

THE NEW PHILOSOPHY

A Quarterly Magazine devoted to the interests of The Swedenborg
Scientific Association.



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Entered at the Lancaster Post Office as Second-Class Matter.

THE NEW PHILOSOPHY.

THE NEW PHILOSOPHY is a quarterly magazine devoted to the exposition of the scientific and philosophical principles contained in the works of Emanuel Swedenborg, and as the organ of the Swedenborg Scientific Association it will be the means of promulgating the uses undertaken by that body. The magazine will contain essays on Science and Philosophy; instalments of some of Swedenborg's Scientific works; and the transactions of the Association.

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Publication Offices: No. 9 N. Queen St., LANCASTER, PA., and Huntingdon Valley, Pa.

Subscription price—One Dollar per annum; to members of the Association, Fifty Cents.

Subscriptions and Business Communications should be sent Carl H. J. Asplundh, Business Manager, Huntingdon Valley, Pa.

The Swedenborg Scientific Association.

This Association was organized on May 27th, 1898, for the following purposes :

I. The preservation, translation, publication and distribution of the Scientific and Philosophical works of Emanuel Swedenborg.

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The NEW PHILOSOPHY will be furnished to members of the Association at Fifty Cents per annum.

THE NEW PHILOSOPHY.

VOL. V.

JANUARY, 1902.

No. 1.

THE SENSES.

PART FOUR OF THE ANIMAL KINGDOM, BY EMANUEL
SWEDENBORG.

CHAPTER IV.

Smell.

67. 1. The uses of smell are as follows:—1. Smell exists in order that the soul may take cognizance of what slips into the lungs, for the sake of the blood, which takes thence atmospheric elements, and is thereby turned into arterial blood. 2. In order that the brain may be exhilarated, and perchance that its spirit may take in ethereal and, as it were, celestial elements by this way. 3. In order that the cerebrum and the cerebellum may be excited by external causes into their alternate changes of animation; likewise the lungs. 4. In order that, by the excitation of sense, phlegm may be drawn off from all the organs of the head, and from the brain, and that they may thus be purified.

68. 2. As to the first use, namely, that smell is in order that the soul may take cognizance of what slips into the lungs, for the sake of the blood, which takes thence atmospheric elements and is thereby turned into arterial blood, see Part II. of the *Animal Kingdom*, on the Tongue, pages 12-15, n. 284. Note: These things are to be observed:—1. That the atmosphere bears in its bosom stores and crowds of effluvia. 2. Still more so does the

ether. 3. Men sensate only the atmospheric properties and abundance; brute animals sensate also the ethereal, as is evident from the power of scent in dogs, and from eagles and other [birds], which sensate things from a long distance. 4. The aliments which smell sensates, more than taste, are the purer things of the blood. 5. But because aliments and elements of both kinds [that is, of smell and of taste] contribute to the nutrition and refreshment of the blood, hence there is so great an affinity between them; each sense fully instructs the soul, as may appear in brutes. 6. The lungs sensate at the same time, wherefore animals draw the animations of their respiration deeply. 7. This is why the nerve of the fifth pair goes to the nostrils, and the intercostal nerve to the lungs; the office that the fifth pair performs in the head and towards the sensory organs, the intercostal performs towards the lungs; wherefore they concur, or the one inflows into the other, in order that they may act from agreement. 8. The sense, as for instance taste, notices from the same cause what may be useful; for the soul regards the blood as her vicar in the body. 9. That thence the blood is turned into arterial blood, see *The Nose*, Part II., 10. That the cuticles also draw in those things, see *The Cuticle*.

69. That sense is to the end that the brain may be exhilarated, and likewise by this way receive ethereal aliments, appears from the following considerations:—1. It appears from the sudden change of the brain and the animus, from a very strong indrawn breath. 2. From the sudden change of the animus either to gladness or to grief (*necem*). 3. From the cuticles, the office of which the nostrils more distinctly perform; for the cuticles of the nostrils are more tender, and more immediately communicate with the brains by means of the fibres and membranes. 4. From the immense abundance of arteries and veins, as also of glandules of various kinds, as in the cuticles. 5. From the immediate sanguineous or arterial way into the brain, through the foramina of the cribriform plate, and by other communications with the arteries of the brain. See Winslow on the *External Carotid*, above. 6. It appears especially from phenomena. 7. Then also from the nature of this sense in that it sensates more subtile parts than does taste, therefore it snatches up those parts

which are suitable for the purer blood or spirit. 8. From the communication with all the medullary fibre, with each meninx, especially the pia mater, with the arteries; all these fibres, namely, the medullary fibre, the pia mater and the artery, are concentrated in the cortical substance. 9. That smell is in the very pole of the whole cranium and brain, and is the beginning of the axis of the duct into the body. 10. Therefore there is a certain concentration in the inferior sense.

70. *Smell exists in order that it may excite the cerebrum and the cerebellum into their alternate turns* (see *Animal Kingdom*, Part II.). 1. As an external cause which corresponds to the internal. 2. This appears from sneezing. 3. From the very organism of the fibres, and from the connection of all things pertaining to it. 4. Why not in man as in beasts, see cited passage.

71. *Smell exists in order that the mucus may be drawn off from the organs.* 1. From the ear. 2. From the eye. 3. From the brain. 4. From the blood. 5. Whence it is the duct from all [the organs of the head]. 6. Wherefore it is intermediate to all, and as it were the central place, whither all the pituitæ flow together. 7. Thus it is the common emunctory of the head. 8. When a papilla is excited, a glandule is also excited; thus also the ducts, membranes and arteries, are conjoined; for the sense is the cause of the action of all these things, for it is their life; see *Animal Kingdom*, Part II.

72. *The use of these things which the sense of smell offers* 1. the circle; the use is for the soul, for the spirit, for the blood; and from the blood it returns into the spirit; thus all things are clarified and exalted into gladness.

73. 3. The *first* movement of this sensation is the reception of those things which touch; the *second*, thence arising, is sensation; the *third*, flowing forth from sensation, is affection; the *fourth*, is change of state; the *fifth*, is the effect.

74. The *first* movement, or reception, is of the body or of the nostrils, which admit the air fecund with effluvia. The *second*, or sensation, is of the soul herself; for she sensates the minutest divisions of touch. The *third*, or affection, is of our mind and at the same time of the soul; for the mind does not

perceive the minutest divisions, but only the affection thence rounding, and its varieties; thence it is evident how obscure our sensation is, for one affection consists of infinite things; wherefore it is evident how fallacious it is. The *fourth*, or change of state, is of the mind and at the same time of the organ or sensory; appetite indeed intercedes and a certain affection of the animus. The *fifth*, or the effect, is of the organ itself and at the same time of the whole body to which application is made, and to which use it yields; for all things in the whole body dispose themselves for receiving, and for serving the common use.

75. From these things it appears that there is a circle, that it first begins in the body, tends towards the soul and returns to the body, even so that where the beginning is there are the terminations; but after the finished gyre it is the office of the body, *first*, to receive, especially so of the nostrils; *second*, of the soul to feel; *third*, of our mind to be affected; *fourth*, of the animus to desire; *fifth*, of the nostrils to be changed as to suitable state; *sixth*, of the whole body to be disposed in order that an effect may be given forth; thus the first and the last, after the gyre is run through, come together.

