# Chemical Education Between Bethel and Ai

## Academy of the New Church

## Faculty Development Study

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**Introduction**

On his first journey through the land of Canaan, Abram pitched his tent between Bethel and Ai until a famine forced him southward (Gen 12:8-10). Upon returning to Canaan after the sojourn in Egypt, Abram again camped here with Bethel on the one side and Ai on the other (Gen 13:3-4). The *Arcana Caelestia*[1] interprets Abram's sojourn as an educational process, and camping between Bethel and Ai before and after this process represents changes of state resulting from education in both things of the world (Ai) and the Word (Bethel) (*AC* chapters 12 and 13). I view the early Abram story as a description of mental development and the onset of adult rationality, and I believe it contains material valuable to collegiate curricula.

This paper uses biblical imagery as a framework for analyzing motivations for the chemistry curriculum at Bryn Athyn College of the New Church with the specific aim of identifying how science education can have lasting value in a New Church, liberal arts, collegiate environment. From its inception in 1876, the Academy of the New Church[2] has sought to achieve an education that balances world and spirit. Simply put, the education we strive to provide combines the best of what is available from research and application regarding matters of physical and spiritual life.

By using worldly and spiritual resources we can be children of God more fully than if we accept only one or the other. The Word illustrates this. Bethel was a holy shrine for the occupants of Canaan long before Joshua and the children of Israel took possession of it, and it remained a shrine throughout the history of the Northern Kingdom. Ai was a city of commerce, a place of merchants and the hustle of life such as might be found presently in Chicago. Ai was also a stronghold and was well

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[1]The *Arcana Caelestia* is an eight-volume, Latin work by Emanuel Swedenborg (1688–1772) explaining the inner meaning of the books of Genesis and Exodus. Swedenborgian faiths generally accept this work as divinely inspired. Parenthetical references to Swedenborg's works given in this paper are to his paragraph numbers. *Arcana Caelestia* chapters 12 and 13 explain the meaning of the sojourn story.

[2]Bryn Athyn College is one of four educational branches of the Academy of the New Church, the other three being the Academy Theological School, the Boys School and the Girls School.

defended—as Joshua discovered. But with proper orientation Ai submits to divine authority and the children of Israel eventually conquer it, giving the place its Hebrew name, "Ai," which means "a ruin." At times Bethel, Hebrew for "house of God," is called Beth-Aven, "house of evil." Beth-Aven houses many images of polytheistic idolatry which entice the Israelites time and again. Prophets such as Hosea and Amos preach against the practices there. For example Hosea writes:

> The people who live in Samaria fear
> for the calf-idol of Beth Aven.
> (Hos 10:5)

But Bethel is a place of true worship as well, as indicated by some of the activities recorded in the Word that took place there, such as Bethel's role in reconnecting fractured Israel after the horrific actions of the Benjamites (Jdg 20-21)[3] and Jacob's dream (Gen 28:10-22). After his vision of the Lord standing above the ladder Jacob said, "This is none other than the house of God" (Gen 28:17), which gave the place its name. The promised land contains both Bethel and Ai. With both areas in view, so to speak, Abram is on his way to being a blessing to all generations of the earth, as was foretold him by God at the beginning of his journey (Gen 12:2-3).

In navigating a winding path between Bethel and Ai this paper touches on many subjects, and without map or compass the journey may seem odd. I offer the following to guide the reader through this study. We begin with a fairly detailed review of the *Arcana Caelestia's* treatment of the sojourn story as an allegory of educational development. In the long section, *Sojourning in Egypt*, I explore the terms "knowledges" and "cognitions"—words used frequently in this part of the *Arcana*—and suggest how factual knowledge and concepts relate to these terms. I also look at the roles of learning facts and building concepts, as well as the roles of worldly knowledge and knowledge from the Word in mental development. The section ends by connecting collegiate education with the sojourn story.

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[3]The re-connection that takes place at Bethel after the Benjamites' sin was tainted in several ways, revealing folly and lack of responsibility characteristic of Beth-Aven.

In *Finding Lasting Value between Bethel and Ai* I address the questions: "How can I emphasize things of lasting value while teaching chemistry?" "What are students seeking?" and "What am I after as a teacher?" Ai represents education bogged down by focusing on trivia. We need to learn facts to help us get to a higher level, but facts alone are not living or useful.

As a field of study, chemistry lends itself well to helping students exercise new areas of analysis and abstraction. Starting from this proposition the next section, under the heading *Atoms and Abstractions,* shows how learning chemistry requires forming abstractions. Students tend to resist abstraction and need to be convinced of its necessity. But learning to form abstractions in chemistry can help students learn to form abstractions in other fields, too. This is the subject of the section entitled, *Developing Abstractions and Synthesis*. Here, I show how we need to use abstractions in order to apply Scripture to our lives. The sensual level of the mind reads the text, providing mental material for the rational level to analyze. From abstractions formed in this analysis, together with insights from the celestial level, the spiritual level of the mind can see the intellectual truths present in the story. When we see these truths, we also see how they apply in life. Finally, this leads to living in accordance with the truths, which is celestial wisdom.

*Creative Tension* addresses the uncertainty we experience when we force ourselves to exist between physical sense reality and abstraction, what we are and what we believe in, or Ai and Bethel. It seems easier to settle in one camp or the other. But through the Bible and the Writings we find the Lord calling us out through the threshold of whichever camp we call our home. Again, chemical education can play a role in helping us find our way over the threshold. The section called *Grounding Imagination Through Analysis* proposes that belief in the absence of fact, traps us just as well as facts alone. Here I take an example from chemical kinetics to show how chemists test theory—a process that requires combining imagination with experience.

Testing abstractions in chemistry can help us learn to test our beliefs as well. In science testing theories is relatively easy since scientific theories relate to the operations of the physical world. Testing beliefs is more difficult. In *Chemical Metaphor* I discuss

how knowledge of the way the physical world operates can help us test our spiritual ideas. In this section I take a few examples from thermodynamics to show how these may relate to concepts regarding creation and salvation. Chemical concepts can help us clarify our spiritual beliefs, and these beliefs, in turn, can inspire a holy sense in our worldly applications.

**Sojourning in Egypt**

In order to gain perspective on a New Church view of education, I have undertaken a review of Abram's first journeys through the promised land and his sojourn in Egypt as an allegorical tale of education. This view finds support in the treatment given in the twelfth and thirteenth chapters of *Arcana Caelestia*. In this revelatory treatment, we read that Abram represents the young Jesus, and Abram's sojourn Jesus' education. While Swedenborg identifies a few differences between Jesus' education and education of all people (*AC* 1462), this story also gives us indications of how a human mind develops. In his exposition of the sojourn story, Swedenborg describes the mind as composed of four levels—celestial, spiritual, rational, and factual (*AC* 1495). Our consciousness begins with the factual and rational parts of our minds, but all levels are present and receive life from the Lord, who enters our minds most directly through the celestial level (*AC* 1495).

Swedenborg describes "knowledges" and "cognitions" as the means by which our minds open to us, and our external and internal person conjoin. At this point I run into some difficulty because the meaning of Swedenborg's terms "knowledges" and "cognitions" is not consistent in his works, and has been a subject of long-standing controversy for some of his readers.[4] In the two chapters of *Arcana Caelestia* covering

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[4]In 1905, *New Church Life* published an exchange of ideas regarding these terms. C. T. Odhner began the discussion with his article on "Knowledge, Scientifics and Cognitions," as used by Swedenborg in the Writings. After bemoaning the several English translations that fuse these terms and render them as "knowledge" (159-160), Odhner proposes that "Cognitions are distinguished from science and scientifics not by . . . higher degree of assimilation . . . but by virtue of referring to a higher class of subject matters" (165). By higher subject matters he means the Word. In response, S. M. Warren wrote that while "cognitions" usually applies to knowledge

Genesis 12 and 13 Swedenborg describes cognitions. He writes: "Changes of the state of thoughts are cognitions" (*AC* 1463), and cognitions have "celestial and . . . worldly aspects" (*AC* 1553). The dual nature of cognitions, reflected in the second quotation, is especially important to this study.

At one point early in the Abram series, Swedenborg seems to indicate that cognitions can be "intellectual truths" (*AC* 1495.1) belonging to the spiritual level of the mind. In what may be a definition by simile Swedenborg writes, "To wisdom, or life, [a person] is introduced through coming to know and being aware, that is, through knowledge and cognitions" (*AC* 1555.2). Perhaps in this context knowledge is simply

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from the Word, it also implies a higher order of knowing (437-438). Odhner, who served as editor of *New Church Life* that year then reported on a letter received from W. B. Caldwell, who gives an occurrence (*SE* 1558a) where Swedenborg uses the term "cognitions" to mean "things abstracted from things material" (487). After considering Warren's and Caldwell's objections, Odhner seemed to change his own view and wrote, "The term 'cognition' defines not the nature of the thing known, *e.g.* whether it be doctrinal or philosophical, but the way in which it is known" (Caldwell, 488), and then quotes *Arcana Caelestia* 2850, "Cognitions refer themselves to the rational, but scientifics to the natural."

In 1973 *New Church Life* published another exchange on the subject, this time between R. W. Brown and H. K. Gutfeldt. Again the debate started with the notion that "The general distinction . . . is tantamount to that between what is essentially spiritual and what is essentially natural, cognitions being derived from revelation as the sciences are derived from experience" (Brown, 111). However, while Brown confined cognitions to things derived from the Word, he also argued that not all knowledge from the Word represents cognitions. To him, cognitions represent knowledge from the Word that has been mulled over and integrated into higher order thoughts (209). To this Gutfeldt replied, "The discrimination of levels of knowledge in the Writings is according to the level of integration in the individual, not to its origin in science or revelation in the first place" (301).

