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# The Neuromance of Cerebral History

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Once upon a time, when quizzed about the recent advances in the sciences of human brain, “Dr. Felix” was quick to reply that he rather had begun to “feel like Buck Rogers.” And, he added, “we are just on the threshold,” lest anyone doubt it: “where will we go—I don’t know. But it is so far, so fast, that our wildest dreams are likely to be ultraconservative”(Coughlan, 1963a, p. 106).

The year is 1963, “Dr. Felix,” Robert H. Felix, director of the National Institute for Mental Health, Bethesda, and the pages of *LIFE* magazine the outlet which broadcast, lavishly illustrated as always, Felix’s wildest dreams (indeed, not only Felix’s). “ESB” for instance, or Electrical Stimulation of the Brain, one read, was very high up on the list of those things likely to arrest even the ultraconservative imagination. This “electronic tool” promised to modulate the brain’s electrical circuits—at will: “ways to “operate” directly on unhealthy emotions;” induce them—rage, fear, aggression, anxiety, happiness, a “well-oriented drive to attack and destroy;” heal sex criminals, compulsive overeaters, and those suffering from “shaky palsy” alike. Already, truculent monkeys were easily converted from “bad-tempered dictator to ... benign and tolerant philosopher” (Coughlan, 1963a, p. 100). If that hadn’t been enough, readers were assured that more potent and dramatic even should prove the “chemical side of the matter,” and “chemical mind-changers” in particular: the “startling” hallucinogens and, all the more familiar to readers of *Life*, all those “psychic energizers,” “mood elevators,” and “tranquillizers” (Coughlan, 1963b). In 1963, the day drew near when human personality would be “change[d] and maintain[ed] ... at any desired level,” loneliness, depression, gloominess, and pessimism removed from society, and (a more ambiguous prospect) a “single pound” of LSD clandestinely making its way into “say, New York City’s or Moscow’s water supply” might easily “produce a temporary ‘model psychosis’ in the whole population” (Coughlan, 1963b).

Almost half a century later, the imaginary futures of neuroscience look altogether less Pynchonesque, but the neuroscientific Buck Rogers are still—or again—among

us, even if, by virtue of sheer numbers they now would seem to resemble not the lone hero Buck but his foes, the innumerable Tiger Men from Mars (in the US, what began as an affair of less than 500, the Society for Neuroscience (SfN), now sports more than 40,000 members) (Doty, 1987, pp. 431–432; SfN, 2009). All this, no need to reiterate here, much to the excitement—or alarm—of no small number of critics and commentators; not to mention, the growing number of parasitic discourses and hyphenated disciplines grafting the “neuro” onto anything which might usefully profit from such a timely interdisciplinary alliance—anything, that is, from aesthetics to law.

Quite necessarily, a “critical” neuroscience would also have to operate within this heterogeneous web of discourses, actors, institutions, and emergent practices; and quite inevitably, this critical project would always seem to be at risk, despite all the good intentions, of thereby reinforcing the sense of exigency, or of merely reproducing the rhetoric, images, and futures advanced by neuroscientists, neuroenthusiasts, and neuroskeptics alike (a delict “neuroethics” indeed has been accused of being guilty) (De Vries, 2007; Hedgecoe, forthcoming). Any pretence of being critical would indeed seem to involve, at the very least, some reflected awareness of the shape of the discourse one is addressing. In this chapter, therefore, I shall be concerned, in broadly historical terms, with one of the elements traversing this complex discursive web: one perhaps all-too-obviously central as to be questioned, or sidelined—the brain. It is the brain, or rather the brain-centeredness of our accounts of what seems to be at stake, that I wish to confront with if not exactly a critical then certainly an unsuitable past. This chapter, in a way, is about the merits of being, from the vantage point of the history of science, not a historical program of how-to-be-critical. It offers an unromantic view from the history of science, not a historical program of how-to-be-critical.

It is certainly not immediately apparent why (or how) those pondering the “potential implications” of contemporary neuroscience should be particularly concerned with, say, the wild dreams induced in the 1960s by the electronic tools of brain science; nor, for that matter, what exactly the psychedelic threats to the geopolitically significant water supply systems were—all the less so, because the dramatic expansions of the hard-to-fathom complex of activities we refer to as the neurosciences are very recent history at best: “It is so far, so fast.” Naturally, perhaps, much “neurotalk” tends to be future-oriented. The historical imagination, at any rate, has played no really explicit, or critical, role in what is, to be sure, a highly varied set of discourses. And yet, if the latter-day Buck Rogers naturally, as it were, keep their stern eyes on the future of the neurouniverse rather than on the subtleties of its past, it does not necessarily mean legitimately so; and history not being made explicit, does not necessarily mean that it is absent or that this is the case and, more specifically, that there is a tendency to endorse—somewhat uncritically—a romantic, brain-and-mind-centered vision of neuroscience’s pasts, is the argument that I shall develop in this chapter.

The point, in brief, will be to deflate the notion that historically speaking neuroscience is best, and naturally, imagined as solely and essentially revolving around man’s cerebral nature.<sup>1</sup> Itself of fairly recent vintage, this brain-centric vision has arguably structured (not least) much of the historical narratives of neuroscience which have become

<sup>1</sup> Of course, one could easily adduce a list of items where a little historical reflection might prove enlightening, quite irrespective of whether or not this historical imagination is indeed “brain-centered.” In

available in recent decades. It is this vision, or historical figure, that the *neuromance* in the title gestures at: a cerebral romanticism inscribing the neurosciences, wittingly or not, into an age-old, anthropological quest of ultimate significance, the final capstone on the long-winded path to human nature exposed (the more obvious examples for this kind of sweeping narrative would include: Changeux, 1997; Clarke & Dewhurst, 1996; Corsi, 1991; Finger, 2001; Gross, 1998; Poynter, 1958).

As I shall argue, problematizing the neuroscientific past might mean thinking somewhat less romantically about the neurosciences instead; it might mean, that is, to disengage our historical imagination a little more from that very organ that has so profoundly come to define the image of neuroscience—the brain. Accordingly, I shall be less concerned in the following with an object-lesson in the illuminating (or exposing) deployments of neurohistory; or, for that matter, with chemical mind-changers and electrical stimulation in the post-World War II period per se; rather, more historiographically, and more inclusively, with the kinds of pasts conjured up in the first place. The difficulties of turning such historical niceties into “critical” ones (lest we celebrate too early) are, however, compounded by a host of issues which speak not merely to the tendency of romanticizing the brain; not least, they point to a tendency built into science studies, a field always prone to elevating its object—Science—into perhaps too central a force in matters of societal change; indeed, as I shall conclude, it may inadvertently run counter to the object of “critique:” feed rather than deflate the neuroscientific exigency—becoming Buck Rogers.

