

I

INTRODUCTION

This essay is an endeavor to look at some of the connections between science and religion. For the last two centuries science and religion have tended to take adversarial roles. It is our contention that this hostile confrontation is not necessary and misses the main point of what is being said. Science is one means out of many whereby man contends with his environment and as such it can support the religious perspective. Our purpose is not just to provide a manual for the scientific support of religion but rather to suggest certain connections or common areas where a sense of completeness and satisfaction in the unity of truth can be achieved.

The choice of topics and examples in this essay is highly personal. Despite the current discussion on evolutionism versus creationism little will be said about that debate. Our emphasis will be on phenomena of the physical world and its deeper levels where the degree of scientific exploration seems highly developed. These deep parts of nature also provide some of the most fascinating puzzles about the limits of observation and knowledge, and therefore show promise of the sorts of connections we are seeking.

The religious viewpoint in this essay, while containing some universal aspects, is Swedenborgian in the sense that the theological writings of Emanuel Swedenborg are taken as Divinely inspired revelation. These will be referred to as the Writings. Those who take this position are sometimes referred to as Swedenborgian but usually prefer to be known as members of the New Christian Church or New Church for short. Hence the designation "New Churchman."

The beliefs of the New Church are derived from the content of the Writings and are summarized here in a way which lays emphasis upon those parts which are most germane to our discussions. These beliefs are:

1. There is one God, omnipotent, omniscient, and omnipresent who

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is responsible for the creation of the world. He is the source of all reality through separation and finition of His substance.

2. Reality is dualistic: natural (of this material world) and spiritual (having to do with the mind and the life hereafter).

3. Man is created as the ultimate object of God's love with the unique ability to respond freely to God's desired purpose of making man eternally blessed in heaven. This freedom includes the option to reject the life of heaven.

4. God communicates directly with man through written revelation given in the Old and New Testaments as well as the Writings.

Subsidiary to these general statements are the following:

a) The Old and New Testaments contain internal levels of meaning which, in general, relate to 1) the nature of God, 2) the salvation of individual man and 3) the historical religious state of the church with mankind, as well as several other related concepts. The internal meanings are what give logic and purposefulness to the revelation, especially in those instances where the literal sense does not appear to have historical validity. This is especially true with the Genesis story of creation.

b) Man, as a responsive creation, has been endowed with the faculties of liberty and rationality, in order that his response to God be thoughtful and freely given. It is these faculties which characterize him as human.

c) Man is created to fill a certain use or role in heaven and all men are not created for the same role. The intended uses are the set of all those which sustain all aspects of a greater or 'grand man of heaven' each individual taking on one small part in the whole. Because of this the human form becomes the preeminent model for interrelated functions in a complex system.

This essay has some pretensions to being a philosophy of science within a religious context. But philosophy has many subcategories and its own rigor. In this essay we only attempt to say something about two of these topics, epistemology and metaphysics. But we say nothing about a Swedenborgian ethic of science, nor do we explore in any depth the multitudinous possibilities of a New Church psychology.

Our plan is to first look at the two sources of knowledge, revelation and the scientific method, to determine both their relevance and limitations for the task at hand. We then turn to the more metaphysical parts of the study, giving a brief description of the mechanisms

by which the Writings try to describe reality as it descends to the natural world, and then a scientific view of the levels and forces of nature. We also devote a chapter to our version of the distinctly Swedenborgian "grand man" model of the structure and functioning of a system. From this discussion we return to touch on some of the factors which limit our knowledge of the deepest parts of nature. And it is seen that at bottom the limitations on our knowledge may be of Divine origin, as a protection of human freedom.

II SOURCES OF KNOWLEDGE

There is only one truth about nature, or in fact about anything, yet there may be many representations of that truth. Similarly, while God is the only source of truth, the many representations can also be considered as secondary sources. In this essay we are concerned with the truth about nature, not as represented by the poet or painter, but the truth as an objective reality. One representation of such truth is science with its particular method of study, a method which seems objective, straightforward, and most suited to the subject. The other representation is revelation, which is at once more comprehensive but often less easy to use directly. Revelation must be read very carefully for knowledges about nature, since its main purpose is not to provide an alternative to the knowledges of science. Therefore our sources of knowledge are revelation and science. We will discuss some general features of these sources and some aspects of their common interface.¹

Revelation

Revelation is a communication from God to man which defines man's relationship with God. In his 1901 *Varieties of Religious Experience*, William James chronicles many apparently legitimate religious experiences.² Yet only some of these would qualify as revelation in the

¹ Swedenborg writes of the two foundations of truth as being the Word and nature (SD 5709). Much of the point of this essay is to focus on nature as a foundation of truth, with revelation (the Word) and science as representations or sources for information about that foundation. But the distinction between source and foundation can become somewhat arbitrary. The main idea is that God is the origin of revelation and nature.