In 1988 E. J. Brock took up this discussion in his monograph *New Church Epistemology*. Brock's position was close to Warren's and Odhner's original proposition. He concluded that the Writings use the term cognitions to mean "Things that are derived from revelation" (62), or "Matters of the life of faith derived from any part of the three-fold Word" (63). He also agreed with Warren's and Gutfeldt's positions that unprocessed, factual knowledge from the Word is a "scientific" rather than a "cognition" (64).

Most contributors noted that Swedenborg uses the Latin terms *scientia, scientifica,* and *cognitiones* in different ways, among these is F. G. Griffith who noted in 1962 that the Swedenborg Society had done a thorough analysis of these terms in the Latin Writings (93).

In my own study I have adopted a position close to the one C. T. Odhner eventually came to and Gutfeldt spelled out: that the difference between knowledges and cognitions is the way in which something is known, not the revelatory or experiential source of the information. I believe this definition works best in the context of *Arcana Caelestia* chapters 12 and 13.

knowing something, whereas having cognitions implies an underlying awareness of it. This seems to hit the right tone. At one point Swedenborg contrasts factual, rational, and intellectual truth saying, "Factual truth is a matter of knowledge; rational truth is factual truth confirmed by reason; while intellectual truth is joined to an internal perception that the thing is so" (*AC* 1496). Awareness may indicate a connection between sensual knowledge and an internal perception. Cognitions appear to walk the middle road between the sensual and celestial levels of the mind and between the internal and external aspects of a person. The middle two levels of the mind are the rational, and spiritual degrees and cognitions may well exercise both. But in his treatment of Abram's sojourn Swedenborg uses the word "knowledge" as a multifaceted term as well, writing of "knowledges comprised of cognitions" which he contrasts with "knowledge in general" (*AC* 1462.1).

Earlier in the *Arcana Caelestia,* while dealing with the creation story, Swedenborg writes: "Cognitions . . . reside with the internal man and . . . facts . . . belong to the external man" (26), which implies that the difference between the two terms depends on the level of integration in the individual. But later in the *Arcana Caelestia* we read:

> [Religious] teachings consist in what is derived from the Word, cognitions in what is derived from those teachings on one side and factual knowledge on the other, while factual knowledge consists in what is derived from one's own and other people's experience. (6386)

In this case the difference between the terms is not level of integration but source. Cognitions are matters of knowledge influenced both by doctrinal things of the church derived from the Word, and factual knowledge, perhaps including sensory knowledge from the world.

Swedenborg describes a role for sensory knowledge in developing cognitions in another section of the *Arcana Caelestia*:

> Sensory knowledge . . . is factual knowledge about external things which belong to the world . . . . It consists in the things which enter immediately through the external senses and which are perceived by that sensory awareness. . . . This serves as a basis not only for cognitions of interior natural things but also later on for cognitions of spiritual things. For spiritual things are founded on natural ones and are represented within them. (4360)

Thus sensory, worldly knowledge is a resource for building cognitions. This passage also indicates that cognitions can be of two kinds—interior natural things and spiritual things. But in another theological work by Swedenborg, *The New Jerusalem and its Heavenly Doctrine*, "cognitions" specifically refers to spiritual things alone. In this passage the word "scientifics" means ordered knowledge or concepts:

> There are scientifics which concern natural things, scientifics which relate to the civil state and life, scientifics which relate to the moral state and life, and scientifics which relate to the spiritual state and life. But for distinction's sake, those which relate to the spiritual state and life are called cognitions, consisting principally of doctrinals. (51)

This passage has led some readers of Swedenborg to conclude that "cognitions" refers to things derived from the Word and excludes matters of knowledge obtained through studying the world. But a passage in *Arcana Caelestia* referring to the Abram sojourn story seems to assume something else. In describing Jesus' education and how it differed from others', Swedenborg writes, "In childhood the Lord wished to take in no other cognitions than those of the Word" (1461), clearly implying that it is possible to take in cognitions from sources other than the Word. Indeed, the *Arcana Caelestia* speaks of worldly aspects of cognitions (1551).

For my purposes I usually read "knowledge" as fact-based information. That the sun rises in the east is a fact (for someone living near the equator), and our knowing that represents knowledge. I read cognitions as a higher order of knowledge that represents some exercise of our rational minds and sometimes the spiritual level of the mind. Perhaps cognitions are what some educators describe as "concepts," where the word "concept" has special meaning, describing a synthesis of many facts into a higher order structure that fits in with other higher order structures in our minds.[5] We can have factual knowledge about our solar system—the sun rises in the east—and we can build concepts from that knowledge together with others. Interpretation of a great number of facts, and

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[5]Merrill and Tennyson provide the following definition of *concept:* "A concept is a set of specific objects, symbols, or events which are grouped together on the basis of shared characteristics and which can be referenced by a particular name or symbol" (1977, 3).

construction of concepts regarding those facts, may represent what Swedenborg means as cognitions. In this way the statement "the earth orbits the sun" may represent a cognition if it arises from analysis of facts. On the other hand, it may represent a memorized bit of factual knowledge if we store it as a piece of information rather than obtain it or analyze it through making observations.

In 1905 Rev. Carl Th. Odhner, differentiating the terms "scientific" and "cognition," wrote, "We know from science that the sun is the center of the planetary system; this is a scientific. But we know from doctrine that the Lord is the center of all spiritual life; this is a cognition" (166). To this I add that having the information that the Lord is the center of all spiritual life is more a fact than a cognition unless we see this fact in relation to others. For example, we could say: "As the sun is the center of the solar system, the Lord is the center of all life." In this relationship both previously isolated facts have become cognitions—one worldly and the other spiritual. Viewed this way perhaps the term "knowledge" refers to the currency of the factual or sensual level of the mind and "cognition" to the rational level. If this is the case, knowledges exercise and open the sensual level while cognitions exercise and open the rational level, and as indicated above, perhaps the spiritual level as well.

The purpose of knowledges and cognitions is to open the mind (*AC* 1555). Swedenborg sums up the process by which both the willing and understanding portions of our minds open. He does this as he unfolds meaning from the words used to describe Abram's return to the place between Bethel and Ai, after his sojourn in Egypt:

> Few if any people know how a person is led to true wisdom. Intelligence is not wisdom but it leads to wisdom, for having an understanding of what truth and good are is not the same as being a true and good person; but being wise is. With every person there are two parts of the mind—the will and the understanding . . . . A person's will is being formed by the Lord from infancy on into childhood, and this is achieved through the innocence that has been instilled into him . . . . *In this way the first degree is formed.*
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> But because a person is not human unless he is provided with understanding as well, will alone does not make a human being but understanding and will together. And understanding cannot be acquired except by means of knowledge and cognitions, and therefore he has to be endowed with these step by step from childhood onwards. *In this way the second degree is formed.* Once the understanding part of the mind has been furnished with

> knowledge and cognitions, especially cognitions of truth and good, he is for the first time able to undergo regeneration. And when he is being regenerated, truths and goods are implanted by the Lord by means of cognitions within the celestial things he has been granted by the Lord since infancy. The result is that the ideas now in his understanding make one with those celestial things. And once the Lord has joined them together so, he is endowed with charity from which he starts to act and which constitutes conscience. This is how he comes to receive new life for the first time, something that is achieved step by step. The light of this life is called wisdom, which then plays the leading role and is set above intelligence. *In this way the third degree is formed.* (*AC* 1555.2-3, emphasis in original)

Although I want to avoid oversimplifying the treatment of the mind given here, and I do not want to fix an inadequate image in our minds, I have decided to include a figure that represents my understanding of the development of the mind as given here by Swedenborg (see the figure on the following page). The figure portrays the sequential opening of the three degrees or three states of the mind. The degrees in the above passage are degrees of progression in mental development rather than levels of the mind such as the sensual, rational, spiritual, and celestial mentioned above. The first state or degree I take as the mental state of small children, perhaps from birth to about five or six years of age. The second state, I think, relates to the usual ages of education, about six to twenty two years of age. However, I believe this second degree has different areas of emphasis at different ages. For example I think the rational level of the mind remains mostly dormant early on and becomes more and more important the older a student gets. In the college years I think it is this rational level which most deserves our attention and our students' exercise. The third degree is the state of mind we take to heaven, and this degree can increase in scope and depth to eternity. One important distinction between the first two degrees and the third is that the first two hold separate the lower and higher parts of our minds. In the third state all four levels connect. This is the conjunction of the internal person and the external. In the first two states we hold many extraneous facts in our heads—facts which are of no service. But in the third state all factual knowledge exists as a grounding for the higher reaches of our consciousness. I see the discontinuity present in the first two states as a break in our consciousness. In the first two states we are aware of our knowledges and rational constructs but not of celestial goods and truths from God.

We are also unaware of the connections between our celestial truths and our sensual knowledges. In the third state I believe we are aware of these connections.

