

BRAIN, SOUL AND SWEDENBORG (1688-1772)[†]

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Summary

Swedenborg, born into a prominent family of good standing in Swedish society, became a versatile, distinguished scientist. In neurology, and out of step with the orthodoxy of his day, he showed that the cerebral cortex was the anatomical and physiological locus of the mind. He forsook his scientific studies to develop a cosmology that integrated nature and natural phenomena, including scientific discoveries, with his concept of Christianity. In so doing, it is argued, he dug the grave of his neurological propositions.

Introduction

Gustavus Adolphus had been dead more than thirty years when Emanuel Swedberg was born in Stockholm in 1688. The Swedish king's legacy of sound judgement, skillful military and civil administration, and support of education, particularly at the University of Uppsala, had left Sweden at peace and protected from its enemies. Although the quality of Swedish society deteriorated from outside pressure under the uninspired rule of succeeding weaker monarchs, the soil Gustavus Adolphus had cultivated stayed unusually fertile for generations to come. Sweden and its immediate neighbors had been spared involvement in the War of the Spanish Succession when Marlborough led England, Holland and Austria against France under Louis XIV. The Lutheran Church in Sweden had secured the country's religious emancipation from Rome, but had kept its episcopal governance which made for an acceptance of establishmentarianism with the sovereign as the supreme administrator.

It was into this stable and enlightened society that Emanuel was born with a silver spoon in his mouth and with the advantage of social prominence. His mother had been enriched by her holdings in Swedish ore

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mines; his father, Jesper Swedberg, ordained into the Lutheran Church of Sweden, had been appointed chaplain to the king. This ensured his later preferment as Bishop of Skara, a position he held for 33 years.

At this time, Swedish society was progressive, independently minded and in touch with the discoveries of western Europe. William Harvey (1578-1657) and Willis (1621-1675) were not long dead, and Morgagni (1682-1771) and John Hunter (1728-1793) were at the height of their fame. It was the age of Newton, Goethe, J. S. Bach, Wesley and Washington, and in Sweden, of Linnaeus (1707-1778). In unimportant North America, the Hudson's Bay Company had recently been granted its royal charter, and before the end of Emanuel's life, France, by the Treaty of Paris, had ceded her North American possessions to Britain.

Emanuel graduated from Uppsala University in 1709 at the age of 21. He spent the next five years travelling on the continent and in England (there is no record of his visiting Scotland or Ireland) before returning home. His acquisition of a sound knowledge of geology and mineralogy led to the king granting him the position of assessor extraordinary in the Swedish College of Mines. One of his notable services was his comparison of foreign smelting and assaying with methods in his own country. Three years later, when Queen Ulrica, widow of Charles II, ennobled him and his family, Emanuel changed his name from Swedberg to Swedenborg. He had just turned 30. In the same year, he became a member of the Swedish Diet. In debates in the House of Nobles he spoke on the decimal system, currency, trade and liquor laws, and he opposed any increase in the power of the Crown in spite of the royal patronage he and his father had accepted.

Swedenborg declined the offer of the chair in mathematics at Uppsala University on the grounds that, as a theorist only, he was unsuited. The probable reason, however, was that he could not see himself tied to one line of thought. His turbulent mind was only satisfied with the exploration of all things in heaven and earth and the formulation of a system of creation within the boundaries of science. In this, his line of thinking was similar to Descartes, with whose writings of a few decades earlier Swedenborg was familiar.

Swedenborg's voluminous writings encompassed topics as varied as the scientific explanation of the universe, published when he was only 33, followed by works on mineralogy, paleontology and physics. He was the

first to advance the nebular hypothesis of the formation of the sun and planets; he wrote a theory of light and of cosmic atoms; he described phosphorescence and elaborated the molecular theory of magnetism. He also established the science of crystallography, and devised a lunar and astral navigational system to improve on dead reckoning. "He suggested the use of experimental tanks for testing the powers of ship models, invented an ear-trumpet for the deaf, improved the common house-stove of his native land, cured smoky chimneys, took a lively interest in machine guns and even sketched a flying machine"¹

