auguste Comte*. Lyon: A. Rey & Co.

Ghiselin, Michael. 1997. *Metaphysics and the Origin of Species*. Albany: SUNY.

Gilson, Gregory and Irving Levinson (Eds.). 2013. *Latin American Positivism: New Historical and Philosophical Essays*. New York: Lexington.

Gouhier, Henri. 1933-6. *La Jeunesse d'Auguste Comte et la Formation du Positivisme*. Paris: J. Vrin.

Gouhier, Henri. 1941. "La Philosophie 'Positive' et 'Chrétienne' de D. de Blainville." *Revue Philosophique de France et de l'Étranger* 131, nos. 1-2: 38-69.

Haeckel, Ernst. 1874. *Anthropogenie oder Entwicklungsgeschichte des Menschen*. Leipzig: Wilhelm Engelmann.

Haines, Barbara. 1978. "The Interrelations between Social, Biological and Medical Thought, 1750-1850: Saint-Simon and Comte." *British Journal for the History of Science* 11, no. 37: 19-35.

Hegel, Georg Wilhelm Friedrich. 1830. *Enzyklopädie der Philosophischen Wissenschaften im Grundrisse*. 3rd. ed. Heidelberg: Oßwald. (1st ed. Heidelberg 1817; 2nd ed. Heidelberg 1827).

Hegel, Georg. [1821-31] 1895. *The Philosophy of Religion*, translated by Ebenezer Speirs and Burdon Sanderson. London: Kegan, Paul Trench, Trübner.

Hirai, Masahito [n.d.] "Objectivity in the Beginnings of Positivism: Dispute between Auguste Comte and Émile Littré." *Archive for Philosophy and the History of Science* [online: repository.itc.u-tokyo.ac.jp (in Japanese]).

Hjørland, Birger. 2005. "Empiricism, Rationalism and Positivism in Library and Information Science." *Journal of Documentation* 61: 130-55.

Høffding, Harald. 1922. *Den Nyere Filosofis Historie: en Fremstilling af Filosofiens Historie fra Renaissancens Slutning til vore Dage.* 3rd ed. Copenhagen: Gyldendalske Boghandel.

Humboldt, Wilhelm von. [1852] 1969. *The Limits of State Action*, edited by John Burrow (Cambridge Studies in the History of Theory and Politics). Cambridge: Cambridge University Press.

Husserl, Edmund. [1931] 1960. *Cartesian Mediations: An Introduction to Phenomenology*, translated by Dorion Cairns. The Hague: Martinus Nijhoff

Ikaheimo, Heikki. 2017. "Hegel's Psychology." In *The Oxford Handbook of Hegel*, edited by Dean Moyer. Oxford: Oxford University Press, 424-49.

Iggers, Georg. 1958. *The Cult of Authority: The Political Culture of the Saint-Simonians: A Chapter in the Intellectual History of Totalitarianism*. The Hague: Martinus Nijhoff.

Iggers, Georg. 1959. "Further Remarks about Early Uses of the Term 'Social Science'." *Journal of the History of Ideas* 20: 433-6.

Jacoud, Giles (Ed.) 2019. *Économie Politique et Politique: Textes Sain-Simoniens (1830-1831)* (Écrits sur l'Économie 9). Paris: Garnier.

Juvenel de Carlencas, Félix de. 1757. *Essais sur l'Histore des Belles Lettres des Sciences et des Arts*. Vol. 1. Lyon: Duplain.

Kedrow, Bonifatij M. 1975-1976. *Klassifizierung der Wissenschaften*, translated from the Russian *Klassifikatsiia Nauk*, 1961, by Lili Keith and L. Prudenkowa. Moskau: Verlag Progress.

Kempski, Jürgen von. 1974. "Einleitung." In Auguste Comte *Die Soziologie: Die Positive Philosophie im Auszug*, edited by Friedrich Blaschke. Stuttgart: Alfred Kröner, ix-xxxii.

Kent, Beverley. 1987. *Charles S. Peirce: Logic and the Classification of the Sciences*. Montreal: McGill-Queen's University Press.

