

THE HUMAN FORM

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“Then God said, ‘Let us make man in our image, in our likeness, and let them rule over the fish of the sea and the birds of the air, over the livestock, over all the earth, and over all the creatures that move along the ground.’ So God created man in his own image, in the image of God he created him; male and female he created them. Thus the heavens and the earth were completed in all their vast array.”¹

The causality of Emanuel Swedenborg was not complicated or abstruse. The world - nature, humans, and "the heavens and the earth... in all their vast array" - was created by God, within the coherent framework of a plan. And everything within this framework, both physical and spiritual, was derived in stepwise manner from the thing prior to it, leading to its ultimate cause, which was God himself.

Swedenborg, then, in any consideration of the universe, as reflected in natural science or matters of spirit, always began with the idea of *Genesis* 1:26 implanted firmly in his mind, and worked from that perspective. It was no different with his treatment of the human form.

The human form is a slippery topic at best, because it involves a forest and its trees. We as humans are so superficially familiar with the idea that we can scarcely consider it objectively at all. It is the purpose of this study to allow some objectivity by backing off a bit from the familiar, and examining just what it is that we - as actual human beings existing in the natural world - might be.

But first, we must return briefly to our Biblical introduction to focus specifically on two words which will become very important to our discussion. The first word is image (in the image of God he created him...). From the several possible uses of the word, we shall dwell on this definition: the visual impression of something produced by reflection from a mirror, or refraction through a lens.² The second word for consideration in this discussion is found in the definition of the first. This is refraction, or "the bending of a ray, wave of light, heat or sound, as

¹ *Genesis* 1:26-2:1. *Holy Bible*, New International Version.

² *Webster's New Universal Unabridged Dictionary*, 2nd Edition, Simon and Schuster, New York, New York, 1979.

it passes obliquely from one medium to another of different density, in which its speed is different, or through layers of different density in that same medium.³ These two words, image and refraction, will become increasingly important as this discussion of the human form proceeds.

As stated above, the human form is a slippery topic. Within this discussion we shall magnify it to the limits of our senses, and we shall dissect it to its inner limits as well. By doing so, the human being will be redefined as something quite apart from the preconceived notions we humans share.

The plan of this paper is to present the problem in several steps, beginning with Swedenborg's description of the human form as found in his *Heaven and Hell*, published in London in 1758.

We will then expand on this theme as we are referred by Swedenborg to his other treatment of the subject in the *Arcana Coelestia*, in an inclusive section, n. 3624 - 5726. This has long been considered separately as his definitive statement on the matter. The extracted work has often been entitled, for convenience, *The Universal Human*.

Following this, some reference will be made to Swedenborg's ideas on the human form as they intersect with some of his ideas on other topics, such as his elegant system of stepwise relationships he calls degrees, as found in *Divine Love and Wisdom*, and his compelling thoughts on energy in *On Tremulation*. In this book, Swedenborg deals with the equally elegant arrangement of the human body into its subdivisions of structure and function.

From these historical considerations our emphasis will shift to include an overview of the structure of the human body as it has traditionally been defined by science over the years since Swedenborg and his fellow natural philosophers gave us their remarkably coherent start. This will be a look at the human organism as seen by contemporary scientists - anatomists, histologists, zoologists and physicians - separated from the theological implications our later

³ Ibid.

discussion will include. This is the human form as "the real thing" - the actual, substantial form, or structure of the human body we know so well. It is this form, or palpable state, to which we must direct our attention during the ensuing discussion. No matter how expanded our definition of the human form may become, the familiar image of the human body as a recognizable whole is the key to our understanding of it as the sublime spiritual organism it is as well. The sublime, as we shall see it, is also the mundane.

Finally, this paper will involve the reader in a little speculation on the actual nature of this human form of ours. Up to this point I will have developed Swedenborg's ideas on the topic, and presented these with the counterpoint of modern scientific knowledge as it has evolved to explain the phenomenon of the organism. It is here that we will diverge slightly into my own rather personal interpretation of the human organism as it has evolved over the years from college biology through graduate studies in anatomy and molecular biology, and ultimately through nearly fifteen years of medical training and practice - hands-on knowledge of this human form, in its many permutations.