## Neuromance

Though Dr Felix won't concern us here much further, let us briefly return to the scene painted at the outset. As a historical picture of brain science in the early 1960s, the above is, of course, little more than a caricature. One should certainly not imagine the 1960s brain as especially comic; neither, perhaps, as simply superseded in its at times bizarre enthusiasm; nor, however, was this little vignette meant to intimidate a deeper resonance with contemporary neuroscience. What the phantasm of unlimited brain-control unfolding in the above was meant to invoke was not a historical situation so much as a historical gesture: a quite typical maneuver on the part of the historians of neuroscience. In fact it is a—or perhaps the—primary mode of understanding and constructing this history: that the brain was not in the news for the first time either then or today will hardly be news for readers following the—more professional—historical literature. More properly, it is the project of showing—the novelty rhetoric of much of the contemporary “neurotalk” notwithstanding—that the brain and its sciences were always fundamentally cultural objects and, as such, have histories long pre-dating the much more recent advent of the neurosciences.

It is not too difficult to see how the above might fit into such picture, say, of the Cold War American brain: one showing the brain, its sciences, and the ways they mattered deeply entangled with the cultural, economic, and political fault-lines of the

fact, surprisingly little of this type of analysis has actually happened. Not least here, however, disinvesting in the brain/mind drama could be crucial, certainly for analytical purposes.

times. The specter of being brain-washed, or the antics of CIA-funded neuropsychiatrists might be familiar (see Alder, 2007; Littlefield, 2009; McCoy, 2006), as might the sky-rocketing use of amphetamines, tranquilizers, and anti-depressants in the 1950s and early 1960s, busily cultivated by a burgeoning pharmaceutical industry (Herzberg, 2008; Rasmussen, 2008; Tone, 2008).

There is indeed a very good case to be made that it was then, in the middle decades of the twentieth century, that the *central* nervous system began definitely to shape not merely the discourses, but also the practices, surrounding the nervous: lobotomy, the EEG, ESB, “electronic brains,” a fast-growing range of wholly new substances promising a cure for the mentally ill and relief for the melancholy masses—Benzedrine, Miltown, LSD, chlorpromazine; the steady, well-engineered growth of psychosomatic medicine since the 1930s; chemical warfare worth its name (from the scientific, neurophysiological point-of-view, that is); “death” on the verge of being rethought as “brain death.” All this would have contributed to the rising scientific and public salience of the “living brain” in the 1950s and 1960s (Belkin, 2003; Borck, 2005; Braslow, 1997; Crowther-Heyck, 1999; Pressman, 1998; Schmaltz, 2006).

More significant, however, for my purposes than the possible feel of déjà-vu is that, in fact, we lack anything in the way of a comprehensive picture of the developments at issue: the neurosciences in the second half of the twentieth century. And if, as seems plausible enough, there was indeed a significant shift around 1950 in matters of the brain—both culturally as well as an object of experimental science—the point of the following is not to improve on such a picture, or to belabor a necessarily somewhat arbitrary point of origin. Rather, by looking more closely at the formative decades just prior to the institutional, post-1970s crystallizations of “neuroscience,” it is my aim to explore the limits of the historical maneuver above; of imagining, that is, the history of neuroscience in overly cerebral, brain-centric terms.

But first, it will be appropriate to dwell a little longer on these latter terms. The express concern with the cultural dimensions of the brain is indeed, and hardly surprisingly, what is most salient about the recent accumulation of historical literature on the neurosciences—as a historical occupation (and label) itself nearly contemporaneous with the run-up to the Decade of the Brain. “Surely the rising star of body parts in the 1980s” must have been the brain, as feminist historian Elaine Showalter noted in 1987 (Showalter, 1987, p. 39). The ensuing decade saw the creation, notably, of a *Journal of the History of the Neurosciences* and an *International Society for the History of Neuroscience*. From the mid-1990s, the US Society for Neuroscience launched a series on the *History of Neuroscience in Autobiography*, now grown to six volumes. And quite apart from such concerted efforts, it has become easier than ever to turn up remains relating to your favorite branch of neuroscientific prehistory in the vast, digital seas of the internet. While one would be hard pressed to detect the traces of an over-arching master-plan in these quite diverse activities in tradition-building, overall, the framing is perceptively different than the kind of history writing still prevalent well into the 1980s.<sup>2</sup> The history of this young science has become grafted

<sup>2</sup> Take the case of phrenology: though its ghost is still, or again, haunting the makers of fMRI images today, such polemic instrumentalizations are very unlike the deep interest historians have shown for the

onto a history of the brain, as much, perhaps, as the latter has been re-imagined through the lens of “modern neuroscience.” The casual collapse of the one (neuroscience) into the other (brains) begins, but hardly ends, with the *Wikipedia* entry on “Neuroscience” (at the very beginning of knowledge). Its history section will carry you, and almost perfectly reproduces, another entry: “History of the Brain”. Politically-correct-enough, it informs at length about contributions from “non-Western” science, but otherwise tells a familiar and edifying, if not particularly subtle, plot: Ancient Egyptian surgeons, Aristotle, Galen, Descartes, and on to the “modern period” which sets in with a number of great, nineteenth-century figures (the twentieth is generously skipped over): Golgi, Ramón y Cajal, Du Bois Reymond, and Helmholtz at the cellular end; Broca, Jackson, and Brodmann at the cortical one (“History of the Brain,” 2010).

But Wikipedia is only one such symptomatic case, and probably not the most authoritative one. The tendency is widespread, and although I will focus here on the more academic kind of histories, I do not mean to single out, or prioritize, the latter when referring to the “historical imagination.” Biographies of distinguished members of this or that medical specialty—for instance neurologists, psychiatrists, neurophysiologists, psychologists, and so on—are more likely to be subsumed now under the label “neuroscientist” (Söderqvist, 2002). Meanwhile, the label “behavioral sciences,” once providing a similarly salient, omnivorous but disparate umbrella, that—spilled well over into the social sciences, has lost much of its former relevance in structuring narratives (see esp. R. Young, 1966). In other cases (and here we are coming closer to the kind of memory work at issue here), personae and events, should they fit less obviously into the (self)images of the neurosciences, recede practically into obscurity or remain at a safe distance, remembered as exponents of other, less obviously brain-and-mind-centered disciplines—say, molecular biology or biochemistry.

