

A Deep Dive Into the Brain, Hand-Drawn by the Father of Neuroscience

The breakthrough drawings of Santiago Ramón y Cajal are undeniable as art.

By ROBERTA SMITH JAN. 18, 2018

It's not often that you look at an exhibition with the help of the very apparatus that is its subject. But so it is with "The Beautiful Brain: The Drawings of Santiago Ramón y Cajal" at the Grey Art Gallery at New York University, one of the most unusual, ravishing exhibitions of the season.

It presents 80 small notebook renderings in shifting combinations of ink and pencil by the Spanish neuroanatomist Santiago Ramón y Cajal (1852-1934) that are considered among the world's greatest scientific illustrations. Together they describe a fantastic netherworld of floating forms, linear networks, bristling nodes and torrential energies. They posit the thing between your ears as an immense cosmic universe, or at least one of the most intricate of all of nature's creations. That the images are also undeniable as art only adds to the complexity of the experience.

Cajal is considered the father of modern neuroscience, as important in his field as Charles Darwin or Louis Pasteur are in theirs (though relatively unknown outside of it). His discoveries, made during the last dozen years of the 19th-century, concern the way neurons, the building blocks of the brain, spinal column and nervous system, communicate with one another. His theory — immediately accepted by most,

3

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Through a chemical and electrical transmission, the single-stemmed axon of one neuron talks to the branched root-like dendrite of another.

This process of synaptic messaging between unconnected cells came to be called the Neuron Doctrine, and in 1906, it earned Cajal the Nobel Prize in Physiology or Medicine. He shared it with the Italian histologist Camillo Golgi, who had devised a new method of staining tissue that singled out individual cells under the microscope instead of presenting tangled illegible masses. An irony of the joint prize (for revealing the structure of the nervous system) is that Golgi remained unconvinced by the Neuron Doctrine and true to reticular theory, which saw neurons as physically connected.

In his research, Cajal's two tools were the most powerful microscope he could find and one of the oldest art techniques known to mankind: drawing, for which he had great talent. Looking through the lens he saw with such acuity and drew so precisely (freehand) that some of his renderings still appear in text books. And yet he also drew with such delicacy and vivacity that his drawings stand on their own as wonders of graphic expression, both mysterious and familiar.

The drawings are at once fairly hard-nosed fact if you know your science. If you don't they are deep pools of suggestive motifs into which the imagination can dive. Their lines, forms and various textures of stippling, dashes and faint pencil circles would be the envy of any modern artist. That they connect with Surrealist drawing, biomorphic abstraction and exquisite doodling is only the half of it.

These small works evoke enough things you already know — landscape, weather systems, trees, marine life — that they bring you back around to reality, implying the multiple purposes if not universality of certain natural structures. Root systems, functioning in different ways, are found in trees, turnips and the pyramidal neuron, which Cajal called “the noble and enigmatic cell of thought.”

Born in Navarra, the son of a doctor, Cajal was a rebellious artistic child, with an innate distrust of authority and an obsessive-compulsive proclivity. At 8, according to the catalog, he drew everything around him and then set out to collect everything pertaining to birds. He taught himself photography, making carefully posed self-portraits throughout his life. And he trained as an artist, but his father cajoled him

toward by enlisting him to make anatomical drawings as teaching aids. The son then went to medical school and eventually found his calling in researching the extremely refined, nearly invisible workings of the brain. It was an exciting area of study at that time and it perfectly fused his various interests and talents.

This show, the first exhibition of Cajal's drawings in this country, originated at the University of Minnesota and continues in May to the MIT Museum in Cambridge, Mass. It was selected from the 2,900 or so drawings that Ramón y Cajal made in his lifetime; all come from the Cajal Institute in Madrid, which organized the show with the university's Weisman Art Museum and three neuroscientists on its faculty — Eric A. Newman, Janet M. Dubinsky and Alfonso Araque. The catalog is an absolute treasure, jargon-free, with excellent reproductions and an illuminating biographical essay by Larry W. Swanson, a neurobiologist and author of "Brain Architecture" (2002). The outliers of the group are Lyndel King, director and chief curator of the Weisman and Eric Himmel, editor in chief at Abrams Books (the catalog's publisher), who contribute a riveting essay detailing Cajal's artistic sensibility and working processes.

The drawings will elicit stupefied awe from art enthusiasts, who use their brains without knowing how they work, and excited chatter from visiting neuroscience types. . I asked one loquacious, evidently knowledgeable viewer if "gray matter" was a colloquialism or a term of science. I learned that it's a term of science that became a colloquialism: the brain has gray matter, which contains cells, and also white matter, which is fibrous.

The 80 drawings here were made between 1890 and 1933, and are divided into four sections. "Cells of the Brain" presents some of the basics, beginning with pyramidal neurons, and including the pericellular nests that surround them like pointy hats, or Eva Hesse sculpture, and proceeding to the coral-like Purkinje neurons (from the human and pigeon cerebellum).

In "Sensory Systems," you'll find several of the show's masterpieces: "Cells in the retina of the eye," a vertical stack of textures and intersecting lines and shapes, suggests a wall hanging by a very ambitious fiber artist of the 1950s. Drawings for the retina of the lizard and sparrow evoke espaliered trees. Blue ink added to the

peninsular forms of “The labyrinth of the inner ear,” renders them solid. And the Wagnerian “Ending of the vestibular nerve” is swept with diagonal streams of lines and rising neurons.

“Development and Pathology” is rife with strange aberrant forms and a sense of agitated circuitry; also several outstanding drawings in a purely visual sense. Cajal samples the brain cells of a drowned man and one suffering from paralysis and in “Tumor cells of the covering membranes of the brain,” he achieves tangled skeins that conjure William Blake and Louise Bourgeois. Things quiet down in “Neuronal Pathways,” which I recommend for the strange little landscape that is “Connections within the hippocampus.”

“Seeing the Beautiful Brain Today,” a section on contemporary renderings usually in jolting bright colors, presents animations as well as detailed microscopic photographs that are juxtaposed with reproductions of Cajal drawings of the same subject. Nothing here compares to Cajal artistically, but the animations have their own kind of wonder and should not be missed.

The Beautiful Brain

Through March 31 at the Grey Art Gallery, New York University, Manhattan; 212-998-6780, greyartgallery.nyu.edu.

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