PHILOSOPHICAL NOTES

Cause. Cause has been a lively topic in recent issues of this journal. And it is well that it should be, for it is of fundamental importance to New Church philosophy. Most of our discussions have been concerned with the definition of cause or with an effort to discover its meaning. Our distinctiveness from others lies in our believing that this is not a meaningless term but rather a quite meaningful one. However, because of its fundamental nature it can have a multitude of representations in different disciplines.

In New Church philosophy cause is not determinism as is the case in much philosophy today—especially in the philosophy of science. Our belief depends upon the concept of variety that is in ultimates. This is a concept stated by Swedenborg in the *Principia*—wherein the primitive elements, the first natural points and finites, are identical to each other in every respect except as to location. Variety appears, according to his cosmology, as these primitive elements are compounded. This variety is illustrated in an explicit manner later in the *Principia* where he treats of the magnetism, and still later under the topic "The Diversity of Worlds."

In the Writings this variety is manifest in the individuality that is given to each human soul and is illustrated by the freedom which each soul has to receive influx and to act according to order or contrary to order. This is certainly not determinism, yet everywhere present is the relation of cause and effect in the process of regeneration.

There are, of course, places in creation where man does not control the cause and effect relation. In a certain sense one might use the word "determinism" in such a case, but of this I am not sure. Such involuntary functions which are in the order of creation and are beyond man's will are in the innermost degree of the mind. In the natural world an illustration is the heart beat. Many lesser involuntary functions are developed with man while on earth, as for example walking and breathing. These are lesser examples because man can interfere with their orderly exercise. It is a significant characteristic of these involuntary functions that their very existence, far from interfering with man's

freedom, makes such freedom possible. How much of man's vitality would be left over for free action if he had to devote part of his conscious nature to the business of breathing or of walking—which are very complicated mechanical actions indeed?

Aside from the variety among souls there are other examples of variety wherein a beautiful interplay between cause and effect makes a variety of manifestations possible—even though there seems to be present a certain substratum of a special cause which we might call determinism.

Consider electrons for example. As in the primitive elements of the *Principia* so with electrons. They are apparently all identical with each other except for their individual location in nature. How various the phenomena in chemistry and in physics that arise by special controls upon these particles! The science of electronics, vast as it is, represents only a very small part of this variety. Chemistry can be described as a specialized field concerned with electrons. Yet in spite of the great variety of manifest phenomena and an apparently limitless number of applications of these phenomena by man, there is in the background a certain cause and effect relation which might be called determinism: for example that which keeps the electron as an electron, which determines its function in the atom and makes that atom act as it does, and that strange character in conductors and semiconductors called the "free electron."

Operationalism. One of the philosophies mentioned in this series of notes is operationalism. It received its most important impetus from the pen of Bridgman in 1927 in his book *The Logic of Modern Physics.*

People have argued since whether operationalism is a philosophical school or not. Whether it can be shown to be a philosophical school or whether it is a valid basis for scientific method is somewhat secondary to the historical fact that it has had its impact upon thousands of scientific workers.

Operationalism is discussed in the *Review of Modern Physics* for January 1963 in a paper "Conceptual Structure of Physics" by Laszlo Tisza. The final section is entitled "Philosophical Reflections."

A revised statement by Bridgman is quoted by Tisza in 1959 (that is 32 years after the original publication of his book).

We could do hardly better than quote from Bridgman's penetrating reappraisal of the early ideas of operationalism. "If I were writing the 'Logic' today I would change the emphasis so as to try to avoid what I regard as the one most serious misunderstanding. That is, I would emphasize more that the operations in terms of which a physical concept receives its meaning need not be, and as a matter of fact are not, exclusively the physical operations of the laboratory. The mistaken idea that the operations have to be physical or instrumental, combined with the dictum . . . , 'The concept is synonymous with the corresponding set of operations,' has in some cases led to disastrous misunderstanding. If I were writing again I would try to emphasize more the importance of the mental or paper-and-pencil operations. Among the very important of the mental operations are the verbal operations. These play a much greater role than I realized at the time. . . ."

It would appear by a vague implication from these remarks that Bridgman meant, even in 1927, that his meaning of operation was broader than physical laboratory operations. But many capable readers did not see it that way, and it seems more likely that Bridgman himself over those years was indoctrinated into the broader view so as to include "mental or paper-and-pencil operations."

