

THE NEW PHILOSOPHY

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



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THE NEW PHILOSOPHY.

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II. The promotion of the principles taught in these works, having in view likewise their relation to the science and philosophy of the present day.

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THE SENSES.

PART FOUR OF THE ANIMAL KINGDOM, BY EMANUEL
SWEDENBORG.

CHAPTER IV.

(Continued.)

89. 10. *Smell excites the alternate forces of respiration from external causes.* 1. This is true, as is evidenced by many things, as by intestinal worms, by diseases of the blood (*hematosis*), by the tickling of the palate, and the like, which cause a slight sensation of touch and pricking; 2, they excite the whole organic mechanism, the œsophagus, the stomach and the intestines into contrary motion, trembling and convulsions. 3. Now as regards the fibres, it excites the whole muscular mechanism by the breath of the mouth, by heat, by hot water, by the hand, in another way by the pricking of the lips and by touch, as the muscular mechanism of the heart, of the diaphragm, of the stomach; even after death stimulation indicates this. 4. Still more so does the olfactory touch, which arises from similar causes, and indeed it excites the mechanism of the brain, into all parts and membranes of which it flows, and the form of which is according to a more perfect modification. 5. The ultimate composition of this is according to the form of the modification of smell. 6. The external and internal cause is everywhere present for exciting something, after the

inversion of the body; for the soul which is in beginnings, and the body which is in effects conspire so that all mediate things coincide, as has been observed everywhere above. 7. The external cause of the excitation of the brain into animatory motion, and thus into the motor and local part, or into contraction and expansion, is the friction and pricking of the parts producing smell; this fibre obeys more fully than the muscle and its fibre, for it is better adapted for acting. 8. This is especially so, since in the nostrils, the whole mucous membrane, the bones of the cranium, the *dura* and *pia mater*, the fibres and the vessels conspire; for one touch pervades the whole common membrane; thus all things are connected, and follow each other even to the beginnings. 9. Consequently there are common mutations of state induced upon the cortex, wherefore also upon the whole brain; mutations of state are brought about without contraction and expansion; these mutations are, however, from smell arising together with expansion and contraction, for the mammillary processes lie like bags, and are inrooted in all the fibres. 10. At every touch the fibres and membranes are corrugated, but according to touch and the kind of things touching, more or less, hence there is a modification with contraction, which pervades even to the cortical substance. This proceeds from a double sense; for while the sense of smell produces modification, the sense of touch produces a general modification together with a certain kind of corrugation. 11. While the fibres are corrugated they are also contracted, but at that time indeed the cortical substance is expanded, likewise every cavity of the brain, as is to be taught in regard to the brain. 12. Therefore inspiration makes for the expansion of the cortex or vital substance, together with the soul, in which is life and which expands. 13. But the cortex indeed falls together and is compressed of itself, in which is as it were death; thus there is a perpetual battle between life and death; the soul with the forces of the body, especially with outmost things as those of smell, resuscitates life, but the body collapses of itself. 14. Hence we see that the respirations of the lungs, and the animations of the brain coincide; (see my tract).

90. *The sense of smell exists only at the time of inspiration, but not at the time of expiration, on account of a manifest use,*

1, in order that the brain may be excited by the alternate forces of the body and by the soul, or by things most remote; 2, lest smell and sense be struck by incongruous things, which slip forth from the lungs, which would create perpetual nausea; 3, wherefore no one perceives his own offensive exhalations except by reflection, or from others. 4. That putrid things go forth from the lungs, see Part II, on the Lungs. 5. Then also the fibre is in its corrugation, the purer blood then flows into the cortex, which being stretched by corporeal causes is duller of feeling, as the fibre is of carrying away. 6. Furthermore the nexus itself induces this; for at the time of inspiration all things are, by the expansion of the ventricles and cavities, and by the corrugation of the fibres, in a state of the reception of sense, because they deport both one and the other kinds of contact at the same time; thus also the mammillary processes and their insertion through the cribriform plate. See further in those things which have before been excerpted concerning the mammillary processes. 7. Thus the nexus ought to agree with the operations; 8, wherefore that relation is taste and touch. 9. While inspiration subsists from the body, external ideas and sensations or those of the body creep up; in expiration ideas descend from the superior region or from the soul, as has been noted above; smell represents the ideas of this to the life. 10. Thence also it is that expiration takes place from the less aperture into the greater, inspiration, from the greater into the less; thence is impetus and opposition.

91. 11. *The sense of smell and of nasal touch also excites the pituita of the brain and of all the organs of the head, especially of the eye, and urges them to discharge.* 1. This is the prior consequence, because it excites the brain into a kind of corporeal life. 2. This is to be considered as an effect. 3. This, not only the causes, but also the nexus, induce; for all things conspire to these ends. 4. These things have been treated of in the *Second Part* concerning the nose; but now more particularly.

92. *This sense excites the pituita of the brain, and draws them down, through the foramina of the cribriform plate, into the nostrils.* 1. That this takes place from the sinuses of the brain, experience proves; for thither a passage lies open to the

air, which there circulates, and in the vapors of which are enfolded by heat and by vibrations, both the sense of smell and the hearing of speech; 2, indeed the air there is seen entering thither, and breaking forth thence, even forcibly enough for the extinction of a candle. 3. There are yet many invisible passages in the cranium, for it is everywhere lamellated, and thither enters the offshoot of the mucous membrane; there the lymph is driven out by vibration, thus by living forces. 4. The bones of the nostrils are the very fulcra of the bones of the cranium; from the peripheries to their own fulcra all fluid tends, as to their own foci,—middles,—centers of gravity. 5. Furthermore there is an opening in the foramina of the cribriform plate between the membranes which accompany it to the papillæ, and to the glandules; which are spread over the entire membrane, between the *pia mater* and the fibres, and among the fibres themselves. 6. These tremble from the sense of smell and of touch, the turbinated bone and the ethmoid in the meanwhile greatly assisting; 7, these are alternately contracted and expanded, so that they produce a kind of pumping forth. 8. If they should become concreted there would be no sense. 9. This appears especially from sneezing; indeed from catarrhal effects, and from many phenomena. 10. The cribriform plate is the center and fulcrum of the whole brain, for thither each membrane returns as to its own first and higher form. 11. There the sinuses of the *dura mater* begin and terminate. 12. There are found the falciform productions of the *dura mater*. 13. There the internal carotid communicates with the external. 14. There the convolutions of the brain converge as to their own first and ultimate; there is the station of quiet of both hemispheres of the brain. 15. There indeed preferably all the fibrous or medullary maniples are terminated and converge into the mammillary process. 16. This is especially the case with its more open passage. 17. Whence those processes are so tumid in the hollow orbits; being inflated they expand the whole medulla of the brain; 18, trembling now taking place, which pervades the continuous and fluid parts, and alternate constriction and expansion taking place, the effect surely follows, namely, that the fluid is drawn thitherward. 19. Neither are there elsewhere places of discharge not yet discovered, nor

veins which imbibe. 20. There are then cavities among the membranes, between the furrows of the convolutions; among the fibres passages greater and smaller; and these last are always moist, sometimes tumid with stagnant ichor, as in many diseases. 20. This can by no means be explored by experience in dead [collapsis] brains; many causes hinder. 21. That pituita is of a three-fold kind: that which is between the membranes, that which is between the *pia mater* and the fibres, and that which is between the fibres. 22. For each kind there are in the nostrils certain passages and determinations; 23, namely, between the double plate, or the periosteum and the pituitary membrane, through the cellular texture of the pituitary membrane, and finally between the fibres themselves. 24. For ducts lie open between the membranes, which pierce the pituitary membrane, in abundance. 25. Thus it is to be affirmed, that this lymph does not flow immediately into the nostrils, but from the interior outwardly, between the membranes, through the purer cellular texture, etc. 26. That lymph is of a nobler nature, wherefore it is reabsorbed by inspiration, is collected into vapors and again carried in, then also it is absorbed by the veins, nor does it easily turn into mucus, unless there be a diseased state.

