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# The history of the brain and mind sciences

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Fernando Vidal and Francisco Ortega, *Being Brains: Making the Cerebral Subject*. New York: Fordham University Press, 2017. 328 pp. ISBN: 9780823276080

Katja Guenther, *Localization and its Discontents: A Genealogy of Psychoanalysis & the Neuro Disciplines*. Chicago: University of Chicago Press, 2015. 296 pp. ISBN: 9780226288208

Stephen Casper and Delia Gavrus (eds) *The History of the Brain and Mind Sciences: Technique, Technology, Therapy*. Rochester, NY: University of Rochester Press, 2017. 318 pp. ISBN: 9781580465953

Jonna Brenninkmeijer, *Neurotechnologies of the Self: Mind, Brain and Subjectivity*. London: Palgrave Macmillan, 2016. 169 pp. ISBN: 978-1137533852

Art, culture, and society are products of human brains. They originate in our faculties of perception, thought, and emotion, and they cumulate and spread through the epidemiological dynamics by which one person affects others. Shouldn't we be curious to understand these connections? Both sides would win. The humanities would enjoy more of the explanatory depths of the sciences, and a forward-looking agenda that could attract ambitious young talent (not to mention appealing to deans and donors). The sciences could challenge their theories with the natural experiments and ecologically valid phenomena that have been so richly characterized by humanities scholars. (Pinker, 2018: 824–5)

Despite the power of the fMRI images to recruit believers, the core problem remains. There is no central 'theory of the brain.' ... The 40,000 neuroscientists who meet annually at the Society for Neuroscience often seem to have no common language. Two books on our shelves, each about memory, one by a cognitive psychologist and the other

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by a molecular biologist, share few common references; even their understandings of what constitutes ‘memory’ differ. The neurosciences are data-rich and theory-poor. (Rose and Rose, 2016: 82)

It is now almost 20 years since the so-called ‘decade of the brain’ came to an end, and things have changed. There now exists a community of scholars dedicated to both contemporary and historical assessment of the neurosciences – some of whom first trained as, or now collaborate with, neuroscientists – which seeks a middle way between naïve compliance and swingeing critique of the neurosciences (Mahfoud, Maclean and Rose, 2017; Pickersgill *et al.*, 2018). The two epigraphs above are evidence that the pamphlet war continues nonetheless; but the battle lines drawn are instructive. On the one side, that ‘art, culture, and society are products of human brains’ is cause enough for collaboration; on the other, integration remains a problem *within* the neurosciences, which remain ‘data-rich and theory-poor’. At the same time that the reach of neuroscientific experimental designs has been extended through functional neuroimaging to ‘art, culture, and society’, the theoretical foundations of the conceptual tools of cognitive neuroscience have come increasingly under scrutiny (Turner, 2012; Uttal, 2011). Initial neo-phrenological claims have receded behind a (not so new) connectivist paradigm, and the leading institutions of biological psychiatry acknowledge they cannot diagnose mental illnesses on the basis of a neuroscience that doesn’t exist yet. Already 20 years ago, historians placed the ‘decade of the brain’ in a long history of attempts to materialize the mind (Breibach, 1996). For scholars of ‘the history of the brain and mind sciences’, the ‘and’ has become constitutive of the attempt to thoroughly historicize this asymmetrical integrative project (Casper, 2014).

Historicizing integration also means establishing the limits of interdisciplinarity. As Fernando Vidal and Francisco Ortega explain in their book *Being Brains: Making the Cerebral Subject* (2017), existing attempts at integrating neuroscientific research with the traditional objects of the human sciences are crippled by the epistemic irreverence of the former and its consequent neglect of concepts and theories from the latter. They seek to counteract this with a defence of the integrity of the human sciences, those that seek ‘an interpretive and historicizing *Verstehen*’ (229), and exemplify their case by documenting the historical origins of the contemporary cerebral anthropology that bolsters neuroscience’s intellectual asymmetry. The other works under review here partake in this countermovement from a variety of different perspectives. Jonna Brenninkmeijer’s *Neurotechnologies of the Self: Mind, Brain and Subjectivity* (2016), an ethnographic and historical study of contemporary neurotechnologies, replaces visions of a reductive cerebralization with an account of how contemporary technologies that provide ‘direct access’ to the brain expand and complicate, rather than curtail, the possibilities of self-control in the 21st century. Similarly, Katja Guenther’s *Localization and its Discontents: A Genealogy of Psychoanalysis & the Neuro Disciplines* (2015) pursues a historical reconciliation of psychoanalysis and neurology. She achieves this through a careful reconstruction of how a physiological model of reflex action, coupled with an associationist psychology, formed the dynamic intellectual matrix of 19th-century neuropsychiatry from which both of these sciences eventually developed. In complement to Guenther’s study, which sticks to central figures in the history of psychiatry and neurology, *The History of the Brain and Mind Sciences: Technique, Technology, Therapy*

