Swedenborg ends it with the confession that he has not solved the ultimate problem.

There is yet an infinity of other means which enter into this series of ends, either mediately or immediately, to wit, in respect to things mundane and corporeal, and in respect to things spiritual. In respect to things *corporeal*, in that men may be (fed and) covered or clothed. Therefore the whole globe and even tiny worms supply clothing, as also food, both being necessary if man is to live in the body. Therefore both are provided. In respect to things *mundane*, that the citizen may live, such as wealth and possessions, besides an infinitude of other things which are in the world; also sciences, etc. In respect to things *spiritual*, in that the nature of heaven is revealed, the nature of the will, how (God) is to be adored, and by what means the state of the soul is to be perfected so as to be a member of heaven, and this in such a way that its liberty is not injured but that it can turn to God. (*Rational Psychology* 560)

Because Swedenborg had traversed the whole gamut of nature, from outmosts to inmosts, and yet admittedly had not discovered the ultimate secret of the soul, he next turned to the study of the Word, and thereby was at last prepared for intromission into the spiritual world, and for his true mission as the servant of the Lord in His Second Coming. Toward this goal the Lord had been leading him secretly throughout his entire life; and all his studies in science and in philosophy had been a necessary preparation for it. Surely some knowledge of his philosophy must be of value to those also who receive the spiritual truth of the Heavenly Doctrine, and who seek to understand its relation to the wonderful phenomena of the material world.

PHILOSOPHICAL NOTES

Change and Permanence. Is there motion within the primordial substance? This question arose among the early Greeks. The names of Heraclitus and Parmenides respectively are preserved as representatives of those who believe that there is such a motion and those who do not.

The question for them is not so much how the change takes place but whether there is any change at all. For Heraclitus change is ultimate and permanence a mere sensory appearance. For Parmenides, the permanent is fundamental and change a mere appearance. For these philosophers, the problem of substance is relegated to a secondary position. (*A History of Philosophy*, Thilly and Wood, p. 17.)

Heraclitus and Parmenides. According to some records Heraclitus flourished in 504–501 B.C. Parmenides was younger, being born about 515 B.C. Only fragments are attributed to them.

One of these attributed to Heraclitus says:

You could not step twice in the same rivers: for other and yet other waters are ever flowing on. (*From Thales to Plato,* T. V. Smith, p. 11.)

On the other hand in a fragment from Parmenides we read:

[Being] is unmoved, in the hold of great chains, without beginning or end, since generation and destruction have completely disappeared and true belief has rejected them. It lies the same, abiding in the same state and by itself; accordingly it abides fixed in the same spot. . . . Nor is there nor will there be anything apart from being; for fate has linked it together, so that it is a whole and immovable. Wherefore all these things will be but a name, all these things which mortals determined in the belief that they were true, viz., that things arise and perish, that they are and are not, that they change their position and vary in colour. (*Ibid.,* p. 16.)

It seems at first that these two statements are trivial and yet this appearance vanishes as one follows the problem through history up to the present time. Already in Greek times the contradictory ideas of Heraclitus and Parmenides affect others. For example, Aristotle is responsible for a saying attributed to Cratylus:

. . . who criticized Heraclitus for saying that one cannot enter the same river twice, for he himself held it cannot be done even once. (*Metaphysics,* 1010a.)

Thus Cratylus, through his criticism of Heraclitus, is really a follower, because he carries the position with respect to motion one step further. Not only the object examined, the river, changes ceaselessly, but also the subject, the one who examines.

On the other hand, Parmenides had his supporters. The well known paradoxes of Zeno are arguments on the side of permanence.

Newton and Swedenborg. Swedenborg and Newton each wrote a book which is entitled in present English editions: *Principia.* In the two notes which follow one can see some of the differences in these two works. In connection with our present interest in permanence vs. change, we consider the difference between the mass particles in Newton's *Principia* and the activity of and within the particles of Swedenborg's *Principia.*

Newton's Principia. Concerning the nature of the mass particles of Newton we read:

We no other way know the extension of bodies than by our senses, nor do these reach it in all bodies; but because we perceive extension in all that are sensible, therefore we ascribe it universally to all others also. That abundance of bodies are hard, we learn by experience; and because the hardness of the whole arises from the hardness of the parts, we therefore justly infer the hardness of the undivided particles not only of the bodies we feel but of all others. That all bodies are impenetrable, we gather not from reason, but from sensation. The bodies which we handle we find impenetrable, and thence conclude impenetrability to be an universal property of all bodies whatsoever. That all bodies are movable, and endowed with certain powers (which we call the inertia) of persevering in their motion, or in their rest, we only infer from the like properties observed in the bodies which we have seen. The extension, hardness, impenetrability, mobility, and inertia of the whole, result from the extension, hardness, impenetrability, mobility, and inertia of the parts; and hence we conclude the least particles of all bodies to be also all extended, and hard and impenetrable, and movable, and endowed with their proper inertia. (Newton's *Principia,* Cajori translation, p. 399.)