Kislev, Shachar Freddy. 2021. "Hegel and Knowledge Organization, or Why the Dewey Decimal Classification Is Not Hegelian." *Information & Culture* 56: 32-48. DOI: 10.7560/IC56102

König, René. 2000. "Gesellschaft und Soziologie bei Saint-Simon und Comte: Studien zur Frühgeschichte der Soziologie." In *Zur Konstitution Moderner Gesellschaften. René König – Schriften – Ausgabe Letzter Hand*. Wiesbaden, Germany: VS Verlag für Sozialwissenschaften, vol 7, 255-307. https://doi.org/10.1007/978-3-322-80855-4_3

Koyré, Alexandre. 1968. *Newtonian Studies*. Chicago: University of Chicago Press.

Kuhn, Thomas. 1962. *The Structure of Scientific Revolutions*. Chicago, IL: University of Chicago Press.

Lagrange, Joseph-Louis. 1811. *Mécanique Analytique*. Paris: Courcier.

Larsen, Timothy. 2018. *John Stuart Mill: A Secular Life* (Spiritual Lives [3]). Oxford: Oxford University Press.

Lamarck, Jean-Baptiste. 1802. *Hydrogéologie: ou, Recherches sur l'Influence qu'ont les Eaux sur la Surface du Globe Terrestre*. Paris: Agasse.

Lane, Charles. 1826. *A Classification of the Sciences and Arts, or, A Map of Human Knowledge*. London: Effingham Wilson.

Leboyer, Olivia. 2014 "A Lecture by Auguste Comte, from some Unpublished Notes." *Revue Philosophique de France et de l'Étranger* 139, no. 2: 221-7.

Lessing, Gotthold. (1780) 1831. *Lettres sur la Religion et la Politique; 1829; Suivies de l'Éducation du Genre Humain de Lessing*, translated by Eugène Rodrigues. Paris: Bureau de l'Organisiteur.

Lewes, George. (1853) 1878. *Comte's Philosophy of the Sciences, being an Exposition of the Principles of the Cours de Philosophie Positive by Auguste Comte*. London: Henry Bohn.

Littré, Émile. (1873-77) 1958. *Dictionnaire de la Langue Française*. Paris, Galimard/Hachette.

Lonchampt, Joseph. 1889. "Précis de la Vie et des Écrits de Auguste Comte." *Revue Occidentale* 23, no.101: 1-30, 135-72.

Ludz, Peter. 1972. "Soziologie und Sozialgeschichte: Aspekte und Probleme". In *Soziologie und Sozialgeschichte: Aspekte und Probleme*, edited by Peter Ludz (*Kölner Zeitschrift für Soziologie und Sozialpsychologie*, Sonderheft 16). Opladen: Westdeutscher Verlag, 9-28.

Lyell, Charles. 1830-35. *Principles of Geology, Being an Attempt to Explain the Former Changes of the Earth's Surface, etc*. London: John Murray.

McCalla, Arthur. 1993. "Romantic Vicos: Vico and Providence in Michelet and Ballanche." *Réflexions Historiques* 19: 389-408.

McDonald, Lynn. 1993. *The Early Origins of the Social Sciences*. Montreal: McGill-Queen's University Press.

Machlup, Fritz. 1982. *Knowledge: Its Creation, Distribution and Economic Significance.* Vol. 2: *The Branches of Learning*. Princeton: Princeton University Press.

Manuel, Frank. 1962. *The Prophets of Paris: Turgot, Condorcet, Saint-Simon, Fourier, and Comte*. New York: Harper.

Marx, Karl [1867] 1967. *Capital: A Critique of Political Economy*, edited by Friedrich Engels. New York: International Publishers.

Matz, Lou. 2009. "The Utility of Religious Illusion: A Critique of J.S. Mill's Religion of Humanity." *Utilitas* 12: 127-54.

