



## Neuroanniversary 2020

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### 1970

Mexican neuroscientist Arturo Rosenblueth (1900–1970) died. In 1930, he obtained a Guggenheim Scholarship and worked at the Harvard University Department of Physiology with Walter Cannon (1871–1945) to explore the chemical mediation of homeostasis. With Norbert Wiener (1894–1964) and Julian Bigelow (1913–2003), he wrote *Behavior, Purpose, and Teleology* in 1943, which, according to Wiener himself, set the bases for the new science of cybernetics.



The Nobel Prize in Physiology or Medicine was awarded jointly to Sir Bernard Katz (1911–2003), Ulf von Euler (1905–1983), and Julius Axelrod (1912–2004) for their discoveries concerning the humeral transmitters in the nerve terminals and the mechanism for their storage, release, and inactivation. Katz established the existence of “miniature end-plate potentials,” demonstrating that acetylcholine, the messenger substance between motor nerves and muscles, was released from the nerve terminals in small packages, which he named quanta. Von Euler discovered the adrenergic transmitter substance, noradrenalin, as a neurotransmitter in the sympathetic nervous system. He also showed that this substance is stored in small nerve granules. Axelrod revealed both the enzymatic inactivation of noradrenalin and its reuptake into the storage sites in the nerve terminals.

Robert M. Young (b. 1935) published his well-documented and much-cited overview of the localization of function discussion in the nineteenth century, titled *Mind, Brain, and Adaptation in the 19th Century*.

### 1920

Adam Politzer (1835–1920; see [Figure 1](#)) was born in Albertirsa, Hungary, and died in 1920 in Vienna. After his medical studies in Vienna, he worked in Carl Ludwig’s (1816–1895) laboratory in Leipzig. He was a prolific inventor of new medical devices for the diagnosis and treatment of ear diseases. He developed several instruments for surgery of the outer and the inner ear structures that were named after him. In 1878, he wrote the first illustrated atlas of the tympanic membrane in health and disease, with color drawings made by himself, as well as *Lehrbuch der Ohrenheilkunde (Textbook of Ear Surgery)*, an authoritative text on otology. He cofounded the first journal dedicated to ear disorders, *Archiv für Ohrenheilkunde (Archive for Ear Surgery)*.

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**Figure 1.** Adam Politzer (1835–1920).

Wilhelm Wundt (1832–1920), once a student of Hermann von Helmholtz, became Professor of Physiology in 1864 in Heidelberg and subsequently Professor of Philosophy in Zurich and Leipzig. There he founded the first laboratory of experimental psychology and wrote *Grundzüge der physiologischen Psychologie (Principles of Physiological Psychology)*, an extensive overview of the functioning of the brain, in 1874.

Leonardo Bianchi (1848–1927) was an Italian professor of psychiatry and neuropathology at the Universities of Palermo and Naples. In 1882, he inaugurated the Psychiatric Institute of Naples. His best-known written work is *La Meccanica del Cervello e la Funzione dei Lobi Frontali (The Mechanism of the Brain and the Function of the Frontal Lobes)*, published in 1920. In it he describes experiments with monkeys and dogs after he had surgically removed (ablated) the frontal lobe. He concluded that the frontal lobe had more functionality than previously believed, and he described the lobe as the center of coordination and fusion of the incoming and outgoing products of the sensory and motor areas of the cortex.

Stephen Walter Ranson (1880–1942), Professor of Neurology and Director of the Institute of Neurology at Northwestern University, demonstrated connections between the hypothalamus and pituitary gland in 1920. In that same year, he published his textbook, *The Anatomy of the Nervous System*.

