

## Obituary.

PROF. CAMILLO GOLGI.

PROF. CAMILLO GOLGI, member of the Italian Senate for a number of years, Nobel Prizeman in 1906, died on January 21. Though almost eighty-four years of age, he had preserved until a short time ago the astonishing lucidity of his marvellous mind, and when I saw him last in January 1924 he was still taking part in the public life of his country and scientific activities of the University of Pavia, where he had obtained his medical degree in 1865 and had become extraordinary professor of histology in 1875. Towards the end of that year he went as professor of anatomy to the University of Siena to return a few months afterwards to Pavia, where he occupied the chair of general pathology and histology until 1918, the year of his retirement from active teaching.

Son of a distinguished medical practitioner and for some time a pupil of Mantegazza, Bizzozzero and Lombroso, Golgi spent the first years of his career in the Home for Incurables of Abbiategrasso in the Province of Milan, where he went as chief resident physician. Abbiategrasso was in those days a village remote from any centre of scientific activity, and one can easily imagine how inadequate must have been the means of investigation with which young Golgi had to content himself. It was, however, in Abbiategrasso that he wrote his early papers on the history of pellagra, the etiology of mental alienations, the structure and development of Psammomata, the changes of the lymph-vessels of the brain and the structure of the neuroglia, which even now can be consulted with profit. But it was in that Hospital that he discovered his chromate of silver method by means of which nerve cells, with all their processes and the finest ramifications of the latter, can be seen singled out and intensely stained black against a transparent yellowish background. At a time when histological technique was in its infancy, and the structure of the central nervous system looked like an impenetrable mystery, Golgi's discovery revealed the existence of an unforeseen world. A first hint of the new method was given in his paper on the grey substance of the brain (1873). However, the so-called slow process was fully described only in 1875, and the bichromate and mercury chloride method in 1878. The rapid process was first published in his paper on the structure of medullated nerve-fibres (1880). All of them and the mixed process were again minutely described in the last chapter of his monumental work "Sulla fina anatomia degli organi centrali del sistema nervoso," published between 1882 and 1885.

By means of Golgi's methods the microscopic anatomy and physiology of the central nervous system were placed on the sound foundation on which they at present rest. He had since 1873 observed the long- and short-axoned nerve cells with which now every medical and science student is familiar, and the collaterals arising from the axon of the cells of the I type. Already in 1874 he had described the large nerve cells of the granule layer of the cortex cerebelli which bear his name, and pointed out that the "granules" are in fact minute nerve cells. In 1875 he had been able to give a first description of the structure of the olfactory bulb, and to show that both the olfactory fibres and

the protoplasmic processes of the mitral cells arborise within the olfactory glomeruli. But it was only in his main work that he set forth definitely the results of his fundamental studies on the morphology and relations of nerve cells, the central origin of nerves, the architecture of some cerebral convolutions, the structure of the cortex cerebelli and hippocampal region, with the addition of fresh observations on the morphology, connexions with blood-vessels and histogenesis of neuroglia cells.

Golgi's description of the diffuse network (*rete nervosa diffusa*) was the anatomical corollary of these investigations and of those on the structure of the spinal cord (1880 and 1890). As he observed in various papers and again in his lecture at Stockholm, his diffuse network consists essentially of the collaterals of the axis-cylinder of the long-axoned cells, the complicated arborisations of the axis-cylinder of the short-axoned cells, and the collaterals and arborisations of the axis-cylinder of the motor and sensory nerve-fibres which reach any given region of the nervous system from others. He always considered the diffuse network, not as a working hypothesis, but as a well-defined anatomical entity linking together the different parts and functions of the nervous system. He was, however, extremely keen on pointing out that it is immaterial whether the thin filaments composing the network actually anastomose with one another or are simply superimposed to form thick interlacements. In other words, the continuity of the innumerable and non-insulated nerve-fibres which permeate the grey substance was in no way necessary to his conception of the united action of whole groups or layers of nerve cells or even entire regions of the central nervous system. For these reasons he persistently refuted the neurone theory, though based on the results of his methods, and could never agree to the individual action of nerve cells postulated by this doctrine.

Mention can only be made of other discoveries, such as the sensory end-organs of tendons (1880), the exact course of uriniferous tubules (1889), and the secretory canaliculi of the oxyntic cells of the gastric glands which Golgi succeeded in impregnating at the same time as Erik Müllar (1893). The pericellular investment and the internal apparatus of nerve cells were described in the same paper in 1898 and the neurofibrils of the superficial portions of nerve cells in 1900. In 1908 he published his arsenious acid method for the demonstration of the internal apparatus, and, by showing (1909) that this cell organ may in glandular epithelia become shifted from its ordinary position, he anticipated the results of recent investigations regarding the important part that the apparatus probably plays in secretion.

Of Golgi's researches in the field of pathology, it will suffice to recall his observations on malaria (1885-1893). After Laveran's discovery, Golgi gave a masterly description of the parasites of the tertian and quartan fever and their non-sexual cycle of development. By showing that the beginning of fever in malaria coincides with the sporulation phase, taking place at intervals definite for each species of the parasite, he led the way to the rational use of quinine in the struggle against this scourge of humanity.

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