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Stjepan Poljak (1889–1955)



Stephen Lucian Polyak in a 1939 photo taken by Friedrich Wassermann [10]

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Stjepan Poljak was born on December 13, 1889, in Gjurgjevac, Croatia (at the time part of the Austro-Hungarian Empire). He attended the classical Gymnasium (secondary school) in Zagreb and began medical studies in 1909 at Graz University, Austria (anatomy instruction by Moritz Holl), interrupted by a six-month military duty in Budapest in 1912 and by World War I [2, 9].

While at the Russian front with the Austro-Hungarian Medical Corps, he was captured in 1914 and employed in a Russian military hospital in Fastov and a field hospital in Vasilevska. He left Russia in 1917 through Arkhangelsk by ship, sailing from the White Sea around Norway to Scotland; he continued through England and France to Thessaloniki, Greece, where he joined the Serbian armed forces in 1918 [2].

Poljak obtained medical degrees from Odessa New Russia University (1916) and Zagreb University (1920). He began research on the nervous system as an assistant in neurology and psychiatry at Zagreb's Agram Neurological Clinic (1920–1928). From there he travelled extensively. He visited the Neurological Institute headed by Otto Marburg in Vienna (1921), and subsequently worked in London with Sir Grafton Elliot Smith, an early protagonist of cortical cytoar-

chitectonics, (1924–1925), in Madrid with Santiago Ramón y Cajal (1925), and in Chicago with the neurologist C. Judson Herrick and the neuropsychologist Karl S. Lashley (1926–1927).

In 1928 he permanently moved to the United States. He became Assistant Professor of Neuroanatomy at the University of California (1929–1930), and then moved to the University of Chicago, as Assistant and later Associate Professor of Neurology (1930–1937), finally as Associate and later full Professor of Anatomy (1937–1955). The spelling of his name was changed to Poliak [3] and then Polyak [7, 10].

Poljak conducted Golgi studies of the human spinal cord [4], the central and autonomic nervous system of Chiroptera (European noctule), the cochleo-vestibular end organs, and the structure and connections of the cat visual cortex [5]. He served on the editorial board of the *Journal of Comparative Neurology* (1937–1948), where he had contributed 'An experimental study of the association, callosal, and projection fibers of the cerebral cortex of the cat' (1927) and 'A contribution to the cerebral representation of the retina' (1933).

Poljak's recognition mainly rests on his research on auditory and visual pathways. He published 'The connections of the acoustic nerve' and 'Association fibres of the cere-

bral cortex' in the Journal of Anatomy (1926), and an extensive study of the structure of the auditory system and its physiological and behavioural implications [6]. 'The cerebral representation of the retina in the chimpanzee' (with Rei Hayashi) appeared in Brain (1936), and a critical review on 'Retinal structure and colour vision' in Documenta Ophthalmologica (1949). In a 1953 tribute, he likened the influence of his mentor Cajal in neurobiology to that of Vesalius in anatomy and Newton in physics, and underlined the lasting impact of Cajal's view on the fusion of binocular vision [9].

Poljak laid down three decades of work in a trilogy of landmark monographs. The first deals with the afferent projections of the monkey cortex [3]; in ablation experiments, he demonstrated that the wide extent of somatic sensory cortex includes the precentral 'motor' region, and underlined the integrative role of the thalamocortical projections. The second is an exhaustive, classic study of the primate retina with 100 figure plates and a 130-page bibliography [7], published on the semicentennial anniversary of the University of Chicago. The third, a tour-de-force of scholarship on the vertebrate visual system, was published posthumously, with 546 figures and a 300-page bibliography [10].

Poljak's discoveries helped our

understanding of retinal connectivity, amacrine and bipolar cells in particular, and the mono- and polysynaptic organization of rod and cone pathways [1]. He contributed the nervous tissue and the eye chapter to Maximow and Bloom's 1938 *Textbook of Histology* [8], and the entry on the anatomy of the human eye to the *Encyclopaedia Britannica* (1955).

With Gladys McHugh, a pupil of the anatomist and illustrator Max Brödel, Poljak produced two teaching aids, 'The human eye in anatomical transparencies' (1943, with Peter Kronfeld) and 'The human ear in anatomical transparencies' (1946, with Delbert Judd), exposing serial sections of the eye and ear in a three-dimensional fashion.

The neuropsychologist Heinrich Klüver praised Poljak's honesty, humility and scientific integrity [2]. The physiologist Ragnar Granit, whom Poljak had nominated for the Nobel Prize in Medicine in 1946, eventually sharing it with Haldan Hartline and George Wald in 1967 for the elucidation of visual processes, considered Poljak one of the great neuroanatomists of our time, a lone worker who devoted his life to the grand theme of human vision [1].

Poljak came to suffer from a gradual deterioration of extramacular vision and died in Chicago on March 9, 1955, from a chronic heart ailment. During his last months,

he amassed his experiences and thoughts in 'Glory to them all: recollections of a nobody' [2], a 2000-page manuscript.

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