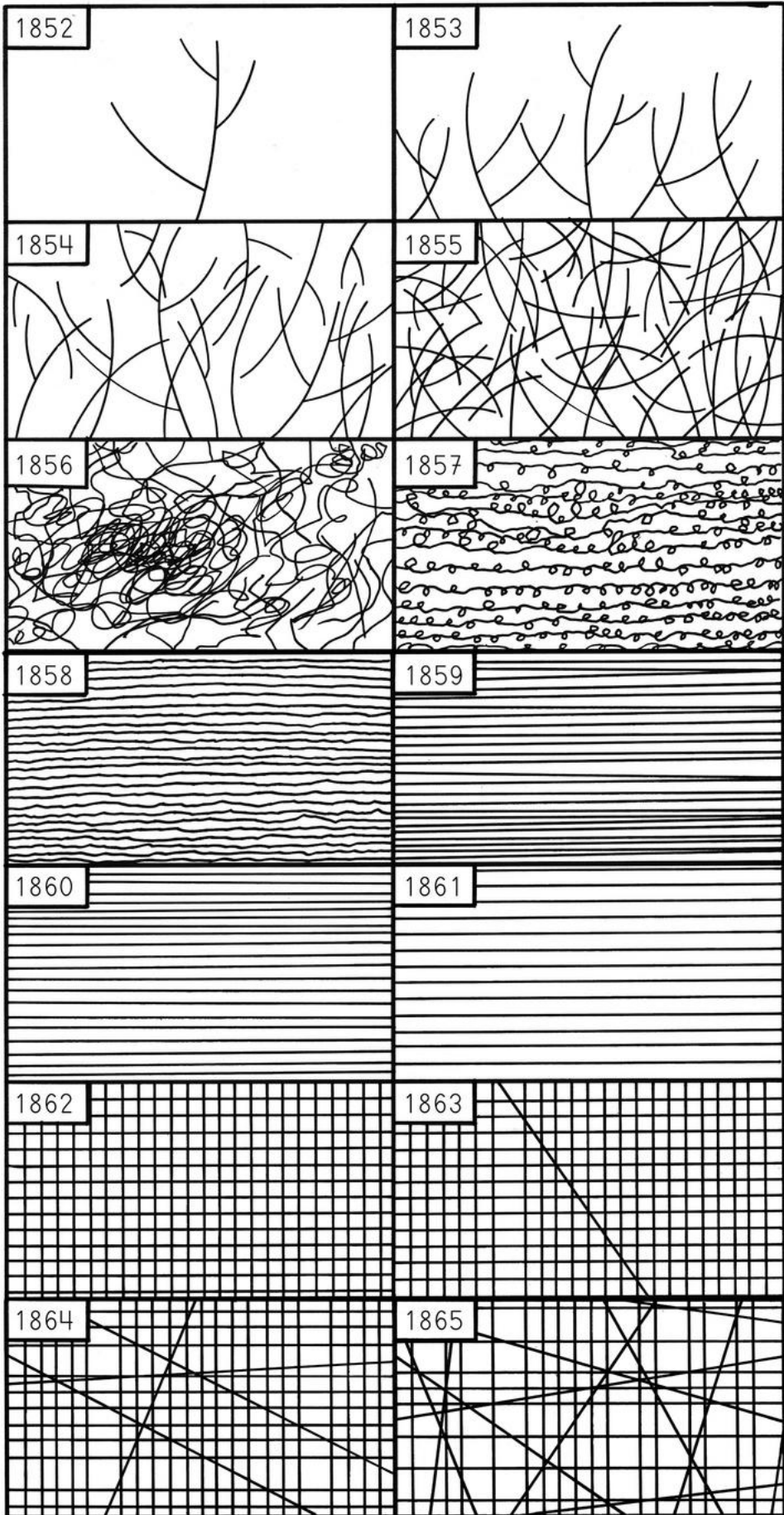


# SANTIAGO RAMÓN Y CAJAL

By Brais Rodríguez





# 1852 - 1865

1852 - Santiago Ramón y Cajal was born in 1852 in Petilla de Aragón, Spain.

