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The ‘Physiology of the Understanding’ and the ‘Mechanics of the Soul’: Reflections on Some Phantom Philosophical Projects*

1. Introduction

In what follows I seek to understand a series of ‘phantom philosophical projects’, by which I mean projects which either seem to have existed only in spectral form, sketched out by opponents in order to warn of the possible existence of such doctrines, or were announced programmatically by authors speaking enthusiastically of these doctrines without ever clearly filling out their contours, so that they remained virtual. While such cases are probably innumerable in the history of philosophy – unwritten doctrines, or reconstructions like ‘baptized Epicureanism’ or ‘mitigated skepticism’ which are impossible to find in any text – my interest centres on a series of phantomatic accusations and programmatic outlines centripetally circling around the classic Lockean empiricist study of the logic of ideas and its potential outcomes and/or appropriations in experimentalist, scientifically naturalistic and at times (most problematic) more or less materialist directions.

Two phrases used in the mid- to late 18th century can serve as markers of this cluster of phantom philosophical projects: the physiology of the understanding, and the mechanics of the soul. The first is employed by a canonical figure, Kant, to describe Locke’s project; the second, by a less-known figure belonging more to the history of medicine (although also an influential figure in mind-body debates at mid-century), the German-born professor of medicine and chemistry at Leyden, Jerome (Hieronymus) Gaub, in correspondence with the Genevan natural philosopher, Charles Bonnet¹. A key concern in both cases is the nature, scope and legitimacy of a science of the mind – and its philosophical implications.

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¹ I. KANT, *Kritik der reinen Vernunft*, Preface to 1781 edition (‘A edition’, KGS, IV), A VIII, in [I. KANT], *Kants gesammelte Schriften*, ed. by the Königlich Preussische Akademie der Wissenschaften in Berlin. Reprint, De Gruyter, Berlin 1900- (= KGS); Gaub to Charles Bonnet, letter of 25 March 1761, in A. DE

When Kant describes Locke's project as a physiology of the understanding – whether this is taken literally, or more likely, as meaning any form of a 'science of the mind' – he means to disqualify it, as he doesn't think that the mind can or should be a scientific object of study. Elsewhere, in the context of his anthropology, Kant also states that it is "futile" to "demand a physiological explanation" of the law of the association of ideas; he describes the project of studying the relation between bodily organs and thought as an "eternally futile inquiry"². The more charitable reading of Kant's attitude to empiricism here is that he is ruling out 'how?' questions as both metaphysical and futile, while not denying per se that there *are* neural correlates of consciousness³. The less charitable reading diagnoses a kind of panicky reaction to any science of mind, and back-peddalling defense of dualism (in the sense that the nature of the mind and the nature of the physical world have to be of a fundamentally different kind, whether we take this to be scientifically plausible or not; my analysis is not a tale of scientific success and retrospective legitimization of 'good' versus 'bad' projects, hence also my emphasis on the 'phantom' character of some of them).

Whether or not this does full justice to Kant (who had similar qualms with regard to the localization of a 'seat of the soul' late in his career⁴), plenty of other

CARAMAN, *Charles Bonnet, philosophe et naturaliste. Sa vie et ses œuvres*, A. Vaton, Paris 1859, p. 173 (unless otherwise indicated all translations are mine).

² I. KANT, *Anthropologie in pragmatischer Hinsicht*, 1798, § 31-B, KGS, VII, p. 176; letter 79 to Markus Herz, 1773, KGS X, pp. 145-146; KGS, XXV, p. 9 (Bonnet and others are wrong because they infer from the brain to the soul). He also insists that an "empirical doctrine of the soul" (*empirische Seelenlehre*) is far removed from natural science, for one cannot mathematize "the phenomena of the inner sense" (*Metaphysische Anfangsgründe der Naturwissenschaft*, 1786, KGS, IV, p. 471). In other contexts including aesthetics, Kant uses the language of 'physiology' in a similar way, opposing transcendental to so-called 'physiological', i.e. empirical/naturalistic explanations: a physiological exposition of aesthetic judgments is "merely empirical" (*Kritik der Urteilskraft*, KGS, V, p. 277). Similarly, when Kant seems more charitable to Locke in the "Deduction of the Pure Concepts of Understanding" (*KrV*, A 87/B 119), he is still opposing a merely empirical investigation of the mind (i.e. the genesis of its ideas) to a transcendental deduction. It remains controversial whether his critical statement in the Preface to the *Critique* is of the same kind as his criticisms in, e.g. the *Anthropology*; for my purposes, Kant consistently is trying to 'block the exits' to a naturalized science of mind (whether in terms of freedom as in the later texts, or in terms of a transcendental project with which the mind has to be approached, in the *Critique*). Thanks to Paolo Pecere, Paola Rumore and Tamas Demeter for help with these references.

³ If one reads Locke's 'historical, plain method' in a more Baconian fashion, i.e. as offering an experimental history of how the mind is 'furnished' with ideas, then Kant's objection seems at least pertinent (for an important contribution to a such a reading of Locke, see P.R. ANSTEY, *John Locke and Natural Philosophy*, Oxford University Press, Oxford 2011). But if one takes seriously Locke's repeated insistence that his is a *practical* project, motivated by and dealing with "matters concerning our conduct" ("Our Business here is not to know all things, but those which concern our Conduct"; J. LOCKE, *Essay Concerning Human Understanding*, ed. by P. Nidditch, Oxford University Press, Oxford 1975, I.I.6) then Kant's objection seems misplaced – not least given Locke's bracketing-off of 'physical considerations' on the mind, as I discuss below.

⁴ Kant insisted in reaction to Samuel Soemmerring's 1796 *Über das Organ der Seele* (to which he contributed a rather critical appendix) that one had to distinguish between the 'seat of the soul' and the 'seat of the organ of the soul'; as Paolo Pecere notes, Kant thinks there is a logical incoherence inherent

figures definitely linked the empiricist articulation of sensation and knowledge to its darker cousin, materialist philosophy of mind, in which cerebral and otherwise corporeal processes were fully sufficient to account for our mental life. Thus Madame de Staël, to quote one among many, states that the “repellent view” according to which thought is “just a material product of the brain”, is “the most natural result” of tracing all of our ideas back to our sensations⁵. Conversely, Diderot argued dramatically in a variety of texts that if one granted that matter could sense, all the rest (including thought) fell into place; more minimally, as he commented in response to Hemsterhuis’ *Lettre sur l’homme*, “grant me that the animal can sense. I will take care of the rest”⁶. To be sure, some careful anti-materialist authors sought to draw a distinction between Locke’s project and some of its proximal materialist reverberations. Indeed, the Jansenist critic of the *Encyclopédie* Abraham-Joseph Chaumeix was careful to distinguish between (i) the claim that all of our thoughts come from our sensations and (ii) the claim that our body, which is the material basis of our sensations (and our capacity to sense), whether this is specified in cerebral or otherwise organismic terms, is the *cause* of our thoughts, where at least (i) is independent of (ii); Chaumeix noted, precisely, that materialists such as Diderot forced Locke’s claim (i) into his own claim (ii), while claim (i) on its own was not necessarily a problem⁷, contrary to what other anti-materialists such as Samuel Formey thought. Formey did not make such a distinction and insisted in a kind of dogmatic Cartesian fashion on the self-transparency of the mind, over and against the confusion of bodies and senses⁸.

Yet if we want to respect Locke’s own authorial intentions, we should take seriously his statement early on in the *Essay* that “I shall not at present meddle with the Physical consideration of the Mind”; any effort to “enquire philosophically into the peculiar Constitution of Bodies” was, Locke added, “contrary to the

in making a temporal concept into a spatial one (KGS XII, pp. 31-32 and pp. 34-35). For more on Kant’s criticism of Soemmering see M. HAGNER, *The soul and brain between anatomy and Naturphilosophie in the early nineteenth century*, *Medical History*, 36 (1992), p. 9 and P. PECERE, *Kant’s Über das Organ der Seele and the limits of physiology: Arguments and Legacy*, in R. ORDEN *et al.* (eds.), *Critical Paths Outside the Critiques*, Cambridge Scholars Publishing, Cambridge 2016.

⁵ A.-L.-G. Necker, Baronne DE STAËL-HOLSTEIN, *De L’Allemagne*, in *Œuvres complètes*, Wahlen, Brussels 1820, vol. IX, p. 148.

⁶ D. DIDEROT, *Observations sur Hemsterhuis*, in DIDEROT, *Œuvres complètes*, ed. H. Dieckmann *et al.* (eds.), Hermann, Paris 2004, vol. XXIV, p. 299.