Since the 1980s, not only have the sciences of the brain been refashioned as neuroscience (or rather neuroscience has been fashioned as the new, and true, brain science). Importantly, the registers employed and theoretical tools mobilized by academic historians engaging with the brain have also mutated, alongside significant ideological re-constellations and a new sophistication in the profession, generally. Some of these new horizons will be familiar—the turn to the “local” and the much celebrated attention that was now being paid to the (equally local) practices of science, for example. Particularly important here is another, related theme which featured prominently in these historiographical departures since the 1980s: the increasingly culturalist orientation and habits of mind that historians of science brought to their subject matter. Somewhat ironically, it is this culturalism which, despite its utter productiveness in re-envisioning science’s pasts, has been—inadvertently—complicit in what I called the romantic tendencies in the neurohistorical

matter as late as the 1960s and 1970s (Cantor, 1975; Cooter, 1985; Shapin, 1975, 1979; Wyhe, 2004); then, phrenology’s rehabilitations as something quite other than “pseudo-science” functioned in a very different socio-political climate, more likely to be directed, by the waves of Marx-reading scholars, against the illegitimate powers and pretensions of the behavioral sciences and psychiatry (rather than, say, the much more nebulous prospects of a neuroenhanced, posthuman future).

imagination; inadvertently because, in terms of history, much of what has been written about the brain in the past few decades, had been driven by decidedly skeptical attitudes towards the new and growing visibilities of something called “neuroscience.” The way to proceed has been to write histories of the brain and its sciences in the idiom of “culture;” and noteworthy too, it has been to study not the recent genesis of neuroscience, but periods prior to World War II.

Works such as Anne Harrington’s *Medicine, Mind and the Double Brain* (1987) were among the first to react to “the burden of a wide variety of social, moral and philosophical concerns” which, Harrington wrote, the brain was made to carry in the late twentieth century, “when the explanatory possibilities of the brain sciences [were] widely perceived as almost limitless”—again (Harrington, 1987, p. 5, p. 285). As Harrington then set out to show (along with a growing number of fellow historians), such perceptions were not so fundamentally new. Moreover, it was shown that notions of the brain’s structure and functioning could not be dissociated from the moral and social norms and discourses structuring, say, nineteenth-century industrial society, and the conditions that reproduced class, gender and racial divisions: and even though historians took pains not to draw explicit parallels concerning the contemporary “relationship between ideas of brain functioning and the social and political order,” little doubt was left that the late twentieth-century resurgence of brain-talk should not be exempt to similar relativizing scrutiny. Indeed many of the same concerns—the naturalization-through-brains, in brief, of the social order or the “cultivation” of the cortex—were beginning to drive similarly ambitious projects (Borck, 2005; Hagner, 1992; R. Smith, 1992; Weidmann, 1999).

Whether Victorian mad doctors or interwar brain eugenicists, we are beginning to possess an increasingly fine-grained picture of just how consistently the brain has served within the last two or three centuries as the projection site of social, moral, and political spaces. These histories, sophisticated and scholarly, were for good reasons, explicitly not meant to be understood as histories of “neuroscience.” Rather, they were advanced as—to be sure, timely—cultural histories of the brain. This was a quite different endeavor in so far as the goal here was rarely to recover origins, precursors, or to simply chart the evolution of neuroscience’s embryonic ideas and concepts. It was to expose, if you will, the historicity and historical specificity of discourses that locate human nature in the brain; and it was to expose the complex ways in which such knowledge claims were culturally mediated, a maneuver which was not meant to yield straightforward continuities with contemporary neuroscience (and its quite distinct cultural contexts). Whether such subtle points are always registered as such may be an entirely different matter, of course, particularly once we factor in how such cultural history may function within the broader force-fields that define neuroscience’s past (a connection which is always made, after all, and one which it has become difficult not to make).

To be sure, processes of naturalization, or representations of the brain are by no means the sole preoccupation of historians of neuroscience. But even when the historical object was ostensibly not the brain but less dramatic entities—the story of chemical nerve transmission, for instance (a relatively well-charted episode)—existing narratives have been remarkably resilient in omitting those agents that consistently propelled such knowledge (Dupont, 1999; Valenstein, 2005). These agents—insecticides,

chemical warfare, the pharmaceutical industry, psychiatry—would indeed not seem to sit easily with the image of the fundamental-science-of-the-mind that neuroscience has accrued (Russell, 2001; Schmaltz, 2006). Others have been more impressed by neuroscience as an instance of modern biopolitics, or by the persistent recurrence of the past and the social in the concepts, practices, and rhetoric of the latest, current installment of neurofurore. But in these cases too, it was the brain/mind which figured as the—unquestioned—vanishing point (Abi-Rached & Rose, 2010; Dumit, 2003; Littlefield, 2009; Maasen & Sutter, 2007; Vidal, 2009). When, for example, Fernando Vidal argues, convincingly, that the “ideology of brainhood”—the modern notion that human beings, or persons, essentially are their brains—was intellectually prepared in the early modern period (far from being something “caused” by recent advances in neuroscience), intellectual history and history of brain science may enter an antithetical and asymmetrical relationship; the assumption still is that it is “human nature” that must be at stake, reproducing rather than challenging the inflated rhetoric of much neurotalk (Vidal, 2009).

I am schematizing terribly, of course, when collapsing a range of very different positions, approaches, and agendas into a single line of unearthing neuroscience’s past. Still, it is worth pondering what arguably unites this historical discourse, and what arguably unites it too with the much broader realm of memory-work centering on contemporary neuroscience (which would span early and influential interventions such as Gardner (1985) to the more recent additions to the corpus by Craver (2007), Gross (2009), or Kandel (2006)—the former a case of philosophical rather than historical under-laboring, attesting to the confusing “mosaic” that is neuroscience, an epistemic coherence, slipping in the brain as the virtual entity holding it all together). What is common to all of these is the focus on the brain/mind—as a cultural construct; in terms of a history of ideas; a series of progressive, scientific departures; as part of a philosophical (mind/body) epic. Or here, in this affirmation of neuroscience’s phantasmic, discursive glue is where one needs to locate the limits—and for critical purposes, short-comings—of what gets floated under the label “history of neuroscience.” Even the more skeptical, cultural-historical maneuvering is all too easily turned on its—neuroromantic—head.

By culturalism, then, I do not mean here the theoretical commitments of a very peculiar historical approach but rather, the consensual way of doing history of science today. It might mean (a culturally-informed) “intellectual,” “discourse,” or “conceptual” history, though more often it would now also imply attention being paid to the “local:” the situatedness of knowledge claims, laboratory cultures, visual and representational technologies, and so on. Characterized negatively, “cultural” here means not least paying attention to the cultural and local, largely at the expense of political, social, economic, and, in this specific case at least, recent history. Let us, then, not take too seriously the allusion in the above to social and political conditions. Like the majority of contributions to the *Journal of the History of Neurosciences*, like the bulk of practitioners’ histories and like Wikipedia, what has emerged over the last few decades as the cultural history of the neurosciences, despite the obvious differences between and within these genres, has a common, and overly romantic, point-of-reference: the brain. It is a

perfectly legitimate project, but one that has curiously distracted from, even obscured, the less romantic dimensions of this past; and even more so, the conditions that have turned the neurosciences into a major scientific industry within the past few decades.

