The Psychiatry of Carl Wernicke

Stephan Heckers, MD MSc

Department of Psychiatry and Behavioral Sciences

Vanderbilt University

No Conflicts of Interest

Support from NIH

Outline

- Life / Career
- Publications
- Ideas
- Impact

1885


Dr Carl Wernicke
Medicinalr.
E. 1885 -

1905


GALERIE HERVORRAGENDER ÄRZTE UND NATURFORSCHER.
Carl Wernicke.
Wernicke.
Beilage zur Münchener medizinischen Wochenschrift. Blatt 170, 1905.
Verlag von J. F. LEHMANN in München

Life

- Grew up in Silesia; Parents died before age 18


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250
500 km
DENMARK
SWEDEN
Ringkjöbing
Copenhagen
Malmö
Baltic Sea
The North Sea
Niemen
Königsberg
Vilno
Kiel
Danzig
EAST PRUSSIA
Hamburg
Schwerin
Stettin
NETHER-LANDS
Bremen
GERMAN EMPIRE
RUSSIAN EMPIRE
Warthe
Vitsula
Amsterdam
Hannover
Berlin
Posen
Weser
Potsdam
Bug
The Hague
Magdeburg
Oder
Warsaw
Ems
Rotterdam
HARZ MTS
Elbe
Lodz
Dortmund
Leipzig
SAXONY
SILESIA
Breslau
Lublin
Essen
Rhine
Antwerp
Erfurt
Dresden
Liège
THURINGIAN FOREST
ORE MOUNTAINS
Brussels
Cologne
Kattowitz
BELGIUM
Mainz
Frankfurt
Prague
Labe
Krakow
Main
LUXEMBOURG
Moldau
Lemberg (L'viv)
Reims
Metz
BAVARIA
CARPATHIAN MOUNTAINS
Marne
Verdun
Rhine
Stuttgart
FOREST
Strassburg
Aube
Munich
Danube
Tisza
Vienna
FRANCE
BLACK
Inn
Budapest
Seine
Dijon
Zurich
Kapos
Saone
Bern
AUSTRO — HUNGARIAN EMPIRE
ALPS
Loire
SWITZERLAND
Adige
Drave
Maros
Geneva
Save
Rhone
Zagreb
Lyon
ITALY
Trieste

Life

- Grew up in Silesia; Parents died before age 18
- Risk taker; wine and music; conflicts

"*An enemy of compromise in science, so he was in life*."
Bonhoeffer, 1905

"*He was as warm, loyal a friend as he was a staunch foe*."
Liepmann, 1924

Life

- Grew up in Silesia; Parents died before age 18
- Risk taker; wine and music; conflicts
- Married late; 2 daughters, 1 son

Life

- Grew up in Silesia; Parents died before age 18
- Risk taker; wine and music; conflicts
- Married late; 2 daughters, 1 son
- Died at age 52; pneumothorax after bicycle accident

Career: Breslau I

- High school: graduated 1866, at age 17
- Medical school: Breslau (1866-1870)
- War of 1870/71

Career : Breslau I

- Assistant: Ophthalmology (1870), Breslau
- Assistant: Psychiatry (1871-1875), Breslau
- One semester with

  Theodor Meynert

  in Vienna

PSYCHIATRIE.

KLINIK

DER

ERKRANKUNGEN DES VORDERHIRNS

BEGRÜNDET

AUF DESSEN BAU, LEISTUNGEN UND ERNÄHRUNG.

VON

Dr. THEODOR MEYNERT

K. K. ORD. Ö. PROFESSOR DER NERVENKRANKHEITEN UND VORSTAND DER PSYCHIATRISCHEN KLINIK IN WIEN.

ERSTE HÄLFTE.

(BOGEN 1—18.)

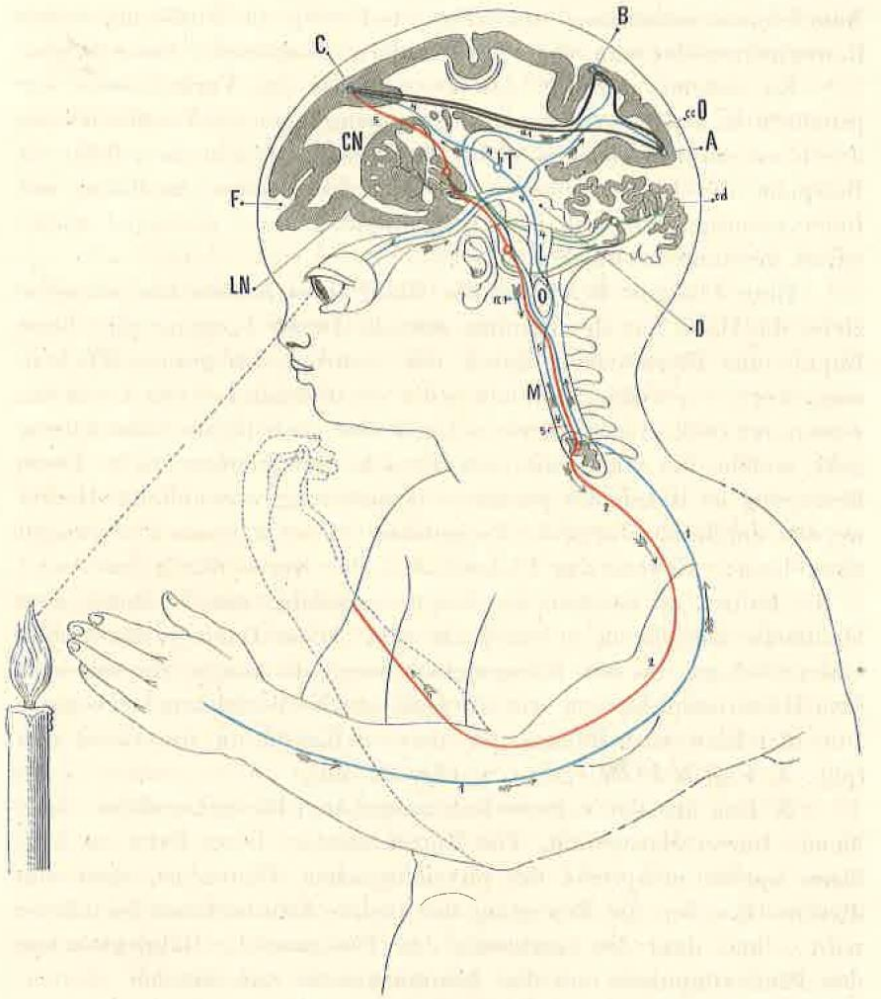
MIT 64 HOLZSCHNITTEN UND 1 TAFEL.

WIEN, 1884.

WILHELM BRAUMÜLLER

K. K. HOF- UND UNIVERSITÄTSBUCHHÄNDLER.

Fig. 60.



Schema für die Entstehung einer bewussten Armbewegung.

Career: Berlin – Breslau II - Halle

- Assistant: Psychiatry (1876-1878), Berlin
- Private Practice (1878-1885), Berlin
- Chair in Breslau (1885-1904)
- Chair in Halle (1904-1905)


DENMARK
SWEDEN
Ringkjöbing
Copenhagen
Malmö
Baltic Sea
0
250
500 km
N
W
E
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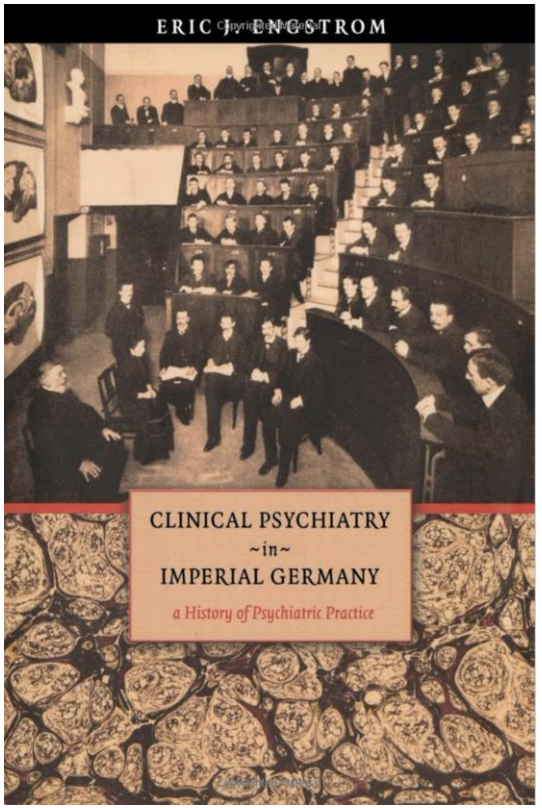
The North Sea
Kiel
Hamburg
Schwerin
Stettin
Bremen
Königsberg
Danzig
Niemen
Vilno
EAST PRUSSIA
NETHER-LANDS
GERMAN EMPIRE
RUSSIAN EMPIRE
Amsterdam
The Hague
Rotterdam
Hannover
Berlin
Potsdam
Posen
Warthe
Vitsula
Bug
Warsaw
Lodz
Lublin
Weser
Ems
Magdeburg
Oder
Elbe
HARZ MTS
Dortmund
Essen
Leipzig
Dresden
Breslau
SAXONY
SILESIA
Antwerp
Rhine
Erfurt
Liège
Brussels
Cologne
BELGIUM
THURINGIAN FOREST
ORE MOUNTAINS
Kattowitz
Prague
Labe
Krakow
Lemberg (L'viv)
Mainz
Frankfurt
Main
LUXEMBOURG
Moldau
CARPATHIAN MOUNTAINS
Reims
Metz
Verdun
Marne
Rhine
BAVARIA
Stuttgart
FOREST
Strassburg
BLACK
Munich
Danube
Vienna
Tisza
Aube
FRANCE
Inn
Budapest
Dijon
Seine
Saone
Bern
Zurich
Kapos
AUSTRO — HUNGARIAN EMPIRE
ALPS
Adige
Drave
Loire
SWITZERLAND
Maros
Geneva
Save
Zagreb
Rhone
Lyon
ITALY
Trieste