⁷ A.-J. CHAUMEIX, *Préjugés légitimes contre l’Encyclopédie et essai de réfutation de ce dictionnaire, avec un Examen critique du livre De L’Esprit*, 8 vols., Hérissant, Bruxelles/Paris 1758-1759, vol. I, p. 238.

⁸ J.H.S. FORMEY, *Recherches sur les éléments de la matière*, n.p., 1747, § LXXXV. Also, more aggressively, the anonymous writer reviewing the French translation of the *Essay* in the Jesuit *Journal de Trévoux* (Janvier 1701, p. 128). The Abbé Lelarge de Lignac’s varied criticisms of Locke in his 1760 *Témoignage du sens intime* don’t specifically target the doctrine of ideas coming to us through the senses as potentially materialist.

Design of this Essay”⁹. And indeed, despite Locke’s early studies of medicine and natural philosophy, including with Thomas Willis¹⁰, there is no trace of medical, physical or chemical reductionist explanations of mental processes in the *Essay*¹¹. As was noted rather acidly by Dugald Stewart in an entry for the early *Encyclopedia Britannica*, in the *Essay* “not a single passage occurs, savouring of the Anatomical Theater or of the Chemical Laboratory”¹². Locke does not categorically rule out that knowledge of the brain might or should have an impact on knowledge of the mind (even if he seemed hostile to or at least ‘not amused’ by the speculative materialism of a Toland, he was affectionately close to the equally materialist Anthony Collins)¹³. But examination of his work reveals no trace of a physiology, a physics or a medicine of the mind (the latter being understood not as a ‘therapy’ of the mind in the older sense, like Tschirnhaus¹⁴, but as an inscription of mental processes in a more general medical framework of humors, passions and/or animal spirits).

Lockean empiricism is in no way either a program for science, an ancillary door-keeper for a nascent philosophical materialism, or an analysis of the ‘logic of ideas’ which seeks to relate their association and general functioning to processes in the brain, as David Hartley notably tried to do in his 1749 *Observations on Man* with its ‘vibratory’ account of mind, in which small vibrations (“vibrunticles”) are impressed in the solid filaments of the nerves by external objects, and these sensations are transmitted by ætherial vibration to the infinitesimal

⁹ LOCKE, *Essay* cit., I.I.2; II.XXI.73

¹⁰ H. ISLER, *The development of neurology and the neurological sciences in the 17th century*, Chapter 8 in S. FINGER et al. (eds.), *Handbook of Clinical Neurology* vol. 95, Elsevier, New York 2009, pp. 91-106.

¹¹ Thus it makes no sense to describe Locke as the pupil of Willis who, using anatomical discoveries as “stepping-stones,” developed the “philosophy that would shape the Enlightenment and modern neuroscience” (B.C. LEGA, *An Essay Concerning Human Understanding: How the Cerebri Anatome of Thomas Willis Influenced John Locke*, in *Neurosurgery*, 58 (2006), p. 569). John P. Wright notes more accurately that one should not confuse Willis’s more ‘Epicurean’ project to naturalize the soul (as described in C.T. WOLFE / M. VAN ESVELD, *The Material Soul: Strategies for Naturalising the Soul in an Early Modern Epicurean Context*, in D. KAMBASKOVIC-SAWERS (ed.), *Conjunctions: Body and Mind, Sexuality and Spirit from Plato to Descartes*, Springer, Dordrecht 2014, pp. 371-421) with Locke’s rejection of “physical considerations of the mind” (J.P. WRIGHT, *Locke, Willis, and the Seventeenth-Century Epicurean Soul*, in M.J. OSLER (ed.), *Atoms, Pneuma, and Tranquillity: Epicurean and Stoic Themes in European Thought*, Cambridge University Press, Cambridge 1991, pp. 255-256).

¹² D. STEWART, *Dissertation First: Exhibiting A General View of the Progress of Metaphysical, Ethical and Political Philosophy Since the Revival of Letters in Europe*, in *Encyclopedia Britannica* (1811), 7th ed., vol. 1, Edinburgh 1842, p. 101.

¹³ When his younger friend Anthony Collins wrote to him of Toland’s forthcoming *Letters to Serena* in neutral ‘reporting’ tones, Locke responded that “though he [sc. Toland] has parts yet that is not all which I require in an Author I am covetous of, and expect to find satisfaction in”. Collins to Locke, February 16th 1704, letter 3456 in J. LOCKE, *Correspondence*, ed. E.S. De Beer, vol. 8, Clarendon Press, Oxford 1989, p. 198; Locke to Collins, February 28th 1704, letter 3474 in *Correspondence* cit., p. 217.

¹⁴ W. VON TSCHIRNHAUS, *Medicina mentis, sive tentamen genuinae logicae, in qua dissertitur de methodo detegendi incognitas veritates*, A. Magnum & J. Rieuwerts Jr., Amsterdam 1687.

particles that make up the substance of the brain. By their differences in degree, kind and place, these vibrations represent different primary sensations, or “simple ideas” in the brain, which can become complex ideas through associations with other chains of vibrations¹⁵. In contrast, Locke wishes to get some distance on the understanding and take it as an object of inquiry, but without looking into its “physical” underpinnings¹⁶. He cleverly puts back to back traditional metaphysics (considerations “wherein its Essence [*sc.* the mind] consists”) and the danger of Hobbesian inert materialism (“to resolve all into the accidental unguided motions of blind matter, or into thought depending on unguided motions of blind matter, is the same thing”)¹⁷. Locke is not a metaphysician of essence nor a corpuscular reductionist *per se*; the elementary level he wishes to focus on is that of *ideas*, not the “depths of the ocean of Being”¹⁸.

It seems like an embarrassing mistake on Kant’s part, then – a basic philosophical blunder – to state that Locke *does* seek physical explanations of what goes on in the mind, in the form of a “physiology of the understanding”, however we understand the term ‘physiology’. It’s not! At this point, it would seem that the situation is fairly clearcut: we should simply distinguish between, on the one hand, a set of authorial claims (or even a ‘system’) – here, a ‘pure empiricist’ project of investigating the logic of ideas without giving any causal linkage (whether explanatory or ontological) to a material substrate – and, on the other hand, their strong (mis-)reading and even overdetermination in the set of claims (or ‘system’) of another author – here, more or less polemical critiques which seek to link the former project to materialism, whether this linkage is meant to imply a kind of category mistake, or something worse. Or, in a more *begriffsgeschichtlich* way, we could study the diverse reception and transformation of Locke’s project of a non-substantialist logic of ideas in authors such as Voltaire, Hartley, Priestley, Tetens and Kant, and ask, how ‘fair’ are these critiques, including in the celebrated case of Locke’s thoughts on thinking matter, which Voltaire converted into a more assertive form with the impact we know?¹⁹

¹⁵ HARTLEY, *Observations on Man, His Frame, His Duty and his Expectations*, 2 vols., Richardson, London 1749, I, pp. 13-16. Hartley cautiously tries to ward off ideological difficulties, adding that “I do not, by ascribing the performance of sensation to vibrations excited in the medullary substance, in the least presume to assert, or intimate, that Matter can be endowed with the power of sensation” (*Observations on Man* cit., I, p. 33). That brain-mind relations and indeed the ‘identity’ between cerebral and mental processes can be fully described mechanistically, “with the same certainty as other effects [...] from their mechanical causes” (I, p. 500) is nevertheless not, for Hartley, tantamount to an ontological commitment to a materialist ‘substance metaphysics’.

¹⁶ LOCKE, *Essay* cit., I.1.1.

¹⁷ LOCKE, *Essay* cit., I.1.2; IV.x.17.

¹⁸ LOCKE, *Essay* cit., I.1.7.

¹⁹ J.W. YOLTON, *Locke and French Materialism*, Clarendon Press, Oxford 1991. I do not discuss Locke’s notion of thinking matter here as my concern is with the nature of a ‘science of the mind’ in this context, and not so much the metaphysics; for a companion paper in which the issue is addressed, see C.T. WOLFE,

But instead of comparing two relatively ‘closed’ philosophical systems, including the appropriation of the one by the other, I would like to complicate our picture of the intellectual landscape a bit further, in order to understand some less canonical options, which I referred to above as ‘phantom projects’. Because there were also a number of *Lockean* projects in the mid-18th century which sought to experimentally investigate the logic and association of ideas (for example, David Hartley’s and Charles Bonnet’s neuro-psychologies), *while nevertheless* strongly denying that they were materialist projects. (Despite their shared ‘connexionist’ picture of the mind as a system of neural fibres, vibrations, and various versions of identity-theories between these systems of resonating parts and the association of ideas, only Priestley is willing to connect such a project to a materialist ontology – connecting the functioning of ideas to a materialist substrate²⁰). And of course here we touch on the contested topic of the emergence of psychology as a science²¹, since the triangulated post-Lockean conceptual zone which Madame de Staël and Diderot diversely map out is exactly that which psychological thinkers seek to claim for themselves, over and against accusations of materialism: as I will discuss below, figures ranging from the very prominent (Charles Bonnet, in the 1760s-1770s) to the much less prominent (Jean Trembley, the nephew of the Swiss naturalist Abraham Trembley, in the 1780s) sought to defend the experimental study of mind as non-materialist.