To see where this might be heading, consider briefly just how distant the spaces of contemporary neuroscience have become from however we end up imagining its pre-history. Impressive indeed is the very recency of neuroscience's emergence and its institutional expansions. According to one recent survey, no less than 81% of American neuroscience programs now in existence were founded only after 1975; 72% of the undergraduate programs even only after 1989. All the while, the neuroscience community has expanded dramatically, doubling since 1991; the number of (US) PhD degrees awarded rose steadily from 404 in 1996 to 584 in 2004 and 689 in 2005, and was estimated to be well over a 1000, or one in eight biomedical PhDs, by 2008—figures matched only by biochemistry (Association of Neuroscience Departments & Programs (ANDP), 2007; National Science Foundation (NSF), 2009). NERV, the Nasdaq/Neuroinsights Neurotech Index, to cite another sign of the times, claims that since 1999, “venture investment” in neurotechnology has nearly tripled, constituting now a \$145 billion “global industry” (of which, hardly surprising, some 85% are made up of—entirely unromantic—“neuropharmaceutical revenues”) (NeuroInsights, 2010).

Such numbers should be treated with tremendous care, as Paul Nightingale and others have argued, showing just how empirically unfounded all the talk of a biotech “revolution,” or for that matter, a “neuro-revolution,” in fact is (Hopkins, Martin, Nightingale, Kraft, & Mahdi, 2007). Here they may serve to bring home the point pressed above, illustrating how deeply at odds we should imagine this industrious “thing” called neuroscience to be with those historical narratives centering on the brain (or on human nature, or those which casually conflate the intellectual history of the mind/body problem with that of brain science). In this version, the coherence provided by the brain/mind as the entity structuring our narratives would quickly seem to lose its informativeness.

This other, untold story would be impressed instead by the conditions that have sustained neuroscience's growth, attempting to see it as a symptom rather than a cause. It would quite probably come to resemble, and blur with, those other, less stimulating histories which are now being treated under separate headings such as that of the pharmaceutical industry, psychiatry, mental health, or health care; more generally, it would blur with a domain which has become increasingly well-charted by STS scholars—biotechnology/biomedicine—including the concomitant transformations of the academic research sector since the 1980s (its neoliberalization/commercialization in particular) (for instance, Jasanoff, 2007; Mirowski & Sent, 2005; Shapin, 2008). Along different lines, such de-centered histories would also blur the disciplinary vision that follows the brain (or memory, or language) too closely into the laboratories. Instead, they would embed the neurosciences within much broader transformations in the (recent) history of science, while at the same time make neuroscientific knowledge production imaginable as a historically specific form of knowing—as an effect which coalesced at the intersections of various techno-scientific departures (none of which, significantly, would seem to be very romantic): molecular biology, of which brain-minded



scientists have begun to dream by the 1950s, is an obvious case in point; computer science, physics, and engineering another (think of MRI and data analysis).

Construing the neurosciences as the grand, or detestable, finale to a history of the brain is a historical construction that on the whole has worked against, rather than for, arriving at a historically and empirically informed picture of contemporary neuroscience—whether or not it was advanced in terms of a heroic, eminent lineage; as the foil onto which to project progress; or, as a repressed past whose exposure would undermine neuroscience's claims to revolutionary novelty. I am not suggesting that this must necessarily be so, or that the one could, or should, replace the other. The strategic point, after all, of writing histories of the brain—or better yet, and more inclusively, of the nervous system—is ideally about establishing some de-familiarizing distance between the two. What I am suggesting, however, is that we should be more careful in crafting our stories, and that “the brain” effectively serves to conceal, rather than reveal, the mundane determinants of neuroscience's genesis. Especially the discourse of the new, human nature and society-transforming science of the brain/mind is something that the construction of which is itself in need of analysis, not a concept that should guide our analyses.

## Cyber Romance

To illustrate, let us return, once more, to the middle of the last century. One of the more potent origin myths of, if not exactly neuroscience, then all the more emphatically, of the dawn of a new era of scientific engagement with the brain/mind is located at this juncture: World War II. And like many a myth, this one is not entirely without its plausibilities. For there can indeed be little doubt that in the wake of World War II, both human behavior and mental health—injured by a very recent, violent past and endangered by a fully-automatized future—had turned into fundamental problems of planetary dimensions. It would provide new opportunities, not least for those biomedical scientists skilled enough to profit from the rampant post war ideology of “basic science,” “team work,” and “interdisciplinarity.”

Most famously, it was Vannevar Bush who then spelt it out for everyone: “basic research” now would be key (Bush, 1945). One of the more visible expressions in the world of biomedicine of this new optimism were the several institutions launched in response to the American National Mental Health Act of 1946 (Farreras, Hannaway, & Harden, 2004); elsewhere too, all the signs seemed to point towards progress, expansion, and fundamental science. In England, the Mental Health Research Fund was founded in 1946, its activities heavily slanted towards the newly coalescing field of “neurochemistry” (Bachelard, 1988; McIlwain, 1985); neurophysiology, a rather more academic specialty, also thoroughly emancipated from its institutional entanglements with medicine, spurned in its rigors by the wonders of electronics the recent war had thrown up (Chadarevian, 2002; Schoenfeld, 2006); more self-confident than ever, neuropsychiatrists and neurologists turned experimental and interventionist, zeroing in on the brain rather than its bodily, outwards manifestations (Braslow, 1997; Pressman, 1998). None of these tendencies, to be sure, was new and without precedent. But there was now a “climate favorable to all fields of research in any degree involving the brain, whether they begin or end with it,” as the French electro-physiologist

Alfred Fessard would diagnose the situation in 1952, pondering the case for a projected International Brain Institute under the umbrella of UNESCO. Fessard did not even bother “to repeat the usual generalities about the importance to mankind of the intensive study of the brain” (Fessard, 1952).

“Neuroscience” as we know it barely existed. What existed, and what we may in retrospect identify as so many departures, elements, and events presaging its eventual coalescence were a myriad of scattered traditions, specialties, initiatives, institutions-in-the-making and new alliances not always, not yet, and not primarily structuring their practices around this common object, the central nervous system—the “most complex organ in the universe,” as it turned proverbial at the time (see, for instance, Pfeiffer, 1955; Walter, 1953). Rather—and this is the thrust of the present section—to the extent that they did enroll the central nervous system, we had better look twice so as not to conflate heroic discourse and the (by and large) banality of scientific realities. Indeed, a great many instrumental figures once-to-be fashioned as makers of this nascent, neuroscientific future were well established by the time. Significantly, many of them, like Francis Schmitt, Ralph Gerard, Bernard Katz, or Stephen Kuffler, were raised in the prewar period in quite different circumstances, and were engaged with quite different, unspectacular objects: the central nervous system was not the horizon of their scientific doings and self-perceptions (Hodgkin, 1992; Katz, 1998; Libet, 1974; McMahan, 1990; Schmitt, 1990). Instead, they focused on bioelectricity and muscular metabolism: frogs’ legs, the dog’s heart, sea-urchins, nerve fibers obtained from the squid and other such lowly and peripheral things—the things that defined the realm of “excitable tissues” through which this dizzyingly heterogeneous lot of experimental physiologists had once roamed freely (Stadler, 2009).

