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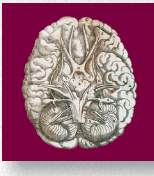

ABSTRACTS OF THE 24TH MEETING OF THE INTERNATIONAL SOCIETY FOR THE HISTORY OF THE NEUROSCIENCES

8–11 July, 2019
Vilnius, Lithuania

VILNIUS UNIVERSITY, Aula Parva and Senate Hall
Universiteto st. 3, Vilnius, Lithuania

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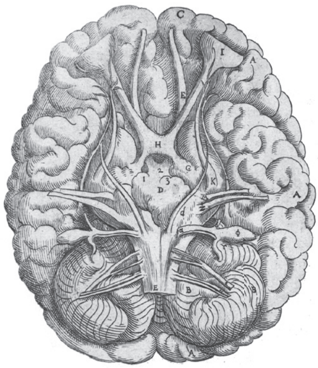

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President's Welcome

Welcome to the 24th annual conference of the International Society for the History of the Neurosciences. On behalf of Eglė Sakalauskaitė-Juodeikienė, the chairperson of the local organizing committee, welcome to Vilnius University which is celebrating the 440th anniversary of its founding this year. And, welcome to Lithuania which has been here for some 750 years and welcome to its capital city, Vilnius, which was first referenced in written sources in 1323.

Our Society has been made to feel welcomed by the University and Faculty of Medicine through its generous gifts of facilities and services that allow this conference to happen. I want you to especially appreciate Eglė, who as chair of the organizing committee arranged for our facilities and sponsors, organized the local arrangements, our Gala dinner, the concerts, the tours of the university and Trakai and numerous details that enable the conference. Special thanks goes to Professor D. Jatužis, Head of the Clinic of Neurology and Neurosurgery, Professors R. Mameniškienė, head of the Center of Epileptology, R. Kizlaitienė, head of the Center of Multiple Sclerosis, A. Utkus, Dean of the Faculty of Medicine, and R. Kondratas, director of Vilnius University museum. Finally, I want to recognize the Program Committee, our past secretary/treasurer Sherry Ginn, our treasurer Paul Eling and our secretary Yuri Zagvazdin, all of whom helped in too many ways to innumerate.

It is a pleasure for me to represent our Society and its endeavor to chronicle the foundations of the neurosciences.

J. Wayne Lazar
President, International Society for the History of the Neurosciences

Apomorphine: the Forgotten History of a Pharmacological Curiosity

MANON AUFFRET

EA 4712 Behavior and Basal Ganglia Research Unit, Faculty of Medicine, University of Rennes 1 (France)

Apomorphine has a long and tortuous path in the therapeutic armamentarium, with numerous indications in human and veterinary medicine. Though its effects were first explored in human and animals exactly 150 years ago (May 1869), apomorphine is now recognized as the oldest antiparkinsonian drug on the market and increasingly prescribed in Europe. However, its history is far from being limited to movement disorders.

This presentation will trace the history of apomorphine, from its earliest empirical use, to its synthesis (1845), pharmacological development, and numerous indications, in light of its most recent uses and newest challenges. Throughout history, three main clinical indications stood out: emetic (gastric emptying, respiratory disorders, aversive conditioning), sedative (mental disorders, clinical anesthesia, alcoholism), and antiparkinsonian (fluctuations). During this presentation, we will particularly focus on the various neuropsychiatric indications of apomorphine between the 19th to the 21st centuries, highlighting the work of several clinicians who advocated for a better use of this peculiar drug. Its chequered history in the United States and the controversies that aroused among clinicians in the past (and in some ways, lives on among neurologists) will also be discussed.

The Creation of Motion Illusion in Op Art: Victor Vasarely and Bridget Riley

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Op art established in the early sixties, describes abstract works that applied "optical" principles to give the illusion of depth and movement on a flat surface. Artists created complex visual effects, including spiraling, flashing, bulging, or warping, using after images, hidden figures, exploiting, for example, mach bands, and "gestalt" principles. This research explores and comparatively analyses the early work of two prominent representative artists, Victor Vasarely (1906 - 1997) and Bridget Riley (b. 1931) during their Black and White transitional periods. Both artists display and exploit techniques associated with *gestalt* principles and motion perception in creating perceptual effects of illusory motion and depth. This has been viewed as intentional on the part of Vasarely who was trained in science, and exposed to the "Bauhaus" movement. His stated aim was "blending art" and "future programming technology". Riley, on the other hand, denied "demonstrating the use of any scientific principle". She admitted to being inspired by the Impressionist and Post-impressionist painters, and only paying attention to "certain relationships" in structure and size, among others. Yet her paintings reveal a keen awareness of the principles underlying motion perception. This raises the question: how did both artists achieve similar effects despite the significant differences in background and stated approach?

It will be argued that whether they were individually aware or not of *gestalt* and other perceptual principles, their techniques appear to have evolved through empirical experimentation with visual effects, focusing on the dynamic interaction between the viewer's perceptual experience, and the painting on the canvas. Complex effects with color will follow.

Historical Aspects of Mild Traumatic Brain Injury and PTSD

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[2] Private practice, Rome (Italy)

For millions of years, human bodies and brains have co-evolved to meet the demands of uniquely human strategies: gathering food, hunting and, all too often, war. Modern times have added transportation, sports, and terrorism to the list of head injury causes. Posttraumatic stress disorder (PTSD) does not necessarily follow physical trauma and can be collective.

Traumatic brain injuries (TBIs) and their sequels have been described since ancient times. Homer vividly described the effects of head injuries and Hippocrates dealt with them at length. An account of the battle of Marathon describes warriors who experienced frightening battle dreams. The Renaissance saw Swiss mercenary soldiers suffering from despair and homesickness. PTSD was a major military problem during World War I when it was known as "shell shock". Half of military discharges during and after World War II were due to PTSD. Other military and political tragedies have created major psychological sequels that are felt to this day. Despite improvements in car safety, between 20 and 50 million people suffer lasting injuries and PTSD.

It is now known that not all concussions resolve spontaneously and may result in lasting neuropsychological effects. It is also since 2005 known that chronic traumatic encephalopathy is a sequel of TBIs, particularly in boxing, football, and other sports. There is a clear evolutionary advantage in imprinting danger in the mind, but this can become pathological. PTSD is a sign that the amygdala has done its work too well. Let us be optimistic and hope that in the future, many TBIs will be prevented.

Brain Disease and Artistic Creativity

FRANÇOIS BOLLER[1], JULIEN BOGOUSSLAVSKY[2] &
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Disease does not create and most often destroys. The career of many artists has been truncated by illnesses. However, in some circumstances, one witnesses emergence of previously hidden artistic creativity. We will discuss the possible role of migraine, syphilis, Parkinson disease (PD) and frontotemporal dementia (FTD).

Migraine is a debilitating disease, but sometimes it may inspire greatness. Famous painters, composers and writers including Seurat, van Gogh, Monet, Debussy, Mahler, Dikinson, Woolf, Carroll and others were inspired by their symptoms.

At the end of the 19th century, up to 15% of Parisian males had syphilis. Artistic genius and syphilis were strange, but frequent bedfellows. In artists, in a few instances, there was an explosion of frenetic genius-like mental activity. This is vividly represented by Thomas Mann in "Doctor Faustus," inspired by a real-life artist, probably Friedrich Nietzsche.

In PD, despite motor and cognitive deficits, some patients exhibit a burst of artistic output. There is at least one instance where a patient with PD developed new and worthwhile poetic abilities.

Most individuals with neurodegenerative diseases experience cognitive dysfunction that limit and impair the artist's ability to realize their creative and expressive intentions through painting or writing. Yet there are instances of patients with FTD whose painting abilities improved or who suddenly exhibited new talent. Apparently, the disease that destroys some brain areas activates others, unlocking hidden talent. Bruce Miller wrote: "Some of the most beautiful art I've ever seen has come out of my patients with degenerative diseases".

“Perfidious Albion” or “Trusting America”? Was there a Lapse in Scientific Ethics, or even Plagiarism, in the Relationship between Hodgkin, Huxley and Cole in the 1940s and 1950s?

JOHN CARMODY

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Hodgkin and Huxley’s elucidation, published in the *Journal of Physiology* in 1952, of the mechanism of impulse generation and propagation in axons was one of the great neuroscientific achievements of the 20th century, but the extent of their intellectual and instrumental debt to the American biophysicist, “Kacy” Cole, is scarcely acknowledged and poorly documented. The irony is that, unsurprisingly for those times, they knew one another well.