Midtgarden, Torjus. 2020. "Peirce's Classification of the Sciences." *Knowledge Organization* 47: 267-78. Also available in *ISKO Encyclopedia of Knowledge Organization*, edited by Birger Hjørland and Claudio Gnoli, https://www.isko.org/cyclo/peirce

Miksa, Francis. 1998. *The DDC, the Universe of Knowledge, and the Post-Modern Library*. Albany, NY: Forest Press.

Mill, John Stuart. [1843] 1851. *System of Logic: Ratiocinative and Inductive*. London: J.W. Parker.

Mill, John Stuart. (1859) 1902. *Utilitarianism; On Liberty; Representative Government*. London: Dent.

Mill, John Stuart. 1866. *Auguste Comte and Positivism*. London: Trübner.

Mourgue, Roland. 1909. "Philosophie Biologique d'Auguste Comte, Part 1." *Archives d'Anthropologie Criminelle de Médecine Légale et de Psychologie Normale et Pathologique* 24: 190-2.

Müller, Friedrich Max. [1861] 1899. *The Science of Language* (Collected Works, Vols. 1-2). London: Longmans.

Murray, David and Stephen Link. 2021. *The Creation of Scientific Psychology* (Scientific Psychology Series). New York: Routledge.

Oken, Lorenz. 1809. *Lehrbuch der Naturphilosophie*. Jena: Friedrich Frommann.

Oldroyd, David. 1986. *The Arch of Knowledge: Introductory Study of the History and Methodology of Science*. Sydney: New South Wales University Press.

Olson, Theodore. 1982. *Millennialism, Utopianism, and Progress*. Toronto: University of Toronto Press.

Ostwald, Wilhelm. 1914. *Auguste Comte: Der Mann und sein Werk*. Leipzig: Unesma.

Packard, Alphaeus. 1901. *Lamarck, the Founder of Evolution: His Life and Work.* London; Longmans, Green.

Palmer, Robert. 1985. *The Improvement of Humanity: Education and the French Revolution*. Princeton, NJ: Princeton University Press.

Panichi, Nicola (Ed.) 1989. *Antoine de Montchrétien, Il Circolo dello Stato.* Milan: Guerini e Associati.

Peirce, Charles. [1865] 1982. "Teleological Logic." In *Writings of Charles S. Peirce: A Chronological Edition*. Vol. 1: *1879-1884*, edited by Christian Kloesel. Bloomington: Indiana University Press, 303-09.

Peirce, Charles. [1903] 1998. "An Outline Classification of the Sciences." In *The Essential Pierce*. Vol. 2: *(1893-1913)* (Peirce Edition Project). Bloomington: Indiana University Press, 158-62.

Petit, Annie. 2016 "Comte Revu et Corrigé: Le Cas Littré." *Cahiers Vilfredo Pareto* 54, no. 2: 69-88.

Pickering, Mary. 1989. "New Evidence of the Link between Comte and German Philosophy." *Journal of the History of Ideas* 50: 443-63.

Pickering, Mary. 1993. *Auguste Comte: An Intellectual Biography.* Volume 1. Cambridge: Cambridge University Press.

Pickering, Mary. 2009a. *Auguste Comte: An Intellectual Biography.* Volume 2. Cambridge: Cambridge University Press.

Pickering, Mary. 2009b. *Auguste Comte: An Intellectual Biography*. Volume 3. Cambridge: Cambridge University Press.

Poincaré, Henri. 1902. *La Science et l'Hypothèse*. Paris: E. Flammarion.

Polanyi, Michael. 1962. *Personal Knowledge: Towards a Post-Critical Philosophy*. London: Routledge.

Priya, Rashmi. [2015]. "Hierarchy of the Sciences according to Auguste Comte." Crick Institute. https://www.yourarticlelibrary.com/sociology/hierarchy-of-the-sciences-according-to-auguste-comte/43721

Quételet, Adolphe. 1835. *Sur l'Homme et de Développement de ses Facultés, ou Essai de Physique Sociale*. Paris: Imprimeur-Libraire.

Rachootin, Stan. 1985. *Darwin's Embryology*. Ann Arbor, MI: University Microfilms International.