76. 4. Now as to the first movement, namely, *that it is the reception of those things which touch*, these things are to be observed:—1. Those parts are especially the harder corpuscles of the mineral, vegetable and animal kingdoms,—angulate, polygonous, plane and variously spherical. 2. These parts are like those in taste, but are smaller, for where is the smallest of taste there is the largest of smell. This is observed in this, that those things that are tasted are not smelled except as to the subtle parts; we taste common salt, alkali, acid, but we do not smell them. 3. But [we smell] the more volatile saline, sulphurous, urinous particles, and the like. 4. Wherefore these things float about in the air, and, as may appear, embraced by the bullæ or vapors themselves, when they are released from these bullæ they strike the little sensories. 5. Wherefore also they are present in greater abundance, for they are in a superior sphere and degree, where there are more varieties but greater harmonies. 6. The greatest of taste, as for instance common salt, does not act

upon the organ of smell as an object of its sense, but as an object of a common sense; for the cuticle itself or the mucous membrane feels it, whence arises a corrugation, a kind of titillation, a permutation, and many other things; for like things at the same time allure many of the little sensories, or the glandules themselves, in which there is a common sense, similar to a more subtle and more sensible cuticular touch. 7. Whence it may appear that what is the greatest of smell is not that which is the smallest of taste, but that it is of a superior degree, of like figure with acids or simple salts, which consist of compounds. 8. The smallest of taste can be said to be one spine of acid salt, wherefore these things are the smallest trigons, cubes, parallelograms, polygons and the like; whence the very basis, or the greatest of that sense, appears; whence the smallest is known. 9. Brute animals know distinctly still purer things, on account of many causes, of which below. 10. From the above we might deduce whence arises the sense of what is fragrant, noisome and the rest, even so far that those senses can be described if the science of corpuscles be worked out, without which we never arrive at a knowledge of sensation, but only of affection, which thing is not rational, but animal. 11. How infinite are the effluvia of this kind, is evident from every object of the mineral, vegetable and animal kingdoms, in that every one of these objects continually breathe forth a billow and ocean of effluvia which continually renew themselves. Derived from magnetic effluvia a similar crowd fills full every object; especially the still purer things whence are compounds.

77. *As to what concerns the second movement or sensation,* it has been said that it is proper to the soul, which apperceives all the parts distinctly. 1. Thence is her affection, which differs altogether from the affection of our mind. 2. For her affection is of a superior degree, and from single differences taken together truly feels whether or not a thing is suitable for the blood; on the other hand, the affection of our mind apperceives delight, but does not therefore know from affection whether a thing conduces or not; poisonous things frequently smell sweetly, some useful things horribly, and so forth. 3. That sensation requires papillæ adequate to the objects of that sense;

wherefore those papillæ are more subtile, and are not visible except when boiled in water (see Winslow); there is also, according to Heister, a villosity. 4. Those papillæ are more tender, more marked, as may be seen under the sheath of pia mater, like the papillæ under the sheath of the outmost or coarser membrane of the tongue. 5. They arise from the nerves, even so that they are nerve forms. 6. The membranes themselves cannot give any such sense, except only the sense of touch, but the forms are adequate to the objects, which forms can apply those objects to themselves, and impress the very mode and figure upon the nerves, whence there is a corresponding modification. 7. It is similar in regard to sight, the rays of which spring back from the hard parts as objects, whence continuously exists a modification. 8. How great is the abundance of such papillæ, see Winslow. The olfactory nerves, together with their meninx, pass over into those papillæ, and are terminated in them as in their own extremities; see the authorities.

78. The vehicles which convey those objects are as follows:—1. The air is the vehicle which carries them about. 2. Then also the purer air or ether. 3. In the ether they flow more actively, both because they are more minute and because they float in more volatile atmospheres, which impart to them their force of striking. 4. It may seem as if there are vapors in which the parts are embraced, which are set free in the tumefied nostrils, and thus strike [the sensories]. 5. There are also spirits which bear them, as also thin oils, and the like. 6. On account of their subtilty they penetrate the mucus itself. 7. They infold and insinuate themselves into a kind of thin humor, which distills from the brain through the pores of the cribriform plate; this, like the salivas on the tongue, dissolves and insinuates those parts; for this saliva is most limpid in its first origin, but this humor being evolved makes the rest thick, whence is mucus (see Winslow). Hence also this sense rejoices in its own saliva; for that something similar exudes from the smallest arterial capillaries can also be conjectured. 8. The things which are coarser are introduced into the mucus, and there beaten, and excite touch, whence also such affections and changes of state redound as are corrugations and expansions, which continually

extend themselves according to every contact, namely, by means of or along the dura mater.

79. How the sense of smell penetrates the common sensory.

1. It takes place especially through the fibres of the olfactory nerves. 2. Wherefore those fibres tend by the mammillary processes through the pores of the cribriform plate even to those little organs. 3. Those fibres are therefore multiplied and are thin; for the thinner they are the more suitable they are for the sense; furthermore, they are almost fluid, according to the description,—all these things being arguments of exquisite sensation. 4. These fibres are annexed to all the fibres of the medulla of the brain; for they arise between the corpora striata and the thalami of the optic nerves. 5. Thence the way lies open into all the cortical substance of the brain. 6. Besides these fibres, fibres of the fifth pair also flow along which carry the sense also to the cerebellum; for in order that a change of state may exist, it is necessary that it take place from the cerebellum, which induces a change of state, not only on the organ, but also on the whole body generally; this change of state is the office of the fifth pair, as has also been observed in the sense of taste. You will see many causes below. 7. Besides there is also the pia mater which hides those papillæ under its sheath; this also conveys the sense by an opposite way towards the cortex where a meeting takes place. That the pia mater enters the single spherules of the cortex and gives them a common tunic is to be seen elsewhere. 8. How very swiftly the modification traverses those very subtle fibres, and dissipates itself into the whole expanse of the membranes, even to their utmost limits, may appear from the nature of the modification. Thus on account of this meeting, sense is terminated in its beginnings. 9. The sense is also carried by an arterial way, or by the corporeal fibres which likewise enter the cortex; which has been seen in the part on the Cuticle and will be seen in the part on the Brain. 10. Hence [the sense enters] by a triple way. 11. It is allowable to add a fourth way, by the dura mater; but by this way the sense of touch proceeds, whence permutation, etc. 12. Therefore every sensation of smell pervades the entire cortical substance of the brain. 13. And by mutations of state gives the sense, which

mutations respond to the modifications of the fibres, as does sight to harder objects. Sensation in the cortex of the brain is only change of state. 14. The fibre of the nerve of the fifth pair carries those modes also to the cerebellum, but, as may appear, by the fibres alone and [also by] their tunics, thus also into the cortex by a double way. 15. The composition of the fibres corresponds to the acumen of the senses; that the acumen of sense is greater arises solely from the composition, tenderness, and multiplication of the fibres, and from the abundance of spirits in them. All these things concur in the animations in brutes, as may appear from the description of the mammillary processes.

80. 5. *As to the affections, which the senses of smell and taste cause*, these things are to be held. 1. The affections of the soul are of one kind, those of the rational mind another, those of the imagination another, and those of the organ itself of another. 2. The affection of the soul will show itself as a certain love of the society or commerce of its own body, for the sake of ulterior ends, either for the sake of society, or for the sake of the heavenly kingdom, altogether according to the spiritual state of the soul which looks above itself; but the natural state looks to the side or to society. 3. The affection of the rational mind is for the sake of good or evil, especially on account of its body and mind, and its safety; thence arises an affection of a kind of goodness which is believed to be here within, whither they warn those senses. The perception of goodness is according to principles *a posteriori*, according to knowledge and other things, which are the causes of the principles. 4. The affection of the imagination or of the soul is a kind of gladness and hilarity, or a sadness arising from the sense. 5. The affection of the sense itself, whether of taste or smell, as, for instance, sweetness or fragrance, or the contrary, is of the organ itself, therefore also the pleasure. This affection does not arise from the aforesaid affections, even as might have been concluded of them, but only from the harmony and more perfect form of the parts which come into contact [with the sensory], to which like modifications in the nerves respond, and like mutations of state in the cortex of the brain;

thus there is an agreement of form, 6. To know the harmonies of those mutations is an immense labor, for they are according to the forms in every degree. 7. Wherefore those senses are not corporeal, although they are not sensated except in the brain by its mutations, and the mutations of its cortical substance. There is a harmony which can be submitted to calculation, especially in these senses where circular forms occur, but it is of vast labor, and it would not now be useful to go into those subtleties.