² William James, *The Varieties of Religious Experience*, New American Library, New York, 1958.

sense in which we use the term. For many of these experiences had their origins in extreme physical and mental conditions of the recipient, or perhaps disorderly communications from the spiritual world.

Yet revelation does channel through individual men with varying degrees of awareness and cooperation from the individual involved. In *True Christian Religion* 202 Swedenborg describes a direct form of communication which existed in the earliest church (the Most Ancient) between men and angels through a kind of joint thought connection brought about by focusing on objects which corresponded in meaning to spiritual qualities. In the following church (referred to as the Ancient Church) the communication was through a written revelation (now lost except for the first ten chapters of Genesis) and while the previously used symbols still had meaning they lost their power to connect both spiritual and natural worlds. These symbols survive now somewhat in ancient writings such as the hieroglyphics of Egypt.

With the Jewish Church, revelation becomes more public in the sense that it becomes written and preserved. The Christian Church continued this pattern by adding the gospels and other books to make up the collection which is usually referred to as the New Testament. For the New Church, the Writings were added. But there is a new feature in that the Revelation of the New Church (the Writings) specifies which parts of the canons of the earlier churches are to be retained as revelation. This kind of direction is unique to the New Church.

The canon of the New Church includes most of the two earlier testaments and the Writings. Even the briefest of examinations reveals vast differences in tone and content. Revelation speaks to the condition of the church at the time. In the Old Testament a contractual arrangement with the Israelites was stated in which the people were to follow rigorously the commandments of God in return for their special place as His chosen people. The New Testament builds on laws of the Decalogue with a higher and more personal level of love to the Lord and the neighbor. The Writings appeal to another level of sophistication by showing the inner meaning of previous revelations in terms of the realities of the spiritual world, the developing mind of man, an eternal relation between male and female, and a developmental view of the spiritual history of man. Philip H. Johnson characterizes the message of *Arcana Coelestia* as follows:

- 1) revealing of the mysteries of faith
- 2) statement of God's providential care for mankind
- 3) a new way of approach to the Lord Jesus Christ
- 4) a knowledge of, and guide to, eternal life.³

It is interesting to note that the Writings are the first revelation to be self-conscious in the sense that they are a revelation which treats explicitly of the general nature of revelation. The fourth chapter of *The True Christian Religion* which is entitled "The Sacred Scripture, or the Word of God" speaks to this issue. It is made clear that true revelation is Divinely inspired (TCR 200), that although the letter of the Word does not always display the truth with clarity (TCR 254) the letter is the basis, support and containant of the spiritual and celestial senses (TCR 213). Nevertheless there is a degree of uncertainty permitted and indeed considered necessary in the communication of God to man through revelation. Man is enlightened by the Lord not just according to his knowledge of revelation but according to his motivation in the study of revelation. Thus a state of enlightenment is not achievable by man alone (TCR 231). From these statements we infer that although the Writings are sufficient as a written instrument, mere knowledge of their contents does not guarantee complete understanding. Understanding and eventually an intuitive wisdom only come as man orders and lives his life according to the precepts of religion. The uncertainty enters because the degree of enlightenment of a given person is not determinable, and therefore there is not a legitimate "standard" interpretation of revelation.

What general features seem to apply in regard to learning about nature from revelation? From this point of view there are differences between the Writings and the other two testaments. The literal creation story of the Old Testament is highly compressed in time and generally unrealistic in terms of both the general thrust of the Writings and the evidence of modern science. Yet it fits well with other primitive notions of creation and provides an explanation which was within the grasp of the early nomadic Jewish people. Similarly in the Writings given through Swedenborg there are no firm descriptions of scientific ideas which were significantly beyond the knowledges of his time. Of course this is done in order that the reader not be compelled to believe in the revelation, and thereby lose

³ Philip H. Johnson, *Revelation Through the Ages*, Swedenborg Society, London, 1949, p.24

his necessary freedom. (This theme of freedom will be discussed more fully in later sections.)