Hodgkin had met and worked with Cole at Woods Hole in 1938 and learned about J. Z. Young’s re-discovery of the squid “giant axon”, yet in 1939, in an important paper by the two young Britons (in *Nature*), Cole’s work was not acknowledged; neither was Bernstein’s seminal book *Elektrobiologie* (1912). Those experiments (the basis for their Nobel Prize) were reported in 1952 but began in the English summer of 1948 *after* Cole and Marmont had introduced Hodgkin to their all-important voltage-clamp technique which they had *already* begun to use experimentally. Furthermore, in 1949 in Paris, Hodgkin and Huxley heard Cole report experiments demonstrating the early current influx into excited axons. Yet, in 1952 they gave only the most cursory acknowledgement of Cole’s technique and *none* to those experimental findings which had anticipated theirs.

As McComas told Huxley in 2004, Cole was bitter that “his early discussions with [Hodgkin] and his development (....) of the voltage-clamp had not been (....) properly acknowledged”. Without question, as biologists, Hodgkin and Huxley surpassed Cole with finer experiments and superior analysis. They deserved their Prize but Cole’s pioneering work warranted more honest acknowledgement.

Franz Joseph Gall's Non-Cortical Organs

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Franz Joseph Gall (1758 - 1828) is rightfully remembered for trying to explain behavior with recourse to a large number of independent mental faculties. Nonetheless, it is often erroneously thought that his faculties were only associated with discrete cerebral cortical territories. Yet, in addition to the 26 faculties he did localize in the cerebral cortex, he also localized the first of his final faculties, the reproductive faculty, in the cerebellum. Moreover, the picture he painted in his well-known works - his four volume *Anatomie et Physiologie* (1810 - 1819) and *Sur les Fonctions* (1835) - represented the final outcome of thinking influenced by observations and feedback obtained over many years, while he was in Vienna, numerous German cities, neighboring regions (e.g., the Netherlands), and finally Paris. Analyzing his earlier lists of faculties, as revealed by those who heard him lecture, shows that his list was still in flux before he entered Paris in 1807. Not only was he changing the number of faculties, and some names and locations, but early on he was also associating at least three faculties with midbrain or medullary structures.

We will illustrate this presentation with some of Gall's earlier lists, and will focus on what he was telling his audiences about brain-stem-based faculties. This is a part of the early history of what others would soon designate as "phrenology", a feature of Gall's developing doctrine that has not received adequate attention.

The Cerebral Thermometry of Josiah Stickney Lombard

MOSHE FEINSOD & ITAMAR KAHN

Faculty of Medicine, The Technion, Israel Institute of Technology (Israel)

A corollary of the energy conservation principle was the hope that psychic or mental cerebral activity will cause a measurable rise of temperature in the brain that can be picked from over the scalp. An important protagonists of the 19th century of this endeavor to study the cerebral thermal response to various stimuli, especially cognitive and emotional, was Josiah Stickney Lombard (1842 - 1904). Believing that these changes will be measurable using sensitive thermocouples and galvanometers, Lombard made endless measurements of the temperatures of the scalp, studying his subjects hundreds of times thus producing many thousands of "hyperaccurate" readings believing, that such results were true because of being precise and thus fell victim to self-deception, attributing significance to differences of 10^3 centigrade.

After analyzing Lombard's raw materials we suggest that the attention should be shifted from Lombard's Sisyphean inadequate measurements and to acclaim the messages of his creative mind. It should be recognized that Lombard was the first to emphasize the importance of mapping accurately the surface of the head for functional studies, and to create a reproducible chart. He did antedate neurophysiologist by at least a century using the heat map to demonstrate that the functional representation of various activities have temporal and spatial dynamics of their own. The results of the study of internal recitation versus recitation aloud may be regarded as the roots of the idea of "Psychic Energy" which pass as a thread in the future studies of Mosso and Berger.

Mark Twain's Revealing Phrenological Experiment. Three Renditions of his Deception

STANLEY FINGER

Department of Psychological and Brain Sciences,
Program in History of Medicine, Washington University,
Saint Louis, MO (USA)

Samuel Langhorne Clemens (1835 - 1910), the American humorist and author better known as Mark Twain, was skeptical about clairvoyance, supernatural entities, palm reading, and certain medical fads, including phrenology. During the early 1870s, he set forth to test phrenology, more specifically its reliance on craniology, by undergoing two head examinations with Lorenzo Fowler, the leading American phrenologist, now with an institute in London. Twain hid his identity during his first visit, but not when he returned as a new customer three months later, only to receive a very different report about his humor, courage, etc. He described his two experiences in a short letter written in 1906 to a newspaper correspondent in London; in humorous detail in a chapter found in post-humous editions of his autobiography; and in *The Secret History of Eddypus*, a work of fiction involving time-travel, which he began to write around 1901 but never completed. The three versions of Twain's phrenological ploy differ in detail, but all reveal why, after studying phrenology as a quick way to assess character and finding some merit in it, he soured on cranioscopy early in the 1870s, and now ridiculed it in his most famous works (e.g., *Tom Sawyer*, *Huckleberry Finn*, *Life on the Mississippi*).

Science, Self, and Society in Wilder Penfield's Thought

DELIA GAVRUS

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This paper will analyze the ways in which the American-born Canadian neurosurgeon Wilder Penfield (1891 - 1976) drew on neuroscientific ideas of the time and on his experiences as a doctor to publically promote specific social values in the middle decades of the twentieth century. After retiring from medical practice, Penfield, who had founded the Montreal Neurological Institute, became the director of the Vanier Institute for the Family in 1965. To raise money and awareness for this institution, he traveled across the country to give speeches about the social values that he thought Canadians should adopt.

Using these speeches and other archival material, as well as drawing from articles, essays, and fictional work Penfield published throughout his career, I will illustrate how Penfield thought about the complicated relationships between the self, society, and science.

The Health and Illness of Dowager Empress of the Russian Empire Maria Feodorovna, 1807 - 1811

VILMA GUDIENĖ

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Department of Drug Technology and Social Pharmacy,
The Museum of the History of Lithuanian Medicine and Pharmacy
(Lithuania)

The aim of this study is to analyze the health, illness and medicines that were used to treat the Dowager Russian Empress Maria Feodorovna, widow of Tsar Paul I in 1807 - 1811. The main source was the Imperial court pharmacy prescription book. Hypotheses about the diseases and medical problems of the Empress and how treatment for her differed according to circumstances, particularly after the loss of her granddaughter Princess Elizabeth, have been made based on the prescriptions recorded in the book.

The content of the prescriptions suggests that the Empress suffered from gastrointestinal tract disorders, skin and eye diseases, neuralgic pains and insomnia. The royal pharmacy had the richest assortment of medicinal raw materials. The Empress was treated with the most expensive plants. The doctors prescribed medicines for Empress Maria consisting of components from 35 different plants, 20 chemicals and 6 materials of animal origin. Special attention was given to making her medicines as pleasant as possible.

Despite the fact that the Empress received a small amount of potent drugs such as mercury, antimony compounds, opium and others, her medicines could have been detrimental to her health. Nevertheless, despite her illnesses and possible damage from aggressive medications, Empress Maria died at the age of 69 years.

Development of Electroencephalography (EEG) in Humans in the 21st Century

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Since the pioneering work of Hans Berger in 1926 - 9 (Germany), confirmed by the British studies of Adrian & Matthews, the human EEG has been studied in great detail, advancing our understanding of consciousness, epilepsy, brain mechanisms in motor control and disease. From a single channel system to multiple channels (up to 128 or more), recordings have been obtained from the scalp, intracranially from the epidural, subdural spaces, cerebral cortex and even the depths of the brain with stereo-EEG techniques, mainly in patients with refractory epilepsy that are candidate for surgical excision or disconnection.

Together with synchronized video-monitoring of behavior and polygraphed parameters we have achieved new understanding of sleep mechanisms, in physiology and pathology, including stupor and coma, even used as adjunct in determination of brain death. Although the technology is deceptively simple, recording microvolts of brain-derived activity in the midst of millivolts or volts of electrical interference, the interpretation of human EEG for clinical diagnosis requires specialized training and equipment. As we approach the first century of human EEG studies, exciting new developments arise from recording higher frequencies of activity, with new correlations to seizure-onset zones in epilepsy, functional neuroimaging findings and potential applications for long-term recording non-invasively at home. The analysis of such vast datasets requires computer analysis and data reduction, likely using artificial intelligence methods, based on a new paradigm of “neural networks“, among other methods.