93. *It likewise clears the lungs of pituitæ.* 1. For tickling in the nasal openings strikes deeply [*per condit*] into everything that is appended, as tickling of the palate does in regard to the stomach. 2. This tickling is continued through the whole trachea (see A. K., Part II); this becomes evident from sneezing; 4, as also from the harmony of the motions of the brain and of the lungs. 5. What excites one excites the other; the air itself excites the lungs, and its effluvial parts excite the fibres. 6. This appears still better in insects where the lungs commingle with nerves.

94. *The sense of smell and of touch in the nostrils purifies the blood of the external carotid, and thus draws off the pituitæ from the blood which is about to go forth to the brain.* 1. It is known that the external carotid has five branches, and that the glands draw off the salivas and pituitæ for the sensory organs, as has been observed above. 2. The nasal crypts especially, and the mucous membrane which according to Vieu-

sens is supplied with infinite arterial ramifications, perform these functions. 3. The extent of that membrane is vast; it is spread over the palate, the œsophagus, the trachea, and the brain; 4, and by means of the fibres it is conjoined with the *dura* and the *pia mater* of the brain, to such a degree that it is a membrane of very great extent. Since every particular refers to a general, therefore how far smell and that sense does this is evident from the following: for every tremor and modification courses through every continuous thing, thus upward and downward in the same manner; and since the nose is the principal axis of the œsophagus and the larynx, as also the fulcrum of the brain and its cranium; 6, therefore from thence as from a centre goes forth the radius of modification, in order that this sense may represent as it were the beginning of the vital activities of the body; all things of the periphery when the sense itself of the nose is in the centre. 7. Each sense, or smell and touch, acts its own part, and joins its work to that of the other; the one adds something local, the other modifies; each exists at the same time, and one promotes the other. 8. Parts of this membrane are adapted to each sense; the larger filaments, the ducts, glandules and papillæ are active; the cartilages, bones, etc., are passive. 9. Wherefore each sense strikes every artery and vein, and thus sends the blood into circulation, for the blood runs to its extremes, and thus unburdens itself. 10. There are arteries placed, as it were, starwise, so that from their mechanism (as in the kidneys) they put off the pituitæ from themselves. 11. Thence comes the mucus of the nostrils when the more fluid parts are drawn off. 12. This pricking and friction effects, as is evident from diseases of the blood [*hematics*], and from other things: something similar takes place by the puncture of washing parts. 13. Thence it becomes evident what snuff does, and what other spirits of diverse kinds which excite the fibres, do. 14. The blood also is urged forward that it may perform its swift circle in the veins, and return purer. 15. That sense gives a determination towards the lower parts in the uvula, and outside the nostrils; for it moves the whole membrane according to that flux.

95. *The sense of smell also purifies the eye of pituitæ.* I. For this sense is the nearest neighbor of the eye; there is only

a little bone which separates the orbit. 2. There are inter-passages and plates between the nose and the eye. 3. Furthermore there is the lachrymal sack, existing in brutes, and many blind crypts, which are yet porous, although they will not admit a stylus. See Winslow. 4. It purifies the eye in three ways: in the first place doubtless it draws off the superfluous pituitæ. 5. In the second place, it proceeds to the brain and strikes the beginnings and excites them into a tremor, and also the fibres, wherefore it sets the fibres, especially the optic fibres, in order. 6. In the third place also, perhaps by blind ways, by the arteries, by the membranes, it approaches the optic nerve itself and the substances of the eye, and thus also sets them into their order, by modes similar to those mentioned in regard to the fibres and minute things of the brain; the neighborhood and communication, then also the effects, induce this. 7. The external carotid seems to transfer its cleansed and pure humors rather to the eye than to the brain, and this indeed by the membranes of the arteries, which thing is to be further inquired into. 8. The tremor and modification proceeds especially to what is most minute, and indeed penetrates those most minute parts themselves, because they are most nearly neighbors. 9. In order that we may know what conduces to the eye, we will say this: it will be that which moves each of its senses, namely, smell and touch; these mutually correspond to each other, and the things thus moving will be harmonious with their very forms; this experience alone detects, for what harmonically touches each of its senses that is the best; 10, perhaps as also the finest spirit penetrates this also will penetrate thither.

96. *The sense of smell also purges the ear.* This is done, 1, by the extraction of the pituitæ from the arteries penetrating thither; 2, by means of the Eustachian tube. 3. These things are done in order that a tremor may pervade that tube, for it is membranous, cartilaginous and bony. 4. Thus the tremor goes directly thither, and strikes those parts which inhere in the membranes. 5. But the tube is situated at the palate, or at the interstice of the nostrils and the palate, in order that taste, and especially its tremor, may give forth its effect. 6. Thus in a multiplex mode the sense of smell purifies, whence its use is very great.

SWEDENBORG'S SUMMARY OF THE PRINCIPIA.¹

ENTITLED IN THE ORIGINAL LATIN.

*"From my Principles of Natural Things."*CHAPTER I; THE MEANS LEADING TO TRUE PHILOSOPHY.²

1. If the mind (*animus*) be well connected with the organs of the senses, that is, if man be truly rational, he will continually aspire towards wisdom. 2. The sign that we are willing to be wise is the desire to know the causes of things, and likewise that we desire to know the mysteries of things and unknown operations. 3. He who wishes to attain the end should also wish to acquire the means. 4. The means which lead to a knowledge truly philosophical are especially three, namely, experience, geometry and the faculty of reasoning. 5. By philosophy is here understood the knowledge of the mechanism of our world, or of whatever in the world is subject to the laws of geometry, or which it is possible to disclose by experience, assisted by geometry and reason. Under the government of geometry are its three kingdoms, the mineral, the vegetable and the animal, and a fourth may be added, namely, the elemental.

5. Under the government of geometry, and under the mechanical laws of motion, the whole mineral kingdom, as well as the vegetable, may be ranked; and even the animal kingdom in respect to mechanical organs, muscles, fibres and membranes; or in respect to its anatomical, organic and vegetative relations. 6. It is a great task to explain philosophically the most secret nature of the elementary world, which is most remote and deeply hidden from the scrutiny of our senses. 7. By experience is meant all the knowledge of the things which

¹ With this issue of the *New Philosophy* a portion of Swedenborg's unpublished manuscript "*Ex Principiis rerum naturalium meis*" is presented in an English translation; a critical and bibliographical review will be printed in a future issue.

² The material for Chapter I has been supplied from the *Principia* by the translator.