1853 - His childhood took place in a rural environment, in contact with nature.

1854 - From a very young age he showed great interest in natural phenomena.

1855 - This innate curiosity and love of nature will determine his future work as a scientist.

1856 - Through drawing he expresses his interest in nature. This artistic vocation will accompany him for the rest of his life.

1857 - Although his family is humble, his parents give him a solid education.

1858 - Justo Ramón, his father, will be a determining figure in his life. Coming from a poor family and illiterate until the age of 16, he devoted himself to medical studies until he obtained a doctorate at the University of Madrid.

1859 - Justo, aware of his son's talent, will insist on Santiago's future medical career.

1860 - In his first years as a student, Ramón y Cajal stands out for his lucid thinking and intelligent character.

1861 - His academic problems were numerous, leading him to confront his professors.

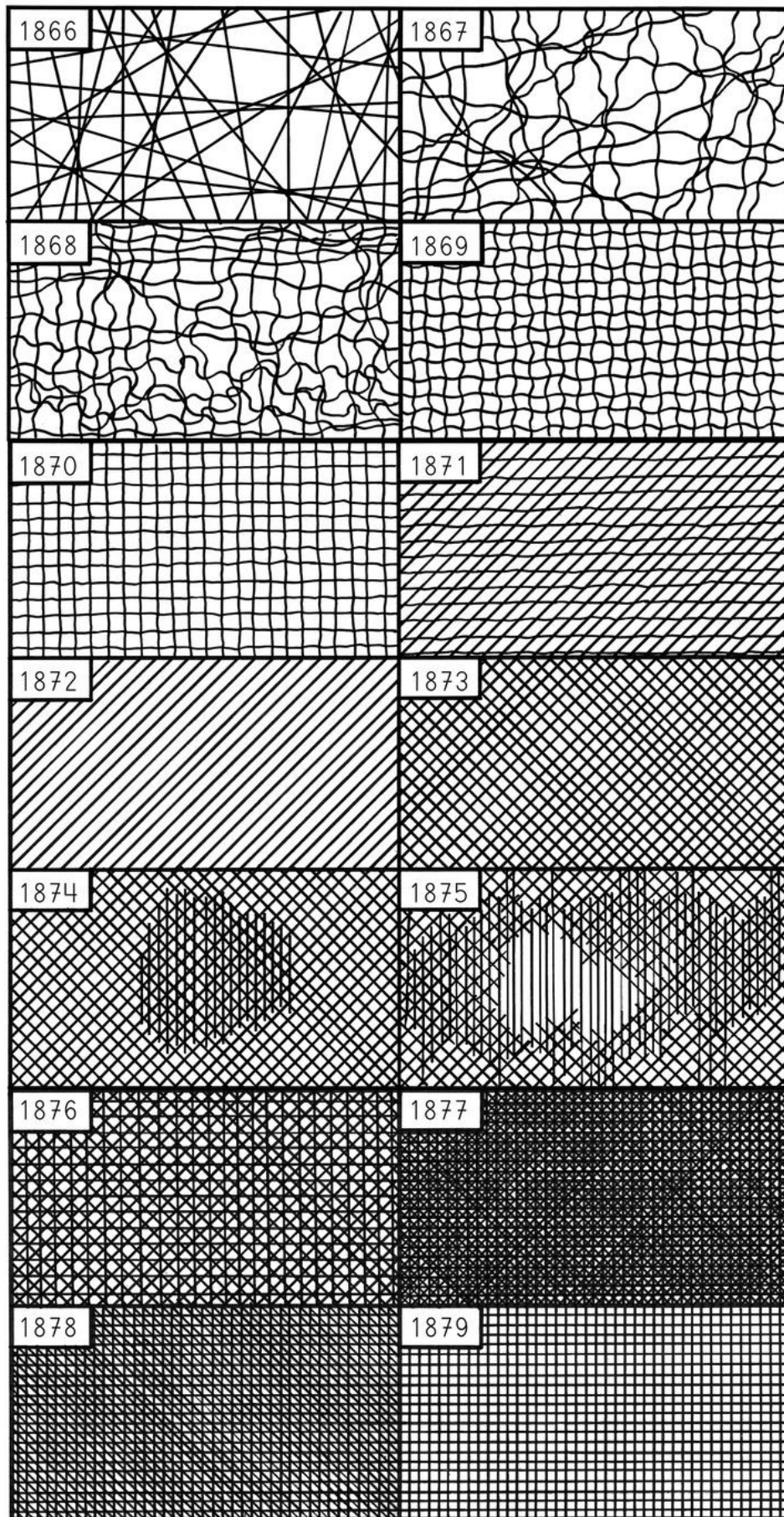
1862 - His artistic vocation coexists in his youth with the paternal requirement to develop scientific studies.

