An Essay in Neurosociology

Synopsis

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The main thesis of the book is that sociology must be interested in, and should be able to contribute to, neurosciences the very moment it becomes evident that the anatomy of the brain and the dynamics of neurological systems owe as much to the behaviour of the (human) organism in its natural environment as to the fact that any one brain at a certain moment has to be able to account for other, and possibly similar, brains in its social environment.

The book is written throughout in some hypothetical, if not speculative way. As it is written by a sociologist, references to anatomical detail are avoided almost throughout since any reference of that kind would surpass sociological competence. Instead the argumentation looks as strictly as possible at interfaces mainly between brain and society, introducing the notion of a plurality of brains being found in the environment of any one brain, and here and there also at interfaces between consciousness and brain (being subject to autoepistemic limitation) and between consciousness and society (which here is not our issue).

Currently, there are in sociology attempts to develop a neurosociology starting from the discovery of the utmost importance for human live of positive emotions both cultivated and checked for in small groups and families (e.g., Warren D. TenHouten, David D. Franks, H. Jonathan Turner, Alexandra Maryanski) and approaches to critically observe core assumptions, methodological constraints and journalistic successes in the media of neurosciences by what is called a critical neuroscience (Suparna Choudhury, Jan Slaby). Lacking, however, are attempts to look at the interaction of brain, consciousness and social situation in more complex situations in society. A rich research in the use of language, the listening to music or the formation of habits, however, is emerging which should both be connected to sociological research and supported by it.

The book draws on four sources to look more closely into possible contributions of social situations, i.e. a plurality of other brains and other consciousnesses, to the working of any one brain and consciousness. There is, first, Aleksandr R. Luria's and the school of Russian cultural psychology (Lev Vygotsky, A. N. Leont'ev) who already looked into "the higher cortical functions in man" and inquired into a possible co-evolution of brain, consciousness

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and society. There is, second, the discovery of the neo-cortex as a structure continuously constituting, and testing on, anticipations based experiences and memories (Vernon B. Mountcastle's columnar hypothesis, see also Jeff Hawkins), such that expectations thought by sociology to be established as social structures may find a correlation within nervous systems. Of what nature that correlation might be is of course the crucial question of any neurosociology, which for the time being we can only attempt to find some possible terms for, not to answer. Third, there is second-order cybernetics' view of the brain of the organism as a system computing information by continuously linking motoric to sensory data (Heinz von Foerster), thus laying the foundations for the understanding of the nervous system as a difference-based system engaged in "predictive coding" (e.g., Sigmund Freud, Chris Frith, Rajesh P.N. Rao/Dana H. Ballard/Yanping Huang, Georg Northoff and others). And there is, fourth and last not least, Immanuel Kant's philosophy of the necessarily unconditional constitution of reason on the three ideas of categorical subjectivity (autonomy), hypothetical synthesis (framing) and distinction of purpose and means (systems) (Critique of Pure Reason, B378f) which possibly mirrors achievements of the brain to account for the creativity and autonomy of other organisms with brains encountered in its social environment.

The overall purpose of the book is to enable sociology to look more closely at the results of research in neurosciences, to remain sceptical—as it fits sociology's intellectual temperament—as regards assumptions, metaphors and political recommendations supposedly stemming from that research and to nevertheless contribute to the development of more fruitful experiments on the interdependence of the operations of multiple brains on each other.

The book has 14 chapters. Chapter 1, The Cleft, takes up Rámon y Cajal's, Sherrington's and others' observation that any new discovery within the nervous system bridging functions formerly seen working in isolation means to have to ask for further mechanisms or functions now linking the previous functions, thus strengthening the idea and impression of a rather autonomous working of the nervous system. If we don't understand it, it at least seems to be able to understand—and organise—itself.

Chapter 2, Cultivated Ignorance, looks at previous attempts to understand a co-evolution of brain and society by scientific approaches at the periphery of the discipline such as Russian cultural psychology and American neurosociology while the rest of the discipline thinks it safe to just assume that humans bring with themselves enough of some nervous, organic and mental complexity—including memory—to be able to participate in society.
Chapter 3, *Reading and Writing*, collects some intuitive ideas, such as humans being able to read and write, to handle complex language (i.e., the reference problem of any language, see Terrence Deacon) and so on, to shed some light on the question just where to start inquiring into the co-evolution of brain, mind and society. Few instances in the history of philosophy (René Descartes) and sociology (Talcott Parsons) are recalled to understand how the problem of the plurality of brains was both addressed and avoided. The chapter introduces an understanding of 'complex forms,' which consists in distinguishing-to-connect systems levels such as the organic, the neural, the mental and the social system.