Clinical Psychiatry in Imperial Germany

- Universities
- Schools
- Journals
- Textbooks



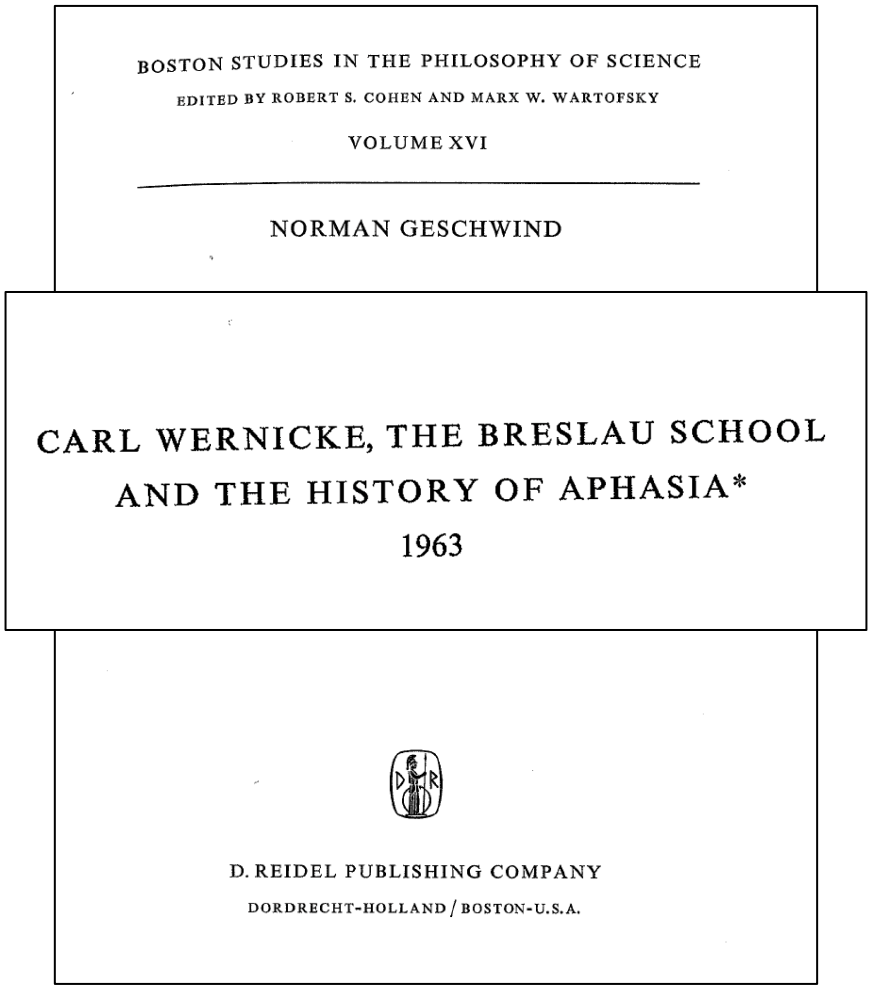
Clinical Psychiatry in Imperial Germany

- Breslau

Psychiatric Clinic, circa 1900

Clinical Psychiatry in Imperial Germany

- Breslau



1974

Clinical Psychiatry in Imperial Germany

- Breslau
- Liepmann,

  Bonhoeffer, Kleist

apraxia

endo-
exo-
genous

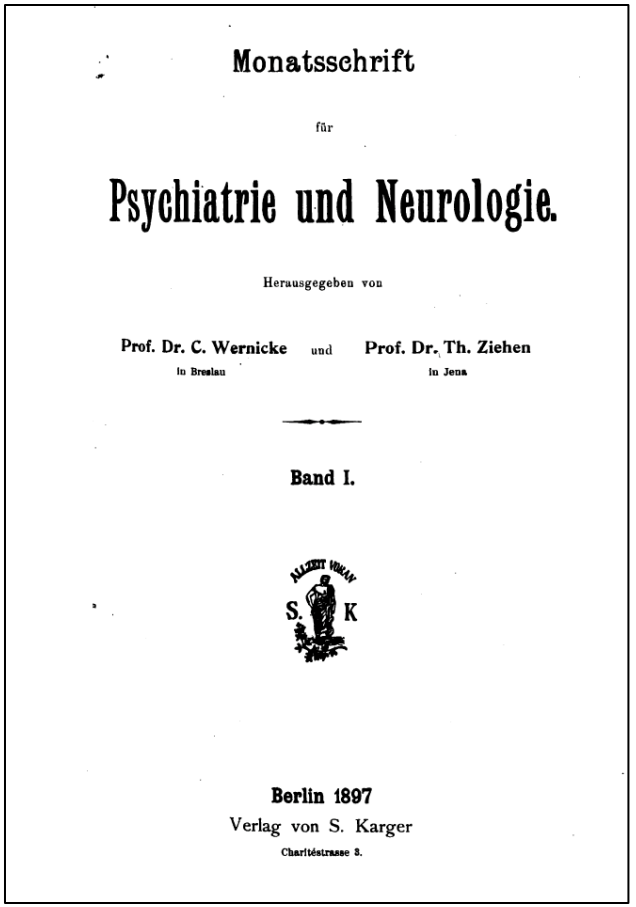
psycho-motor

Clinical Psychiatry in Imperial Germany

- Breslau
- Liepmann,

  Bonhoeffer, Kleist
- *Monthly review of*

  psychiatry and neurology


Monatsschrift

für

Psychiatrie und Neurologie.

Herausgegeben von

Prof. Dr. C. Wernicke in Breslau und Prof. Dr. Th. Ziehen in Jena

Band I.

Berlin 1897
Verlag von S. Karger
Charitéstrasse 3.

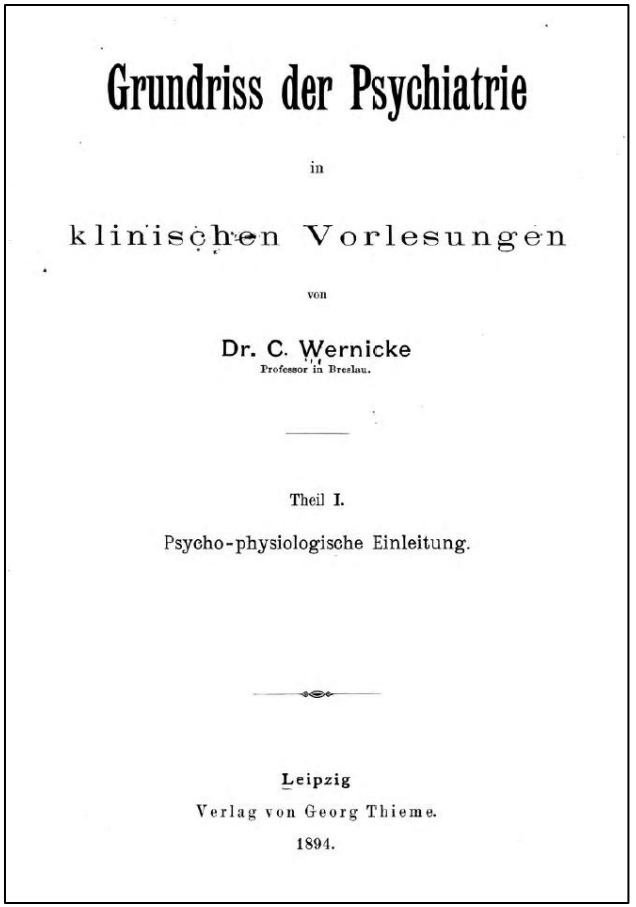
1897

Clinical Psychiatry in Imperial Germany

- Breslau
- Liepmann,

  Bonhoeffer, Kleist
- *Monthly review of*

  psychiatry and neurology
- *Outline of Psychiatry*



Grundriss der Psychiatrie

in

klinischen Vorlesungen

von

Dr. C. Wernicke

Professor in Breslau.

Theil I.

Psycho-physiologische Einleitung.

Leipzig

Verlag von Georg Thieme.

1894.

1894

Publications: 3 Topics

- Neuroanatomy / Neuropathology
- Clinical Neurology
- Psychiatry

Topic 1: Neuroanatomy

- Textbook of Brain Diseases, 1881
- Brain Atlas, 1897-1900

Textbook of Brain Diseases, 1881

Lehrbuch

der

Gehirnkrankheiten

für

Aerzte und Studirende

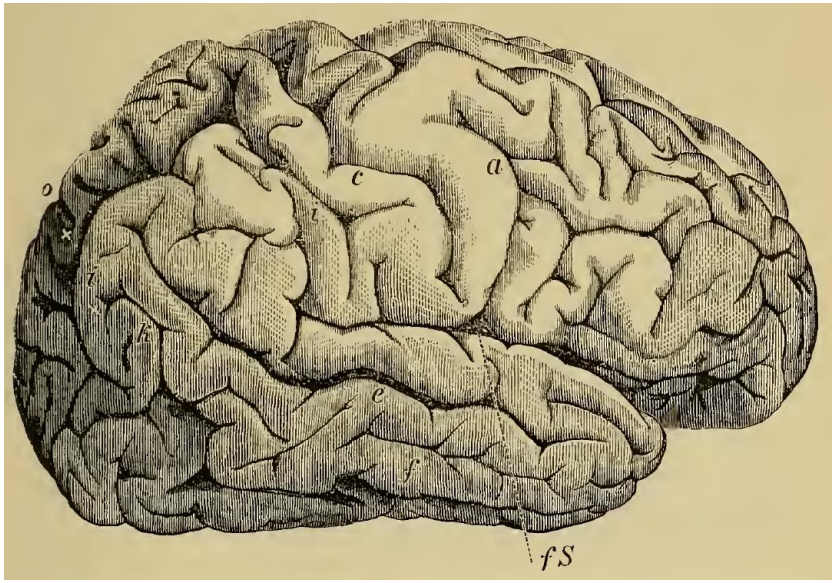
von

Dr. C. Wernicke,
Privat-Docent an der Universität Berlin.