1863 - Ramón y Cajal draws in secret, away from his father, and refuses to study.

1864 - This tension will continue during his youth, forging his willful character.

1865 - The excessive use of memory and the discipline of his teachers produce a lack of academic motivation in Ramón y Cajal.





# 1866 - 1879

1866 - After another academic failure, his father decides that Santiago will work as a shoemaker for a year, putting on soles and sewing booties.

1867 - He reaches an agreement with his father - he will allow him to enroll in drawing lessons if he focuses on his studies.

1868 - After accompanying his father to the anatomical dissection room and being able to draw the parts of the human body, Justo managed to awaken his son's interest in Medicine.

1869 - He will study Medicine at the University of Zaragoza, where he begins to develop his interest in histology and anatomy.

1870 - He progressively devotes his efforts to the studies of Medicine.

1871 - He discovers photography, and becomes fascinated by this medium. He writes "History of Photography", a work unpublished until 1983.

1872 - During his student years, he starts being concerned about his physical appearance, going so far as to skip muscle physiology classes in order to attend a gym several times a week.

1873 - He graduates in Medicine.

1874 - After enlisting in the army as a doctor, he leaves for Cuba, where he will defend his country in the War of Independence of this Spanish colony.

1875 - In Cuba he contracts malaria, and returns to Spain. This disease will cause him health problems in the following years.