According to the treatment given in the *Arcana Caelestia,* Jesus came into the third state at a young age and well before any other person could expect to. The story in Genesis 12:17-20 of Pharaoh's angrily sending Abram and his wife Sarai away reflects how the boy Jesus came into an awareness, through the knowledge he was gaining, that he "ought to possess no other truth than that which was to be joined to the celestial" (*AC* 1493). This awareness saddened him, and this grief finds expression in Pharaoh's harsh words to Abram (Gen 12:18-19, *AC* 1492). Apparently Jesus found delight in learning but realized he must direct his efforts away from educating the rational level of his mind for its own sake, must expel information of no service to him, and focus on joining the internal and external aspects of himself. I imagine Jesus as a dazed and dejected youth as he came into this realization, probably dropping whatever studies he was taking up at that time and moving into a period of solitude. I can also imagine his saddened (and perhaps relieved) instructors as their prize student disappeared without warning. With Jesus' dilemma in mind, Hosea's words suddenly have a surprisingly sad sting:

> When Israel was a child I loved him,
> And out of Egypt I called my son.
> (Hos 11:1 *NIV*)

Culling our storehouse of factual knowledge to what serves the internal, celestial part of ourselves receives emphasis in *Arcana Caelestia* Chapter 12. This chapter makes clear the uselessness of retaining trivia. Obtaining factual information helps build the mind at first, but as our minds open these facts become impediments to further development. In the third state of mental development we retain only those facts that connect with our life. Abram's sojourn in Egypt represents progress in this development, as the *Arcana Caelestia* teaches:

> When the Lord as a boy absorbed facts he first of all knew no otherwise than that facts existed solely for the sake of the intellectual man, that is, that they existed so that from them he might come to know truths. But later on it was disclosed that they had existed so that he might attain to celestial things. This took place so that celestial things should suffer no violence but be saved. When a person is being instructed the progression is from facts to rational truths, then on

> to intellectual truths, and finally to celestial truths, which are meant here [in Gen 12:19] by "wife." If that progression passes from facts and rational truths straight to celestial truths and not by means of intellectual truths, then that which is celestial suffers violence; for no connection is then possible, linking rational truths, based on facts, with celestial truths, except through intellectual truths, which are the means. (1495.1)

This passage indicates the need for an orderly progression from the factual to the celestial regions of the mind. In particular, the rational level cannot be free to explore what is celestial until the celestial level orders the spiritual level of the mind, which in turn orders the rational level, as is spelled out as this *Arcana Caelestia* passage continues:

> To enable people to know what is implied in all this, something must be said about order. Order consists in the celestial flowing into the spiritual and adapting this to be of service to itself; the spiritual in the same way flowing into the rational and adapting this to itself; the rational in the same way into factual knowledge and adapting this to itself. But when a person is receiving instruction during earliest childhood, the same order in fact exists, but it appears to be otherwise; that is to say, he appears to progress from facts to rational things, from these to spiritual, and so at length to celestial things. The reason why his instruction appears to follow such a course is that a way must thereby be opened to celestial things, which are inmost. All instruction is simply the opening of a way, and as the way is opened . . . an ordered influx accordingly takes place . . . . Celestial things are presenting themselves uninterruptedly, and are also preparing for themselves and forming the vessels which are being opened. (1495.2)

The purpose, then, of education is to serve as the means whereby we establish connections through all levels of our minds and join the part of ourselves that receives life directly from the Lord—our internal person—with that part of ourselves that interacts with the world—our external person. As we near the full development of the second degree of our mental development we still lack continuity through the spiritual level of the mind, but that continuity becomes solidified as we more and more live a life in agreement with what we know to be true and good. In other words, stepping into the third state requires a rebirth or regeneration effected in us by the Lord, and this is possible only so far as our external person is willing to submit to the Lord's will.

An interesting characteristic of this progression is that we perceive it as building from the sensual level to higher levels of the mind, and from one point of view this is the truth. But the bottom up progression is devoid of life. Life comes to us from the Lord

through the higher regions of the mind. The concluding paragraph of the cited *Arcana Caelestia* passage makes this point:

> In themselves factual knowledge and rational conception are dead, but . . . they give the appearance of being alive because of the interior life flowing into them. This may become plain to anyone from the powers of thought and of forming judgements. Hidden within those powers lie all the secrets of analytical art and science . . . . All their thought and everything they speak from it is full of such things [life from the Lord]—though not one, not even the most learned, is aware of this; yet this could not be unless celestial and spiritual things within had been presenting themselves, flowing in, and bringing forth those thoughts and utterances. (1495.2-3)

Without ongoing development of higher, unconscious levels of our minds, development of lower levels is impossible. Another way of looking at this is to ask the question, "What is the point of education?" If the answer is to produce human beings with loads of information spilling from their heads then we have missed the point, since we would be chasing something that has no life from itself. The Academy educator, Bishop George de Charms believed that the role of a teacher is to provide conditions that allow insight. He wrote, "If, even on the basis of a very few knowledges, there is genuine insight, then education achieves its goal" (1944, 316), and:

> So intimately is every least part of the created universe bound up with every other part, in the supreme unity of the Divine purpose, that if we could perceive the full significance of a single flower, or even a grain of sand, we would be equipped to understand all things, and we would understand them as soon as they came to our knowledge. (317)

Unfortunately, training in facts without leaving space for developing concepts, particularly concepts relating to spiritual life, is not just a waste of time but is also dangerous.

Swedenborg mentions the need to protect what is celestial from the probing inquiry of the rational level of the mind. Earlier in his analysis of the sojourn story, while explaining why Abram asked Sarai to say she was his sister, not his wife, Swedenborg writes: "Knowledge is of such a nature that it desires nothing more than to introduce itself into celestial things and examine them. But this is contrary to order, for if knowledge is used in this way it does violence to celestial things" (1475). Pharaoh is not to see the

connection between the celestial and the rational, just as we are not allowed to investigate the nature of God or the heavens if we seek to do so only as an intellectual exercise.

I think this situation adds more power to a statement Swedenborg reports seeing inscribed over the door to a temple in heaven: "I saw there was an inscription over the door: NOW IT IS PERMITTED. This meant that now it is permitted to enter with the understanding into the mysteries of faith" (*TCR* 508.3). Swedenborg reports this experience in the last revelatory work he published, *True Christian Religion*, produced twenty two years after the first volume of the *Arcana Caelestia*. And in the later work he writes again of the danger present when penetrating the mysteries of faith—of the rational level of the mind investigating what is celestial. "Seeing this inscription," he writes, "led me to think that it is extremely dangerous to enter with the understanding into the dogmas of faith which have been put together out of one's own intelligence and the falsities it produces, and even more so to seek to support them by quoting the Word" (*TCR* 508.3). But he goes on to explain why now this is permissible:

> But in the new church the opposite happens; here it is permitted with the understanding to approach and penetrate all its secrets, and also to support them from the Word. The reason is that its doctrines are a series of truths revealed by the Lord through the Word; and proving them by rational argument causes the understanding to be opened up above more and more. This lifts it into the light enjoyed by the angels of heaven; and that light is in essence truth, and it makes the acknowledgment of the Lord as the God of heaven and earth shine out in all its glory. This is what the inscription 'NOW IT IS PERMITTED' over the door means . . . . It is a rule in the new church that falsities shut off the understanding, and truths open it up. (*TCR* 508.5)

Putting the statements quoted from *True Christian Religion* together with the material from *Arcana Caelestia* Chapter 12, I think the permission to use the understanding to probe into the mysteries of faith requires a life in line with what we know to be good and true, and it requires contiguity between the internal and external parts of ourselves. The New Church does not have blanket permission to use the understanding in ways denied to previous churches. We must satisfy two requirements. One is that we must use doctrines from the Lord rather than from man, and one of the blessings of the New Church is a revelation that helps us see those doctrines in the Old

and New Testaments. This agrees with the order Swedenborg describes in the *Arcana Caelestia*—that the order of our mental development begins with the celestial level of the mind which receives life from the Lord. Another requirement is that we have an intact and conscious spiritual level to our minds—the third state as described in *Arcana Caelestia* 1555, quoted above. The third state of mental development requires advancement into a heavenly state through regeneration. This second requirement makes the "now" in "now it is permitted" conditioned on our own willingness to follow the Lord with our whole being.

This situation leads to a paradox. In order to be in the third degree of mental development and take advantage of the new permission granted the human race, we need truths from the Lord so that we can put our lives into compliance with that truth. But we cannot consciously explore those truths before being reformed. This is why Swedenborg refers to development of the third state as occurring "step by step" (*AC* 1555). This also implies that the Word holds a special place in our development, and this brings up several more questions.

In the *Arcana Caelestia* Swedenborg explains that the words from Genesis 12:10, "'And Abram went down into Egypt to sojourn' means instruction in cognitions from the Word" (1461). He goes further:

> "Egypt" means knowledge comprised of cognitions, and "sojourning" receiving instruction. That the Lord received instruction in childhood as anybody else does is clear from the places in Luke just quoted [Lk 2:40, 46-49, 52]. . . . The external man . . . cannot possibly be made to correspond and accord with the internal man except by means of cognitions. The external man is seated in the body and the senses, and does not receive anything celestial or spiritual unless cognitions are implanted in it as in the soil. Celestial things are able to utilize these as their own recipient vessels, but those cognitions must be from the Word. . . . From this it may become clear that in childhood the Lord wished to take in no other cognitions than those of the Word. (1461)

This passage raises the question, What does Swedenborg here mean by the "Word?" In explaining the meaning of John 1:1-5, Swedenborg writes in the *Arcana Caelestia*:

> Few know what "the Word" is really used to mean here. From every particular detail it is clear that the Lord is meant, but the internal sense teaches that it is the Lord as regards the Divine Human who is meant by "the Word," for it is said that "the Word became flesh and dwelt among us, and we beheld His glory." And

> since the Divine Human is meant, "the Word" is used to mean every truth having reference to Him and deriving from Him which exists in His kingdom in heaven and in His Church on earth. This is why it is said that "in Him was life, and the life was the light of men, and the light appears in the darkness." And since truth is meant, "the Word" is used to mean all revelation, and thus also the Word itself or Holy Scripture. (2894)

This is a broad definition of "the Word" and perhaps this broad definition is what Swedenborg means in what is quoted above from *Arcana Caelestia* 1461. One way to understand the words "in childhood the Lord wished to take in no other cognitions than those of the Word" is to think of Jesus' acquiring only those things that were in agreement with his inner or celestial being, which in his case was divine. Another way to look at this in relation to the meaning of Abram's ejection from Egypt is that after the time Jesus realized that he must discontinue learning for the love of learning and take in only those things that would join his external person with his internal, he then took no cognitions from any source except the Word. As a lad, Jesus may have come to this discrimination in much the same way as he later described in the parable of the merchant looking for fine pearls (Mt 13:45-46). When the merchant found one of great value he sold everything he had and bought it. According to the *Arcana Caelestia* the pearl represents charity or good of faith, and the merchant one who is looking for "cognitions of truth and good" (2967.7). The high value means of the highest form. Selling all that one has to buy this pearl of great price may represent orienting one's receptiveness to learning from the Creator rather than learning from oneself. If we accept that the definition of the "Word" given in *Arcana Caelestia* 2894 includes revelation through sense experience, then this does not mean we pay no attention to the world around us and our own experience of it. It means we attend to our experience with an ear to hearing something from our Creator.