(2017), edited by Stephen Casper and Delia Gavrus, reveals a complex and fragmented patchwork of episodes in which the loci of mind and brain were curated, marginalized and re-staged over the last 150 years.

There is no hope of doing justice to the diversity of material covered in these works in a synthesizing review such as this. In fact, it is precisely in their partiality and their specificity that the universalizing and reductive claims of certain neuroscientists can be historically dismantled. The history of the mind and brain sciences, to exaggerate, is equally wary of the excesses of *both*, and shows how it is often through the abuse of its counterpart that one seeks, unsuccessfully, to achieve hegemony. Rather than take sides, it shows how psychology makes demands of physiology (and vice versa), and how people may choose to become their brains, to resist their brains, or do both. Yet it needs to be emphasized that the flow of academic capital, symbolic and monetary, comes predominantly from the brain and the neurosciences, for which 'the history of the brain and mind sciences' – effectively coined by the Casper and Gavrus volume – is a barely disguised placeholder. For instance, while in the title the phrase runs 'brain and mind', it becomes in the introduction predominantly 'mind and brain', yet as the third sentence explains, it is a corrective to 'historians of neuroscience' (1) and as noted later, the mainstream 'historiography of neuroscience' (7). It is this tension between the task of historicizing contemporary neuroscience, and delimiting the claims of neuro-collaboration, that gives the emerging historiographical framework its energy and its urgency.

*Being Brains* is not about brains, but about the history of making people into brains. It makes a threefold argument: firstly, claims that we are our brains predate 'neuroscientific breakthroughs' and derive from the re-conception of personal identity in the 17th century; second, while neuroscience bolsters these claims it does not substantiate them; and finally, overall the connection between the two is scientifically underdetermined and often ideological (Vidal and Ortega, 2017: 9–10). The scope of the argument is huge, as the authors recognize, but it is handled skilfully across four main areas of research: 'neuroascisis', or the cerebralization of self-help, post-1990s neuro-disciplines, specifically neuroaesthetics, neuroanthropology, and cultural neuroscience, the impact of the neuro-ideology on psychiatry, and the refraction of the neuro in literature and film. It is hard to summarize the diversity and richness of the authors' assessed material, but the thrust of their argument is pithily captured in the phrase 'cortex without context simply won't do' (129). The experimental designs of neuro-collaboration, predominantly driven by neuroimaging, within both the humanities and psychiatry tend to pursue causal (read correlational) explanation at the expense of contextual and phenomenological factors. The 'neuro' is ultimately 'uncomfortably protean', offering different 'ways of being a cerebral subject' (187), and neuro-collaboration has revealed 'the complexity of the brain's interactions with internal and external milieus, both organic and social' (227).

The historical argument is genealogical in the Foucauldian sense of being 'a history of the present' (4) which critiques post-1990s 'neurocultures' (or just '*neuro*'), unified by the claim that '*the mind is what the brain does*' (3), by showing that people were doing their brains long before contemporary neuroscience. The connecting frame is anthropological. 'Brainhood' is an anthropological sub-category of personhood (which is historically and logically prior) that is both fairly intuitive (headaches, head injuries) and the result of a philosophical anthropology first given contour by Locke, which

internalized relations of property to explain how a person relates to a body ('every Man has a Property in his own Person' [25]), and how a person relates to itself (continuity of memory and consciousness). 'Personhood as brainhood' becomes a possibility for thought (post-Locke) as a boundary case of personal identity (e.g. brain swapping), yet its historical importance is in anchoring brain science within a discourse about the modern self. It may well be the case that our minds 'reside in or are a product of the brain' (24), but *being* a brain has nothing to do with this (42). The key argument the authors make is that rather than knowledge *about* the brain stimulating the location of personal identity within the brain, the reverse took place.

