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### Collision Theory in Developmental Relationship

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Two ontological themes that have been of concern to philosophy since antiquity concern understandings of permanence and change. *Exposition of the Divine Principle* [EDP] does not distinguish these, but lumps them all together in its general description of relationship.

Through the agency of universal prime energy, the subject and object elements of every entity form a common base and enter into interaction. This interaction, in turn, generates all the forces the entity needs for existence, multiplication and action.<sup>[1]</sup>

In *New Essentials of Unification Thought* [NEUT], Dr. Sang Hun Lee expands on many themes from EDP, and with respect to permanence and change he describes identity maintaining and developmental quadruple bases.<sup>[2]</sup> Identity maintaining describes how things maintain their existence, whereas developmental refers to the situation of change and development of some kind.

Taken together these two types of quadruple base seem to offer explanation for both permanence and change in existing beings.

In my previous writing I have been primarily concerned with dual characteristics and the identity maintaining situation described in NEUT. In particular I have been interested in how this relational ontology connects to the scientific view of existence that has developed over the last two hundred years. Beginning from John Dalton's atomic theory in the early 1800's science has developed a description of existence based in large part on particles that finds a philosophical root in the atomist philosophy of Democritus and Leucippus. Democritus was contemporary to Plato, but Plato and Aristotle rejected the atomist ontology of particles and instead said existence was based on form and a continuous matter. Rather than atomism, the Platonic and Aristotelian understanding of form and matter has been the ontological underpinning of Western thought. The problem is that form and matter ontology is not compatible with the particle nature of existence found in atomism. Consequently the discrete particle nature of existence experimentally demonstrated by science leads to a fundamental break between scientific understanding and the ontology of traditional Western thought. This, for me, is the critical problem to be resolved in the relationship between science and religion before we can even begin to address such things as evolution.

NEUT contains important insights for this relationship of science and religion, but I have found that Lee incorporated traditional form and matter thinking into his philosophical structure in a way that is not compatible with science or present in EDP. In particular, he regards *sungsang* as form and *hyungsang* as matter.<sup>[3]</sup> Since *sungsang* and *hyungsang* are two of the fundamental ontological concepts of NEUT, this has serious consequences for the whole structure of the thought, up to and including the lack of a discussion of the spiritual realm. When we remove the influence of traditional ontology from the explanations in NEUT, the resulting identity maintaining structure describes existence in terms of a hierarchical series of relationships within existing beings in a way that is compatible with EDP and our particle-based understanding from science,<sup>[4]</sup> and can lead to a novel understanding of the spirit world.<sup>[5]</sup>

In this paper I turn to change and the developmental situation. With respect to change we again find discontinuity between science and traditional thought. The traditional form and matter ontology is a very static one. Time and space are a kind of box in which things exist, and matter is seen as an inanimate, formless, and continuous stuff that needs to be given shape and life. When some piece of unformed matter has been shaped by a form it is fixed in shape and consequently has no ability to change.<sup>[6]</sup> The universe as a whole tends to be seen as a static backdrop against which the drama of life is played out. Science gives us a very different picture. In science there is no static backdrop. Space and time themselves in many ways depend on the things that exist, and the universe is a dynamic place with constant and ongoing change at all scales. Change is one of the fundamental characteristics of the universe.

If we are to address change adequately within the context of NEUT, the developmental situation should describe change in terms that can be clearly connected to what we observe. So we start here with an examination of the developmental concept as presented by Lee. This examination reveals that his fundamental explanation of developmental give and receive action in the Original Image primarily derives from form and matter ontology. Consequently his explanation of the developmental quadruple base cannot be easily applied to what we actually observe in existing beings. In order to move toward an explanation of change compatible with science, and one that can be applied more easily to existing beings, I subsequently turn to an understanding of change found in physics and chemistry that is based on collisions between particles. This different basis for explaining change also affects how we view the dual characteristics of yang and yin.

One of the consequences of regarding *sungsang* and *hyungsang* as form and matter is that yang and yin can only be regarded as correlative characteristics<sup>[7]</sup> of an existing being.<sup>[8]</sup> There cannot be any yang or yin beings as such in this view, only a preponderance of yang or yin correlative characteristics in any given being.<sup>[9]</sup> and the ontological importance of this set of dual characteristics is thus greatly reduced. Proposing collisions as the conceptual framework for explaining change in the context of NEUT changes this structure and, as we shall see, restores the significance of the dual characteristics of yang and yin. Let us begin with an examination of developmental relationship in NEUT.

## Developmental Quadruple Base in Unification Thought

The beginning point for understanding the developmental quadruple base as presented in NEUT is the description of give and receive action, as follows:

When such a reciprocal relationship is established, something is given and received between the two partners. In human beings, people are giving and receiving words, money, power, influence, love, and so on. In the natural world, universal gravitation acts among heavenly bodies, carbon dioxide and oxygen are exchanged between animals and plants, and so on. The action of giving and receiving something between the two partners is called “give and receive action.”<sup>[10]</sup>

Though giving one description of give and receive action, Lee describes two kinds of results of that give and receive action.

These two kinds of result are a union or a new being and result from identity maintaining or developmental relationship.