From the ideas presented here, we shall see how, with little effort, the interjection of the mystical elements of our form - the structure and function of the soul, or spiritual body and the place this form occupies in the grand scheme of things - will serve to complete the question of ontology which naturally arises from this fresh look at the human organism. This will hopefully produce in the reader a new understanding of just what he is, where he is, and what his destiny may be.

Emanuel Swedenborg, scientist and theologian, was very comfortable with matter; with substance. He had studied chemistry and metallurgy and the physics of matter. In the introduction to his *Principia* of 1734, he went to great lengths to define matter before he would

be so presumptuous as to discuss its behavior.⁴ He defined the smallest divisible units of matter as "elementary particles", and he explained that these could not exist alone, but only in twos, or multiples thereof. This is strongly prescient of our modern notion of subatomic particles, and in like manner he anticipated the quandary of our "new physics" in dealing with the origin and causality of these particles, and hence all matter. To explain the origin of matter, he described the "first finite" as the smallest knowable entity, born of a point, but without form or substance without motion. The motion (termed *conatus* by Swedenborg to denote a rudimentary notion of energy) was supplied by God to produce the marriage of matter and energy we still acknowledge as the basis for modern physics. Matter, for Swedenborg, was matter in motion. This became the universe from "finiting the infinite *conatus*," which was God.

Matter thus defined, the next level of organization for it was, for a natural philosopher such as Swedenborg, not to be observed directly, but derived philosophically. With his Aristotelian roots, it was a simple progression for him to establish matter in form, using Aristotle's four Causes,⁵ which are universal, as applied to the universe itself. With the universe (heaven, the natural world and the spiritual world) as the final cause, matter itself becomes the material cause. This leads to God through man as the efficient cause, and ultimately to the form, or actual shape of things in this universe, as the formal cause. The human form to Swedenborg, then, was in fact the form of things, as in the formal cause of the universe. Since God is the infinite *conatus*, or cause for matter, and since we have seen already that God created man in his image, then we can readily see that Swedenborg's idea of a universe in human form was not lightly or superficially conceived. He established his idea of the universal human by revelation on one hand and science on the other - to Swedenborg, the soundest of proofs. These represented to him two sides of the same reality, the concurrent spiritual and material existence of all things.

⁴ Swedenborg, Emanuel, *The Principia*, W. Newbery, London, 1846, reprinted 1976 by Swedenborg Scientific Association, Bryn Athyn, Pennsylvania.

⁵ Aristotle, *Natural Science*, excerpted in *Aristotle*, Philip Wheelwright, ed., Odyssey Press, New York, 1951, pp. 35-37.

We move now to a discussion of the ideas set forth in Heaven and Hell, where Swedenborg explains in some detail how we are to understand this concept of in his image. His approach to the problem is in an almost geographical description of heaven and its components. He says that heaven consists of an infinite variety of communities, all of which are interrelated but nonetheless discrete in function and location. A community large or small, we are told, is a heaven in smaller form - arranged spatially to resemble a human being. From a distance, this arrangement appears as an angel.

In another level of organization, Swedenborg tells us an angel is a heaven in its smallest form, indicating that heaven is within, or inwardly expressed. The inmost parts of this individual correspond to all the parts of heaven, and even the smallest parts reflect the largest in their form. Heaven then, as described by Swedenborg from "things heard and seen", reflects or appears as a single human - this is called by him the maximus homo in Latin - the universal human. As described by Swedenborg,

in That heaven in its whole complex reflects a single man is an arcanum hitherto unknown the world, but fully recognized in the heavens. To know this and the specific and particular things relating to it is the chief thing in the intelligence of the angels there, and on it many things depend which without it as their general principle would not enter distinctly into the ideas of their minds. Knowing that all the heavens with their societies reflect a single man they call heaven the Universal Human and the Divine Man; - Divine because it is the Divine of the Lord that makes heaven.⁶

As the body serves the soul within it, so does the entire heaven serve its component parts - communities, communities within communities, and individual humans (angels) within these communities. All these divisions, simultaneous and discrete, can exist separately or in concert. All parts, large and small, are connected. The body serves the soul (or spiritual body), which is directed by the understanding and the will. These two things make a person human, and the body acts only from these.

This idea of the universal human is too large to grasp immediately, and for this reason

⁶ Swedenborg, Emanuel, *Heaven, And its Wonders, and Hell*, Swedenborg Foundation, New York, 1988, n. 59.