Band I.

Mit 96 Abbildungen.

KASSEL.
Verlag von Theodor Fischer.
1881.



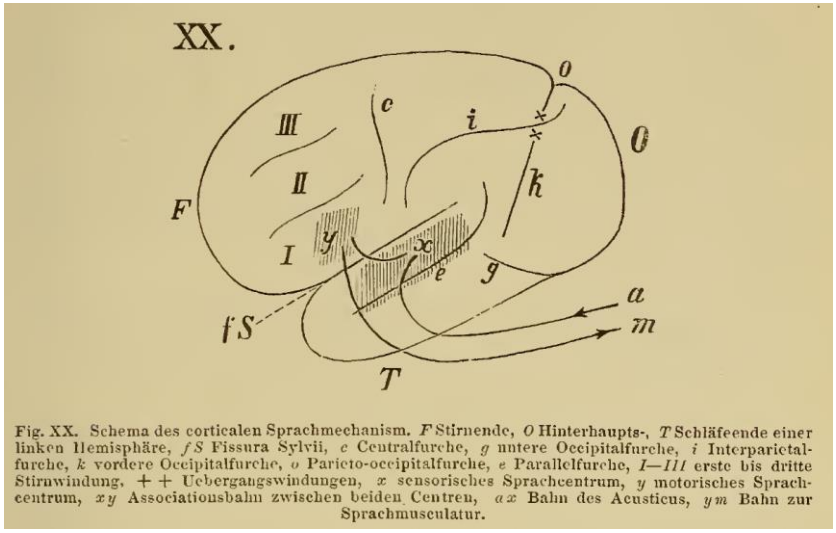
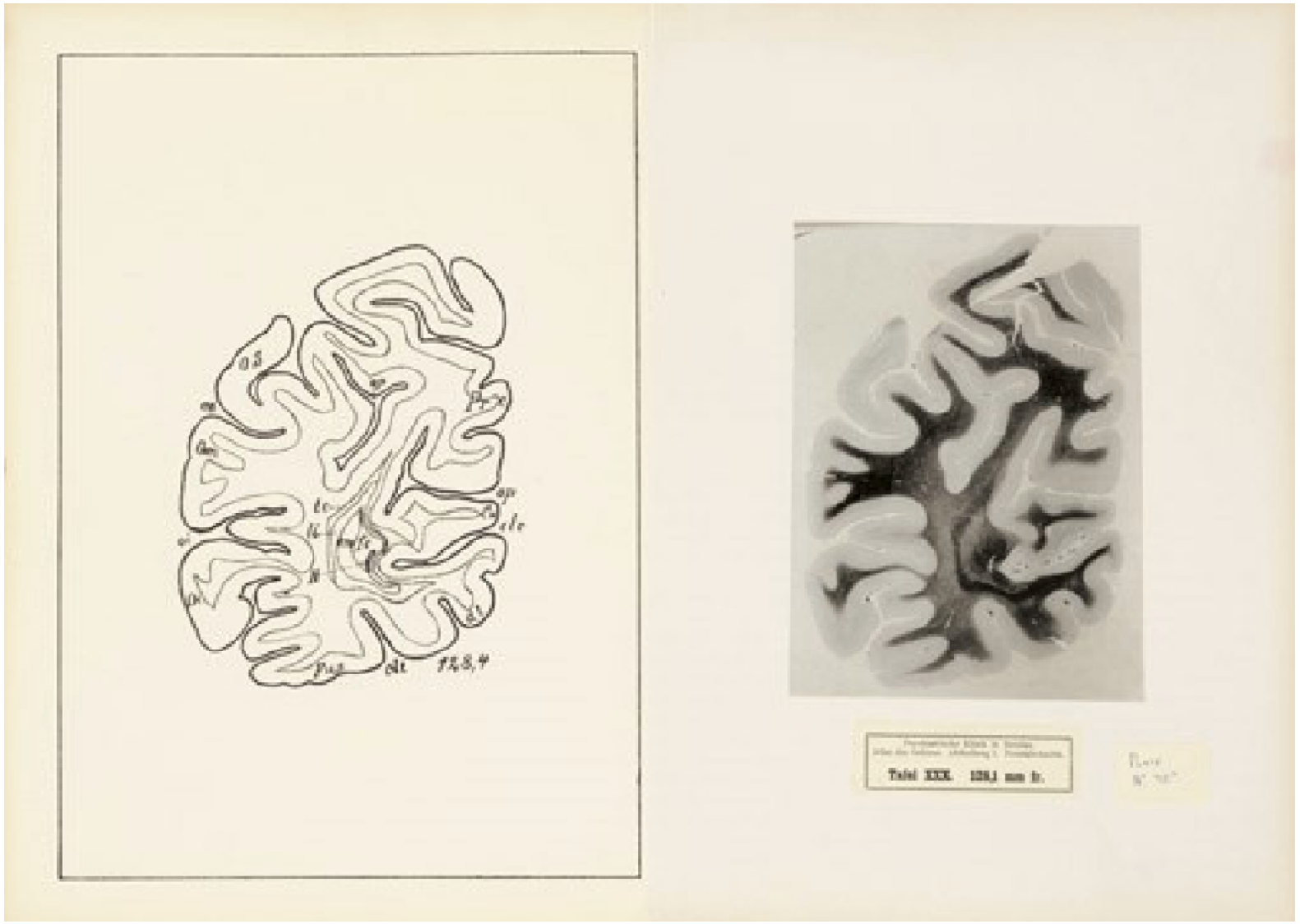


Fig. XX. Schema des corticalen Sprachmechanism. *F* Stirnende, *O* Hinterhaupts-, *T* Schläfeende einer linken Hemisphäre, *fS* Fissura Sylvii, *c* Centralfurche, *g* untere Occipitalfurche, *i* Interparietalfurche, *k* vordere Occipitalfurche, *o* Parieto-occipitalfurche, *e* Parallelfurche, *I—III* erste bis dritte Stirnwindung. + + Uebergangswindungen, *x* sensorisches Sprachcentrum, *y* motorisches Sprachcentrum, *xy* Associationsbahn zwischen beiden Centren, *ax* Bahn des Acusticus, *ym* Bahn zur Sprachmusculatur.

Brain Atlas, 1897-1900



Neuro-anatomy, -pathology

Macroscopic

- Meynert, Forel, von Gudden, Wernicke

Microscopic

- Cajal, Nissl, Alzheimer, Brodman, Vogt

Neuro-anatomy, -pathology

Macroscopic

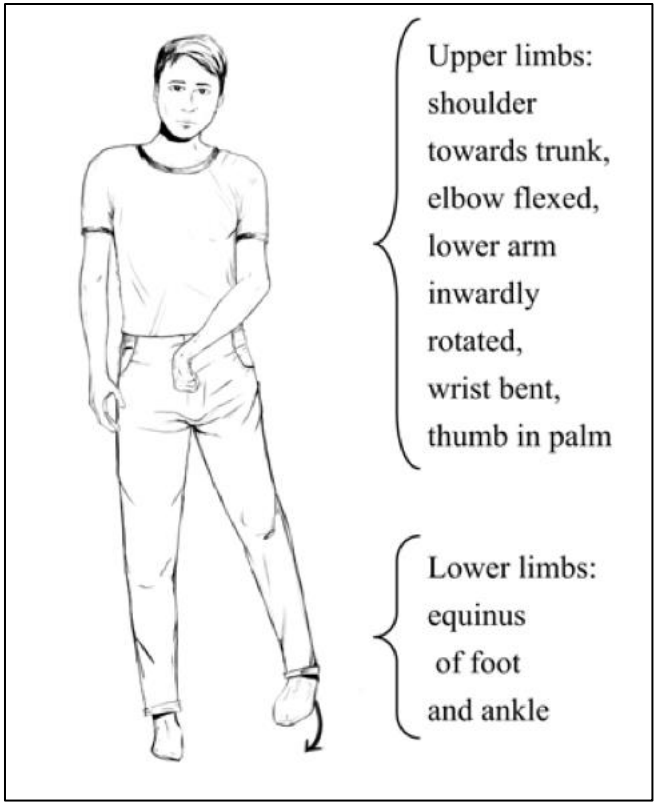
- Meynert, Forel, von Gudden, Wernicke
- CT; MRI

Microscopic

- Cajal, Nissl, Alzheimer, Brodman, Vogt
- Cell number, Gene expression

Topic 2: Clinical Neurology

- Aphasia (1874)
- Encephalopathy (1881)
- Hemiplegia (1889)



Topic 3: Psychiatry

- Scientific viewpoint (1880)
- Theory of psychiatric symptoms (1892)
- Outline of psychiatry, 3 vol. (1894-1900)
- Case series, 3 vol. (1899-1900)