Professor Valmantas Budrys (1958 – 2015) and Promotion of the History of Neuroscience in Lithuania

DALIUS JATUŽIS

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Professor Valmantas Budrys (1958 – 2015) was a graduate of Vilnius University, Faculty of Medicine in 1983. V. Budrys worked as a neurologist in Vilnius University Hospital Santaros klinikos, in 1997 founded the first specialized neurological scientific journal in Lithuania *Neurologijos seminarai*, became Head of the Clinic of Neurology and Neurosurgery in 2007. Professor improved diagnostics, treatment and care for patients with multiple sclerosis, Parkinson's disease, epilepsy, Alzheimer's disease, and other nervous system disorders in Lithuania. Since childhood, V. Budrys' hobby was painting; professor also had a rich collection of famous Lithuanian artists' paintings. V. Budrys was especially well known in Lithuania and worldwide for his publications in history of neurology, research in the field of neurology and art.

In this study we analyze V. Budrys' articles, presented in *European Neurology* ("Neurological Eponyms Derived from Literature and Visual Art", 2005; "A Portrait of Myasthenia Gravis?", 2005; "Neurological Deficits in the Life and Works of Frida Kahlo", 2006), *Journal of the Royal Society of Medicine* ("Parkinson's Disease Before Parkinson, Vilnius 1814", 2005), *European Journal of Neurology* ("Neurology in Holy Scripture", 2007), *Neurologijos seminarai* ("The Field of the Miracle and Neurology: Neurological Disorders in the Miracle Books of the Great Duchy of Lithuania", 2007) and other journals.

The legacy of V. Budrys is valuable for science historians, students of various specialties, general public, and significant for promotion of the history of neuroscience in Lithuania.

Max Nonne and Otfrid Foerster: Two German Neurologists during the Nazi era

AXEL KARENBERG

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As part of a larger project dealing with neurology and neurologists during the Third Reich we are currently researching the biographies of German neurologists who continued to live in Germany between 1933 and 1945. Max Nonne and Otfrid Foerster, both internationally renowned scientists, serve as a model for illuminating the ambivalence and ambiguity of classifications like culprit, victim, follower, etc. as they have been used by investigators. Nonne and Foerster learned to live with the political system, yet managed to exploit their room for manoeuver - each one in his very own way. The analysis of archival documents and contemporary publications yielded astonishing results in both cases.

Inflammatory Demyelinating Central Nervous System Diseases in Lithuania (17^{th} – 19^{th} centuries)

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The history of inflammatory demyelinating central nervous system (CNS) diseases in Lithuania was introduced as the first documented cases of probable multiple sclerosis (MS) described in the 17^{th} century Marian Miracle Books of the Great Duchy of Lithuania. A couple of centuries later the personal diary of Sir Augustus d'Este (born in 1794), grandson of King George III of England, revealed a medical history strongly suggesting that Augustus suffered from MS. In 1868 Jean-Martin Charcot coined the term *sclerose en plaques*, and the French term *neuro—myelite optique aigue* was first used by Eugene Devic in a paper communicated on the occasion of the *Congres Francais de Medecine* in Lyon in 1894. At the same time, anthropometric, morphometric, somatic and neurological examinations were performed in Vilnius University clinics.

The official date of establishing the Faculty of Medicine of Vilnius university (founded in 1579) is 1781. Nervous system (NS) diseases, including encephalitis, apoplexy, hydrocephalus, paralysis, spinal cord diseases, were described at the beginning of the 19^{th} century in Vilnius. The history of myelitis, including the results of autopsy showing inflammation of spinal cord and meninges, was first described by Kazimieras Dobrovolskis in his doctoral thesis, defended in 1829. Even though in Vilnius, as well as in other European clinics, the causes of NS diseases were sought in the cerebrum and spinal cord, using autopsy findings as an essential part of the anatomo-clinical method (the influence of solidism doctrine), autopsy findings usually revealed brain and spinal cord congestion with blood, confirming the inflammation of NS theory. The level of diagnostics and treatment methods of nervous system diseases (including probable inflammatory demyelinating CNS diseases) in the 19^{th} century Vilnius corresponded to the level of Western Europe.

Neuropathology in the Great Pathology Atlases

PETER J. KOEHLER

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In the period between Morgagni's *De Sedibus* (1761) and Cruveilhier's *Anatomie pathologique* (1829 - 1842), six pathology atlases were published, in which neuropathological subjects were discussed and depicted in more or less comprehensive ways.

It was a period of transitions in medical, technical, and publishing areas. The first three atlases (by Matthew Baillie (1761 - 1823), Robert Hooper (1773 - 1835), and Richard Bright (1789 - 1858)) were mainly based on museum specimen and intaglio printing techniques (Baillie‘s in black & white; the others mostly in color). They were selective rather than comprehensive. The other three (by Jean Cruveilhier (1791 - 1874), James Hope (1801 - 1841), and Robert Carswell (1793 - 1857)) were usually made from autopsy observations, requiring special logistics that were more available in Paris than in London, which is the reason why Hope and Carswell made many of the drawings in France. The plates in these three were color lithographs. Baillie's book only contains figure descriptions. Bright's and Cruveilhier's atlases provided case descriptions. Hooper‘s and Hope‘s provide theoretical texts and figure legends. Carswell's book has twelve theoretical sections, each followed by plates. The cost of the atlases was relative to the number of plates. Bright's, Hope's, and Carswell's (40-48 plates) costing between £350 and £480 (converted to present values). From that perspective Cruveilhier's was less expensive (230 plates for £607). Although the authors made use of artists and engravers, several were talented artists themselves, including Bright, and particularly Hope, and Carswell. Most of the common neurological diseases were depicted, in particular by Cruveilhier, Hope, and Carswell.

Ada Potter and Her Microscopical Neuroanatomy Atlases

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In his *Recollections* Dutch neuropsychiatrist Cornelis Winkler (1855 - 1941) mentioned his colleague Ada Potter (1878 - 1961), who made many of the neuroanatomical drawings in his publications. In fact, she made two experimental microscopical brain atlases (in 1911 - a rabbit's brain, her PhD thesis, and in 1914 - a cat's brain) and participated in the endeavors to publish a human brain atlas. Although Winkler was first author, Potter took the largest part in the production.

Born on East Java (Dutch Indies), Potter received her MD from the university of Amsterdam in 1909. She worked with Winkler until his retirement (1926) and then moved to Iowa City (working with Samuel T. Orton (1879 - 1948)). Subsequently, she went back to East Java, where she acted as a physician in an insane asylum (Soember Porrong). In the meantime, she was active in the Women Emancipation Movement. After a short stay in Geneva, she returned to the Netherlands (1939).

The rabbit and cat atlases were two major projects and served animal experimenters up to the 1980s. They consist of 40 and 35 black and white plates respectively, depicting microscopic fiber and cell structure drawings with extensive legends. In a period, in which medical photography had fully developed, the authors argue why they preferred drawings, a choice shared by well-known neuroanatomists, including Ramon y Cajal, who noted that drawing facilitates analysis and teaches scientists how to see. With respect to the human brain atlas project, two parts were published. Partly due to the outbreak of WWI, the project was considered a failure.

Neurological Observations in Andrew Sniadecki's *Theory of Organic Beings*

RAMŪNAS KONDRATAS

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The first volume of Andrew Sniadecki's (1768 - 1838) *Theory of Organic Beings* was written in Polish and published in Warsaw in 1804. It was translated into German and French. The whole three volumes of the work in Polish were published in Vilnius in 1838. Sniadecki's study is considered one of the earliest works on physiological chemistry, the chemistry of life – a precursor of modern biochemistry. It's a synthetic work of broad sweep. The text which was probably used for lectures is divided into chapters and numbered paragraphs. The first volume is devoted to establishing the general principles and foundations upon which his theory of life is based. The second and third volumes deal with the physiology and chemistry of various body parts and organ systems as well as human behavior, social and physical anthropology. In this presentation, I will focus on the third volume where Sniadecki describes "the life of nerves" and "the theory of nerves".

Sniadecki was well-qualified to produce such a comprehensive work. He studied at the University of Pavia, where he became acquainted with the most progressive ideas in the natural sciences and experimental physiology as well as with the new chemistry associated with the oxygen theory of Lavoisier, the experimental work of Antoine Fourcroy, and the chemical nomenclature of Claude Berthollet. He learned how chemistry and the physical sciences could be applied to the life sciences and to medicine. He also spent two years at the University of Edinburgh attending the chemistry lectures of Joseph Black (1728 - 1799).