81. *The causes of the desires and appetites, in like manner as of the mutations of the state of the organ of these senses, are as follows:—*1. The cause is the affection itself, and its cause is the knowledge or understanding of those things which affect the sense. 2. Wherefore the cause of appetites in the soul is different from that in the mind, and so forth. 3. There is of the soul indeed a love of perfecting the blood, by those parts which approach or are attracted by the atmosphere; her affection is true, but her superior affection is truer, as also her love; because the cognition of things causing that sense is true. 4. Of the rational mind is the desire for those things which touch [the sensory]; for the mind is affected by the goodness of those things according to science which it acquires by art or experience or other cognition. 5. But of the animus or imagination is appetite, arising either from the mind and thus from what is superior to itself, which is a rational appetite, or from the quality of the sense itself, thus from the sense itself of the given organ. 6. To the sense itself appetite cannot be attributed, but change of state or a disposition for receiving that to which it is thus instigated; as, for instance, will, cupidity and action. 7. From these things it may appear that they who have appetite from taste or smell alone are animal, but not rational, wherefore neither are they truly men; on this account they are not able to abstain from those things which are hurtful. They are only clients of pleasure, both in respect to quality and in respect to quantity. 8. From these causes it may appear, who excites these senses, or, rather, what excites the changes of state themselves, namely, on the part of the soul, it is her love, or, on the part of the rational mind, it is its desire, or, on the part of the

imagination, it is its appetite, or, on the part of the body, it is its pleasure. 9. This is the reason that as many as are the heads so many are the senses; and that what pleases one displeases another, that what is pleasurable to one is unpleasurable to another, and that we sometimes desire incongruous and wonderful things, as do pregnant women, etc.

CONNECTION OF RESPIRATION WITH MUSCULAR CONTROL.*

BY MISS LILLIAN BEEKMAN.

V. Organic connection between inspiration of the lungs and control of the muscles by the cortical glands or gray matter cells.

The result of thus bringing the lungs into action at birth is, to usher in the conscious activity of the larger integrated-organism of which they are a part: to which conscious life they always afterwards act as a common physiological plane or fulcrum; by placing all that coarser tissue, chiefly muscular, which the red-blood especially feeds and keeps in tension, under control of the determining activities of [the cortical glands].¹

The indrawn breath firmly held brings the entire body under immediate control of the determinate action or "will" of the cortical glands. A deep inspiration is thus the instinctive preliminary, the physical premise, basis and fulcrum, for many actions; and that irrespective of quality. The man who desires to regain self-control takes a deep breath, and finds it effective; the workman and athlete take a deep breath preparatory to their best endeavor, and find it effective; the murderer also may take a deep breath to brace himself to the exertion of driving the knife home to an innocent heart,—and find it effective.

An inspiratory action of the lungs, deep and firmly held, is the especial and efficient means of bringing all the bodily powers and structure under the immediate direction and control of the cortical glands.

* This is the Fifth note supplementary to the article, "Mechanism in the Brain by which Alternating States of Sleep and Wakefulness are Produced. *The New Philosophy*, Vol. IV., No. 1.

¹ "Mechanism of Sleep," Chap. I., p. 11.

This is the way it works. When the lungs expand, or "take a breath," the cortical glands are in contraction or systole. The brushing of the outside air along the nasal and other air-passages, affecting the delicate peripheral ends of the nerves there, is the general external means of stimulating the cortical glands to contraction; ² although the cortical glands and the lungs can also act upon each other directly, if either be sharply stimulated by something acting immediately and exclusively upon it.

By all this the inspiration or *expansion* of the lungs, and the systole or *contraction* of the cortical glands, are made simultaneous; and they also are, it appears, coincident in length of time. Now *at* and *by* the systole or contraction of the cortical glands, the animal spirit (which is as it were the *arterial* side of the purer-blood circulation) is driven from the central chambers or ventricles of the cortical glands, powerfully down along **the simple fibres** (the pure nervous fibres) issuing from those glands; which fibres terminate, some of them in the red-blood tides, and a very great bulk of them in the centers of the corporeal "leasts" or units (or cells) of the body.

If this contraction or systolic action of the cortical glands be strong and steadily held, these corporeal "leasts" or units of the body will necessarily *be filled with the animal spirit* or arterial-purer-blood (which is the pure, homogeneous, nervous fluid), *even to impletion*.

And wherever any tissue or cell is filled with purer blood to impletion the red blood is crowded back out of its capillaries in that tissue; and thus cannot enter it at all. "For when the animal spirit acts, the red blood yields."³

Thus for that moment during which such contraction powerfully and steadily lasts, the tissue thus acted upon ceases, you may say, to be vascular; and becomes an "as-it-were" nervous tissue because of this "impletion of it" by the pure nervous fluid or animal spirit. And thus for that moment that tissue must become an "other self" and "pure obedience" to every determining, directing, governing activity of the cortical glands,

² *Economy Animal Kingdom*. Part I., Nos. 283-4; Part II., 39, 43.

³ *Animal Kingdom*, No. 518 (note 1).

operating by means of their "proper own," living, fluid protoplasm, i. e.—the purer or intermediate blood. This thing is true of muscular tissue pre-eminently. During its action it has practically no red blood in it.

It is to be observed that the fact that the simple fibres also weave the very channels of the red blood itself, affords a powerful adjutor help in thus driving the red blood from the bed of its own channels. For where and when the elastic simple fibres are full and swollen with animal spirit, they are greatly expanded both in length and breadth, and thus they literally narrow the fine red-blood channels.

Thus in producing this impletion of the corporeal "least" and "units" or cells by the animal spirit, the "red blood" is for the moment "ruled out;" and ruled out by two means or instrumentalities,—one, by which the animal spirit or arterial-purer-blood acts directly in and into the tissue; the other, that by which it also governs the red blood supply to that tissue by having a sort of contracting grip around the very red-blood vessels.

The interesting thing here is that this purer or intermediate blood which thus ousts the red blood from that very tissue⁴ which is peculiarly its own kingdom, is *not* the purest, highest blood, or living, fluid protoplasm, in the body. It is, however, the particular blood which represents the state of the cortical glands,⁵ and which the Writings say is kept in perfect correspondence with the marriage of love and wisdom or of evil and falsity in the man personally (or in his conscious self and will). And by this organic operation just treated of, the very interior quality of his will in its act, seems to be *by and in* the very act itself, structurally and dominantly inscribed, literally, on the interiors of the tissue units and structural leasts of the body, *whenever this particular blood*,—acting coincidentally with

⁴ Of this tissue the purer blood then takes possession even to impletion, itself alone ruling and dominating and being operatively and structurally active in the bodily leasts and units, during the time of this contraction or systolic action of the cortical glands and simultaneous deep inspiration of the lungs.

⁵ *Economy Animal Kingdom*, Part II., p. 305; *Divine Love and Wisdom*, 423.

the inspiration of the lungs,—is thus driven actively and of purpose, fixedly *down into the body*; so that *it only* of the two bloods, the purer blood and the red, is there present and operative during the moment this activity lasts. Thus the very nature of the man's will inscribes itself bodily in his deed.