Swedenborg's Principia. From the beginning of this work to its end the structure of the world depends upon motion, upon an activity of some kind whether it be called vortical or spiral. One may go further than to say that activity exists in the particles of the *Principia.* One may say their very existence depends upon activity.

A general review of the motions of and within his series of finites is given by Swedenborg in the Preface to the *Principia* as follows:

Let us then, in a few words, present the sum and substance of our philosophy; and in so doing begin from the first Simple.

1. We observe then, that in a Simple there is an internal state tending to a spiral motion, and consequently that there is in it a like conatus or endeavour to produce it.

2. That in the first Finite thence resulting, there is a spiral motion of the parts. The same obtains in the other elementary Finites, in all which there is thus a like principle.

3. That from this single cause there arises in every Finite a progressive motion of the parts, an axillary motion of the whole, and, provided there be no obstacle, a local motion of the whole.

4. That if there be a local motion, there arises thence an Active, similar to the agent producing it, and differing only in degree and dimension. (*Principia,* Clissold edition, XIV.)

Newton's Influence. By regarding nature as made up of mass points Newton was able to construct a system of mechanics which is one of the most important contributions to our culture. On the

basis of three axioms of mechanics coupled with a mathematical expression for the force of gravity, not only can all mechanical motions made by man be described but also the motions of the planets, the comets, and the moon.

By this year, 1964, things have changed considerably and much is done using principles quite different from those known as "Newtonian." The new principles are applied both in particle physics, that is in the small things of this world, and in astronomy, that is in the large things of this world. Nevertheless much is also accomplished which depends upon the use of Newtonian mechanics. And "classical mechanics", as it is called, is still not only a respectable intellectual challenge as one of the elements necessary to understand the nature of our universe, but also it is the means by which much physics is brought together into a unity.

That these mass points of Newton themselves move is of course essential to the science of mechanics. Nevertheless the very definition of the mass points excludes change or motion as well as structure within them.

Boscovich and Atomism. One, other than Swedenborg, who departed from Newtonian ideas was Boscovich. An interesting article has just appeared in the October, 1964, issue of the *American Journal of Physics* entitled "William Rowan Hamilton, Michael Faraday, and the Revival of Boscovichean Atomism," by Robert Kargon, Department of History in the University of Illinois. Kargon gives the following brief background concerning Boscovich:

> Boscovich, a Servian Jesuit, was a well-known 18th century scientific figure. In his *Philosophiae Naturalis Theoria* of 1758, Boscovich attempted to replace the traditional hard, extended atoms composed of a "prime matter" with a purely kinematic inertial motion. According to the *Theoria*, what in the visible world is called "matter" is really composed of indivisible point centers of force without extension or mass, in the naive sense. These points are associated with a specific force law, quite different from Newton's law of gravitation. The force between two points is according to Boscovich, alternatively attractive and repulsive, depending upon the distance between them. As the relative distance approaches zero, the mutual force becomes asymptotically infinitely repulsive. As the relative distance approaches infinity, the force becomes attractive according to the inverse r^2 law. Between these two limits, the force oscillates between attraction and repulsion. All points are, moreover, endowed with the property of inertia. All physical phenomena were explained by Boscovich on this model.

(The reader is referred to the article if he wishes to see how this idea was used by Hamilton and Faraday. I will for the present refer only to the following comment by Kargon:

> Boscovichean atomism, interpreted by Faraday has centers of force, not particles of matter. The so-called "matter" in which force resides in the orthodox atomic theory disappears leaving only a mathematical point.

Students of Swedenborg's *Principia* will be interested in this remark because it clearly indicates that there is a distinction between the mathematical point and the mass point. But I cannot go into this matter here as it will take us away from the main business of tracing through history the contest between change and permanence.)

It appears that the active particles of Boscovich had some influence on thought in the nineteenth century, and the active particles of Swedenborg had less. Until the early years of the twentieth century the mass particle of Newton predominated in influence. And, although chemists had made notable strides in distinguishing between the molecule as one kind of particle and the atom as another, they were essentially static in character.

Activity in Particles of Physics. Now there is ample evidence that many kinds of activity are present in the particles of nature. In the three succeeding notes brief descriptions are given of models or ideas which are used in an effort to visualize the causes of known phenomena. The three cases referred to are the molecule, the atom, and the nucleus of the atom, respectively.

