

# Economo, Constantin von

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**Abstract** Constantin von Economo left marks of brilliance in neuroanatomy, neuropathology, and clinical neurology. He discovered encephalitis lethargica (“von Economo’s encephalitis”), suggested the existence of brain centers for sleep regulation, and co-authored, with Georg N. Koskinas, the *Cytoarchitectonics of the Adult Human Cerebral Cortex* (1925), defining 107 cortical areas.

**Keywords** Brain evolution; Cortical cytoarchitecture; Economo-Koskinas areas; Encephalitis lethargica; Postencephalitic Parkinsonism; Progressive cerebation; Sleep regulation; von Economo’s encephalitis; von Economo neurons.

**Persons** Julius Wagner-Jauregg; Alfred Fuchs; Georg N. Koskinas; Theodor Meynert; Korbinian Brodmann; Caroline von Schönburg-Hartenstein

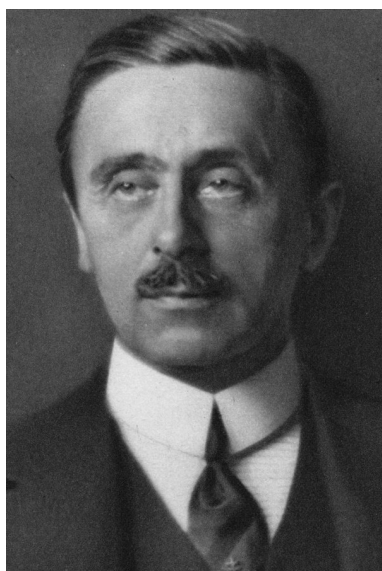


Figure 1. Constantin von Economo (1876–1931)

**CONSTANTIN VON ECONOMO** (1876–1931) had two distinguished careers, one as a neuroscientist and the other as a pioneer aviator.

## Career

Economo was born in Brăila, Romania, the fifth of seven children of Johannes Economo (1834–1921) and Elena Economo (née Muraty, 1848–1923). In 1877, at the time of the Russo-Turkish War in the Black Sea, the family moved to Trieste (then part of Austro-Hungary). Constantin, a prodigious child already able to read at the age of 3, grew up in a multicultural setting. At 17 Economo enrolled in the Vienna Polytechnic to study engineering; two years later he transferred to Vienna University, graduating in medicine in

1901. After an internship, he trained in psychiatry and neurology for three years in Paris, Munich and Berlin.

While in Paris, Economo became interested in aeronautics, initially flying balloons, and then airplanes. He was licensed as an aeronaut in 1906, only three years after the historic flight of the Wright brothers. In 1910 he became Austria’s Pilot no. 7 and served as President of the Aero-Club for 16 years.

In 1906 Economo became Assistant in Psychiatry and Neurology at the Clinic of Julius Wagner-Jauregg (1857–1940) in Vienna. He was subsequently promoted to Lecturer in 1913 and Professor Extraordinarius in 1921. By 1920 he had published papers on posthemiplegic chorea, Wilson’s disease, optic neuritis, progressive paresis, and the heritability of mental traits.

During World War I, Economo served as a volunteer on the Carpathian and Tyrol fronts. In 1916 he was summoned back to Vienna to attend to patients in the Division for the Wounded headed by Alfred Fuchs (1870–1927).

Economo kept a lifelong interest in international neurology and promoted neurosurgery as an independent specialty. In 1931 he inaugurated an Institute for Brain Research, sponsored by the Austrian Ministry of Education.

Economo was married to Princess Caroline von Schönburg-Hartenstein (1892–1986). As a nobleman of independent means, he never accepted remuneration from patients or the University for his services, and in addition he subsidized the cost of his research and publications with personal funds.

## Encephalitis lethargica

In 1917, Economo described a new disease, epidemic “encephalitis lethargica,” in a presentation to the Viennese Society for Psychiatry and Neurology. He carefully and accurately documented its pathology and clinical spectrum — including somnolent-ophthalmoplegic, hyperkinetic, and amyostatic-akinetic forms — in two books. In consequence, this condition was eponymously recognized as “von Economo’s encephalitis.”

Economo’s insight was to recognize stupor as a common denominator, across cases with diverse clinical presentations. He applied the clinical-pathological method of the French school, recording neurological signs during the patient’s life, and correlating them with tissue alterations observed postmortem.

Encephalitis lethargica occurred worldwide in 1915–1927 and was a major cause of postencephalitic Parkinsonism. Economo distinguished encephalitis lethargica from hemorrhagic encephalitis, the Spanish flu, and other epidemic encephalitides. The frequently associated sleep disturbances (i.e., both insomnia and somnolence) led him to surmise the existence of a “sleep-regulatory center” near the oculomotor nucleus, a prediction that was experimentally confirmed in the 1990s.

For discovering encephalitis lethargica, he was nominated for the Nobel Prize in Physiology or Medicine.

### Cytoarchitectonics

In 1925 Economo and Georg N. Koskinas (1885–1975) published their monumental *Atlas of Cytoarchitectonics*, which detailed variations in the cellular structure (cytoarchitecture) of cerebral cortical layers, following in the footsteps of Theodor Meynert (1833–1892) and Korbinian Brodmann (1868–1918). By dissecting each gyrus perpendicularly to its surface, Economo and Koskinas practically solved the problem of flattening out the convex polyhedral surface of the cerebral mantle. They defined five structural cortical types (agranular, frontal, parietal, polar, and granulous) and 107 cytoarchitectonic modifications (35 frontal, 13 limbic, 6 insular, 18 parietal, 7 occipital, 14 temporal, and 14 hippocampal), and introduced the term “koniocortex” to denote the dusty appearance of sensory areas. At the boundaries of koniocortex with ordinary isocortex, they identified thin bands with giant pyramidal cells (“parasensory zones”).

Economo and Koskinas also provided the first comprehensive description of distinct rod and corkscrew cells in cingulate and frontoinsular areas. These cells (“von Economo neurons”) are also seen in apes, cetacea, and elephants, and may be involved in social behavior and the pathophysiology of neurodevelopmental and mental disorders.

### Further Reading

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### Cross References

Brodmann, Korbinian; Influenza Virus; Myoclonus; Parkinson's Disease; Parkinsonism; Sleep Medicine, History of; Tic Disorders.

### Relevant webpages

IBRO History of Neuroscience Series:

[http://www.ibro.org/Pub/Pub\\_Main\\_Display.asp?LC\\_Docs\\_ID=2767](http://www.ibro.org/Pub/Pub_Main_Display.asp?LC_Docs_ID=2767)

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