Early revelation provided a comprehensive world view for man, probably the only source of knowledge beyond sense impression and the experience of a daily routine. This world view and the possibility of miraculous happenings provided a climate for ready acceptance of revelation. Although they often strayed from obedience to Jehovah the Children of Israel appeared to have been believers, en masse. In the early Christian Church knowledge of Greek philosophies was somewhat incorporated into Christian doctrine, thereby maintaining the Church's hold on the total world view of the learned man. But with the continued rise of scholarship in western Europe this monopoly was eventually broken. As we shall see, the story of Galileo's dealings with the church is quite instructive in this regard. The situation today is quite different, especially for those who are well educated and well informed. Revelation has generally become a minor part of the total information flow. Competing philosophies and the multitudinous possibilities for feeding the love of the world provide an immense amount of static which interferes with reception of the essential messages of revelation. Swedenborg spoke of the difficulties experienced by the learned in coming to grips with the life of the spirit.⁴

As well as this trend toward the proliferation of competing information, the changing value placed on revelation during the history of the different churches has necessitated the provision of new revelations. As a church decays, distortions, compromises, and incorrect interpretations of fundamental doctrines arise which have resulted in the necessity of the new revelation. Paul Vickers suggests that the need for successive revelations arises on two counts: a) the development of erroneous doctrinal interpretations (as suggested above) and b), the gradual change in man's state caused by the previous revelation and the development of events and ideas.⁵ The Writings suggest that the cycle of church decay and further revelation has ended and that there will be no more new revelations—or at least that there need be no further revelations (TCR 787, AE 641). One might infer from this that the Writings are sufficiently com-

⁴ See for example *Arcana Coelestia* 3747, 3749, and 4760.

⁵ Paul V. Vickers, *God-talk and Man-talk*, General Conference, London, 1970, p.61

plete that no further explanations are required, and that they are sufficiently precise in their meaning that a substantial degree of unnoticed doctrinal distortion is impossible. However this is speculation.

Today a conscious building of faith is required to sustain the religious life. Revelation is addressed initially to the conscious natural mind and is in many ways a matter of perception of its truth and value by the understanding. Yet the will is engaged also and must be rebuilt to support and strengthen the initial perception. A description of this process is involved, and we will not pursue it further. But the point we are trying to make is that the acceptance of revelation, unlike science, involves a strong component of the will. The knowledges of science, once learned, are rarely rejected because they do not especially require a commitment of the will. Yet a commitment to faith is a commitment of life, for life is determined by the will (DLW 1).

Science

The existence and validity of science is based upon a series of postulates. In one sense science requires a faith on the part of the scientist but not one which is demanding in the sense of a religious faith. The postulates of science include the following:

1. The belief that the universe operates according to a certain order.
2. The belief that this order can be comprehended through observation and inference. This assumption includes a variety of sub-postulates such as the fact that measurements are reproducible, or more broadly, that the laws of nature are constant through time and space (the Cosmological Principle).
3. The notion that the discovered laws of nature retain their validity on a contingent basis. If phenomena are found which contradict these laws then they are rejected.

It is important to note that science is a man-made technique which developed in historical context. The Greek philosophers generally did not study nature in this way nor did the early Christian scholastics. We are familiar with Francis Bacon's espousal of this technique, but the scientific method really developed as the science of measure-

⁶ On this subject note the following quotation from *Apocalypse Revealed* 82: "Every church at its beginning regards the good of life in the first place, and the truths of doctrine in the second, but as the church declines it begins to be the reverse of this."

ment developed. The telescope and the microscope were very important as was the mathematization of theory. The 17th century represented a flowering of the scientific method in the study of mechanics, optics, gravity, as well as many others. Today this process is so sophisticated that many years of training are required in order to become a successful practitioner.