Swedenborg spends quite a bit of time on his explanation of it. A particularly useful summary can be found in numbers 63 and 64 of Heaven and Hell:

Heaven being such, it is ruled by the Lord as a single man is ruled, thus as a one. For although man, as we know, consists of an innumerable variety of parts, not only as a whole but also in each part - as a whole, of members, organs, and viscera;, and in each part, of series of fibers, nerves, and blood vessels, thus of members within members, and of parts within parts - nevertheless, when he acts he acts as a single man. Such likewise is heaven under the auspices and direction of the Lord.

So many different things in man act as one, because there is no least thing in him that does not do something for the general welfare and perform some use. The general performs a use for its parts, and the parts for the general, for the general is composed of the parts and the parts constitute the general; therefore they provide for each other, have regard for each other, and are joined together in such a form that each thing and all things have reference to the general and its good; thus it is that they all act as one.⁷

From this we see that heaven is a unit as a body of parts within parts, and just as in our personal experience, the whole serves the parts while the parts in turn serve the whole.

Since the whole heaven reflects a single person, heaven is divided into parts the way a person is, with communities residing in specific parts, analogous to organs, nerves, fibers, the skeletal framework. Likewise, this arrangement is divided into general regions as a body, such as head, thorax and pelvis, and legs and feet, each with different general functions to serve the whole. So we have developed by this idea the notion of levels of arrangement, with all levels concurrently discrete yet interdependent. Such is the arrangement of the living organisms within our experience, and such, says Swedenborg is the reflective arrangement of the universe.

The universal human is a mammoth concept. But if we can continue to focus on the human of our own experience - the familiar form of our own bodies - while pondering such a cosmic concept as the universal reflection of it, the problem will begin to focus. We can then begin to see ourselves in a splendid new way, and begin to understand our place within the system.

It is within the large section of the Arcana Coelestia subtitled The Universal Human that Swedenborg perfects the development of this idea, supplying us with a rich fabric of detail for

⁷ Ibid., n. 63 and 64.

illustration. It is not necessary to recount all these details, although the methodical repetition of them is useful as an educational device. For the purposes of this paper, only those points which will best serve the needs of the discussion will be included, leaving the Arcana to the reader wishing further edification.

Swedenborg, in several places within his writings, describes two forces which act on all bodies to define their form in space. The first is a force acting outward from within, and in living organisms, he states that this force is life itself, from a continuous influx of the Divine. The second force is a continuous pressure from without, pushing in and confining a body in its three-dimensional state. These two forces in equilibrium serve to impart form to all things, from the smallest parts of a body to the body itself. An example of these forces at work in a dynamic way might be described as a blob of mercury suspended in the weightless environment of a space ship - with atomic interactions driving the atoms apart, and cabin pressure keeping them together. This ultimate equilibrated state, a perfect sphere, is far from static. It is a dynamic state of rest, with its form a compromise of forces. It is this simple system of opposites that ultimately gives form to all things - even the organs within a body, or the "parts within parts," mentioned above. Then Swedenborg tells us that everyone who enters heaven is an organ or member of this Universal Human.

From our discussion at this level of organization, we now move to another, higher level - grander perhaps, but directly related nonetheless. In the Arcana, n. 3637, we move up a step, from the individual to the heavens in their entirety. This is a large conceptual step to take, but in accordance with the line of reasoning to be developed, it is the only step we can take in tracing matter to its origin, the universe, to its source. As in *Heaven and Hell*, Swedenborg states that in the Universal Human, all the parts correspond to the Lord alone; to His Divine Human.

Relative to humanity, the Universal Human is the whole of heaven, but in the highest sense the Universal Human is the Lord alone. Everything in heaven corresponds to him... Hence they who are in the heavens are said to be in the Lord, even in His Body; for the

Lord is the all of heaven, in whom all are assigned their provinces and offices.⁸

In *Arcana Coelestia* n. 3648 he says that heaven is called the Divine Human because of its correspondence to, reflection of, and likeness to the Lord. And this brings us back to the word reflection, one of the words in our original definition of image. We are moving steadily toward a new definition of mankind.

