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Broca's area in Broca's era

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Leblanc, Richard. 2017. *Fearful asymmetry. Bouillaud, Dax, Broca and the localization of language, Paris 1825-1879*. McGill-Queen's University Press, Montreal, 2017. 255 pages. Hardback. \$35.96.

Richard Leblanc is a neurosurgeon at the Montreal Neurological Institute and a Professor in the Department of Neurology and Neurosurgery at McGill University. He is specialized in the analysis and treatment of brain tumors and gliomas. The richly illustrated book on the Montreal Neurological Institute that he co-edited with William Feindel (Feindel and Leblanc 2016) has already demonstrated his interest for the history of his field of research and medical practice.

As is indicated by the subtitle, *Fearful Asymmetry* offers an account of the early attempts of localization of the language faculty in the human brain during the XIX<sup>th</sup> century. As the existence of a “speech area” was inferred during this period principally based on cases of speech disorders of cerebral origin, the book represents a new contribution to the literature on the history of aphasia. The book is an essay in intellectual, rather than social, history of medicine and neuroscience, focusing almost exclusively on what happened in the French-speaking medical world.

The title echoes a poem by William Blake (*The Tyger*, in which the expression “fearful symmetry” refers to the aspect of a tiger). It also alludes to Xavier Bichat's double doctrine of “the symmetry of the external forms [organs] of animal life” and of the “harmony of action” of these organs (including the cerebral hemispheres) that derives quite naturally from this symmetry (Bichat 1799). Trained in the anatomo-pathological tradition of Bichat, Broca would have been reluctant to concede a specific involvement of the left hemisphere in the production of speech because such a thesis was in contradiction with Bichat's

doctrine. For Bichat, inequality of action between the hemispheres, whatever the reason, could only yield confusion in the mind and harmful consequences.

The first part of the book deals with functional localization before Gall (chapter 1); in the work of Gall himself (chapter 2) and with the contribution of Jean-Baptiste Bouillaud (chapter 3), who was the first notable author to ground a defense of Gall's view of functional units in the brain (and more generally, of functional localization) on a combination of clinical and anatomical findings related to speech disorders. The second and third parts (chapters 4 to 11) proceed from the foundation of the *Société d'Anthropologie* in 1859 to Broca's first papers on the question of "aphemia" (his name for expressive aphasia) and the ensuing controversies, especially the one raised in 1863 by the priority claims of Gustave Dax in favor of his father, Marc Dax. The fourth part (chapters 12 to 15 and Epilogue) focuses on Broca's final views on both localization and lateralization, that is, his conception of the "dynamic asymmetry" of the brain. The Epilogue, "cortical localization after Broca", singles out the works of Theodor Meynert, Karl Wernicke and, in the XX<sup>th</sup> Century, of Wilder Penfield. One can regret that in this Epilogue, Leblanc does not address larger questions, in particular, how the debate continues around the issue of how language-specific the activity of the Broca area is, as well as the parallel discussion concerning its exact role in speech production (Flinker 2015).

There is no separate Bibliography as bibliographical references are included in the notes. If references are made to a selection of the secondary literature, previous books on a similar topic are not mentioned (Hecaen and Dubois, 1969; Harrington, 1987; Jacyna, 2000; Tesak, 2001; Forest, 2005). One of the main contributions of *Fearful asymmetry* to our knowledge of Broca's research is the analysis of "thermometry" in the 15<sup>th</sup> Chapter, even though this topic has not been entirely neglected by previous authors (Raichle, 1998). While it is an overstatement to see Broca as a forerunner of contemporary functional imaging techniques, his measurements of differences of temperature in various parts of the brain, not only to distinguish between possible sources of speech disorders but also as an attempt to correlate mental tasks and the augmentation of regional blood flow, remain noteworthy.

Taken as a whole, *Fearful asymmetry*, because of its purely narrative perspective, answers how-questions more than why-questions. For instance, it tells us, in vivid terms, how, that is, in what circumstances Broca became interested in the cerebral origins of speech disturbances. But it does not tell us

why after centuries of clinical observations of speech disorders (Benton and Joynt 1960), defining the cerebral basis of the language faculty became so important to the medical and scientific community. Leblanc quotes Penfield who said that “the problem of neurology is to understand man himself” but he does not reflect on the various attempts to build a science of man that preceded the foundation of the *Société d’Anthropologie*, and that constituted the intellectual background for Broca’s research. In the early 19<sup>th</sup> century, for people like Cabanis, a science of man was not conceivable without a decisive contribution from physiology (Cabanis 1802). The naturalized view of man’s higher mental powers proposed by Gall also meant that the task of brain science was not merely to localize the faculties as understood in the Aristotelian tradition, as in the times of Willis and Prohaska, but to suggest a different kind of functional decomposition of the mind. Leblanc does not evoke this broader context, although it is responsible for the enduring interest that brain physiology and brain disorders have received beyond the neuroscientific community, from Auguste Comte and John Stuart Mill to Jerry Fodor.

The importance of the question of language localization is also due to the paradigmatic value of Broca’s contribution, that fits quite well the Kuhnian view of paradigms as shared examples (Kuhn 1969): alexia, agnosia, apraxia and other neurological conditions were later defined on the model of aphasia. Thus, the development of a specific style of neurological enquiry led to a new kind of normal science through the recurring application of the heuristics of localization and decomposition to the human cortex (Bechtel and Richardson 2010). With its long quotations from primary sources and its clear style, *Fearful asymmetry* draws a detailed picture of a pre-paradigmatic period in the modern history of the science of the brain in a way that gives food for thought.

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