Science would seem to have two advantages over revelation as a source of truth. First, science deals with the apparently "real" things of the material world, which are tangible and immediately sensible. Second, science claims only a contingent validity for its theories. That is, a fundamental part of the scientific method allows for the destruction of an existing scientific theory if that theory is no longer supported by empirical data. Because this mechanism for hypothesis disproval through contrary results exists in the scientific method, it is perceived as more "rigorous" than revelation. As Karl Jaspers put it: "... there is no knowledge without knowing its limitations." Or again "... there is no certainty without uncertainty ..."⁷ These apparent advantages are somewhat illusory. First of all, the "real" things of nature that scientists study with their sophisticated equipment seem very far removed from conventional matter and our everyday experience. As we shall see in a later section there is no satisfactory picture for material reality. Secondly, the fact that the scientific method has a self-correcting mechanism is not a special virtue in that any human (and therefore imperfect) activity needs a similar mechanism if it is going to maintain its value. (This statement becomes obvious in the context of political systems.)

Interface of Science and Religion

There are three positions which may be delineated in regard to the interface of science and religion. One position is that they involve separate domains and therefore the discussion of the one is irrelevant to the other. Clearly that is not the position taken in this essay. Another position is that the domains of science and religion do overlap and that history has shown that there are basic conflicts between these two sources of knowledge. Finally there is the position to which we subscribe, namely that the domains do overlap, religion providing the overview and science the details, and when man sees the whole truth he will see agreement between science and revelation.

⁷ Karl Jaspers, *Philosophical Faith and Revelation*, Harper & Row, New York, 1967, p. 50

The history of science vis-a-vis religion has generally been one of conflict, as it is today with the re-emergence of the evolution-creation debate. This tension was especially pronounced during the beginnings of modern science. The question of the Copernican, heliocentric view of the solar system versus the Catholic Church's position of a geocentric system is a prime example. The story is quite interesting and instructive.

Galileo Galilei (1564-1642), the Italian astronomer and experimental philosopher, took up the Copernican position based in part upon his contemplation of observations of one of the moons of Jupiter (1610). This mini solar system seemed to provide sufficient incentive for confirmation of the revised but controversial theory. Eventually Galileo's views became known to the church leaders and he travelled to Rome confident that he could successfully defend his position. Unfortunately for Galileo, his method of approach seems to have been characterized by a kind of naive and aggressive optimism with which he managed to stir troubled waters more than he calmed them. Nevertheless, he escaped from his first encounter with the Congregation of the Index (March 5, 1616) with only an injunction not to publish the heretical view.

As time passed, Galileo seems to have felt that the Church's position was not strongly supported by either Pope Paul V or his successor Pope Urban, who had been a friend and admirer of Galileo. Therefore he set about producing his famous work *Dialogo del Due Massimi Sitemi del Mondo* (*Dialogue on the Two Chief Systems of the World*) in which he used the device of three characters, Salviati (who speaks for the author), Sagredo (who portrays an intelligent listener) and Simplicio (an obtuse disciple of the old Aristotelian view). While the work met with much critical success its production was a direct contravention of the 1616 edict and its style drew the ire of the Church authorities. Galileo was summoned to appear before the Inquisition in 1632 and, while he seems to have been treated well, was examined at some length. The net result was that Galileo publicly recanted his Copernican views and agreed to do some light penance for three years. There is a story, presumably apocryphal, that after his recantation Galileo still had to have the last word, and as he rose from his knees he stamped his foot and said, "Eppur si muove!"⁸ (And yet it moves!)

The confrontation between Galileo and the Catholic church

⁸ *Encyclopedia Britannica*, 11th edition, Vol.11, Cambridge Univ. Press, Cambridge, 1910, p. 409

seems to have been the last major attempt by the church to use the coercive powers of the Inquisition to counter apparently heretical scientific ideas. The late 17th century was noted for major advances in science, and in fact it has been called the golden age of physics. Furthermore the new ideas and observations often came through religious men—Newton, Descartes, and Swedenborg to name just a few. Yet the attempt by scientists to develop total cosmologies or natural philosophies which encompassed all reality became increasingly rare. Descartes' cosmology was perhaps the last of the famous attempts. Swedenborg's later and less well known *Principia* cosmology was also based upon a priori concepts rather than empirical observation. On the other hand Newton's "Principia" avoided comprehensive philosophizing and represents the modern trend of science toward limited and strongly focused goals.