Well! One can really ask now, What happened to operationalism? Tisza prefaced his quotation from Bridgman with the following:

Yet there is a growing awareness of the fact that there is something wrong, or at least lopsided, about the great emphasis on "operationalism" which for several decades has dominated empirical philosophy.

Positivism. Other interesting difficulties with operationalism are discussed by Tisza, who, however, had previously stated that:

The method of analysis of this paper is, I believe, in agreement with the spirit and the underlying goals of the philosophical school that is alternately called analytic, positivist, or empirical.

He says, for example:

We turn now to another difficulty of positivism, namely, its predominantly restrictive character which bids us to dismiss most problems of traditional philosophy as 'meaningless.' Granted that the traditional methods are lacking in precision, we are faced with the unhappy choice of dealing with significant problems in an unsatisfactory manner or bringing to bear a precise method on problems the wider import of which is not immediately apparent.

A little later, he says:

In order to understand the origin of the restrictiveness of positivism, we have to go back to the beginnings of mechanistic physics. With the brilliant success of Newtonian mechanics, it seemed tempting to brush away the complex and eroded conceptual system of scholastic philosophy. The proposition of temporarily restricting oneself to the conceptual framework of the new mechanics seems entirely sound, even in retrospect. However, the contention that this conceptual framework would be satisfactory at all times was unwarranted, and turned out to be actually incorrect.

And further, he says:

During the mechanistic era it became customary to dismiss types of questions that did not fit into mechanistic systems as unscientific.

I have an idea that Tisza is in for some jabs from some of his contemporaries. But it is also true that his kind of thinking may lead to the restoration to traditional concepts of a meaningfulness that has been denied them during recent decades when the philosophy of science has suffered so many restrictions under positivism and operationalism.

Why the Topics Chosen in These Notes? Example: Operationalism. Can it be that there are educated people today that do not recognize the importance of such topics? Are not the topics chosen of importance to those who would further the interests in New Church philosophy? Let me illustrate with one of these topics.

Operationalism has from time to time been treated of in these notes. It was assumed that operationalism and its effects upon present day thinking would be known to our readers. Notes to be notes must assume some background, else they will always be weighted down with background introductions—longer even than the notes themselves.

Let us take a look to see why operationalism is important to philosophical consideration. The ideas of operationalism are as old as science itself. But its more or less precise definition and its influence on present day thinkers in all fields stems from P. W. Bridgman's book, *The Logic of Modern Physics* first published in 1927. By the time I bought my copy in 1938 it had gone through four reprintings—a large number for a book on a topic in the philosophy of science. On page 5, Bridgman gives a definition of operationalism.

In general, we mean by any concept nothing more than a set of operations; *the concept is synonymous with the corresponding set of operations* . (Italics are his)

Explicitly he says:

The concept of length is therefore fixed when the operations by which length is measured are fixed.

This illustrates the manner in which all concepts are to be viewed; otherwise they are "meaningless." And by all concepts is meant here *all concepts even in disciplines other than physics.* (Italics mine)

Specifically Bridgman attacks the concept of absolute time in Newton's *Principia.*

He says:

Now there is no assurance whatever that there exists in nature anything with properties like those assumed in the definition, and physics, when reduced to concepts of this character, becomes as purely an abstract science and as far removed from reality as the abstract geometry of the mathematicians, built on postulates. (p. 4–5)

He also says concerning the use of operations as criteria for establishment of meaningfulness of concepts:

Furthermore, if we remember that the operations to which a physical concept are equivalent are actual physical operations, the concepts can be defined only in the range of actual experiment, and are undefined and meaningless in regions as yet untouched by experiment. (p. 7)

What can be more clear than that the above challenges the serious contemplation of "absolutes" or in fact anything whatever that is not capable of being handled by operational techniques? Is it not evident to anyone who reads history, social science, biology, or almost any subject that pretends to be the result of serious consideration, that the literature on such subjects is cluttered with statements condemning absolutes on every level of thought and branding as meaningless a multitude of traditional concepts not capable of operational treatment? How can anybody who believes in God, in truth, in good, in life, in cause, in purpose, . . . maintain that such a doctrine as operationalism, whether it is recognized as a school of philosophy or as a scientific method, has no importance to philosophy in general and to New Church philosophy in particular?

It can hardly be argued that when originally stated operationalism was merely a regulative method to be used by the scientist. It was not regulative; it was supposed to *produce results*—new results.