Rassias, George. 1991. "A Summary of C.F. Gauss's Life and Mathematical Work." In *The Mathematical Heritage of C.F. Gauss*, edited by George Rassias. London: World Scientific, 1-11.

Richards, Graham. 1992. *Mental Machinery: The Origins and Consequences of Psychological Ideas, 1600-1850*. London: Athlone Press.

Ricoeur, Paul. 1970. *Freud and Philosophy: An Essay on Interpretation*, translated by Denis Savage. New Haven: Yale University Press.

Roscher, Wihelm. [1854] 1878. *Principles of Political Economy*, translated by John Lalor. New York: Henry Holt.

Rouvre, Charles de. 1920. *L'Amoureuse Histoire d'Auguste Comte et de Clotilde de Vaux*. Paris: Calmann-Lévy.

Saint-Simon, Claude Henri de. [1802] 1832. *Lettres d'un Habitant de Genève à ses Contemporains, 1802; etc*. Paris: Libraire Saint-Simoniene.

Saint-Simon, Claude Henri de. [1811] 1966. "Correspondance with M. de Redern." In *Œuvres*, edited by Felix Markham. Paris: Éditions Anthropos, Vol. 1, 104-18.

Saint-Simon, Claude Henri de. [1813] 1858. "Mémoire sur la Science de l'Homme." In *Œuvres* (E. Dentu edition), Geneva: Slatkine [1977 repr.], Vol. 5 Part 2, 5-313.

Saint-Simon, Claude Henri de. 1821. *Du Système Industriel*. Paris: Renguard.

Šamurin, Evgenii Ivanovich. 1967. *Geschichte der Bibliothekarisch-bibliographischen Klassifikation*. Leipzig: VEB Bibliographisches Institut.

Schmaus, Warren. 2020. "From Positivism to Conventionalism: Comte, Renouier, and Poincaré." *Studies in the History and Philosophy of Science* 80: 102-9.

Serres, Michel. 1972. *Hermes II: Interférence* (Collection Critique). Paris: Éditions de Minuit.

Shearer, Ned. 1974. "Alexander Bain and the Classification of Knowledge." *Journal of the History of the Behavioral Sciences* 10, no. 1: 56-73.

Simon, Jonathan. 2005. *Chemistry, Pharmacy and Revolution in France, 1777-1809*. New York: Routledge.

Smith, Woodruff. 1991. *Politics and the Sciences of Culture in Germany, 1840-1920*. Oxford: Oxford University Press.

Spencer, Herbert. 1854. "The Genesis of Science." *British Quarterly Review* 20: 108-62.

Spencer, Herbert. 1855. *The Principles of Psychology*. London: Longman.

Spencer, Herbert. 1862-1892. *The Principles of Synthetic Philosophy*. London: Williams and Norgate.

Spencer, Herbert. 1864. *The Classification of the Sciences: To which are Added Reasons for Dissenting from the Philosophy of M. Comte*. New York: D. Appleton.

Spencer, Herbert. [1864] 1879. *First Principles*. London: Williams & Norgate.

Spencer, Herbert. 1884. *Reasons for Dissenting from the Philosophy of M. Comte.* London: Williams & Norgate.

Spencer, Herbert. 1891. "The Genesis of Science" and "The Classification of the Sciences." [Originally with] "Reasons for Dissenting from the Philosophy of M. Comte." In *Essays: Scientific, Political, and Speculative*. London: Williams and Norgate, 1-144.

Spencer, Herbert. 1907. *Spencer's Essays: A Selection*. London: Watts.

Stafleu, Frans. 1971. "Lamarck: The Birth of Biology." *Taxon* 20: 397-442.

Sziede, Maren and Helmut Zander (Eds.). 2015. *Von der Dämenologie zum Unbewussten: Die Transformation der Anthropologie um 1800* (Okkulte Moderne [1]). Berlin: De Gruyter.

Topisch, Ernst (Ed.). 1972. *Logik der Sozialwissenschaften*. Cologne: Kiepenheurer & Witsch.

Toulmin, Stephen and June Goodfield. 1965. *The Architecture of Matter*. Harmondsworth: Penguin.