In a sort of grand summary of this massive idea of man as an image of God, we read:

It is recognized that every organ and every member in the body is made up of parts and of parts of parts. Take the brain, for example. In general, this consists of the cerebrum, the cerebellum, the medulla oblongata, and the spinal medulla, this last being a continuation or a kind of appendix. Yet the cerebrum itself consists of many members that are its parts, namely the membranes called the dura mater and the pia mater, the corpus callosum, the corpora striata, the ventricles and hollows, the lesser glands, and the septa. It consists generally of gray matter and medullary matter, with sinuses, blood vessels, and ganglia.

The same is true of the body's sensory and motor organs and the viscera, as is sufficiently familiar from anatomical studies. All of these, in general and in specific, correspond very precisely to the Universal Human, and in the same measure, so to speak, to the heavens. In fact, the Lord's heaven is similarly divided into smaller heavens, these into still smaller ones, and these into the smallest. Ultimately it is divided into angels, each of whom is a miniature heaven corresponding to the greatest one. These heavens are quite distinct from each other, each belonging to its own general part, and the general heavens to the most general or the whole, which is the Universal Human.⁹

Before moving on from the development of this rather weighty image of reflections of the human form, it is time to retrace our steps a little, to see how we have arrived at where we are. In summary:

1. Matter is the finiting of the ultimate conatus, or energy, which is God acting on a single point in the natural world. Matter, then, is formed at the interface of the spiritual and the natural.
2. The form of matter is a reflection of the system in which it exists - the formal cause of the human then, is the form of the universe in which he exists.
3. This form is the image of God, who created the whole universe to begin with.

⁸ Swedenborg, Emanuel, *Arcana Coelestia*, Swedenborg Foundation, New York, 1984, n. 3637.

⁹ *ibid.*, n. 4222.

4. This form is human.

So man actually just sort of “ended up” in the human form. There was, simply stated, no other form he could have taken. This human form is established by the structure or arrangement of the components of heaven, from its whole (which is the very Lord himself) to the inmost parts of the angels. The universe, then, is the Universal Human; the Lord Himself.

Now all this information is intellectually stimulating, and this new concept of the human as a reflection of his spiritual roots might be useful in an esoteric kind of way. But what does all this really have to do with the human form we know, these bodies of ours, which function predictably on this natural plane? By continuing to dissect this creature, the human, we will find the answer to our question.

We have discussed the human organism with respect to its place in the universe - its unique simultaneous existence on many levels of organization - its form determined by its reflective and refractive inflections from its origin in the Divine Human.

But in order to incorporate this thinking into our working definition of man the spiritual/natural organism, we must do more than propose such a scheme. We must demonstrate it as the actual organizational mechanism at work in the cosmos. The problem is one of organization.

We have established, by various arguments, that all the parts of the Universal Human, down to the very smallest parts, exist both independently and in concert. But we have to this point established the anatomy of this body, so to speak; the structure, but not the function. Not surprisingly, Swedenborg has provided us with just such a functional scheme. It comes not from his Universal Human at all, but from a discussion of "the structure of creation" in another of his books, Divine Love and Wisdom, published in Amsterdam in 1763. We find our explanation for functional integration in a discussion of how all things in the natural and spiritual world are related - by an enormous principle called the Doctrine of Degrees.

It is by degrees that all these parts of parts of parts are connected, and as we shall see, the

connections, whether in this world or on the spiritual plane, are very real and substantial. From numbers 173 - 235, Swedenborg unfolds another of his grand schemes - too grand for this discussion to fully embrace - of the connection or direct relationship of all things in two concurrent modes: 1) in a continuum (as in the temperature along a metal rod, heated on one end, or in the familiar phenomenon of color gradation in the visible light spectrum), and 2) in a series of separate but related things. Swedenborg calls these relationships continuous and discrete degrees, respectively (Figure 1, in the Appendix of Figures).