The inspiration of the lungs is thus a sort of "push-button," deliberately setting in motion a certain plane of effective causes or active instrumental means,—which plane of cause or instrumental means is alike common and serviceable to good, bad and indifferent ends or purposes. Its use or practical working is to bring the bodily structures immediately under the direction of the brain-cells or cortical glands; so that for the instant of its duration the body becomes (or, rather, the particular acting or muscular tissue, becomes) as it were nervous, and not vascular. And during the space of that instant the muscle is, and serves as, the *efficient instrument* of the cortical glands and their determinations. Thus the very quality of the union of love and wisdom or of evil and falsity which is in those determinations rules and is active on the ultimate bodily plane.

Quiescence of muscular system before birth.

Before birth,—when the systole of the heart or fountain of the red blood coincided always with the systole of the cortical glands which are the fountains and hearts of the purer blood,—determinant action by means of the muscular tissue was not possible. Because always precisely at the instant where the white or purer-blood entered its channels in the ultimate tissues with full impulse, push and pressure, the red-blood coincidentally entered its channels with exactly equal impulse, push and pressure. During this finely balanced action and reaction, the tissue structure, itself being held as it were in equilibrium between two acting forces, was quiescent; and as unmoved as if neither force existed. When at birth the beating of the red-blood heart is thrown out of step and synchronism with the beating of the cortical glands (which are "the hearts" of the purer or intermediate blood circulation)—it then becomes possible for the purer blood (the *arterial* purer blood, or animal-spirit, is here meant) to "get in ahead" of the red-blood in the tissues; by running in and taking possession,—say at the time

of the heart's *diastole* or moment of absence of its contractive impulse.

To this "general ground" of possibility of getting in first, there is added the *particular* possibility of the powerful coadjutor activities of the "inspiring lungs." This coadjutorship of the lungs is based on the fact that whenever the lungs expand they communicate,—by their tendinous and membranous interconnections everywhere,—a tendency and pull and lift toward expansion to every corporeal "least" and unit of the entire mass of tissue in the body. This tendency and lift and help toward expansion by a kind of *outside pull* thus communicates a kind of diastole, or effort at diastole, to every tissue unit or cell; and this acts coincidentally with and by means of the inspiration of the lungs.

Now because of this direct relation of pulmonary inspiration to the cortical glands, this outside-pull upon the bodily "units" or cells, drawing them toward expansion or diastole, must occur *simultaneously* with the crowd and pressure of the animal spirit down into the tissues by way of the "simple fibres" which terminate in them. So that the assisted tendency of the bodily "units" toward diastole or expansion always operates coincidentally with the impulsion of the purer blood into them; falling indeed exactly with it. But only accidentally, one might say, would it ever chance to fall so as to coincide exactly with the impulsive movement of the red-blood.

Coincidence, in turn, of the contraction of the cortical-glands with the expansion of the simple or pure cortex; from which it follows that the spirituous fluid or highest blood, and the lowest or red blood, always act together, and act together coincidentally with the expiratory action of the lungs; thus alternating with the time of action of the purer or intermediate blood, this latter always coinciding with the inspiratory action of the lungs.

This contraction of the cortical-glands is coincident again with an expansion of the simple or pure cortex which is within them. In fact, it seems even to be brought about, partly and primarily *by* that expansion, as an inner cause working hand in hand with the outer. For when the pure-cortex within the cor-

tical gland is *in expansion*, swells, tumifies, inspires its own aura, and experiences the pressure of "the high spiritual" or mated-correspondent of its own degree down into it, it naturally must crowd against and partially fill up the central chamber or ventricle of the cortical gland in which it is resident. Now this is pretty much equivalent to "a contraction" of that ventricle, or *a lessening of its holding capacity*,—which comes to the same thing. This manifestly assists, and may even lead the way as an initiative and empowering impulse, in sending the *intermediate-fluid-protoplasm or animal spirit*, contained in that chamber or ventricle of the gland, flying down along "the fibre" issuing from the gland.

Of course, whenever in human beings the simple or pure cortex expands, the First Aura must come *sucking in* into it; pretty much as air does into the lungs when *they* expand. But it seems fully evident that it is *during the subsequent contraction of the simple cortex* (and consequent expansion or opening-again of the cortical glands), *that this new amount of First Aura* thus entering the simple cortex during its expansion (and there being formed into spirituous fluids)—would be poured or forced forth through those purest, simplest fibrils which are its own proper channels; by which it goes,—in part directly into the ventricular chamber of the cortical glands, there to form and reform and vivify the intermediate or purer blood; and, in part, to go to and be disseminated throughout the entire organism by way of those purest fibrils which form the interior and prior-part or plane of every tissue of the body. Thus at every breath, all life through, a certain positive increment of the human spirituous fluid goes on; which increment in early life is used to the growth of the body; and later,—in propagation.

But by the mechanism and operation of the organic structural parts,—treated of in the first paper of this series,—this contraction or systole of the simple or pure cortex must occur simultaneously with the expiratory action of the lungs. Thus it appears to be during the contraction or expiration of the lungs that the spirituous fluid is itself most powerfully and directly active down *in the bodily economy*; alternating thus, in moment, with the "activity" of the *intermediate blood*.

From these two things it follows that the *human spirituous fluid*, the highest "blood" of all,—acts *especially and in coincidence with the red-blood* or *lowest* and most ultimate blood of the body.

Relations of the Bronchial artery to the Lungs and to the Pulmonary Artery.

The Bronchial artery as compared with the Pulmonary artery is no "mere little side issue" to the lungs; it was there first; it was the parent of the lung tissue. And since all the body is woven of "fibres" and blood vessels, it is from the ramifications of the Bronchial artery that the vessels of the Pulmonary artery and vein themselves were woven, so far as vascular ramifications enter into or contribute to their contexture. The Bronchial artery is also always interior; has always the "inside track" in the structure and construction of the Lung tissue itself. In addition, because of the fact that its ramifications enter into the structure of all the vascular-channels of the pulmonary stream, it also goes to rule the entire pulmonic-tide, by means of its channels.

Thus by means of its ramifications, the Bronchial artery is *interior* in the organic structure of the lung where it formatively and nutritively rules (in so far as red blood contributes to nutrition). It is also *outmost*, about the stream of pulmonary blood; its ramifications embracing the channels of that stream; thus it has its hand at governing that blood also. Upon the lungs it acts from within; but upon the entering pulmonary blood, it acts from without.

Again,—its blood being pure, homogeneous, well-fed and full of spirit, it is always central; while the heterogeneous tide of the pulmonary vessels coming from the heart is always relatively sluggish, thick, mixed, and thus necessarily always relatively external. The Pulmonary blood thus does not enter to the "leasts" of the lung by any "central way," but approaches them always from without. And it still and ever remains without or external, relatively to the more central structure of the lung and the more central vitality of the Bronchial artery blood. *It is this Bronchial artery blood, coming thus as it were from a more interior ground* (since it comes out from the intimate

structure of the lungs), *into those least and last ramifications of the air cells* (where the sluggish mixed blood of the great venous tide brought from the right side of the heart by the Pulmonary artery, is spread out to feed and renew itself from the air), which here, by addition from its own purer tide, tempers the venous pulmonary blood and renders it fluid, nimble and active.

For this more-interior-and-purer Bronchial artery blood,—which, under the domination of the higher bloods, was the prenatal mother of the lung tissue,—always retains a like place, office, and function; not alone to the lung tissue *as a tissue*, during *all* the time of its experience,—but also in all those *operations of the living function of that tissue* which it enters upon at birth.

The Bronchial artery and its blood is thus mother to the lung tissues; it is primitive and perpetual former and nourisher of them, under the dominance and activity of the higher bloods. The Bronchial artery is carrier of pure, arterial, nimble, obedient blood; is ruler moreover of the entering tides of pulmonary blood, by virtue of being all around and about them, and having “the grip of its hand” round about the channels by which that blood enters; and, furthermore, by the addition, at need, of its own purer, more obedient, forceful and homogenous tides it tempers and renders “more human” the sluggish, mixed, muddy, more material stream of the incoming Pulmonary tide. Which service is sometimes greatly necessary to maintain the blood in the living activity of its ultimate functions in the economy. It presents then an instance of the “power” which ministered in the formation of the organic structure of the lungs, *continuing always to minister* to its sustenance; and its frequency.