Anatomist and Neurologist

In 1736, Frederick I gave Swedenborg leave of absence from his occupation as assessor of mines so that he could devote his time to the dissection of the human body. He moved to Paris and stayed in lodgings near the new school of surgery. In his petition to the King, he had expressed the need to journey freely to centres of learning and thus "to profit by consultation with learned men" and by the use of libraries. He was successful in achieving his aim; much of his knowledge and his speculations on the brain's function arose from a familiarity with the writings of European anatomists, whom he freely cites. Indeed, his dissections were not the mainspring of his extensive writings. Rather, the reasoning behind his hypotheses was based on the data of others, which he reported with fidelity.² Although he would probably have learned anatomy from Professor Roberg at Uppsala, his concentrated studies were compressed into the two years in Paris. Most of his attention was directed to the human brain, but he also studied other species (he refers to his dissection of a drake's brain) in preparation for his philosophical treatise *The Economy of the Animal Kingdom*.

There is much in Swedenborg's neurological writings to admire. He added to what little was already known of localization of function in the brain by showing that the centre for the highest brain activities (voluntary

¹ *Encyclopedia Britannica*, 11th ed., s.v. "Swedenborg, Emanuel."

² Emanuel Swedenborg, *Three Transactions on the Cerebrum*, vol. 2, ed. and trans. Alfred Acton (Philadelphia: Swedenborg Scientific Association, 1940). This volume includes Swedenborg's excerpts from the anatomical writings of Heister, Morgagni, Boerhaave, Nuck, Winslow, Vieussens, Albinus, Baglivi and Lancisi.

movement, sensation and mind) lay in the cerebral cortex. From his deductions he sketched his version of the functional map of the cortex, which preceded the head maps of the phrenologists Gall and Spurzheim whom Jefferson has credited with the authorship of the theory of cortical localization.³ Swedenborg's map was not much improved until 1870 when Fritsch and Hitzig reported the results of their experiments on cortical stimulation.

Swedenborg speculated on the physiological nature of the soul, and deduced from his anatomical studies the site of the mind. The soul, he said, was everywhere in the body since it was contained in the body fluids.⁴ The brain was not its exclusive preserve.

The soul, carried in the brain's juices (blood, cerebrospinal fluid and tissue fluid) influences the mind "that all things may be disposed to that end which the soul intends."⁵ The mind, the handmaiden of the soul, was located in the cerebral cortex, a proposition that conflicted with the contemporary belief, represented in the work of Haller (1708-1777), that the basal ganglia and the cerebral white matter subserved the role of the mind. The soul not only reanimated the failing mind but corrected it when it erred. "The soul is superior to the mind and may be in conflict with it."⁶ "As soon as the soul...sees that the cerebrum is becoming inanimate, she at once intensifies her forces, and in consequence, pours in all that fluid wherein she resides. It is the soul, then, that seems to be the veriest cause of the animation of the cerebrum."⁷

The role of the cortex, on the other hand, is described in terms more in line with modern neurophysiological concepts: "the cortical substance of the cerebrum is most highly adapted for the reception of modifications coming to it from the external organs."⁸ "The cortical substance is, therefore, the seat wherein sensation finally ceases..."⁹ "Therefore nothing can

³ Geoffrey Jefferson, "The Contemporary Reactions to Phrenology," in *Selected Papers* (London: Pitman Medical Publishing Co. Ltd., 1960).

⁴ Emanuel Swedenborg, *Three Transactions on the Cerebrum*, vol. 1, ed. and trans. Alfred Acton (Philadelphia: Swedenborg Scientific Association, 1940), p. 58.

⁵ *Ibid.*, n. 855, p. 513.

⁶ *Ibid.*

⁷ *Ibid.*, n. 214, p. 140.

⁸ *Ibid.*, n. 606, p. 341.

⁹ *Ibid.*, n. 43, p. 30.

exist in the whole body...of which the cortical substance is not at once rendered conscious...Consequently, this noble substance is the centre and, as it were, the meeting place of all contingencies that come up from the body [sensory] or terminate in the body [motor]."¹⁰

It can hardly be expected that all of Swedenborg's proposals have stood the test of time. For example, he placed great importance on the neurological role of the dura mater, and the control of autonomic ("unconscious") function by the cerebellum. By contrast, his explanation of the transmission of influences in the nervous system is close to what is known today of the nerve impulse.

