

# Constantin von Economo's 90th death anniversary

## O 90º aniversário da morte de Constantin von Economo

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### ABSTRACT

The year of 2021 marks 90 year since the death of the neuroscientist Constantin von Economo, whose research in various areas was extremely relevant for the field of neurology. He described lethargic epidemic encephalitis, published an atlas of the cytoarchitecture of the human cerebral cortex, and conducted multiple studies in neuroanatomy, neurophysiology, and clinical neurology. Von Economo's genius extended into other nonmedical fields such as aeronautics, and he had renowned artistic skills.

**Keywords:** History; Neurology; Parkinson Disease, Postencephalitic; Influenza Pandemic, 1918-1919.

### RESUMO

O ano de 2021 marca o 90º aniversário da morte do neurocientista Constantin von Economo, ou Constantin Freiherr (Barão) von Economo. Von Economo realizou várias pesquisas de grande relevo na área da neurologia, com a descrição da encefalite letárgica epidêmica, a publicação do atlas sobre a citoarquitetura do córtex cerebral humano, além dos seus múltiplos estudos em neuroanatomia, neurofisiologia, bem como na neurologia clínica. A genialidade de von Economo se estendeu para outras áreas não médicas, com o seu grande interesse em aeronáutica, como piloto de avião, além dos seus reconhecidos dotes artísticos.

**Palavras-chave:** História; Neurologia; Doença de Parkinson Pós-Encefalítica; Influenza Pandêmica, 1918-1919.

## INTRODUCTION

Amid the global COVID-19 pandemic, neurological complications including acute encephalopathy resulting from severe acute respiratory syndrome coronavirus 2 recall the cases of encephalitis lethargica (EL) described in 1916 and 1917, which were initially related to the Spanish flu<sup>1</sup>. These cases described more than 100 years ago by Constantin von Economo aroused major research interest, particularly on the etiopathogenic mechanisms of this illness, which remain enigmatic (Figure 1)<sup>1</sup>. The description of these cases has made von Economo famous, but his contributions to neurology were much broader, and led him to three nominations for the Nobel Prize in Physiology and Medicine<sup>1-4</sup>. The year 2021 marks the 90th anniversary of von Economo's death.


## BARON CONSTANTIN VON ECONOMO (1876-1931)

Constantin Alexander von Economo (Figure 1) was born on August 21, 1876, in Brăila, Romania. His family, which descended from the Greek aristocracy, moved first to Trieste (part of the Austro-Hungarian Empire at the time) and later to Vienna<sup>4,7</sup>, where von Economo graduated in Medicine in 1901. In 1903 and 1904, he was a resident in internal medicine under Carl Wilhelm Nothnagel. As his interest in neuroscience grew, he completed several internships in various countries across Europe. In Paris he attended the neurology services of Pierre Marie, Fulgence Raymond, and Alexis Joffroy; in Germany he interned with Alois Alzheimer and Emil Kraepelin (in Munich), and with Hermann Oppenheim and Theodor Ziehen (in Berlin)<sup>4,7-10</sup>. He also attended other neuropsychiatric services in Nancy

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**Figure 1.** Combination performed by the authors from von Economo's photo, his publication on lethargic encephalitis<sup>11</sup>, and later publications on the same issue.

(with Hippolyte Bernheim), Strasbourg (Albrecht von Bethe), and in Trieste (Carl Isidor Cori). He returned to Vienna with this experience in the field and worked as an assistant at the Psychiatry and Nervous Diseases Clinic at Vienna's General Hospital from 1906, under the direction of Julius Wagner-Jauregg (who won the Nobel Prize for Physiology and Medicine in 1927)<sup>4,7-10</sup>. That same year von Economo was granted the title of Baron ("Freiherr") and his name became Constantin Freiherr von Economo. In 1913, he became associate professor of Psychiatry and Neurology at the University of Vienna. In 1919 (at age 43) he married Princess Karoline von Schönburg-Hartenstein<sup>4,7-10</sup>. Two years later, von Economo was appointed as full professor of Psychiatry and Neurology at the University of Vienna, where he organized his line of academic research; this culminated in the creation, in 1931, of the Department of Brain Research, which he coordinated. Five months later he died at the age of 55, from a myocardial infarction complicated by a stroke. He was buried in Trieste<sup>4,7-10</sup>.