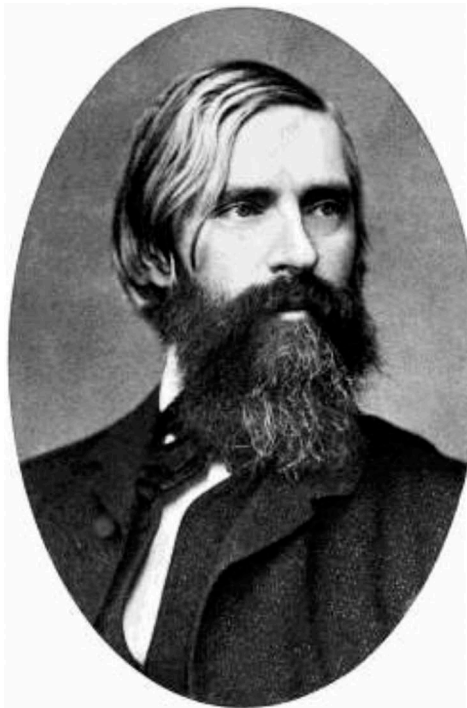
German neuropathologist Hans Gerhard Creutzfeldt (1885–1964) published his paper, “Über eine eigenartige herdförmige Erkrankung des Zentralnervensystems” (“On a Peculiar Focal Disease of the Central Nervous System”) in 1920. In it, Creutzfeldt, then working in Walther Spielmeyer’s (1879–1935) unit in Munich, first described a disorder in a 23-year-old woman as “a peculiar nodule forming disease of the nervous system.” He distinguished the condition from multiple sclerosis and termed it “pseudosclerosis.” A few months later, in 1921, Alfons Maria Jakob (1884–1931), Professor of Neurology and Psychiatry in Hamburg, published details of three more cases he called “spastic pseudosclerosis,” and subsequently the eponym Jakob-Creutzfeldt disease came into use.

Adhémar Gelb (1887–1936) and Kurt Goldstein (1878–1965) collaborated closely at a special unit, the Institute for the Study of Sequelae of Brain Lesions, for the examination and rehabilitation of brain injured soldiers in Frankfurt during World War I. Their influential observations were presented in *Psychologische Analysen hirnpathologischer Fälle* (*Psychological Analyses of Patients with Brain Lesions*) in 1920. These observations contributed significantly to the development of a holistic approach of brain-injured patients.

## 1870

Guillaume Benjamin Armand Duchenne de Boulogne (1806–1870) was a French neurologist who greatly advanced electrophysiology and is remembered for his diagnostic innovations, including deep tissue biopsy, nerve conduction tests, and clinical photography. He is still cited for his studies on facial expressions of human emotions presented in his book, *Mécanisme de la physionomie humaine, ou Analyse électro-physiologique de l'expression des passions applicable à la pratique des arts plastiques* (*Mechanism of the Human Physiognomy, or Electro-Physiological Analysis of the Expression of the Passions, Applicable to the Practice of the Plastic Arts*), published in 1862.

Prussian pioneer of ophthalmology Friedrich Wilhelm Ernst Albrecht von Gräfe (1828–1870; see [Figure 2](#)) made many contributions to ophthalmology and is considered perhaps the most important ophthalmologist of the nineteenth century. Among his achievements were a new surgical technique for the treatment of cataracts and the



**Figure 2.** Friedrich Wilhelm Ernst Albrecht von Gräfe (1828–1870).

introduction of iridectomy for glaucoma. He described the combination of retinitis pigmentosa and perceptive deafness in Usher's syndrome, and he also provided early descriptions of optic neuritis (1860), chronic progressive external ophthalmoplegia (1868), and papilledema. In addition, he is credited with designing the "Von Gräfe knife," a special knife for cataract surgery, which was used until the 1960s. In 1855, he founded the *Archiv für Ophthalmologie*. In 1863, he founded the *Deutsche Ophthalmologische Gesellschaft*.

Jacques Lordat (1773–1870) was Professor of Anatomy and Physiology at the University of Montpellier in France. After a stroke at the age of 52, he reported that he could not get his words out. He called his problem "verbal amnesia," or *alalia*, and clearly distinguished between intelligence and language.