Rather than finding ourselves in our brains we have, as moderns, tried to improve ourselves through them. The 19th century heralded the birth of cerebral self-help. This combined extant forms of 'cerebral asceticism' (brain training) with evangelical self-improvement, a pursuit exemplified in the work of Warren Felt Evans (1817–1904), an American Swedenborgian minister who freely combined elements of phrenology, phrenomagnetism, pantheism, and gnosticism in developing a therapeutics of scalp-touching and positive thinking. The process of improvement involved touching the patient's head in the desired place and silently willing them to adopt the desired mental state. For Evans, thought could change anything, but thought depended on the brain. Evans' exercises are continued in contemporary 'brain gym exercises' by brain athletes who lay their fingertips on the 'positive points' above their eyes, halfway between hairline and eyebrow, in order to 'bring blood flow from the hypothalamus to the frontal lobes, where rational thought occurs' (Vidal and Ortega, 2017: 51).

But contemporary 'objective self-fashioning' (Dumit, 2003) through 'neuroasceticism' is also distinctively more technical. This more technical self-fashioning is the topic of Jonna Brenninkmeijer's *Neurotechnologies of the Self* (2016). Her study compiles the fruits of several years of observing, and participating in, the use of 'neurofeedback' machines. It grapples with the ontological ambiguity that practitioners of neurotechnologies encounter when they try to manipulate the brain to fix the self, whether that means treating ADHD, helping someone sleep, or obtaining spiritual peace – in short, 'you have to take care of your brain, while your brain takes care of you' (4). The basic setup works as follows: the patient, subject, or anthropologist connects themselves to a quantitative electroencephalograph (qEEG) by attaching electrodes to their scalp; meanwhile, a technician assesses the brainwaves displayed at a computer terminal. Training takes place by showing the patient their brainwaves and asking them to produce a specific rhythm, such as a beta or alpha wave, which since no one knows exactly how it works, can be done in many ways.

The world of the 'neurofeedback tribe' is therefore unpredictable. Some never make it far, such as one client who complained to Brenninkmeijer: 'So, what did [clinic X] do with my EEG, in 24 sessions and 3500 euro? Well, nothing. . . . Their answer to why my EEG remained unchanged was "You have a stubborn brain"' (Brenninkmeijer, 2016: 39). Whereas another, this time a self-taught neurofeedbacker, recorded in his qEEG diary how he 'drives really fast on the highway by using the words "vroom, vroom, beta" and the first thing you can see when you enter his home is a huge poster of his own brain' (99). Brenninkmeijer constructs a suitably cybernetic theoretical framework, blending Foucault, Pickering, and Latour, to describe how the feedback loop enables various

entities to interact during training. This is particularly impressive and does an excellent job of accommodating the reflections of her interviewees, which shift between reductive brain-identification and holistic spiritualism, with an understanding of feedback as a ‘dance of agency’ which is given final shape by practitioners themselves, through the quest to improve their selves. Importantly, in contrast to Vidal and Ortega, in Brenninkmeijer’s analysis people work on their brains *directly* – they are not persons reduced to brains, but persons that change and extend themselves by acting upon their brain.

But what does it mean to work *directly* on the brain? While this is fundamental to Brenninkmeijer’s characterization of what makes a ‘neurotechnology of the self’, it is exactly this ontological claim which Vidal and Ortega problematize. In their assessment of contemporary ‘neurodiversity’ movements, they note that unlike the antipsychiatry movements of the 1960s and 1970s, which tended to reject the fundamental materialism of mental pathologies, these movements ‘see the brain as the somatic seat of legitimate identities’ (Vidal and Ortega, 2017: 169). Yet there remains the problem of using an organic difference to define oneself as having an ‘autistic brain’ when there is no consensus on the neurobiological aetiology of disorders such as autism. The directness of neurofeedback is the simultaneity of the subject’s attempts to achieve ‘control’ with their observation of their own brainwaves. Yet this directness is mundane compared to the *indirect* far-reaching changes users make in ‘the way they live their lives, think their histories, deal with setbacks, and interact with others’ (Brenninkmeijer, 2016: 98). The success or failure of cerebralization is only indirectly connected to knowledge of the brain, because what is at stake in being a brain is a way of living in which the brain plays only an indirect part.