exist in the world and may be approached by our senses, whether they be in the elements, or in metallurgy and chemistry, whether in botany, anatomy, or other [sciences], if only it may be known by the senses how they operate on the sensual plane, or act *a posteriori*. 8. The inquiry into the secret and invisible things of nature need no longer be deferred. 9. For the knowledge of natural things there is no necessity of the innumerable phenomena, which some think are necessary. 10. In the state of ignorance in which we are at the present day we can become wise only by experience. The knowledge of metals and chemistry I wish to especially emphasize. 11. The reason that men are able to grow wise by experience and refer objects to some reasoning faculty and investigate them and present them distinctly is that they have an active and most subtle principle or soul. 12. All perception passes through connection by what is contiguous from a grosser medium to one which is more subtle. 13. We ought to be instructed by the senses; only by that which passes through experience to the mind (*animum*) can we attain knowledge and thus become wise. 14. Man is developed by the exercise of his faculties, and the very organs which mediate between the senses and the mind (*animum*) are formed by continual culture, and without such culture and use those organs would be closed, as it were, and consequently man would become similar to a brute. The slowness of his growth from infancy to manhood contributes in an important and essential manner to the forming and opening of such organs or motions in the most subtle membranes. 15. Although we grow wise only by experience, it does not therefore follow that they are the wisest who are the most experienced, or retain many things in the memory; but I affirm that they may become wise, and that experience is the medium which leads to wisdom. 16. Consequently, he who retains all the natural experience of the world laid up in the store house of the memory is not on that account a philosopher, and capable of knowing the causes of things, and of reasoning *a priori*, unless he knows how to digest all things analytically by geometry and rational philosophy; and unless there be present the faculty of reasoning philosophically, which consists in a certain situation and figure of the organs, as connected with the rational

faculty, produced by continual cultivation and use. Thus he may first become a philosopher, penetrate into the causes of things, and finally speak from causes by means of experience. Hitherto we have treated of the first medium leading to philosophical wisdom, or to the knowledge of the mechanical or organic world; let us now proceed to the second. 16. The second medium leading to wisdom, by which the arcana of invisible nature may be unlocked or revealed, is geometry and rational philosophy, by which we may weigh experiments, analytically digest them, reduce them to laws, rules and analogies, and thus arrive at a third or fourth deduction which was at first unknown. 17. The world itself, elementary as well as mineral and vegetable, and also the animal anatomy, is purely mechanical; geometry therefore accompanies the world from its first origin or from its first boundary to the last. 18. Since all things in the world, which move and have limits, are mechanical, it also follows that the least natural things, as well as the greatest, flow in a mechanical manner, and that the least, as well as the greatest, are actuated by a similar mechanism. From these considerations it may be concluded that a mechanism governs the animal body, and that in the least animal there is a mechanism which is similar to that in a large animal and in the greatest. In the least or smallest things there is a purer mechanism and one which is more conformable to rules than in those which are great and much compounded.

19. Since nature operates in the world in a mechanical manner, and the phenomena which she presents to our senses are subject to their proper laws and rules, it follows that nature cannot operate mechanically except by contiguity and connection; so that the mechanism of the world consists in contiguity, without which neither the world nor its mechanism could exist. 20. The mechanism of the world is natural to some men and animals, or is familiar to them by nature without an instructor. 21. Although the world is mechanical and consists of finite things which have arisen by means of the most various contingents, and though the world because it is such and may with the help of geometry be explored by experience and the phenomena which are in it, it does not therefore follow that all things whatsoever that are in the world are subject to the

government of geometry. The infinite cannot at all be explored by geometry, because it exists as a cause before there is geometry. There are also many other things, which, although they originated from the Infinite as well as the world, have not yet been discovered by geometry or rational philosophy, as, for instance, that intelligent principle which exists in an animal, or the soul, which together with the body constitutes its life. There is a Providence in things, which is infinite in the Infinite or in that which is provident in the highest degree and hence there follows a connection and series of consequents (*fatorum*) according to which all events by means of causes and the causes of causes are as it were determined and disposed towards a certain end. 22. Since the intelligence in the soul is not mechanical, but only the mode by which it operates, there arises the question, what is that in the soul which is not mechanical and what is its verimost rational and intelligent principle which is not subject to known laws? The rational quality in the soul is the continual analysis of those things which are in a similar manner scientifically inherent in its organs. Let these statements suffice concerning the second means of arriving at a mechanical knowledge of the secret things in nature; we now come to the third means or to the faculty of reasoning. 23. The third means by which we may arrive at a true philosophy in cosmology and the knowledge of the secret things in nature is the faculty of reasoning. The faculty of reasoning justly, and of arriving at the end in view by the proper means, which are experience and geometry taken in a wide sense, is the characteristic of the rational man. A like faculty of reasoning is not given, and at this day cannot be given, to all. 24. But in order that it may be clearly understood what and of what quality the faculty itself ought to be, it must be grasped that the sciences and experience should be so disposed and harmoniously diffused through the organs, that immediately, when that which is active or an active force approaches, all those things so disposed in the organs which are of a similar nature should tremulate and as it were run to meet it and as it were present themselves to the soul simultaneously; but not together with others except as it were in obscure connection. The case is not different than [the law which obtains in the following illustra-

tion] : If a hundred chords be equally tuned upon a lyre ¹, when one chord is moved or sounded, all the others tremulate without there being any contact and as it were concur in the same sound and present themselves together to the ear in concord; from these premises it follows that we are wise in proportion to the things retained in the memory. 25. If experiment and geometry be called to our aid, I have no doubt, under the auspices of such leaders, of arriving at some knowledge of the invisible things of the world. 26. By a true philosopher we understand the man who, by the means which have been mentioned, is able to arrive at the real causes, and the knowledge of those things in the mechanical world which are invisible and remote from the senses; and who is afterwards able to reason *a priori*, from principles and causes, concerning the world and its phenomena, as well in physics, chemistry and metallurgy as in all other things which are subject to the government of mechanism. Were it possible to bring to light elementary nature, afterwards that of metals, then that of the vegetable kingdom, and finally that of the animal kingdom, what fruitful advantages the world would reap! 27. No man seems to have been capable of arriving at true philosophy, since the age of that first of mortals who is said to have been in a state of the most perfect integrity, that is to say, who was formed and made according to all the art, image, and connection of the world, before the existence of vice. The reason why man in a state of integrity was made a complete philosopher was that he might the better know how to venerate the Deity, the Origin of all things, that Being who is all in all, for no one can be a complete and really scientific philosopher except he be most devoted to the Deity. True philosophy and contempt of the Deity are two opposites. Veneration for the Infinite cannot be separated from philosophy; for he who thinks himself to be wise, unless his wisdom teach him to acknowledge the Divine and the Infinite, that is, he who thinks he can be wise without a knowledge and veneration of the Deity, is not wise at all. 28. They therefore are mere children, and have scarcely reached the first threshold of true philosophy, who ascribe to nature

¹ The strings of a piano also afford an apt illustration.—Tr.

the origin of all things, to the exclusion of the Infinite; or who confound the Infinite and nature, when yet nature is only something which has been caused, or a *causate*, the Infinite being its efficient and cause. 29. True philosophy does not derogate from [the credibility of] miracles, for all things are ascribed to the Divine Omnipotence, as that the world came into existence, which took place by contingents and mutations (*vices*). 30. I will present the two states of man, first, that which was of the greatest integrity and perfection, afterwards that which was perverted and imperfect. 31. It may be conceived that when man was in a state of the greatest integrity and perfection there existed such a state of contiguity [throughout his system] that every motion proceeding with a free course from his grosser parts could arrive, through an uninterrupted connection, to his most subtle substance or active principle, there being nothing in the way which could at all impede. 32. In the perverted and imperfect state of man in which we live today we see that nothing can be investigated without means, that nothing can penetrate to the ultimate active principle or soul except by means of continual experiments, by the assistance of geometry, and by the faculty of reasoning which is thus acquired. 33. The more profound his wisdom, the deeper will be man's veneration of the Deity and consequently his love of the Deity. Primevally his delights wholly terminated in the love of God, a love which exhausts and replenishes all sense of delight. It may therefore be most reasonably inferred that the delights of the first man consisted in this, that the end of the delights which he derived from the contemplation of a world so perfect and pleasing left for the use of himself and his hereditary posterity, and from the agreeable perception, by means of his senses and organs, of the motions existing in all the elements, was the love of the Deity. Supreme veneration and supreme love of the Deity could not exist without the supreme worship of Him. Therefore, the wiser a man is, the more will he be a worshipper of the Deity. From the same reasoning it also follows that such a man God must have loved supremely; for love is not only reciprocal and according to connection, but is also greater in what precedes and less in what follows. 34. The contrary to all this must necessarily take

place in a man not in a state of integrity and in whom the above mentioned connection has perished and therefore the Infinite and Only Begotten was made man that He might restore to man the connection with the Infinite in Himself and consequently by a certain connection with Himself in those who are like Him.