Ludwig Robert Müller (1870–1962) was Professor of Internal Medicine in Erlangen and a pioneer in autonomic nervous system research. He was the first to report afferent pathways from internal organs to the brain. His book, *The Vegetative Nervous System*, was first published in 1920. In 1931, he wrote *Lebensnerven und Lebenstrieb* (*Life Nerves and Life Instincts*). Many of his papers dealt with the regulation of thirst, hunger, and sleep.

Oscar Vogt (1870–1950) was a German neurologist. He and his wife, Cécile Vogt (née Mugnier, 1875–1962), founded a private research institute called the Neurologische Zentralstation (Neurological Center) in Berlin, which was formally associated with the Physiological Institute of the Charité Hospital as the Neurobiological Laboratory of the Berlin University in 1902. This institute served as the basis for the 1914 formation of the Kaiser Wilhelm Institut für Hirnforschung (Kaiser Wilhelm Institute for Brain Research), of which Oskar was a director. The Vogts are known for their extensive cytoarchitectonic studies on the brain.

German psychiatrist Bernard von Gudden (1824–1886) initiated in 1870 the modern study of the thalamus, when he showed that specific thalamic nuclei degenerate when certain areas of the cerebral cortex are destroyed.

German physicians Gustav Theodor Fritsch (1838–1927), assistant at the Anatomy Institute, and Eduard Hitzig (1838–1907), physician and electrotherapist in Berlin, published their famous study, *Über die elektrische Erregbarkeit des Grosshirns* (*On the Electric Excitability of the Cortex*), in 1870. It was an important step in convincing many of the validity of the notion of localization of function in the brain.

## 1820

Jirí (Georg) Procházka (1749–1820) was a leading Czech-Austrian anatomist, ophthalmologist, physiologist, writer, and Professor for Anatomy and Ophthalmology at the University of Prague. He conceived of the concept of nerve conduction and wrote his major work, *Commentatio de functionibus systemis nervosa* (*Comments on the Functions of the Nervous System*), in 1784. He also wrote the first genuine textbook on physiology, *Institutiones physiologiae humanae* (*Principles of Human Physiology*). He was a staunch promoter of the modern reflex theory.

Vincenzo Chiarugi (1759–1820) was an Italian physician who helped introduce humanitarian reforms to the psychiatric hospital care of people with mental disorders. He was director of various mental hospitals in Florence. Chiarugi's three-volume *Della*

*Pazzia in Genere e in Specie (On Insanity in General and in Particular)* was published in 1793. In 1802, he became Professor of Dermatology and Mental Diseases, and later Professor of Physiology, Pathology, and Materia Medica at the medical school of Florence.

German anatomist Joseph von Gerlach (1820–1896) specialized in neurohistology. As the institute director of anatomy at the University of Erlangen, he developed new neuromorphological staining techniques such as carmesin red, and the microphotography of brain slides. He wrote the first textbook on photography in medical science.

Heinrich Müller (1820–1864) was a German Professor of Anatomy at the University of Würzburg. In 1851, he noticed the red color in rod cells now known as rhodopsin. He also described the fibers of neuroglia cells that make up the supporting framework of the retina. This structure was to become known as “Müller’s fibers.”

Claude François Lallemand (1790–1854) studied in Paris at the Hôtel Dieu under Guillaume Dupuytren (1777–1835) and, from 1819 to 1845, was Professor of Clinical Surgery at Montpellier. His most important work, *Recherches anatomico-pathologiques sur l’encéphale et ses dépendances (Anatomico-Pathological Research on the Encephalon and Its Annexes)*, was published between 1820 and 1836 and was translated into many languages.

## 1770

Julien-Jean-César Legallois (1770–1840) was a French physiologist and director of the Bicêtre hospital. He studied respiration in animal lesion studies and discovered, in 1820, the center of respiration in the medulla oblongata. He is also known for the description of the metamere structure of the spinal cord.