For both books, an anthropological focus leads to a necessary aporia, clearly articulated in *Being Brains*, whereby the authors state, ‘the cultural history of the cerebral subject is largely independent from the history of brain science’ (Vidal and Ortega, 2017: 35). This seems to be a strong claim, and in a way at odds with other facets of the book. But it follows from the assertion that brainhood is a type of personhood, not the result of the brain sciences. While Brenninkmeijer pays attention to how neurofeedback is part of ‘the (historical) quest to grasp the self with a brain device’ (Brenninkmeijer, 2016: 72), the brain we do, and therefore the ‘distributed’ self, is ultimately more important than the positive knowledge of the mind or brain. Vidal and Ortega have little to say about the relationship between theoretical innovation in the brain sciences and cerebral ideology beyond acknowledging their mutual reinforcement, or more specifically, that the latter is a cultural and psychological reality. An ethnography of the lived reality of cerebralization is inevitably, as they acknowledge, a contribution to that reality (Vidal and Ortega, 2017: 11). In addition to these approaches, we must also pursue the exact ways by which cerebralization developed and changed historically, and the internal dynamics of experimental attempts to link mind and brain, to understand better what is at stake in integration.

The project of localization that emerged in the 19th century is the focus of Katja Guenther’s monograph *Localization and its Discontents* (2015). Moving through close textual engagement with the work of six figures within her neuropsychiatric genealogy, Theodor Meynert, Carl Wernicke, Sigmund Freud, Otfried Foerster, Paul Schilder, and Wilder Penfield, the argument proceeds by careful case analysis, unfolding the

development of a reflex model of brain physiology up to its bifurcation on one side as psychoanalysis and on the other as neurology–neurosurgery. The achievement of Guenther’s work is to re-form the history of localization within an epistemological matrix with theoretical, practical, and clinical axes, such that the arrangement of the mind and brain sciences is no longer framed by a dualist opposition, but is extended to a model-making pursuit which self-critically and experimentally moved between anatomical, physiological, and psychological observation. Localization proceeded from a somaticist creed that mental pathology equalled brain pathology, typically surmised in Wilhelm Griesinger’s (1845) aphorism that ‘mental disease is brain disease’,<sup>1</sup> but the road to somaticization produced some of the most productive elucidations of its limits, and some very fertile offspring.

Guenther details how Theodor Meynert (1833–1892) imported the Bell–Magendie law of sensory and motor separation, developed through anatomical investigation of the spinal cord, into brain physiology in order to better equip it to explain psychological phenomena, such as how mental representations might be formed and localized in nerve fibres. In pursuing this integration, however, Meynert ended up distancing himself from the *Zentrenlehre* (localization), as it became clearer that while presumably basic impressions could correspond to specific nervous fibres, mental representations could become impossibly complex in the process of thought, connecting diverse parts of the cortex, and nullifying localization. As Guenther goes on to show, it was exactly this tension which prompted Freud to reject Meynert’s localization as too psychological for physiology, as nerve fibres could not support the burden of mental representations, and his association psychology as too physiological for consciousness, since associative connections transgressed the distinction of higher (conscious) and lower (digestion, heart regulation etc.) functions.

Guenther’s presentation of Freud is indicative of the work as a whole. By carefully reading his early neurological writings, including unpublished manuscripts, within the context of the influence of Meynert’s theoretical and clinical work (under whom Freud worked in 1883), Guenther unearths an unfamiliar origin for Freud’s well-known ideas, such as the unconscious. The unconscious, here, is the result of an attempt to universalize association as a connective principle proper to psychology. Unlike in Meynert’s model, Freud proposed that association was pervasive throughout the nervous system: the relations of associations, both expressed and latent, became the hermeneutic for understanding mental pathology. Moreover, Freud’s shift away from Meynert’s pathological anatomy and lesion model in his *Project for a Scientific Psychology* (1950[1895]) by stripping brain physiology of its psychological qualities led him to allow for entirely autonomous psychological aetiologies, whereby pathological associations could form independent of any brain damage, for which Freud used the word ‘trauma’. Psychoanalysis emerges as a rejection of localization, which moved from the radicalization of one of its core principles, the reflex model of brain physiology, to an understanding of autonomous psychological pathology.

