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Baginsky on aphasia

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Abstract

The first functional representation of language processes, depicted in the form of a diagram, was probably produced by Adolf Baginsky in 1871. The present paper contains a short biography of Baginsky and a translation of the relevant part of his paper on aphasia due to a severe kidney disorder. It appears that Baginsky formulated a theory of normal language processing, based on the notions of (functional) centres and connections between centres. On the basis of this model he deduced various forms of aphasia. It is argued that, before Wernicke published his model for the representation of language in the brain in 1874, not only Baginsky but also other authors—in England, the Netherlands and France—have used concepts such as functional centres and connections. Apparently, Wernicke unjustly received credit for formulating the first connectionist model for language representation in the brain.
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1. Connectionism: the beginnings of modernity

Arbib, Caplan, and Marshall (1982) considered neurolinguistics from a historical perspective. They not only summarised the historical facts, but also attempted to analyse the conceptual frameworks deduced from the historical works. They started out with the early Egyptian and Greek observations of the effects of brain lesions, and continued with authors such as Gesner and Schmidt, whom Arbib et al. consider to form the transition to

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modernity. In this category, they also mention Gall and Broca. They described Broca's position as follows:

> "Broca himself was not prepared to localise in particular brain areas any subcomponents of the language faculty other than the mechanisms responsible for articulate speech. His patients, he conjectured, had lost "le souvenir du procédé qu'il faut suivre pour articuler les mots". Broca did not, of course, hold that this procedure was an exhaustive description of the language faculty; rather, he believed that the brain as a whole constituted the material substrate for whatever further capacities are involved in the exercise of our linguistic ability (p. 10).[2]

Presumably, modernity starts for Arbib et al. with Carl Wernicke, who performed a 'thorough Psychological Study of Language on an Anatomical Basis', the first unified neurolinguistic theory. An important new feature of Wernicke's theory, according to Arbibet al, is the integration of the phrenologists' concept of computational centres and the associationists' cortical connections. The theory purported to show how language abilities are organised into functional subsystems, of which the structure and pattern of interconnections could be interpreted, and in part even could be linked to specific brain structures.

The functional 'diagrams' as developed by Wernicke and his colleagues are not just memory aids for syndromes, as Arbib et al. point out. The 'diagram makers' gave two further interpretations of the diagrams: the boxes and arrows referred to specific convolutions and fibre tracts. At the same time, the circles and arrows were identified as *functional* devices.

Arbib et al. provide another argument for the view that the connectionists formed the beginning of the new era: modernity. Connectionists, they argue, go beyond the construction of descriptive models. Wernicke attempts to *explain* the reliance of speech production upon memories for the sounds of words by reference to the nature of language learning, thus irrevocably tying speech production to sounds stored in a 'centre' related to speech perception.

An important, although admittedly less interesting, aspect of historical analyses is to look for the original source of a particular theory. The central aim of the current paper is to analyse the question whether Wernicke is indeed the starting point of modernity. After all, Wernicke was just 26 when he published his theory and had had only half a year's experience with aphasic patients and the views of Meynert. Indeed, Wernicke himself admitted in his thesis that his views were not entirely new, or to put it in his own words: "Similar psychological and philosophical conclusions may be found in the writings of many aphasia authorities. Baginsky[3], for example, has expressed parallel views in his classification of centrifugal and centripetal aphasia. My conclusions differ from these

[2] It may seem that Broca only accepted localization of the faculty to articulate words and that he had a sort of holistic view for language in general. However, Broca did mention different levels of language processing and different functions on these levels, but was presumably unwilling to speculate on the precise localization of these in the brain. His main point was to convince his colleagues that Gall's principle of localization of function was right; speculation would probably have weakened his position.

[3] This is the only place where Wernicke refers to Baginsky.

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