Still another way to read the requirement that cognitions must be from the Word alone is to strike a difference between Jesus' educational experience and that of everyone else. This last view receives some support from the very next paragraph in the *Arcana Caelestia* which differentiates the meaning of Egypt in regard to the Lord from its meaning with regard to all others. "In reference to the Lord," we read, "[Egypt means]

knowledge comprised of cognitions, but in reference to all others, knowledges in general" (1462). This seems to imply a wider range of acceptable information useful for building human minds.

Of the possibilities above I think the widest interpretation of what is the "Word" fits best. In this sense anything can teach us as long as we acknowledge that the source is the Lord and not humankind or nature. I rely on this interpretation when I assume that chemical education has a place in developing and freeing the human being.

The sojourn in Egypt describes an educational process that helps develop the mind. When Abram leaves Egypt, I believe he represents the time of transition between the second and third degrees of mental development. And when he entered Egypt he was just beginning to develop the second degree. Both before and after the sojourn Abram pitches his tent between Bethel and Ai, but the wording describing his location is slightly different at either end of this journey, and these differences have significance. In Genesis 12:8 Abram is said to be at "the mountain on the east of Bethel . . . , Bethel being toward the sea and Ai toward the east." When he returns the wording is, "And he went in accordance with his journeys from the south and even to Bethel, even to the place where his tent had been at the start, between Bethel and Ai" (Gen 13:3). Swedenborg explains these words saying:

> "From the south even to Bethel" means from the light of intelligence into the light of wisdom. "Even to the place where his tent had been before" means towards the holy things which were there before he had been endowed with cognitions. "Between Bethel and Ai" means here, as previously, the celestial and worldly aspects of cognitions. (*AC* 1553)

Going from the light of intelligence to the light of wisdom marks a change in state from the second to the third degree.

The phrase "Bethel being toward the sea and Ai toward the east" does not appear when Abram returns. This is because the phrase means that Jesus' "state was still obscure . . . [in terms of] cognitions of celestial and spiritual things" (*AC* 1453). But when Jesus returns from his sojourn he was moving back into "the celestial things which [he] already possessed before" (*AC* 1556), but this time in possession also of the light of intelligence.

He was therefore ready to join the interior and exterior parts of his mind. In explaining this Swedenborg writes:

> Worldly things cannot be dispelled until truth and good are implanted in celestial things by means of cognitions, for a person cannot possibly tell celestial things from worldly until he comes to know and is aware of what the celestial is, and of what the worldly is. Cognitions turn a general and obscure idea into a clear and distinct one, and the clearer the idea is made by means of cognitions the more can worldly things be separated. (*AC* 1557)

I am interested that at this time of transition between the second and third degree Ai is still present. We need "worldly aspects of cognitions" (*AC* 1553) to build our minds, and some of these worldly cognitions remain even as we advance to the next state. We dispel the obscurity resulting from missing the spiritual and rational levels of our minds after a sojourn in Egypt. When Abram returns to "the place he was before," Bethel is no longer said to be "toward the sea" and Ai "toward the east." Being "toward the sea" is an idiom for being to the west. The west represents obscurity and the east enlightenment. At first, worldly things are clearer than celestial things, but after developing the rational and spiritual levels of the mind celestial things become clearer. I take this to indicate that instruction in worldly things has a place in our education at least through the transition point between the second and third degrees of our mental and spiritual development. And I think this transition does not take place with most people until after their college days and probably not until midway or late in life.

When I consider the state of the minds I teach in an undergraduate college classroom, I conclude that it is mostly the rational part of the natural mind I am seeking to educate, and that I can approach this education using something as worldly as chemistry. And yet something else needs to be present as well. Abram's tent is between Bethel and Ai, not in one city or the other. In developing the second degree of the mind we are also seeking connections between the internal person and the external, and these connections are between life from the Lord in the celestial region of the mind and intellectual truths, rational cognitions, and factual knowledge which is to be of service to what is in the celestial, as obscure as that may be to us. As I discuss under the heading, *Chemical Metaphor,* I have found certain bits of factual information that seem to resonate with an

inner sense that a thing is true, and I pursue an education that seeks out, in an intellectually honest manner, these moments of connection. I have also found that these connections seem stronger the more rigorously I employ the tools of our analytical, rational minds. In other words, a soft education treating worldly facts as something light or even optional seems impotent in opening the mind to higher regions. I do not believe it is insignificant or incidental that Swedenborg was a world-class, scientific observer—well published and well respected—before he was a revelator. But while making a strong case for the value of a rigorous, rational education I do not want to overlook the importance of opening the spiritual level of the mind as well, which occurs as concepts in the rational mind stimulate an inner sense that a thing is true in the spiritual mind. I think this is the area for dialog between Bethel and Ai in the college years.

**Finding Lasting Value Between Bethel and Ai**

One question I face whenever I analyze my chemistry curriculum is How can I emphasize things of lasting value in this course? No teacher wants his or her students cramming for a test just to forget the material within days, hours or minutes after taking it. Yet the *Arcana Caelestia* makes clear that this is exactly what must happen with the trivial bits of information we must accumulate in the process of our education (cf. 1487). We must contact and memorize thousands of facts before we can begin assembling these facts into concepts, integrating this information into higher order knowledge we hold in our brains. I want a first year course in chemistry to get into those higher reaches of our mental activity, and yet I know that in order to do so I must cover much trivia. The challenge is not to stop on the foothills of facts but push on to the heights of rational understanding, evaluation, and application. An equal challenge is to give the foothills their due while panting after the mountains. The first inclination of many high scoring students is to assemble facts, often neatly into bundles, memorize them, work them through some algorithms to make sure they function properly, and be perfectly happy with that. This strikes me as entirely unsatisfactory since these students have already ordered their minds to function like this—like fact ingestors and regurgitators. If the point

of a liberal arts education is to free the human being, then how can reusing a successful "learning" formula time and again in different subject fields accomplish this? It seems more like an enslavement to me. My hope is to take these already successful students on an exploration of their own uncharted mental territories, introducing them to more of the many wonders of the mind. I want them leaving the class knowing themselves and their own capabilities significantly better than when they entered. All subject fields have the power to do this. My field happens to be chemistry. And in that field I see a number of applications that can serve to draw us closer to our goal of human freedom. But I cannot do this when the foothills seem satisfying enough and the mountains far too complex, or boring or, even worse, not to the point.

Not to the point? How can reaching beyond algorithms into the human sphere of careful consideration not be to the point? What point are we looking at? Many of the better students seem to see the point of education as:

a) To get good grades and impress my parents, my friends, and/or myself

b) To get good grades and use these to move on to a job I hope to enjoy

These are fine goals and have served their owners well through most, if not all of their educational process. But many teachers, myself included, are not satisfied with these ambitions. What haunts me about an approach to education along these lines is the fact that algorithmic learning simply duplicates machine learning. Any process we can reduce to an algorithm we can teach a machine. I do not want to be in the business of turning out flesh and blood algorithm processors. I am not afraid that computers or robots might someday become so human-like that we will lose the distinction between the two. Rather,

I am afraid humans might more and more come to resemble these machines.[6] I hold that education built upon trivia is, like Ai, like the world itself, a ruin.

Why is Ai a ruin? If we think of an ancient ruin—take the Incan city Machu Picchu for example—what sort of message do we perceive from it? What questions does it bring to mind? This old city was once a lively place full of dreams and accomplishments. Incas loved, hated, gave birth, and murdered there. Writers of that day represented the vast panorama of human activity there. But today it is a ruin—a shell of what it once was. As a shell, a ruin implies that it once contained something. When that something was present, along with the now ruined walls, that city was a containant of human life and eternal significance. As an axiom, Ai is a ruin because its walls now contain nothing. In the same way the world is a ruin. It is not a ruin in the sense that it is entirely worthless but in the sense that without what it contains it has no value. "Meaningless, meaningless," writes the Teacher of Ecclesiastes (1:2). But when this earthly shell is not empty it has great value. In John we read, "For God so loved the world that he gave his one and only Son, that whoever believes in him shall not perish but have eternal life" (Jn 3:16 *NIV*), and in Luke, "Are not five sparrows sold for two pennies? Yet not one of them is forgotten by God. Indeed, the very hairs of your head are all numbered" (12:6-7 *NIV*). So the world is both a ruin and at the same time of great value since it is a shell, but a shell containing life. If we focus on the shell itself we gain little, and we come to know something that has fleeting importance; but if we focus on the shell together with the life in the shell we gain much, and this is of lasting value. Thus even though the world is, in a sense, a ruin it contains much and teaches much.

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[6]I share this fear with Erich Fromm, who, in his 1941 work *Escape From Freedom*, wrote of how human beings tend to avoid feelings of isolation through a process he called "automaton conformity" (208). A person escapes in this way by adopting a programed way of being (208-209). "The decisive point [between genuine being and automaton conformity]," Fromm writes, "is not *what* is thought but *how* it is thought" [Fromm's emphasis]. This question of what leads us to think a certain thing, is crucial to my educational motivations. Fromm continues, "The thought that is the result of active thinking is always new and original; original, not necessarily in the sense that others have not thought it before, but always in the sense that the person who thinks has used thinking as a tool to discover something new" (218-219). Developing an algorithm requires just this sort of thinking, but applying an algorithm does not.

Educational trivia are just this sort of ruin. They are Ai. But just as I would not throw away the world simply because, of itself, it is meaningless, I also believe we cannot throw away learning trivial facts, even though, eventually, we must release those facts which are not useful. Life inside the shell requires the shell, and education of the higher reaches of the mind requires educating the factual brain too. A worthwhile education, therefore, pitches its tent between Bethel and Ai.