The Neglected History of Hemineglect

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The history of this astonishing disorder is fascinating. The relative paucity of early use of this term was perplexing; at first glance, "hemi-neglect" seemed itself neglected. Diverse terminology, hinting at differing subtypes, has been used to characterize a multi-factorial disorder with rather startling manifestations. Patients with neglect and hemi-inattention, acting as if the world space they perceive is full, do not phenomenally experience the omissions or absences so obvious to observers.

From the late 19th century, hemi-inattention was described according to its prominent manifestations, visual, bodily or spatial. From then, diverse terms including imperception, inattention, unilateral visual inattention, unilateral spatial agnosia, and neglect, among others, reflected proposed underlying mechanisms.

Unlike neurological counterparts already designated as hemi-syndromes by the beginning of the 20th century, not until about 1970 did neglect become broadly recognized as a syndrome, featured in neurological texts and neuropsychological literature. However, manifestations of hemi-inattention had been described a century earlier as case reports. Neglect was designated as an overarching term for a class of disorder with distinct subtypes. Theories proposed accounting for the dramatic features included body-scheme disruption, perceptual extinction, amnesia for half the body, and sophisticated models of distribution of directed spatial attention, and disrupted perceptual processes.

Concepts of connectivity and interaction, neural networks, and functional integration enhance understanding of dysfunction, recovery and compensation in neglect and inattention. Focus on the clinical, neuropsychological, and behavioral manifestations clustered under the umbrella of neglect offers a vantage point for examining historical trends in approach to this remarkable phenomenon.

From Speculation to Observation and Experiment: Graphical Representations of the Optic Chiasm and the Course of its Component Nerve Fibers Over Four Centuries

DOUGLAS J. LANSKA

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European recognition of the optic chiasm and its semidecussation spanned centuries. Many illustrations from the 16th - 18th centuries show no optic chiasm: Bartisch (1583), Descartes (1637/1664), Bartholin (1651), Rohault (1671), Briggs (1682), Zahn (1685), and Porterfield (1759). Other illustrations showed a chiasm: Vesalius (1543), Varolio (1573), Willis (1681), Newton (1682), and Taylor (1738). Few recognized a partial decussation: Newton (1682, unpublished until 1855), Taylor (1738) - all well anticipating Munk (1874).

The first *published* illustration of the optic chiasm was by the itinerant oculist John Taylor in 1738. How Taylor came to this understanding is unclear. In 1682, Briggs produced a diagram of the anterior visual pathways (which owes much to earlier diagrams by Descartes) and sent this with a copy of his paper to Newton. Briggs postulated that the anterior visual pathway nerves remain uncrossed from the eye to the thalamus. Newton replied in two letters, the first indicating that he questioned some of Briggs opinions, and the second, dated September 12, 1682, suggesting instead a semi-decussation at the optic chiasm. Newton elaborated and illustrated this idea in an undated and unpublished manuscript as discussed by Brewster in his 1855 biography of Newton. This was also apparently the basis of Query 15 in Newton's *Opticks* (1704). With few exceptions, Newton's idea of semi-decussation of the optic nerves, obtained on theoretical grounds, was largely ignored by anatomists and clinicians until the idea was rediscovered by Wollaston in 1842, and until von Gudden experimentally demonstrated this in animals in the 1870s.

A Survey of 19th- and Early 20th - Century Approaches to Cross-Sectional Anatomy of the Central Nervous System

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Notable 19th- and early 20th-century cross-sectional anatomies of the central nervous system include: (1) Scottish surgeon-anatomist Charles Bell's (1774 - 1842) *The Anatomy of the Brain, Explained in a Series of Engravings* (1802); (2) French surgeon-anatomist Jules Germain Cloquet's (1790 - 1883) *Manuel d'anatomie descriptive du corps humain, représentée en planches lithographiées* (1825); (3) Russian surgeon-anatomist Nikolay Ivanovich Pirogov's (1810 - 1881) *Anatome topographica sectionibus per corporis humanum congelatum triplici directione ductis illustrate* (1859); (4) German anatomist Wilhelm Braune's (1831 - 1892) *Topographisch-anatomischer Atlas: nach Durchschnitten an gefrornen Cadavern* (1867–1872); (5) French neurologist Jules Luys's (1828 - 1897) *Iconographie photographique des centres nerveux: ouvrage accompagné d'un atlas de soixante-dix photographies et de soixante-cinq schémas lithographiés* (1873); (6) Polish neurologist Edward Flatau's (1869 - 1932) *Atlas des menschlichen Gehirns und des Faserverlaufes* (1894); (7) French neurologist Joseph Jules Déjerine's (1849 - 1917) *Anatomie des centres nerveux* (1895, 1901) [with collaboration of Augusta Déjerine-Klumpke, and photographs and detailed drawings by H. Gillet]; and (8) French surgeon Eugène-Louis Doyen's (1859 - 1916) *Atlas d'anatomie topographique* (1911).

Most used traditional dissection approaches with brains extracted from the skull, but Pirogov, Braune, and Doyen used whole-body techniques that did not specifically target the nervous system. Pirogov and Braune serially sectioned frozen bodies, while Doyen injected cadavers with preserving fluids and hardened them over 2 - 6 months ("veritable scientific mummification") before feeding them through a "megatome", a five-meter-long band saw. Images were created using artistic skills (Bell), a grid-based approach to transfer images to paper (Pirogov), an optical projection system to copy images onto paper (Déjerine), or photography (Luys, Flatau, and Doyen).

Changing Graphical Representations of Sulci and Fissures Spanning more than Four Centuries: From Spaghetti-like Gyri to the Gradual Recognition of Basic Cortical Anatomy

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The first crude woodcut illustrations of the brain in printed books began in the last decade of the 15th century incorporated anatomical fictions (medieval cell doctrine, *rete mirabile*). Subsequent printed images showed an undifferentiated spaghetti- or sausage-like cerebral cortex (e.g., Fries, 1518, 1529; Gersdorff, 1523, 1530; Berengario da Carpi 1523, 1530; Dryander, 1536; Ryff, 1541; Vesalius 1543, 1555; Estienne and de la Rivière, 1545; Valverde, 1560; Bartisch, 1583; Spiegel/Casseri, 1627; Kawaguchi, 1772; Vicq d'Azyr, 1786). Many early images of the brain were highly derivative. Portrayal of major landmarks only began in the 17th century. Fabrici d'Acquapendente had illustrated the lateral fissure (1600), but his plates were never completed or published. The first published illustration of the lateral fissure (and insula) was in Thomas Bartholin's 1641 revision of his father's *Institutiones anatomicae* (1611). The "line of Gennari" was recognized by Gennari (1782), Vicq d'Azyr (1781, published in 1784), and Sömmerring (1788); only Gennari illustrated it, though he did not understand its significance.

The most dramatic improvements in representing basic cerebrocortical anatomy occurred in the 19th century, with increasing appreciation that the cerebral cortex was essential to mentation, language, vision, and voluntary movement. Important 19th - century developments included description of the cingulate gyrus (Burdach, 1822), pre- and postcentral gyri and Rolandic fissure (Rolando, 1825), and transverse temporal gyri (Heschl, 1855), plus Gratiolet's demarcation of the brain's cortical surface into five lobes (including insula) (1854). Advancements in recognition and illustration of gross cerebrocortical neuroanatomy depended on a framework of knowledge and prior illustrations.

Presidential Address: The History of the Neurosciences as Represented by the *Journal of the History of the Neurosciences*

J. WAYNE LAZAR

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This paper discusses the history of neuroscience as seen through the articles published in the *Journal of the History of the Neurosciences* (JHN) from 1992 through 2018. It analyzes articles by content and by author. Although articles about the history of the neurosciences might be published elsewhere, JHN is the official journal of the ISHN. The articles' content allows a view of the comprehensiveness of the field and reveals emphases and neglects. Content information primarily came from analyses of titles, "keywords", many of the abstracts, and perusing of articles. Authors are analyzed by number of articles, by countries of residence, and by job affiliations.