Swedenborg saw this scheme at work in maintaining the dynamic state of the universe - the "functional integration" of all the parts by means of this method of keeping order. He goes to great lengths to explain it clearly using many examples, and as is so often the case, the human form as he, the anatomist and physiologist knew it, serves as the source of his examples. Swedenborg the theologian was first and always Swedenborg the scientist as well. Building this system up, again by a familiar series of rational arguments involving the notion of cause, he folds in the idea of the substantial nature of all phenomena including the spiritual, and then shows the nature in which these phenomena are related. For a taste of this:

The doctrine of degrees which is taught in this part, has hitherto been illustrated by various things which exist in both worlds; as by the degrees of the heavens where angels dwell, by the degrees of heat and light with them, and by the degrees of atmospheres, and by various things in the human body, and also in the animal and mineral kingdoms. But this doctrine has a wider range; it extends not only to natural, but also to civil, moral, and spiritual things, and to each and all their details. There are two reasons why the doctrine of degrees extends also to such things. First, in every thing of which anything can be predicated there is the trine which is called end, cause, and effect, and these three are related to one another according to degrees of height. And secondly things civil, moral, and spiritual are not something abstract from substance, but are substances. For as love and wisdom are not abstract things, but substance, so in like manner are all things that are called civil, moral, and spiritual. These may be thought of abstractly from substances, yet in themselves they are not abstract; as for example, affection and thought, charity and faith, will and understanding for it is the same with these as with love and wisdom, in that they are not possible outside of subjects which are substances, but are states of subjects, that is, substances. That they are changes of these, presenting variations, will be seen in what follows. By substance is also meant form, for substance is not possible apart from form.¹⁰

¹⁰ Swedenborg, Emanuel, *Divine Love and Wisdom*, Swedenborg Foundation, New York, 1988, n. 209.

This statement introduces the idea of degrees, and serves to show the universality of this principle, as it embraces all things, "natural, moral, civil, and spiritual." But the meat of this great doctrine of connection is found in Swedenborg's use of it to explain to himself just how it is that these components of the Universal Human are in communication. He says it is by these discrete degrees that the parts are a whole, but the parts have their own activities. In what may be one of the grandest summary statements in all of his writings (and in all biological writing for that matter), Swedenborg is at once at home in both spiritual and natural worlds. In fact, in the following narrative, he can scarcely see the door between:

As degrees of breadth, that is continuous degrees, are like gradations from light to shade, from heat to cold, from hard to soft, from dense to rare, from thick to thin, and so forth; and as these degrees are known from sensuous and ocular experience, while degrees of height, or discrete degrees, are not, the latter kind shall be treated of especially in this part; for without a knowledge of these degrees, causes cannot be seen. It is known indeed that end, cause, and effect follow in order, like prior, subsequent, and final; also that the end begets the cause, and, through the cause, the effect, that the end may have form; also about these many other things are known; and yet to know these things, and not to see them in their applications to existing things is simply to know abstractions, which remain in the memory only so long as the mind is in analytical ideas from metaphysical thought. From this it is that although end, cause, and effect advance according to discrete degrees, little if anything is known in the world about these degrees. For a mere knowledge of abstractions is like an airy something which flies away; but when abstractions are applied to such things as are in the world, they become like what is seen with the eyes on earth, and remains in the memory.

All things which have existence in the world, of which threefold dimension is predicated, that is, which are called compounds, consist of degrees of height, that is, discrete degrees; as examples will make clear. It is known from ocular experience, that every muscle in the human body consists of minute fibers, and these put together into little bundles form larger fibers, called motor fibers, and groups of these form the compound called a muscle. It is the same with nerves; in these from minute fibers larger fibers are compacted, which appear as filaments, and these grouped together compose the nerve. The same is true of the rest of the combinations, bundlings and groupings out of which the organs and viscera are made up; for these are compositions of fibers and vessels variously put together according to like degrees. It is the same also with each and every thing of the vegetable and mineral kingdoms. In woods there are combinations of filaments in threefold order. In metals and stones there are groupings of parts, also in threefold order. From all this the nature of discrete degrees can be seen, namely, that one is from the other, and through the second there is a third which is called the composite; and that each degree is discreted from the others.

From these examples a conclusion may be formed respecting those things that are not visible to the eye, for with those it is the same; for example, with the organic substances which are the receptacles and abodes of thoughts and affections in the brains; with atmospheres; with heat and light; and with love and wisdom. For atmospheres are receptacles of heat and light; and heat and light are receptacles of love and wisdom; consequently, as there are degrees of atmospheres, there are also like degrees of heat and

light, and of love and wisdom; for the same principle applies to the latter as to the former.