**Atoms and Abstractions**

As a field of study, chemistry lends itself well to helping students exercise new areas of analysis and abstraction. The big push in chemical education is to understand the microscopic causes of macroscopic phenomena. This requires abstraction since we do not encounter matter as atomic but as continuous and macroscopic. Therefore, to "think chemically" is to think abstractly. Dudley Herron demonstrates this well in his analysis of the atom as a concept, and the information students require to construct that concept (1996, 267). The following discussion gives a taste of the mental abstraction necessary to build the concept "atom" and suggests why this abstraction is useful.

If abstraction is one of the reasons students find chemistry difficult to master, we might ask What is abstract about matter? What could be more concrete? We interact with matter every moment of our lives and have built a tremendous database in our brains regarding the way matter behaves, which materials we expect to be light and which heavy, which flexible and which brittle, and so on. We find nothing abstract, or beyond the immediate, in any of this.

The problem comes when we start investigating why a material is hard or soft, conductive or insulating, dull or shiny, reactive or inert. Current explanations of these phenomena depend on the microscopic world of atoms, and this is where the abstractions arise. When have we seen or investigated an atom? Atoms have diameters of less than $7 \times 10^{-10}$ meters, which is smaller than a wavelength of visible light, making them impossible to "see." Atoms weigh less than $5 \times 10^{-25}$ kg. That number is small enough to have no meaning for most people. If we compare the mass of the heaviest atom to the mass of a

160 lb (75 kg) human, we find the human weighs $1.6 \times 10^{26}$ times more than the atom. That comparison still leaves us is a quandary. How do we compare this proportion to anything? If a human has a mass $1.6 \times 10^{26}$ times greater than an atom, what has a mass $1.6 \times 10^{26}$ times greater than a human? The mass of the entire earth is $5.98 \times 10^{24}$ kg, which is just $8.0 \times 10^{22}$ times more than a person. Hence we are more massive when compared to the mass of the earth than the heaviest atom is when compared to us. In fact, the mass of the heaviest atom is to us what our mass is to two thousand earths! This can give us some comprehendible idea of the smallness of an atom.

One of the amazing characteristics of an atom is that even though it has little mass, it concentrates that mass into the very highly dense nucleus. The density of the nucleus is much greater than that of any material we contact in the macroscopic world. If the mass of the earth were compressed until its density matched that of the nucleus of an atom, the diameter of the compressed earth's sphere would be about 200 meters. The reason the materials we handle are much less dense than a nucleus of an atom is because the great majority of an atom's volume is just empty space. This inventory of atomic characteristics can leave our atomic vision wholly disconnected from our everyday vision.

An entity as small as an atom requires abstraction, and abstraction causes difficulties. I tell my students that matter is mostly empty space, but that is contrary to their own experience. They know they cannot walk through walls. How can my telling them that atoms are mostly empty space help them? Why should students bother with an abstraction when the physical realities of macroscopic matter have sufficed thus far?

The answer is we cannot explain properties of materials without a microscopic understanding of those materials. Even so, people may ask, What's the use of *explaining* a property when all we really need is *knowing* the property? After all, the important thing about copper in a wire is that copper conducts electricity, and equally important, that the plastic around the copper does not. Why should we care why the copper conducts and the plastic insulates?

One answer to that question is that understanding why materials have properties enables us to predict properties of new materials: new either because we have synthesized

them or new because we have not yet discovered them. Several synthetic polymers make good examples of this. The chemical industry is producing polymers with a vast array of different properties these days. The clothing market is one beneficiary of these new materials. Chemists have designed some polymers to stretch for a close fit with the skin, repelling water, and ventilating. Other polymers have very strong fibers that resist sheer. These have been used in lightweight body armor. Recently dentistry has switched from using metal amalgams for fillings to polymers. These dental polymers have specific requirements. They must not shrink or enlarge upon setting, they must set at or near body temperature, and they must not release toxic reagents. Chemists designing the dental polymers were unlikely to strike upon the proper materials satisfying these requirements had they not understood the way the microscopic properties of matter would affect their macroscopic properties. The particular beauty of synthetic polymers—as an example of the power of understanding the role atoms have in determining physical and chemical properties of matter—is the fact that these materials are entirely artificial. They are not somewhere waiting to be discovered. They actually do not exist until the chemist brings them into existence. And chemists do not usually make thousands of polymers and then test each one to discover its properties. Chemists actually design polymers to have certain properties. Of course they do not always find that the polymers have the expected properties, but they arrive at the intended materials much more quickly than by completely random construction and sampling.

Understanding atomic behavior has helped our understanding of biochemistry as well. In this area pharmaceutical research is the most obvious beneficiary of detailed chemical knowledge, but other areas benefit as well. Studying the chemical foundations of biological activity helps us discover new chemical and physical functions. A good example is the “chemiosmotic pump,” which is the driving force that creates a chemical and electrostatic charge across the membranes of biological cells. Nature designed her own batteries long before humans did. How many more currently hidden phenomena await our discovery and application in new functions? One intriguing area is the study of

cellular communication and its potential to help us find new methods of management and leadership.

**Developing Abstractions and Syntheses**

The utility of chemical abstraction in understanding the world of atoms and molecules rests in the fact that by engaging in this type of thinking we become more capable of modifying our environment to suit our needs. If, for example, we understand why bronze is stronger than copper, perhaps we can design other alloys with properties we desire. In addition to helping our technology advance, I believe that thinking simultaneously in both abstractions and physical-sense reality helps us develop into more complete and freer human beings. I say this because the simultaneous use of physical, abstract, and synthetic reasoning serves other human endeavors too. In reading a novel we deal both with the text on the page and the unwritten text beyond the page without which the text has less or no meaning. For example, in Faulkner's *Absalom, Absalom!* the reader learns the plot through patches of narrative provided by several characters, and Faulkner's reader must assemble and evaluate what he or she can from these many bits. Erich Auerbach, Robert Alter, and Kristin King demonstrate how readers must synthesize a whole from scant textual material in their respective analyses of Abraham's call to

sacrifice Isaac in Genesis,[7] the David story presented in Samuel,[8] and Swedenborg's representation of spiritual reality in *Heaven and Hell*.[9]

When we consider spiritual growth and awareness through reading Sacred Scriptures, we find a similar situation. Again we have the facts of the matter—the words on the page, the traditions of the culture—but we also need to consider and reflect on what is not there directly, but is still an important component of the process. We find ourselves out of the factual story but very much a part of the abstracted narrative. When Abram hides from the people of Egypt the fact that Sarai is his wife, for example, we are present in that story, but we need to work to find ourselves there. Paradoxically, we must think imaginatively or abstractly to apply the text to our lives, and without that exercise the text itself has little value. But when we do find ourselves there the effects can be overwhelming.

According to *Arcana Caelestia* and Luke 24:27, Jesus found himself and his mission described in the stories of Hebrew Scripture. The Scribes, Pharisees, and Sadducees all read those same texts but came to a very different idea of the Messiah. One of the basic arguments Jesus appears to have had with the Jewish leaders was over what

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[7]Auerbach's essay, "Odysseus' Scar," points to large gaps in the Abraham narrative and contrasts these with the intense detail present in Homer's work. One outcome of this difference in narrative technique, Auerbach argues, is that while Homer resists interpretation, Genesis encourages it (1953, 8-9, 13-14).

[8]Alter maintains a negative view of David's character throughout his interpretation of the text and argues that the original author also felt this way about David. Alter supports this supposition by pointing to what the author includes and leaves out of the narrative. As a story of establishing a lasting kingship one would expect a kind of golden view of the founder and his deeds but instead we read of treachery and scandal. But most damaging, according to Alter, is the way the author allows this interpretation through gaps in the story that omit ameliorating circumstances, explanation, or apology. One example of this is the fact that the author never indicates any feelings David may have had for Michal while clearly indicating her (initial) love for him (1 Sa 18:20, 28; Alter 1999, 115). This permits the interpretation Alter supports which is that David's interest in Michal stems only from political ambition.

[9]King examines what is left out or said to be unutterable in Swedenborg's descriptions of heaven and hell and discovers a surprising lack of warmth in the matter-of-fact portrayals. This omission, she argues, stems not from a lack of heartfelt experience but from an inability to communicate it through the symbolic medium of language (1999, 6-7).

was abstracted from the text. The Jews abstracted an ideology of nationalism and ritual while Jesus found humanity and freedom. One way to view the error the Jewish leaders made is to note that their abstractions were tightly confined within the physical constraints of their lives on earth. In the Gospel of John they deny the possibility that Jesus is the Messiah because they think of him as coming from Galilee, and they know that the Messiah will not come from there (7:52). Also in John, Jesus confuses both his disciples and his adversaries with his metaphors: "He said to them, 'I have food to eat that you know nothing about'" (4:32 *NIV*); and "My flesh is real food, and my blood is real drink" (6:55 *NIV*). It seems one message we get from Scripture is that the most obvious interpretation is usually incorrect and that we must either struggle to find true meaning there or have a conscious, inward sense of what God is saying to us—a sense that comes from innocence.

Troublesome as interpretation has been, many current Bible commentators are providing excellent analyses full of insights and application. *The New Interpreter's Bible* is a good example of this type of work. I am amazed at how often the commentaries help me find myself in the story. Terence Fretheim provides several examples of this in his analysis of Abram's sojourn in Egypt. Realizing a tension between promise and fulfillment in the story Fretheim explores implications of this on our lives. He writes:

> Abram no sooner receives the promise [of the land] than he has to leave it behind. Promises often work this way. The promises are real and reliable, because God has made them. But one cannot settle into what has been promised, forever secure in its reality. Promises do not result in certainty; certainty exists only in myth. Promises can only be trusted, believed in; the journey toward the fulfillment of the promise involves faith, not sight. (1994, 430)

Fretheim is connecting the text to our experience and in so doing he helps us see the genius and power of the story written some 3,000 years ago.