The international character of the neurosciences is well represented in our journal. Authors from the United States accounted for 30% of the articles, however, 39 different countries are represented. From the historiographic perspective, practitioner-historians predominated. Neurologists were the majority of them followed by a substantial number of psychologists. Academic - historians accounted for about 15% of the authors. The interdisciplinary nature of the neurosciences is not well represented by the articles' content. Pathologies and the practitioners associated with them made up the bulk of the content. There were but few articles about contributions of associated technologies, computation science, systems, genetics, or biochemistry. Historical figures were typically from the mid-nineteenth to the mid-twentieth centuries. For the most part topics were provided by individual authors, but several times during the past 27 years special symposia were organized explicitly around group interests diverse as historiography, art and the Third Reich.

Graphic Representations in Brain Maps from Gall to Geschwind

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This presentation will focus on how brain maps expressed changes in the way brain functions were conceptualized from phrenology at the beginning of the 19th century to the neural networks of the 21st century.

The virtual brain maps of the phenologists were based on Gall's personal impressions, non-systematic validations, and only the beginnings of knowledge about the nervous system, and they reflect this weak beginning. Not until 1870 and 1873 with electrical stimulation experiments of Fritsch and Hitzig and of Ferrier did maps convincingly illustrate motor centers in the mammalian cortex. Comparisons of their results show awareness of increased response variation. Considerable scatter of both motor and sensory responses was reported sixty years later when Penfield and Borley (1937), following Foerster's lead, published the results of electrical stimulations of the cerebral cortex in humans. The adequacy of Penfield's iconic homunculus to reflect their data is discussed in light of this variation. During the last quarter of the 19th century, Wernicke and Lichtheim suggested ways that localized functions might interact. Their brain maps were diagrams showing hypothesized interactions between presumed localized mental processes. Geschwind elaborated their views in modern terms eventually leading to the understanding of how auditory, visual, and motor areas (not psychological areas) of the brain might combine to make complex functions. At the same time, the maps of Hubel and Wiesel showed construction of visual perceptions from elementary aspects of the visual stimulus. This encouraged brain maps that model machine learning after neural networks.

Circulations of Concern with the "Uncertainty of Signs of Death" in mid-18th Century France: a Historical & Cultural Translation Perspective

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Recent interest in the history of definitions of death coincided with new bioethics preoccupations related to brain-centered definitions and end-of-life decision-making post-1968. Anglophone historical inquiry could benefit from greater familiarity with recent French medical historiography, be it from post-1970s *histoire des mentalités*, or contemporary "material history" of French and European practices and legal frameworks for the cadaver. Although authors on both sides of the Atlantic and the English Channel agree that mid-18th century France was the epicenter of a new form of medicalization of "signs of death", most recent developments by French historians have yet to be translated.

This paper begins by examining recent French historiography on signs of death in the 18th and early 19th centuries. We also point out some areas that could be further developed within the French framework including the language and style of descriptions of medical resuscitations, and their borrowings from the Catholic Church and from folk discourse on miracles. We also discuss avenues for further research regarding French vitalism(s) that are particularly relevant for history of death neurophysiology in the 18th and early 19th centuries. Finally, to develop cross-national perspectives on knowledge circulation, we argue that cultural translations of psychophysiological uncertainty regarding death can provide a useful framework for our understanding of the European and American diffusion of concern that stemmed in part from the successful federation in 18th-century France of scientific, religious and popular preoccupations with uncertain death.

Classification of Headache Disorders in the Beginning of the 19th Century in Vilnius and Comparison with ICHD-3

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In this paper we present the classification of headaches introduced by Marcellus Octavius Malewicz in his doctoral thesis on the frequency of brain diseases (*Dissertatio inauguralis medico-practica de frequentioribus cerebri morbis in Instituto Clinico Vilnensi observatis*) published in 1829, in which he described the definition, causes, clinical features and treatment methods of headaches observed while practicing as a student of medicine in Vilnius University Therapy clinic. Then we compare it to the modern classification of headache disorders (3rd edition, ICHD-3) adopted by International Headache Society in 2018.

Malewicz defined idiopathic (primary) and symptomatic (secondary) types of headaches. The author described headache location (temporal, occipital, frontal, and supraorbital), distribution (unilateral vs bilateral), duration, quality (pulsating, stabbing, throbbing, pressing, pulling, and spastic), intensity (from light to unbearable), association with menstrual cycle and circadian distribution. Malewicz paid attention to accompanying symptoms such as facial flush, visual auras, photophobia, nausea and other phenomena. Exposure to heat or cold, alcohol abuse, psychologic burnout, external violence, common cold, organic brain disease, hysteria and metal intoxication were believed to be the causes of idiopathic headache. The pathogenesis of this type of headache was thought to be blood accumulation in the brain. On the contrary, symptomatic headaches were assumed to be symptoms of acute illnesses, and also indicated spread of the disease to the brain.

In this paper we will also show that Malewicz's and others' early accounts on headache classification are comparable to research-based modern headache classification systems.

Imagination Matters: A Historical Overview of the Theory of Maternal Impressions

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"Maternal impressions" is a universal folk belief and an outdated medical theory that a pregnant woman's emotional experiences (what she imagines, sees, feels or craves) could be directly imprinted onto her unborn child in somewhat "photographic" way. Force of the mother's imagination was used to explain anything odd starting from unusual child's appearance to severe congenital malformations.

Written traces of this belief could be found already in antiquity but it was starting from the 16th century when the *imaginatio gravidarum* made its way into the scientific medical writing. In the following centuries countless cases on monstrous births due to maternal impressions were reported in the works of highly educated men. Occasionally the pathophysiological mechanisms were considered. Should there be a direct communication of nerves between the mother and the foetus? Could overexcited animal spirits pass from the mother to child via umbilical cord and damage the tender and soft fibres of the unborn?

Despite the solid objections that were raised starting from the 18th century, the theory died hard. Reports on maternal impressions could be found in medical journals such as Lancet and JAMA as late as the early years of the 20th century. As argued by teratologist Josef Warkany (1951) - it seems that this idea is somehow inbuilt in human brain. And doctors are no more no less than human after all.

Cross-sectional Representations of the Central Nervous System in Pirogov's *Ice Anatomy*

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Russian surgeon Nikolay Ivanovich Pirogov (Pirogoff) (1810 - 1881) introduced the teaching of applied topographical anatomy in Russia. Pirogov's monumental four-volume atlas *Anatome topographica sectionibus per corporis humanum congelatum triplici directione ductis illustrate* ("An Illustrated Topographic Anatomy of Saw Cuts Made in Three Dimensions Across the Frozen Human Body"), colloquially known as the *Ice Anatomy*, was published in Latin *in folio* from 1851 to 1859. Pirogov's goal was "investigation of the normal and pathological positions of different organs and body parts using sections made in three principal directions (transversal, longitudinal and anterioposterior) throughout all regions". To accomplish this, Pirogov froze corpses below -18.75 °C "to the density of the thickest wood" and then cut them into thin plates (0.67 - 1.35 cm) with a special mechanical saw (similar to that used at furniture factories).

Pirogov's approach was reportedly inspired by his observations of butchers sawing across frozen pig carcasses at the meat market in St. Petersburg during winter. Since this "method of anatomical investigations is possible only here in the North (...) the author might have named his anatomy *anatomia borealis*, but he preferred a more modest title". A painter transferred the results onto square-ruled paper with the help of ruled glass, and 995 natural-size, black-and-white, cross-sectional images were subsequently printed using lithography. The remarkably detailed cerebral and spinal images from Pirogov's atlas strikingly resemble modern high-resolution CT and MRI scans. In particular, these images provided new insights into the orientation of the *corpus callosum* within the skull and the relationships of skull-base structures.

Edward Flatau and Moscow School of Neurologists

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What do we mean by a scientific school in neurology? There are many publications on "Moscow neurological school", but its characteristics are not clearly defined. Professor Alexei Kozhevnikov (1836 - 1902), the first chair of nervous and mental diseases at Imperial Moscow university is regarded as the teacher whereas his numerous younger colleagues are viewed as the pupils (Sergei Korsakov, Livery Darkshevich, Lazar Minor, Grigory Rossolimo, Vladimir Roth, etc.). Edward Flatau (1868 - 1932) is one of the most famous and internationally known among them.

My presentation is based on previously unknown materials from the archive of Imperial Moscow University related to his study there (from 1886 to 1892) and of his PhD thesis "The law of eccentric storage of long tracks in the spinal cord" (defended in 1899). After numerous experiments on dogs, Flatau concluded that the "greater the length of the fibers in the spinal cord, the closer they are situated to the periphery". This became known as Flatau's law. The dissertation was reviewed and approved by A. Kozhevnikov. Korsakov was appointed as an opponent but due to his poor health he was replaced by Roth. From 1892 to 1898, Flatau conducted research in Berlin and it was there that he published his famous brain atlas which was translated into several languages. He practiced neurology in Warsaw from 1899 until his death.