Note for example what Bridgman says about Einstein and relativity:

> For of course the true meaning of a term is to be found by observing what a man does with it, not by what he says about it. (p. 7)

And in particular with respect to the concept of the relative nature of simultaneity in Einstein's theory Bridgman says:

> Entirely apart from the precise quantitative relations of Einstein's theory, however, the important point for us is that if we had adopted the operational point of view, we would, before the discovery of the actual facts, have seen that simultaneity is essentially a relative concept, and would have left room in our thinking for the discovery of such effects as were later found. (p. 9)

This does not seem like a regulative doctrine in the Kantian sense as for example when he restricted metaphysics to be a regulative discipline. It appears to be much more like an active method to produce results.

Not only did Bridgman mean that "operationalism" might be a practical scientific method applied only to physics, but he extrapolated its application far beyond physics. For example, he said:

> I believe that many of the questions asked about social and philosophical subjects will be found to be meaningless when examined from the point of view of operations. It would doubtless conduce greatly to clarity of thought if the operational mode of thinking were adopted in all fields of inquiry as well as the physical. Just as in the physical domain, so in other domains, one is making a significant statement about his subject in stating that a certain question is meaningless. (p. 30)

Notice there are two elements in this statement made back in 1927 that have had much effect upon thinking in all fields that depend upon so-called scientific studies. First: that operational methods are to be used in all these fields: *i.e.,* in social fields as well as physical. Second: that the concept of what is meaningful depends upon operational methods.

The fact that Bridgman and others some thirty years later came around to modifying operationalism almost out of existence

does not in any way take away from its original effects upon those who are not aware of the history of philosophical thinking in those years.

But for my readers I believe these arguments justify the discussions and references to operationalism in those notes. Also justified are repeated reference to appeals to "meaninglessness." A similar introduction could be developed with respect to positivism, as well as to attacks upon teleology and cause and effect. I think these things have very much to do with those of us who profess interest in New Church philosophy.

In brief: I can logically expect my readers to take exception to my position on these matters, but I cannot logically expect them to take the position that these things have no relation to our studies which should push forward New Church philosophy in these days.

Why is Philosophy Necessary for Science? These two disciplines are to a man's mind somewhat like the two legs to his body. Given only one good leg he *can* get around—and often does, especially if he has a lot of help from people who have two legs. But he is still a cripple, and might well have been better off with two legs instead of one.

So it is with philosophy and science. Man can get along with one or the other—and often he does. In fact in these days of specialization most do get along with at most one and either passively ignore or actively scorn the other.

That a great scientist calls upon philosophy for assistance is illustrated by the following:

> In 1928 there appeared the greatest contribution to physical theory of our time. Just as Newton's *Principia* forged together the five independent laws of Kepler and Galileo, all of hydrodynamics and every known fact of astronomy, ballistics, and optics—so also did Dirac's theory of the electron unite in one formally beautiful, and experimentally powerful theory every idea of the particle physics of the Twenties. N. H. Russel, *American Journal of Physics*, 27 vol 1. (Jan. 1959) p. 3.

This quotation is given to introduce the reader to the importance of P. A. M. Dirac in science. He is probably not known to the lay public as are Kepler, Galileo, and Newton; their names at least are known to most—even if their deeds are not. It may be

that although he shared the Nobel Prize in 1933 with Schroedinger not even the name of Dirac may be known, let alone his work.

Dirac expresses himself on the question of the use of philosophy. On page 3 of *The Principles of Quantum Mechanics* (fourth edition 1958):

> The necessity to depart from classical ideas when one wishes to account for the ultimate structure of matter may be seen, not only from experimental facts, but also from general philosophical grounds.

This statement is enough to flabbergast the smug isolationistic scientist. It appeals to two concepts outside his narrow universe of discourse: the *ultimate* structure of matter and general *philosophical* grounds.

Later Dirac discusses the difficulty of, and gives the objection to, explaining matter in terms of particles which in turn are explained in terms of still smaller particles. These in turn demand still smaller particles. This eternal regression has been shunned by most philosophers. Dirac prefaces his effort to resolve this difficulty with the following:

> So long as *big* and *small* are merely relative concepts, it is no help to explain the big in terms of the small. It is therefore necessary to modify classical ideas in such a way as to give an absolute meaning to size.

Here he calls upon the idea of "absolute" applied to size. We pass by the opportunity to discuss how this statement, affirmed as late as 1957, flings a real problem in the face of the relativist follower of Einstein who already 60 years ago discussed the lack of such meaning with respect to measuring rods. However important its resolution may be for our purpose now, this is a side issue to a larger one raised by the appeal to "absolute."