It was not least from these circles that those would be recruited who would impose, beginning in the 1960s, an early identity onto a new label: neuroscience. By 1973 J. Z. Young, re-discoverer of the squid giant axon and another one of those instrumental figures, could ponder, when looking back on those amorphous days, that at last “we know our identity ... we are [all] Neuroscientists” (Worden, Swazey, & Adelman, 1975, p. 40). But this, alas, is not the story we know; and certainly, it is not the one that has gripped the historical imagination. Neither is it any one of those other plotlines which we might want to bring to bear in this connection: the story of neurochemistry (which would be a far less academia-centered one than that of the self-appointed neuroscientists above); or that of neurology; cell-biology; or molecular biology. The grand narrative that exists is a different one. It is the story of cybernetics.

This one, to be sure, is not a story explicitly, or merely, about “neuroscience,” even though the brain looms large in the great mass of literature that has accumulated on this major intellectual event (see Abraham, 2003; Dupuy, 2000; Edwards, 1997; Galison, 1994; Gerovitch, 2004; Hayles, 1999; Hayward, 2001; Heims, 1991; Husbands & Holland, 2008; Kay, 2001; Pias, 2004; Pickering, 2002a). “We selected from prompt action” (as the exemplary object of cybernetic theorizing), as John von Neumann—physicist, weapons-science spin-doctor, and game-theorist—pointed out to his cybernetic friend Norbert Wiener, in a letter in 1946, “the most complicated object under the sun—literally” (“Neumann to Wiener,” 1946).

Famous enough their mission has become nevertheless; and because of, rather than despite, this forbiddingly complicated organ. Wiener and von Neumann thus belong to

the core set of actors appearing again and again in our accounts of the brain/mind around mid-century: and there is no doubt that cybernetics' central protagonists were always quick to announce a new age of brain science; this, these maverick scientists believed to be unlocking with the aid of models, interdisciplinary inquiry, colorful teams composed of vagabond engineers, physiologists, and mathematicians, a new language (wrestled from the communication engineers) and novel, modern instrumentation. As one of them, Grey Walter, saw it: previous generations did not—and perhaps could not—dare to “accept the brain as a proper study for the physiologist;” instead, they had chosen simplicity: muscle, nerves, and sense organs, “often carried to the extreme ... so as to eliminate all but a single functional unit” (Walter, 1953, pp. 27–28).

What Grey Walter preferred not to mention was just how powerfully this physiological extremism held sway, side-lining the brain and mind underneath and beyond the speculative loops spun by his cybernetic comrades. Worse, people “speculating along such lines,” opined, for one, the then secretary of the British Medical Research Council, wrapping up the empiricist temper that fortunately curtailed the scientific mainstream—rarely produced “adequate data either to check or support their speculations” (“Mellanby (MRC) to Randall,” 1949). The story of these speculations has been told often enough, at any rate, so that we can confine ourselves to some pertinent complications. Let us remind ourselves, briefly, of what is said to be at stake in the story of cybernetics' unfolding.

As the received stories have it, ontological certainties that were previously in place were effaced in the process: man/machine/animal; model and reality; natural and artificial were categories no longer commanding assent when, from the early 1940s, the cyberneticians inaugurated a new vision of the human aided by information theory, circuit diagrams and flow charts. Most relevant to my argument, it was here that not only was a new vision of the brain/mind in the making—the brain-as-computer, a model-making and information processing thing—but also that the “living” brain/mind was introduced as an object of experimental and quantitative study in the first place—perhaps, after half a century of “eclipse,” as one historian put it (Kay, 2001); after a dark age of behavioristic superficialities, timid physiologists of the peripheral nervous system, and primitive research technologies, as cybernetics aficionados themselves liked to style it. A great many commentators—media theorists, literature critics, and historians—have explored cybernetics as this epistemic event, the latter diagnosed early on as no less than the “fourth discontinuity” (the fourth that is after the Copernican, Darwinian, and Freudian ones) (Mazlish, 1967). Tracing the reverberations of cybernetics into fields as far apart (or close) as literature, pedagogy, city planning, art, and ecology, their interests were not always, or primarily, confined to the brain, let alone brain science. In fact, few would claim that cybernetics exhausted, or even fundamentally shaped, the history of the brain/mind around mid-century. That cybernetics had basically “evaporated” by 1960, or that it made little contact with the “wet” biology of the brain and the scientific mainstream, is common knowledge.

Yet, more fundamentally than anything else, it was cybernetics that has served to frame historical narratives of brains and minds in the twentieth century (among others see Baars, 1986; Boden, 2006; Gardner, 1985). Certainly it is not too difficult to see why cybernetics would have assumed such a prominent position in the historical imagination, even if the computational brain, at least in its mid-century variant, would

seem to have long lost its appeal (Borck, this volume). The ontological confusions routinely set into operation by cyberneticians—the figure of cyborg, especially—surely enough resonate with twenty-first century, technoscientific conditions of living as much as the renegade image of vanguard interdisciplinarity that cybernetics came to exemplify must appeal to anyone who discerns its vindication in the amorphous disciplinarity of contemporary science; here were computers and modeling practices elevated for the first time to the center of scientific activity; here was a technoscientific war, whose manifold implications in the origins of cybernetics continues to excite; here was a materialist, seductively (or seemingly) anti-humanist discourse of the mind and human nature attractive to both explorers of the brain as well as *Geisteswissenschaftler* suspicious of the traditions of meaning-and-subject-centered analyzing. Here, not least, was something recognizably “cultural” in the science: unlike those hordes of fairly monosyllabic, uncultured, and altogether unexciting specialists that had begun to inhabit the laboratories of biomedicine by 1950, the missionaries of cybernetics were not nearly so inhibited; on the contrary, they were vocal, imaginative, and out-reaching.

Whether they deflated head-on, “the Cartesian split between mind and body” (“McCulloch to Gerty,” 1943), brought inspiration to art and music, or mounted robotic spectacles at the Festival of Britain, the spectacular—the popular, philosophical, and techno-futuristic—was thus never far off in this cybernetic delirium of a universal science of control and communication (Dunbar-Hester, 2010; Pickering, 2002b); and never far afield either was the brain—albeit, on the whole, a somewhat virtual one: a brain modeled, theorized and imagined rather than a brain dissected and measured. The vision of the missionaries of cybernetics was a naturalistic one that could cause ideological alarm (as when communism or technological progress threatened to reduce men to mere automata) as much as the much-needed hope: for many, here was in the offer a model of postwar living: a world where life, peace, and truth would be matters of “communication” (Young, 1951); where scientists (and artists too) operated not unlike these model-generating brain-machines; and where the common people would ideally operate like scientists. For others this vision constituted a dangerously “new type of metaphysics;” “No Christian,” as Wiener’s old friend J.B.S. Haldane commented sardonically on the new “cerebralism,” “after reading the first verse of St John’s Gospel, can object to the emphasis laid on communication” (Haldane, 1952).