1848

Aphasia 1874

Scientific viewpoint 1880

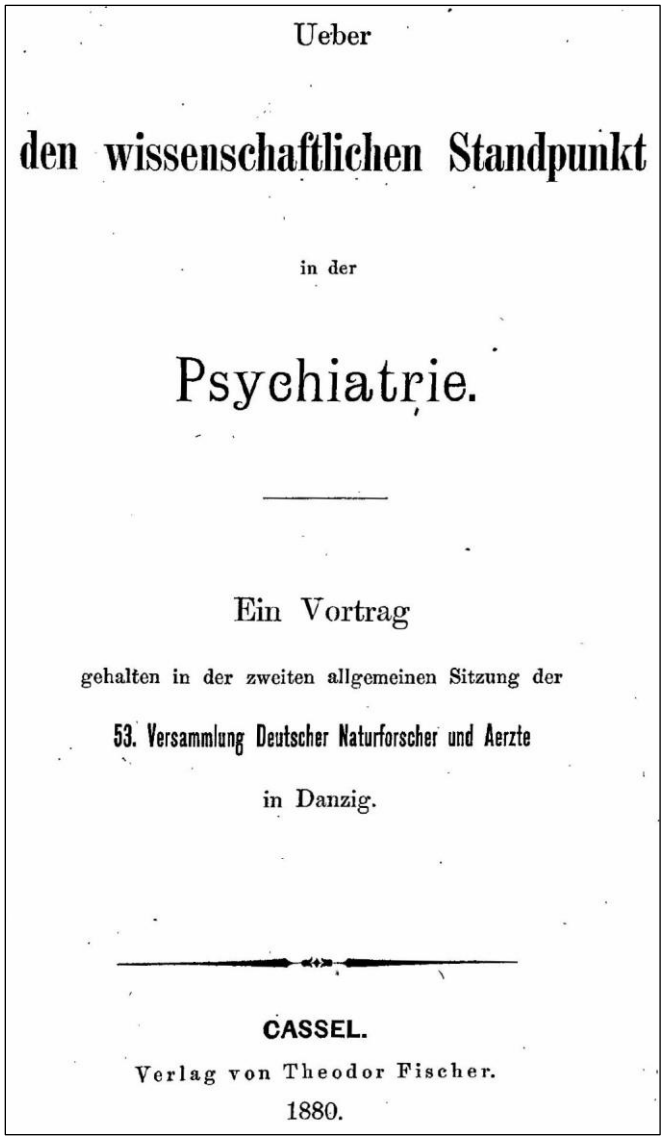
Textbook of brain diseases 1881

Theory of psychiatric symptoms 1892

Outline of Psychiatry 1894 – 1900

1905

Scientific Viewpoint of Psychiatry, 1880



Ueber

den wissenschaftlichen Standpunkt

in der

Psychiatrie.

Ein Vortrag

gehalten in der zweiten allgemeinen Sitzung der

53. Versammlung Deutscher Naturforscher und Aerzte

in Danzig.

CASSEL.

Verlag von Theodor Fischer.

1880.

History of Psychiatry
2022, Vol. 33(2) 236–255

DOI: 10.1177/0957154X221075240
journals.sagepub.com/home/hpy
SAGE

Classic Text No. 130

'Regarding the scientific viewpoint in psychiatry', lecture by Carl Wernicke (1880)

With an introduction by

Stephan Heckers
Vanderbilt University Medical Center, Nashville, USA

Kenneth S Kendler
Virginia Commonwealth University, Richmond, USA

Translation by

Astrid Klee
University of Toronto, Canada

Stephan Heckers
Vanderbilt University Medical Center, Nashville, USA

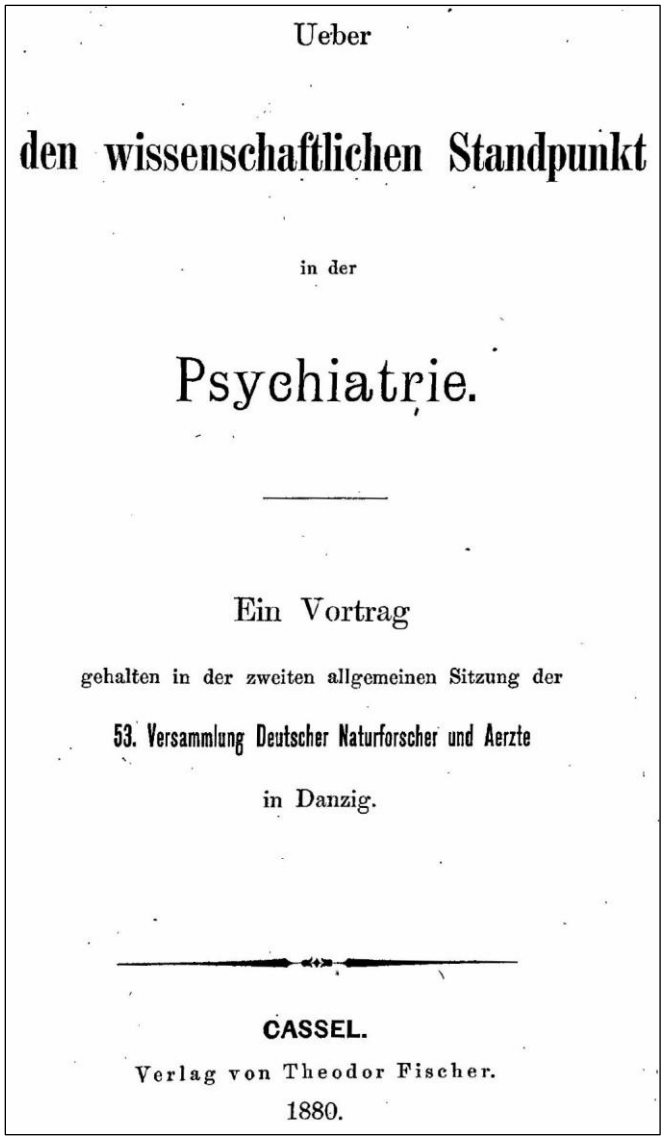
Abstract

In 1880 Carl Wernicke gave this plenary lecture at an annual meeting of German physicians and natural scientists. He used principles from his 1874 aphasia monograph to build a neural model of mental illness. He proposed that the brain keeps a record of experiences in distinct areas of the sensory and motor cortices in the form of memory images, which allows for recognition of objects and the planning of motor acts. He conjectured that imperfections, partial defects and complete loss of such memory images lead, respectively, to mild, moderate and severe forms of psychopathology in sensory and motor realms. The lecture is an early presentation of Wernicke's system of psychiatry. Several of his concepts have remained relevant in contemporary neuroscience.

Keywords

Aphasia, network dysfunction, psychiatric neuroscience

Scientific Viewpoint of Psychiatry, 1880



Ueber

den wissenschaftlichen Standpunkt

in der

Psychiatrie.

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Verlag von Theodor Fischer.

1880.

”Let us make a distinction between the practical goals of psychiatry and the scientific ones!
As meritorious as it is as a practical psychiatrist to treat the mentally ill and to fully meet the demands of this difficult profession, psychiatry is also a branch of natural science and as such has to solve tasks that are equal to the greatest tasks of natural science. (…)
The analysis of aphasia therefore gives us the paradigm for all mental processes …”

Scientific Viewpoint of Psychiatry, 1880

Ueber

den wissenschaftlichen Standpunkt

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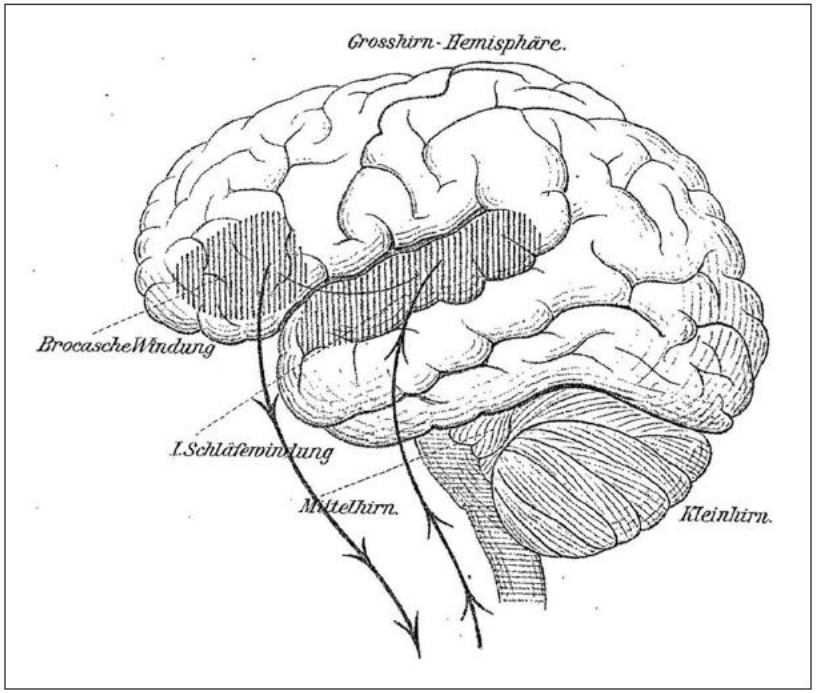

Scientific viewpoint (1880)

- Aphasia as the model for information processing
- Memory images
  - Sensory
  - Motor

Scientific viewpoint (1880)

"If we imagine that it were possible to rob a healthy person unnoticed of a large part of the memory images in which the outside world is reflected in him, or to change their content, we would find all sorts of wrongs, that he committed in his perplexity, fully explicable.
The peculiar state of mind of patients has the same causes, is based on the same processes (…) as in the healthy, and so it seems to me to be a question of great importance, (…) whether most emotions of the insane are not motivated in the same way as in the healthy.
(…) emotions are usually reflected in the facial features in a regular manner that is independent of the will. Therefore, even where the patient does not want to communicate, they allow a conclusion to be drawn about the underlying ideas."

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(…) emotions are usually reflected in the facial features in a regular manner that is independent of the will. Therefore, even where the patient does not want to communicate, they allow a conclusion to be drawn about the underlying ideas."