He was familiar with the use of the microscope, which he combined with gross dissection to trace the continuity between cortical nerve cells and their processes. He recognized brain "fibres" that originated in the cerebral cortex and which could be traced through the central nervous system into the peripheral. These fibres were, he said, "the royal road of the sensations of the body to the soul...and all determinations of the will also descend by that road...it is the Mercury of the Olympos..."¹¹

The demonstration by Galvani (1737-1798) in 1792 that neural stimulation by static electricity produced muscle contraction was yet to come. The "animal spirits" and "juices" that Swedenborg hypothesized could transmit information in both directions along the "fibres," were still viewed as the body's communication system. It was a concept analogous to the modern understanding of the nerve impulse in location and function, though not in kind.

Swedenborg derived his opinion of the dependence of the mind on the cerebral cortex from his anatomical observations. But he fell back on contemporary orthodoxy to explain that the mind was activated by contact with the body fluids: blood, cerebrospinal fluid and tissue fluid, the "animal spirits," vectors of the soul. The search for a physiological basis for mind continues today using techniques and knowledge unavailable to Swedenborg. How new ideas are born, however, is no nearer to a physiological explanation now than it was to Swedenborg, and probably never will be.

¹⁰ *Ibid.*, n. 41, p. 30.

¹¹ O. M. Ramström, "Swedenborg on the Cerebral Cortex as the Seat of Psychical Activity," *Transactions of the International Swedenborg Congress* (London, 1910), pp. 56-70.

Throughout this period, Swedenborg's thoughts were never far from Christianity and the human soul. However intensely he concentrated on anatomy, metaphysical and theosophical questions were waiting for answers. Once he had exhausted his anatomical curiosity he never returned to dissection or to anatomical writing. Instead, as had probably been his original intention, he applied the knowledge he had gained in an attempt to lay a scientific foundation to spiritual realities.

Mystic and Divine

Swedenborg's compulsion to understand the origins of natural phenomena led him from the brain and soul to cosmology. Undaunted, he speculated on the order, interrelationships and source of the whole of creation. Inevitably, his inquiries brought him to the final stage of his work—the pursuit of the meaning and purpose of life.

He abandoned his scientific interests to concentrate on the search for enlightenment and guidance within the Christian faith. He accepted the primacy of Christianity over other religions but steered away from the teaching that salvation and enlightenment can be granted only through communion with the Church as God's instrument on earth. Today, his *Doctrine of the New Church* (1769) seems mild and unexceptional, although it may have seemed radical even to Protestants (Lutheran and Anglican) of the mid-18th century.

One form of his enlightenment was manifested in visions or "experiences," which convinced him he was in direct communion with God. They strengthened his conviction that his secular, scientific and religious beliefs had divine support. Thus, he felt free to question any of the Church's teachings. He believed that Judgement Day had passed, that parts of the Bible should not be taken as divinely inspired, and that the path to salvation need not be through the hands of ordained priests.

His "experiences" were remarkable, if not alarming, and may have contributed to his alienation from a sceptical scientific community. He would lie for days in a trance while, as he said, his servants listened from without to his conflicts with evil spirits. On one occasion he cried out in agitation, "At this very hour the Emperor Peter III of Russia has died in prison." And it was so. On another occasion, at the moment of its outbreak, he said a fire had occurred 300 miles away in Stockholm; shortly

afterwards he announced with relief that it had been contained just before his house could be consumed. All turned out to have happened as he had said. In a letter to John Wesley he regretted he could not meet him as they had arranged, since on the appointed day he “would enter the world of spirits, never more to return.” He was true to his word and died on March 29, 1772. The authenticity of these stories is of no great moment; their importance lies in their contribution to the legend of a remarkable man.

For all his radical departures from the Lutheranism he was heir to, he was no proselytizer. He led a simple unmarried life, content to use his time in thinking, reading, writing and discussion. Rather than lock horns in argument he would state his point and leave it at that. Nor did he see himself as a founder of a movement. The Church of the New Jerusalem was founded by Swedenborg’s adherents in accordance with his beliefs, first in London (1783) and then in Baltimore (1790). (There are now about 40,000 members of the church in the world.)

