

At the time of the writing of this article for the *Academy Journal* the Hoover letter could not be located. Recently Dr. Acton's daughter Benita (Mrs. Vincent Odhner) came across the letter in some of Dr. Acton's papers. I thank her for remembering my earlier request to have a copy.

Many readers of Swedenborg have grown accustomed to misconceptions being circulated concerning him. That he was still living on earth in 1919 is, however, one that is a rare reversal on Swedenborg's own statement that during the eighteenth century he visited the spiritual world. The second letter—quite in contrast to the one from Herbert Hoover—was found recently in the Archives of the Academy of the New Church by Professor Eldric Klein, Archivist. We on our end had performed our own twist, for although the letter was addressed to

Mr. Emanuel Swedenborg
c/o The New Philosophy

a note on the envelope says "refer to Rev. W. B. Caldwell" who was Editor of *New Church Life*, not the NEW PHILOSOPHY. As I recall, Mr. Caldwell had his own form of humor, and if anyone runs across his answer I would like to see it.

E. F. A.

EMANUEL SWEDENBORG (1688-1772), NATURAL SCIENTIST, NEUROPHYSIOLOGIST, THEOLOGIAN *

Emanuel Swedenborg, better known for his writings in theosophy than in science, was born "Swedberg," in Stockholm; however, he spent the greater portion of his early life in Uppsala where his father, a Lutheran bishop, lived in comfortable circumstances.¹ Even as a youth his mind was engaged in contemplation of God, salvation, and the spiritual ills of man. After attending the university at Uppsala where he concentrated on mathematics and mining, he began the first of several extended tours of England and the Continent, studying the natural sciences, conducting experiments, and making acquaintances with the learned men of his

* Reprinted from JAMA, the Journal of the American Medical Association, Vol. 206, No. 4, Oct. 21, 1968, pp. 887-8.

¹ Rodgers, R. R.: Swedenborg, the Philosopher and Theologian, *Trans. Int. Swedenborg Congr.*, 1910, pp. 269-284.

day. His imaginative mind at various times in his life dealt with such practical subjects as the construction of submarines, airplanes, mercury air pumps, hydraulic engines, machine guns, and canals; crystallography; shifting coastlines; improvement in mining and smelting of ores; and the determination of longitude from observations of the moon.² In 1715, he returned to Sweden, devoted his time largely to scientific rather than religious matters, and founded *Daedalus Hyperboreus*, a journal for mathematics and philosophy. In due time he was appointed by the King to the Board of Mines, first as extraordinary assessor and later as ordinary assessor. In 1719, his family was ennobled by Queen Ulrica Eleanora, and the name was changed from Swedberg to Swedenborg.

Swedenborg's treatise, *Principia*, the first volume of his *Opera Philosophica et Mineralia*, which appeared in 1734, speculated on cosmic evolution, advancing "the nebular hypothesis," a theory later made familiar by Laplace. He anticipated the modern molecular theory of magnetism as well as the concept of the atom, called by him the first elementary particle. He wrote abundantly on scientific matters in this period of his life and was equally prolific when he changed emphasis and moved on to theosophy. Discussions of neurology, neurophysiology, psychology, and the seat of soul provided continuity in the transition. In 1747, he resigned his position with the Board of Mines to settle in London.

Swedenborg's contributions in the medical sciences, prepared in Latin, lay unnoticed in the library of the Swedish Royal Academy of Sciences until the 1880's when Tafel translated into English the four-volume treatise, *The Brain*.³ Included in this monograph were observations on cortical localization, the somatotropic arrangement of the motor cortex, reference to integrative action of the nervous system, the significance of the pituitary gland, the formation of cerebrospinal fluid, and a pronouncement on what is now known as the neuron theory. The cerebral cortex, the intermediary between the sensory receptors and the soul, conditions the faculties unique to man such as imagination, judgment, will, and the source of motor volition.³

² Ramström, M.: *Emanuel Swedenborg's Investigations in Natural Science*, Uppsala, Sweden: University of Uppsala, 1910.

³ Swedenborg, E.: *The Brain*, R. L. Tafel (trans.-ed.), London: J. Spiers, vol. 1, 1882; vol. 2, 1887.