In addition, there were explicitly medico-materialist works which praised Locke as a trailblazer but then considered that an empirically fleshed out mind-body connection was needed in medicine, including in the treatment of the passions and other aspects of mental pathology. More intriguing, authors like Gaub spoke of the need to investigate the “mechanism of the soul” which would, again, be a deliberate extension of the Lockean project, *while – explicitly – not falling*

From Locke to Materialism: Empiricism, The Brain and the Stirrings of Ontology, in A.-L. REY / S. BODENMANN (eds.), *What Did It Mean to be an Eighteenth-Century Empiricist?*, Springer, Dordrecht, forthcoming.

²⁰ Priestley reprises elements from Locke and Hartley, zeroing in on the aspect of the Lockean project involving the tracing of ideas to their source in sensation, which David Hartley’s *Observations on Man*, in Priestley’s view, showed the way for; but Priestley adds, e.g., that if thought and perception are dependent on an *organized system of matter*, then thought “is a property of the *nervous system*, or rather of the *brain*”; “as far as we can judge, the faculty of thinking, and a certain state of the brain, always accompany and correspond to one another” (J. PRIESTLEY, *Disquisitions Relating to Matter and Spirit*, J. Johnson, London 1777, pp. 26, 27). Erasmus Darwin is close to Priestley in holding both that “all our knowledge is acquired through our organs of sense” and – despite his denial that he addresses more fundamental levels – that “the sensorial power is produced in the brain” (E. DARWIN, *Zoonomia, or the Laws of Organic Life*, 2 vols., J. Johnson, London 1794, I, Sections III.vi.4; XII.viii). Interestingly, Marx already emphasized the trajectory from Locke to Hartley and Priestley in *Die Heilige Familie*, drawing on Renouvier, as was noted by Olivier Bloch and more recently reiterated in A. THOMSON, *Bodies of Thought: Science, Religion, and the Soul in the Early Enlightenment*, Oxford University Press, Oxford 2008.

²¹ G. HATFIELD, *Psychology as a Natural Science in the Eighteenth Century*, *Revue de Synthèse*, 115 (1994), pp. 375-391; F. VIDAL, *The Sciences of the Soul: The Early Modern Origins of Psychology*, University of Chicago Press, Chicago 2011.

into materialism. In fact, Gaub plays an ambiguous role here because the territory he starts to map out in the 1747 lecture, *De regimine mentis*, is precisely that of an embodied-materialist account of mind-body interdependence, while his call in 1761 to study the “mechanism of the soul”, to Bonnet, is quite firmly anti-materialist and, in the terms I shall discuss below, *substrate-neutral*.

All of these philosophical zones overlap with, borrow from and extend, sometimes inadvertently the projects we associate with major philosophical systems, but they are precisely not identical to such systems. Note that we are still in the context of the purported Lockean ‘physiology of the understanding’, because these diverse projects branch out from a Lockean starting-point in (at least) two directions – both of which Kant would have ruled out (to be clear, my point is not to refute Kant’s understanding of Locke, but to seek to reconstruct a situation which was both *Lockean* and *unfaithful to Locke*, indeed, a series of theoretical constructions, all of which are species of a possible ‘naturalization of the soul’). These two lines of development are the following.

First, what I will call a *substrate-neutral* investigation of the ‘mechanics of the soul’. That is, a scientific (naturalistic, causal, more or less experimental) investigation of the mind which, despite its contribution to an explanatory and/or ontological naturalization of an account of mental processes, does not seek to trace such an account to an explicit material substrate (whether this be the brain, the nervous system, the organism, or living matter as a whole).

The second line of development is in fact more of a literal version of the ‘physiology of the understanding’ which Kant feared, because it is an attempt to integrate the psychology of association in a medico-materialist account of mind and body. Such projects aim to provide an account of the material substrate of mental life – which can of course be ‘cashed out’ in diverse ways, from earlier neurophysiologies of animal spirits to psychophysiologies of nervous fibres, sometimes articulated with mechanistic analyses of the passions, as in the writings of the Paris physician Antoine Le Camus, author in 1753 of a *Médecine de l’Esprit* which, in a rather patchwork, sometimes confused manner, seeks to trace, e.g. mental pathologies at the functional level back to cerebral and/or *passionnel* disturbances at a structural level, with a reference to Locke. Again, the experimental and philosophical resources for articulating a ‘physiology of the understanding’ and/or a ‘mechanics of the soul’, that is, **S** science of the mind, are diverse. My argumentative reconstruction will focus on two notable ways of articulating this diversity: more mechanistic, substrate-neutral sciences of the mind and more explicitly substantial-materialist accounts, which notably borrowed from the topos of ‘medicine of the mind’. I now turn to these two different approaches to a naturalized ‘science’ of mind.

2. Gaub, Bonnet and the mechanics of the soul

In a letter of 25 March 1761 to Charles Bonnet, Gaub posed a problem which is at once beautifully sharp, indeed central to the present discussion, and frustratingly obscure. To put it bluntly, Gaub was worried about materialism and the status of the mind. In the background, fueling his fears, was the figure of La Mettrie, long-dead but who had caused him much grief with his approbation for Gaub's earlier rectoral address at Leyden in 1747, *De regimine mentis quod medicorum est*, which he had attended (Gaub had been Herman Boerhaave's student, and took over his Chair in Leyden)²². The problem was already there in 1747 with this tension between the professor of medicine and the materialist philosopher: is there a *legitimate* way to treat the mind as belonging to medicine, and another, *illegitimate* way which falls (or leaps) into materialism? The way Gaub puts it to Bonnet in 1761 is as follows: there is such a thing as the "physics of the soul" or the study of the "mechanisms of the soul", which can legitimately be undertaken by physicians²³. The danger is when "materialists" add to this study, the claim that soul is a mere "effect" of this mechanism. Gaub first worried that Bonnet's essay on the soul would have the same negative 'reductionist' implications as La Mettrie's work, but concludes that this is not the case: the study of the "mechanism of the soul" (*ibid.*) need not entail materialism, since in Bonnet's case (and Gaub approves) it supports the claim that thought is *not* a mere effect of this mechanism. Gaub even begs Bonnet to publish an additional treatise on this topic, "so as to demonstrate that the mechanism of the operations of the soul is so far from favoring materialism, being instead the most convincing proof of the opposite system"²⁴.

It seems surprising to me and, I would think, to most of us, that a study of the mechanics of the soul – not least one undertaken by a natural philosopher, close correspondent of the physiologist and über-vivisectionist Albrecht von Haller, Bonnet for whom 'soul means mind', in a sometimes deliberate, sometimes inadvertent terminological slippage between *âme* and *esprit*, in his *Essai de psychologie, ou Considérations sur les opérations de l'âme* (1755) and *Essai analytique sur les facultés de l'âme* (1760) – that such a study, then, is opposed to materialism. It must thus have been disturbing to Gaub that La Mettrie spoke so favourably about the ideas he heard at the 1747 lecture, not least since his

²² H. GAUB, *De regimine mentis quod medicorum est*, in L.J. RATHER, *Mind and Body in Eighteenth-Century Medicine. A Study Based on J. Gaub's De regimine mentis*, University of California Press, Berkeley 1965. The influence of Gaub's lecture is also visible in the title of Kant's 1786 lecture (also a rectoral address) on the relation between medicine and philosophy as faculties (and the interrelation of mind and body from a medical point of view): *De medicina corporis, quae philosophorum est* (KGS, XV, pp. 939-953).

²³ Gaub to Charles Bonnet, letter of 25 March 1761, in CARAMAN, *Charles Bonnet* cit., p. 172.

²⁴ Gaub to Charles Bonnet cit., in CARAMAN, *Charles Bonnet* cit., p. 173.

enthusiasm makes sense: Gaub had defended the view that for the physician, the metaphysical distinction between mind and body is irrelevant. Faced with the consequences, Gaub has to demand in 1761 that someone of Bonnet's stature and scientific competence write a treatise to show that the naturalistic study of the "physics of the soul" (presumably some combination of psycho-physiology, psychology and of course the 'medicine of the mind') does not entail materialism.