CHAPTER II; THE FIRST NATURAL POINT.

1. *Concerning the first simple of the world.* There is a first entity produced by the Infinite. Nothing finite can exist *per se*; therefore, it must exist by means of that which can finite [or produce what is finite], and which is Infinite *per se*. Therefore composite things derive their origin from simples, simples [derive theirs] from the Infinite, and the Infinite from itself, which is also the only cause of itself and of all things. All finite things came into existence successively, for nothing can be at once what it is [capable of becoming] except the Infinite.

2. Geometry itself acknowledges a certain simple and first entity of its existence which it calls its own or mathematical point.

3. The Holy Scriptures also wish to instruct us in this, that the world was created by God and the infinite.

4. Rational philosophy does not acknowledge that there can be an *esse* or *existere* without a mode.

5. And if [the first simple] was produced by motion from the Infinite, it must also be supposed that in the Producer there was a will (*aliquid velle*) which produced. The simple is the first entity existing by motion from the Infinite, and thus, in regard to existence, as it were a medium between the Infinite and the finite.

7. This point is the same as the mathematical point, or the point of Zeno; it is called the natural point.

8. The point is a simple and most simple entity, than which nothing can be more simple, since what is simple admits of no degrees. It [the point] is in no respect compounded, nor finited, nor limited, because it is simple, unless it may be said to have only one termination or limit.

9. Since there is [only] one limit, it follows that it [the point] is the first entity and seed of finite things.

10. [The point] is a kind of medium between the Infinite and the finite, for it is by the mediation of this point that finite things exist from the

infinite. 11. This point is immediately produced from the Infinite. 12. This natural point is purely motion in the universal Infinite, and consequently it is pure and total motion, which cannot be conceived of geometrically. 13. This motion presupposes no substantial, by (*per*) which it may be said to exist. In what way, therefore, are we to conceive of this purity and totality in motion? I reply that it cannot be otherwise conceived of geometrically and rationally than as an internal state or endeavor (*conatus*) to motion. Thus [in composite substances] we have first the motion of the individual corpuscles (*singulorum*), then the state of all together or the internal state, and thus the endeavor (*conatus*); therefore in what is simple there is motion, internal state and endeavor, etc. 14. This point cannot be conceived of as extended; it is without parts and indivisible. 15. Neither can it be said to fill space, unless it be space simply understood. It cannot be said to have figure, unless figure be simply understood. 17. Figure thus conceived of is most perfect. 18. In respect to quantities, or geometrically [considered, this point] is as it were nothing, or eludes the imagination. 19. Nothing can be attributed to this point, which is attributed to what is composite, unless by analogy.

20. Within its pure and most perfect motion are all those [qualities], as well active as passive, which limit (*finiunt*) finite things, and by which they are finited (*finiuntur*) throughout all their series. 21. Since this motion is endeavor (*conatus*) towards motion, or pure motion, the figure of its motion must be most perfect; if most perfect, it must be altogether similar to the circular figure; if the circular figure is the most perfect, it must be perpetually circular, or spiral; the motion must be similar to a perpetually spiral one; therefore this motion must have its centre in *conatus* and it must have a periphery. Therefore it cannot be said that such motion flows from the centre to the periphery, unless it be added that it is in the centre and in the periphery in the same instant, and thus everywhere present in its space instantaneously. 22. From the mechanism and geometry of the internal spiral motion there results, first, a certain axillary motion; then a progressive motion of all the spires around their poles; and from the axillary

and progressive motions, if there be full liberty and no contact, another or local motion, and indeed [a motion which flows] into perpetual surfaces. 23. Nature, which is a motive force, neither wishes nor is able to flow into any other figure of motion more freely than into the spiral; by which figure also its whole celerity is conveyed with the greatest freedom and facility through all its degrees; and to which, likewise, it appears to have applied all its mechanical force (*vim*) and power (*potentiam*). 24. Motion is the only medium by which anything new can be produced. Motion itself, which is only a quality and mode, and not substantial, may yet present what is substantial, or a similiarity to what is substantial, if something substantial be put into motion.

CHAPTER III; CONCERNING THE FIRST OR SIMPLE FINITE.

1. From the points or simples treated of in the preceding chapter there is produced this simple finite or first substantial. 2. Nor can any finite arise from points except by means of motion among the points. 3. But the cause of motion must be in the simple or point itself, that is, in the very internal motion and state of the point. 4. This new motion or motion of the points among one another, and their state, must necessarily resemble a pure motion, or the internal state which is in the point; that is, [this new motion must itself] also be spiral. 5. [The first finite] is the first entity or simple finite existing from the motion of the points among one another, and is thus the first substantial of all the finites. 6. [The first finite] is also the least substantial. 7. There is no other substantial in the world except this finite. 8. The least [substantial] is geometrical; it is limited, but limited by least or very small boundaries. 9. It fills space, but is the least among the finites, or [it is such that] a smaller than it cannot be supposed. It is endowed with figure, but figure in its least boundaries. 10. Its figure is the most perfect of finite figures. 11. The figures of such finites are most similar [to each other]. 12. [This finite] arose by means of the motion of the points among one another. 13. The kind (*ratio*) of motion among the points, which forms this finite, is, in a certain respect, similar to the kind of motion

in the point. 14. This finite possesses in itself the same active force as the point, so that it may produce the following and more compounded finites; that is, it receives from the point the force of finiting the sequents. 15. Thus the first finite likewise enjoys internal motion as does the point. 16. This simple finite must be compounded by means of a motion among the points. The points finally settle into a position (*situm*) in agreement with their motion and figure, and that position, thus formed in motion, derives its similarity [to the point] from the motion, figure and space of the points, likewise its quality and power of moving itself further. 17. This finite, in regard to its substance, is the first boundary of all the finites; as to motion, it is the first ratio of celerity; and all the analogies among finites cannot be reduced to a smaller boundary or ratio. 18. In comparison with [things] much finited and compounded it is as if they were nothing, but nevertheless it is a something and a finite entity. 19. It may be concluded *a priori* that the motion and position of the points among one another thence arising in similar to the internal motion and state of the point, or that it is a spiral reciprocating from the centre to the periphery and from the periphery to the centre. 20. If the continual motion be spiral it must also be reciprocal from the centre to the periphery and *vice versa*. 21. From the motion of the points arises the constant position of all; consequently, that in the finite by motion and position there arose two poles, the one opposite to the other; and the poles are formed like cones. Likewise, in every finite entity, whose parts are disposed into the spiral figure, there are an equator, ecliptic, meridians and other perpendicular circles. 22. From the regular position of the parts in a spiral figure there is a general endeavor (*conatus*) of all towards one and the same general motion, and that endeavor, if there be nothing extraneous to impede it, causes a general axillary motion or a circumvolution of the finite around its polar axis. 23. From the endeavor of all towards motion there exists a progressive motion of all the parts and spires which is much slower than the general or axillary motion, in which motion there is preserved a similar position and the same figure of all [the parts]. 24. Therefore all primitive force in the point and also the derivative force in the sequents consist in

this : that the motion, state and endeavor in the point is towards the spiral figure, which motion, state and endeavor cause an axillary and likewise progressive motion, which together produce another or local motion in which consists the very active force of finding and compounding the sequents and of so modifying them through a long series in the manner in which we perceive by means of our senses that the world [is modified]. 25. The motion of all the points must be most similar and regular, likewise the progressive motion thence arising, and also the second [or local] motion. [26. The principles can be but little proved by experience until we have arrived at the elementaries.] 27. Without a connection, similarity and derivation of one cause into another nothing natural could be produced.

CHAPTER IV; CONCERNING THE SECOND FINITE.