## MAIN CONTRIBUTIONS TO NEUROLOGY

Von Economo made very significant scientific contributions to neurology. His paper entitled *Die centralen Bahnen des Kau- und Schluckaktes*<sup>11</sup>, the first in his capacity as a graduated physician, is one of the first studies in the history of brain research to attempt to describe the brain centers of mastication and deglutition<sup>12</sup>. In this paper, he had already shown his interest in the functions and anatomical connections of the substantia nigra. He suggested that the coordination and succession of all alimentation movements are performed as a whole in the substantia nigra, with the involvement of cranial nerves (facial, hypoglossal, vagus, trigeminal)<sup>12</sup>. In 1917, he first published an article in *Wiener Klinische Wochenschrift* describing cases of a rare disease occurring during 1916–1917, which he defined as lethargic epidemic encephalitis (later known worldwide as von Economo encephalitis) (Figure 1)<sup>4,7-13</sup>. Two additional publications neuropathologically and clinically defined this





## REFERENCES

1. Hoffman LA, Vilensky JA. Encephalitis lethargica: 100 years after the epidemic. *Brain*. 2017 Aug 1;140(8):2246-51. <https://doi.org/10.1093/brain/awx177>
2. Reid AH, McCall S, Henry JM, Taubenberger JK. Experimenting on the past: the enigma of von Economo's Encephalitis lethargica. *J Neuropathol Exp Neurol*. 2001 Jul 1;60(7):663-70. <https://doi.org/10.1093/jnen/60.7.663>
3. Dickman MS. Von Economo encephalitis. *Arch Neurol*. 2001 Oct;58(10):1696-8. <https://doi.org/10.1001/archneur.58.10.1696>
4. Triarhou LC. Pioneers in neurology: Constantin von Economo (1876-1931). *J Neurol*. 2007 Apr;254:550-1. <https://doi.org/10.1007/s00415-006-0308-7>
5. Pearce JM. Baron Constantin von Economo and encephalitis lethargica. *J Neurol Neurosurg Psychiatry*. 1996 Feb;60(2):167. <https://doi.org/10.1136/jnnp.60.2.167>
6. Kyle RA, Shampo MA. Constantin von Economo. *JAMA*. 1978 Aug 11;240(6):568. <https://doi.org/10.1001/jama.240.6.568>
7. Jellinger KA. A short history of neurosciences in Austria. *J Neural Transm (Vienna)*. 2006 Mar;113(3):271-82. <https://doi.org/10.1007/s00702-005-0400-7>
8. Sak J, Grzybowski A. Brain and aviation: on the 80th anniversary of Constantin von Economo's (1876-1931) death. *Neurol Sci*. 2013 Mar;34(3):387-91. <https://doi.org/10.1007/s10072-012-1111-0>
9. Demetriades AK. From encephalitis lethargica to cerebral cytoarchitectonics: the polymath talento of Constantin von Economo (1876-1931), pioneer neuroanatomist, neurophysiologist and military aviator. *Scott Med J*. 2012 Nov 8;57(4):232-6. <https://doi.org/10.1258/smj.2012.012108>
10. Triarhou LC. The signaling contributions of Constantin von Economo to basic, clinical and evolutionary neuroscience. *Brain Res Bull*. 2006 Apr 14;69(3):223-43. <https://doi.org/10.1016/j.brainresbull.2006.02.001>
11. Economo CJ. Die centralen Bahnen des Kau- und Schluckactes. *Pflüger Arch*. 1902 Sep;91:629-43. <https://doi.org/10.1007/BF01659665>
12. Petousi VG, Proios H, Triarhou LC. The physiological experiments of Constantin von Economo on the central pathways of mastication and deglutition. *Rev Neurol (Paris)*. 2019 Oct;175(9):506-18. <https://doi.org/10.1016/j.neurol.2018.10.009>
13. von Economo CF. Encephalitis lethargica. *Wiener Klin Wochenschr*. 1917;30:581-5.
14. Dale RC, Church AJ, Surtees RAH, Lees AJ, Adcock JE, Harding B, et al. Encephalitis lethargica syndrome: 20 new cases and evidence of basal ganglia autoimmunity. *Brain*. 2004 Jan 1;127(1):21-33. <https://doi.org/10.1093/brain/awh008>
15. von Economo CF, Koskinas GN. Atlas of cytoarchitectonics of the adult human cerebral cortex. 1st ed. Basel: Karger; 2008. 182p.
16. Triarhou LC. The Economo-Koskinas atlas revisited: cytoarchitectonics and functional context. *Stereotact Funct Neurosurg*. 2007 Aug;85(5):195-203. <https://doi.org/10.1159/000103258>
17. Allman JM, Tetreault NA, Hakeem AY, Manaye KF, Semendeferi K, Erwin JM, et al. The von Economo neurons in the fronto-insular and anterior cingulate cortex. *Ann N Y Acad Sci*. 2011 Apr 28;1225(1):59-71. <https://doi.org/10.1111/j.1749-6632.2011.06011.x>
18. Lavie P. The sleep theory of Constantin von Economo. *J Sleep Res*. 1993 Sep;2(3):175-8. <https://doi.org/10.1111/j.1365-2869.1993.tb00083.x>
19. Ransmayr G. Constantin von Economo's contribution to the understanding of movement disorders. *Mov Disord*. 2007 Mar 27;22(4):469-75. <https://doi.org/10.1002/mds.21352>
20. Thriarhou LC. Constantin von Economo's last publication: a commentary on Charles Fraipont's "Évolution cérébrale". *Acta Med Hist Adriat*. 2016 Dec;14(2):387-92.