A case of E. Flatau illustrates international networking in neurology in the late 19th century.

To Act or Not to Act: Developments in the Pre- and Postnatal Care for Children with Spina Bifida*

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Until the middle of the twentieth century, newborns with *spina bifida aperta* had a low chance of survival. During the 1960s, advances in the surgical treatment of hydrocephalus reduced mortality, but also revealed the downsides of proactive surgical strategies, as some considered the qualitiy of life of these patients be unacceptable. But the alternative, selective nontreament, also had significant downsides, leading to an ethical deadlock. Over the past thirty years, a more proactive attitude has emerged, which – besides "standard" postnatal surgical repair of the cele – has been marked by rising abortion rates and the sporadic application of "active termination of life" in newborns with severe spina bifida. At the same time, novel treatment strategies, such as fetal surgery, continue to be developed.

* The content of this abstract was published as an article in the Dutch Journal of Medicine: Lutters BTH, Spoor JKH, De Jong THR, Kompanje EJO, Verhagen AAE, Brouwer OF, Groen RJM. Handelen of niet handelen? Ontwikkelingen in de pre- en postnatale zorg voor kinderen met spina bifida aperta. Ned Tijdschr Geneeskd 2019;163:D3858.

Description of Seizures in the 19th Century Vilnius Clinics

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The aim of this study is to present descriptions of seizures in the 19th century Vilnius clinics. We analyzed "Medical – obstetrical inaugural dissertation exhibiting a pair of observations on puerperal seizures" (*Dissertatio inauguralis medico – obstetrica exhibens observationum par in convulsiones puerperarum cum epicrisi*), defended at the Imperial university of Vilnius by Paulus Mokrzycki in 1824.

The importance of brain localization was emphasized in VU clinics, associating cortical lesions with seizures and paralysis. However, in other dissertations epilepsy and some other nervous system (NS) diseases (including St. Vitus dance) were stated to be a spinal cord pathology. Typical focal motor seizures, evolving to bilateral convulsive seizures, with foaming at the mouth, involuntary urination, and postictal somnolence, were clearly described. Although the seizure semiotics for the determination of the epileptogenic focus had not yet been considered, the onset of puerperal seizures was closely monitored. It was thought that a plethoric patient (presenting as robust, red-faced, and suffering from frequent headaches, with a full and hard pulse) had a higher risk of convulsions and, therefore, antiphlogistic treatment (especially bloodletting) was considered as the best choice.

Even though in Vilnius, as in other European clinics, the causes of NS diseases were sought in the cerebrum and spinal cord (the influence of solidism doctrine), bloodletting, the use of purgatives, leeches, and cupping therapy were frequently used as treatment options for patients presenting with epileptic seizures.

The Carlo Besta Neurological Institute: A Century of Care and Research

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The Guastalla Military Hosptal was established in Milan in 1915 to care for the wounded of the First World War. It was replaced in 1918 by the *Istituto Neurologico Carlo Besta* (The Carlo Besta Neurological Institute) which became one of the top institutes in Europe uniting in a single complex research, clinical diagnostics, surgery, and therapeutic services for adults and children.

This paper will discuss the one hundred years of the Institute emphasizing its areas of excellence, the staff members who were important in promoting its national and international prestige, as well as highlighting its interdisciplinary and collaborative approach. Particular attention will be paid to Carlo Besta who was a student at the University of Pavia under Camillo Golgi, Nobel Prize winning neurologist and scientist. Besta was Professor of Clinical Nervous and Mental Diseases at the University of Milan from its founding in 1924 until his death in 1940. His scientific and medical expertise were instrumental in creating the broad neuroscientific approach of the Carlo Besta Neurological Institute. In 1952, the Institute was recognized "for its merits in the field of neurological assistance and studies, of its neuroradiological and neurosurgical activity and of its particular initiatives in the field of neuropsychiatric childcare".

Lorenz Heister and the Treatment of Extradural Hematomas in the Early 18th Century

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Trephination is a surgical technique known and used since ancient times; but until the late 17th century surgeons operated primarily for depressed fractures, hematomas were seen as a source for infections in the first place and not as the cause of the initial clinical symptoms of the trauma. Eventually surgeons started to open the skull solely for the removal of suspected compressive hematomas even in the absence of fractures.

Lorenz Heister (1683 – 1758), an anatomist, surgeon and botanist, Professor at the Universities of Altdorf and later Helmstedt, was the author of *Compendium Anatomicum* in 1717 and two years later - of surgical textbook *Chirurgie – Wund-Artzney*, the first edition published in 1719, namely 300 years ago. In this book he described the indications and most recent techniques of trephination in much detail and gave tips and tricks that could be transferred even in today's training programs.

While comparing the different editions, it becomes evident that over the time Lorenz Heister had gathered additional insight in the problems of epidural hematomas. For instance, the author became aware of the special problems while dealing with posterior fossa hematomas, their difficult diagnosis and poorer prognosis compared to supratentorial hematomas. This is unique phenomenon in the surgical literature of Heister's time and rarely could be found in the other sources.

An overlook on the concepts of traumatic epidural hematomas and the changing management in the early 18th century with special emphasis on Lorenz Heister's contribution will be presented.

Camera Obscura and the Eye: Ibn al-Haytham and the Failure of an Analogy

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The eye has frequently been compared to the camera since the invention of photography. The limitations of such a comparison have been discussed by visual scientists. It is, however, rooted in the discovery of image formation in a *camera obscura*, first in a pinhole, then with a focusing lens, and in its application to describe the visual/optical mechanism of the eye.

Historically, the systematic experimental investigation in dark rooms of formation of images based on point to point correspondence goes back to Ibn al-Haytham (965 - 1040 AD; Latin, Alhazen). In two of his works (*Optics*, *Kitāb al-Manāẓir*, c. 1027 and *On the shape of the Eclipse*, *Maqāla fī şūrat al-kuşūf*), he investigated projected images, largely but not exclusively of light in dark rooms (*al-bayt al-muẓlim*) with controlled apertures of varying sizes and shapes. The evidence in these two works leaves no doubt that Ibn al-Haytham was thoroughly familiar with and understood the principles of image formation in a *camera obscura*. Furthermore in his *Optics*, he had brought together visual optics and anatomy of the eye. Then the question arises, why did Ibn al-Haytham not apply the *camera obscura* directly to the eye to describe what Kepler subsequently did in identifying the retinal image as a “pictura”? Or did he consider it but formulated instead an alternative theory which derived largely from mechanics? In this presentation a possible explanation of the reasons will be explored.

Ludwig Heinrich Bojanus (1776 - 1827) on Gall's Craniognomic System

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The aim of this study is to present Ludwig Heinrich Bojanus' (1776 - 1827) early account of Franz Joseph Gall's (1758 - 1828) organology. We analyzed two Bojanus' articles, *Encephalo-Cranioscopie. Aperçu du Systême Craniognomíque de Gall, Médecin à Vienne*, published in 1801 and the English translation of it, entitled *A Short View of the Craniognomic System of Dr. Gall of Vienna*, published one year later.

Bojanus practiced in Vienna's General Hospital and attended Gall's public lectures during 1797 - 98. Later he became a Professor of Zoology and Comparative Anatomy at Vilnius University, a founder of modern veterinary medicine and a pioneer of pre-Darwinian and pre-Lamarckian evolutionism. In his articles, devoted to Gall's craniognomic system, Bojanus listed 33 faculties. The author described three organs that did not involve the cerebrum, the functions and localization of those faculties humans share with other animals (*Instinct and Copulation*, *Instinct to Assassinate,* etc.). Bojanus agreed with Gall that man is the "most perfect animal", and that the organs under the anterior and superior parts of the frontal and parietal bones are essential for the faculties that belong exclusively to humans (*Spirit of Satire, Theosophia*, etc.). Bojanus accepted Gall's new theory and defended him against the charge that his doctrine leads to materialism.

Bojanus was one of the first physicians to provide detailed reports on Gall's organology in French and English. Bojanus predicted that the new system would be fruitful for developing new research about the brain and mind.

