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II. SECONDARY LITERATURE. See Richard Assmann, “Professor Dr. Adolf Sprung†,” in *Wetter*, **26** (1909), 25–27; and Wladimir Koeppen, “Dr. Adolf Sprung. Nachruf,” in *Meteorologische Zeitschrift*, **26** (1909), 215–216.

J. GRUNOW

SPURZHEIM, JOHANN CHRISTOPH (*b.* Longuich, near Trier, Germany, 31 December 1776; *d.* Boston, Massachusetts, 10 November 1832), *psychology, psychiatry, neuroscience*.

Spurzheim’s family, who were Lutheran, farmed the land of an abbey in a small town on the Moselle about sixty miles from Koblenz. His early education was intended to prepare him for a clerical career. He studied Greek and Latin in his native village and at the age of fifteen entered the University of Trèves (now Trier), where he studied Hebrew, divinity, and philosophy. Around 1799 he moved to Vienna and was engaged as a private tutor. The following year he met Franz Joseph Gall, with whom he collaborated on neuroanatomical research for the next thirteen years. From 1800 to 1804 Spurzheim completed his medical studies at Vienna, where he was formally

awarded his medical degree in 1813, after he and Gall had ceased working together. He received licensure in London from the Royal College of Physicians; was awarded a second degree, possibly a medical one, at Paris around 1821; and received recognition from many learned societies, including honorary membership in the Royal Irish Academy. He remained a theorist all his life, however, for his skepticism regarding medicine as it was then understood led him to avoid private medical practice.

Spurzheim’s unique contributions to the behavioral sciences have traditionally been intertwined in those of his mentor Franz Gall, who, although considered the founder of what later came to be known as phrenology, never used that term to describe his own system. Furthermore, Spurzheim was often accused of being a popularizer of Gall’s views on cerebral localization of mental functions because he was responsible for making them into a complete system of phrenology and teaching it widely. Spurzheim accepted the basic assumptions of this theory of mind, brain, and behavior—(1) that the brain is the organ of the mind, (2) that the moral and intellectual faculties are innate, (3) that their exercise or manifestation depends on organization, (4) that the brain is composed of a congeries of as many particular organs as there are propensities, sentiments, and faculties that differ from each other, and (5) that the shape and size of the skull faithfully reflect the shape and size of the underlying cerebral mass. Nevertheless, he extended Gall’s basic views in a singular way and made them in many respects more utilitarian and also more acceptable to a wider audience. In contrast with the more conservative view that Gall held in regard to his own doctrines, Spurzheim took the position that phrenology was capable of ameliorating most of the social ills of his day.

Shortly after his professional and personal break with Gall in 1813, Spurzheim formalized his views and presented them in his first major publication, *The Physiognomical System of Drs. Gall and Spurzheim: Founded on an Anatomical and Physiological Examination of the Nervous System in General, and of the Brain in Particular; and Indicating the Dispositions and Manifestations of the Mind* (London, 1815). It was from this major effort that Spurzheim later extracted sections, extended them, and published them as separate works. For example, his *Essai philosophique sur la nature morale et intellectuelle de l’homme* (Paris, 1820) elaborated upon his philosophical position. *A View of the Elementary Principles of Education Found-*

ed on the Study of the Nature of Man (Edinburgh, 1821) applied phrenology to education, and *Observations on the Deranged Manifestations of the Mind, or Insanity* (London, 1817) applied phrenology to psychiatry. Like many of Spurzheim's works, the latter was published in other languages, including German (Hamburg, 1818) and French (Paris, 1818). The work on insanity influenced the development of early American psychiatry; and when it was first published in America (Boston, 1832), it was edited by the well-known alienist Amariah Brigham.