It would no doubt be difficult to imagine a cultural history of the nervous system in the period without cybernetics; it would, however, be equally mistaken to take the “cerebralism” and its cultural/intellectual effects (which it evidently had) *for* this history. It is the near inevitability with which this problematically cultural (and intellectual) vision figures in the stories we actually tell that is flawed—a function, more than anything, of cybernetics’ public visibility. The romanticism, if you will, consists in the ways these stories tend to reproduce, rather than question, the dramatic categories prescribed by the cybernetic discourse itself—revolutionary departure, brain/mind/body, human nature, and so on. But, just as talk of an “information society” and its celebrated weightlessness (another feat routinely traced to the vicinity of cybernetics) consistently obscures the energies and materialities at work beneath the glitter of digital futures, so the rupture story of the cybernetic brain obscures the inconsistencies of the record; and similarly serves to locate the onset of a heroic

endeavor—an interdisciplinary, materialistic science of the mind/brain—in the past: a comprehensible future that has already begun.

It is not, in fact, too difficult to imagine a somewhat different picture. Thus, whether historians have re-located the sources of what may be called cybernetic regimes of knowing (as opposed to the outpourings of the small coterie of self-professed cyberneticians) in interwar telephone engineering or the machinery of state bureaucracy (Agar, 2003; Beniger, 1986; Hagemeyer, 1979; Mindell, 2002; Noble, 1986); whether they have historicized the mid-century moment of model-mindedness and interdisciplinarity as a symptom of complex ideological circumstances (less so, the inevitable progress of knowledge spearheaded by maverick scientists) (Cohen-Cole, 2003, 2009; Crowther-Heyck, 2005); or whether they have shown even the “cyborgs” to be suspiciously absent from the annals of cybernetics (Kline, 2009), the result is less recognizably the plotline of a singular incision. All this invites reading the cybernetic discourse, in historical terms, as a symptom of much vaster (and mundane) sea changes—and, for our purposes, in ways that bring to the fore the multiple and non-convergent forces that shaped the sciences of the nervous system during this period.

In belittling discourses surrounding the brain, my aim is not to pit a dull history of “real” science against a cultural history of the nervous system in the period. The case that is being made is about taking more seriously the many and less obviously neuroscientific factors besides the brain that shaped the history of the nervous system; and, it is about being more scrutinizing in our attempts to locate “culture” (and the significance we want to bestow on it). We might then quickly arrive at a dramatically deflated and thoroughly cultural picture of cybernetics’ significance, while at the same time come to better appreciate just how tangential her cerebral discourse may have been to whatever happened in the laboratories, or in most of them.

The case of Norbert Wiener, whose immense public presence as the Cassandra of the dawning age of automation has been thoroughly documented, is itself instructive in this connection (Hayles, 1999; Heims, 1980; Siegelman & Conway, 2004). And present Wiener was: by 1949, Wiener’s notoriously difficult, formula-laden *Cybernetics* (1948) had sold a spectacular 13,931 copies and a more accessible version was already in commission. “PANDORA” or “CASSANDRA,” Wiener’s own preferred titles being “absolutely out of the question” (“from the publishing point of view”), Wiener’s grim vision of man’s technological future hit the shelves in 1950 as *The Human Use of Human Beings* (“Technology press to Wiener,” 1949). Indeed, just how actively Wiener and allies were courted by journalists and the extent to which these medializations may have shaped the message and nature of the cybernetic project itself, is a dimension yet to be fully explored. Not least the discourse of “models” for which cybernetics rightly acquired fame, might then, on closer inspection, turn out to be less of the epistemic rupture that opened up fundamentally new spaces of scientific complexity (such as the brain). Rather, cybernetics might emerge as an effect, or condensation of the media-technological infrastructure with which it came interlaced. Its significance would reside in the light it casts on the mediations of postwar intellectual life; far less so, in what it tells us about the evolutions of brain (or neuro-) science.

Cybernetics thus would, as one such helpful scribe advised Wiener, “make the foremost story of the 20<sup>th</sup> century”—but only, that was, “if the essential element of CYBERNETICS could be reduced to simple symbols — blocks of wood, even” or, even

better, “photographs:” “Channel[s]” that “would make the implications of CYBERNETICS amenable to presentation in dramatic and concrete terms with meaning for the average man” (“Jones to Wiener,” 1948). Models, metaphors, visual aids, charts, analogies, and diagrams—the insignia of the cyberneticians—served purposes beyond the emphatically epistemic, as not least the then thoroughly professionalizing community of science-journalists would have come to appreciate. More than ever before, these devices were beginning to live precarious double lives as tools of communication, a problem felt in particular when they seemingly were needed most—when scientists ventured beyond their own disciplinary terrains, or, as happened with similarly increasing frequency, beyond their laboratories (Bowler, 2009). Such transgressions were programmatic to what cybernetics was and, as Bowker (1993) has shown, much of the cyberneticians’ success was dependent on strategically exploiting an idiom of “universalism;” it would smooth the implantation of the cybernetic discourse in potentially any science. A more historical, and less sociological, approach would highlight instead how profoundly such “cybernetic strategies” were themselves parasitic on the verbal and visual technologies that were then being floated. Models and related verbal and visual technologies of communication were not the exclusive domain of the cyber scientist. Advertisers, journalists, and educators in particular had by then generated an impressive armature of models, visual aids, and other technologies of persuasion (Buxton, 1999; Lagemann, 2000; Seattler, 1990). “To tell the truth [was] not enough” as Patrick Meredith, science teacher turned director of the Visual Education Centre, Exeter, explained in 1948, “it must be communicated” (Meredith, 1948).

By no means were model strategies the proprietary format of the cyberneticians, even though they may have been particularly adept at the task. Cybernetic missionary J. Z. Young was “highly stimulating ... [and] quick, vigorous, imaginative,” unlike the “usual scientist,” as one BBC employee judged (“Notes on J. Z. Young,” 1948). It was such “really first-rate science popularizer[s]” who excelled—much to the pleasure of the BBC—at bringing closer to the postwar public the most recent confluences of minds, brains, and machines. It is unsurprising, then, that the likes of Young or Grey Walter were routinely given the opportunity to weigh in on the general “spate of brain talks” which were hitting the airwaves at the time. Here the man of “average, not exceptional intelligence” was offered “synoptic glimpses” of difficult subject matter—not least, the many models, analogies, and other “illustrations” of “the way information is conveyed from one creature to another” (“Draft outline,” 1949).

It is, in part, the fact that such symbiotic relations as the one between Wiener and the press, or Young and the BBC, were by no means exceptional which renders the cybernetic discourse highly problematic as a historical account of brain science (or of scientific modeling, or of technological evolution). Just as cybernetics amalgamated rather than originated vast amounts of (futuristic) knowledge, so the format of its presentation is best construed as parasitic on a set of fairly banal practices and developments. In fact, even this would be saying too much, in as much as the postwar publicity in matters of the cerebrum was vastly more encompassing than the cybernetic story would seem to suggest—an ideological playground and confrontation space for all manner of learned neurologists, philosophers, anthropologists, and laboratory scientists.