Thus to the ultimate structure of the lungs upon the plane of the red-blood itself, *there are seen to come two streams of red-blood*, relatively inner and outer; with simultaneous action and reaction,—i. e., the stream of Bronchial artery blood and the stream of Pulmonary artery blood; both of which streams are manifestly impelled into the lungs at one and the same stroke of the heart. The Bronchial artery tide is the inner stream,

running to and into the intimate structure of the lungs, and coming to the pulmonary vesicles,—which are as it were the working ultimates of the lung-tissue,—from a relatively interior and central plane. The other entering tide, that of the Pulmonary artery, occupies a more external place always; even from nature.

And it is by means of the simultaneous action and reaction of this double tide of entering red-blood, Bronchial and Pulmonary,—that the fine structural units or living leasts of the ultimate lung tissue are kept in the freedom of a finely balanced equilibrium between two forces,—one acting from within, one from without. And by means of this equilibrium the entire lung is held securely under the dominion of the higher centers, and delicately responsive to the most finely decisive, guiding touch.

And by means of this living mechanism the lung is held in equilibrated freedom of response to the higher bloods, in spite of (even because of) the power with which the Heart impels its full tides from *both its sides* into that organ.

CRITICAL NOTES ON THE ESSAY, "IDENTIFICATION OF HYDROGEN AND THIRD FINITES."

AN essay was read at the last meeting of the S. S. Association, New York, May, 1901, and published in the "*New Philosophy*" of October, under the above-named title. We preferred to write an independent article on the above problem, and sent it in for publication, but the editor suggested it would be more acceptable to take up the printed essay, and critically examine its suggestions, facts, references and arguments.

Note 1.—*Composition of Water—Leading Question.*

"The molecule of water is composed of hydrogen and oxygen gases."

"The molecule of water is composed of Third Finites and Fifth Finites." "Which of these two classes of finites constituting the water particle answers most nearly in its characteristics to hydrogen gas?" p. 115.

We answer—*Fifth* Finites, and not *Third* Finites, as given in the essay. Our answer is based on our personal knowledge of Experimental Chemistry.

When two volumes of hydrogen unite with one volume of oxygen, the combination makes only two volumes of water vapor; the one volume of oxygen has disappeared into the inner space of the hydrogen, and adds to the weight, but not to the volume of hydrogen. The two volumes of hydrogen remain the same as if no oxygen had been added thereto. Therefore, two volumes of hydrogen fills the general envelope and body of the water particle, and one volume of oxygen fills the *inside* space. So says Swedenborg, namely, that the *outside* volume is *double* the *inside* volume.

“According to the theory of water, the *internal cavity* is *half* of the space.”

“If the internal cavity be equal to the volume which crustals occupy, and the diameter of the particle be 10, it follows that the diameter of the cavity will be very nearly 8; for $8 \times 8 \times 8 = 512$; and $10 \times 10 \times 10 = 1000$.”—(*Principles of Chemistry*, Part IX., n. 1.)

The essayist gives two diagrams, Figs. 1 and 2, of air and water, which we refer to for the sake of the explanation. “The large black dots represent Fifth Finites which form the *general envelope*. The *inside* minute dots represent Third Finites” (pp. 121-125). The essayist places hydrogen of two volumes in the inside, where Swedenborg in the passage above quoted from his *Chemistry* says the inside is only half the volume of the outside.

Note 2.—*Third Finites and Photosphere.*

“According to Swedenborg a relatively pure volume of Third Finites envelops the sun, and that a great volume of Third Finites exist around the Solar center. And that a certain volume of them is always maintained in existence there” (p. 119).

So says the essayist: Swedenborg defined his conception of solar matter as follows: “The Solar Ocean consists of the actives of the first and second finites. It is of these that the Solar Ocean primitively consisted and continues to consist even

to the present day." (*Principia*, Vol. I., p. 185.) The Third Finites are the only ones in immediate contact with these two solar actives, because they admit into their interior space the actual solar matter, which no other finites do or can do (p. 196). They are the only entities in actual touch with solar matter, receiving, collecting and storing up the full current of the solar force. And like the carbon points of a battery, becoming thereby incandescent and luminous, forming the Solar *Photosphere* (Vol. I., p. 196).

That is the place where they originate, and are converted into second or magnetic elementaries. The *Photosphere* is therefore a magnetic or second elementary phenomenon. *There* and *there* only is the place and location of the Third Finites—at the *Photosphere*, in actual touch with the solar matter. They have nothing to do with the Chromosphere.

The essayist places the Third Finites in the *Chromosphere*, under the impression that it is in immediate touch with Solar matter. This is entirely opposed to all spectroscopic experience. There is a plane of condensation where all the metallic vapors are congregated, which covers an open space of at least 1,000 miles in the lowest strata of the solar atmosphere, above which the Chromosphere rises to a height of from 6,000 to 10,000 miles. Hydrogen is the lightest and expands more and rises higher than any other of the many metallic vapors in the solar atmosphere.

Note 3.—*Fourth Finites and Chromosphere.*

At the close of the Third Finite Era, when the Solar Vortex was formed, there was no Chromosphere of Third Finites left as a refuse or surplusage; the supply ceased with the demand. Up to this period there was no Solar Atmosphere, nor any Chromosphere. Why? Because a solar atmosphere could not exist until the Vortex of the system was complete and filled with entities. For otherwise, there would have been nothing but a *vacuum* outside the atmosphere to press upon and hold it together. So with the Chromosphere; it could not exist until the solar atmosphere was created, in which it could float and be held together along with the other metallic vapors.

We have abundant confirmation in the fact so fully explain-

ed by Swedenborg, that the *Fourth* Finite Era brought into existence for the first time metallic vapors which crowded upon and covered the face of the *Photosphere* like a dense cloud, and finally brought about the chaos which gave birth to the planets and satellites. Swedenborg says all these things, planets included, were the products of the *Fourth* Finite Era, and which covered the Third Finities in the *Photosphere* like a dense cloud. This they do now, in the form of solar spots; but they are all *Fourth* Finite products, *chromosphere* included, and not Third Finities.

The essayist has located Third Finities in the wrong place—in the *Chromosphere* instead of the *Photosphere*; and also placed Third Finities there instead of Fourth Finities.

“In this manner the number and quantity of *Fourth* Finities more and more increase and *condense themselves* around the solar space (where the *chromosphere* and metallic vapors are now in the plane of condensation). They concrete into an immense volume and crowd around and enclose the sun so as to form an incrustation.” (*Principia*, Vol. II., pp. 258-262.)

This is the work of the *Fourth* Finite Era, of which the Solar Atmosphere and Chromosphere formed a part. According to Swedenborg, in this passage, the Chromosphere with all its metallic vapors is without exception the work of the *Fourth* Finite Era. The *Photosphere* is the work of the *Third* Finite Era.

S. BESWICK.

A NEGLECTED FACTOR IN THE DOCTRINE OF EVOLUTION.

SWEDENBORG, in both his Scientific and Theological Works, shows that the doctrine of *Series* is of great value in the development of a rational knowledge of the universe. The doctrine of *Evolution* is an attempt to apply the doctrine of *Series* to the origin of the world, and of animal and vegetable life, and of man. A similar attempt to apply the principle of evolution is made at the present day in nearly every field of human knowledge. Le Conte expressed his appreciation of this when he

said, that the doctrine of evolution was more than half of all science.