Foramen caecum medullae oblongatae in the History of Anatomical Nomenclature

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This term was originally dealt with by L. W. Swanson (2015), and this contribution complements and updates his historical study. F. Sylvius wrote that in-between the *pons* and *ventriculus quartus* there is an *alius canalis, alveus nominandus*, i. e. another canal, which is to be named *alveus* in his *Disputationum medicarum decas* (1663). Sylvius' definition was attacked in 1665 by A. Deusing in his polemic tractate *Sylva-caedua jacens*, maintaining that Sylvius was using new terms which in his view were fanciful, since Sylvius' *alius canalis* was well known to ancient and modern anatomists alike. Th. Bartholin used the same passage by Sylvius almost word-for-word in his *Anatomia reformata* (1663), and later in 1762 A. Haller even called the part in question *alveus Sylvii*, with reference to both Sylvius and Bartholin. Haller in fact was the first to use the word *foramen* in this respect, which ultimately led to the emergence of the expression *foramen caecum*, used by S. Th. von Soemmerring in his 1778 *De basi encephali libri*. This author consistently used the term *foramen*, but he selected a new attribute for it, namely *caecus*, literally blind. The use of the adjective *caecus* in anatomical terminology was no novelty, but Soemmerring evidently used the adjective in the sense of "hidden, invisible". This part is known in subsequent anatomical literature also as the "foramen of Vicq d´ Azyr", even though he was not the first to describe it.

The Electro-Shock Circle: a Revived Interest in the First ECT Apparatus in the 1960s

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In occasion of the 80th anniversary of the electro-convulsive therapy (ECT) equipment in 2018, new attention for the device is raised. In 1938, the Italian psychiatrists Ugo Cerletti and Lucio Bini presented the first prototype to the scientific community in Rome. Precisely such 1938 device is displayed at the Museum of the History of Medicine (MHM). However, there is no record of how the apparatus came to the MHM from the Sapienza Clinic of Nervous and Mental Diseases. Moreover, Cerletti's and Bini's belongings were sent to Topeka by their families.

We aim to reconstruct a revived interest in the first ECT apparatus by the circle of personalities who determined its preservation and memory in the summer of 1964, just before the decline of its public image in the 1970s. This circle includes: Lucio Bini, one of the apparatus inventors, Adalberto Pazzini, the founder of the MHM at Sapienza University of Rome, Bruno Magliocco, the staff psychiatrist at the Menninger Foundation in Topeka (Kansas) and, behind him, two key figures in American psychiatry, Karl and William Menninger. We use the mail correspondence and other papers in Italian from the Menninger Archive, as well as other papers from the MHM Inventory and Archive.

We suggest a series of hypotheses of why the device is still in Rome, and not in Topeka with the rest of Bini-Cerletti Archive.

Evolution of the Cranial Nerves in Images of the Brain from the Sixteenth Century to von Soemmerring and Beyond

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Advances in the imagery of the cranial nerves required progress in the scientific method, scientific collaboration, and art, but the history of this issue saw as much plagiarism as art.

In one of the earliest descriptions, Galen nominated seven pairs of cranial nerves at the base of the brain, but without illustrations. Leonardo da Vinci produced some remarkable images in his notebooks, which include his interpretation of the cranial nerves, although his contemporaries would never see this body of work. Advances in printing in the mid-15th century made it possible for anatomical works to be, at times, lavishly illustrated. Vesalius's illustrations in the *Fabrica* (1543) are artistically outstanding, but the drawings of the base of the brain and the cranial nerves appear confused and incomplete. Illustrated works of Varolio (1573), Eustachi (1552/1714), Willis (1664), Bidloo (1685) and Cowper (1698) demonstrate the evolution of the concept of the anatomy of the cranial nerves during the 16th and 17th centuries. Thomas Willis at Oxford provided an exceptional illustration (1664) of the base of the brain, executed by Christopher Wren, in which the cranial nerves can be clearly identified. In a doctoral thesis in 1778, Samuel Soemmerring distinguished 12 pairs of cranial nerves.

Soemmerring's classification was quickly adopted in Europe and is the one used today. Later works of the British anatomists, Gray (1858), illustrated by Henry Vandyke Carter, and Cunningham (1903), show that the British anatomists were slow to adopt this classification.

The Sydney Mechanics School of Arts and Other Professionals in the Promotion of Phrenology in New South Wales 1830 - 1850

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Sydney began as a penal colony in 1788. British phrenologists were initially very keen to obtain indigenous skulls for their own museum but also attempted to bring about penal reforms and convict selection through phrenological assessment.

Although transportation to New South Wales continued until 1840, free settlers first arrived in the Colony in 1792. With the free settlers and emancipists, this emerging middle class was keen to dissociate from the convict past. Following the publication of George Combe's (1788 - 1858) work, *The Constitution of Man* in 1828, many embraced phrenology. The support for phrenology during the period 1830 to 1850 came from some unexpected sectors. The Sydney Mechanics School of Arts (SMSA), formed in 1833, aimed to promote the "diffusion of scientific and useful knowledge". The School set up a lending library and public lectures were organised. Phrenology proved a very popular subject for the lecture program while the library stocked many publications.

Some doctors, lawyers and other professionals gave phrenology lectures at the SMSA, but one in great demand was Dr. William Bland (1789 - 1868). Bland was himself an emancipist and one of the first private medical practitioners in the Colony. He later donated his own collection of 60 cranial casts to the SMSA museum.

After this initial period of enthusiasm for phrenology, the "science" was taken over by largely unregistered practitioners. In some areas, such as vocational guidance, phrenology persisted well into the 20th century.

Neuroscience, Crossroads between the Academic and the Commercial

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The dopamine hypothesis of schizophrenia was first proposed in 1966 by Jacques van Rossum, and became, after the works of Philip Seeman and Solomon Snyder in the 1970s, the most influential pathophysiological theory of schizophrenia.

While many authors have singled out the role of the pharmaceutical industry shaping biological psychiatry in general, some have recognized the role haloperidol played in the development of the dopamine hypothesis. This presentation shows how the career of Paul Janssen tied together both the pharmaceutical industry and the dopamine hypothesis. Janssen founded, as a young medical doctor, *Janssen Pharmaceutica*, the pharmaceutical company that would become one of the most important players in the management of mental illness.

This presentation describes how Paul Janssen followed classic pharmaceutical industry's techniques for increasing the sales of haloperidol. These techniques included supporting and conditioning clinical trials, creating close proximity with the academic and clinical worlds, sponsoring basic research, putting best spin on data and advertising in medical journals. In this process the dopamine hypothesis became central to Haldol's commercial endeavour.

Misconceptions in Neurology: Osip Mochutkovsky and the Suspension Therapy of *Tabes dorsalis*

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Russian physician of Polish origin Osip Osipovich Mochutkovsky (originally Josef Moczutkowski; 1845 - 1903) illustrates that mistakes, fashions, and misconceptions are among the most interesting parts of medical history.

Born into a Catholic family of a teacher in the Kherson region of the Russian Empire (now Ukraine), he graduated from the medical faculty of St. Vladimir Imperial University (Kiev) in 1869 and moved to Odessa. From 1870 - 1877 he was head of internal medicine and infectious diseases at Odessa city hospital, and from 1877 - 1893 he headed there a new department of nervous diseases. Then he moved to St. Petersburg and became chair of nervous diseases at Grand Duchess Elena Pavlovna Clinical Institute (for postgraduate training). He founded Odessa Balneological Society and was elected an honorary member of the Odessa and Vilna Medical Societies.

Mochutkovsky conducted research on relapsing fever (*typhus recurrens*), which included injecting himself with blood from a patient. He nearly died after this experiment and suffered from chronic myocarditis the rest of his life. In the Odessa neurology department, Mochutkovsky began to treat *tabes dorsalis* by suspension. He questioned the syphilitic origin of the disease and explained its symptoms by compression of spinal roots. In 1889 the French government sent Fulgence Raymond to Russia to learn about medical education there. Raymond saw suspension therapy at Mochutkovsky's clinic and informed Jean-Martin Charcot, who promoted this method internationally. Suspension proved to be useless and was gradually abandoned. Mochutkovsky also invented several diagnostic instruments for neurological diagnosis (for measuring pain, touch sensation, etc.).

Neuroscience of the Cognitive Mechanisms of Mirror-Touch Synesthesia

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Synesthesia is known as the simultaneous experiences of multiple senses. Mirror-touch synesthesia is an extremely rare condition in which a person experiences the same sensation that another person is feeling, for example, by an individual being touched. The first known case was reported in 2005, a female patient, after observing an individual being touched, experienced the same sensation herself. There is evidence that mirror neurons may be responsible in activating the mechanisms that allow the tactile response to be expressed. Mirror neurons in the brain are activated as the neurons strike the threshold that allows the impression of touch. The responsibility of this mirror neuron-system is to convert the sensory information into motor activity.