The story of the cybernetic discovery of the brain/mind is nothing, in other words, that could simply serve to contextualize the stories we tell, let alone a story that penetrates deeply beyond the surfaces of postwar cerebral culture. Neither is the business of models the only such fairly unromantic dimension. Much the same could be said, for instance, about “interdisciplinarity” (Cohen-Cole, 2009; Stadler, 2009); their mediations were not merely a matter of journalistic pastimes either. When Norbert Wiener—appalled by the rumors of hordes of war-traumatized Americans and, yet more disconcerting, of housewives now “‘practicing’ ‘dianetic therapy’ upon each other”—pondered filing an infringement lawsuit against the “dianetics boys” in the early 1950s, it may have been a signal of just how deeply cybernetics expressed, rather than informed, the cultural climate of the times. (This confusion was in fact only “understandable, since both sets of postulates,” as Ron Hubbard helpfully explained it to Wiener, “do both stem from electronic engineering” (“Hubbard to Wiener,” 1950; “Wiener to Schuman,” 1950).

Even allowing for the complications introduced into the picture by what was generously glossed over here, namely, the more seriously incommunicable strategies to which cyberneticians availed themselves—statistics, mathematical models, and information theory—the story of cybernetics begins to look significantly different when re-embedded in its historical conditions of possibility. By the same token, the standard cybernetic story is not very illuminating as a guide to the mundane and less stimulating world of the average neurophysiological laboratory (or asylum, or neurological clinic). This world has been largely obscured from our view, and among the reasons, as we have seen, are the complex entanglements of the cybernetic vision with its own popularity. The general picture we have of postwar developments as viewed from within the various, traditional disciplines cyberneticians attempted to colonize, and from which they themselves operated (most of the time), is thus blurry at best. However, and as if to return to the stories which have been less successful in shaping our historical imagination, it may have been precisely these less spectacular departures which then aided the inauguration, in less visible and spectacular fashion, of this new identity whose history I have attempted to disentangle from the adventures of the brain and mind. One influential lineage at least of this new species managed, let us note here, to elevate in the process its profoundly and instructively non-cerebral doings towards new and cerebral horizons. It is the story of the so-called neuroscientists of the first hour.

For the likes of them, a trajectory such as that of Ralph Gerard—sometimes credited for having coined, towards the late 1950s, the term “neuroscience”—would have been far from atypical: by the end of the war, and already internationally famed, Gerard had turned Professor of Physiology at the University of Chicago, and chairman of the Physiology panel of the Office of Naval Research. He soon re-emerged as Director of Laboratories at the University of Illinois Neuropsychiatric Institute and in 1955 went on to become a member of the Mental Health Research Institute in Ann Arbor (Libet, 1974). Always of a somewhat holistic bent, Gerard was also a “core group” member of the Macy Conferences on Cybernetics; yet even for all his intellectual vitality, Gerard’s immense scientific reputation was built on different, and definitely less metaphysical, grounds: notably forays into the heat production of muscle and nerve, and later, into the electrophysiology of resting potentials in single muscle cells. These were hardly the raw materials for an epic of the brain and mind. Similarly, take the case of Francis

Schmitt, whose central place in the annals of neuroscience as the man behind the so-called Neuroscience Study Program had been secured early on (see Swazey, 1975).

There was “urgency in effectuating [a] quantum step in an understanding of the mind,” as Schmitt announced by 1963. The required “entirely new type of science,” on Schmitt’s mind, would in turn better be fundamental—a “biophysics of the mind” (cited in Swazey, 1975, p. 529, p. 532). Though the label was soon eschewed (evidently), there is indeed little in Schmitt’s utterly unromantic oeuvre that would seem to predispose him to having paved the path towards neuroscience—as long as we construe them that is, in overly brain-centric terms: like Gerard and a great many other instrumental figures, Schmitt was brought up between the wars on the biophysics of nerve and muscle—frogs, squids, and other such lowly materials. When the entrepreneurial Schmitt arrived at MIT in 1941, his ambitions began even more definitely to concentrate on the mushrooming (and bewildering, many-faceted) research-field which then went under the name of “biophysics.” In no time, as Nicolas Rasmussen has shown (1997a, 1997b), Schmitt turned his MIT facilities into a world center of electron microscopy. His wartime projects—supported in part by the rubber and leather industries—on wound healing and the structure of collagen and rubber, set the pace for Schmitt’s more recognizably biophysical future. This future, significantly, converged less on the mind than on the biophysics of muscle and nerve; and it converged, secondly, on Schmitt’s passionate engagement with this new science called “biophysics” (a mission which notably resulted in a grandiose, month-long international conference in Boulder, Colorado in 1956).

Importantly, historians of this curiously amorphous science have shown just how indistinguishable and undifferentiated in its biophysical hey-day, the future transdisciplinary ventures of molecular biology, bioengineering and neuroscience were (Chadarevian, 2002; Gaudillière, 2002; Rasmussen, 1997a). Indeed, it would be difficult to image a terrain more distant from the epic of the cultivation of the brain than the mix of collagen, keratin-fibres, polymers, leather, muscles, and squid-nerve which Schmitt, for one, assembled together—with ease. “We encounter little difficulty in securing grants-in-aid ... for fundamental biol[ogical] research related to medicine,” as Schmitt had approvingly noted (Schmitt, 1954a). Indeed it was here that the new alliances were being forged between people, as Schmitt said, “working ... on the molecular level” (“Minutes, NIH,” 1956),—electrophysiologists, molecular biophysicists, physical chemists,—and, after all, the brain.

Indeed laboratory scientists of the fundamental kind now encountered few difficulties when tapping into the social and cultural concerns haunting the postwar world. Prominent among them was, as Schmitt, a skilful propagandist and money-raiser, put it one more than one occasion, “the almost staggering problem of mental health (said to compromise more than half of all the health problems of the nation)” (Schmitt, 1954b). And it was to much more palpable (if less publicly visible) effect than the cyberneticians that the likes of Schmitt translated such compromising facts into concrete realities. A considerable chunk of Schmitt’s sprawling biophysics program at MIT was thus paid for by the Commonwealth Fund which, as Schmitt quickly discerned, was one of the many agencies then developing a “considerable interest in psychiatry, particularly as it bears on social problems” (“Schmitt to Dean



G. Harrison,” 1950). The MIT-Commonwealth program would quickly “stabilize” at 20–25 postdoctoral fellows a year, Schmitt’s “young turks” soon circulating by the dozen (Sizer, 1956). By 1954 some sixty “medical men” alone had gone through the process, serving the “far flung attack” on the problems of biomedicine.