2. Since there is one kind of finite in the universe and all the finites are similar to each other, this therefore is the only [kind of substance] which can procreate anything from itself. 3. Nor can [anything procreated] derive its origin from the more simple and only existing finite except by means of motion. 4. Nor can motion be conceived between the finite substantials unless its cause be conceived at the same time, therefore the very cause must be in the substantial itself. 5. But the cause cannot be efficient and present a causate unless there be a contingent [which is this], that the series and abundance of these smallest substantials is so great that one is in contact with another. Therefore we can conceive of only two contingents, either that the abundance of the least substantials is so great that one by contact presses upon another, from which contingent exists a new finite, or that the abundance of least substantials is not so great that one presses by contact upon another, a contingent from which exists the active of the first [finite]. 6. It is a second finite entity, which exists from the motion of the simple finites among one another, and is thus the second substantial of all the finites. It came into existence only by means of motion; it is motion which distinguishes, finites, configures, makes one thing equal to another, retains it within its limits and so binds it together that it may exist as one

finite ens capable of being separated from another. 7. [This finite] consists only of simple finites. 8. It is not divisible into lesser [parts] than the simple finites of which it consists. 9. It is the second geometrical entity, limited, but in very small boundaries, and there can be no smaller finite than it, except that first substantial of which it consists. 10. It is endowed with a figure similar to that of the first substantial. 11. Its figure nearly approaches the most perfect figure of the finites, but it is not the most perfect. The figures of all these finites are similar, but, nevertheless, there may be dissimilarity among them. 12. The internal motion, position and state of this point are similar to the internal motion, position and state of the first substantial. 13. The motion of the whole, or the general axillary motion, likewise the motion of the parts, or the progressive motion, as also the second [or local] motion, if there be opportunity for it, are similar to the general, progressive and second [or local] motion of the first finite. From these things it follows that the position and progression of the centre of gravity in this second finite is such as is the position and progression of the centre of gravity in the first finite. 14. The celerity of the second finite, as well in regard to its general motion as in regard to its progressive and local motions, is less than the celerity of the first finite. 15. The first ratio of celerity is in the motion of the first finite; in the second finite is the second ratio, and this finite in regard to substance is the second boundary. 16. In itself and in its own internal state and motion it possesses the same force and quality as the first substantial, so that it is able to finite and produce the succeeding and more compounded finites, that is, it has received its whole force of finiting the succeeding [finites] from the first substantial, but, nevertheless, this force is no longer that of the first substantial, so as by it to be able to finite, but that it is its own, proper and acquired. 17. In respect to things much finited and compounded, it is small and as yet scarcely comprehensible geometrically. 18. That the motion in the point is spiral cannot be concluded from geometry but only from reason, but in the motion and position of the sequents the geometrician, as well as the physicist, may see that it is spiral. In the lever mechanics sees its power and forces; in the inclined plane its motion; in the perpetual lever

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5. But the cause cannot be efficient and present a causate unless there be a contingent [which is this], that the series and abundance of these smallest substantials is so great that one is in contact with another. Therefore we can conceive of only two contingents, either that the abundance of the least substantials is so great that one by contact presses upon another, from which contingent exists a new finite, or that the abundance of least substantials is not so great that one presses by contact upon another, a contingent from which exists the active of the first [finite].

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a perpetual power; in the perpetually inclined plane perpetual motion; in the spiral figure which represents both it sees all its possibilities and capabilities. If the centre of gravity consist in motion, so that the centre is itself formed by a continuous and most regular motion, mechanism teaches that such a body in motion will move still further, the motion being directed by the centre of gravity. If therefore this centre of gravity be not the centre of a quiescent body but the centre of some motion, it immediately becomes lively and active, or that becomes a living force which in a quiescent [body] is dead and inert.

ON THE CAUSES OF THINGS.¹

1. *On the equilibrium of the planets.* If a ball, which is heavier than water, be swung around in water, it runs out from its centre of rotation; if it be lighter [than water] it runs in; if of like weight it swings evenly and neither out nor in. This seems to be the case with the planets in the air, in like manner as a hollow lead bullet can be made to float on water.

2. *The most universal matter.* The particles which are in the ether must be round; thus also the other [kinds of] particles. The more the particles make room between each other and inside of themselves, where there are still other smaller particles, and between these still smaller ones, and so on to infinity, thus [it follows] that the most universal matter must be infinite or rather indefinite.²

3. *On the origin of matter.* In the first creation there was a considerable contention between fire and water, so that from the compression of both there arose from the latter salt and from the former sulphur; and when they still further compressed each other the sulphur became oil and the salt a flowing glass. The sulphur by its compression was finally turned into an earth and whirled out as pure fire.

4. *On rain; the rising and falling of water [in the atmos-*

¹ A few remarks in consideration of this translation of Swedenborg's paper *On the Causes of Things* will be found on pp. 206-8 of the present issue of *The New Philosophy*, together with critical and bibliographical information.

² The sentence appears to be incomplete.

phere]. If fish-bladders be balanced [in water] so that they neither float nor sink, if in luke-warm or warm water they float, but if it become colder they sink; in like manner if they lie at the bottom [of a vessel] and the water be poured off they float upward. [Or in other words the case is] thus, namely, when the water is at its first [degree of] coldness the bladders are balanced; but if more water be poured on, when they stand a little [raised up] from the bottom, they immediately fall downward; for as the bladders become more and less compressed they change their weight in relation to the water in like mass and quantity. The case is similar with the particles of water; for as long as the ether expands them by the warmth and rays of the sun, so that they become much larger than they would otherwise be of themselves, these particles of water float upward into the air no otherwise than a hollow lead bullet in water; but if the atmosphere be too high and consequently produces a stronger pressure, on account of which the particles of water cannot reach their full size so as to be able to balance themselves against the air, the water must remain near the earth; but as soon as the height and the pressure reach their maximum, which the water strives after because of the warmth of the sun, it immediately goes upwards, and when the quantity up in the air collects, nothing else can follow than [that it will find] a way backward, and as long as the lower height of the atmosphere allows the upward course [of the water], so long changeable weather of rain and sunshine continues in alternate succession, all according to the greater and lesser height [of the atmosphere].

5. *Experiments.* If by means of a lamp small glass bubbles, like hazel-nuts or peas, be blown rather thin and of an oval shape like fish-bladders, and they be balanced with lead in water in like manner as before said, and be placed in the midst of water in a bottle or glass,—then it can be noticed that if the glass be further slowly filled with water so that the upper part which is above the bubble be increased, or, rather, higher than it was before, the bubble sinks to the bottom; but if the water in the upper part be diminished, it floats upwards. The reason of this is that the deeper the bubble was under the water the more it was compressed and consequently lost its balance

in relation to the water. That a greater depth produces a greater pressure can be proved by this, that when you tie a stone to an empty four-sided glass bottle securely screwed tight and sink it by a cord into the sea, it will be found that in the beginning and at a little depth the bottle will safely hold [together], but if it be sunk too deep it goes to pieces, so that one has only left the screw and the string; and then [it also follows] that according to the strength of the bottle it endures a greater or lesser depth before it breaks. This is also the reason that divers who go under water cannot endure a (—) greater depth than their bodies allow in the water fall.³ This is also the reason why sick fish which live at the bottom of deep water cannot float upwards, as those do which live up in shallow water.

6. If a number of fish-bladders be taken and trodden asunder, or, rather, if a little hole be punched in each with a fine needle and the air be pressed out so that they become altogether empty, in so far as can be noticed, and they be put in cold water or in a pot or kettle, they immediately sink to the bottom; but as soon as the vessel is placed on the fire so that the water becomes warm, these same bladders float up from the bottom. The reason is that the little air which is still left and not sufficiently pressed out expands itself and increases in size on account of the warmth and then soon carries the bladders up with itself, provided that the air be not too light [in weight] or slip out through the small holes which are pressed together. For the same reason it is that vinegar and all other liquids which contain any impurity form a scum when put on the fire.