Chapter 4, *Opening and Closure*, looks into that highly astonishing and irritating discovery by Johannes Peter Müller–taken seriously by people such as Gustav Theodor Fechner, Hermann von Helmholtz or Jacob von Uexküll–that indeed the nervous system is operationally closed while being materially and energetically closed and links that discovery back to Aristotle's talking about the soul, Kant's critique of reason and forward to Heinz von Foerster's, Humberto R. Maturana's and Francisco J. Varela's notion of autopoietic closure of systems such as organisms.

Chapter 5, *The Idea of Form*, introduces George Spencer-Brown's idea, notion and calculus of "form" to frame some of the most important issues to deal with in any theory of the brain, which are distal perception by proximal stimulus, auto-epistemic limitation (brain and consciousness not being able to perceive the brain), operational closure and restriction to first-order ("intuition") and third-order perspectives ("in vitro") on the brain, lacking any second-order perspective to perceive brain or consciousness as a thou ("in vivo"). Spencer-Brown's notion of the form of a distinction seems to be able to at least conceive of a type of operation that is able to both close a system by reproducing it and opening it by indicating an outside to any operation of distinction.

Chapter 6, *A Teleological Apparatus*, continues to work on a form theory of the brain by referring to a hypothesis maintained by Mountcastle
as well by many others, including Chris Frith, of the brain as a purposeful or teleological apparatus, as indicated as well by the idea of predictive coding. Purposes or expectations and the distinction between their confirmation or disappointment enable the brain, or so it seems, to organize itself according to both its inner structure and its continuous scanning of its environment.

Chapter 7, *Mobile, Erect and Nude*, looks at the brain within the organism and the human within their habitat to begin to understand what kind of work is to be done by the brain. Sigmund Freud's idea of stimulus discharge ("Reizabfuhr", from his *Entwurf einer Psychologie*, 1895)
is used to develop a general understanding of the self-organisation of the brain with respect to stimuli both from its natural as from its social environment, taking account of the change of the environment of human beings by walking upright and being nude (which enables human beings to encounter a different intimacy than that among apes and other mammals), yet also stresses those human beings in ways demanding various ways to discharge stimuli.

Chapter 8, $\Omega (\xi_i, \xi_j)$, introduces Heinz von Foerster's way to account for an organism's way to compute its environment by projecting any stimulus on a richly structured inner surface.

and chapter 9, *Gesture, Language, Emotion*, follows on that notion to look at three specific types of stimuli computed by the brain,

$$\Omega_r (\xi_{i1}, \xi_{j1}) = \Omega_r \left[ R_{i1,j1} (\Omega_{i1}, \Omega_{j1}, \ldots \Omega_{ni}, \Omega_{nj+1}) \right]$$

and is treated as perturbations dealt with by second-order observations that is by attributing those perturbations to other organisms supposed to be equipped with brains, that is with intransparent, yet purposeful and memorising self-organisation as well.

Chapter 10, *The Kantian Code*, discusses what might be gained from Kant's understanding of the necessarily autonomous working of reason, looking at his understanding of ideas, the
synthesis of the manifold and the hypothetical unconditional of subjects, series of objects and systems.

And chapter 11, *Deviant Purposes*, follows up on that by discussing sociology's proper notions of action and experience accounting for the double contingency of human beings encountering each other as autonomous beings due to their intransparent and memorising brains and consciousnesses ("the modern individual", see Talcott Parsons, Niklas Luhmann).

Chapter 12, *Within the Medium of Semiosis*, tries to bracket ideas on "subjects" and "objects" to be distinguished in order to conceive of human encounters as a process of shared semiosis dealing with "significant symbols" (Peirce, Mead, Lévi-Strauss, Deacon).

Chapter 13, *No Self*, looks at notions of consciousness describing it as a function of social action and interaction (William James) rather than as the closure of an individual within itself and chapter 14, *Ratchet Effects*, looks at evolutionary universals such as the eye, language, social institutions and, indeed, consciousness as presuppositions of any further self-organisation of encounters among brainy beings.

Chapter 15, *A Cognitive Differential*,

\[ \Omega_r (\xi_i, \xi_j) = n \mid t \mid v \mid s \mid k \mid m \]

concludes by describing the form calculus of any one neural operation, \( \Omega_r (\xi_i, \xi_j) \), as the unity of distinctions between neurons operating in parallel, \( n \), teleological structure (checking the state of the organism), \( t \), variation of that structure, \( v \), and social, \( s \), cultural, \( k \), mental variables, \( m \), and the unmarked state, \( 0 \), accompanying the reproduction of any form. A sociological theory of the brain should, the book claims, be able to describe the brain as a structure able to both receive and produce the variations needed to deal with a natural and social environment.