Scientific viewpoint (1880)

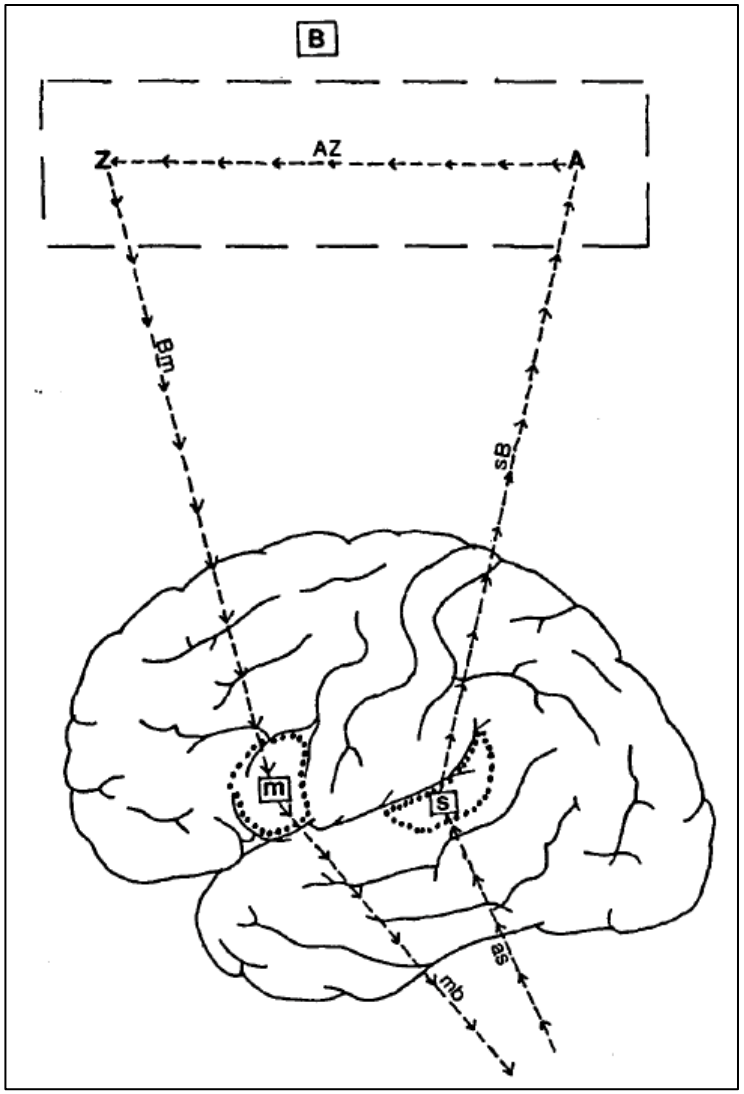
- Abnormal memory images lead to:
  - Perplexity
  - Pathology of Exteroception [Allopsychosis]
  - Pathology of Interoception [Somatopsychosis]
  - Pathology of Self images [Autopsychosis]

Topic 3: Psychiatry

- Scientific viewpoint (1880)
- Theory of psychiatric symptoms (1892)
- Outline of psychiatry, 3 vol. (1894-1900)
- Case series, 3 vol. (1899-1900)

3 Categories of mental illness

- sA Psychosensory
- AZ Intrapsychic
- Zm Psychomotor



Lanczik 1988

Theory of psychiatric symptoms (1892)

"The next task of psychiatry, therefore, will be to create a natural system of classification of the symptoms of disease: a framework broad enough to accommodate the apparently inexhaustible variety of psychic symptoms, and yet each of its compartments so specific in its content, that they can be described in brief. Such a principle of classification can be achieved by following the principles which have gained general validity in the theory of aphasia. (...)

All disturbances in the speech of the mentally ill can then be divided into three categories according to whether they belong to the path s A, A Z, Z m, and accordingly are named psycho-sensory, intrapsychic and psychomotor. Closer examination soon reveals the applicability of this schema, which was developed for the process of speech, to all psychic symptoms in general."

3 Functional Disturbances

- A-, Hypo- function
- Para - function
- Hyper- function

3 Functional Disturbances

- A-, Hypo- function
- Para - function
- Hyper- function

	Hypo	Para	Hyper
Psychosensory			
Intrapsychic			
Psychomotor			

Theory of psychiatric symptoms (1892)

II. Aus der psychiatrischen Klinik zu Breslau.

Grundzüge einer psychiatrischen Symptomenlehre.

Von

Prof. **C. Wernicke.**

(Nach einem im Verein Ostdeutscher Irrenärzte am 5. December 1891 gehaltenen Vortrage.)

Psychosensorische	Anaesthesie
„	Paraesthesie
„	Hyperaesthesie
Intrapsychische	Afunction
„	Parafunction
„	Hyperfunction
Psychomotorische	Akinese
„	Parakinese
„	Hyperkinese.

Example: Psychomotor disturbance

"With every psychomotor performance of a patient, but of course also with every failure of an expected psychomotor performance, we will then have to ask ourselves the question: is it caused by psychomotor or intrapsychic or psychosensory factors?"

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SPEECH	A-, Hypo-kinesis	Hyperkinesis
Psychosensory		
Intrapsychic		
Psychomotor		

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SPEECH	A-, Hypo-kinesis	Hyperkinesis
Psychosensory		
Intrapsychic		
Psychomotor	mutism	

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SPEECH	A-, Hypo-kinesis	Hyperkinesis
Psychosensory		
Intrapsychic	delusions, poverty of thought	
Psychomotor	mutism	

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SPEECH	A-, Hypo-kinesis	Hyperkinesis
Psychosensory	abnormal sensation in body	
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SPEECH	A-, Hypo-kinesis	Hyperkinesis
Psychosensory	abnormal sensation in body	
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Psychomotor	mutism	compulsive talking

Example: Psychomotor disturbance

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SPEECH	A-, Hypo-kinesis	Hyperkinesis
Psychosensory	abnormal sensation in body	
Intrapsychic	delusions, poverty of thought	pure mania
Psychomotor	mutism	compulsive talking

Example: Psychomotor disturbance

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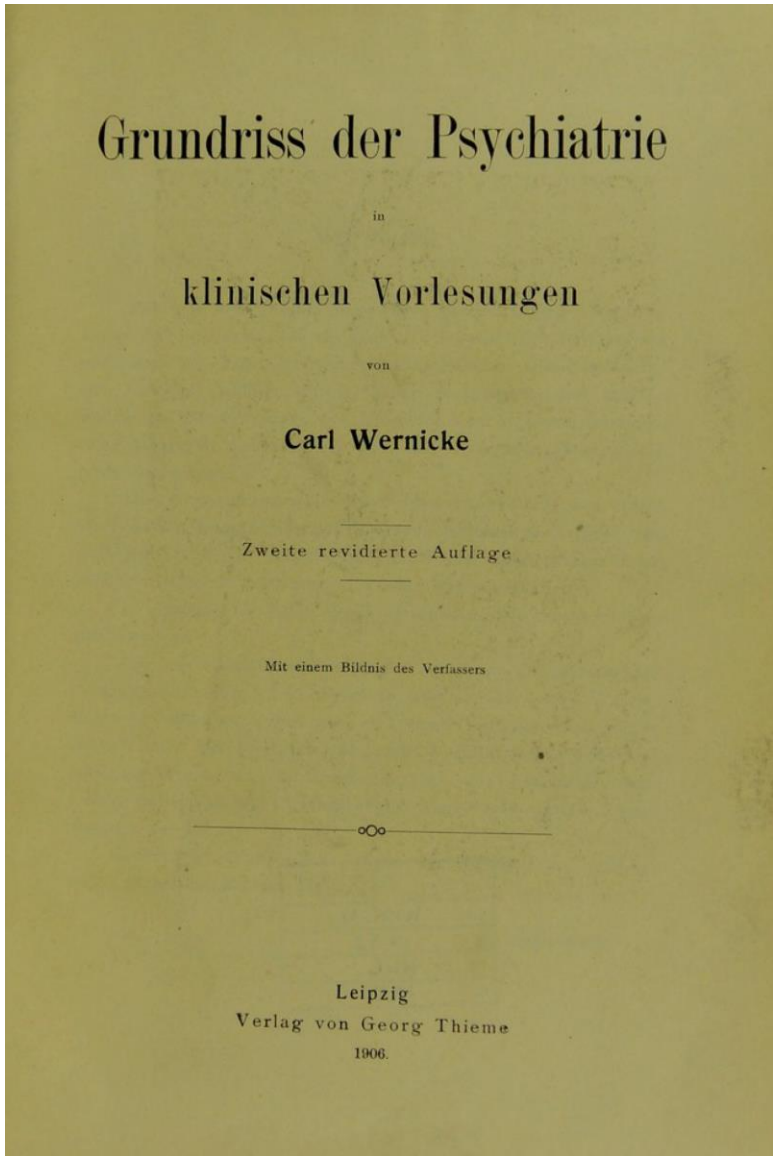
SPEECH	A-, Hypo-kinesis	Hyperkinesis
Psychosensory	abnormal sensation in body	hallucinations
Intrapsychic	delusions, poverty of thought	pure mania
Psychomotor	mutism	compulsive talking