While Guenther’s work shows us how a historicization of dualisms – ‘like physiology-psychology or soma-psyche’ (94) – can be achieved through close reading and attention to practical and clinical contexts, it does little to show us how past alterity can shift or undermine the contemporary asymmetry in neuroscientific thought. It bears

pointing out that Guenther's conclusions on the legacy of Freud, especially his early work in the *Project*, read remarkably similarly to those of contemporary biological psychiatrists and neuroscientists who seek to appropriate Freud as a proto-neuroscientist.<sup>2</sup> Inevitably, perhaps, the source material limits what Guenther can offer regarding her ambition to 'reframe anxieties about the place of neuroscience in contemporary academic culture' (12). The book devotes most of its attention to the fate of localization pre-WWII, stopping before the arrival of the reductive 'neuroscience', which has framed its claims to integration predominantly in the disparate languages of molecular biology, genetics, and cognitive science. Freud's psychoanalysis may have had roots in physiology, but attempts at neuropsychology have so far remained asymmetrical and it remains unclear how the book's genealogy might reconcile the two disciplines. It is absolutely right to assert that in the history of the mind and brain sciences 'the clearest ruptures we can discern seem to be not *across* disciplines, but *within* them' (189), but that demands paying equal attention to the complex histories of psychological concepts, a task that exceeds the limits of a book structured around a physiological reflex concept.

*The History of the Brain and Mind Sciences: Technique, Technology, Therapy* (2017), to which Guenther contributes an epilogue, does an excellent job of simultaneously expanding the horizon of investigation beyond the nervous system and setting sights 'on comparatively less ambitious aims' (Casper and Gavrus, 2017: 7). While the chapters offer much individually, the vision of the editors is the most impressive and important feature of the collection. They note the specific lure of a historiography which focuses on highly visible technologies, such as neuroimaging, and highly charismatic scientific ideologues, such as John Eccles or Wilder Penfield, in construing an over-determined and insular history grounded in contemporary 'vogue categories' (7). Consequently, the alterity and contingency of 'normal science' are concealed. In its place, they substitute the figures of modernity and marginality, in order to reveal how modern 'science is constantly constructing teleologies' (12) by forgetting, effacing, or discontinuing sets of practices; the shifting centre-margin relationship therefore acts as a model for a non-linear, reflexive, and fragmentary history of the modern mind and brain sciences. This is all the more important for limiting the expectations of historical scholarship, which, given the sheer quantity and complexity of output in these sciences throughout the 20th century, cannot hope for comprehensiveness but rather must settle for tempering meta-narratives with readings from the margins.

This position is fleshed out through the trinity of technique, technology, and therapy, although the main focus is on technique, which stretches across the diverse activities of exhibition design, novel writing, neurosurgery, and biological rhetoric. What stands out is the mobilization of unexpected source material. For instance, Delia Gavrus's reconstruction of the career and life of the lesser-known lab technician of Wilder Penfield, Edward Dockerill, assesses the importance of professional self-fashioning in the modern neuropathological laboratory through the unpublished quasi-autobiographical novel Dockerill wrote expressing his dissatisfaction at being an undervalued and invisible technician. Dockerill worked in Penfield's lab at Presbyterian Hospital, NYC, from 1923, and followed him to Montreal in 1928 (leaving his wife and children in England), where he assisted Penfield in the development of a therapy for idiopathic epilepsy, one which ultimately proved a dead end. The promise of a 'rational therapy' was unfulfilled

by the ambiguous results of the histopathological work. Dockerill's manuscript told an alternative fictional story of therapeutic success, while also lamenting the actual state of modern organized science, which not only favoured opportunist and self-publicising scientists (read Penfield) but silenced the maverick genius 'with his uncouth habits and occasional flashes of inspiration' (read Dockerill) (Casper and Gavrus, 2017: 152). Gavrus reminds us how the biomedical laboratory was simultaneously a real and fictive site where scientific identities and rational therapies were both imagined and marginalized.

