

# Neurosciences in Germany

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The article on *Neurosciences in the Third Reich: from Ivory Tower to Death Camps*<sup>1</sup> in this issue reminds us of the prime historical example of a scientific establishment shooting itself in the foot: Germany after 1933. Before 1933, Germany was the world epicenter of scientific medicine. After 1933, with Hitler's accession to power and the implementation of his antisemitic racial policies, Germany's scientific preeminence self-destructed. The Jewish physicians and scientists who had done so much to give German medicine its luster were driven from their posts, forced into exile, and gassed in concentration camps. At the time in 1938 that Nazi Germany invaded Austria, annexing that little country to the Third Reich, 65 percent of all physicians in Vienna were Jewish. Almost all, of course, were swept away. Of the 197 professors in the Medical Faculty of the Vienna University, 132 were discharged because of their "Jewish" or "indeterminate" origin.<sup>2</sup> No scientific establishment could survive hammer blows of this nature.

The article<sup>1</sup> fits into the saga of the neurosciences in that maelstrom. In the scientific Holocaust, brutal meddlesomeness replaced controlled experimentation; ideology was substituted for the scientific method. These horrors in the world of medical experimentation reproduced in miniature the colossal savagery of such extermination camps as Auschwitz and Sobibor.

The losses of Jewish physicians in the neurosciences were especially painful. In 1934, Kurt Goldstein, a specialist in aphasia and brain injuries, fled from Frankfurt am Main to New York. In 1939, Ludwig Guttmann, whose name is indissolubly linked with the treatment of spinal injuries, was able, literally at the last minute, to leave Breslau for the safety of England. In November 1933, Willy Mayer-Gross, known for one of the authoritative psychiatry textbooks of the mid-20th century, emigrated from Heidelberg to a post at the Maudsley Hospital in London. (His *Clinical Psychiatry*, written with Eliot Slater and Martin Roth, was published in 1954; Slater later said of Mayer-Gross, "He wrote most of it. I had to turn his Germanic English into English."<sup>3</sup>)

So the losses were terrible. Literally overnight, the neurosciences in Germany plunged from world leadership into a racist backwater, becoming a nonplayer on the international stage and a source of such spectacular pseudoscience on the domestic stage that the Nazi doctors would later be the objects of a Nuremberg trial.

Yet the events of 1933-45 cause us to forget how central was the role of German neuroscience before 1933, and how dramatically the neurosciences in Germany have resurged since the 1960s.

Before 1933 there is no doubt that Germany represented the world center of gravity of clinical psychiatry, neurology, and the basic neurosciences. In a field such as neuroanatomy, the list of pioneers is studded with German names. The career of a scientist like Korbinian Brodmann, who pioneered the study of cerebral localization, reads like a Michelin guide to the field's three-star laboratories. Born in 1868, Brodmann studied medicine at Leipzig, then trained under Alois Alzheimer at the City Insane

Asylum in Frankfurt am Main. In 1901 he moved to Berlin, to work with Oskar Vogt at the world famous Neurobiology Institute. In 1910 he accepted a post with Robert Gaupp, one of Germany's leading psychiatrists in the Department of Psychiatry at Tübingen. And in 1918 Brodmann became head of the topographic-histologic division of Emil Kraepelin's recently-founded German Psychiatry Research Institute in Munich, which would later become the premier neuroscientific institute of the world. Had Brodmann not died prematurely of sepsis in August of that year, he would have had as colleagues at the DFA (as it was known by its German initials – today the Max Planck Institute for Psychiatry) such figures as Franz Nissl, whose name is familiar to every medical student because of his stain, and Walther Spielmeier, the great histopathologist.

Contributions to neurophysiology have been perhaps more international in nature. Yet here too German names predominate among the leaders in the years before 1933. Hans Berger, who discovered the electroencephalogram in 1924, was the professor of psychiatry in Jena. Friedrich Goltz, who pioneered the study of CNS reflexes, taught at a series of universities, the last being Strasbourg (after the Germans annexed it in 1871). It would be tedious to further extend the long list of important German neurophysiologists, yet one cannot forbear mentioning Hermann von Helmholtz, founder of neuro-ophthamology or Johannes Müller, the Berlin anatomist whose "ten laws" of optics had a big impact on Helmholtz.

In the study of neural transmission and neurochemistry, Otto Loewi, the Graz physiologist who in 1921 described the chemical transmission of the nerve impulse, counts as the leading pioneer. (For this achievement, he won a Nobel Prize in 1937.)

People once said, slightly tongue in cheek, that it would be difficult to find a neuropathologist who was not Central European (Giovanni Mingazzini, the professor of psychiatry in Rome, being one of the few exceptions – yet even he had studied in Munich under Bernhard von Gudden, spoke German fluently, and had a German wife!). Germany's achievements in neuropathology were the result of a long series of psychiatry professors and asylum physicians such as the Viennese neuropathologist Theodor Meynert sitting hunched over their microscopes after hours, trying to find lesions in other mental disorders comparable to the clear anatomical changes in neurosyphilis.