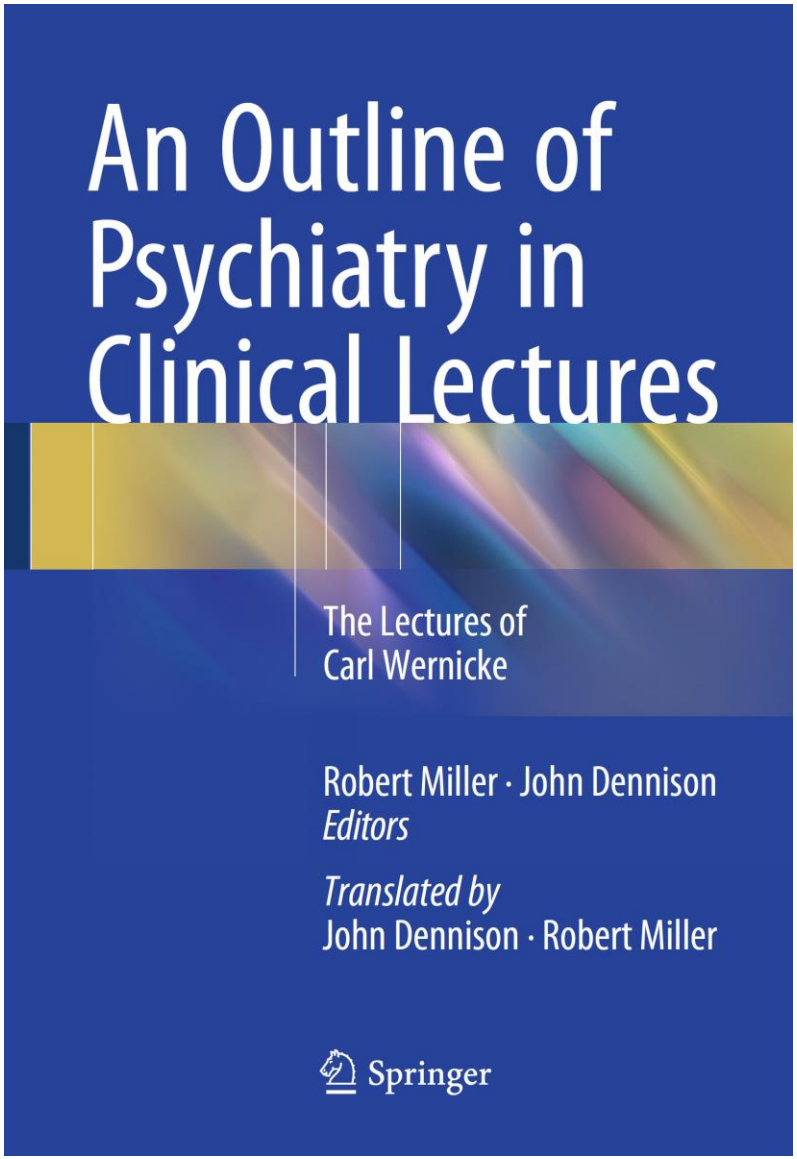
3 Contents of Consciousness

- Allo – psychosis [World]
- Somato – psychosis [Internal milieu]
- Auto – psychosis [Self]

Topic 3: Psychiatry

- Scientific viewpoint (1880)
- Theory of psychiatric symptoms (1892)
- Outline of psychiatry, 3 vol. (1894-1900)
- Case series, 3 vol. (1899-1900)


Grundriss der Psychiatrie
in
klinischen Vorlesungen
von
Carl Wernicke
Zweite revidierte Auflage
Mit einem Bildnis des Verfassers
Leipzig
Verlag von Georg Thieme
1906.


An Outline of Psychiatry in Clinical Lectures
The Lectures of Carl Wernicke
Robert Miller · John Dennison
Editors
Translated by
John Dennison · Robert Miller
Springer

Outline of psychiatry, 3 v. (1894-1900)

- 41 lectures
- Aphasia as model
- 3 categories, 3 disturbances, 3 contents
- Sejunction

Sejunction

"We will give this process of detachment an appropriate name and call it 'sejunction'; we cannot fail to see it as a deficit, a break in continuity, which must correspond with failure of certain lines of association.

The fact that, in the brain, different ideas and idea complexes are not merely juxtaposed, but are normally combined into larger groups, and finally into unity of the ego, can, in the final analysis, be due only to associative processes."

Topic 3: Psychiatry

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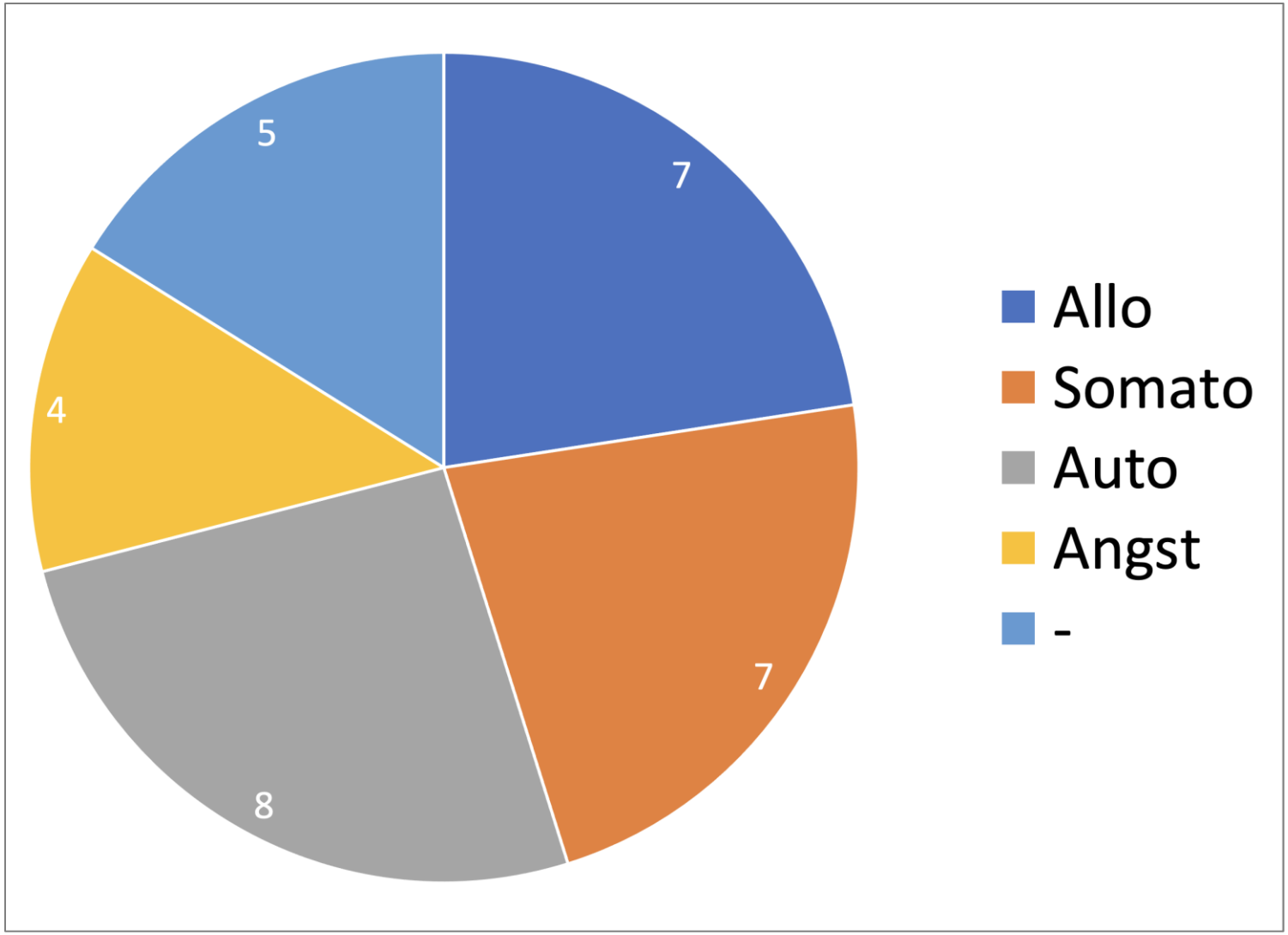
- Outline of psychiatry, 3 vol. (1894-1900)
- Case series, 3 vol. (1899-1900)

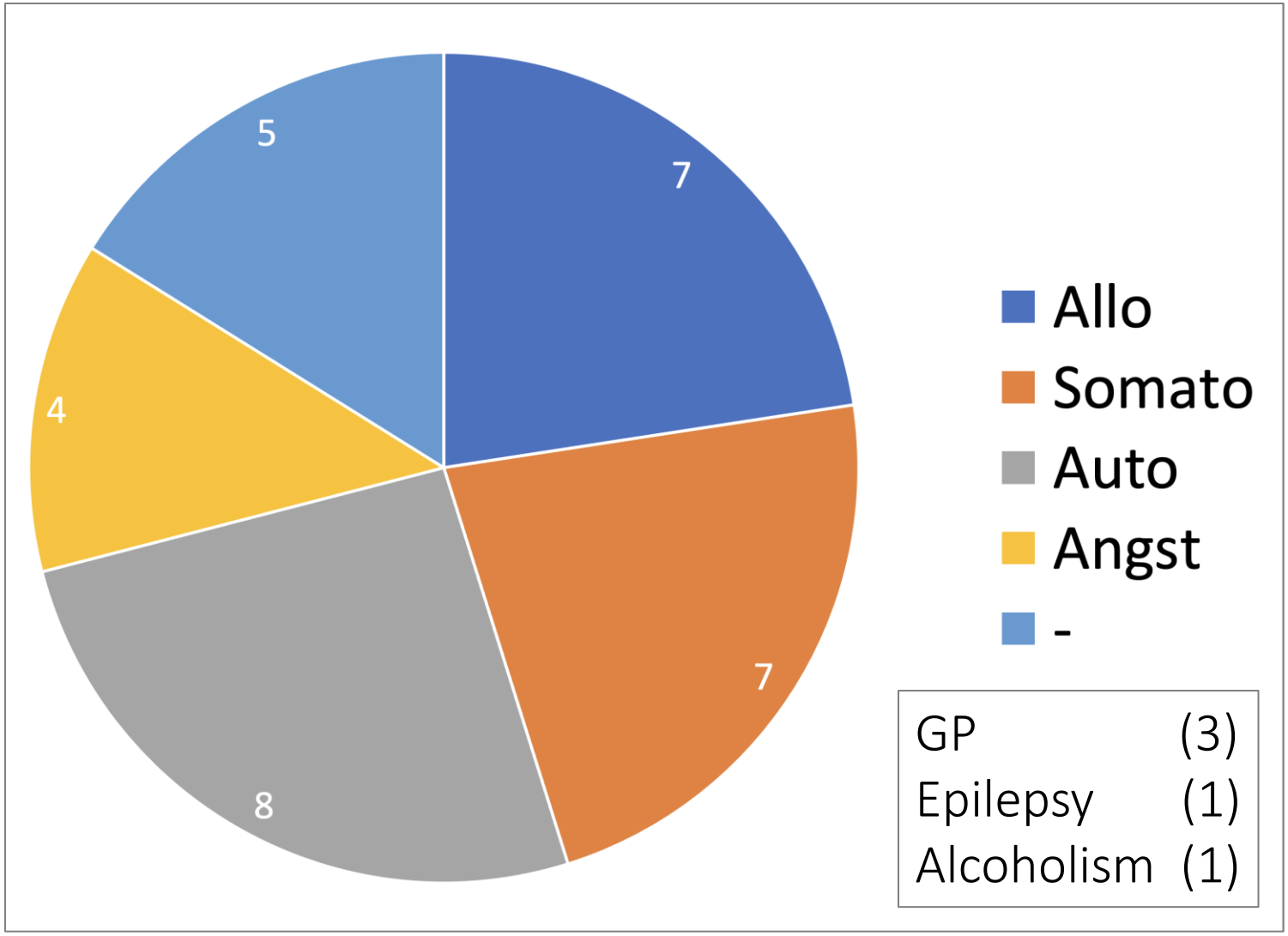
Case series, 3 vol. (1899-1900)