But what should this study of the 'mechanism of the soul' be? Gaub is not very forthcoming but he clearly indicates that, while being experimental and in that sense part of natural philosophy or science broadly construed, this study would nevertheless not reduce thought to a mere "effect" of this mechanism. One way of course to flesh out this somewhat mysterious category is to ask why Gaub thought Bonnet was the one to carry out the project. If one looks for an answer in terms of ideology, there are some obvious sources, and much has been written already on Bonnet's relation to Albrecht von Haller, to a Protestant natural-theological context, and even to a kind of Leibnizian inheritance²⁵. Suffice it to say that Bonnet's various works on 'psychology' and 'the soul' are self-consciously experimentalist while trying to steer clear of the shoals of materialism, an effort which sometimes borders on the obsessive, as when he writes to Haller warning him of the materialist implications of various aspects of his work, so that Haller has to reiterate a kind of classic division of labor between philosophy or metaphysics, and experimental fields such as anatomy and physiology, particularly when they touch upon sensitive questions such as the 'seat' or localization of the soul – or 'mind', since precisely in this period, authors such as Bonnet insist on rendering the former by the latter. And indeed, more than the classic ideological issues, what is significant in the Gaub-Bonnet 'moment' is that it points to an ontological instability *and* functional productivity of a (naturalized) concept of soul, visible in the increasing insistence, inseparably terminological and conceptual, that 'soul' just means the part of us which thinks: 'soul' in this context exclusively means the locus of mental activity, of which the brain is the physical substrate; it does not mean the metaphysical opposite of matter, or something which survives the body after death; soul has become a psychological term. By 1787, Karl von Knoblauch can laconically write, "Seele (*mens*)"²⁶.

²⁵ See e.g. M. BUSCAGLIA / R. SIGRIST *et al.* (eds.), *Charles Bonnet, savant et philosophe (1720-1793)*, Éditions Passé-Présent, Geneva 1994. The idea that a fully causal "mechanics of the soul" need not imply a monist materialist commitment is quite possibly of Wolffian provenance; see P. RUMORE, *Mechanism and Materialism in Early Modern German Philosophy*, in *British Journal for the History of Philosophy* (forthcoming, 2016).

²⁶ K. VON KNOBLAUCH, *Über des Denken der Materie*, in *Teutsche Merkur*, 3 (1787), p. 190; thanks to Falk Wunderlich for this reference. Sometimes authors seem to be engaged in a counter-reform: thus where Gaub uses *mens* in his first oration on mind and body (1749), he uses *anima* much more in the second (1763).

Now, a mechanistic study of the soul, which is to be ‘cashed out’ in more or less associationist fashion with some correlation or correspondence between neural fibres / vibrations and ideas, also seems quite close to the then-disputed question of the ‘seat’ of the soul, as Bonnet noticed. When natural philosophers such as Robert Hooke spoke of the seat of the soul and ideas as held in the “repositorium” of the brain, in the later 17th century²⁷, there did not seem to be any danger inherent in the view. In contrast, in a letter of 22 January 1771 to Bonnet, Haller quietly backpedals: “while philosophy favours a single part as the seat of the soul, anatomy remains silent on the issue”²⁸. Bonnet was actively interested in the issue, seeking out the assistance of the anatomist Vincenzo Malacarne, to whom he wrote: “The question that interests me the most is that of the seat of the soul”; the question is whether the soul is distributed throughout the brain, or localized in particular areas, as he believed²⁹. Unlike Haller’s cautionary note (or the complications introduced by Kant some decades later, warning that one had to distinguish between the ‘seat of the soul’ and the ‘seat of the organ of the soul’), Bonnet wants to put the cerebral correlates of the logic of ideas on neuroanatomical footing. While some prominent authors such as Diderot in the Supplement to the article AME in the *Encyclopédie* or D’Alembert in his *Essai sur les Éléments de philosophie* were quite ironic and deflationary about localizationist attempts to find a seat of the soul³⁰, for Bonnet, regardless of strict localization of the ‘soul’ in a part of the brain or the brain as a whole, the system of relations of fibres (corresponding to ideas) was mechanistic. But Bonnet wavers

²⁷ R. HOOKE, *Lectures of Light* (1705), in *Posthumous Works*, ed. R. Waller. Reprint, Frank Cass, London 1971.

²⁸ Cit. by C. BONNET, *Essai d’application des principes psychologiques de l’auteur à la manière dont les idées sont rappelées par les mots, et à l’association des idées en général*, in C. BONNET, *Œuvres d’histoire naturelle et de philosophie*, 15 volumes en 18 tomes, S. Faulche, Neuchâtel 1771-1783 (= OHNP), vol. VII, p. 90.

²⁹ Bonnet to Malacarne, February 12 1779, Fonds Bonnet, Bibliothèque Publique et Universitaire de Genève. Bonnet, who could not conduct the investigations himself, being almost blind, asked anatomical questions which Malacarne sought to answer. They ultimately disagreed on questions of cerebral localization, with Malacarne being more in favor of this view, producing ‘geographical imagery’ for the brain, as he wrote to Bonnet in letters of March 1779 (Fonds Bonnet); thanks to Céline Chérici for this reference and for discussion on these points. For more discussion see C. CHERICI, *Opérations mentales, pathologies cérébrales et altérations de l’intellect : controverses autour de l’anatomie et de la physiologie du cerveau*, in C. CHERICI / J.-C. DUPONT (dir.), *Les querelles du cerveau. Comment furent inventées les neurosciences*, Vuibert, Paris 2008, pp. 87-103.

³⁰ While attempts to find a seat of the soul could themselves be perceived as overly materialist or at least making the category mistake of ‘spatializing’ this entity, Diderot’s irony targets the very entity of the soul itself: “now it is settled in the corpus callosum, until a new experiment is conducted which displaces it again, and leaves the physiologists wondering where to put it” (AME, in DIDEROT and D’ALEMBERT (eds.), *Encyclopédie ou Dictionnaire raisonné des sciences, des arts et des métiers...*, Briasson, Paris 1751, vol. I, p. 341a-b ff.; p. 342b. For D’Alembert, searching for the seat of the soul was “one of the chimeras of ancient and modern philosophy” (J. le Rond D’ALEMBERT, *Essai sur les Éléments de philosophie* (1759), Fayard, Paris 1986, p. 273).

on localization, or rather, he has a strong commitment to localization in a broad sense but is hesitant as to the specifics.

Micro-motions at the cerebral fibre level correlate with (and perhaps even correspond to – Bonnet wavers on the issue) associations of ideas. In his *Essai de psychologie*, Bonnet writes that “all the ideas affecting the soul at the same time, do not affect with an equal vivacity. This variety in impression[s] stems mainly from the greater or less intensity of the movements communicated to the fibres of the brain,” and in the later *Essai analytique sur les facultés de l’âme* that “the vivacity of sensations is necessarily proportional to the intensity of the movements that excite them”³¹. Bonnet was not the only one to propose such a model: a late version of such an attempt to correlate the association of ideas and the “contraction of fibres” is Erasmus Darwin’s 1794 *Zoonomia*, with its account of association as the type of “connexion” that exists “when fibrous contractions succeed other fibrous contractions”; Darwin discusses other types of “connexions” such fibrous contractions succeeding sensorial motions, but notes that all of them are produced by habit: “All the fibrous motions, whether muscular or sensual which are frequently brought into action together, either combined in tribes, or in successive trains, become connected by habit, that when one of them is reproduced the others have a tendency to succeed or accompany it [...]”³². The main conceptual difference with Bonnet is that Erasmus Darwin also has a more or less ‘transformist’ theory of living matter, while Bonnet is neutral on the essence of matter.

Bonnet’s mechanistic analysis of the soul is not a materialist account of the brain-mind relation. Yet there is plenty of deflationary, and even reductionist impetus in his discussions of the topic, together with a localizationist impulse. That is, he does wish to ‘deflate’ the level of phenomenal experience towards a more naturalistically specifiable psychophysiology, with localizable correlations between ideas and neural fibres, yet without any ‘eliminativist’ impulse:

“If Vaucanson was able to design an artificial duck that brought its beak forward to grasp the food offered to it, couldn’t Vaucanson’s designer (*auteur*) have designed an Automaton imitating human actions? I don’t mean to insinuate that Man is a mere

³¹ BONNET, *Essai de psychologie*, ch. VI, in OHNP, vol. VIII, p. 13; *Essai analytique*, ch. XI, in OHNP, vol. VI, p. 139. On the category of ‘intensity’ in Bonnet’s psychology see M. RATCLIFF, *Le concept d’intensité dans la psychologie de Charles Bonnet*, in *Revue d’histoire des sciences*, 50(4) (1997), pp. 421-446.