The recent identification of the condition resulted in further research on mirror-touch synesthesia by numerous institutions and its incorporation into programs. Although findings have been controversial, there has been a significant increase in its acknowledgment both in sensory neuroscience, as well as in the public awareness by publications on specific cases. A review of the research will be conducted to determine the definition and nature of the condition in order to understand the underlying mechanisms (normal or pathological), and to explore its impact on individuals, as well as possible social consequences.

The Invention of the "Chun Gun" and its Role in Improvement and Standardization of the Method of Cranial Transillumination

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Richard Bright introduced cranial transillumination to clinical practice in 1831. He used the sunlight and candles as light sources. In 1960s the method was popularized by Phillip Dodge, who used a simple battery-operated flashlight to transilluminate the cranium for evaluation of hydrocephalus and other intracranial anomalies in infants and children.

Dr. Raymond Wai Mun (Ray) Chun (1926 - 2014) was a Professor of Neurology and Pediatrics at the University of Wisconsin-Madison. In collaboration with biomedical engineers from the University of Wisconsin he developed a new medical instrument for cranial transillumination, which later become known as the "Chun gun", in honor of Dr. Chun.

The light source was provided by a focused 150 watts projection lamp, which emitted a constant bright light. The associated heat was dissipated by 2 absorbing glass filters, placed in front of the projection lamp, and five cooling fins. The instrument had a two-position switch. The first position would activate a weak red lamp that allowed the operator to view the infant in the dark examination room and the second position would turn off the red light and activate the projection lamp. The first prototype was built probably in late 1960s or early 1970s.

A number of research articles were published on the method of cranial transillumination using the "Chun gun". Before the development and widespread use of modern imaging technologies the "Chun gun" was used extensively around the world until 1990s, and saved many children from the risks and discomforts of invasive diagnostic procedures.

Binocular Rivalries: Wheatstone and Brewster on Vision

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In the 1830s both Wheatstone and Brewster came to stereoscopy armed with their individual histories of research on vision. Brewster was an authority on optics and had devised the kaleidoscope, Wheatstone had invented the kaleidophone (for rendering acoustic patterns visible). Both had written on subjective visual phenomena, a topic upon which they first clashed at the inaugural meeting of the British Association for the Advancement of Science in 1832 (the year Wheatstone made the first stereoscopes).

Wheatstone published his account of the mirror stereoscope in 1838, Brewster's initial reception of it was glowing but he later disputed Wheatstone's priority. They both described investigations of binocular contour rivalry but their interpretations diverged. As was the case for stereoscopic vision, Wheatstone argued for central processing whereas Brewster's analysis was peripheral and based on visible direction. Brewster's lenticular stereoscope and binocular camera were described in 1849. Both were involved in the marriage between stereo and photography. However, in this as in other matters of vision, their interpretations were disparate. Brewster's camera had a fixed separation between the lenses and so disparities were restricted to near objects. Wheatstone was more pragmatic and provided a table of camera separations for objects at different distances. The rivalry between Wheatstone and Brewster is illustrated with anaglyphs that can be viewed with red/cyan glasses; the anaglyphs include rivalling "perceptual portraits" as well as examples of the stereoscopes and stimuli used to study binocular rivalry.

Crazy about Steroids: Psychosis in Ray's *Bigger than Life*

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In 1955, Roueché published the case history *Ten Feet Tall*— about a teacher who would go into a manic psychosis after taking a large dose of cortisone. The article was spotted by the actor and producer James Mason, who asked the film director Nicholas Ray (*Rebel without a Cause*, *Johnny Guitar)* to turn it into a film.

The film *Bigger than Life* - an undisputed classic in American cinema - shows Ed Avery (James Mason) with acute neck and head pains and increasingly prolonged, severe bouts of stomach pains until he collapses. The diagnosis is eventually determined as periarteritis nodosa and he is treated with corticosteroids. The side effects of corticosteroids are well shown in *Bigger than Life* and Mason displays hypomanic behavior and grandiosity. Mania and persecutory delusions were also shown. Ray posed the question of whether the domestic bliss of the 1950s was a farce and perhaps the steroids exposed and exacerbated a less-than-idyllic situation or precarious finances. In Ray's judgment, cortisone removed all inhibitions, exposing Ed Avery's urge to rise above his social class and to escape his dull life. Allowing for poetic license, the film's takeaway for physicians is to be wary of unexpected side effects of new, dramatically effective "wonder" drugs.

The Landmark Discovery of the Ascending Reticular Activating System

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The discovery of the ascending reticular activating system (ARAS) is attributed to research neuroscientist Horace Magoun's laboratory at UCLA, and his collaborators, Giuseppe Moruzzi (Institute of Physiology, University of Pisa) and Jack French, a neurosurgeon from Long Beach. Before this finding, most scientists would focus on the diencephalon (and anterior midbrain) but not more caudally.

Stimulating the ARAS desynchronized EEG and caused more wakefulness. Destruction would synchronize EEG. This finding was a dramatic departure from the early philosophers' ascription of the awake soul to the ventricles (Galen), lumbosacral cord (Plato), pineal gland (Descartes), and even from more modern 19^{th} and 20^{th} century hypotheses that the corpus striatum or periaqueductal gray matter housed the "seat of awareness". Magoun and his collaborators closed in on its true location in the cephalic brainstem.

Our current understanding is that the ARAS is indeed a poorly delineated structure consisting of a number of axonal fascicles spreading out in many directions caudal to the pons. The ARAS influences autonomic regulation of respiration, heart rate and blood pressure. The rostral portion of the pons regulates wakefulness. A bilateral lesion of the tegmentum (and, likely, extending into the medial portion of the brainstem) is needed to affect its function. An historical timeline of discoveries of this crucial structure in functioning of consciousness is presented.

Pavel Ivanovich Yakovlev (1894 - 1983) and his Contributions to the Neurosciences

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Neuroanatomist and neuropathologist Pavel Ivanovich ("Paul") Yakovlev was born to a family of noble heritage in the small town of Turetz (Turec) in the Russian Empire (now Belarus). He graduated from the Classical Gymnasium in Wilno (now Vilnius, Lithuania) and then in 1915 entered the Imperial Academy of Military Medicine in Saint Petersburg as an awardee of the fellowship of Sir James Wylie, the founder of the Academy, surgeon general of the Russian Army, and physician to Catherine the Great. In December 1919, encouraged by professor Alexander Alexandrowitsch Maximov, Yakovlev escaped the Bolshevik-generated devastation by crossing the ice-and-snow covered Gulf of Finland at night. He was lucky to continue and ultimately complete (in 1925) his medical education in Paris under the guidance of Pierre Marie and Joseph Babinski. Maximov, by then a professor at the University of Chicago, advised him to come to the United States. Yakovlev started as an assistant to a neurologist in Providence and embarked on a long and very productive carrier at Harvard Medical School and various hospitals in Massachusetts.

His numerous contributions to neurology and neuropathology included works on the origins of the human frontopontine tract, schizencephaly, development and maturation of myelination, cerebral asymmetries, and the anatomy of the limbic cortex. He served as the President of the American Association of Neuropathologists and was an influential founder of the American Academy of Neurology. Yakovlev's outstanding collection of more than 900 brains is now housed at the National Museum of Health and Medicine in Washington, DC.

The Disputes on Mental Hygiene and Eugenics in Vilnius and Lithuania in 1919 - 1939

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The aim of this study is to present the care of mentally ill as well as ideas of eugenics in a context of social hygiene movement in interwar Vilnius. We analyzed the primary sources, papers written by the medical doctors and hygienists practicing at that time, such as Kazimierz Karaffa-Korbutt, Aleksander Safarewicz, Kazimierz Pelczar, Adolf Falkowski, Danielius Alseika and others.

In Eastern Europe and Poland, as well as in Vilnius district, the eugenic ideas emerged naturally in a context of the new challenges of a health care system. The influence of World War I and progress in medicine made changes in health care organization. Social medicine was considered to be a priority line. Health education, pronatalism, interstructural cooperation, hygiene propaganda and other measures were the new tools that helped to create healthier society. However, among the challenges there was a relatively new problem of mental diseases. That type of diseases needed complex measures and solutions. Both social and biomedical means were discussed by Vilnius medical doctors.

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