Our point is that Dirac has openly called upon philosophy—as indeed he should. Einstein also in many connections has done likewise. He reacted to those who would institute statistics as the fundamental way in which nature works by stating that he did not believe that God played dice in such matters.

Dirac and Einstein are only two of several of the greatest scientists of our age who have dared to be philosophical. But lesser lights do not hesitate a moment to scorn philosophy if they think about it at all. For the most part they merely ignore it.

Why is this? It is because great minds cannot avoid asking questions that go beyond the limits arbitrarily set so that questions can be answered.

Margenau in a book *Open Vistas—Philosophical Perspectives of Modern Science,* in discussing the subject informally in the introduction says, concerning the scientist isolated in his specialization:

> Unless his mind soars above his daily pursuits, it is fairly natural that the working scientist should characterize his business as a welter of different and incompatible techniques. In the same spirit the woods man might claim that there are only trees but not forests. . . . Since knowing is only part of human experience, science is limited.

Speaking of any effort to define that part of human experience proper to science Margenau says, ". . . and to define an isolated part of it is always an arbitrary matter."

Whatever side points may be introduced in this note the purpose of the note is to indicate how scientists depend upon concepts that go beyond science and into philosophy.

Cosmology in Swedenborg's ***Principia.*** In the note above on "Why is philosophy necessary for science?" reference is made to the difficulty with the idea that large particles are explained in terms of smaller ones. This leads to what was there termed an "eternal regression."

There is nothing of this idea in Swedenborg's cosmology because in his system creation begins with the Creator and ends with the ultimate things of nature.

How this finition takes place and what is the nature of the relation between discrete degrees and in particular how to understand the nature of the first natural point—all these things do present *fundamental* problems to the student of the *Principia.*

> But since it is of such a nature, that it must necessarily be contemplated as immediately proceeding from the Infinite, and yet existing before any finite, and so must be considered as non-geometrical, although it resembles what is geometrical, inasmuch as the latter is produced by it, like always begetting its like; I could wish that some other person, capable of the task, would favor us with a better or more just view of the subject. *Principia* Chapter II. 19.

However, the important thing for now is that Swedenborg certainly shunned the concept of eternal regression. In the *Principia* (Chapt. III. 9) he says of the first finite:

That it fills space, but is the smallest among the finites, or is such that a smaller cannot be assigned.

An Historical Perspective. Let us consider the question, can a scientist be a philosopher? How strange this question is when we try to fit it into the history of thought! Why strange? Because its meaning would at first seem to be entirely different to the modern and the ancient. How many people are there today who call themselves "serious" scientists who will consent to the title of philosopher—or even admit an interest in philosophy—or admit that philosophy has a place in their "area of interest"? I venture to say, "Very few indeed."

How does this compare with the great in the Greek period? What in contrast would Plato or Aristotle think of the question? "How can one be a scientist without being a philosopher?" they would cry out. And alternately: "How can one be a philosopher without being a scientist?"

On coming closer to modern times, what of the great philosophers Descartes, Leibnitz, Kant . . . who were also great mathematicians, or scientists?

But I wonder if the above does not indicate a need for an historical perspective. Was the ancient Greek mind different from the modern one? Or was the mind of the rationalist different? I wonder if the truth is not closer to this: that in modern times and ancient times as well we find few minds capable of scientific and philosophical integration. As we go back in time we are likely to lump together a very long period into a very contracted one.

It is true that the lives of Plato (427–347 B.C.) and Aristotle (384–322 B.C.) overlap. But from the time of Thales (*circa* 585 B.C., the date of a solar eclipse which he is said to have predicted) to the time of Epicurus is 315 years. This is the span of time that includes what is often referred to as the "Greek period." Looking back 315 years would carry us back to the year A.D. 1648! Galileo Galilei died in 1642 and Isaac Newton was born in that same year.

What a challenge to the historical perspective of the modern who can with difficulty lift his vision outside of a decade of time! But I go on wondering. Have not the 300 or so years since Galileo died produced as many who could unite science and philosophy as did those 300 years which followed Thales?

But statistics in such matters carry with them illusions. The actual number of people and the actual number of years is not what is important. What does seem important is that the output of brains capable of integrated thought is very small in any period of time, although an active example can stimulate lesser ones to create periods of intensive activity.

What further creates an illusion today is the extensive scientific activity. This activity absorbs into the ranks of practicing scientists thousands who never would, in other times, have given a second thought to science. Many of these, regardless of their titles, are mere technicians or bookkeepers—but they ride the active waves which every now and then make a big splash.