The cerebrum is the common bond connecting the organs of sense of the body with the sensories of the soul; for all fibres after having passed through the brain terminate in the cortical substances.

On this account the cerebrum is called the *common or general sensory*; for all the generals belonging to sense are proper to the cerebrum; consequently, as is the order and government, so is the copula and uniting medium which conveys the modes of the body to the soul. For it is the office of the cerebrum [to provide] that the internal sensations shall flourish, and, as behooves in a regular system, that they shall live harmoniously among one another; and therefore it is its office to provide that the inmost senses shall be able to perceive, think, judge, and will, thus to contemplate ends, or to see whether a thing be true or false, and to insert it among its analytical conclusions. Upon the cerebrum therefore depend the faculties of remembering, imagining, craving, desiring, willing, etc.

The cortical substance of the frontal lobe, or the "anterior province of the cerebrum," was recognized by Swedenborg as the center of the intellect, concerned with memory and the seat of the subconscious. It was divided structurally into three lobes for innervation of the skeletal muscles in the reverse anatomical order.³

. . . consequently it is the determiner of the will and the desires of the mind into ends having respect to the election of good and evil, and into ultimate acts. Wherefore *the cerebrum is the general voluntary organ of motion.*

The cerebrum acts the part of a *regulating organ* not only of the inmost sensories, where the intellect resides, but also of *the internal sight and its memory and recollection*; of that faculty, namely, which presents to the intellect material ideas for discussion, in order that hence they may exist abstractedly from material terms.

. . . the muscles and actions which are in the ultimates of the body or in the soles of the feet depend more immediately upon the highest parts; upon the middle lobe the muscles which belong to the abdomen and thorax, and upon the third lobe those which belong to the face and head; for they seem to correspond to one another in an inverse ratio.

Selected deductions were made from experimental observations supported by pathological findings. One example was the effect on the determination of the will in disease.³

. . . for if the cerebrum is either inflamed, or obstructed, or flaccid, or injured otherwise, the intellectual faculty is unsettled.

The pituitary gland, the "arch-gland" of Swedenborg, was recognized as possessing special function in body economy, two centuries before contemporary endocrinology. Also, he extended the observations of Willis on the formation of cerebrospinal fluid by the fourth ventricle.³

³ *The Brain.*

Wherefore the pituitary gland deserves to be called the arch-gland. This appellation it also deserves on this ground, that it devotes its whole force to the transmission of the genuine liquids of the brain in the interiors, and also in the exteriors, of its body, notwithstanding both being so well closed up; but chiefly, on this ground, that it receives the whole spirit of the brain, and communicates it to the blood, to which it thereby imparts a special quality, upon which quality, compared with its quantity, depends the life of the whole of its kingdom. And further, on this ground, that all the members of the brain, and also those of the dura mater, their planes, axes and centres, and the very bones of the cranium itself have respect to that gland as to their final terminus; and since it repels the *pituita* of the brain, rather than carries it abroad, it may deservedly be styled the arch-gland.

This fourth ventricle, on account of the actuality of motion which it secures for the circumjacent members of the encephalon, supplies also a noble and most highly gifted juice impregnated with spirit to the roots of the nerves, and hands it over for distribution to the medulla oblongata, and especially to the spinal marrow. This choicest serum and defecated lymph, which is expressed from the tender shoots and villi of the vertebral artery between the laminae and inmost folds of the cerebellum, and which enters thence into the fibrillous interstices of its medulla, cannot escape or be discharged by any other way than by that of the medullary stems into the subjacent ventricle, or into that cavity which is intercepted and closed up by the peduncles; for there is no other egress.

In the *Economy of the Animal Kingdom*, Swedenborg described the blood flow of the myocardium through the Thebesian vessels.⁴

. . . let us, by induction from what we have stated, yet still with experience at our side, ascertain how the blood is carried downwards from the lacunae, through these ducts into the muscular substance of the heart, and how it is carried downwards into the coronary vessels. One thing is evident, that there are ducts leading into the muscular substance of the heart, and which we shall call *Immissaries* [Thebesian-capillary system]; that there are also ducts leading from the muscular substance into the coronary vessels, and which we shall call *Emissaries* [coronary venules and arterioles?]; and that there are ducts leading immediately from the lacunae into the coronary vessels, and from these back into the lacunae, and which we may call *Commissaries* [Thebesian-arterial, Thebesian-venous anastomoses].