Schmitt was remarkably (and exceptionally, it must be said) successful in inserting his stronghold of fundamental biology as a central node into the local network of Boston hospitals and research institutions. It served, not least, the need to thoroughly instill into biomedical minds the “quantitative methods of biophysics and biochemistry.” And, bizarre though it may seem, it did not so appear to contemporary eyes and mindsets deeply, even naively optimistic about the powers of science and technology. “The spirit of the times,” said Schmitt; “such [was] the nature of pure research that one cannot predict the particulars,” reported the *Rhode Islander* in summer 1952, the “MIT squid project” consuming its entire, over-sized cover page: “Important clues to the functioning of the human nervous system may be uncovered. ... In any case, the frontiers of knowledge, as we consider them, will be pushed back a little further” (H. Smith, 1952).

## Conclusion

The story, or stories, of pushing back these frontiers, and of these nascent neuroscientific identities as well still needs to be told. It is unlikely that it would turn out to be an epic revolving around the brain and mind, let alone around human nature. This chapter has dealt with only one such lineage and the aim, to be sure, was not to advance yet another myth of origins. Rather, it was my intention to sketch a space of inquiry into the nervous system that is all-too-easily glossed over in these necessarily manifold origins of neuroscience, devoid as it was for the most part, of the brain, of “culture” (certainly in the emphatic sense), and of the intellectual excitement surrounding cybernetics and the puzzles of the mind–body problem. Instead of a grand narrative of human nature transformed—or reduced—to the brain, this story would indeed seem to lack such a center; or if there was one, it more likely would revolve around squid, muscle potentials, molecules, sea snails, and other such uncerebral entities—and of how it came about that they became so closely allied to human memory, mind, or language.

Once we rid ourselves of the idea that the neurosciences fundamentally and always revolve around the essentials of human nature, our questioning might, in turn, take on a less dramatic but more constructive tone. Complicating the conceptions—and this would prominently include, the empirical picture—of neuroscience’s past and present conditions of operation might help us move beyond, for instance, the “linear” and quasi-deterministic models of technoscientific change that implicitly inform much of the hype (or scares) surrounding the ascent of the neurosciences and our imagined, neurocultural futures. Similarly, one might then come to question more soberly whether the quite typical, apologetic, and polarizing constructions of ground-breaking but innocent neuroscientists on the one hand, and a merely sensation-hungry media landscape on the other, adequately reflect the political economy of science in the twenty first century (or indeed, the complex entanglements of any kind of knowledge

production). Then again one might wonder, as we primarily wondered here, to what degree the departure-rhetoric and brain-centric images of contemporary neuroscience might be complicit in the debatable constructions of—and assumptions about—neuroscience’s pasts.

Being “critical” would begin rather than end here. The romance of the brain that was at issue here is, needless to say, at best one such matter at stake. As the case may illustrate, however, it is not necessarily “neuroscience”—a problematically vague construct enough—that is to be singled out for critique, let alone neuroscientific research. Brain-centric discourses abound. Thus, when today’s neuroskeptics feel their intuitions about human nature being offended, or neuroethicists feel obliged to sound out her imminent devastations, such interventions all too often operate in seeming ignorance of the historical malleability of this very nature, and on an impoverished view of the putative transformative agency—science—that is being accused, or celebrated. Likewise, it is often difficult to resist the impression of historical naiveté when observing the neuroenthusiast proliferation of “interdisciplinary” ventures, as if science and the humanities had ever suffered from cross-pollutions (albeit pollutions relegated, more often than not, to the trash bins of intellectual history). Perhaps, in the current times of neoliberal academia-government, when the less natural sciences perceive growing difficulties in justifying their existence, it might be advisable not to overzealously accelerate the leveling of voices by casting one’s lot with the mirror neurons; if “human nature” is under siege these days, it may after all have to do less with the “potential implications” of neuroscience, than the diminishing space and prestige that other, less neuroscientific voices will be given in the twenty first century.

Yet, to end on a more self-critical note, there are perhaps few reasons to be overly expectant about what history and science studies can achieve in the critical direction; at least in so far as one demands, intellectually or otherwise, to go beyond slogans such as that science is somehow cultural and social, and beyond the rehearsal of positions and gestures of exposure that have long become history themselves—think, for instance, of Foucault-inspired analyses (half a century old by now), and the kind of reflex-like manner in which genealogical modes of analysis tend to be invoked. The “culturalism” at issue in this chapter is only one element in the way that the postmodern, left-leaning canon that has shaped so much of intellectual life in the latter half of the twentieth century has not only been thoroughly established, but also, has come to lose the subversiveness it may once have had (Anderson, 2009; Cooter, 2007; Latour, 2004).

Perhaps academia and the reality of critique has always been more impotent and conservative than one would like to think, but the considerable *Umwertung der Werte* at stake here certainly makes it no easier to envision what a critical neuroscience might profitably draw from the fields of science studies or history of science (and what not). The perceived inability of telling or arriving at big pictures of developments is one example; the absence of being able to communicate with either scientists or a broader public another. More disturbing perhaps is the sense that the very conceptual ammunition of science studies has somehow lost its critical impetus; or, at any rate, that it has come to curiously resemble the complexity-increasing (rather than merely reductive) vocabulary of the technosciences. Perhaps, as Bruno Latour proclaimed not long ago,

the once seemingly stable dichotomies of nature/culture, fact/artifact, or knowledge/power have indeed become so very unstable and so universally appropriated as non-dichotomies, that “explanations resorting automatically to power, society, discourse have outlived their usefulness”: outlived, that is, their critical force (Latour, 2004).

If so, surely this is one further reason to find limitations in the overly culturalist mode of imagining neuroscience’s pasts—it also makes it all the more difficult to envision something of a positive program. There is no doubt that there is something deeply disturbing about the new cerebro-biologism that creeps into all manner of social domains, and not least into the humanities themselves, be it under the guise of neurointerdisciplinarity or the questionable promise of a “third” culture. Equally there is no doubt then that it is not something called “neuroscience” that deserves to be singled out for critique, let alone daemonized, but the conditions that serve to render it a perhaps overly self-confident and increasingly hegemonic discourse about human affairs. Things surely are not all bleak in matters of being critical. A quite minimal list of items would probably include: let’s not follow too closely on the heels of those promulgating overly simplistic and futuristic assumptions about (neuro)science—as when the latter is equated, for all practical purposes, with those things that happen in an academic laboratory, or things that are novel and innovative, obscuring the established and workable. Furthermore, and more curiously, let’s not follow too closely on the heels of the observers of science themselves; they all too easily fall, after all, into the habit of seeing only science—theirs is a tendency to overestimate the very relevance of science (or technology) in processes of societal change at the expense of other factors—as if it was science which had the power to actually “define” and “make-up” things, persons, and beings; as if it was truly “world making.” Like the romance of the brain, after all, such elevations may bestow upon science, or neuroscience, a significance that may be undeserved; and hence be counter-productive, in terms of being critical.

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