Motion in Molecules. The ammonia molecule is known to consist of three atoms of hydrogen and one atom of nitrogen. Chemists have represented the arrangement of these four atoms by a pyramid. A hydrogen atom is placed at each corner of the triangular base and the nitrogen atom at the top vertex.

Mathematical theory indicates that the ammonia molecule has two states. One of these states is represented as described above and the other with the nitrogen corner pointing downward instead of upward.

After the development of means of producing of radio waves of very high frequencies in radar during World War II, these waves were applied to a volume of ammonia gas, and it was discovered that there was sharp resonance absorption when the power

immutable limits of rest and permanence, and a world where the fixed and unmoving was, as we have already noted, higher in quality and authority than the moving and altering. (*Ibid* p. 54)

Later he says,

And change rather than fixity is now a measure of "reality" or energy of being; change is omnipresent. The laws in which the modern man of science is interested are laws of motion, of generation and consequence. He speaks of law where the ancients spoke of kind and essence, because what he wants is a correlation of change, an ability to detect one change occurring in correspondence with another, etc. . . . (*Ibid.* p. 61)

Why does Dewey draw such an apparently unfair comparison between the moderns and the ancients? It is as if Heraclitus had never lived—only Parmenides!

One suggestion that can be offered is that both are too ancient. Their ideas appear only in fragments too short and inconclusive to be useful. And yet Dewey is making comparison between the moderns and the Greeks—perhaps it is Plato whose doctrine of change he refers to in another place.

But Plato in his system seems to depend both upon Parmenides and upon Heraclitus. His system was dualistic. His "ideas" were the essential forms of things. These were above the transient nature of man's thought. The ideals of beauty, truth and the like have a reality independent of us and of our knowing them. There is something permanent about these.

And yet there is also the sensual world. This world is always changing: one thing now, still another later. This world is as Heraclitus would have things. True, it can be said according to Plato that this is not a very important world because the appearances in this world are mere appearances. But it is difficult to see how such appearances, mere or otherwise, can have any existence whatsoever without having some kind of grounds.

The least that can be said is that Heraclitus, with his always changing rivers, and Plato, with his always changing appearances in nature, clearly show that the Greek mind was not isolated from the possibilities of change in creation as opposed to permanence, Dewey's remarks notwithstanding.

Change and Permanence, A Summary. With Heraclitus and Parmenides, as Thilly says, the case was not *how* change or per-

manence takes place but *that* change or permanence *exist*. The problem has to do with being.

By Plato's time many of the disputes of the pre-Socratic period to which Heraclitus and Parmenides belonged had ceased to exist as important. Plato was not interested in *whether* change or permanence existed but *how*.

He accepted both the position of Heraclitus, that change somehow does exist, and also the position of Parmenides, that permanence somehow does exist. The existence of knowledge and of a reality being granted, it remains to discover the nature of knowledge and the nature of reality, in particular the nature of knowledge as to how change and permanence fit into reality. Without going into the details of Plato's realities, we note that he assigned permanence to the higher realities and change to the lower ones.

In what respect do change and permanence enter the *Principias* of Newton and Swedenborg? Newton's *Principia* was an example of the application of his dynamics, which has to do with motion. But the motion is the motion of mass points. These mass points have no structure. Therefore it is meaningless to assign any form of activity to their internal nature. In Swedenborg's *Principia,* however, the concern is with the very nature of the internal structure of the particles in creation. Their very nature depends upon the activity which is within them.

When we consider the ideas of Dewey it seems as though he ignores the entire contest between change and permanence through the course of history. He assigns the doctrine of permanence to the Greeks while he espouses the doctrine of change as if he had never heard of Heraclitus. This last is an impossible presumption to apply to one who makes so much of his philosophical antecedents in his writings as did Dewey.

The explanation seems to lie in his monistic naturalism. Two steps taken by Dewey may have led to his statements in the note above.

The first step was to assume naturalism as the basis of his philosophy. The second step was to apply this assumption to the specific question of change and permanence.

In what seems pertinent to the first step one reads:

> If one denies the supernatural, then one has the intellectual responsibility of indicating how the logical may be connected with the biological in a process of continuous development. This point deserves emphasis, for if the following

discussion fails to fulfill the task of pointing out satisfactorily the continuous path, then that failure becomes, for those who accept the naturalistic postulate, but a challenge to perform the task better. (Dewey, *Logic; The Theory of Inquiry*, p. 25)

Once granting the naturalistic postulate, it seems easy to take the second step and assess history in the manner in which he does. Plato had assigned permanence to the higher realities, which of course the naturalistic postulate would exclude as not meaningful. Such change as does exist for Plato is on the plane of appearances. In his *Reconstruction in Philosophy* (see p. 107) Dewey makes such statements as: "Time, change, movement are signs that what the Greeks called Non-Being somehow infects true Being," and "Whatever there is change, there is instability, and instability is proof of something the matter, of absence, deficiency, incompleteness."