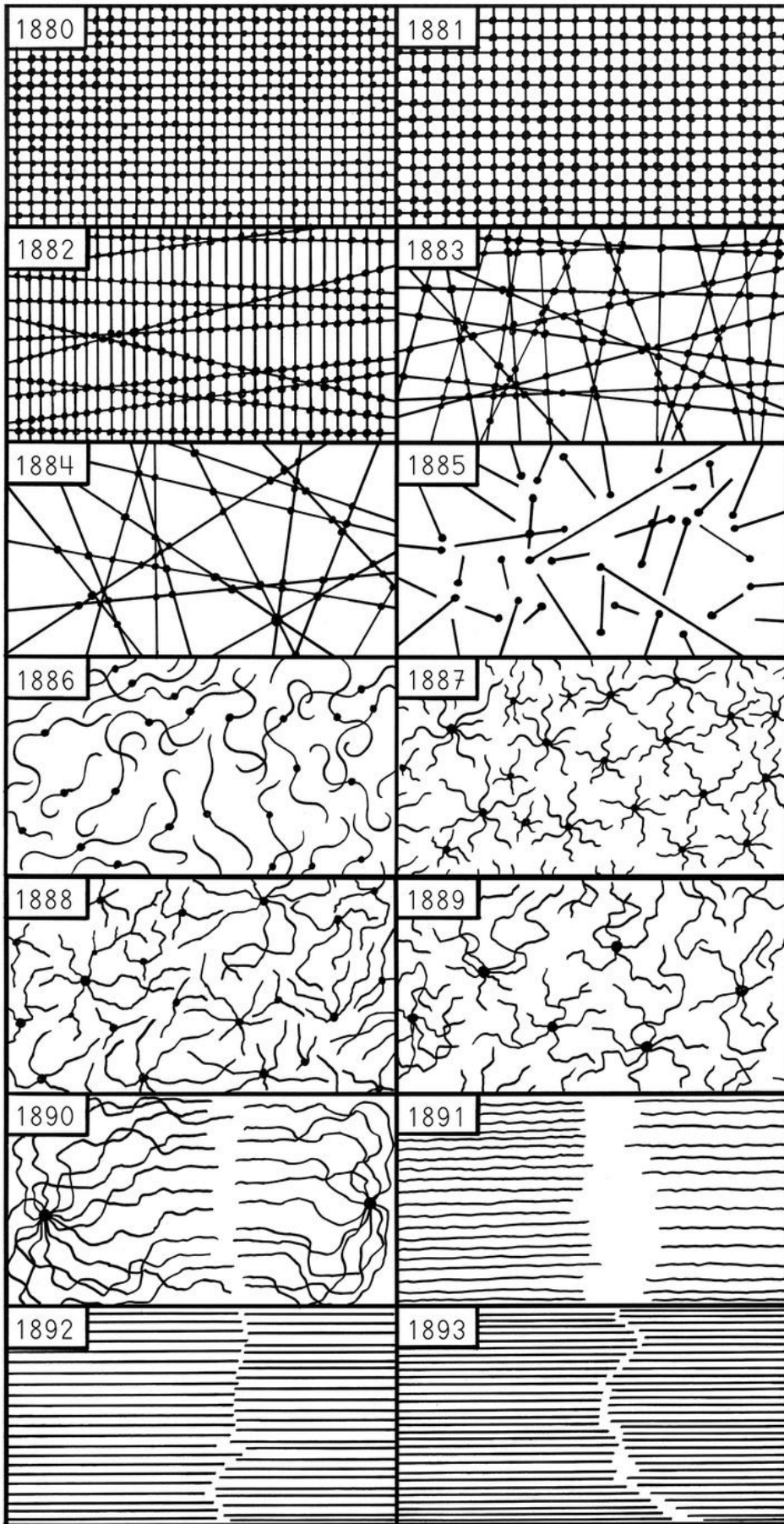
1876 - He began his career as a teacher and acquired his first microscope.

1877 - He obtained a doctorate from the University of Madrid with the thesis Pathogenesis of inflammation.

1878 - Ramón y Cajal's health worsens as he suffers from tuberculosis.

1879 - He marries Silveria Fañanás, with whom he will have seven children and share the rest of his life.





# 1880 - 1893

1880 - He continues to develop his interest in photography. He manages to reduce a photographic self-portrait to the size of a pinhead, thus being a pioneer of the first microfilm.

1881 - During these years, he also spends time writing science fiction stories. In his story "Life in the Year 6,000" he predicts a dystopian future.

1882 - He is appointed Chair for Descriptive Anatomy at the Faculty of Valencia.

1883 - He publishes a series of articles in the weekly magazine La Clínica, called The Wonders of Histology under the pseudonym Dr. Bacteria.

1884 - Cholera epidemic in Valencia. Ramón y Cajal studies the behavior of the disease from his laboratory.

1885 - The Zaragoza council provides him with a Zeiss microscope.

1886 - Under the pseudonym Dr. Bacteria, he writes the work "Vacation Stories. Pseudoscientific narratives", a set of pedagogical and informative stories.

1887 - He visits Dr. Luis Simarro, who shows him samples of nervous tissue processed with *razione nera*. This staining allowed these tissues to be observed with enormous clarity under the microscope.

1888 - He observes the presence of small spines in the dendritic spines of a group of neurons, which would allow the connection surface between neurons.

1889 - He attends the Congress of the German Anatomical Society to present his research work. His neural theory is received with success and achieves international relevance.