Fretheim offers several observations that bear up strikingly well when set beside Swedenborg's exposition of the story's inner meaning. One is Fretheim's statement that "Egypt is both life-threatening and life-enhancing" (429). Another is his attention to Abram's comely first words. Abram responds with silent obedience to God's calling him to leave his land. He does not speak a word until he is on his way to Egypt, and then he

turns to his wife and speaks those lovely words, "I know what a beautiful woman you are" (Gen 12:11 *NIV*). The first spoken words often characterize a person or a story. Fretheim posits that Sarai's beauty is the centerpiece of this story and of Abram's concern (427). Swedenborg's analysis is in close agreement. The *Arcana Caelestia* informs us that Sarai represents the celestial things to which lower things are to be connected (1468), and that "truth from a celestial origin is delightful" (1470). A properly ordered opening of a way to these celestial things is the thrust of this story.

One of the themes of this story is faith in the face of defeat. As the story opens Abram is at the early end of connecting the levels of his mind, which is why he goes to Egypt and why he must treat Sarai as a sister instead of as a wife. Fretheim points out the ironic fact that although God has promised Abram that he will become a blessing to all people, Abram's first interaction with others "brings a curse rather than a blessing on the nations" (428). Abram's story of delayed fulfillment of divine promise has a connection to our own experience both as individuals and as observers of church growth. We undergo a lifelong process of rebirth involving gentle leading, education, repentance, reformation, and regeneration. While undergoing this process we experience many more failings than successes. In terms of church growth the New Church lives with the promise that it is, "The crown of all the churches which have up to now existed upon earth" (*TCR* 786), yet the organized bodies of the New Church, at any rate, have hardly been noticed and have a combined membership of less than 0.0017 percent of the people on earth, and this after being established for over two hundred years. To me the personal message available in this is that our faith in God is more important than our physical success.

Before moving on let me suggest that the text of the early Abram story, an allegory regarding mental development and the organization of the mind, itself models mental structure. I imagine a thread of continuity from the sensual level of the mind which reads the text leading up through rational analysis or interpretation of this, then on to intellectual truths concerning it—which, I believe, involves seeing the story in relation to one's own life—and finally into living these truths as the wisdom of the celestial level.

In the fields of chemistry, literature,[10] and in the Word we find this cycling between sense experience, analysis and abstraction from that experience, and application resulting from abstraction.

**Creative Tension**

Returning to the imagery of being between Ai and Bethel we find a tension here as well. Being between these two discrete and definable entities means being outside the definition of either. In a similar way the Promised Land itself is in tension since it is geographically located between the powers of the north and those of the south—Assyria, Babylon, and Persia on the one side and Egypt on the other—a situation well exploited in Daniel's vision of the conquests of the kings of the north and south (Da 11:1-35). Far from being a land of peace, Canaan, time and again during its history, is tugged one way and then the other. Why would God send his chosen people into a land of disputes such as this? Jesus' saying, "I am the gate" (Jn 10:7) and "I am the way the truth and the life" (Jn 14:6) shows that he, the Lord, is with us in that tension—that he stands in the middle with us and *is* our conduit from one state to the next. Perhaps the epitome of this imagery is when Jesus stands at the threshold between life and death and raises Lazarus from the tomb (Jn 11:43). In contrast, the false gods do not stand at the threshold but live confined within the walls of their various temples. In one case Ezekiel finds a pagan temple literally in the wall (Ez 8:7-10). Perhaps in subconscious recognition of their inability to lead into a new state, the priests to Dagon do not step on the threshold of his temple (I Sa 5:5). Not being at the threshold, at the conduit between, indicates a deadly lack in the false gods. Zephaniah's prophecy singles out false prophets who will not stand at the doorway.[11]

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[10]One fine example of this discussion dealing with literature and revelation is Kristin King's analysis of Robert Frost's poem, "Birches," in which the poet plays with the imagery of bending a birch tree to illustrate how abstractions must lead us back to the ground (King 1999, 52-55).

[11]"On that day I will punish
all who avoid stepping on the threshold,

The prophets have an important place in calling us into creative tension. Idolatry is a common topic for most of the prophets, and the contrasts they draw between false, human-made gods and the one true God often hinge on the idea of volition or freedom. For example, Jeremiah distinguishes between false gods and the true God by describing idols as being nailed to a pedestal, immobile and mute (10:4-5). Habakkuk makes similar statements (2:18). While the idol does nothing, is just a "scarecrow in a melon patch" (Jer 10:5 *NIV*), the people who worship the idols move around and make noise (Hab 2:19). Worship of the Lord is in sharp contrast. Habakkuk writes:

> But the Lord is in his holy temple;
> Let all the earth be silent before him.
> (2:20 *NIV*)

To Habakkuk a false and a true deity are distinguished by who is silent and who makes sound. False gods are a trap that keeps us confined in small rooms. In these small rooms we hear only ourselves. The true God comes to the doorway and opens it for us and calls us to a new life. Is there any example in the Bible of a false god doing that for anyone?[12]

I think our natural tendency is to seclude ourselves in Ai or Bethel and resist going to the door. Swedenborg reports seeing a spiritual replica of Stockholm while he was in the spiritual world (*SE* 5711). The houses had no windows, representing the locked and lightless state of mind trapping many of his countrymen and women. Another example of our tendency to stay put is the many trials Moses must endure because of his reluctant followers in the wilderness. On many occasions they accost him, whining about how he has led them out into the desert to die and how they want to return to Egypt. After settling in the land the people, at the risk of losing what is possible, seek traditions and forms that will help them remain confined to what they know. They clamor for a king instead of a heavenly ruler, and in return they receive a dynasty that abuses them and

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> who fill the temple of their gods
> with violence and deceit" (Ze 1:9 *NIV*).

[12]A non-biblical example of a god calling a mortal into a new state is Athena's words of encouragement to Telemachus in Book I of Homer's *The Odyssey*.

keeps them in submission. Near the end of the Jewish kingdom Jeremiah narrowly keeps his life as he tells his people they must throw off their pride and confidence of peace and protection within the walls of Jerusalem, abandon their city, put on the yoke of the Babylonians, and go captive into that foreign land (6:1, 27:12). The leaders say "Peace, peace" when there is no peace (6:14). Jeremiah tells the people that they cannot rely on Jerusalem or blind and senseless faith in Jehovah to save them. They have no security there. They need to change their state, and that is what they most resist.

Why is Jeremiah's message relevant to us today? Where are we in this story? Through imaginative abstraction from the text we may find the story calling us to leave our "Jerusalems," our safe walls, and stop relying on our mistaken or incomplete picture of our God. My claim is that we can apply techniques of abstraction we learn in chemistry to our reading the Bible, and that in doing this we can connect educational value of one field to another and expose ourselves to ever greater horizons. In studying chemistry we are forced to keep our thinking balanced between immediate, sense experience (Ai) and imaginative, abstract rationalizations of that experience (Bethel). If I can strengthen this type of balanced thinking in chemistry students and connect this to the usefulness of linking experience and imagination in other human endeavors, then I am teaching chemistry in a liberal arts tradition which seeks to free human beings from provincialism and ignorance.[13] This is one way chemical education can have lasting value.

**Grounding Imagination Through Analysis**

Study of chemistry contributes to our balance between Ai and Bethel in another way, too. While Ai's focus on the natural readily appears as an error to those whose orientation is to think of life as a spiritual entity, Bethel's error is less obvious to this group even though it is equally or more dangerous. Bethel errs when it adheres to

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[13]Bryn Athyn College does not stand alone in its desire to teach science as a means of educating the whole person. The American Association for the Advancement of Science supports teaching science as a liberal arts course and part of a liberal arts education (AAAS Study Group 1990, 11-12). Farmer, writing on what is being done at King's College in Wilkes-Barre, Pennsylvania, makes similar statements (1988, 134-135).

ideology at the expense of experience. As soon as a person utters or thinks "I believe," that person becomes less observant of contradictory evidence. This error is not the exclusive property of religious believers but infects all who cling to theories. One historical, chemical example is the idea of phlogiston—a philosophical quality of energy possessed by materials. Adherents to this idea, like Joseph Priestly (1733-1804, the discoverer of oxygen), had either to ignore observations or impart strange properties to this thing they called phlogiston. Some adherents to the phlogiston theory even claimed the material had negative mass (Salzberg 1991, 177). Like any science, chemistry teaches us to test our beliefs with sense experience. I find this testing essential in order to come to know the strengths and weaknesses of my own beliefs.

In a course like first-year chemistry I make a point of exposing reasons for many of our current theories. The kinetic molecular theory of a gas is a good example. This theory states, among other things, that all gas particles are in constant, random motion, and that the average kinetic energies (KE, energy due to motion) of two gases at the same temperature are identical. We speak of *average* kinetic energies because gas particles at the same temperature do not have a single velocity but are smoothly distributed over a wide range of speeds. The kinetic molecular theory predicts that the average speed of a gas particle is related to its mass since KE = $(\frac{1}{2})mv^2$, where $m$ = mass of a particle and $v$ = its velocity. This theory has been tested in a number of ways.

One test I show the class is the agreement between the kinetic molecular theory and Graham's law of effusion. Graham's law states that gases effuse (escape) through a tiny hole in a pressurized container at rates relative to the square root of the reciprocal of their molecular weights. Effusion rate is a measure of molecular speed because the faster a gas particle travels the quicker it "searches" the interior of the container and finds the hole.

The following proportionality expresses Graham's Law:

$$r \propto \sqrt{\frac{1}{m}}$$

where *r* is rate of effusion of the gas and *m* is the mass of the gas particles. Graham also compared the rate of effusion of one gas to another by dividing one rate by the other. The resulting equation is:

$$\frac{r_A}{r_B} = \sqrt{\frac{m_B}{m_A}}$$

where *A* and *B* refer to gases *A* and *B*.