That these degrees are homogeneous, that is, of the same character and nature, appears from what has just been said. The motor fibers of muscles, least, larger, and largest, are homogeneous. Woody filaments, from the least to the composite formed of these, are homogeneous. So likewise are parts of stones and metals of every kind. The organic substances which are receptacles and abodes of thoughts and affections, from the most simple to their general aggregate which is the brain, are homogeneous. The atmospheres, from pure ether to air, are homogeneous. The degrees of heat and light in series, following the degrees of atmospheres, are homogeneous, therefore the degrees of love and wisdom are also homogeneous. Things which are not of the same character and nature are heterogeneous, and do not harmonize with things homogeneous; thus they cannot form discrete degrees with them, but only with their own, which are of the same character and nature and with which they are homogeneous.

That these things in their order are like ends, causes, and effects, is evident; for the first, which is the least, effectuates its cause by means of the middle, and its effect by means of the last. It should be known that each degree is made distinct from the others by coverings of its own, and that all the degrees together are made distinct by means of a general covering; also, that this general covering communicates with interiors and inmosts in their order. As a result, there is a uniting and a unanimous activity of all things.¹¹

This is heavy stuff. The organizing principle behind all biological processes (and all other processes spiritual, civil and moral for that matter) is contained in this terse description, and its elegance is in its simplicity. This statement, made in 1763, is the stuff of what we, in this enlightened era, smugly call our "new science:" "As a result, there is a uniting and unanimous activity of all things". And what is this "new science?" We will find it in the "old."

Before we talk about the "new science", we must first define it by an examination of what it is the "old science" does, and what it cannot do. Figures 2 - 8 are included in this study with a single purpose in mind - to demonstrate the astonishing order which is immediately apparent upon examination of a living organism. The figures have been arranged to demonstrate the subdivisions, into smaller and smaller units, of the parts of the human body. The subdivisions begin with the deep fascia enveloping the whole organism, and this extends to envelop the organs. Continuing inward, the membranes subdivide geometrically. Note that the divisions and subdivisions are effected by means of connective tissue membranes which divide the organism ultimately into units of molecular size. This connective tissue is a proteinaceous substance, the

¹¹ *ibid.*, n. 189 - 194.

body's "generic" and ubiquitous building material. We shall have more to say about this substance later. The figures should be examined with the comments of this section in mind.

There is an order to the parts of the human body which is basic and universal. Swedenborg knew about this order, as we have seen in his description of degrees. He was fascinated with the structural series of large-to-small divisions of a body's parts, as produced by divisions and subdivisions of its internal membranes. He saw an implicit wisdom in this orderly arrangement, and recognized it for what it was - an illustration of the principle of degrees he saw at work in all relationships. Swedenborg knew, as Figures 2 - 8 demonstrate, that all the body's parts, from the whole to the inmost parts we would now recognize as the molecular components of the cell and its nucleus, are in direct and continuous contact within a three dimensional lattice of structural membranes. There is a hierarchy of organizational levels in the living organism which is just as Swedenborg described, in this order of arrangement:

- fascia of whole organism
- periosteum of skeleton
- peritoneal membrane
- organ capsule (connective tissue fibers)
- septae (inward subdivisions of capsule by fibers of capsule)
- reticular fibers (investing individual cells)
- cell membrane
- intracellular fibrous and membranous structures
- nuclear membrane
- fibrous structures within nucleus (on which the DNA is arranged)

This is the universal anatomical plan for all living organisms. Each level is discrete in its function, but is concurrently dependent on all other levels within the whole. The organism is the sum and its parts. "As a result, there is a uniting and unanimous activity of all things."

With this arrangement in mind, the next place to look for coherence in this human form is in Swedenborg's *On Tremulation*, a book published in 1720. One of Swedenborg's early publications from his "scientific" period, this discussion of functional arrangement of the body is little different from his later "theological" works we have examined. While reading some excerpts from this work, the reader should keep in mind the orderly partitioning of the body by means of the membranous structures which make up the divisions we have seen.

If common sense be consulted and allowed to guide us as we inquire further and further into the real cause of life - as to what it is that really makes us living and wherein living force most generally consists - we must finally come to the conclusion that this cause is motion. For is it not according to common sense that everything that lives also moves, that is, that the living or the being is inseparable from the moving?