³² DARWIN, *Zoonomia* cit., vol. I, II.II.11; X.I.1. Similarly, “many of our ideas are originally excited in tribes (and) associated by habit [...] form complex ideas [...]” (X.III.3). Darwin gives a classic Lockean example for such “association of tribes and trains”, not just at the level of sensation or irritation, but concerning the functioning of ideas: the simple idea of whiteness composes a part of the complex idea of snow, milk or ivory; see generally XII.II.1 (“Of sensorial exertion”) and for discussion, C.U.M. SMITH, *All from fibres: Erasmus Darwin’s evolutionary psychobiology*, in C.U.M. SMITH / R. ARNOTT (eds.), *The Genius of Erasmus Darwin*, Ashgate, Aldershot 2005, pp. 133-143.

Automaton, but rather, to suggest that it is possible for the actions we attribute to the Soul, to be the effect of a secret mechanism (*une secrète mécanique*)”³³.

The actions we attribute to the soul might just be the effect of a hidden mechanism, or mechanisms. Such terminology is frequent in Bonnet’s writings (the mechanism of the brain, the mechanism of the senses, the mechanism of instinct...), also explaining what Gaub might have in mind. More concretely, the “hidden mechanisms of the soul” take the form of a psychophysiology of fibres in which neither the ontological status of the brain nor any strict correspondence or identity between mental processes and cerebral processes is specified, although Bonnet definitely tries to work out correlations (as Erasmus Darwin will persist in doing in the last years of the century).

If we recall Gaub’s rather dramatic letter, in which he explained that at first he worried that the *Essai de psychologie* would be a dreadful materialist work, but then realized Bonnet was just the person to investigate the workings of the soul/mind in such a way as to nullify materialism, we can say that the problem is, so to speak, a live one: Malacarne himself, who has a cerebro-centric explanation of all of human nature, acknowledges that this can sound like materialism but simply adds that he does not want to explore this option further; he slowly eliminates the term ‘soul’ from his writings. Bonnet also says, “I do not believe in the materiality of the soul, but if I was a materialist I would not be ashamed to admit it” and “if someone did demonstrate that the soul is material, far from being alarmed, one should admire the power which gave matter the capacity to think”³⁴.

Whether or not these are philosophically watertight positions (including in their relation to somewhat unstable empirical claims concerning the correlation and/or correspondence between cerebral fibres and ideas), the fact remains that Bonnet, in a manner partly comparable to Hartley some decades earlier, is providing a *substrate-neutral* account of the mechanics of the soul/mind. Recall that

³³ C. BONNET, *Essai analytique sur les facultés de l’âme*, ch. XIX, in OHNP, vol. VI, p. 215.

³⁴ BONNET, *Analyse abrégée de l’Essai analytique sur les facultés de l’âme*, § XIX (entitled “Reasons why the author is not a materialist”), in OHNP, vol. VII, p. 34. This and the previous section, which are not pieces of great argumentative clarity, seem to be saying ‘I’m not a materialist, but even if I were, it is not such an important issue’. Resorting to a rather traditional definition, which he provides very little argument for, Bonnet ultimately insists on the ‘unity’ of the soul as a basis for his not being a materialist (*Analyse abrégée de l’Essai analytique* cit., § XIX in OHNP, vol. VII, p. 34). For Udo Thiel, Bonnet’s account, “with its emphasis on the activity of ‘fibres in the brain’, certainly tends towards materialism” (U. THIEL, *Self-Consciousness and Personal Identity*, in K. HAAKONSSON [ed.], *The Cambridge History of Eighteenth-Century Philosophy*, Cambridge University Press, Cambridge 2006, p. 305). But this is not Bonnet’s intention. Closer perhaps to that intention is Thomas Sturm’s suggestion, in his important article on 18th-century psychology and medical anthropology in a Kantian context, that Bonnet is a functionalist (T. STURM, *Why did Kant reject physiological explanations within his pragmatic anthropology?*, in *Studies in History and Philosophy of Science*, 39 [2008], p. 497).

Hartley insisted on the difference between a mechanistic analysis of sensation in terms of cerebral vibrations and the materialist attribution of “the power of sensation” to matter. Bonnet, in a note added to the *Essai analytique*, stresses that his account of fibres (and “molecules of fibres,” “fibre networks,” etc.) is not in fact an ontological commitment: “I deliberately leave out (*ignorer*) the true nature of these infinitely small organs, which are suited to sensations and ideas of all kinds, and by means of which the Soul deploys all of its Faculties”³⁵. That Bonnet was ultimately a kind of dualist does not change the fact that he does not have a metaphysical dualism at work explaining, in this case, brain and mind relations; at most he has a kind of function dualism, that does not specify the nature of either ultimate constituents or foundational substances, but which locates interaction between mental and cerebral processes in the seat of the soul. As Timo Kaitaro has observed, in authors like Bonnet, “the separateness of the immaterial soul served the interests of the reduction of the mental. One could correlate sensation, memory and other mental phenomena with physiological mechanisms like a reductionist materialist. And when one was suspected of being a materialist, one could always refer to the immaterial soul and its mysterious interaction with the body taking place in the seat of the soul”³⁶. This should answer our earlier question as to why Gaub thought Bonnet was the one to solve the problem of how a science of the mind might not fall into, facilitate or otherwise entail materialism. And indeed there were a number of such proclamations in the 1770s-1790s, again returning to Locke as a safe point of departure, in order to seek to hygienically seal away the materialist implications.

Johann Nicolaus Tetens, “the German Locke,” follows a Lockean agnostic line in seeking to articulate an ‘experience-based’ psychology. He explicitly invokes a Lockean parentage but then (exactly unlike Priestley) warns that other ‘Lockeans’ such as Hartley and Bonnet go too far, not per se because they are, say, materialists, but because they are just as metaphysical (in the sense of foundationalist ontological commitments) as Leibniz and Wolff at the other end of the spectrum – which is ironic, given that they are explicitly non-metaphysical, describing the dynamics of the mind rather than its substance. As Vidal notes, “Tetens [...] did not exclude brain physiology from psychology but rather

³⁵ In a familiar invocation of the Newtonian methodological appeal to unknowns, Bonnet adds that when he uses the term ‘fibre’ he does so like Newton did with ‘attraction’, i.e. “in order to refer to an effect, the true cause or the *how* of which, is entirely unknown to me”. However, even if the association and generation of ideas does not happen according to his psychophysiology of nervous fibres, it nevertheless depends for Bonnet on prearranged physical systems (“as a variety of experiments confirm”), which he describes in terms of fibres, molecules of fibres, and so on (BONNET, *Essai analytique*, ch. VIII, in OHNP, vol. VI, p. 40n.).

³⁶ T. KAITARO, *Brain-Mind Identities in dualism and materialism: a historical perspective*, in *Studies in History and Philosophy of Biology and Biomedical Sciences*, 35 (2004), p. 632.

assigned it a different position”³⁷. But – in a sense correctly, as we shall see in the next section – claims regarding, e.g., memory traces as material locations in the brain are substance claims for Tetens, who thinks he is closer to Locke in giving primacy to an introspective method, which he takes to be less metaphysical or hypothetical³⁸. Jean Trembley, the nephew of Abraham Trembley, argued in a prize essay on the usefulness of psychology in 1781 that it was a mistake to confuse psychological claims concerning (a) knowledge as derived from the senses and (b) the dependence of our mental faculties on our body, with (c) materialism, but he felt that “all arguments fell on deaf ears, people refused to see the truth and chose to see only the physical terms employed in the psychological theory of man, and on the basis of a cursory survey of those words they decided that the philosophers were materialists, and all counterarguments were branded as sophistry and deception”³⁹. Similarly, in the 1790s, when Dominique-Joseph Garat was lecturing at the École Normale on the mind, sensation, and generally ‘empiricist’ themes, with a particularly Lockean title, ‘analysis of the understanding’ (he felt, ironically, that ‘psychology’ was too archaic a term), he went out of his way to make clear that the doctrine that sensation is the basis of knowledge, was not tantamount to materialism⁴⁰. It is worth noting that all three of these rather diverse authors are insisting on the substrate-neutrality of a legitimate naturalistic inquiry into the mind; the terms which Trembley is carefully trying to distinguish (like Chaumeix a quarter-century earlier) are precisely the ones which Madame de Staël viewed as inextricably linked.