After introducing effusion and these two equations, I ask the class to consider how Graham might have arrived at these expressions and what the expressions mean. The first equation is a little easier to understand. It indicates that the smaller the mass of a particle the faster its velocity. But velocity increases as a square root instead of proportionally. This is odd and surely not the kind of mathematical function Graham thought he would obtain. Graham arrived at these expressions through analysis of experimental observations—by fitting a mathematical model to his data. He had no idea why effusion followed this model.

The kinetic molecular theory explains Graham's observation, and the observation serves as a confirmation of the theory. If gases are composed of particles which are in constant, random motion, and the average kinetic energies of these particles are the same at the same temperature, then the average velocity of the lighter particles must be faster than that of the heavier ones, as the following lines of mathematical reasoning demonstrate.

$$\text{If } KE = \frac{1}{2}mv^2, \quad \text{and} \quad \overline{KE}_A = \overline{KE}_B, \quad \text{then} \quad m_A\bar{v}_A^2 = m_B\bar{v}_B^2 ;$$

$$\text{therefore, if} \quad m_A < m_B \quad \text{then} \quad \bar{v}_A^2 > \bar{v}_B^2 .$$

We can combine these expressions into a form similar to the one Graham used. When we do this we obtain:

$$\frac{\bar{v}_A^2}{\bar{v}_B^2} = \frac{m_B}{m_A}$$

We arrive at Graham's empirical expression after taking square roots.

$$\frac{\bar{v}_A}{\bar{v}_B} = \sqrt{\frac{m_B}{m_A}}$$

The proportional rate expression derived from the kinetic molecular theory exactly matches the empirical expression Graham discovered. I make a strong point in class that when we find agreement between two independent methods of describing the way materials behave, one from empirical observation and the other from theory, we can be reasonably confident the theory is correct. This is how we ground imagination with physical analysis.

Chemistry (or any science) provides a good training ground for developing this type of analytical thinking. Once students learn to examine assumptions in science they may transfer that skill to other areas, leaving behind what Socrates called the "unexamined life." Since science is based on sense experience, testing theories in science is relatively easy. Indeed, testability is one of the identifying features of a scientific theory.[14] This is not always the case in other areas of learning. In the New Church we hold that the promised second coming of the Lord occurred in 1757 A.D. and was an event taking place in the spiritual world. The very nature of this doctrine or belief denies the possibility of testing it through sense experience. The event took place outside the physical realm and therefore no test in the physical world can confirm or deny it.[15] We need either to bring non-physical tests to bear on this theory, or to examine it through a kind of correspondential testing. Although analysis of scientific theories is simpler than

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[14]Sometimes scientific theories or hypotheses remain untested for many years until technology catches up with theory. Bose-Einstein condensation is one example. Bose-Einstein condensation is a special phase of matter in which many individual atoms appear to coalesce. Einstein and Bose first predicted this condition in 1924, but it was not observed until 1995 (Anderson, *et al.*).

[15]An interested reader can find arguments for and against employing scientific tests to spiritual phenomena in a debate between Leon James and myself in the pages of *New Church Life.* See "works cited."

analysis of theological ones, we ought not wall off our theological ideas, secluding them from testing. This is the error the Bethel-alone mind set makes.

A simple and often-repeated example from the Word concerning this Bethel-alone error is the ridiculousness of worshiping a graven image as if it were a god. As the prophets say time after time, the images were carved and secured to pedestals by people. They are our creation, and yet we bow to them as creators? They are clay to us, as we are clay to God (Isa 29:16). Will clay say to its maker "worship me"? The question we might ask as we read of idolatry in the Old Testament is why not test whether or not this thing is a god? Indeed, now and again these beliefs were tested. Elijah famously demonstrated that Baal was no god at all, but his powerful, even deadly, test did not end Baal-worship (1 Kg 18:22-40). The believers simply ignored what did not conform to their beliefs. One amazing example of testing false gods is recorded in Daniel, Bel and the Snake, a book in the Apocrypha. Even after Daniel's demonstrations the people sought his death rather than abandon their beliefs. They would rather murder than hear contradictory evidence. Bethel alone is Beth-Aven, house of evil. It is a dark storm haunting the human race, bringing slavery, ignorance, and holocaust in its wake.

Admittedly the physical tests recounted in Scripture and cited above may be inappropriate when applied to theological beliefs since no physical test can confirm or deny God's presence. While we cannot test God,[16] we can examine our understanding of theology. We can also test our own behavior to see how well it aligns with our beliefs. But few people seek opportunities to put themselves in an assay to get an independent measure of uprightness. I have not found means of behavioral testing in the chemistry classroom, but I have found several opportunities for examining some basic New Church ideas about God and salvation.

**Chemical Metaphor**

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[16]When tempted by the devil through a twisting of the words in Psalm 91:11-12 Jesus responds, likewise quoting Scripture (Dt 6:16) saying, "It is also written: 'Do not put the Lord your God to the test'" (Mt 4:7 *NIV*).

I believe the physical world provides us with a means of analyzing how well we understand the nature of the spiritual world, God, and even salvation. We can do this through a kind of abstraction from realities in the physical plane to see how well they fit with our ideas about the spiritual plane. This stems from the assumption that order in the physical world reflects a causative order in the spiritual one (*AC* 5711, Woofenden 1970, 109).

I have already discussed how we can make abstractions in chemistry that help us understand why materials have their properties. We might call this kind of abstraction "horizontal" because we are explaining physical phenomena using physical means such as intermolecular forces of attraction to explain boiling point differences of different materials. If, on the other hand, an abstraction refers to the spiritual realm we might call it "vertical" abstraction. We can employ vertical abstraction when we mentally connect concepts of spiritual properties with natural ones. In the New Church this kind of connection is said to be "correspondential" and Swedenborg's theological works state that a pre-Hebrew, and wide ranging "Ancient Church," represented by Noah and his descendants, specialized in this kind of thinking (cf. *ML* 76). In more recent times the Jewish Cabala and esoteric alchemy espoused similar ideas. The esoteric alchemists attempted to explain properties of heaven by investigating the nature of the physical world—a kind of reverse astrology (Salzberg 1991, 37). Cabalistic, or correspondential, or esoteric—call them what you will—opportunities arise in the chemistry classroom, and these kinds of vertical abstractions can have strong effects on beliefs.

One illustration of this kind of thinking relates the laws of thermodynamics to an important difference between created and uncreated beings. The first law of thermodynamics states that the total amount of matter and energy in the universe remains constant and is nowhere created or destroyed. The second law states that all spontaneous processes (anything that happens) increases the dispersion of energy in the universe. This implies that no matter what we do with our lives we increase randomness or entropy. Whatever energy exists in the entire universe is more concentrated at this moment in time than at the next, and there is nothing we can do to stop this degradation.

One example of this is the energy transformations taking place in our sun. At every instant the sun loses huge magnitudes of energy, radiating it out into space. A tiny fraction of that radiant energy strikes the earth and drives the vast majority of processes taking place here. The energy leaving the sun is not destroyed but becomes more and more dilute as it radiates outward in a sphere. As the radiant energy becomes more dilute its disorder increases. On earth the sun's energy allows increasing order, such as charging a solar voltaic cell or driving photo synthetic reactions. But this increase in order comes at the expense of energy concentration in the light rays striking to solar panel or leaf. The loss in order overwhelms the increase in order we see. This decay in order agrees well with Swedenborg's statements in theological works such are *Divine Love and Wisdom* that the natural world did not and does not create itself, but was created by God (cf. *DLW* 55). Our current understanding of the cosmos and the laws of thermodynamics accords well with this since we know of no means by which we can reverse the decay of order in the universe, and yet somehow the universe came into being. We as created entities in this created world cannot cause a net gain in order. But God, an uncreated being, can.

In the realm of human events we can spot tremendous ordering events that seem to contradict the second law. New York City is a good example. Three hundred years ago Manhattan was a wild island and today it contains awe-inspiring structures above and below ground. Buildings and infrastructure, composed of purified materials, clearly represent a gain in order. But to create this increase in order we had to pay a high price. Tremendous amounts of energy were dissipated (diluted) in the refining, transportation, and construction process.

We can relate loss of order in the universe (second law of thermodynamics) to our personal states. Nothing we do in our lives creates a net gain in order but only a loss. As I tell my class, even if we attempted to end our own contributions to the loss of order by killing ourselves, our decaying bodies would disorder the universe. The second law is inescapable.

Another way to look at this is to think of our spiritual progression as an ordering process. The spiritual work of repentance, reformation, and regeneration cause an

increase in order in our beings. Assuming a spiritual corollary to the physical laws of thermodynamics, this progression in order in our spiritual lives is either impossible, or comes at the price of creating greater disorder. If we were to attempt ordering our own spiritual lives on our own we might succeed in creating a local area of order but only as we create greater disorder elsewhere. If this is the case, our regenerating ourselves would probably harm rather than help others. But if we accept the Lord of creation as the force that orders our lives, perhaps similarly to the way the sun energizes plants enabling them to make complex sugars from air, or even more similarly to God's creating wholly new universes from spirit, then our regeneration may come at no cost to order, but represent a net gain. We, created entities, cannot do this, but God, who created all order and matter and energy, can. Jesus tells his disciples, "With man this is impossible, but with God all things are possible" (Mt 19.26 *NIV*).

Thinking further on salvation, I believe we can develop physical metaphors for spiritual processes that may help us visualize how we can work with the Lord and let him save us. People have struggled for centuries trying to figure out their role in the process of what Jesus calls being "born again." Nicodemus was perhaps the first to wonder about this. He exclaimed to Jesus, "Surely [a person] cannot enter a second time into his mother's womb to be born!" (Jn 3:4). The doctrine of salvation by faith alone is an attempt to understand our role and God's role in this process. Most Christians accept that they cannot merit salvation and that only faith in the Lord saves us. And yet many also believe that they must do certain things in their lives in order to be saved. This is a paradox. If we cannot merit salvation why must we do anything for it? Nothing we do can obtain it and God gives it to us as a free gift; then why struggle through repentance at all?