- 3 volumes: 31 / 31 / 36 cases
- Case presentations & Diagnoses:
  1. Preliminary
  2. other (e.g., Hebephrenia, Catatonia, Mania)
  3. acute / chronic
  4. Content (Allo, Somato, Auto)
  5. Final

Case series, vol 1 (1899)



Case series, vol 1 (1899)



Main Ideas

- Neural basis of memory image
- Focus on psychomotor behavior
- Categories & disturbances [3 x 3]
- Early stage of psychosis: Perplexity
- Sejunction ~ neural basis of ipseity disturbance

Impact: Psychiatric neuroscience

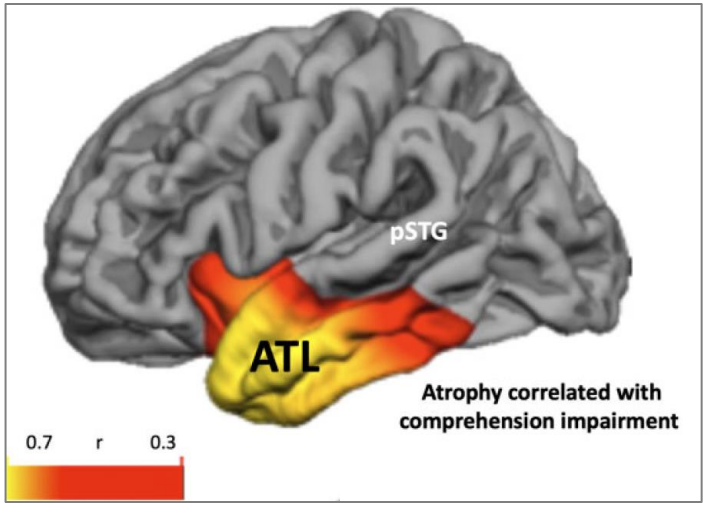
- Neuropsychology / Behavioral Neurology
- Models of psychomotor function
- Network / Computational models of psychosis

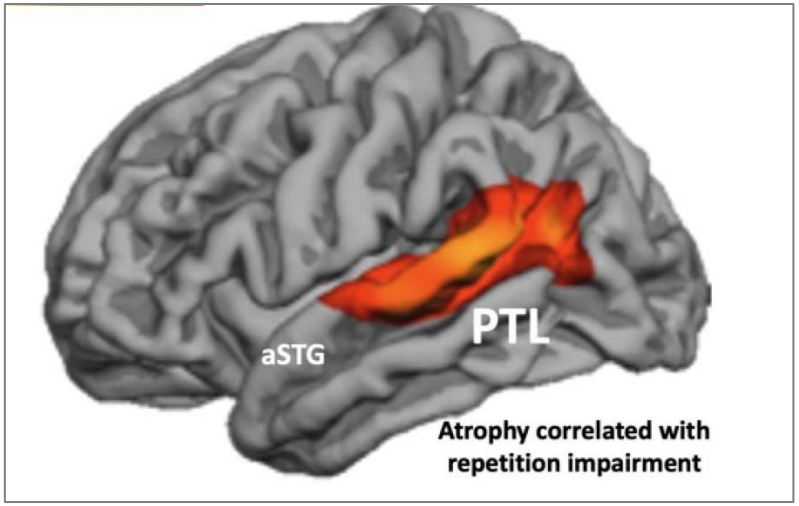
doi:10.1093/brain/awv154 BRAIN 2015: 138; 2423–2437 | 2423

BRAIN
A JOURNAL OF NEUROLOGY

The Wernicke conundrum and the anatomy of language comprehension in primary progressive aphasia

M.-Marsel Mesulam,[1,2,3] Cynthia K. Thompson,[1,4] Sandra Weintraub[1,5] and Emily J. Rogalski[1]