In sum, the substrate-neutrality of a science of the ‘mechanisms of the soul’ should guard it from the pitfalls of materialism. What Gaub saw in Bonnet as a

³⁷ VIDAL, *Sciences of the Soul* cit., p. 141. Indeed Tetens has no problem speaking of material traces in the brain yet wants to maintain a difference between mental representations and such traces: see STURM, *Why did Kant reject physiological explanations*, p. 498. On Tetens and Locke see F. WUNDERLICH, *Eine »dritte Mittelidee von der Beschaffenheit des Seelenwesens«*. *Johann Nikolaus Tetens und die Annäherung von Influxus physicus und Harmonismus*, in G. STIENING and U. THIEL (eds.), *Johann Nikolaus Tetens (1736-1807). Philosophie in der Tradition des europäischen Empirismus*, De Gruyter, Berlin 2014, p. 232.

³⁸ Tetens writes that Bonnet chooses the “way of hypotheses,” “I [sc. Tetens] choose the way of observation” (J.N. TETENS, *Philosophische Versuche über die menschliche Natur und ihre Entwicklung* (1777), ed. by U. ROTH and G. STIENING, De Gruyter, Berlin 2014, I, ch. IV, p. 28). Thanks to Paola Rumore for this reference.

³⁹ J. TREMBLEY, *Réponse à la question, proposée par la Société de Haarlem : Quelle est l’Utilité de la Science Psychologique dans l’éducation & la direction de l’Homme, & relativement au bonheur des Sociétés ? Et quelle serait la meilleure manière de perfectionner cette belle Science, & d’accroître ses progrès ?*, *Verhandeligen, uitgegeeven door de Hollandsche Maatschappye der Weetenschappen te Haarlem*, 20(1) (1781), pp. 1-310, here p. 307, cit. in VIDAL, *The Sciences of the Soul* cit., p. 333n.

⁴⁰ D.J. GARAT, *Cours de l’analyse de l’entendement, Séances des Écoles normales, recueillies par des sténographes et revues par des professeurs, Débats*, Imprimerie du cercle social, Paris 1803, III, p. 43, cit. in C. WARMAN, *Les Éléments de physiologie de Diderot : inconnus ou clandestins ? Le cas de Garat*, in I. MOREAU (ed.), *Les Lumières en mouvement. La circulation des idées au XVIII^e siècle*, ENS Éditions, Lyon 2009, p. 72. For more on Garat including in relation to empiricism and materialism see P. DALED, *Le matérialisme occulté et la genèse du sensualisme*, J. Vrin, Paris 2005, pp. 95-98.

positive contribution, and what Kant sought to rule out (negatively) as a category mistake in Locke, was an experimental science of the mind which was non-committal in terms of ultimate substance, and by extension, left such features of the 'soul' as free will and moral responsibility, more or less untouched (even if some anti-materialists such as Lelarge de Lignac did not appreciate at all Bonnet's extension of Lockean concepts such as uneasiness and the absence of liberty as indifference). But, as I noted above, it was equally possible to see Locke's picture of the mind as missing a material and/or corporeal substrate (which could be cerebral, organismic or generically material depending on the author). For example, at the very end of the 18th century, Cabanis – whose project consisted in part in an effort to tie together medical traditions and materialist philosophy, with limited consequences that do not entirely dispel the 'phantomatic' aura I described in the beginning – discussed the doctrines of sensation in Locke and Condillac and commented that they were only missing a proper study of the structures and functions that subtend the senses, basically the brain⁴¹. Cabanis praises Locke for moving the study of man away from metaphysical hypotheses (bringing together "l'homme moral" and "l'homme physique"), but he judges that Locke did not carry this project far enough⁴². It is to this second line of development in a possible, but not especially actualized form of a naturalistic science of mind (this time, pro-materialist) that I now turn.

3. Medicine of the mind and materialist appropriations

The interchangeability of soul and mind can serve as a profession of faith of materialism, as we shall see: one can explain by material and particularly corporeal properties, that which previously has been attributed to the entity called 'soul', although such a conceptual replacement can sometimes amount to a naturalization of the soul⁴³ rather than its 'elimination' (in the sense of an eliminativist

⁴¹ P.-J.-G. CABANIS, *Rapports du physique et du moral de l'homme* (1802), in *Œuvres philosophiques*, ed. C. Lehec and J. Cazeneuve, 2 vols., PUF, Paris 1956, vol. 1, pp. 141, 165, 196, etc.

⁴² CABANIS, *Rapports du physique et du moral* cit., Preface.

⁴³ It is worth noting given the focus here on problems surrounding the 'scientific treatment of the mental', that Husserl himself used a variant of the expression, 'naturalization of the soul', in the *Crisis*, in the context of a discussion of Hobbes' form of naturalism, which Husserl terms 'physicalism'; he glosses on the latter term as signifying "the naturalization of that which pertains to the soul (*Naturalisierung des Psychischen*)", and adds that this trend extends via Locke to the whole of modernity, up until the present day (E. HUSSERL, *Die Krisis der europäischen Wissenschaften und die transzendente Phänomenologie* (Husserliana, Bd. VI), ed. by W. Biemel, Martinus Nijhoff, Den Haag 1954, pp. 63-64). 'Naturalization of the soul' as discussed here is rather different from R. MARTIN / J. BARRESI, *Naturalization of the Soul. Self and Personal Identity in the Eighteenth Century*, Routledge, London 2000 (which focuses more on the metaphysics of personal identity, 'fission' experiments and the like, in texts by Locke, Collins and others). I am using the expression in perhaps a more common sense – and also the sense that Kant and

attitude). Thus there are other trajectories here which make *no pretense* to substrate-neutrality. From at least the early 1700s onwards, in extremely diverse texts belonging to different traditions, such as work by the English mortalist physician William Coward, clandestine writings by Fontenelle (dating to 1700 but only in circulation as of 1743), and anonymous works such as the materialist *L'Âme Matérielle* (approx. 1725-1730), we witness accounts of sensation and the relation between knowledge and the senses, which explicitly seek to tie the 'phenomenal' level to material processes in the brain, such as the circulation of animal spirits.

In his 1704 *Grand Essay*, Coward states without further ado that "Thought seems to be nothing else but a continual circulation or rotation, as it were, of Ideas in the Brain"; he can "reasonably define" thought as "the result of certain Effluviiums from the Brain, raised and continued by a perpetual Circulation, or Rotation of Ideas" (ideas which were impressed on the brain by God, Coward adds in extremis)⁴⁴. Coward, in a manner quite close to that which Laurence Sterne was to make famous in *Tristram Shandy* (and which Locke also surprisingly uses in unnoticed passages of the *Essay*, as I mention below), also describes phenomena such as concentration, mental exhaustion or learning in terms of "long study affect[ing] sometimes the Animal Spirits"⁴⁵. In his clandestine *Traité de la liberté de l'âme* (written in 1700 but only published, anonymously, in the 1743 *Nouvelles libertés de penser* and attributed to him a generation later), Fontenelle states that "along with all metaphysicians" – by which he may mean Malebranche, in particular – he supposes that "the mind thinks according to the dispositions of the brain", such that certain "material dispositions of the brain", which generate particular motions, produce "certain thoughts in the mind" (he subsequently refers to animal spirits). Conversely, any object which becomes an object of thought, including purely mental objects, leaves traces in the brain⁴⁶. Perhaps most explicit for our purposes is *L'Âme Matérielle*, which declares that

"The sense organs truly act on the animal spirits [...] they push them into certain little canals rather than others. [...] Our sensory network (*rapport des sens*) must then be considered as material or, which amounts to the same thing, as a mechanical action of the sense organs on the animal spirits, which I understand as the parts of the blood and

Husserl seem to have denounced – to refer to shifts in which concepts such as 'soul' are reconfigured to as to be accessible to a natural science.

⁴⁴ W. COWARD, *The Grand Essay, or a Vindication of Reason and Religion, against Impostures of Philosophy*, John Chantry, London 1704, pp. 124, 128-129. He adds further cerebral-materialist reflections on the animal spirits, melancholy and mental activity (pp. 130-132).

⁴⁵ COWARD, *The Grand Essay* cit., pp. 127-128.

⁴⁶ FONTENELLE (1700), section II.

the most subtle fluids, and as the rarefied and highly purified essence of the various matters composing the human body"⁴⁷.

The text also takes the example of memory in order to insist that it is nothing other than the preservation and renewal of sensory information, "and thus can only be regarded as material"; in a telling turn of phrase given our concern with 'mechanisms of the soul', the anonymous author also speaks of the "mechanisms of the senses, formed by material agents"⁴⁸. Later invocations of Locke seek to give a more 'physiological' treatment of ideas than was found in the *Essay*. For instance, in the chapter on organic sensitivity in Condillac's 1780 *Logique*, he asserts that sensitivity is caused by the communication between sense organs and the brain, and – in this close to Diderot – that all of our senses reduce to that of touch⁴⁹.