As now living force is motion, and as life consists of little motions, and as the most subtle motions in nature are contremiscences, it follows that whatever lives in us consists of contremiscences, that is, most subtle motions; it is therefore our opinion that whatever lives in us is a tremulation in our finest nerves, in the most delicate membranes, in the very bones and in the entire systems of nerves and bones. Our theory is therefore, that every part of what is living in the body lives by means of little tremulatory motions which flow into the nerves and the membranes and set the whole system into sympathetic tremulation; and that if all the contremiscences of the senses are taken conjointly, they possess the name of nature, or of life.

This is, therefore, another clear proof that every sensation is a tremulation in the whole nervous system, and that a sensation is not confined to any particular place... but that it exists, as in one, so in all places simultaneously.

The dura mater may be said to produce an expanse over the whole body, for it communicates membranes and tunics to all parts, making a continuous system just as the nerves do. As now the nerves send out ramifications to all the periostia, to all the muscles, and to all the blood-vessels, it follows that the dura mater provides clothing for all these parts, forming all cuticles, periostia, and integuments in the body, so that the whole contiguous system of membranes is nothing but a continuous extension of the dura mater.¹²

These excerpts from Swedenborg's curious little book lead us directly back to *Divine Love and Wisdom*, n. 194: "Further it should be realized that the general covering communicates with more inward and most inward things in their order. As a result, there is a uniting and a unanimous activity of all things." There is remarkable coherence between these statements, of 250 years ago, with current knowledge of the anatomical arrangement of living tissues, and with the necessity of the "new science" to define matter holistically. This is coherence, then, between past, present and future for our paradigm of natural science.

And just what is this "new science," which is leading us into the future? It is lots of things to lots of people, but stripped of the naive and amateurish wishful thinking its postulates can spawn, the message is simple: The universe is not as mechanistic as we have thought; there is a continuity, or connectedness to all things. Recent discoveries in physics tell us this must be

¹² Swedenborg, Emanuel, *On Tremulation*, Swedenborg Scientific Association, Bryn Athyn, Pennsylvania, 1976.

the case. In an excellent summary of the current predicament, Larry Dossey, a physician who would explain this phenomenon in a universal way suggests that "we have merely discovered an elemental oneness of the world. This oneness cannot be diminished by spatial separation. An invisible wholeness unites the objects that are given birth in the universe, and it is this wholeness that we have stumbled onto through modern experimental methods."¹³ New Science? Hardly.

We have covered a lot of ground on our journey from a single finited point, to a God whose form is the very universe of his creation, to the elegant structure of this wonderful organism, the human, and finally to this organism's place in the universe. But as comprehensive as our treatment of the subject may have been, there is still another major question to address: If this human body of ours, with its anatomical plan as we know it (as we have just discussed it), is truly created in the image of God, then how does the thing really work? Putting all the philosophical and theological generalizations aside, what physical mechanisms, understandable on this plane, are at work in this organism to make it live? All the chemistry in the world cannot explain it. It can describe what goes on quite nicely, but it cannot tell us what we need to know about this wholeness thing. A study of parts cannot explain the whole.

To address this problem of wholeness, I attempted, in 1977, to construct the organism from what was known of its parts. In a thesis addressing control mechanisms in living organisms, I proposed a system of functional integration based on the idea of simultaneous communication of all parts. My conclusions were that the organism was greater than the sum of its parts, and in fact constituted a unit of matter in total connection with all other components of the universe. This functional unit represented matter at a particular level of organization, and the character of this functional unit allowing continuity was its inherent electromagnetic nature; joining, by this, the fabric of the universe.

These studies were well in advance of my introduction to Swedenborg's thoughts on the same

¹³ Dossey, Larry, M.D., *Space, Time, and Medicine*, New Science Library, Shambhala, Boston, 1982, p. 100.

subject. But "modern" science has paid little if any attention to Swedenborg, and the "new science" claims to have originated in recent findings alone. Yet all of these point in the same direction. Truth is truth, and will always emerge the same if observation is true. As I quote from this thesis, the reader is encouraged to review the figures demonstrating the marvelous partitioning of the human body, the cosmic idea of discrete degrees, and this mind-boggling idea of the human form as a universal form - the actual form of our Creator and Sustainer as reflected within us. With little effort, all these ideas seem to fit nicely together.