REMARKS ON SWEDENBORG'S PAPER "ON THE CAUSES OF THINGS."

THE short paper by Swedenborg, entitled "On the Causes of Things," of which a translation is printed in the present issue of *The New Philosophy*, pp. 204-6, belongs to the first period of his life as a scientist and philosopher. It is of unusual interest to the student of his science and philosophy be-

³ The sentence is faithfully translated, but is not clear. Perhaps the word for "divers" in the original should be read otherwise.

cause in it, perhaps for the first time, are to be found the conceptions of cosmology and the constitution of matter which occupied his attention for so many years and which are finally presented in their mature and complete form in the *Principia*. The paper "On the Causes of Things" is one of the first of that long series of documents which show how, on the basis of experimental research, the *bullular hypothesis* was gradually developed in all its parts.

In number one we find the idea that the planets float or are balanced in an atmosphere, a subject about which much may be found in the *Principia*. In the second number is found the familiar concept of the later period that "the particles which are in the ether must be round," likewise the "other particles," and that both surrounding them and within them there must be degrees of still smaller particles, so that "the most universal matter" is said to be "infinite or rather indefinite." In number three may be traced the idea that the more inert and inactive substances were formed "in the first creation" by compression from substances which were more active and less inert, and in the remaining portion of the paper, which treats of the causes of rain and changes in the weather, may be found several interesting ideas and experiments.

Critical and Bibliographical Information. In the library near the cathedral at Linköping (Stifts-Bibliotek) there is a large collection of manuscripts and among them some that were once the property of Ericus Benzelius. There is a folio volume (34 centimeters long and 21 centimeters wide, nearly) which, according to the catalogue, which was written later and placed in the beginning of the volume, contains 154 manuscripts by various authors and of various lengths and sizes. The volume is entitled "*Collectanea Physico-Mathematica, as well as several [papers] concerning the Natural History of Sweden, which were used at the foundation of the Literary Society of Upsala.*" (*Collectanea Physico-Mathematica. Sasom ock atskilligt rorande Sveriges Natural Historia, Hvaraf gjordes bruk Vid Societatis Literariae inratande i Upsala*), and on the inside of the cover is written "xl. Bibliothecae Lincopiensis. Ex Donatione C. J. Benzelii." This volume contains a collection of Swedenborg's letters to Ericus Benzelius, his brother-in-law, and also a number of Swedenborg's early scientific papers and other material by or relating to him. The papers in the volume are numbered in lead-pencil and the one numbered "30" is Swedenborg's manuscript, entitled "*De Causis Rerum.*" This document is a quarto leaflet of two pages, which, although somewhat irregular in

shape, are about 21 centimeters long and 16 centimeters broad. The pages are not numbered; they are almost completely covered with writing, nearly the whole of which is Swedish, but on the last page, on the right-hand side, about two-thirds from the bottom and written from bottom to top, are found the words "quicquid sit" in a somewhat lighter color of ink than that used in the manuscript as a whole; although Latin words are occasionally used in the text, the title of the paper being in Latin, these words appear to have no connection with the text, neither with the leaflet which follows in the volume; why they are there is a question. On page four, at the place which is indicated in the translation by a line, there is found in the original document a line with a point above and another beneath. The numbering used in the translation is not to be found in the original in every case, where only the numbers 2, 3 and 4 are to be found. The italicised summary of contents placed at the beginnings of numbers 1, 2 and 3 are written in Latin; those for numbers 4 and 5 are in Swedish.

The original manuscript of *De Causis Rerum* was reproduced by Dr. R. L. Tafel in the Photo-lithographs, Vol. I, number vii, pp. 24-27, together with most of the other documents by Swedenborg contained in the *Collectanea Physico-Mathematica*. Dr. Tafel includes *De Causis Rerum* in the Chronological Account, (*Documents*, Vol. II, pp. 890-891), where a summary statement of the contents is also given, and in Document 311, which may be found a few pages before the Chronological Account, (pp. 876-879). Dr. Tafel has also given a general description of the documents by and relating to Swedenborg which are contained in the volume of manuscripts preserved at Linköping.

The writer did not work from the photo-lithographic reproduction, but from the original manuscript, which was forwarded from the library at Linköping to the Royal Library at Stockholm.

In conclusion, the writer wishes to acknowledge the valuable assistance given by the Rev. J. E. Boyesen and the Rev. C. J. N. Manby, of Stockholm, in the transcription and translation of the manuscript.

ALFRED H. STROH.

Stockholm, Sweden, Nov. 18, 1902.

NOTE AND COMMENT.

We are fortunate in having secured for this issue of the New Philosophy translations of some of Swedenborg's MSS. which have not hitherto appeared in English, and are correspondingly indebted to the contributors of the same. Dr. Sewall's account of the recent meeting of the American Philosophical Association also deserves a careful reading.

The translation of Swedenborg's paper "On the Causes of Things" is of particular interest, as containing, if Dr. Tafel's chronology is

correct, the first written suggestions of Swedenborg's early philosophy that have come down to us. It is assigned by him to the year 1717. To Mr. Stroh's own comments we would add, what most students of Swedenborg's philosophy will readily see, that in the "contention between fire and water" which he speaks of in Sec. 3 is contained the first suggestions of that great duality of nature which so dominated his later philosophy, appearing in the *Principia* as a duality of actives and passives (or finites) and in the physiological and theological works as a duality of will and understanding.

Swedenborg's *Summary of the Principia* may be of interest to those who have not had time to examine the work itself, although it is alone hardly sufficient to give one an adequate idea of the *Principia* philosophy.

Interest in Swedenborg's Scientific MSS. in Stockholm: Through excerpts from letters received by Bishop Pendleton from Mr. Alfred Stroh at Stockholm we learn with the greatest pleasure that an interest in Swedenborg's Scientific MSS. has been aroused among scientists in Sweden which gives promise of accelerating the publication of those papers considerably. The noted Dr. Retzius has become so impressed with their importance that at a recent meeting of the Academy of Sciences, at which many foreign scientists were also present, he moved the appointment of a committee consisting of "Drs. Arhenius, Nathurst, a well-known geologist and palæontologist; C. Lovin, ex-professor of Physiology, and Henschen, a famous pathologist on the brain," for a complete examination of the subject. The motion was unanimously carried and Dr. Retzius himself included in the committee. Dr. Arhenius is quoted as having said on a previous occasion that he believed Swedenborg to have been a greater scientist than Linnaeus.

There would thus appear to be some prospect that general scientific interest coupled with national pride may relieve the Swedenborg Scientific Association of a part of the burden which it has taken upon itself. At all events this interest, following so closely upon the utterances of Dr. Neuburger of the University of Vienna, are very suggestive and stimulating to those already engaged in the work.

The work of copying and collating is also progressing most satisfactorily. Mr. Stroh reports that "he has now collated over 1,400 pages of the Scientific MSS., that over 2,000 have been copied and that the work is now almost completed."

Prof. Macloskie on the Descent of Man: Some time ago there was sent to us a clipping from *The Advance* for July 10, 1902, containing a presentation by Prof. G. Macloskie, of the Biological Department of Princeton University, of the current scientific status of the above question. This was taken from a long letter to the *New York Tribune*, and runs as follows:

"1. It is not the present doctrine of biology that man is descended from the anthropoid or any other division of apes. About eleven years ago it was discovered that the human foot cannot be derived from the anthropoid posterior hand, or from that of any of the monkeys.

"2. The next theory, that man is descended from lemurs, has also been abandoned because of the discovery that lemurs are not closely allied either to man or monkeys.