Energy transfer processes in the natural world may provide us with a representation of the Lord's redeeming us and help clarify our roles and God's role in accomplishing salvation, which is, according to the New Church, necessary to accomplish the Lord's very purpose of creation which is to provide "a heaven from the human race" (*DLW* 330).

Human beings have found various energy resources in the world and have figured out how to make good use of them. A relatively simple example is a windmill to take advantage of wind power. An even simpler example is a sail. In each case humans are harnessing a natural energy source to do work for them. Wind power is available for us to use, and has existed as long as the earth has had an atmosphere. But that power does not do much work directly for us until we assemble some mechanism for it. The power itself is available to us as a free gift, but the means by which we take advantage of the power is our responsibility. We assemble the mechanical works and supporting structures of a windmill from materials distributed in the world. The mechanics then move under the force of the wind and help us with some task. We may look at the windmill and think "I made that," and at the ground corn and say "I milled that corn," congratulating ourselves on our fine brains and accomplishments. But we did not grind the corn—the wind did. And we did not create the wind nor do we know much about it. Jesus said, "The wind blows wherever it pleases. You hear its sound, but you cannot tell where it comes from or where it is going" (Jn 3:8). The power we use comes as a free gift—a gift which for years we may not even recognize. Even power from our own body—running, lifting, pulling—comes not from us but from the biology and chemistry of our bodies. We did not design it and we hardly understand it, but from what we can see of what is going on inside our bodies, our energy comes from a set of reactions developed in bacteria over one billion years ago.

I think this image reflects the process of our salvation. The power that saves comes from God, not from ourselves, but God does not save us with ourselves standing idly by. We must orient ourselves—build the wind mill or trim the sails—so that God's wind turns our wheels, separating flour from waste, or pushes us gently on our way. We do not need to generate the spiritual wind, but we do need to recognize it and let it do its work on us. Even though this requires action on our parts, our action is not what saves us, and so we can take no merit in it.

The Bible uses several images showing what we need to do to accept the Lord's free gifts. Here are a few examples quoted from the New International Version:

> Turn from evil and do good;
> seek peace and pursue it. (Ps 34:14)
>
> Administer justice every morning;
> rescue from the hand of his oppressor
> the one who has been robbed. (Jer 21:12)
>
> For I desire mercy, not sacrifice,
> and acknowledgment of God rather than burnt offerings. (Hos 6:6)
>
> Sow for yourselves righteousness,
> reap the fruit of unfailing love,
> and break up your unplowed ground;
> for it is time to seek the Lord,
> until he comes
> and showers righteousness on you. (Hos 10:12)

As the Bible makes clear, we cannot stand by idly and wait for God to make everything blessed for us. Just as we must recognize natural resources available to us and use our ingenuity to make use of them, we must also "prepare a way for the Lord" (Isa 40:3).

We can view all our natural energy sources as corollaries to the Lord's love desiring to save us. This may give us more respect for the natural resources. In the case of our fossil fuel resources we tend to act like frantic children extracting handfuls of candy from a broken piñata. We could instead visualize a similarity between our natural resources and God's love and desire to save us—all of us. We must use the gifts from our Creator, but we must use them worshipfully, remembering what he told the Israelites: "When you reap the harvest of your land, do not reap to the very edges of your field . . . . Do not go over your vineyard a second time" (Lev 19:9-10 *NIV*).

Vertical abstractions of chemical concepts can help us clarify our spiritual beliefs and, in turn, these spiritual beliefs can inspire a holy sense into our applications in the physical world. This may be how we can move "in accordance with [our] journeys from the south and even to Bethel, even to the place where [our] tent had been at the start, between Bethel and Ai" (Gen 13:3).

One difficulty with abstractions that take us from the natural level to the spiritual realm is knowing when to stop. We must not lose sight of what we need to do here on earth. In her essay on the power and limitation of language, Kristin King discusses Robert

Frost's poem, "Birches," pointing out that the use of metaphor is like climbing a birch tree. Metaphor helps us gain a better view but ultimately leaves us dangling in the air. We need to know enough to realize when it is time to kick out and let the tree carry us back to the ground. King writes:

> Metaphors live only in language and have their own natural capacity; if asked to carry too much too long they break down. They can only point toward heaven . . . using language to describe a reality they cannot quite circumscribe. Metaphors carry us part way, and then set us back on the earth, which is finally the only way to get to heaven. (1999, 54)

This is yet another example of the use of keeping between Bethel and Ai—heaven-directed and earthbound thinking. Metaphor lets us climb from one level to the next and then carries us back down. As mentioned above, everything depends on having a solid base. Dutiful and attentive study and observation are just as much key ingredients of a spiritually-centered education as they are in the secular variety.

**Conclusion**

One conclusion I draw from this study is that educators need to be sensitive to what the Lord is doing behind the scenes, so to speak. Bishop de Charms, a devoted New Church educator, advocated this when he wrote, "An overcrowded curriculum leaves no time for that kind of training which enables the Lord most perfectly to order the mind from within" (1944, 320). The kind of training de Charms was looking for was training that leads to insights. We achieve this when we pitch our educational tent between Bethel and Ai. We can teach in a way that cooperates with what the Lord is doing in secret, but, just as we cannot make the wind blow, we cannot assess or even catalog progress rendered through the Lord's action.

This paper opened with Abram traveling through the Promised Land, migrating from a former life into a new state. This ushering from one state to the next is really what education is all about. A liberal arts education is one whose arts serve to liberate the person from the confines of ignorance, and whose effects are only partially measurable. Throughout this paper I have maintained that progress toward this psychological freedom

requires staying out of one or another tightly defined city of the mind and walking the middle road between. Occupying the space between is one hallmark of the liberal arts approach since this type of education has a tradition of using multiple fields to help a person develop. In this paper and especially in the previous section I strived to show how chemistry can be part of this process.

Looking back at Abram's first travels, I think we can take another important image from this story. Why was Abram on this journey? He was a member of a wealthy family, the children of Terah from Ur of the Chaldeans—owners of slaves and livestock. Abram was married but childless. He and his wife were well on in years and certainly could have spent the rest of their days along the Euphrates. But something spurred him, his father, and family onto a journey toward Canaan (Gen 11:31). However, the family stopped in Haran, on the northern side of the Euphrates, and there Terah died.

Genesis 12 opens with the Lord's call to Abram. It is not clear whether Abram received this call in Ur or in Haran. (Gen 15:7 indicates it took place in Ur, in which case Abram's father and extended family were simply tagging along.) But in any case it is this call that brings Abram to Canaan. The call itself is in the form of a command and a promise.

> Get out of your country,
> From your family
> And from your father's house,
> To a land that I will show you.
>
> I will make you a great nation;
> I will bless you
> And make your name great;
> And you shall be a blessing.
>
> I will bless those who bless you,
> And I will curse him who curses you;
> And in you all the families of the earth shall be blessed.
>
> (Gen 12:1-3)

Abram's only response is immediate obedience. At seventy five years of age Abram departs Haran, taking Sarai, all his possessions, and Lot with him to Canaan, stopping at Shechem (12:6). The Lord then appears to Abram saying, "To your descendants I will give this land" (12:7). Abram again says nothing in reply but builds an altar to the Lord. Abram then moves on to a mountain between Bethel and Ai, pitches his tent, builds another altar and calls on the name of the Lord.

Through all this movement we hear nothing of what Abram said, his first recorded words being those to his wife as they traveled together toward Egypt. Abram did not know where he was going and did not even know the land when he arrived: God had to tell him when he was actually in the land promised to him (Gen 12:6). Abram's journey was in darkness and in faith. And this is similar to our own educational process. We have little idea where we are going and little better knowledge of where we have been, and this is appropriate. The Psalmist tells us that we err when we attempt to control our own development:

> In vain you rise early
> and stay up late,
> toiling for food to eat—
> for he grants sleep to those he loves. (Ps 127:2 *NIV*)

Our growth is in the Lord's hands, somewhat facilitated by those more experienced than ourselves.

I have searched through parts of Swedenborg's theology, the Word, collateral literature, and several secular sources for satisfactory images and directions concerning education. I have drawn diagrams representing the mind and its development. All the while the process so easily named "education" retained its intangibility. Because of this intangibility I am reluctant to close with a model or image of education. However, because it acknowledges mystery while metaphorically describing teaching and learning, a poem by Amanda Rogers-Petro (1999) gives a heartfelt image without misleading solidity.

**Traveling**

We rise while it is dark to make our journey
and lift our dreaming newborn from our bed,
if one so new to touch and taste can dream.
He stretches as I strip his spring pajamas,
rediaper him and dress him, but still keeps
his ancient covenant with sleep.
My husband bears him to the car, the tiny body
an almost weightless burden. As we pull away
onto the empty road we know
the belts and harnesses that hold him in,
a package of cell and soul beyond our fathoming,
won't keep him from the death that waits for him,
or from the life we hope might carry him
into the sleepless rapture of our myths.
Half-way there he wakes. His inky eyes
gaze gravely and his new voice breaks
the dawn-doomed night, as if he knows to wonder
"What place is this, and how did I arrive?"

"What place is this, and how did I arrive?" If we knew to wonder, this is the question we would be asking.

Education is the vehicle taking us from one state to another. We do not drive the car and we sleep for portions of the journey, but nonetheless we are changing. The road lies in between two attractive tourist traps—one marketing worldly fare and the other magic, holy water, and incense. With a divine promise as our spur and guide and faith to see us through shortages, we can avoid lingering in either snare but take what we need from each and eventually become blessings to our fellow human beings and find true joy in the process. We have the best of all role models to show us the way if we are willing to follow.

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