The current state of biology has been established by the stepwise descent of research into smaller and smaller dimensions. Description of normal function has gone from organ systems to tissues, from tissues to cells, from cells to organelles within them, and from organelles to the molecular interactions which drive the living condition. A physical approach to biology investigates the electromagnetic state of matter and energy which directs the formation and activity of these molecules. It is now possible to begin to employ the body of knowledge gained from this descent in a meaningful investigation of the opposite direction. It is time to apply the facts derived from investigation of inner dimensions toward a more complete concept of normal function at the level of the organism, the sum of all biological dimensions.¹⁴

Experimental data support the proposition that structural proteins are capable of serving as electron conductors in living material. This concept can be applied to the body of existing data in such a way that a hypothetical model of electrical integration of function in living systems can be proposed.

The proposed control system operates as a continuum of electron migration through cells, tissues, organs, and ultimately the organism. By this model, conduction is mediated at each level by various structural proteins.

The generation of potential to establish the electrical continuum of the organism is proposed to originate by two independent mechanisms to produce a communicative system in two modes: cells individually generate a potential which is transferred to a pool of moving electrons in the charged lattice of contiguous membranes in tissues, and then to the organismic level, while a potential generated by an element of the central nervous system flows inward along the same reticular pathway to the cellular level. By this electrical activity in two modes, a mechanism of control is proposed which mediates the activity of the molecular interactions inherent to life processes.

By application of the hypothetical model, an explanation for such fundamental phenomena as cell communication, control in morphogenesis and regeneration, differentiation, and others can be deduced.

The organism has been redefined by this hypothetical treatment as not only a discrete collection of chemical interactions, but as a dynamic unit of chemical interaction

¹⁴ Bell, Reuben P. *Experimental Consideration of Structural Proteins As Electron Conductors - A Conceptual Model of Functional Integration In Biological Systems*, a thesis submitted for the degree of Master of Science in the Faculty of Natural Sciences, The Graduate School, The University of Tulsa, Tulsa, Oklahoma, 1977, p.1 -2.

which interacts with the total fabric of electromagnetic flux in which it exists.¹⁵

From this, it should not be difficult to identify my personal attraction to Swedenborg's thoughts on the human form and his "doctrine of degrees." Swedenborg's ideas, however, will be dramatically coherent for anyone who would approach the mystical tradition of religion with a head full of hard-earned rationality. These two positions, considered polar opposites to many, are in fact the same reality for those who will simply observe and think, doing both with complete objectivity. This was the method of Swedenborg, and is the method still of a few scientists today. His contribution to what is so myopically called the "new science" could be truly colossal. The word "new" is a misnomer, of course, as the arguments of this discussion have proved. The new science is concerned, however, with integration and "unanimous action" (as stated by Swedenborg in *Divine Love and Wisdom*), and with the continuity of living systems, and the oneness of the universe. But the problem with science is its myopia, the "new" science notwithstanding. The problem, hardly new, is with human nature:

What has been will be again, what has been done will be done again; there is nothing new under the sun. Is there anything of which one can say, "Look! This is something new"? It was here already, long ago; it was here before our time.

There is no remembrance of men of old, and even those who are yet to come will not be remembered by those who follow.¹⁶

Swedenborg is at home among those scientists of any time who have questioned the fabric of tradition, and dared to observe what is really there.

The conclusion to this eclectic treatment of the human form is a last attempt to define the human organism in its proper physical place in the universe, and by its proper spiritual expression in this same universe. The problem here is obvious: we must come to understand the human as an inhabitant of both of these at once. By considering the arguments presented in this paper, we will see that the human being, consisting as he does as a complement of parts, and yet,

¹⁵ *ibid.*, pp. 61 - 62.

¹⁶ Ecclesiastes 1:9-11, *Holy Bible*, New International Version

as part of a greater whole as well, is an inhabitant of the interface between these two universes. He is the manifestation of the image of God.

If the universal human is the incomprehensible form of our creator as He exists in the real world (natural and spiritual are both considered an expression of this real world)... And if this universe is an infinite series of related structures as described by the concept of "degrees" (from vast to infinitesimal; from groups of communities in heaven to individuals; to the smaller and smaller parts of these individuals)... Then the human being in the natural world may represent the actual, honest-to-goodness interface between the two states of existence - the natural and the spiritual worlds. We, as humans, may be "the visual impression of something produced by refraction, as through a lens." Remember that refraction is what happens to energy as it passes from one medium to another. When through a lens, this will produce an image of its source. When this source is the Divine, it will produce the human form.