Swedenborg's transition from neurophysiology to spiritual science was essentially complete in 1745. His zealous devotion to meditation and philosophical writing influenced the lives of many spiritual leaders for more than two centuries. The *Doctrine of the New Church*, originally published in Latin in Amsterdam in 1769,

⁴ Swedenborg, E.: *Oeconomia Regni Animalis*, A. Clissold (trans.), Boston, 1868, in Pratt, F. H.: Swedenborg on the Thebesian Blood Flow of the Heart, *Ann. Med. Hist.* 4: 434-439, 1932.

was translated and published in London after his death. It rejected a faith in three Gods offering: ⁵

I. That there is One God, in Whom is a Divine Trinity, and that He is the Lord Jesus Christ.

II. That saving Faith is to believe in Him.

III. That Evils ought to be shunned, because they are of the Devil and from the Devil.

IV. That Good Works ought to be done, because they are of God and from God.

V. And that they ought to be done by Man as of himself, but with a Belief, that they are from the Lord operating in him and by him.

Swedenborg died in London and was buried adjacent to a small Swedish church. The Swedenborgians, the religious sect based on the belief that Swedenborg had witnessed the last judgment, was founded after the death of their leader.

SWEDENBORG POINTS WAY IN CEREBRAL PHYSIOLOGY *

Emanuel Swedenborg (1688–1772), Swedish theologian and scientist, is best known for his religious and philosophical deductions. In chronicling his hectic career, most of his biographies fail to note that he also was a “pathfinder” in medicine.

Swedenborg was born Emanuel Swedberg, son of a Stockholm bishop. He studied at the University of Uppsala, Sweden, and then traveled abroad for four years. In 1716, he was named assessor of mines by Charles XII of Sweden. When he was ennobled three years later, he changed his name to Swedenborg and took a prominent in the House of Peers. [*sic.*]

He was an extremely diligent worker, a keen observer, and an unprejudiced man of research, which established him as an outstanding pioneer in the knowledge of cerebral localization. He threw new light on the cortex of the brain with his observations during the years 1734–1745. (Ask-Upmark, E.: Swedenborg as a Pioneer in Cerebral Localization, *JAMA* 183: 805–806 [March 2] 1963.)

⁵ Swedenborg, E.: *A Brief Exposition of the Doctrine of the New Church* (L), London: R. Hindmarsh, 1789.

* Reprinted from *JAMA*, the Journal of the American Medical Association, Vol. 206, No. 4, Oct. 21, 1968, p. 832.

Although the conception of the cerebral cortex as the seat of mental abilities to some degree already had been covered, Swedenborg seems to have arrived at his conclusions in part by experiments in animals but mainly by the recording and comparing of a large number of autopsies at universities in Sweden, England, and elsewhere in Europe.

Swedenborg localized hemiplegia to the brain and paraplegia to the spinal cord, and arrived at a conception of the function of the basal ganglia, which was considered not only to collect afferent impulses but also to initiate automatic movements. He also is said to have been familiar with the importance of corpora quadrigemina for the movement of the pupils, and to have discovered the central canal of the spinal cord and the connection between fila olfactor and the cerebrospinal fluid.

His theologian activities increased about the same time and in 1743 he claimed that he had received a Divine commission to disclose the spiritual sense of the Scripture which differed in many respects with existing beliefs. He died in London within an hour of the time he had predicted and is buried in the Cathedral of Uppsala. The New Church, or New Jerusalem Church, which accepts his philosophy and theology, was organized in London in 1783.

Swedenborg was honored postally by Sweden in 1936 on the 250th anniversary of his birth.—Mirt, J. A., "Medical Pathfinders on Postage Stamps."

TWO HISTORICAL LETTERS

DEPARTMENT OF COMMERCE

OFFICE OF THE SECRETARY

WASHINGTON

May 3, 1926.

Rev. Alfred Acton,
Swedenborg Scientific Association,
Bryn Athyn, Pa.

My dear Dr. Acton :

I am greatly obliged for your letter of May 1st.

Some years ago when I was interested in the translation of Agricola, I also found great interest in Swedenborg's work in relation to the minerals. The time of my life has now passed