VIA MEDICA

HISTORY NOTE

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Leonardo Bianchi (1848–1927) — great Italian neurologist and psychiatrist

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ABSTRACT

The year 2024 marks the 176th anniversary of the birth of the great Italian neurologist and psychiatrist Leonardo Bianchi (1848–1927) who was one of the outstanding personalities responsible for the discovery of the cortical localization of language and other cognitive functions. He was one of the first scientists to study and understand the importance and functions of the frontal lobes. Bianchi was the first to diagnose parietal syndrome, identifying a new clinical form (Bianchi's syndrome). Moreover, Bianchi appeared also in political life as a Member of the Italian Parliament and as Minister of Education where he became a reference point for Italian politics.

Keywords: neurology, psychiatry, history, brain, Bianchi's syndrome

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Introduction — biographical sketch

Leonardo Bianchi was born on April 5, 1848, in San Bartolomeo in Galdo in the Province of Benevento. He grew up in a quiet neighbourhood, being spoiled by his father Vincenzo Bianchi (pharmacist), and his mother Alessia Longo (noblewoman) [1, 2]. From an early age, thanks to the teachings of his father first, and those of the priest of San Bartolomeo later, Leonardo was educated according to a classical education. In this period, in fact, the young Bianchi began to get passionate about literature and the classical arts: a love that will never be abandoned during his entire life [3]. After learning the basics of knowledge from the priest of San Bartolomeo, he continued his secondary education in nearby Benevento and then enrolled in the Faculty of Medicine of the University of Naples. He graduated in Medicine and Surgery in January 1871 [1].

The young Bianchi, after graduating, was appointed doctor of The Bourbon Hospice for the Poor (Albergo Reale dei Poveri) where he began to devote himself to neuropsychiatry [1]. Then he was an assistant in several scientific institutes, hospitals, and laboratories until 1876 when he acquired his teaching qualification in electrotherapy. In 1877 Leonardo Bianchi became a lecturer in special medical pathology and the following year he became a professor in the Medical Clinic at the University of Naples [1, 2].

At the age of 31 years old Bianchi became an official professor of Medical Clinic at the University of Cagliari. After three years, the young professor was nominated as an assistant to Prof. Giuseppe Buonomo, director of the Clinic of Nervous and Mental Diseases annexed to the asylum of St. Francis de Sales, one of the most important hospitals in Naples. In 1882 Bianchi established the Psychiatric Institute of Naples. In the same year he founded and directed the "Annali di neurologia" and one year later founded the periodical "La Psichiatria", which was first headed by Professor Buonomo, and later placed under the direction of Bianchi himself. In 1888 Leonardo became an official professor of the Chair of Psychiatry at the University of Palermo. In the Sicilian capital, Professor Bianchi remained until 1890 when Giuseppe Buonomo died, after which he was appointed as his successor at the University of Naples. His growing fame led him to receive also the appointment as director of the asylum of St. Francis de Sales. He accepted both positions, that of official

professor of Neuropathology and Psychiatry and that of director of the Provincial Asylum. He carried out a profound reform of both institutions. As the author of many important studies in the field of neuropsychiatry, in 1898 he was appointed director of the International Journal of Medical Sciences [1, 3]. In 1907 the creation of the Italian Society of Neurology (Società Italiana di Neurologia) was founded with Leonardo Bianchi as its first president [5]. He was also twice nominated as Rector of the University of Naples in the academic year 1902–1903 and 1911–1912 [2].

In 1892 Bianchi appeared in political life, as a Member of the Italian Parliament where shortly thereafter he became a reference point for Italian politics [5]. As one of the most influential figures of southern Italy, Leonardo Bianchi continued to increase his fame with the publication called "Trattato di Psichiatria" which, translated into many languages, became a reference book for Psychiatry of the time [3]. On 28 March 1905, Leonardo Bianchi was commissioned by the king to govern the Ministry of Education chaired by Alessandro Fortis. By obtaining this important position, he promoted a radical reform of the Italian school organization. Thanks to his work, the chair of Experimental Psychology was established for the first time in all the Faculties of Philosophy of the Kingdom. Leonardo established the Chair of Labour Diseases in Milan and the Chair of Criminal Anthropology in Turin in honour of Cesare Lombroso. In addition, Bianchi undertook a radical attempt to reform middle schools and favoured the spread of primary culture in all the territories of the kingdom, especially in those where illiteracy raged. From June 19, 1916, to October 29, 1917, he was also minister without portfolio with responsibility for the health organization of the country in war. In 1919 he became a member of the Italian Senate [3, 6].