Reflection upon the developments of science since the time of Galileo might lead to the conclusion that religion has been in retreat from the onslaught of science. In one sense this is true. But if one asks the purpose of religion, or more specifically the purpose of revelation, then the picture is modified. The purpose of revelation is to describe the relationship of God with man and provide for the furtherance of that relationship. Revelation does not seek to lay out a comprehensive scientific cosmology. In fact it has been argued⁹ that if revelation did provide a detailed theory of physical reality, man's freedom to accept or reject God's Word would be severely compromised. For if revelation gave a manifestly correct and detailed explanation then surely its claims about man's spiritual life would perform be valid also.

On the other hand, science does deal with the facts and knowledges of this material world. As such it serves many uses: control and use of the environment, increased illustration and understanding of creation, and, in education, enhancing the reasoning abilities of the developing mind. All these uses are, even separately, very important. Yet the injunction of the Writings is clear: "For it is by no means forbidden to learn the sciences, since they are useful to... life and delightful; nor is he who is in faith prohibited from thinking and speaking as do the learned of the world; but it must be from this principle—to believe the Word of the Lord, and, so far as possible, confirm spiritual and celestial truths, in terms familiar to the learned world. Thus his starting-point must be the Lord, and not himself; for the former is life, but the latter is death" (AC 129).

⁹ Philip H. Johnson, *op cit.*, p. 99

The priority is clear. The religious person, specifically those who see the Divine hand in the Writings as well as in the older testaments, would see these as the closest approximations to absolute truth. The truths presented there, expressed in finite language suited to the natural mind, are the essential principles of human life. In regard to religion the role of science is to flesh out these truths with illustration and particular details. Science also may provide another format, a different style which may complement the tone of revelation.

The application of scientific knowledge to confirm the general truths of revelation is one of the uses we hope to illustrate in this essay. But one note of caution is necessary. Man's conception of the creative and sustaining power of God will always be imperfect, and therefore the confirmations and contradictions that man sees must remain somewhat tentative. Science is a human activity which changes, and therefore today's scientific confirmation of a religious knowledge may evaporate with a change in scientific paradigm tomorrow. An example will illustrate the point.

A cosmological theory which seemed quite expressive of the infinite, creative powers of God was the so-called Steady State Cosmology, now defunct. In this theory the universe was taken to be uniform throughout its infinite expanse. Not only was the universe held to be infinite in extent but it was infinite in time; infinitely old yet having an infinite future. When the measured Doppler shift of the electromagnetic spectra of distant galaxies was interpreted to mean that stellar objects were moving away from us at high speeds, the Steady State theory was modified to include the notion of a continuous creation. This latter doctrine allowed for the gradual creation of matter (protons) to fill in the blank spaces left by the departing galaxies. In this way the universe remained uniform throughout space.

Obviously this cosmological theory had several pleasing aspects from the viewpoint of confirming the basic thrust of revelation. First, a universe of infinite extent seemed to be a fitting creation of an omnipotent Creator. Second, the idea of the universe being infinitely old is comfortable in that it conforms to the idea of an infinite and eternal God. Finally, and perhaps most felicitous, the idea of continuous creation provided a readily understandable mechanism whereby God the Creator sustains his creation.

One can hardly blame religious people for accepting this theory wholeheartedly. Yet in a few short decades scientific observation

provided data which discounted the steady state cosmology very effectively, and this same data spawned another theory, the Hot Big Bang cosmology. It is important to emphasize that neither theory is promulgated directly in revelation. Both theories were the conclusion of scientists and both have been contingent on empirical data. This illustration shows that caution must be used in judging the validity of scientific ideas in the light of revelation.

In spite of examples like the above and the passing fashions of science we do see a positive benefit in the study of science as confirming the truths of revelation. Revelation by itself may seem quite abstract and remote from actual life without the specific knowledges which science can provide. It is also of great importance that man see the connection of that which he does and thinks with the teachings of revelation. This applies to one's occupation and clearly includes the vocation of scientist. Perhaps the key to the proper use of science as an illustration of revelation is twofold. First, a scientific illustration must be assumed to be a personal one. Not everybody will see the same illustration or confirmation. People may disagree as to whether a certain phenomenon or theory is really a promising illustration. Therefore freedom of discussion of differing interpretations rather than unity of thought is desirable. Second, conclusions regarding confirmations should remain tentative. For these confirmations are no more valid than the science they rest upon, which is itself contingent.

Having made these general remarks about the interface of science and religion, we now turn to a brief history of the use of deterministic and probabilistic mathematical theories in physical science.

(To be continued)