The doctrine of evolution is, however, a very different application of the doctrine of series from that given by Swedenborg. In the common evolutionary science, the point of view is from the senses and the world. It is a doctrine based on mere sense appearances, which are full of fallacies. Swedenborg, however, in his application of the doctrine of Series, uses it conjointly with the doctrine of Degrees; so that the doctrine of Series and Degrees conjointly is as it were the key to unlock the door by which the mysteries of the universe are unravelled. In presenting this doctrine to the world, he says:

I purpose to give an introduction to rational psychology consisting of certain *new doctrines*, through the assistance of which we may be conducted from the material organism of the body to a knowledge of the soul, which is immaterial. These are the Doctrine of Forms; the Doctrine of Order and Degrees; also, the Doctrine of Series and Society; the Doctrine of Influx; the Doctrine of Correspondence and Representation; lastly, the Doctrine of Modification. (*Animal Kingdom*, n. 14.)

It is my purpose in this article to call attention only to the doctrine of Series in conjunction with the doctrine of Degrees, in order to point out a serious defect in the rational coherence of the theory of evolution as now taught and accepted in the Scientific World. Swedenborg says:—

The Doctrine of Series and Degrees is designed "to teach the nature of Order and its rules, as observed and prescribed in the succession of things; for the rational mind, in its analytical inquiry into causes from effects, nowhere discovers them, except in the subordination of things, and the co-ordination of subordinates; wherefore, if we would advance from the sphere of effects to that of causes, we must proceed by Orders and Degrees, agreeably to what rational analysis itself both approves and advises." (*E. A. K.*, II., 519. See *A. K.*, 67, 161.)

And he says:—

But whereas all things in succeeding each other, follow one another in order, and whereas in the whole circle of things from first to last there is not a single one which is altogether unconnected or detached from the rest; I am therefore compelled, as I said, previous to developing the subject of Rational Psychology, to take into consideration this doctrine concerning order and connection, so remarkably conspicuous in the animal kingdom. (*E. A. K.* II., 579.)

Swedenborg here identifies the idea of Series with that of Order itself. He shows that all things are connected together in a certain order of succession, and hold a certain relationship

to each other. What is produced from one is in a subordinate position to it. Various subordinate things have a relationship to each other which is that of co-ordination or arrangement of subordinates. Thence exists the relationship of cause and effect. The rational faculty of man is delighted with the perception of the relationship of things in their series of succession, subordination and co-ordination. It is on account of this that the theory of evolution has gained so wide an acceptance in the scientific and philosophic world. It is because the facts of nature have been arranged in series as of cause and effect, and each of the series is assigned its place, like links in a chain, and the rational mind, on seeing this connection, concludes that they hold the relationship of cause and effect. From what has now been said it may be seen that the science of Series in connection with that of Degrees will give us important and indispensable tools for the use of rational analysis, opening the way for the perception of causes, removing those things which produce obscurities and which lead the mind astray.

By the doctrine of Degrees Swedenborg shows that as we ascend from the fixed and lowest forms of nature, we come to forms and substances more and more perfect, which are the subject of more perfect and more active forces. Thus we ascend by degrees from lower to higher. The higher are also the origin or cause of the lower. For instance, all the solid and fixed forms in nature may be traced back to liquid and gaseous forms. There are also ascending degrees of atmosphere. As we ascend we come to more active and perfect forces, as sound in the lowest, heat, light and electricity in the next above; and magnetism and gravitation in the highest. In addition to these material degrees and powers, we learn from his theological works that there is a discrete degree of substance above matter, namely, spiritual substance. This also has its degrees of altitude corresponding with those in nature; and its powers and forces ascend in perfection, according to degrees. Inmosty in all these the Divine operates, giving life, activity and power to the inmost, and mediately through this successively to the lower and lowest. In the first place the substances themselves were created in successive degrees from highest to lowest, and after their pro-

duction the lowest is the containant of the higher. Matter is the conglobation and aggregation of spiritual substances, so that it originates from spiritual substance, and is adapted to the reception of its forces and powers.

This doctrine of Degrees shows the distinctions and differences of substances and forces in the order of their formation. But the doctrine of Series shows how one thing is connected with another as links in a chain of causation. Thus we read:—

The universe is a work continuous from the Creator even to ultimates, and because a continuous work, which like one thing linked together, it depends on and is actuated and ruled by the Lord, who is the common centre. . . . The first proceeding is continued even to ultimates by discrete degrees, altogether as end through causes into effects, or as the producing and the produced in a *continuous series*. (Angelic Idea of Creation.)

After creation, this continuity of series by discrete degrees remains, so that every particle of matter or form organized thereof is in a similar series, into which the forces and powers of the Divine Love and Wisdom continually operate. Thus besides the series of things on the plane of nature itself, by aggregations and combinations of matter, and by the changes effected by natural forces, we have another series ascending by discrete degrees, by which all things are connected with the First, and are recipients of the interior forces from the Divine Being.

To illustrate this in the case of man, whom the evolutionists regard as a product of material forces alone. They trace his origin from protoplasm, through all gradations of animal life to man. They teach that this is portrayed in the production of the individual embryo from the cell, passing through similar gradations in which they perceive the stages of the simple cell, the worm, dog, monkey and finally man. All these changes are by them ascribed solely to physical forces and heredity. What light does Swedenborg throw on this problem? Of the formation of the chick in the egg, he says:—

In the formation of the embryo in the womb, or the chick in the egg, all things are carried on most distinctly. And the several members are produced successively, or one after another. . . . There is a certain formative substance or force, that draws the thread from the first living point, and afterward continues it to the last point of life. . . . This formative substance . . . is the first, the most perfect, the

most universal, and the most simple of all the substances and forces of its kingdom; and it has assigned to it, within its own little corporeal world, a certain species of omnipresence, power, knowledge and providence. . . . The veriest formative force and substance is the soul; next in the order of forces and substances is the spirituous fluid; next the purer blood; and next the red blood, which last is thus as it were the corporeal soul of its own little world. *Thus all these may be called formative substances and forces*; that is to say, each in its own degree; while the one vital substance, which is the soul, presides and rules over all. (*E. A. K.* 247.)

Where then does this one vital substance which is the soul, come from, that moulds and forms the body? Swedenborg teaches in the *True Christian Religion* that:—

The soul is from the father and the body from the mother: for the soul is in the seed of the father and is clothed with a body in the womb of the mother; or what is the same, all the spiritual part of a man is from the father, and all the material part from the mother. (*T.* 92.)

And he adds a little further on:—

The soul, which is from the father, is the real man, and the body, which is from the mother, is not the man in itself, but by derivation from the soul, and is only the clothing of the real man, composed of such substances as belong to the natural world; whereas the soul is composed of such substances as belong to the spiritual world. (*T.* 103.)

How this soul is formed and embodied in the seed that it may be transmitted to the ovum, he thus describes:—

The human seed is interiorly conceived in the understanding, and is formed in the will, and is thence translated into the testes where it clothes itself with a natural covering, and is thus conveyed into the womb, and from thence into the world. (*T.* 584.)

Moreover this soul, thus formed, is organized of the substances of the three degrees of the spiritual world (*See D. L. W.*, 432), and at the first conception, the Lord conjoins himself with man in the womb, and forms the embryo, by inflowing with His power through those degrees of substances. (*See D. Wis.*, III.)

In view of these principles, we may see that in man's formation there is a series of degrees of substances and forces in most perfect order, by which the formation in the womb takes place. *This form is essentially human*, and moulds all things to the human form. The judgment of the evolutionist from the mere outward shape of the partially formed embryo is thus seen to be grossly sensuous, not approaching in the slightest degree to the perception of the active influences at work in the formation of the body.