"3. In 1897 Hubrecht saved the tarsiids from being condemned along with the lemurs, and showed that Cope's Homunculus, a fossil skull of early date, belongs to the tarsiids, is a true primate, and may possibly be in the ancestral line both of monkeys and man. I believe he is still investigating his interesting thesis.

"From this it appears still true that (using the words of Claus, published in 1885) 'the view that man has originated from one of the lower forms of primates is only a deduction from the Darwinian theory.' It has not yet been verified, and scientific men are not yet able to formulate its whence or how. * * *

"Under these circumstances it would seem premature to be readjusting our Scriptural notions so as to accord with scientific theories not yet even formulated. Scientific investigators are themselves calling a halt, which one of your contemporaries interprets as signifying that the whole case is settled; but they are at a stand in perplexity as to what will come next."

At the same time it must not be forgotten that the evidence given is purely negative. Existing species are supposed to represent tips of boughs and twigs on nature's genealogical tree, each occupying its own space and growing away from the others, not towards or into them. According to their own theory evolutionists would only expect to find representatives of animal ancestors in the fossil state. This must be kept clearly in mind, if we are to value Prof. Macloskie's remarks properly.

It seems to us that the doctrine of evolution should occasion believers in the supernatural, much less annoyance, than some theories not so often referred to. One of these is the belief that certain organs or parts of the body are "useless." This appears to be closely bound up with an idea popular, by implication at least, with one class of scientists that man was not designed, but only "happened." If it is really true that certain portions of our physical make-up are absolutely useless, not to say detrimental to our existence, it follows that we know a better way of constructing human beings than the present plan. Such being the case birth and growth are not under the care of an active Agent greater than men. Men thus become either coexistent in time with and independent in power from all other minds or are themselves the greatest minds.

We must be careful, however, not to confuse a "functionless" with a "useless" condition. Organs may degenerate and lose their original

functions, but, so long as they are retained, we cannot believe them to be absolutely useless to the individuals in whom they happen to occur.

Of course in the modern and sadly disordered condition of mundane affairs when marriages are often contracted with little regard for mutual fitness and slight thought of future responsibilities, and when unhealthy modes of life are rather the rule than the exception, it is not to be wondered at that weak congenital organizations and even malformations are alarmingly common. It is poor logic, however, and worse science to charge such results on the inherent defects in the human organism. More probably one sees in them a desperate struggle of Life to overcome meddlings with nature little short of criminal.

Just how the much-mooted question of the function of the vermiform appendix will be settled we do not pretend to suggest. It is, however, noteworthy that several organs once supposed to be functionless are now recognized to have distinct uses.

Dr. Minot, of the Harvard Medical School, in his presidential address before the American Association for the Advancement of Science at Pittsburg, June, 1902, referred to some of these as foliols:

"Now, the more we have learned about animals, the better have we appreciated the fact that in them only such structures and functions are preserved as are useful, or have a teleological value. Formerly a good many organs were called rudimentary or vestigial and supposed to be useless survivals because they had no known function. But in many cases the functions have since been discovered. Such, for example, were the pineal gland, the pituitary body, the supra-renal capsules and the Wolffian body of man, all of which are now recognized to be functionally important structures. Useless structures are so rare that one questions whether any exist at all, except on an almost insignificant scale."

How growths, seemingly the most inconsequential, may serve a very important use is well illustrated in the case of certain protuberances found on the backs of reptiles. These really represent the rudiments of dermal outgrowths or hairs which came into active play when the animal was sloughing off its old skin. (See Carl Semper, *Animal Life*, pp. 19-23.)

The Ideal History of Physics Wanting: Dr. C. Riborg Mann, of the University of Chicago, in an article in "Science" of Dec. 26, pleads for the still lacking history of Physical Science, which shall be based not on fragmentary inductions assumed as laws for the time being, but upon the progress of those ideals which in every instance lay behind the inductions. After asserting that if science "grows and develops" it must be an organism with life, he asks: "In what does the life of science consist?" And he proposes as an answer, "in the ideas and conceptions upon which the inductions and classifications of science are based." He adduces instances in Copernicus, Newton and Fresnel,

Faraday and Maxwell, showing that their theories were worked out by applying experiment to preconceived ideals, or to the laws lying really in the realm of the invisible and intangible, i. e., in an imagined rather than in a sensuously known sphere.

The same is eminently true of Swedenborg's theories in his *Opera Philosophica*. Because these treat of the laws of the invisibles and imponderables they are no less a part of science than "the ideas and conceptions" upon which the above-named masters of science based their inductions and classifications. It may indeed be that Swedenborg's theories in the *Principia* and the *Chemistry* will require longer and deeper experimental research for their application, but this in no wise discredits them until such research shall have proved them value-

According to Dr. Mann the true historian of physical science must be the artist rather than the artisan, using Carlyle's definitions of these terms. The artisan sees things apart from their relation to the whole; the artist views them in the relation. "The writers of physical history have shown themselves to be artisans rather than artists. They have failed to perceive that there is a whole, and that only in the whole is the partial to be truly discerned. It is thus evident that the discernment of the whole is beyond the attainments of the scientific historian. Its realization is reserved for some future historian and offers to him a most enticing and remunerative field."

To this excellent observation we would only add that in making this step from the viewer of the parts to the viewer of the whole the scientist will step upward from the plane of science to that of philosophy,—not leaving the science behind, but seeing all its results in their wider and ideal relation. He will then first see things and the laws of things not as a chaos of the disconnected and accidental, but in their Form. For as Swedenborg defines it a Form is that wherein all the particulars have relation to each other and to the whole which they constitute. In regard to the possibility of such an ideal history of science Dr. Mann hopefully remarks:

"Men are beginning to question more than ever the bases of scientific work, to look behind the principles and laws which lie on the surface and to inquire into the real nature of the ideas upon which their science has been founded." F. S.

THE AMERICAN PHILOSOPHICAL ASSOCIATION.

The second annual meeting of this association was held in Washington in Convocation Week in connection with the meeting of the American Association for the Advancement of Science, the sessions covering the two days, Dec. 30, 31. The meetings were held in various lecture halls of the Columbia University, and were very largely attended, the philosophical faculties of nearly all the larger colleges and universities of the country being represented. Among those reading papers and taking part in the discussions were Drs. Ormond and Baldwin, of

Princeton University; Royce and Munsterberg, of Harvard; Ladd and Sneath, of Yale; Dewey, of Chicago; Cattell, of Columbia; Creighton, of Cornell; Hall, of Clark; Patten, of Princeton, and Commissioner Harris, of the U. S. Bureau of Education. Some of the meetings were held conjointly with the American Psychological Association. The papers covered a wide range of subjects and the discussions afforded a free criticism from divergent points of view. The main theories handled were Philosophy and Religion, Philosophy and Education, Philosophy and Science, the Psycho-Physical Parallelism, and the Psychological Classification of the Sciences.

The last-mentioned subject was treated of in a notable address before the joint meeting of the associations by Professor Munsterberg, who furnished his hearers with a carefully elaborated chart displaying a complete system of Theoretical and Practical Knowledge. What is noteworthy in this chart and appeals especially to students of Swedenborg's doctrine of life and mind is its trinal classification of Life, Truth, and Knowledge or Experiences. Life is described as the "immediate reality" felt "as a system of teleological experiences," or, as Swedenborg would say, it is Love willing its ends. Life embraces Volition, Thought, and Enjoyment (Swedenborg would say Delight); and this Thought is made, as with Swedenborg, not Life itself, but the "effect of Life." According to Munsterberg Thought is "Will acknowledging the connection of experiences." Swedenborg in *Divine Love and Wisdom*, Ch. I, on "Love is the Life of Man," says: "No one knows what is the life of man unless he knows that it is love. . . . If this be not known, one person may believe that the life of man consists only in feeling and in acting, another in thinking, when nevertheless thought is the first effect of life and sensation and action are the second. It is said that thought is the first effect of life, but thought is of different degrees interior and more interior, exterior and more exterior; inmost thought which is a perception of ends ("teleological experience") is actually the first effect of life." Munsterberg also classifies Knowledge under the theoretical and the practical, the first embracing knowledge of phenomena according to their relations and their purposes, and the second the application of this knowledge in arts and sciences. But throughout the entire chart the will-experience is the inmost and animating factor.