Leonardo Bianchi throughout his political career as a liberal always took sides in the ranks of the Democratic parties and as senator of the Kingdom of Italy, he opposed Fascism. In response to this opposition, in 1925 Benito Mussolini gave the Italian Government's disapproval of Leonardo Bianchi's candidacy for the Nobel Prize in medicine, proposed by the Stockholm Academy, precluding him from the possibility of victory [7].

In 1910 he abandoned the direction of the Provincial Asylum of Naples to devote himself entirely to the favourite studies of the clinic [3].

On April 13, 1927, he died at the age of 80 during a conference in Naples, from a sudden attack of angina pectoris (Fig. 1) [1].

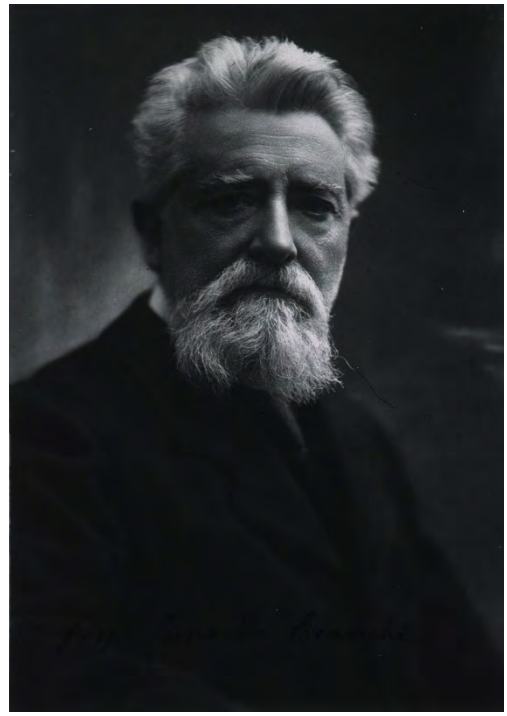

Figure 1. Leonardo Bianchi (1848–1927)[4]

Bianchi's scientific achievements

During the 18th and 19th centuries, many researchers performed animal studies and post-mortem examinations to determine the function of the cerebral cortex. Early research focused primarily on motor function. Over time, however, scientists became interested in the location of places responsible for higher mental functions. Emanuel Swedenborg is believed to be the first person to describe in more detail the link between the location and function of the cerebral cortex. His observations in the first half of the 18th century led him to conclusions about the superior role of the cerebral cortex [8]. Paul Broca also had a huge impact on the evolution of neuroscience. Through examining the brains of patients with aphasia, he found that the speech centre is located on the left side of the brain in the frontal lobes [9]. The following years brought more and more discoveries related to the secret of the functioning of the brain. The scientists who made a major contribution to the development of neuroscience in the next years were Eduard Hitzig, Friedrich Goltz, David Ferrier, Victor Horsley, Herman Munk, and Luigi Luciani [10].

One of the distinguished scientists in this area is Professor Leonardo Bianchi. Central to Bianchi's

scientific activity was the study of the function of the frontal lobes [11]. In 1895 Bianchi published the results of his research *The function of frontal lobes* in „Brain". The most recognition brought him his book *Meccanica del Cervello*. This work, translated in the next years into French and English, was a summary of his more than twenty years of research and experience on the subject. In 1995 the book was republished and entitled as *La meccanica del cervello e la funzione dei lobi frontali* [12].

