imated, and carrying impulses at the slowest rates; and B fibers, of intermediate velocities, myelinated, small, and confined to the autonomic system. Erlanger and Gasser further showed how these different types are distributed in the motor and sensory spinal roots and what other properties vary with the speed of conduction: duration, size and rate of rise of the action potential; refractory period; threshold; and sensitivity to asphyxia and to local anesthetics. The last two variables were especially employed by Gasser and others to analyze somatic sensation in terms of different types of afferent fibers.

After Gasser left St. Louis in 1932 for New York, Erlanger with various collaborators, especially E. A. Blair, devoted his attention chiefly to analyses of the changes in the excitability of single fibers caused by constant currents and thereby disclosed some significant differences between motor and sensory fibers. His Nobel Lecture dealt chiefly with this subject.

After retirement in 1946 Erlanger, as Professor Emeritus of Physiology, continued to work in his St. Louis Laboratory until a year before his death in 1965. A little detail concerning him during this period spotlights one aspect of his character. He had applied to the National Institutes of Health for a research grant. His application was for $900. The study section, all academic physiologists, who had before them as many requests for twenty times that amount, voted to recommend a grant of $1,000. But they were troubled; the thought haunted them that the supplement might offend Dr. Erlanger; they knew how meticulous he was about his every act. He was undemonstrative but affable, critical but never contentious. In giving intellectual aid and continued loyalty to students and colleagues, he was most generous. "Joseph Erlanger’s students," wrote one of them, "and their students will bear the imprint of this great teacher—an academician of the highest order—a friend of lasting loyalty who shall always live in memory."

References


JOSEPH ERLANGER


DAVID FERRIER (1843–1928)

FERRIER was born near Aberdeen, and was educated at the Universities of Aberdeen and Edinburgh. His most influential teachers were Alexander Bain, logician and psychologist at Aberdeen, and William Image, F.R.C.S. and general practitioner in Suffolk, whom Ferrier assisted while writing the thesis for his M.D. in 1870. That year Ferrier moved to London, where he lived the rest of his life.

He was connected chiefly with the National Hospital from 1880 and with the Medical School of King’s College where he occupied the chair of neuropathology created for him in 1889. He was a charter member of the Physiological Society and in 1878 joined with Hughlings Jackson, Sir John Bucknill and Sir James Crichton-Browne in founding the journal Brain. He was elected Fellow of the Royal Society in 1876, Fellow of the Royal College of Physicians (London), 1877, Laureate of the Institut de France, 1878, and received many other honors throughout his long, active life, including knighthood, 1911, the Hon. Sc.D. from Cambridge, 1914, and the Hon. LL.D. from Birmingham in 1927.

As Stanley Cobb has pointed out, Ferrier was probably the
brum. In this connection, it may be mentioned that Friedrich Albert Lange (1828–75) in his *Geschichte des Materialismus und Kritik seiner Bedeutung in der Gegenwart* (1866), was the first to propose such a concept and to distinguish localization of function from localization of symptoms.

Ferrier's studies were begun in 1875 and were published during that year and the three following years. They were undertaken "... to put to experimental proof the views entertained by Dr. Hughlings Jackson... and to follow up the path which the researches of Fritsch and Hitzig... indicated..." In this introduction to his first publication he gave warm credit to others, as was typical of him; the words, "to put to experimental proof," were an expression of his basic scientific philosophy.

He was one of the rediscoverers of the experimental method, and his work was marked by simple, direct practicality, careful control, and precise, full recording. By means of comparative studies he established general principles of the functions of the brain in mammalian species from rodents to apes. He continued his work in the clinic, applying these principles to his observations on man, and on the basis of his experience with animals, strongly urged the surgeons to operate for intracranial disorders. Indeed, Rickman Godlee felt that Ferrier was one of the principal figures in opening the field which is now neurosurgery.

Ferrier was more than an experimenter: he was, rather, a philosopher who did not philosophize but who experimented. He is to be credited with the discovery that removal of the precentral gyrus leads immediately to paralysis of the limbs of the opposite side, and that in the monkey the hemiplegic position is soon assumed. Although his work established the "motor area" and certain "sensory areas," he was not himself misled by the concept of localization. For him the functions of the cerebrum were "sensorimotor" and he stated: "From the complexity of mental phenomena and the participation in them of both motor and sensory substrata, any system of localization of mental faculties which does not take both factors into account must be radically false." He thus presaged the present view which regards the brain as the organ *par excellence* of interaction.

Ferrier was a slight, erect man, quiet of manner, direct of
speech, and of great energy. His life was that of a busy consultant, but he took time to continue some research in collaboration with others, effectively encouraging younger men. He attended scientific meetings assiduously, but avoided scientific polemics. His modest hope that he was "not in the way" while watching an experiment expressed by implication more forcibly than any protestation could have done, his feeling for the importance of the experimenter and the experiment. His vigorous defense of animal experimentation when he was taken to court by antivivisectionists at once won his case and made his name famous throughout England.

ROCKVILLE, MARYLAND

DAVID MCK. RIOCH

References


PIERRE FLOURENS (1794–1867)

Flourens' birthplace was the castle of La Trésorière, at Maureihan, in the South of France. A friend of the family, a priest returned from exile after the revolution, offered to take the boy; and little Marie Jean Pierre, aged nine, installed in front of the curé on a donkey, rode to Payguerolles, about 60 km north, where he worked at his education for the next seven years. Distinctly bright, he was sent to the medical faculty at Montpellier. There de Candolle, the famous botanist, made him join the Society for Natural History and even become its secretary. After grad-