In clinical neurology, the Germans tended to split the honors with the French and the English. Yet any neurologist today will be aware how many of the eponyms that he or she uses on a daily basis are German: (Karl) Wernicke's encephalopathy, (Franz) Chvostek's sign, and so forth.

Then suddenly it all came to an end. By no means were all of the brilliant scientists Jewish. Yet with the expulsion of the Jews from German academic and scientific life, the wind seemed to go out of the system. Under the Nazis, teaching and research became directed towards the then "politically-correct" areas, such as racial science and eugenics. A fear of psychiatric illness caused the Nazis to seek organicity everywhere. In the study of eating disorders, for example, it became correct to see anorexia

nervosa as a disorder of the pituitary gland rather than as a psychological affliction.

Then the Second World War closed down biomedical research definitively, and in the hurly-burly of the postwar years, the rebuilding of a scientific establishment received a low priority in West Germany (an even lower priority in totalitarian East Germany). Thus, the German scientific pre-eminence was shattered.

It has not been widely understood abroad that, since the 1960s, the Germans have been bounding back in the international neuroscience scene. There is a tendency in German science to venerate ancient masters, even if those masters have been internationally invisible. Yet younger generations have been liberating themselves from the dead hand of this kind of ancestor-worship, and making the kinds of contributions that echo the mastery of the prewar years. Rather than attempting to survey the now vast field of the neurosciences, let us take just one example: psychopharmacology.

The Germans have had an automatic advantage in psychopharmacology because organic medicinal chemistry began in the laboratories of the Bayer Company in Elberfeld in the last quarter of the nineteenth century. Germany and German-speaking Switzerland dominated the field thereafter. So there is this Central European tradition of being clever at synthesizing molecules that the years 1933-45 scarcely attenuated. Moreover, the accent here is on Central European rather than German because the German-Swiss, particularly the big pharmaceutical houses in Basel (currently Novartis and Hoffmann-La Roche) have become such important players. Accordingly, several of the major drug classes in psychopharmacology today have clear Central European roots: the benzodiazepines were synthesized by German-trained chemist Leo Sternbach at Roche's U.S. headquarters. The tricyclic antidepressants were developed in collaboration between the Geigy company and Swiss psychiatrist Roland Kuhn. The use of dopamine in parkinsonism began as a Viennese story, where Oleh Hornykiewicz established that depletion of dopamine was associated with the disease, and that IV injections of dopa brought about some improvement. Clozapine, an "atypical" antipsychotic, resulted from collaboration between the Swiss drug company Sandoz (now Novartis) and Munich psychiatrist Hanns Hippus. The CINP, or Collegium Internationale Neuro-Psychopharmacologicum – the world's premier scientific organization in this field – was found-

ed in Zurich in 1957, more or less at the initiative of Swiss psychopharmacologist Ernst Rothlin, the title of the organization proposed by German psychiatrist Wolfgang de Boor. These are some of the recent Central European stories. Nonetheless, the editor of a recent compendium of autobiographies of neuroscience pioneers felt able to write of the 17 narratives in his volume, "The contributors did their scientific work in the United States, Canada, England, Australia, France and Sweden." Germany and Switzerland, of course, were not on the list.

One has to be careful not to claim too much. Psychopharmacology today is certainly an international field, with contributions from all over the world. Yet it is a shame that the German language has fallen into such disuse as an international scientific language, because one certainly cannot count the Germans out.

*Edward Shorter  
Toronto, Ontario*

#### Suggestions for further reading:

- Ban T, Healy D, Shorter E, eds. *The Rise of Psychopharmacology*. Budapest: Animula, 1998.
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- Kreuter A. *Deutschsprachige Neurologen und Psychiater: Ein biographisch-bibliographisches Lexikon von den Vorl ufern bis zur Mitte des 20. Jahrhunderts*, 3 vols. Munich: Saur, 1996.
- Schliack H, Hippus H, eds. *Nerven rzte Biographien*. Stuttgart: Thieme, 1998.
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#### REFERENCES

1. Shevell MI. Neurosciences in the Third Reich: from Ivory Tower to Death Camps. *Can J Neurol Sci* 1999; 26: 132-138
2. Hubenstorf M. sterreichische rzte-Emigration. In: Stadler F, ed. *Vertriebene Vernunft: Emigration und Exil sterreichischer Wissenschaft 1930-1940*. Munich: Jugend und Volk. 1987: 359-415. (see page 381)
3. Peters UH, Willy Mayer-Gross. In: Schliack H, Hippus H, eds. *Nerven rzte Biographien*. Stuttgart: Thieme. 1998:47-54.(see page 51)
4. Squire L, ed. *The History of Neuroscience in Autobiography*, vol. 1. Washington DC: Society for Neuroscience. 1996. (see page x)

*Edward Shorter is Professor of the History of Medicine, Faculty of Medicine, Univeristy of Toronto*