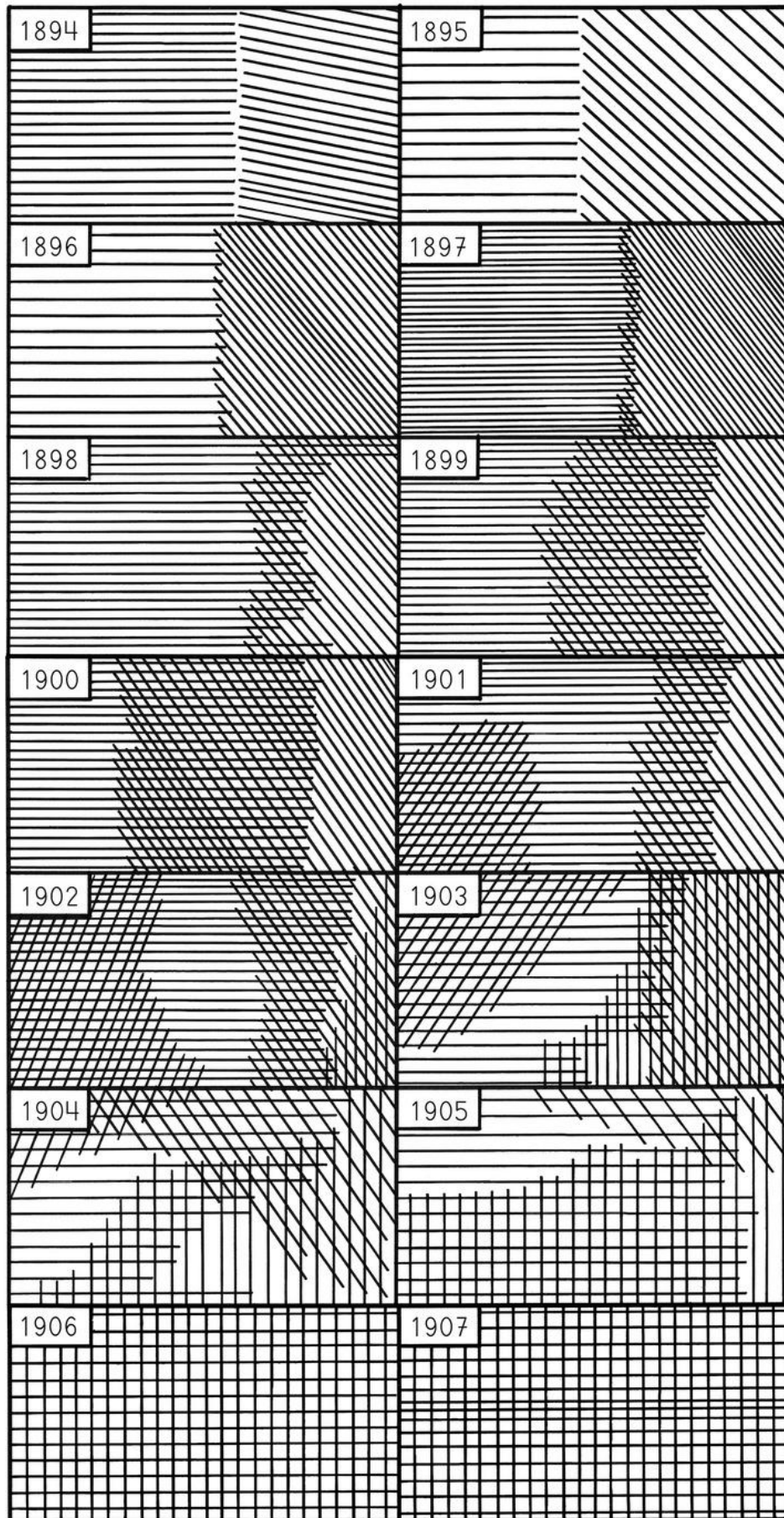
1890 - He publishes "Manual of Normal Histology and Micrographic Technique", a fundamental text in the branch of Histology.

1891 - Waldeyer, after learning about the work of Ramón y Cajal, coins the term "neural unit", which described the neuron as an independent unit.

1892 - He achieves the Chair for Histology at the University of Madrid.

1893 - He continues to disseminate his research through publications around the world and various trips and conferences.