Spurzheim believed that he had been denied the recognition due him as Gall's collaborator. Moreover, he felt that he was personally responsible for many of the neuroanatomical discoveries traditionally credited to Gall alone—especially those made between 1805 and 1813. He was constantly placed on the defensive, furthermore, because he was seen by his critics as only parroting what Gall had taught. But he did not simply take Gall's position unaltered and present it as his own. He contributed to their joint efforts almost from the beginning, and he placed his unique stamp on the history of that very special nineteenth-century doctrine of brain and mind.

Spurzheim taught that there were no fewer than thirty-five innate faculties of the mind—Gall had claimed to have discovered twenty-seven. He placed great emphasis on individual differences in cerebral organization and held that education had to be individualized. He discarded the view that mental faculties have determinate functions, offering instead a more "dignified" view of man that allowed for a greater emphasis on his more positive traits. Spurzheim separated what he believed to be the combined actions of faculties from what individual faculties were held to do, and added a more theological and philosophical perspective.

As a result of Spurzheim's conviction of phrenology's truthfulness, he convinced a great number of auditors to support it. In this regard he was able, unintentionally, to play a unique historical role. By inducing a wide audience to investigate for itself the truthfulness of his enthusiastically espoused belief, Spurzheim inspired inquiries that in some cases led to the establishment of phrenology's inherent incorrectness. Thus, although much of phrenology and Spurzheim's assumptions were essentially wrong—and were shown to be so as neuroanatomical science advanced in the nineteenth century—they were just right enough to further scientific thought.

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I. ORIGINAL WORKS. The small collection of Spurzheim MSS at Harvard Medical School, Boston, includes fragments of Spurzheim's American journal and his correspondence with his wife around the time they were married. A complete bibliography of the many eds. of his works is not available. A listing of his major works is in A. A. Walsh's intro. to *Observations on the Deranged Manifestations of the Mind, or Insanity*, by J. G. Spurzheim (Gainesville, Fla., 1970).

II. SECONDARY LITERATURE. Two biographies of Spurzheim were prepared by his American publisher, Nahum Capen of Boston: *Reminiscences of Dr. Spurzheim and George Combe: And a Review of the Science of Phrenology, From the Period of Its Discovery by Dr. Gall to the Time of the Visit of George Combe to the United States, 1838, 1840* (Boston, 1881); and "Biography of the Author [Spurzheim]," in J. G. Spurzheim, *Phrenology in Connexion With the Study of Physiognomy* (Boston, 1833), 9–168. Andrew Carmichael has published the only complete book on Spurzheim's life, which, despite its errors, is generally well done: *A Memoir of the Life and Philosophy of Spurzheim* (Boston, 1833). W. M. Williams, *A Vindication of Phrenology* (London, 1894), discusses Spurzheim in England (328–340); and A. A. Walsh discusses Spurzheim in America in "The American Tour of Dr. Spurzheim," in *Journal of the History of Medicine and Allied Sciences*, 27 (1972), 187–205, and in "Johann Christoph Spurzheim and the Rise and Fall of Scientific Phrenology in Boston: 1832–1842" (doctoral diss., University of New Hampshire, 1974). Finally, the reader should consult the many references appended to the article on Franz Joseph Gall in the DSB.

ANTHONY A. WALSH

ŚRĪDHARA (fl. India, ninth century), *mathematics*.

Śrīdhara, of whose life nothing is known save that he was a devotee of Śiva, wrote two works on arithmetic, the *Pāṭīgaṇita* and the *Pāṭīgaṇitasāra* or *Trīśatikā*, and one work, now lost, on algebra. Since he seems to refer to the views of Mahāvīra (fl. ninth century), and was used by Āryabhaṭa II (fl. between ca. 950 and 1100) and cited by Abhaya-deva Sūri (fl. 1050), it can be concluded that he flourished in the ninth century.

The *Pāṭīgaṇita* is divided into two sections. The first, after metrological definitions, covers the mathematical operations of addition, subtraction, multiplication, and division; finding squares and square roots; finding cubes and cube roots; fractions; and proportions; the second gives solutions for problems involving mixtures, series, plane fig-