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HISTORICAL NOTE

The subthalamic nucleus and Jules Bernard Luys (1828–97)

The 1860s was an interesting time in the development of clinical and anatomical knowledge, particularly that relating to degenerative diseases. In 1863, Nikolaus Friedreich described progressive hereditary degenerative CNS disorder (Friedreich's ataxia). A year later Hughlings Jackson portrayed traumatic aphasia. More fundamental was the differentiation of dendrites and axons by Otto Friedrich Karl Deiters in 1865, and the detailed histological analysis of the cerebral cortex in 1867 by Theodore Meynert. The stage was set for further research, and the identification of the subthalamic nucleus and the centrum median by Jules Bernard Luys.

Bernard Luys was a French neurologist born in Paris. His doctorate thesis in 1857 was on the microscopic pathology of tuberculosis. In 1862, he was Médecin des Hôpitaux and Chef de Service at the Salpêtrière and the Charité, and succeeded Marcé as Director of the Maison de Santé Esquirol at Ivry-sur-Seine. He was also Director of the lunatic asylum at Ivry. He was an excellent artist and one of the early photographers. He employed these skills in his three dimensional illustrations that are found in his first and most important book.¹ The subthalamic nucleus he described as the “bandelette accessoire de l'olive supérieure” thus showing its spatial

relation with the red nucleus which he labelled the “olive supérieure” (fig 1).

However, Meynert in 1872 thought that it was a subdivision of the substantia nigra, and in 1884 referred to it as the discus lentiformis. It was Forel in 1877, who provided the term *corpus Luysii* to this nucleus for posterity. Its clinical significance was not appreciated until Martin and Alcock showed that lesions of the nucleus were associated with hemiballismus, a word devised by Kussmaul or possibly von Economo.²

Knowledge of the function of the thalamus was virtually unknown until the Dane, SAW Stein's dissertation³ of 1834 revealed the anatomy and the connections with the optic nerves, and cortex, confirmed in RB Todd's *Cyclopaedia* (vol 3, 1835) as “the principal foci of sensibility”. In the 1860s, Luys importantly recognised four centres, each mediating one of the senses: the anterior or olfactory centre, the middle or optic centre, the median or somesthetic centre, and the posterior or acoustic centre. He carefully studied the arrangement of white matter fibres, but thought that the thalamus was the sensorium commune and the corpus striatum the subcortical motor centre. A biographer wrote “Luys's synthesis . . . gave ‘une impulsion nouvelle et durable.’”

Luys's subthalamic nucleus lies ventromedially to the globus pallidus within the diencephalon. It has a reciprocal connection with the globus pallidus. It completes a loop with the pallidum, since the subthalamic nucleus gets input inhibitory input from those areas of the globus pallidus, which excite motion. The subthalamic nucleus sends excitatory efferents to the areas of the globus pallidus, which inhibit motion. It is thus justified to attribute

to the subthalamic nucleus or an inhibitory effect on movement.

In 1874 appeared his book⁴ on physiology and reflex cerebral activity, and soon after his *Le cerveau et ses fonctions*, which was translated into English.⁵

Luys was a large and imposing man with impressive sideburns. He was a clinician and studied insanity, hysteria, and hypnotism on which he wrote extensively. Unfortunately, they yielded little of scientific value, and he was thought to have been misled or duped by his patients. Respected by his colleagues, he was elected to membership of the Academy of Medicine in 1877 and awarded the Legion d'Honneur the same year, being promoted to officer in 1895. He founded and edited *L'Encéphale*, a journal devoted to nervous diseases. As he grew older, his scientific contributions fell away and his reputation declined, although his integrity was not in question. He became increasingly deaf in old age, but continued to attend meetings at the Académie de Médecine.

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Figure 1 Jules Bernard Luys's talent for draughtsmanship created orderly depictions of the connections of the thalamus. 1—Anterior nuc.; 2—afferent fibers to ant. nuc.; 3—efferent fibers; 4—converging fibers from cortex to external thalamus; 5—secondary converging gray fibres which lose themselves in center (6) of thalamus; see original text for additional legends. (Portrait from obit. Signed M. B., 1897; drawing from Luys, 1895, facing p. 39, Plate XVII, Fig 1.