# 1894 - 1907

1894 - His research on the morphology and functioning of neurons, as well as on the processes of nerve degeneration and regeneration, begins to be more accepted.

1895 - Even so, the model of the reticular structure of the nervous system maintained many followers.

1896 - This reticular theory proposes a physical space in which neurons are not separated from each other.

1897 - The neural theory presented by Ramón y Cajal demonstrated a physical space that separates the end of one neuron and the beginning of the next.

1898 - The entire area that encompasses the end of the axon of a neuron is known as a synapse.

1899 - The synapse is where the jump of information from one neuron to another occurs through the release of neurotransmitters.

1900 - This approach gave the field of Histology and Neurology a greater understanding of the function of the nervous system.

1901 - Neural theory also allows us to understand neural plasticity, the brain's ability to adapt to stimuli and experiences, allowing for dynamic learning and memory.

1902 - Ramón y Cajal continues researching and publishing articles on photography, formulating color reproduction, its scientific application or the morphology of emulsions.

1903 - Justo Ramón, his father, dies.

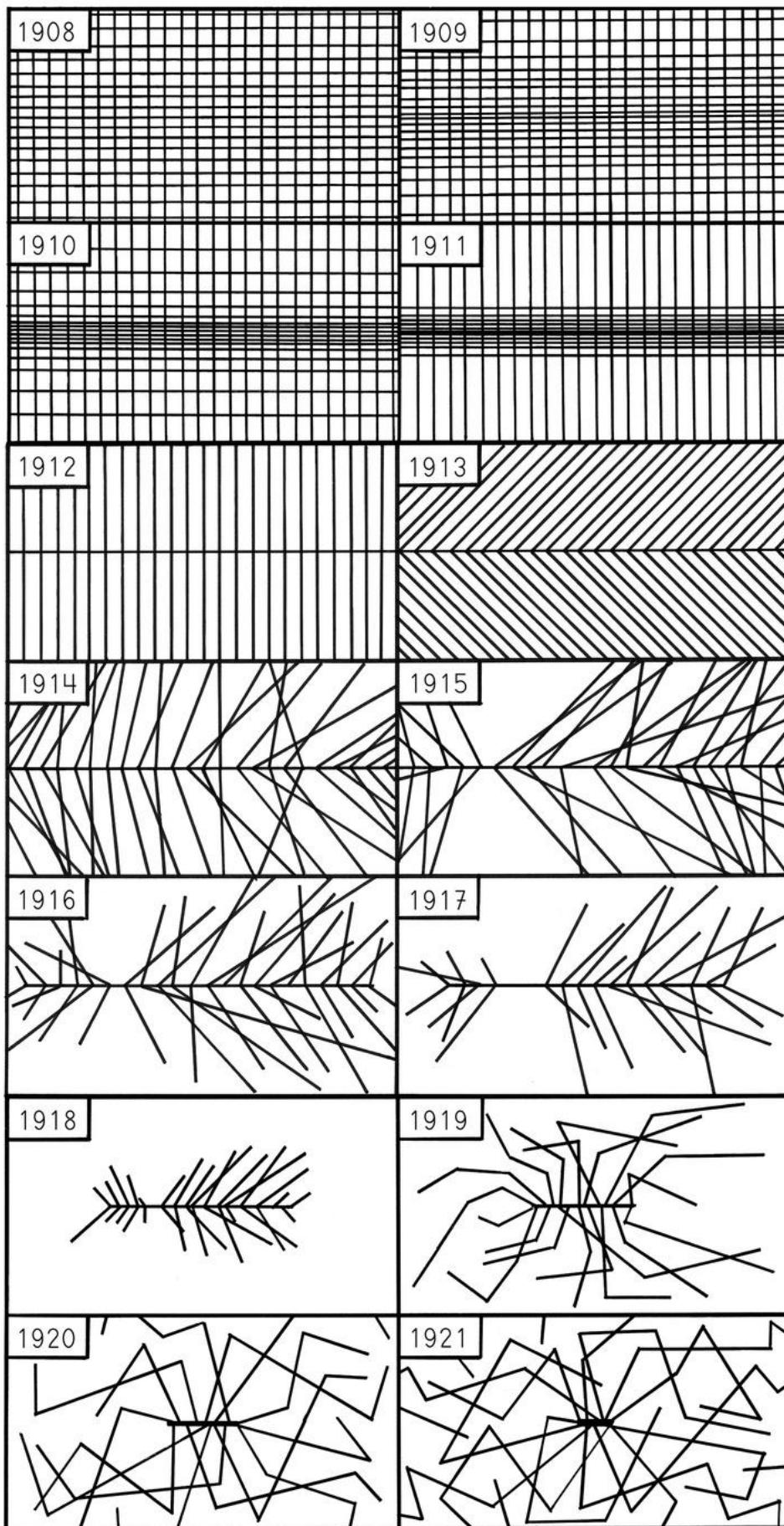
1904 - He publishes "Texture of the nervous system of man and vertebrates", his most important work.