Marc Dax (1770–1837) was a French physician sometimes credited for discovering the link between neurological damage to the left hemisphere, right-sided hemiplegia, and a loss of the ability to produce speech. His conclusion was based on observations of three patients in Montpellier, presented at a conference there in 1836 under the title, “Lésions de la moitié gauche de l’encéphale coïncident avec l’oubli des signes de la pensée” (“Lesions of the Left Half of the Encephalon Coincident with the Forgetting of Signs of Thinking”), and in a paper titled, “Observations tendant à prouver la coïncidence constante des dérangements de la parole avec une lésion de l’hémisphère gauche du cerveau” (“Observations Tending to Prove the Constant Coincidence of Disturbances of Speech with a Lesion of the Left Hemisphere of the Brain”).

Swiss naturalist Charles Bonnet (1720–1792) introduced in 1770 in his philosophical work *Palingénésie philosophique, ou Idées sur l’état passé et sur l’état futur des êtres vivants (Philosophical Palingenesis or Ideas on the Past and Future States of Living Beings)* a new concept of the brain as an assembly of organs, replacing the mechanistic attitude then prevailing.

Samuel Auguste David Tissot (1728–1797) was a Swiss physician practicing in Lausanne and one of the founders of modern rational medicine. His most popular book was *Avis au peuple sur sa santé (Advice to the People in General, with Regard to their Health)*, published in 1761, explaining sanitary principles and dietetics for ordinary people. His most significant scientific work was *Traité de l’épilepsie (Treatise on Epilepsy)*, published in 1770 as Volume III of his six volumes on *Traité des nerfs et de leurs maladies (Treatise on the Nerves and Their Diseases)*. Tissot described the

symptomatology of many forms of epileptic seizures and expressed his views on the pathogenesis, course, and prognosis of epilepsy.

German physician and medical writer Johann Augustin Philipp Gesner (1738–1801) published in 1770 a treatise on what he called speech amnesia, “Die Sprachamnesie.” It was the second chapter of his *Sammlung von Beobachtungen* (*Collected Observations*) and is a landmark publication in the history of aphasia, containing detailed case descriptions of patients with various aphasic syndromes that only would be recognized as syndromes in the nineteenth century.

## 1720

Giovanni Maria Lancisi (1654–1720) was an Italian physician, epidemiologist, and anatomist. He was physician to Popes Innocent XI, Clement XI, and Innocent XII. In addition to influential studies on the cardiovascular system, he also studied the brain. He described in his *Dissertatio Physiognomica* (1713) the corpus callosum as the “seat of the soul, which imagines, deliberates, and judges.” He hypothesized that the longitudinal striae (later named in his honor as the “striae lancisi” or “nerves of Lancisi”) were the conduit between the anterior location of the soul, and the posterior location of sensory organ functions, both within the corpus callosum.

## 1670

The trochlear nerve was the last of the 12 cranial nerves to be recognized. It was likely first described by Italian philosopher Giovanni Filoteo Achillini (1466–1530) in 1520. Italian professor of anatomy Realdo Colombo (1516–1559) assigned the name of “pathetic nerve” or nervos oculorum patheticos to the trochlear in 1559. The name nervus trochlearis was introduced by William Molins (1617–1691), a London surgeon and anatomist, in 1670.

## 1620

Edme Mariotte (1620–1684), a Roman Catholic priest and a founding member of the Académie des Sciences de Paris in 1666, is mainly remembered as the first scientist to discover the blind spot, known as Mariotte’s spot, in visual fields in 1668. Based on this observation, he concluded, in a letter published in the *Philosophical Transactions of the Royal Society of London* in 1670, that the choroid is the sensitive spot for light instead of the retina. His extensive work on optics and color perception is less well remembered.

Swiss physician Johannes Jakob Wepfer (1620–1659) collected his observations in several works, notably *Observationes Medico-practicae de Affectibus Capitis Internis & Externis* (*Medical-Practical Observations on Internal and External Disorders of the Head*), posthumously published in 1727. At least 13 cases, mostly open-head injuries, showed a clear language disorder, which Wepfer described as loss of memory.

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