Thus it seems clear that Dewey interprets the Greek view to be that there is something comforting about permanence and something uncomforting about activity.

Activity is in All Things of Creation. The importance of activity is evident in Swedenborg's treatment of his particles in the *Principia.*

Not only this, but how can the reader of Swedenborg avoid acknowledging the change, the activity, the motion that is everywhere in creation, on every plane as well as in the particles? The existence of man on earth, for example, depends upon the heat and light of the sun. Of the existence of this activity scientists are certain. It is not known, however, in what this activity takes place. In the nineteenth century the luminiferous ether was invented for this purpose. But it presented so many difficulties that the discussion of it has almost vanished from scientific literature. Nevertheless the activity of radiant energy, called electromagnetic radiation, is an essential in all the sciences. It might almost be said that heat and light from the sun is a pure natural activity because, although it exists, it seems to have no material substance as a base.

In addition to this the reader of Swedenborg knows that the natural activities in relation to the spiritual activities to which they correspond are almost as nothing. In the spiritual world there is for example a spiritual sun. This provides on the spiritual plane all the activities for sustaining life on that plane.

E. F. A.

PUBLICATIONS FOR SALE

BY THE

SWEDENBORG SCIENTIFIC ASSOCIATION

The Animal Kingdom.	Two volumes.....set	$6.00
	Each volume.....	3.50
Camina Borea (*facsimile*)	.....Paper	1.25
Dock and Dam, New Method for Construction of a	.....Paper	.15
Economy of the Animal Kingdom.	Two Volumes.....set	6.00
	Each volume.....	3.50
The Fibre and Diseases of the Fibre	.....	6.50
Generation. The Breasts. The Periosteum	.....	4.00
The Infinite and the Final Cause of Creation	.....	2.00
The Letters and Memorials of Emanuel Swedenborg.	Two Vols.	8.00
	First volume, 1709–1748.....	5.00
	Second volume, 1748–1772.....	4.00
Mechanical Inventions of Emanuel Swedenborg	.....Paper	.60
Principia (*Tansley and Rendell*).	Two Volumes.....	7.50
Prologue to Swedenborg's Animal Kingdom	.....Paper	.25
Psychologica.	Latin-English.....	5.00
Psychological Transactions	.....	3.00
Rational Psychology (*Rogers and Acton*)	.....	3.50
A Concordance of Selected Subjects treated of in the Rational Psychology of Emanuel Swedenborg	.....	3.50
Rational Psychology and Concordance	.....set	6.00
De Sale Communi	.....Paper	.75
The Senses	.....	5.00
Tremulation	.....Paper	.50

(Continued on Back Cover)

PUBLICATIONS FOR SALE

(continued)

Swedish Royal Academy Edition.

I. Letters, and Minor Works on Geological Subjects (Swedish and Latin). Miscellanea Observata, Lex Hydrostatica.....Paper 3.00

II. Principia rerum naturalium (The Lesser Principia and part 3 of Larger Principia). Summarium Principiorum.....Paper 3.00

III. Miscellanea de Rebus Naturalibus.....Paper 3.00

Scientific and Philosophical Treatises.

Pt. I (Fascicle 1). On Causes, Fire and Colors, Mussels, Snails, etc.; Height of Water, Lake Wenner.....Paper .75

(Fascicle 2). Soil and Mud, Discovering Mines, Letter to A'Melle, Hydrostatic Law, Motion of Elements, Arguments for Principia..Paper .75

Dingle, H. Swedenborg as a Physical Scientist.....Paper .50

Nathorst, A. G. Emanuel Swedenborg as a Geologist..... .30

Retzius, G. Emanuel Swedenborg, Anatomist and Physiologist.....Paper .25

Prices do not include postage. Order from:

Mr. E. Boyd Asplundh, *Treasurer*
Bryn Athyn, Pa.

Swedenborg Scientific Association

BRYN ATHYN, PA.

President: Mr. Donald C. Fitzpatrick, Jr.
Vice President: Mr. Charles S. Cole
Secretary: Miss Morna Hyatt
Treasurer: Mr. E. Boyd Asplundh

Board of Directors: Mr. Lennart O. Alfelt
Mr. Edward F. Allen
Mr. Charles S. Cole
Rev. W. Cairns Henderson
Miss Morna Hyatt
Dr. Hugo Lj. Odhner
Mr. Joel Pitcairn
Mr. Kenneth Rose
Mr. Tomas H. Spiers

Nominating Committee for 1965 Annual Meeting

Mr. Lennart O. Alfelt and Professor E. Bruce Glenn
Bryn Athyn, Pa. 19009