Again it is one of the principles of the doctrines of Series and Degrees, that the first rules and governs all things after the formation. Thus the soul, consisting of will and understanding in its degrees, rules and actuates all things of its body. Every act and motion of the body goes through a similar series as in the original formation. The mind conceives and wills, flows into the body, and gives the power to act, without which no sensation could be perceived in the body, nor could any motion take place. Thence it may be perceived that there is a series of substances and of forces connecting God with the ultimates of nature. Of these substances man is organized. He receives life from God by which he has intelligence and will to act in the world. Every thing of his life is an operation in these degrees, the visible body being only the plane of effects, the causes and active forces being on the plane or degree of the spiritual substances, of which the soul is composed. The doctrine of evolution has neglected this factor in the problem of creation, and therefore its conclusions as to the origin of man are invalid, because the most essential factor of the problem is left out.

REV. JOHN WHITEHEAD.

NOTE AND COMMENT.

From the Massachusetts New-Church Union (Boston) comes, as we go to press, the new translation of Swedenborg's *Ontology*, translated and edited by The Rev. Alfred Acton, Professor of Theology in the Academy of the New Church. The preface gives an account of the history of this valuable little work and its place among Swedenborg's physiological and metaphysical MSS., incidentally classifying those documents in a manner which will gratify the uninitiated reader. The features which distinguish this translation are enumerated, and the uses of the work are indicated,—as throwing important light on the development of Swedenborg's mind; as furnishing to his readers "illustrative and confirmatory ideas" by which spiritual truth may be more effectively established; and especially as giving us a Definition of Philosophical Terms used by the author in his other writings, theological as well as scientific. Biographical notices of Dupleix and Baron

are given, two little-known authors, whose philosophical principles Swedenborg quotes in the work. An index appropriately concludes the brochure, which is handsome in appearance, contains 59 pages, and is sold for 50 cents.

The writer of the "Critical Notes," which we print on another page, appears to have grasped neither the universal laws of the *Principia* nor the meaning of modern experiment in the synthesis of water by combining oxygen and hydrogen gases. In Note 1 he concludes that the *grosser and more inert* oxygen constitutes the *inside* space of a particle of water, and that the envelope is composed of the *relatively lighter and more active* hydrogen! Every student of the *Principia* will remember that the relatively lighter and intangible substances always occupy the inside space; this is one of the fundamental conceptions. Furthermore, the *figures* in both the *Principles of Chemistry* and the *Principia* leave no doubt as to the relative positions and volumes of third and fifth finites. Passing over the statement that the combination of two volumes of hydrogen with one of oxygen produces "water vapor" when in reality it produces *water*, it should be noted that the two volumes of hydrogen do *not* "remain the same as if no oxygen had been added thereto." The fact is that *the volume after combination is very much reduced*. If the objections in Note 1 are not based on facts, those contained in Notes 2 and 3 necessarily fall to the ground. But to fully expose the misinterpretation much space would be required. We would here note only the reference under Note 2, to the *Principia*, Vol. i, p. 196, that the third finites "admit into their interior space the actual solar matter." Third finites do nothing of the kind. The passage teaches that *MANY* third finites surround the solar actives *to form the second elementary particle*.

The Theory of Evolution and New-Church Philosophy: H. Clinton Hay, in "New Church Review" for October. The writer of this paper points out most clearly that the evolutionist recognizes only continuous degrees in the theory of the origin of living forms. He makes a most earnest plea for the consideration of the doctrine of discrete degrees in the solution of this problem. After quoting Haeckel in favor of pantheism, he says:—

"Here where one would least expect it, the theory of evolution strikes nearest, in its vital and fundamental relation, to New Church philosophy. Here evolution in its extreme of materialism, in utter spiritual blindness, comes face to face with the fundamental verity of creation as taught in the New Church, and shows that it cannot make another step of progress in this direction until its eyes are opened to a knowledge of the great doctrine of discrete degrees." p. 489.

All which is very true, yet how very far apart these two conceptions are. The similarity consists only in the fact that the forces operative are

within the ovum. The difference involves the existence of God as a Divine Man, and the spiritual world as the world of causes.

The writer at times, in his desire to find points of similarity between Swedenborg and the evolutionists, evidently misinterprets Swedenborg. He identifies Swedenborg's doctrines of the creation of seeds, with the first cells or protoplasm (p. 490), quoting *D. L. W.* 312, in substantiation of his contention. Swedenborg undoubtedly teaches that "the first production of the earths was seeds." These seeds were not cells. The seeds were true seeds, producing each its own species. This teaching is repeated in other parts of his writings, where he also teaches that such seeds are produced at the present time under the proper conditions.

The writer at times seems to endorse the doctrine of the evolution of one form from another, for on page 485 he speaks of the ascending series of creation from one celled to many celled, and from worms, fishes, insects, reptiles and birds to man, and says: "We are impressed with the significance of the confirmation found by evolutionists in the story told by the embryo of man's progress from two cells or seeds, made one, unfolding through all the periods of animal creation, from the gastrula to the infant, from moneron to man." Here and in a few other places, as on p. 493, the writer seems to have been touched by the poison of the serpent of sense appearances. He can find nothing in Swedenborg inculcating the idea of two seeds in the formation of man. The seed is not a cell, but is the soul covered with pure material substance that it may be conveyed to the ovum. The ovum is in no sense a seed. The formation of each living thing from start to finish is dominated by that special form alone. Man is human throughout, and partakes in nothing whatever of the nature of "worms, fishes, insects, reptiles, birds and beasts." (p. 485.)

Again he confounds the doctrine that use forms the organs of the body, as propounded by Swedenborg, with that of Darwin. The two ideas are as wide apart as the poles. Swedenborg's idea is that an internal principle of use from the Lord forms the members to correspondence with itself. Darwin's idea is that some extraneous circumstance can destroy or make members and organs.

Another error in the paper is where he says that Swedenborg teaches that "there is in the mineral kingdom an endeavor to produce and sustain the vegetable,—in the vegetable to produce and sustain the animal, and in the animal to produce and sustain man." p. 490. The conatus in the mineral kingdom is the creative force to produce seeds, of which see above. In the vegetable kingdom, from the spheres of the plants the creative force produces corresponding insects; not that one form of life produces another by gradual changes, as evolutionists teach. The endeavor in each plant and animal is to produce its *own kind*, and the same is true of man; thus the law in Genesis I. is fundamentally true. (See *A. C.* 3610, 3648, 5116, 5173; *F.* 16; *W.* 269.) The paper fails in

not carrying out the fundamental idea of discrete degrees with which it starts out. The writer also needs to connect more fully with it the doctrine of series, by which every form of life may be seen to derive its origin from the Creator by discrete degrees, and then by its implanted conatus it continually produces in series those of its own kind. J. W.

The Creation of First Forms. George H. Dole, in *New Church Review* for October. In contrast with the above mentioned paper, another appears in the same *Review*, in which the writer takes the same principle of creation by discrete degrees, but carries out his principle consistently. He says, "Evolution and creation by correspondence are in essence exactly opposite. The former commences with lowest forms of matter and force and derives creation from chance working upward. Creation by correspondence commences with the Creator, the highest, and derives creation from Him through spiritual laws and forces working downward." (p. 537.) His statement of the formative force in nature is thus expressed: "As the spiritual world is within the natural world actuating it, so the spiritual counterpart of plants and animals is within the material part animating and forming it." (p. 541.) The paper is short, but clear and consistent, and its teachings are well calculated to correct the errors in the other. J. W.

In a paper on the Vermiform Appendix read before the Annual Meeting of the Rocky Mountain Interstate Medical Association, last September, Dr. E. P. Hershey surprised and shocked his audience by asserting that this supposedly useless little organ secretes a fluid for the lubrication of the cæcum. The discussion that followed was by no means favorable to the views expressed in the paper, some of the speakers manifesting almost rancorous opposition to accepting the paper at all, though a few admitted the plausibility of the arguments it put forward.