Claim to Recognition as a Neurologist

As modern medical practitioners, scientists and historians, we must be perplexed at the neglect Swedenborg’s neurological works have suffered. His assertion of the paramouncy of the cerebral cortex, in contradiction to his eminent contemporaries who promoted the white matter, put him more than a century ahead of his time. Is this not enough to protect his reputation? In Earl Walker’s *History of Neurological Surgery* (1967), a collection of essays with 2,371 references, there is no mention of Swedenborg. Charles Singer, among his 412 listed publications, wrote a two page article in 1938 in a lay magazine, the *Listener*, on Swedenborg. Singer and Underwood in their *Short History of Medicine* (854 pages) are silent on the topic of Swedenborg. Geoffrey Jefferson, in two probing articles,^{12,13} makes no reference to Swedenborg. In modern medical and

¹² Geoffrey Jefferson, “Variations on the Neurological Theme—Cortical Localization,” *British Medical Journal* (Dec. 10, 1955). Reprinted in Jefferson, *Selected Papers*.

¹³ Geoffrey Jefferson, “René Descartes on the Localization of the Soul,” *Selected Papers* (London: Pitman Medical Publishing Co. Ltd., 1960).

historical literature, there are articles on Swedenborg by Acton,¹⁴ writing from Bryn Athyn, Pennsylvania, the repository of a collection of Swedenborg archives, and by Ramström of Uppsala in the Transactions of the International Swedenborg Congress in London in 1910.¹⁵ In 1903, Retzius, at the opening address at the Congress of Anatomists at Heidelberg, spoke about Swedenborg.¹⁶ More recently, Eastman has written a biographical article on Swedenborg,¹⁷ and Talbott has reviewed his neurological writings.¹⁸ But Swedenborg's name is for the most part still unknown to neurologists. How can this neglect be explained?

Swedenborg was assiduous in his reading of the works of all the distinguished anatomists of his day, and had sat at the feet of many of them. In his writings he freely referred to them. He disclaimed having added any data of his own, but based his theories on the anatomical descriptions of others. Later vindication of his conclusions, which were in conflict with contemporary teaching, should have preserved his memory rather than bury it. The use of Latin would have made his writing accessible to men of learning, while its prolixity, hard on modern readers even in translation, would not have been a detraction to his contemporaries.

But France, Italy and England, not distant Stockholm, were the centres of anatomical thought and medical practice. Perhaps for that reason leading academics dismissed him. Had he stayed longer in Paris and chosen to immerse himself in anatomical studies rather than stay, as it may have seemed, on the fringe, his views might have received more attention. Although he lived in London during the second half of his life, by then his anatomical inquiries were behind him, and anatomists may have shrugged him off as a has-been, or a dilettante with too many strings to his bow. Even if these speculations are true, Swedenborg would not have deigned to correct such disparagements. His interest was in the statement of the truth as it had been revealed to him, not in self-aggrandizement.

¹⁴ Alfred Acton, "Emanuel Swedenborg," *Annals of Medical History*, 4 (1942): pp. 25-30.

¹⁵ Ramström, *Transactions*, pp. 56-70.

¹⁶ G. Retzius, "Emanuel Swedenborg: Anatomist and Physiologist," *New Church Life* (Nov. 1903): pp. 565-78.

¹⁷ J. Eastman, "Swedenborg: Scientific Saint," *The Christian Century* 86 (Jan. 1969): p. 29.

¹⁸ J. H. Talbott, "Swedenborg: Natural Scientist, Neurophysiologist, Theologian," *Journal of the American Medical Association* 206 (1968): p. 21.

Then, as now, scientific materialism threatened the authority of the Church. The Church would have welcomed the allegiance of so great a scientist. On the other hand, in his determination to meld into a grand plan his religious convictions and scientific discoveries, Swedenborg discredited the latter in the eyes of contemporary scientists. His career as a mystic may have left him suspect in the skeptical minds of anatomists and physiologists from which he has never recovered. □

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