It's not that all invocations of a neurophysiology of animal spirits were materialist – far from it. But rather, that there is a growing insistence, e.g. in Le Camus' 1753 *Médecine de l'Esprit* (revised 1769) and Cabanis' 1802 *Rapports du physique et du moral* (in fact lectures given in the 1790s) that Locke's account of ideas *needed supplementing*, in corporeal, cerebral and otherwise material terms. Ironically, Locke himself is not as univocal as we might think; as John Sutton has shown provocatively⁵⁰, it is possible to study interrelations between the analysis of associative mechanisms and 'fantasy' in Locke, and other, more neurophysiological accounts of the functioning of animal spirits. Sutton points to an under-studied aspect of Locke's chapter on association (added in the 4th edition of the *Essay*), where contrary to the prohibitions stated above, Locke allows that "Custom settles habits of Thinking in the Understanding, as well as [...] of Motions in the Body; *all which seems to be but Trains of Motions in the Animal Spirits*, which once set a-going continue on in the same steps they have been used to [...]"⁵¹.

Le Camus praises Locke by name, calling him the "Chef des Philosophes" (and a few pages later gives his version of the empiricist slogan, "connaître, c'est sentir") but then immediately deplores that Locke left out all the anatomical and physiological detail of how the senses work (which he claims he will provide)!⁵²

⁴⁷ ANON., *L'Âme matérielle*, éd. A. Niderst, H. Champion, Paris 2003, p. 230.

⁴⁸ ANON., *L'Âme matérielle* cit., p. 230.

⁴⁹ É. BONNOT DE CONDILLAC, *La logique, ou, Les premiers développemens de l'art de penser*, Chez L'Esprit [et] Debure l'ainé, Paris 1780, Book I, ch. IX, p. 60.

⁵⁰ SUTTON, *Carelessness and Inattention: Mind-Wandering and the Physiology of Fantasy from Locke to Hume*, in C.T. WOLFE / O. GAL (eds.), *The Body as Object and Instrument of Knowledge: Embodied Empiricism in Early Modern Science*, Springer, Dordrecht 2010, pp. 243-263.

⁵¹ LOCKE, *Essay* cit., II.XXXIII.6.

⁵² A. LE CAMUS, *Médecine de l'esprit, où l'on traite des dispositions et des causes physiques qui sont des conséquences de l'union de l'âme avec le corps, influant sur les opérations de l'esprit; et des moyens*

In fact, Le Camus fills in the blanks with rather traditional mechanistic language: “the functions of the soul united with the body [are] mechanical”. In concluding his work, he explains that he has sought to describe “all the physical causes which, as they variously modify bodies, thereby also differentiate minds”⁵³. What seems new is Le Camus’s emphasis that this mechanico-instrumental dimension is literally a means to repair mental pathologies, “correcting the vices of the mind”⁵⁴, but even further, to enable the ordinary individual to, as it were, maximize her potential and become a *grand esprit*, freed from other causal chains preventing her from achieving such potential, in a kind of crude Spinozist ‘emendation’ method, working – he reiterates – on the level of “various physical causes”⁵⁵.

In the case of Hartley, Bonnet, Priestley and also some of the German authors such as Tetens, Locke served as a more or less significant basis for a mechanistic and substrate-neutral science of mind (the Locke for whom certain mental processes were “but Trains of Motions in the Animal Spirits” was not noticed as such, in a case of a virtual project nested within larger, actualized projects). In contrast, authors calling for a ‘medicine of the mind’ or a unification of the study of the physical and the moral (a.k.a. ‘mental’), did not advocate such neutrality. Sometimes, the cerebral substrate appealed to older notions such as animal spirits, themselves linked to mechanism and/or materialism, as in *L’Âme Matérielle*. In other cases, it was also the specific standpoint of the physician which was appealed to. Ironically again, just as there is a Locke who rules out physical considerations of the mind and a Locke who explains mental processes in terms of animal spirits, Gaub also is something of a Janus bifrons.

That is, if we recall my initial distinction between a substrate-neutral investigation of the “mechanism of the soul” versus an integrated, substantial-materialist account of mind and body, the irony is that Gaub unwittingly was also a significant contributor to the second line of development, via his 1747 Leyden lecture, *De regimine mentis quod medicorum est*. Here, Gaub suggests a clinical perspective on the problem of mind-body interaction (for he is speaking of *mens* rather than *anima*), in which the metaphysical distinction between mind and body is irrelevant. “Although the healing aspect of medicine properly looks

de maîtriser ses opérations dans un bon état ou de les corriger quand elles sont viciées, Ganeau, Paris 1753, chapter 1 (“Logique des Médecins”), § 1, p. 13. For another instance of a physician trying to give medical-materialist underpinnings to empiricist epistemology, but in a very unoriginal manner, see A. MAUBEC, *Principes physiques de la raison et des passions des hommes*, B. Givin, Paris 1709, pp. 4, 18, 35, and *passim*: for Maubec, everything comes to us through the senses, but the internal motions of the mind must be explained mechanically. See T. KAITARO, *Diderot’s Holism. Philosophical Anti-Reductionism and its Medical Background*, Peter Lang, Bern 1997, p. 20.

⁵³ LE CAMUS, *Médecine de l’esprit* cit., II, p. 307.

⁵⁴ LE CAMUS, *Médecine de l’esprit* cit., II, pp. 308, 311.

⁵⁵ LE CAMUS, *Médecine de l’esprit* cit., II, p. 311.

toward the human body only, rather than the whole man, it does refer to a *body closely united to a mind* and, by virtue of *their union*, almost continually acting on its companion as well as being itself affected in turn"⁵⁶. Gaub refers to the authority of Descartes, "the most ingenious philosopher of his age", who "yielded to physicians" regarding the priority of medicine in these matters⁵⁷, and states that due to the variability of temperaments, itself explainable in humoral (and hence medical) terms, the philosopher "cannot dispense with the aid of the physician" where the mind is concerned⁵⁸.

Interestingly, La Mettrie seems to have attended Gaub's lecture, some months prior to finishing *L'Homme-Machine* (Gaub mentions his presence), and spoke very favourably of it, carrying these ideas to what may seem (to us) their obvious materialist conclusion. Gaub did not appreciate La Mettrie's materialist appropriation of his ideas, and in 1763, reprised the topic in a second rectoral address, leading to a short essay against him in his new edition of *De regimine mentis*, calling him "a little Frenchman" who produced a "repulsive offspring [...] his mechanical man"⁵⁹. As I mentioned earlier, what may have been especially disturbing to Gaub was that La Mettrie's enthusiasm for the 1747 lecture makes sense: Gaub had defended the view that for the physician, the metaphysical distinction between mind and body is irrelevant. Faced with the consequences, Gaub has to demand in 1761 that someone of Bonnet's stature and scientific competence write a treatise to show that the naturalistic study of the "physics of the soul" (presumably some combination of psycho-physiology, psychology and of course the 'medicine of the mind') does not entail materialism.

These naturalistic projects, either for a 'psychology' (an "experimental physics of the soul", in D'Alembert's terms⁶⁰), a 'medicine of the mind', or an 'anthro-

⁵⁶ GAUB, *De regimine mentis* cit., p. 70 (emphasis mine).

⁵⁷ GAUB, *De regimine mentis* cit., p. 74. Gaub has in mind the passage from Part VI of Descartes' *Discourse on Method* where Descartes notes the interpenetration of mind and the organs of the body, so that medicine is the best way to render people wiser than they have hitherto been (AT VI, 62). Le Camus praised Gaub's lecture, saying Gaub "a enfanté le même projet que nous" (LE CAMUS, *Médecine de l'esprit* cit., II, p. 335), but he found Gaub to still be guilty of a residual dualism, as he allowed for "two active principles reacting on one another" (p. 336), which then leads to the classic problems of the communication between substances.

⁵⁸ GAUB, *De regimine mentis* cit., p. 86.

⁵⁹ GAUB, *De regimine mentis* cit., p. 115.