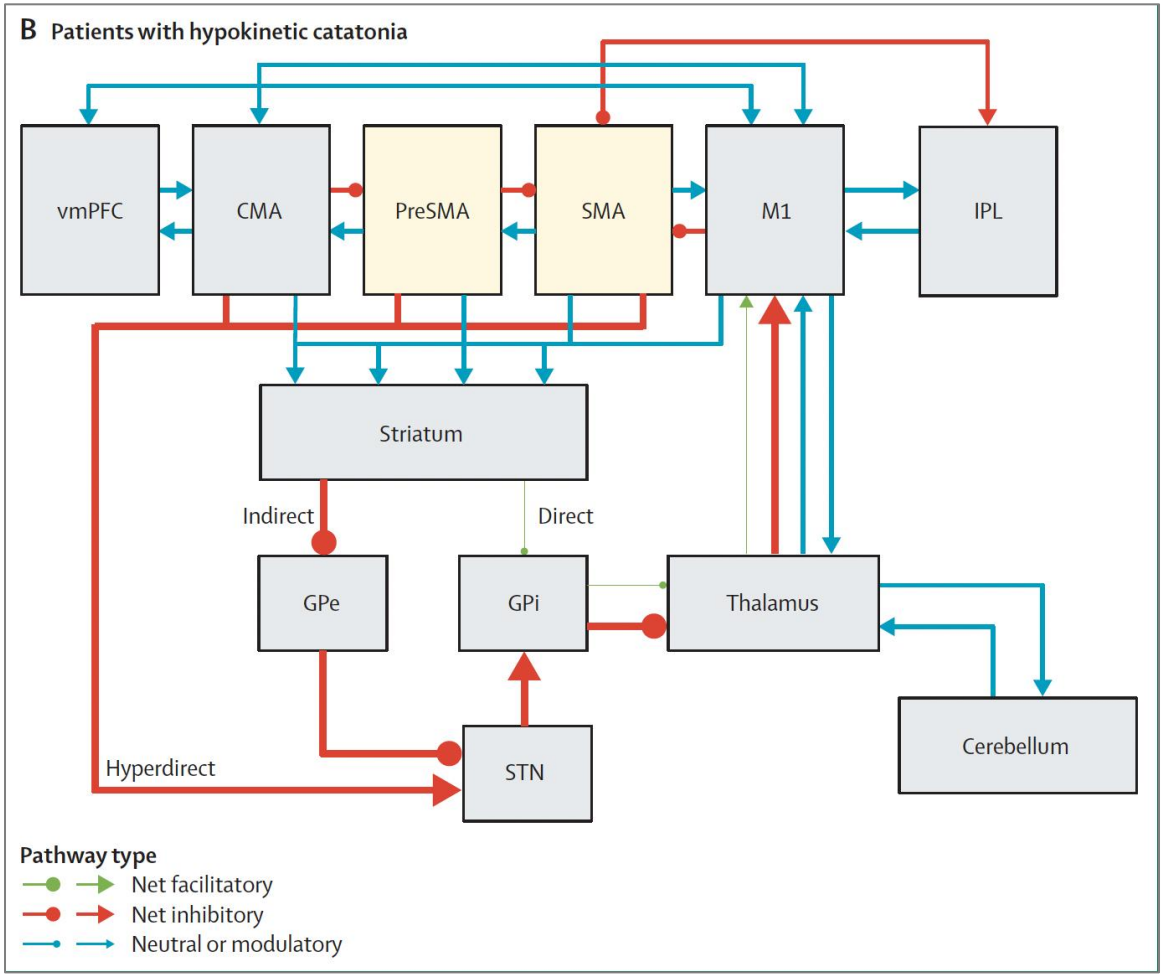
Catatonia 1

Structure and neural mechanisms of catatonia

Sebastian Walther, Katharina Stegmayer, Jo Ellen Wilson, Stephan Heckers

Lancet Psychiatry 2019; 6: 610–19

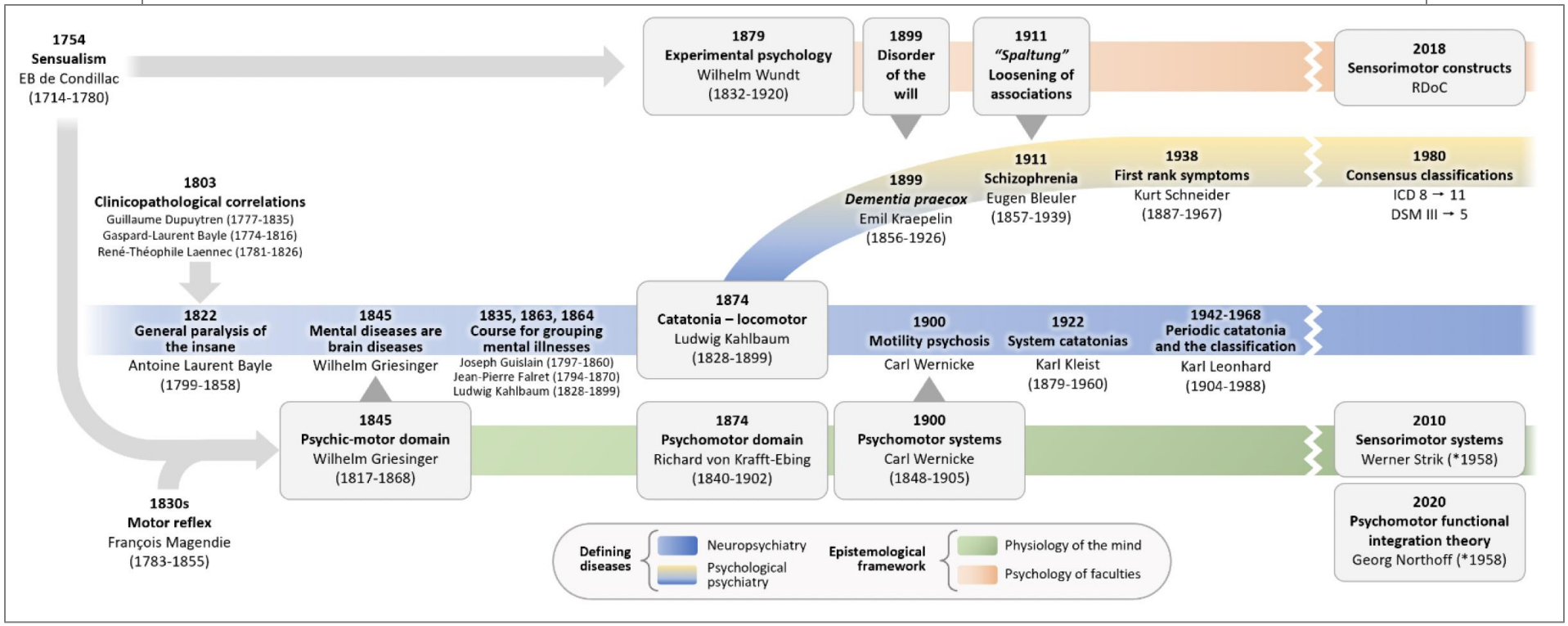
Catatonia is a psychomotor syndrome associated with several psychiatric and medical conditions. Psychomotor signs range from stupor to agitation, and include pathognomonic features such as verbigeration and waxy flexibility.



European Neuropsychopharmacology
Volume 56, March 2022, Pages 60-73

The polysemous concepts of psychomotricity and catatonia

A European multi-consensus perspective



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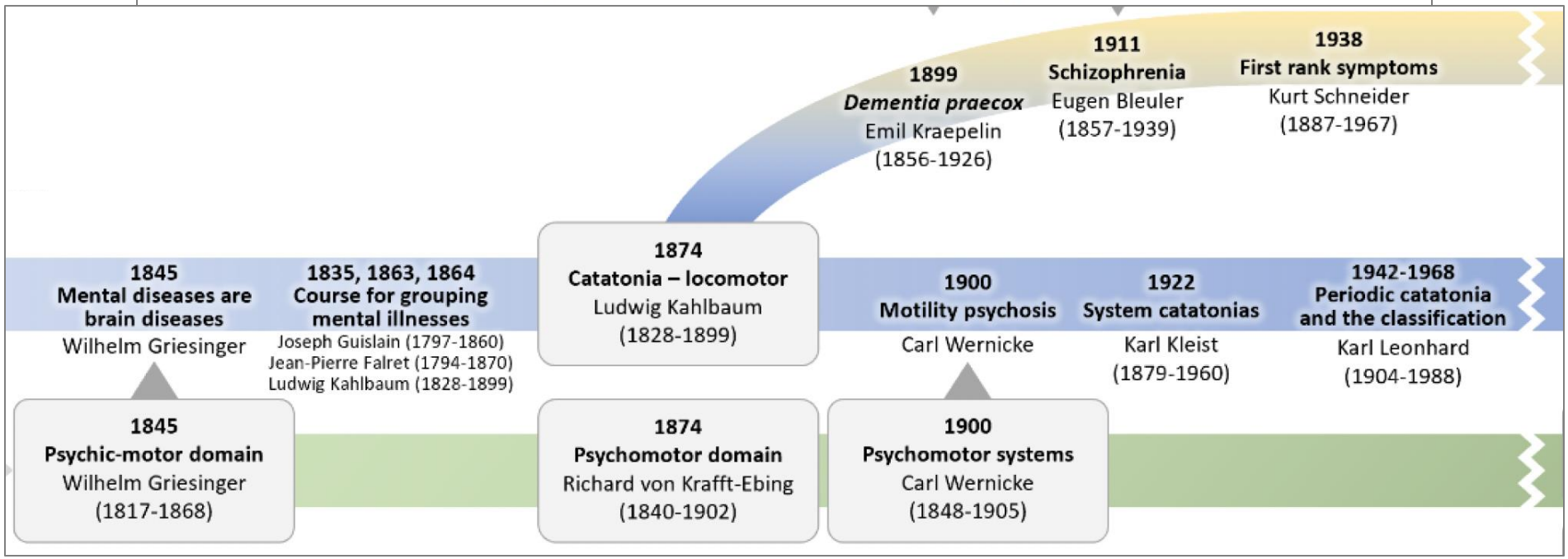

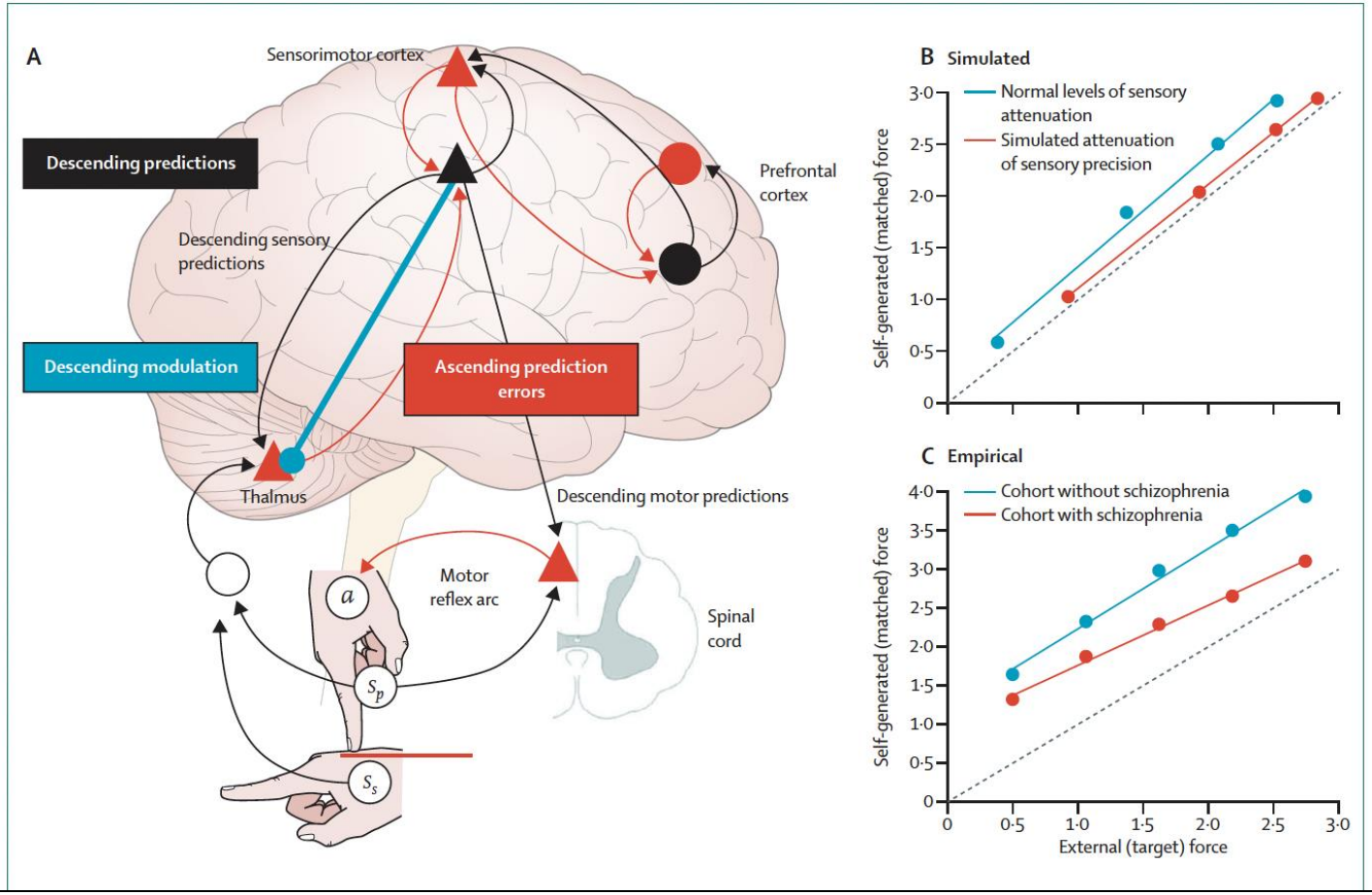

Computational psychiatry: the brain as a phantastic organ

Karl J Friston, Klaas Enno Stephan, Read Montague, Raymond J Dolan

Lancet Psychiatry 2014; 1: 148–158

Wellcome Trust Centre for Neuroimaging, Institute of Neurology, University College London, London, UK (Prof K J Friston FRS, Prof K E Stephan PhD, Prof R Montague PhD, Prof R J Dolan FRS); Translational Neuromodeling

In this Review, we discuss advances in computational neuroscience that relate to psychiatry. We review computational psychiatry in terms of the ambitions of investigators, emerging domains of application, and future work. Our focus is on theoretical formulations of brain function that put subjective beliefs and behaviour within formal (computational) frameworks—frameworks that can be grounded in neurophysiology down to the level of synaptic mechanisms. Understanding the principles that underlie the brain's functional architecture might be essential for an informed phenotyping of psychopathology in terms of its pathophysiological underpinnings. We focus on active (Bayesian) inference and predictive coding. Specifically, we show how basic principles of neuronal computation can be used to explain psychopathology, ranging from impoverished theory of mind in autism to abnormalities of smooth pursuit eye movements in schizophrenia.

1848

1856

Aphasia 1874

Scientific viewpoint 1880

1883
1887
1889
1893
1896
1899
1903

Theory of psychiatric symptoms 1892

Outline of Psychiatry 1894
1900

1905

1910

1915

Textbook of Psychiatry

1926