Professor Dewey in treating of the Psychological Method justified the appeal to experimental science. Energy he claimed to be the universal concept which may be translated into work, capacity, or even substance and cause. Feeling an object is merely experiencing a change of form; this is transformed into Psychic energy. Consciousness, which is absent in the energy of crystallization, begins in nervous energy. The world as thought is energy, a central nervous activity. Here was a reminder of Swedenborg's doctrine of Forms and Modifications or the changes of form and changes of State. [See *On the*

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Soul; nos. 175-190.] "Affections are changes of state corresponding to the harmonies which flow especially into the sensorial organs." But the whole presentation was obscured by the failure to recognize the discrete degree between the natural and the spiritual.

Dr. Ladd in treating of the Psycho-Physical Parallelism seemed to interpret parallel as applying to things on the same plane or degree instead of applying to two discrete degrees between which there is a correspondence and a relation of cause and effect, which is Swedenborg's doctrine. Hence his objection to the popular doctrine seemed to lie in its confusion of things which are distinct. The great forever discrete existences are the Ego and its embodiment, a mind and body, and Dr. Ladd defines "cause" as the action of mind on body. What is wanted is the bond to connect the two. Swedenborg says this bond is that of correspondence of form and influx of life from higher to lower. Dr. Ladd goes only so far, although this is a significant step, as to find this bond in the cosmic order itself, and its only explanation in religion; which we interpret to mean the recognition of the cosmic order as the Divine Will and Intelligence controlling all nature and all life.

Professor Creighton in discussing the paper of Dr. Dewey denied that End can be found by physico-psychological experiment, in so far agreeing with the doctrine of the discreteness of degree between spirit and matter. The end which shapes all purpose cannot, he contended, be discovered by psychological experiment or study. President Stanley Hall pleaded the merits of experimental psychology, instancing the modern methods of Child-study in their behalf, but he failed to point out any special contribution of value from this study.

Professor Hibben, of Princeton, in discussing the Theory of Energetics in its Philosophical Bearings spoke of the theory as 50 years old! Not to mention Aristotle's doctrine of energy as "the first substance which must be immaterial" and as "that active exercise of the mind which constitutes life" (*Metaphysics*; Bk. xi: Ch. VI), we know that Swedenborg in 1740 taught a doctrine of Energetics in his theory of the Conatus in the Infinite Itself as the beginning of all motion and the internal principle of animation; *Econ. Ragn. Animalis*: 135, 281, and in the *Divine Love and Wisdom*, (1763), "That there is an Endeavor (Conatus) in earths to produce uses in forms or forms of uses." Nos. 310-312, and that "In everything spiritual there is an effort to clothe itself with a body," 343, and that "Love or the Will constantly tends towards the human form," 400, which are only fragmentary statements of Swedenborg's great doctrine of the Universe itself as the product of Love or of that primal Energy which creates through its own Wisdom a plane of work in ultimate effects, the phenomenal world of human experience.

Professor Joseph Jastrow, of Columbia, in describing the present status of our knowledge of the "Subconscious," laid emphasis on the

value of the study of dreams and especially of the "ordinary normal dream" without defining just what a "normal" dream would be. He defined the subconscious as that activity which continues beneath or apart from conscious life as in our memory, in sleep, etc. It is connected with the sub-voluntary activities of the mind and body. Swedenborg treats of this distinction in his doctrine of the respective functions of the cerebrum and the cerebellum. See *Divine Love and Wisdom*, 384, and as to what becomes of endeavor and power in man during sleep, 219.

Mr. Spalding, of the College of the City of New York, endeavored by an analogy in physical science of the origin and disappearance of energy, to disprove the dogma *Ex nihilo nihil fit* as applied to consciousness, and to prove that, to the contrary, consciousness does arise from nothing and ends in nothing. Professor Bawden, of Vassar College, contended, in arguing for the Functional Theory of Psycho-Physical Parallelism, that we must alter our ideas of matter; that Function means brains, plus thought, in experience. The conclusion seemed to be that experience is the only reality, and it does not much matter whether we describe it in terms of matter or of mind.

Professor Baldwin, of Northwestern University, gave an amusing critique of some of the bold ventures of the younger philosophers of Oxford. Dr. F. C. French in criticising Hoffding's theory of Religion treated of the new psychological concept of "value" (Swedenborg's "use") defining it not so much as a thing in itself as a ratio, a relation of things to their end.

Professor Ormond, of Princeton University, President of the Association, in his Annual Address on "Philosophy and its Correlations," remarked upon the fact that many themes of pure philosophy or metaphysics were being seized upon by science, more especially by the physico-psychological investigators, and taken out of their rightful realm of spiritual or idealistic thought and treated only empirically or from the material side. He pleaded for the freedom and autonomy of pure thought and the preservation of a rightful distinction between the realms and the respective methods of science and philosophy.

At a joint meeting and Banquet of the Affiliated Societies with the American Naturalist Society, Professor Cattell, of Columbia University, presided and in his Annual Address presented what may be described as a burlesque of psychological statistics.

At another session Dr. Ladd, of Yale, read a strongly affirmative paper on the Argument of the Being of God, which was followed by a general discussion on What should be our Attitude as Teachers of Philosophy towards Religion? in which Drs. Royce and Miller, of Harvard; President Frances L. Patten, of Princeton, and U. S. Commissioner Harris took part. All were affirmative in this "attitude," but there was a difference in the conceptions of Religion as brought into the discussion by the different speakers. Professor Royce seemed to

hold that the precious assurances of religion were in substance attainable without the necessary intervention of the "visible church" and that the philosopher could dispense with its aids and even be freer in the exercise of his use in the world without definite Church affiliation, although to the "church invisible" he would always remain a loyal adherent. What the "church invisible" is without any plane of ultimate and definite activity in the mental and social world was not clearly defined, still less the psychological difference between such mental states as adoration, worship, dependence, etc., as conceived, and the same as ultimated in acts of thanksgiving, sacrifice and prayer. Dr. Dickenson Miller, of Harvard, foreseeing that rational thought would have to give up its belief in revealed religion with its miraculous and supernatural attendants and content itself with the worship of nature and the human ideal, thought that the attitude of philosophy toward religion as so conceived might and ought to be amicable; whereupon Dr. Patten, of the Princeton Theological Seminary, remarked that to religion reduced to these modest dimensions it did not seem to him to matter very much what attitude philosophy assumed toward it. Dr. Harris in conclusion, from an eminently spiritual standpoint, argued for the doctrine of the alone spiritual origin of "cause," and remarked that while the idealistic philosophy as distinguished from materialism could not indeed give us bread and butter, it could give us, or strengthen our belief already possessed, in God, human Freedom and Immortality, and that these would never lose their supreme place in the values of humanity and civilization.

FRANK SEWALL.

Washington, D. C.

" . . . We have at last discovered, and even isolated, what we may call the 'electric substance.' We can weigh it, and measure it, and produce it in any quantity. It may yet prove to be the 'protile' of the philosophers—the fundamental and primordial substance of the universe. Whether it is that or not, we have now some definite and almost tangible nucleus round which to crystallize our thoughts. The 'electric charge' is now no longer a mere phantasm of the mathematician. It is a solid reality; as solid, at least, as a deal table. It remains . . . to remodel our text-books in accordance with the new truths and to build up our whole electrical science upon the properties of the substance whose conquest has been so long and arduous a task."—Writer in the *Electrician* (London).