The fact that Swedenborg ascribed this function to the appendix over a century ago is well known to students of his writings. In the *Animal Kingdom* (published 1744, '45) Vol. I, No. 138, he says: "*The Appendix cæci vermiformis*. . . . pours a new liquid adapted for anointing and lubricating the wavy folds of the colon, and particularly for macerating the fæces, into the fundus of the cæcum and the gorge of the colon."

Whether Dr. Hershey obtained his cue from Swedenborg we are unable to say as this writing. If he did not, one more is added to the already numerous instances of a modern scientist rediscovering a fact which was in reality first brought to light by the inimitable Swedish Philosopher. H. F.

PROF. HUGO MUNSTERBERG AND THE DOCTRINE OF THE
DISCRETE DEGREES OF MIND AND MATTER.

In one of his recent Lowell Institute Lectures on Psychology, Prof. Munsterberg, of Harvard University, made some statements very interesting to students of Swedenborg, as showing the convergence of the modern psychological doctrine of the psycho-physical "parallelism" and the "con-comitancy of action" in brain and thought, to Swedenborg's doctrine of discrete and incommunicable degrees of mind and matter and their relation by correspondence and influx.

Speaking of our present knowledge of the relation of mental efforts to special brain processes he says,—as reported in the Boston *Transcript*:

"The number of commonly accepted facts is still surprisingly small and the most important problems are covered by contradictory theories. There is no agreement as to whether motor centres exist in the brain, besides the sensory centres, or whether every sensory centre is motor at the same time; whether the sensations in perception go on in the same brain parts as the memory-ideas, whether the whole context of the brain is devoted to conscious processes, or whether,—as a brilliant new theory maintains in opposition,—four-fifths of the context processes have no mental accompaniments at all, but serve merely for the connection of psychical phenomena. . . . Yes, we do not even know whether the cells are the seats of the conscious processes or whether those are right who think that the finest nerve fibrils are the seat of the psychical sensations, while the cells have trophic functions. And since the recent methods of psychology have proved that certain cells are able to make movements like a little amœboid protist, we hear from one side that the cells are extended when we are active, and from the other side that extension characterizes rest. We must know this lack of agreement to appreciate fully the humor of the situation when in teachers' meetings the most arbitrary schemes for education are sometimes recommended on the basis of physiological cerebral facts."

In this connection see Swedenborg's work "On the Soul," numbers 26, 42 and 118, and the Theses IV. and IX. appended to the same work by the English translator, pp. 350, 358. In these numbers Swedenborg states that "it may be demonstrated from anatomy that the universal nerve of the senses is one which arises immediately from the cerebrum, just as the universal nerve of the natural motions of the body, or the intercostal nerve, arises from the cerebellum." (No. 42.) He speaks of the "nerve of the fifth pair as concentrating the fibres both of cerebellum and cerebrum and therefore as both a sensor and motor nerve. As to expansion and retraction of the cells, Swedenborg in No. 201 "On the Soul!" describes the expansive effect of joy, or of pleasure. In joy the sensorial organs are animated and the "whole body before constrained swells freely in joy. Through the general expansion, by extended swellings of the cortical substances of the cerebrum, each in-

ternal sensory also is expanded. . . . Thus through joy all ways of communication are opened. . . . A lively trembling and light in the countenance is manifestly betrayed by the eyes and by the speech itself and every action, thence also the brain is cleared, restored, and vivified, and in that moment glides back as it will into the state of its first youth and innocence."

Professor Munsterberg goes on to define the need of science to be that which Swedenborg defines as Correspondence, but which the modern psychologists have called the "psycho-physiological parallelism." And this parallelism, he says, is utterly misunderstood if it is interpreted as a kind of materialism.

What alone prevents it from being materialism is the hypothesis of a discrete degree existing between mind and matter, and that true "cause" belongs always to the degree of mind and never to the degree of matter—thus always to the logical plane of action and never to the physical. By a strange inversion of terms which we wonder at so discriminating a mind as that of Professor Munsterberg accepting without protest,—the higher degree or logical plane is treated here as "states of the brain which are causally connected" and the lower plane as psychical; and the inversion appears in equally objectionable shape in the statement that "mental life cannot be explained psychologically if it does not borrow causal connection from the physical world." Here together with the very important admission that the degree between mental and physical activity is discrete as between the two parallels which never converge is the faulty association of "causal connection" with the physical world instead of with the mental. And this is in direct contradiction with his statement that the connection of the thoughts of an inner life or that by which "one plan demands another" is a logical connection. For this logical demand of "one plan for another" is the true instrumental cause of every effect which takes place in brain or body or the physical universe.

Professor Munsterberg goes on to define the theories of "adjustment between known brain facts and known mental facts" as three, viz., the association theory, the apperception theory and the action theory. The first may be called the "habit of nerve substance," which is rather another name than an explanation. The apperception theory is that of special powers of attention belonging to special centres in the brain. The action theory "considers every idea a starting point of mental impulses." According to this theory, which combines the good sides of the two other theories, the sensation is an accompaniment of a brain process in which a sensory impression is transformed into a mental impulse, and while the quality and intensity of the sensation is dependent upon the impression, the vividness of the sensation is dependent upon the possibilities of motor discharge.

Swedenborg in the Ninth Thesis on the Soul, in *Economy of the Animal Kingdom*, Pr. II; quoted in work *On the Soul*, p. 358, proposes the

theory, "that the operation of the soul in the organic substance of the brain is the mind: the affection of the entire brain or common sensory is the animus; the faculty of feeling is in the sensory organs; the faculty of acting in the motor organs, and that a diligent and rational anatomical inquiry ought to show the nature of the intercourse between the soul and the body; and prove that the soul can communicate with the body but through mediating organs and indeed according to the natural and acquired state of such organs."

Professor Munsterberg rightly says of the theory of distinct nerve centres for the starting and inhibitions of mental life:

"The shortcoming of such a theory is the inability to explain how this mysterious centre can adjust and adapt its decisions and impulses to the totality of experience."

In other words, unless there is a consciousness of the "end" or what Aristotle calls the "Good," how can there be any talk of adjustment or adaptation. Professor Munsterberg, in making every idea a starting of mental impulses and so concluding that "we are thinking merely in so far as we are acting," progresses so far towards the cause of action as to find it in the idea. Swedenborg goes beyond the idea to the perception of the end or will which animates the idea and gives it its originating activity. This Swedenborg develops in his later spiritual philosophy, but he defines it in a measure in the Seventh Thesis (*On the Soul*, p. 358) in the following progression:

"The genuine progression in descending and ascending appears to be in this wise. As the forms of the modulations or sounds of the air in the ear are to the forms of the modifications or images of the ether in the eye, or in the animus, so are the latter to the forms of the superior modifications in the mind, which forms are termed intellectual and rational ideas, in so far as they are illumined by the light of the soul; and so again are these forms of the minds to similar supreme forms, inexpressible by words, in the soul, which forms are termed intuitive ideas of ends, in so far as they are illumined by the life of the first cause."

F. S.

The Monist on Kant and Swedenborg. Dr. Paul Carus, the editor of *The Monist*, devotes six pages of his article on Kant, in the October number, to a discussion of the indebtedness of that philosopher to Swedenborg. While admitting that Kant was undoubtedly influenced by Swedenborg in his doctrines of time and space, Dr. Carus thinks that the influence was overestimated, and that speculations on such subjects were so common in Kant's time that it would be difficult to specify any single influence. He makes the common mistake however of treating Swedenborg's influence on philosophy as mystical, rather than profoundly scientific, an error corrected in the *Encyclopædia Britannica's* article on Mysticism, and one that no one acquainted with the rigid mathematical methods of Swedenborg's discussion would fall into.