

## Mindful Practices: On the Neurosciences in the Twentieth Century

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The neurosciences have been full of promises throughout the last century – from cybernetics to artificial minds, from holistic and integrative medicine to psychoneuro-immunology, from psychosurgery to psychoactive drugs – and they enjoy an astoundingly benevolent public interest. Just after the ending of “The Decade of the Brain” some managers of research in the neurosciences had already arranged to mark the beginning of the next millennium with a conference proclaiming the next hundred years the “Century of the Brain.” Whether a justifiable prediction or wishful thinking, the neurosciences have gained momentum. How does this optimistic omnipresence of the neurosciences relate to the actual research in this area? What will be the consequences of this concentration of research efforts? Will the flood of new data, concepts, and theories revolutionize psychology or clinical medicine? Will the experimentally supported assumption that there is no such thing as free will ultimately change our worldview and our epistemology? How will or could the results affect our daily lives?

Questions like these are relevant for our present situation, but they were already widely debated throughout the entire twentieth century. Even if such “big questions” have not yet been answered, the research already has opened new horizons and expectations. Looking at ambitious projects in the neurosciences from the last century, it becomes obvious that simply gaining more knowledge about the brain was hardly the intention. Whether one takes Oskar and Cécile Vogt’s aim to create a cytoarchitectonic map of the cerebral cortex, or Hans Berger’s and Grey Walter’s work on electroencephalography, or Walter Cannon’s experimentation on pain, or Warren S. McCulloch’s theory of logical neurons: all these projects and their scientific questions were catalyzed by cultural and social claims, and conversely, these projects became part of a more general reformulation of *la condition humaine*. Scientific representations of the mindful brain, as well as outspokenly dualistic viewpoints held by neurophysiologists like Charles S. Sherrington, were part of a particular form of culture and should be reconstructed as such.

In comparison to other important branches of the life sciences such as molecular biology, there is a striking difference in the history of the neurosciences. Its ongoing success has not originated from a technological or conceptual breakthrough, nor has

it been followed, accompanied, or enhanced by a similarly rich and constant flow of technological developments. There's no equivalent of Watson and Crick's modeling of the DNA in the neurosciences. If molecular biology produced (and was produced by) dramatic shifts in technology with consequences not at all confined to molecular biology or the laboratory, were or will the epistemological and cultural consequences of, for example, visualization techniques, such as cytoarchitectonics, electroencephalography, PET-scanning or functional MRI, be anywhere as dramatic? What was the impact of the constant references to the computer as a metaphor for the understanding of the brain?

Of course, the neuron theory, mostly developed by the Spanish neuroanatomist Santiago Ramón y Cajal in the 1880s and 1890s, could be regarded as an exception. It was often said that the neuron is for the neurosciences what the atom is for physics. One can hardly underestimate the importance of the neuron, but it is also true that crucial domains within the brain sciences such as localization theory, electroencephalography, and cytoarchitectonics developed independently of the neuron doctrine.

While the discovery of the DNA and its consequences have fundamentally changed our view of life, the neurosciences still seem to deal with the same old questions of the type: What is cognition? What is consciousness? What is attention? What do we think with? What is the relationship between thinking and feeling? Is there a material equivalent for genius located in the brain? How do we feel pain, fear, pleasure, etc.? This oscillation between old and new, between innovative new technologies and concepts in anatomy, physiology, chemistry, clinical neurology, psychiatry, or in the computational sciences, and often surprisingly conservative opinions about the mindful brain, partly dating back to the nineteenth century, seems to be characteristic of the neurosciences in the twentieth century and, perhaps, the new century. If, for example, the cerebral localization of mental talents and properties like music, mathematics, religiosity, and criminality in particular has a comeback, then this is due to a cohabitation of new visualization techniques with old psychological parameters. The interesting question is how these different elements are again and again (re-)arranged and linked in specific research settings, and how they are embedded in cultural expectations and values.