Spaces are central to the chapters by L. Stephen Jacyna and Stephen Casper, which extend our purview beyond familiar laboratory techniques to the demonstrative and representational environments where the mind and brain were encountered, both by those seeking truth and those seeking entertainment. The Paris Menagerie, commissioned in 1792 to stand in the Jardin des Plantes and subsequently expanded in the 1830s, provided a site where expert and utilitarian naturalists, championed by Frédéric Cuvier, could assess the limits of the residents' intelligence, which often meant incorporating the observations of their forgotten yet 'intelligent' keepers. The menagerie functioned as a 'truth machine', writes Jacyna, where both animal and 'Man' could be studied, and contemporary investigation of animal nervous structures could be enrolled in understanding humanity. Yet the 'machine' looked back. The physiologist Pierre Flourens, adamant that human intelligence was God-given and unique, nonetheless recalled one important encounter in the menagerie where he, accompanied by an elderly friend, investigated a particularly remarkable male orangutan who lacked 'the petulance of other apes' and whose 'demeanour was serious'. Upon their leaving the orangutan's enclosure, the ape approached the elderly friend, mischievously took his walking stick and proceeded to imitate the old man's gait, with bent back and sluggish pace, shortly before returning the stick. Flourens recorded that both men left 'convinced that he also knew how to observe' (Casper and Gavrus, 2017: 44).

Similarly, Stephen Casper's cross-investigation of the 1951 Festival of Britain gives life to the psychotechnical exhibition installations that performed an 'invisible reaction formation' (Casper and Gavrus, 2017: 186), through an exaggerated materialism that symbolized the latent absence of the psyche in the atomistic universe presented to visitors. A visitor to London's Science Museum during the Festival would first encounter a room showing natural objects such as diamonds, which in subsequent rooms were blown up to first ten, then one thousand, then a million times their natural size (and so on) to demonstrate atomic structure. The rest of the exhibition, the director Ian Cox explained, would utilize 'motion pictures, animated diagrams, stereoscopic photographs, electric signs, moving three-dimensional models' and more, thereby enabling visitors to, like Alice, 'wander through a Wonderland where the nucleus of the atom and its surrounding electrons are spread all around him' (195). Unsurprisingly, curating a materialist universe involved engaging the mind. But, critically, Casper uses the Festival exhibit to elaborate the role of dualism in our historiographies by demonstrating that dualism was (and is) a practice often completely amenable to materialist and reductive sciences. The contemporary denial of dualism by neuroscientists likewise makes use of a specific historical argument that obscures its ongoing presence in practices, for example, in the popular use of carefully coloured fMRI brain scans to show mind-in-brain activity.



This volume is an impressive reflection on how we might write the history of ‘the brain and mind sciences’, yet, given its self-confessed dedication to the marginal, it will not serve as a general introduction to the history of modern neurology, psychiatry, or psychology. Nonetheless, as a historiographical primer the editors’ introduction should be required reading, and points to some key inadequacies and future goals for the field. For example, the authors note how the context of evolutionary biology for the historiography of the mind and brain sciences has effectively been ignored, in spite of the fact that the place of the mind has been central to the politics and controversies within evolutionary theory (fn 30, 21). This neglect is itself in part due to the contemporary emphasis, by both historians and ideologues of the neurosciences, on spectacular experimental techniques, at the expense of the complex conceptual history of theoretical biology. To return to the epigraphs with which we began, the ‘data-rich and theory-poor’ state of contemporary neurosciences that Hilary and Steven Rose diagnose directly corresponds to the historically fragmented bricolage that the history of the mind and brain sciences can reveal. The contemporary neurosciences are not a closed system of experts whose experimental results exemplify a common theory of the brain, but rather a conglomeration of experimental systems generating results in spite of a unified theory. This fact is an incentive for the pursuit of an equally diversified and fragmented historiography.

In a review covering these rich and diverse contributions, one must be sensitive to over-emphasizing unity at the expense of subtlety. Indeed, it is not clear that all of these authors would consider themselves to be contributors to ‘the history of the brain and mind sciences’. We should, for instance, differentiate within this grouping between those approaches that lean towards a history of the subject, self, or subjectivity in general, and those that engage more closely with the construction of technical knowledge about the brain and mind. But by holding these strands together, the position of the human sciences is strengthened. In a way, the history of the brain and mind sciences *is* a theory of the brain because it shows exactly how neuroscience can change our minds. It shows, as Cornelius Borck has put it, how we may think (Borck, 2016). Its unity, however, is not found in the space inside our skulls, but in history writing itself.

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1. This is an aphorism and does not appear in the text.
2. Compare Guenther fn12 p.264 with Andreasen (1997).

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