1905 - He receives the Helmholtz gold medal, in recognition of his scientific discoveries.

1906 - Ramón y Cajal is awarded the Nobel Prize in Medicine, along with Camillo Golgi.

1907 - He presides over the newly created Board for the Expansion of Scientific Studies and Research, an institution created to promote research, from which the current CSIC was created.





# 1908 - 1921

1908 - Ramón y Cajal illustrated his discoveries through numerous drawings.

1909 - The purpose of his research was to demonstrate that the Reticular Theory was erroneous.

1910 - The great difficulty was a problem of representation. The visibility of the tissues under the microscope, even using dyes, was not clear, resulting in tangles of numerous cells where it was impossible to independently discern each cell.

1911 - Although there were some advances, microphotography had not been sufficiently developed.

1912 - The rigorous representation of the morphology of nerve cells was essential to address the hypothesis of the Neuronal Theory.

1913 - Drawing becomes the visual tool that Ramón y Cajal uses to represent the shape and complexity of neurons.

1914 - This is a method of direct observation of tissue under the microscope and the representation of the formal structure of neurons through drawing.

1915 - Drawing allows us to discern and clarify morphological descriptions, accompanied by explanatory diagrams.

1916 - The complex texture of a region of the nervous system is thus shown, in a synthetic way.

1917 - Ramón y Cajal combines his artistic talent with the interpretation of microscopic images.