Since linking the mind to the head, brain research has frequently operated in an outspokenly futuristic mode. This started in the early nineteenth century with Franz Joseph Gall's phrenology, which promised to be a comprehensive basis for the management of society, including education, religion, and law. In the twentieth century, the advancement of the brain sciences was said to lift mankind into a state of enlightenment about its own intellectual foundations. Promises to deliver an empirical solution for the mind-body problem or attempts to decipher the brain as merely a computational device are examples for the proleptic structure of the brain sciences. The architectonic cartography of the cortex, the brain as an electric apparatus, and the computer metaphor have served as leitmotifs for the dynamics of research as well as of public understanding of the brain. Due to the proleptic structure

of brain research, these leitmotifs had their own mode of operation in the history of the field: They were extremely powerful and led to a variety of new insights into structure and function of the brain; they helped to shape entire research fields; and after a given time, they began to lose their fascination and faded away. Without revealing insights into the biological foundations of the mind to the promised potential, they molded the neurosciences as a field of research.

Despite its richness, the history of brain research in the twentieth century is, with some remarkable exceptions, still very much a territory to be explored. We are not talking about the increasingly popular hagiographical histories that serve for a public instruction about scientific developments rather than for an intellectual comprehension of the sciences. We are only beginning to formulate the appropriate questions for this multi-faceted aspect of human culture. The papers collected in this issue have mostly emerged from a conference at the Max Planck Institute for the History of Science held in November 1999. While the idea of the meeting was to bring together issues from the cultural history of science with issues from the current neurosciences, this collection focuses on historical trajectories of central themes and research projects in the neurosciences of the twentieth century, mainly the first half. This is no disadvantage, because, as Walter Benjamin once noted, “for the materialist historian, every epoch with which he occupies himself is only a fore-history of that which really concerns him.”

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On December 18, 2000, our friend Lily Kay died unexpectedly. We decided to print her paper as she had sent it to us the previous July. Those who had the pleasure to get to know Lily more closely were deeply affected and saddened by her untimely death. This issue is dedicated to her memory.

We want to close this introduction with a poem by Wislawa Szymborska, one of Lily’s favorite writers. “Cat in an Empty Apartment” opens with stanzas which capture our sense of deep loss: “Die – you can’t do that to a cat./ Since what can a cat do/ in an empty apartment?/ Climb the walls?/ Rub up against the furniture?/ Nothing seems different here,/ but nothing is the same./ Nothing has been moved,/ but there’s more space./ And at nighttime no lamps are lit.” Here is the entire poem in German translation:\*

\* Editors' note: Despite lasting efforts of the editors, *Science in Context* has not received the permissions to reproduce the English translation of Szymborska's poem worldwide.

### **Katze in der leeren Wohnung**

Sterben – das tut man einer Katze nicht an.  
Denn was soll die Katze  
in einer leeren Wohnung.  
An den Wänden hoch,  
sich an Möbeln reiben.  
Nichts scheint sich hier verändert zu haben,  
und doch ist alles anders.  
Nichts verstellt, so scheint es,  
und doch alles verschoben.  
Am Abend brennt die Lampe nicht mehr.  
Auf der Treppe sind Schritte zu hören,  
aber nicht die.  
Die Hand, die den Fisch auf den Teller legt,  
ist auch nicht die, die es früher tat.

Hier beginnt etwas nicht  
zur gewohnten Zeit.  
Etwas findet nicht statt,  
wie es sich gehört hätte.  
Jemand war hier und war,  
dann verschwand er plötzlich  
und ist beharrlich nicht da.

Alle Schränke durchforscht.  
Alle Regale durchlaufen.  
Unter den Teppichen geprüft.  
Trotz des Verbots  
die Papiere durchstöbert.  
Was bleibt da noch zu tun.  
Schlafen und warten.

Komme er nur,  
zeige er sich.  
Er wird's schon erfahren.  
Einer Katze tut man so etwas nicht an.  
Sie wird ihm entgegenstolzieren,  
so, als wollte sie's nicht,  
sehr langsam,  
auf äußerst beleidigten Pfoten.  
Noch ohne Sprung, ohne Miau.

(from: Wislawa Szymborska, *Auf Wiedersehen. Bis morgen. Gedichte.* © 1998 Suhrkamp Verlag, Frankfurt am Main)