Comments are easy to find today, by those concerned with such things: about the "gentleman scientist" for example (defined as one who goes to work at 9:00 A.M. and quits at 4:30 P.M.); or the grinding out of Ph.D.'s (on a 40 hour per week basis); or the mere size of some group projects (high voltage accelerator groups, Bell Labs solid state studies, missile and military programs) where hundreds are solicited and stimulated to go into science-related work they never, in other times, would have considered for a moment.

In one accelerator group there are more than 300 people already —Ph.D.'s, engineers, professional report writers, *etc.* How many of these are "scientists of the first order"? How many of these have the ability to have a perspective that relates their own specialty to their general field of interest, let alone one that relates that general field to philosophy, or more generally to an historical perspective?

The great ones—the Platos, the Aristotles among the Greeks; the Descartes, the Liebnitzes among the rationalists, or the Einsteins and Schroedingers among the moderns—are few in any period. Is it not possible that time has caused what was "timely" among the Greeks and even among the rationalists many years later to have become lost? And only those thoughts and questions which are treated of in a timeless manner have been preserved for us. It is such thoughts the philosopher is concerned with. Is it not possible that much that is "timely" today, and also much that is prefaced on grounds which discard the products of the past as "outmoded" will be soon lost to posterity? Will not the his-

torian of the future, whose perspective is broad enough to look back at us, see the philosopher-scientists as the thinkers of merit of our day? And will not the thoughts of the children of our age —the technicians, the bookkeepers, by whatever titles they are known today—be forgotten?

Should one compare the modern thinker with the ancient one? Or should one rather compare the great modern thinker with the great ancient thinker? Is it not in all times as it was in the time of great explorers—when for hundreds of sailors there were but a few captains?

What of History and Cause? I have been told that among "serious students" of history the same attitude is being adopted as among physicists about the law of cause and effect, namely that it is an obsolete concept belonging to the past. Yet I have been unsuccessful up to now in finding one among my humanistic friends willing to prepare a "serious study" of this subject for this journal.

I get the impression sometimes that "serious study" and "scientific" are synonymous terms to many—even humanists. I recall that in the '20's "scientific" studies were made even in literary things. People are not yet clear whether a certain field of study is "social science" or "social studies."

It might help to clear matters up with the rest of us if some humanist would tell us what humanists mean when they use the term "science." In the meantime I will quote for you what a physicist says about history:

> I hope that physicists can make a contribution toward international understanding by renouncing the extreme ideas of positivism as well as materialism. Above all we must make away with the fairy tale of physical determinism and thus also with the spectre of historical inevitability. *Physics and Politics*, Max Born p. 37.

Life and Teleology. These notes have already extended beyond their normal length. But one more observation is timely because it has to do with another recent article which contains philosophical speculations.

The article follows up on that of Komar referred to above. It appears in *Review of Modern Physics* for January 1963 and is entitled "Measuring Process in Quantum Theory," by M. Burgers.

Surely by now the anti-philosopher among serious scientists must come to think that there is something insidious about quantum mechanics because of the way in which it compels so many to think philosophically. Surely quantum mechanics for this reason would be thrown out as meaningless—except for the fact that it gives too many correct answers when one knows how to work with its formulations!

Burgers in his article concludes with a section called "Philosophical Excursion." He dares to treat of the "notion of causality," suggests a serious application of metaphysics, blandly discusses teleological forces in nature, speaks of physical objects as "societies" (this seems to be an anthropomorphic interpretation far beyond the tendencies of the prescientific period). He even goes so far in this journal of physics to discuss something he calls "life":

> We can say that conceptual activity then gives evidence of a certain purposiveness. The assumption of this possibility leads to a description of *life*, in which the essential aspect of life is not sought in the phenomena of self-reproduction, but in the possibilities of choosing particular, and sometimes new forms of relatedness.

Could this have something to do with free will? Well, I doubt it. But at any rate people seem to be compelled to discuss objects of interest in traditional philosophy more often in these recent days. But don't get too excited about the above article—it does not go overboard in this respect. Among some other things is the sentence, "We know that the physical laws are of a statistical character."

One must always look behind such a statement. Does it mean physical laws are statistical because that is the way in which nature manifests herself in ultimates? Or does it mean that nature acts according to statistical laws in principle? Writers can easily be found who maintain that the latter interpretation is held to by most physicists.

E. F. A.