⁶⁰ D'Alembert famously praised Locke in the "Discours préliminaire" of the *Encyclopédie* for "reducing metaphysics to what it should be, the experimental physics of the soul", in another relatively short-lived term for a phantomatic project (or science): J. le Rond D'ALEMBERT, *Discours préliminaire*, in DIDEROT and D'ALEMBERT (eds.), *Encyclopédie* cit., vol. I, p. XXVII. There were various discussions of 'experimental physics' in this period, and also works on 'physics of the soul', such as Guillaume-Lambert Godart's *Physique de l'âme humaine* (1755). Godart explained that 'physics' should be understood in the broadest sense, as in *phusis*: a genetic account of the growth and development of the soul (i.e. the mind), and he noted that such studies of the mind or the passions could indifferently be entitled 'physics' or 'physiology' (G.-L. GODART, *La physique de l'âme humaine*, aux dépens de la Compagnie, Berlin 1755, p.

pology' which would integrate the physical and moral dimensions of the human being, indicate that in a funny way, the awkward presentation of Locke as a predecessor of and/or a participant in the early days of neuroscience⁶¹ is not strictly a contemporary, 'presentist' mistake. On the one hand, Kant himself made a version of this claim; on the other hand, some materialists (e.g. Cabanis) sought to appropriate Lockean empiricism for their purposes, and other 'period actors' (recall Madame de Staël) felt that empiricism led directly to the horrid consequences of materialism. Yet it is important not to equate the 'naturalization of the soul' as carried out, e.g., by Bonnet, with materialism too strongly. Not because of Bonnet's verbal professions to the contrary, which are rather less significant than his extensive analysis of a cerebral underpinning of the association of ideas. Nor because of the philosophically legitimate point, made clearly by Chaumeix, that the connection between knowledge and sensation need not entail a corporeal-materialist basis. Indeed, one can extend this point as regards psychology as a natural science, as follows: the empiricist holds that (i) *ideas come from the senses*; (ii) *the senses require a brain*; therefore (i') *ideas (and thought) require the brain*, and indeed occur in the brain (although very few thinkers explicitly make this equation); therefore (ii') *knowledge about the brain should shed light on ideas and what knowledge is per se*. Many thinkers committed to empiricism and hostile to materialism defended a version of (i). D'Alembert, who actively disagreed with Diderot's materialism (and was satirized as such in *Le Rêve de D'Alembert*), considered that the basic principle of Metaphysics was that knowledge is "the result of our sensations"⁶². Claim (ii') is carried to its clearest consequences by Priestley, while Gaub's letter to Bonnet (not least when read together with Gaub's lecture on mind-body relations and its appropriation by La Mettrie) effectively describes the reluctance for the science of psychology to endorse such a claim.

Rather, there is an effort at the constitution of a science of psychology, while 'blocking the exits' to materialism. As Gary Hatfield has noted, and Fernando Vidal has reiterated, many, perhaps most of the 18th-century projects that might count as immediate predecessors of a scientific psychology, are non-materialist in nature. It is hard to improve on Hatfield's way of putting it:

"In the standard narrative, the heroes of the Enlightenment are materialists. If psychology is to be made a science, the story goes, mind must be equated with matter

iv). Indeed, the 'experimental physics of the soul' was not understood literally as a 'physics', any more than the Newtonian-influenced vocabulary of 'physical histories of the mind' in the Scottish Enlightenment. Cf. HATFIELD, *Psychology as a Natural Science* cit., pp. 383-384.

⁶¹ LEGA, *An Essay* cit.

⁶² D'ALEMBERT, *Essai sur les Éléments de philosophie* cit., ch. IV ("Méthode générale"), p. 26. It was also true that some non-empiricists like Leibniz could accept (i') and (ii') (thanks to an anonymous reviewer for this remark).

and thereby rendered subject to empirical investigation. The problem is that no one bothered to tell the early practitioners of natural scientific psychology that they had to be materialists in order to be natural scientific psychologists. In point of fact, of all the major 18th century authors who made contributions to the development of psychology, only Erasmus Darwin allowed that mind might be material; 19th century founders of psychology, including Wundt, Helmholtz, Lotze, Ebbinghaus, James, Munsterberg, and Binet, banished the very question from scientific psychology"⁶³.

This is very clear in influential authors of the late 18th century such as Thomas Reid, due to their commitment to what I have called substrate-neutrality. Reid sought to investigate the functioning of the mind while being a much stauncher anti-materialist than Bonnet, but considered that the fact of the mind's being accessible to a scientific investigation should not "mask" the fact that mind was "as different from matter as any two things in the created order can be"⁶⁴. As Reid put it,

"Most Systems of Pneumatology begin with enquiring Whether the mind be material or immaterial, whether mortal or immortal, and afterwards enter into an examination of its faculties. But this is certainly a preposterous order because all that our Reason can discover concerning the Nature and duration of the Mind must be deduced from the Nature of its powers and Faculties"⁶⁵.

4. Conclusion

In denouncing the project of a "physiology of the understanding," Kant wanted to rule out an empirical science of the laws of the mind. Interestingly, thinkers such as Hartley and Bonnet *do* want to arrive at laws (including neuropsychological laws), but without materialism, despite their lack of concern over issues such as the localization (or 'spatialization') of the soul. Bonnet attributes mental faculties such as memory to the brain, explaining that recalling sensations depends on the

⁶³ HATFIELD, *Psychology as a Natural Science* cit., p. 390.

⁶⁴ A. BROADIE, *The Human Mind and its Powers*, in ID. (ed.), *The Cambridge Companion to the Scottish Enlightenment*, Cambridge University Press, Cambridge 2003, p. 71. Reid took notes on several of Bonnet's works and speaks approvingly of both his skill as a natural historian and his ideological reliability as a non-materialist (T. REID, *Thomas Reid on the Animate Creation: Papers Relating to the Life Sciences*, ed. by P. WOOD, Edinburgh University Press, Edinburgh 1995, p. 97, 93); thanks to Sebastiano Gino for this reference.

⁶⁵ T. REID, *Practical Ethics being Lectures and Papers on Natural Religion, Self-Government, Natural Jurisprudence, and the Law of Nations*, ed. K. Haakonssen, Princeton University Press, Princeton 1990, p. 451. I don't mean to imply that Reid was actively committed to substrate-neutrality but that he sought to bracket off a space for investigation of the mind that would not run aground in metaphysical debates, as we don't know the mind *per se*, but rather its acts (although this knowledge is sufficient to establish that such acts can't be the product of a material system) (thanks to Falk Wunderlich for making me clarify this).

communication of motions in the fibres; he uses the language of “belonging” (*tenir au cerveau, appartenir au cerveau*)⁶⁶. One might imagine, thinking of Gaub’s ‘mechanism’ or ‘physics’ of the soul and Bonnet but also of Malacarne, that we need a category for 18th-century approaches to the brain (I mean the ‘problem’ of the brain in the sense, e.g. of the relation between mental processes and cerebral processes, or the problem of the seat of the soul, not any specific neuroanatomical position, of course), amongst the different possible approaches in the period, one which is neither immaterialist nor materialist, not transcendental but perhaps empirical. In that sense, I have tried to describe how different possible explanations of the functioning of the mind could be articulated: metaphysical commitments such as materialism, empirical genealogies of the ‘furnishing of the mind’, and embryonic neurophysiologies. And I have emphasized the difference between two notable ways of articulating these explanations: mechanistic and substrate-neutral sciences of the mind (as in Bonnet, and Gaub’s hopes) and a substantial-materialist account (as in Le Camus, Cabanis and some of Gaub’s *De regimine mentis*). What Kant feared, came true, but ironically some of the thinkers who brought it about, like Gaub and Bonnet, were as anti-materialist (and worried about category mistakes) as he was.

⁶⁶ *Essai analytique sur les facultés de l’âme*, in BONNET, OHNP, vol. VI, ch. XXV, § 793, at p. 380, and ch. XXI, pp. 267-268; further connectionist-type details abound in ch. XXII. In the *Contemplation de la Nature* Bonnet terms the brain the “apartment of the soul” (Bk. IV, ch. VI, in BONNET, OHNP, IV, p. 125).

Abstract: In reflecting on the relation between early empiricist conceptions of the mind and more experimentally motivated materialist philosophies of mind in the mid-18th century, I suggest that we take seriously the existence of what I shall call 'phantom philosophical projects'. A canonical empiricist like Locke goes out of his way to state that their project to investigate and articulate the 'logic of ideas' is *not a scientific project*: "I shall not at present meddle with the Physical consideration of the Mind" (*Essay*, I.I.2). An equally prominent thinker, Immanuel Kant, seems to make an elementary mistake, given such a clear statement, when he claims that Locke's project was a "physiology of the understanding," in the Preface to the A edition of the first *Critique*). A first question, then, would be: what is this physiology of the understanding, if it was not Locke's project? Did anyone undertake such a project? If not, what would it have resembled? My second and related case comes out of a remark the Hieronymus Gaub makes in a letter to Charles Bonnet of 1761: criticizing materialist accounts of mind and mind-body relations such as La Mettrie's, Gaub suggests that what is needed is a thorough study of the "mechanics of the soul", and that Bonnet could write such a study. What is the mechanics of the soul, especially given that it is presented as a non-materialist project? To what extent does it resemble the purported "physiology of the understanding"? And more generally, what do both of these phantom projects have to do with a process we might describe as a 'naturalization of the soul'?

Keywords: Physiology of the Understanding; Mechanics of the Soul; Mind; Psychology; Materialism.

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