Most of Bianchi's research was derived from experiments made on twelve monkeys and six dogs. His hypothesis was as follows — "the frontal lobes are the seat of co-ordination and fusion of the incoming and outgoing products of the several sensory and motor areas of the cortex'' [13]. In *The function of frontal lobes,* he wrote: „The frontal lobes would thus sum up into series the products of the sensori-motor regions, as well as the emotive states which accompany all the perceptions, the fusion of which constitutes what has been called the psychical tone of the individual. Removal of the frontal lobes does not so much interfere with the perceptions taken singly, as it does disaggregate the personality, and incapacitate for serialising and synthesizing groups of representations.". Changes in the behaviour of monkeys with frontal lobes ablation indicated their function and thus made it possible to locate them. In these monkeys suppression of all manifestations of initiative and curiosity was observed. These results show that the experiment limited the ability of imagination, evocative power, and determinism to think. This constellation of symptoms was named a "frontal lobe syndrome", which describes a precise clinical picture, known today as frontal lobe disorder [14, 15]. Bianchi believed that the changes observed in the animals could also be seen in the human species: „That semblance of friendliness and love, which appears in one form in the dog and another in the monkey, is only the embryo of the mature condition which we find in modern civilised man. When both frontal lobes are severely injured in the human subject, or when these organs are not developed similar conditions obtain […] Suppression of interest and curiosity, leading to isolation from the group - in other words, the disappearance of sociality, characterised by indifference towards the social environment and melting away of all manifestations of friendship and attachment […] are facts that are constantly observed after removal of the frontal lobes. The primary emotions, the appetites, and the instincts "remain" [16].

Leonardo Bianchi believed that frontal lobes are organs of a physiological combination of all sensory and motor products developed in the areas of the cortex, respectively in places of special sensory and motor functions. Specific images are synthesized in man in concepts or abstractions. In his view, concepts were the product of the synthesis of several sensory and motor components and their derivatives developed in the perceptive and motor areas of the cortex and then formed into a symbolic form in the language zone. According to Bianchi, this process based on raising personality and consciousness beyond the purely sensual field was the basic function of the frontal lobes [12].

It is also important to mention that Leonardo Bianchi has never asserted that the frontal lobe is the only organ of the intellect. He wrote that „it is an organ of intellect and that work of the entire brain contributes to this, its highest manifestation" [17].

In his book, he also addressed the topic of consciousness. He believed in the existence of higher and lower consciousness: ,,The lower consciousness moves in the shorter circuits of the sensory fields where prevail sensations, images, relatively simple mental constructions, emotions, desires, acts of self-protection […] The higher consciousness moves in wider circuits, forming with the former a more extensive network of notions and experiences, being open to currents which come from all parts of the cerebral mantle.[…] Excessive predominance of the lower consciousness confers on man a more brutally egoistic character, which sometimes leads to criminality […] Prevalence of the higher consciousness raises egoism, leading sometimes to genius […]" [16].

Conclusions — Bianchi's impact on neurology

Leonardo Bianchi's "frontocentric" idea of the seat of the higher mental functions had a significant impact on the work of Antonio Egas Móniz, who is known for performing the first prefrontal leucotomy in 1936. This intervention was aimed at treating neuropsychological disturbance. Bianchi's theories were also confirmed by Wilder Graves Penfield who created the "cortical homunculus". His cerebral localization studies provided important information about the areas of the brain potentially connected to emotions and "thought" [15].

The studies conducted by Roger Sperry were also influenced by Bianchi's works. Sperry developed a new concept of the "mind" due to the changes induced in the behaviour of patients who underwent split-brain surgery. His work resulted in the analysis of the separate and independent specializations of the right and left hemispheres of the human brain and was recognized with the Nobel Prize in 1981 [15, 18]. He

also presented the "theory of the three Rs": rattomorphism, reductionism, and reflexism [19]. Additionally, the work of the Neapolitan neuropsychiatrist had an impact on Alexander Luria's neuropsychological theory [15].

For his theories, concerning the frontal lobes, he was considered the founder of modern neurology. His work on the activity of the frontal lobes titled "The Functions of the Frontal Lobes" was published in 1895 and remained a milestone in the history of neurology [3].

Article information

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