Tresch, John. 2010. "The Order of the Prophets: Series in Early French Social Science and Socialism." *History of Science* 48: 315-42.

Trompf, Garry. 1971. "'Essays on Education' and the Young Herbert Spencer." In *Melbourne Studies in Education 1971*, edited by R.J.W. Selleck. Melbourne: Melbourne University Press, 184-231.

Trompf, Garry. 1977. "Social Science in Historical Perspective." *Philosophy of the Social Sciences* 7: 113-38.

Trompf, Garry. 1979-2023. *The Idea of Historical Recurrence in Western Thought*. Berkeley: University of California Press.

Trompf, Garry. 1994. "Vico's Universe: *La Provvedenza* and *La Poesia* in the New Science of Giambattista Vico."

British Journal for the History of Philosophy 2, no. 1: 55-86.

Trompf, Garry. 2011. "The Classification of the Sciences and the Quest for Interdisciplinarity." *Environmental Conservation* 38: 113-26.

Varenne, Franck. 2011. *Modéliser le Social: Méthodes Fondatrices et Évolutions Récentes*. Paris: Dunod.

Vico, Giambattista. [1744] 1961. *The New Science*, translated by Thomas Bergin and Max Fisch. Ithaca, NY: Cornell University Press.

Ward, Lester. 1898. *Outlines of Sociology*. New York: Macmillan.

Wernick, Andrew. 2006. "Comte and the Encyclopedia." *Theory, Culture and Society* 23, no. 4: 27-48.

Whewell, William. 1840. *The Philosophy of the Inductive Sciences*. London: John W. Parker.

Widad, Mustafa. 2018 "Documentation and Information Science: On some Forgotten Origins of the French Contribution." *Zagadnienia Informacji Naukowej-Studia Informacyjne* 56, no. 1 (111): 7-20.

Wollgraff, Karl. 1864. *System der Staats- und Rechtsphilosophie*. Part I: *Die Wissenschaft in Menschen*, edited by Johannes Held. Marburg: 1864.

Wright, Terence. 2008. *The Religion of Humanity: The Impact of Comtean Positivism on Victorian Britain*. Cambridge: Cambridge University Press.

Wilhelm Wundt. 1866. *Die Physikalischen Axiome und ihre Beziehungen zum Causalprincip*. Erlangen: Enke.

Wundt, Wilhelm. 1889. "Über die Eintheilung der Wissenschaften." *Philosophische Studien* 5: 1-55.

Wundt, Wilhelm. [1896] 1922. *Grundrisse der Psychologie*. Leipzig: Alfred Kröner.

Wundt, Wilhelm. 1908. *Logik.* 3rd ed. Stuttgart: Enke.

Corrections to:

Nikiforova, Aleksandra A. 2022. "The Systems Approach." Knowledge Organization 49(7): 529-542.

At page 531 the following amended text should be substituted:

4.0 Definition and essence of the systems approach

SA is a direction in the methodology of scientific or special-scientific knowledge and social practice that claims to be of general scientific significance, interdisciplinarity and supra-disciplinarity, which is based on the consideration of objects as systems (Sadovsky and Yudin 1969; Uyomov 1978, 5; Bertalanffy 1968, 4-5; Chen 1975). It is noted that SA does not exist in a more or less systematic form or as a single rigorous methodological concept (Sadovsky and Yudin 1969; Yudin 1973; Rousseau 2017c). Rather, it is a new line of research activity (Yudin 1973), which is applicable "not to any scientific knowledge, but only to certain types of scientific problems" (Blauberg and Yudin 1973, 98). A less standard definition was proposed by Kazaryan (2004): SA is "the purposeful application of the concept of a system to solve a scientific problem".

A distinctive feature and, at the same time, the novelty of SA, according to Bertalanffy (1968, 102, 5, 32-3), "seems to offer a new viewpoint", "a basic re-orientation in scientific thinking", the formulation and derivation of those principles which are valid for systems "in general, irrespective of whether they are of physical, biological or sociological nature".