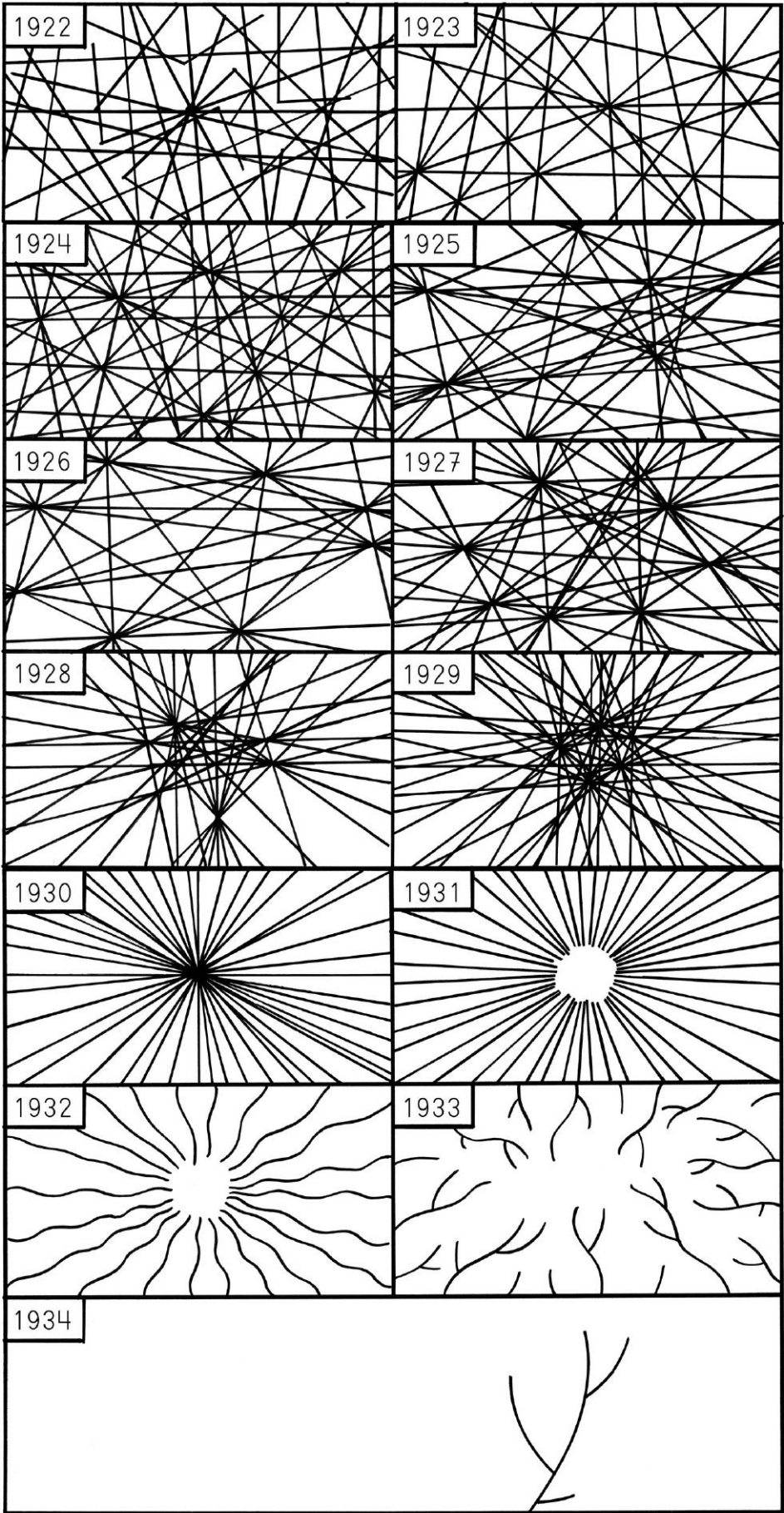
1918 - These drawings reveal the identity of the neuron, the simplest unit of the structure of the nervous system.

1919 - The first step consists of analyzing the typologies and components of this cellular unit, assessing its complexity.

1920 - Each neuron understands a function and establishes links with other neurons, which requires a study of the unit and the whole.

1921 - This basic arboreal structure of the neuron develops through junctions and synapses, resulting in a plastic and rhizomatic organization.





# 1922 - 1934

1922 - The study of neuronal plasticity includes learning, adaptation, illnesses or diseases.

1923 - In the overwhelming and impassable landscape of nervous morphology, the consideration of the neuronal unit allows us to discern *the tree to understand the forest*.

1924 - Ramón y Cajal's contribution has turned out to be fundamental for the understanding and representation of the study of the brain.

1925 - His work within the scientific community extends to the role of researcher, teacher, popularizer, writer, and politician.

1926 - Already retired, Ramón y Cajal does not stop his research work and maintains contact with his students and disciples.

1927 - Multiple tributes and recognitions highlight the importance of his work.

1928 - His contribution to the field of Medicine is comparable to that of scientists such as Darwin, Pasteur or Einstein in their respective branches of research.

1929 - Although his health begins to deteriorate he continues working on reissues of his writings.

1930 - Silvana dies.

1931 - Despite the hard blow of the death of his partner, he continues working on his writings and publications.

1932 - The Cajal Institute of Madrid is inaugurated and he is named Honorary President of the Spanish Society of Natural History.

1933 - He writes his memoirs "The world seen at 80 years old", an autobiographical and lucid text in which he reviews the fundamental events of his life.

1934 - He passed away on October 17 in Madrid.