The give and receive action through which unity is realized, is called an “identity-maintaining give and receive action”; and the give and receive action through which a new being is produced, is called a “developmental give and receive action.”<sup>[11]</sup>

In the identity maintaining situation subject and object positions within an existing being are combined into the larger union by give and receive action with little or no change to subject and object. The union can be viewed as an individual truth body or connected body.<sup>[12]</sup> In the developmental situation NEUT describes the result as a new being rather than a union. The new being refers to a newly born result or product, a new character, a new element, a new individual, or a new phenomenon.<sup>[13]</sup> In this way Lee neatly deals with both permanence (identity maintaining) and change (developmental). However, Lee does not clearly explain the precise connection between give and receive action and the two types of result.

We could perhaps surmise that two types of result should result from two types of give and receive action, but the general impression given in the text is of one give and receive relationship that is involved in both types of quadruple bases.

Within the Original *Sungsang*, centering on Heart, Inner *Sungsang* (i.e., intellect, emotion, and will) and Inner *Hyungsang* (i.e., ideas, concepts, etc.) are engaged in give and receive action, and Original *Sungsang* and Original *Hyungsang* (pre-matter) are also engaged in give and receive action. This is the way in which God exists. When purpose is established by Heart, give and receive action becomes developmental, and creation takes place.<sup>[14]</sup>

This is the closest Lee gives to an explanation of the connection. That is the identity maintaining quadruple base becomes developmental. That’s it. So although Lee does discuss two distinct types of quadruple base, identity maintaining and developmental, he seems to be suggesting only one relationship of give and receive action is involved in both. We are left with a vague explanation of an identity maintaining relationship that at some point becomes developmental and is related to God’s creativity.

What is clear is that Lee’s ontological structure primarily concerns the dual characteristics of *sungsang* and *hyungsang*, while the importance of yang and yin is downplayed. The primary identity maintaining structure of the Original Image is seen to consist of two quadruple bases. These are an inner base from the relationship of an inner *sungsang* and inner *hyungsang*, and an outer base of *sungsang* and *hyungsang*. When change occurs

the whole structure becomes developmental, and each of the two quadruple bases in the identity maintaining structure gives rise to a developmental quadruple base. This allows for the description four fundamental types of quadruple base, since both inner and outer bases can be identity maintaining or developmental.[15] The primary description of all of these bases derives from the understanding of sungsang and hyungsang.

In the context of the Original Image the developmental bases describe God's creativity in the two stage process for the creation of existing beings. The multiplied body in inner developmental quadruple base refers to the Logos for an existing being, and is in sungsang position. This Logos has life and structure as a kind of living mold. Subsequently in the outer developmental quadruple base this mold is given substance. Here is how Lee describes it.

Let me now explain concretely the give and receive action between Original Sungsang and Original Hyungsang that overlap in one position. It is the injection of pre-energy into the mold (spiritual mold) of the plan (Logos). As already explained, a mold of an idea (idea-mold), or a new idea with fine internal structure is formed in the first stage of give and receive action within the Original Sungsang, and when it is given life by the impulsive force of Heart, it becomes a completed plan. This completed plan is a living idea-mold, or, a living mold. In other words, an idea-mold with fine internal structure in the first stage, is given life in the next stage. However, as much vitality as it may have, and as fine an internal structure it may be, it is still only a mold (spiritual mold). In making an iron product, molten iron is injected into a mold which has a spatial structure. Likewise, in God, the material element of the Original Hyungsang (pre-energy), which corresponds to molten iron, is injected into an idea-mold which has a spatial structure.[16]

From this passage we can see that Lee's treatment of the developmental quadruple base derives directly from his use of form and matter ontology. Logos, as the immaterial form, has life, vitality, and structure. Original Hyungsang, the molten iron, is the inert and continuous material stuff without form or life. Together in the developmental outer quadruple base these are combined to give an existing being. This explanation of creation is very similar to that given by St. Augustine. Augustine in his exposition on Genesis described the creation of existing beings in terms of a process of illumination whereby the eternal forms in God's mind give shape and life to an unformed matter.[17] Both Augustine's and Lee's explanations are logical consequences of the Platonic conception of form and matter adapted to Christianity.

This passage also gives us insight into Lee's conception of the developmental base. We start with the identity maintaining give and receive relationship between sungsang and a continuous unformed hyungsang. Centering on purpose, the identity maintaining structure becomes developmental. First through a change in sungsang, this is subsequently manifest in the hyungsang because of the continuous and unformed nature of the hyungsang. In this process of an identity maintaining structure becoming developmental there is only one kind of give and receive action. It is in the development of sungsang and its relationship with an unformed hyungsang that we see the change from identity maintaining to developmental. A similar pattern is used to describe human creativity. In the Theory of Art, for example, the creation of a work of art is described as the relationship between the artist's sungsang and the materials used.

This [two stage] process of creation by God is manifested as the two-stage structure of creation in human artistic activities. First, a plan is made; and second, a work of art is made by substantializing the plan through the use of materials.[18]

Though this description seems analogous to the inner and outer developmental quadruple bases in the Original Image, there is a discontinuity here that is not found in the Original Image. The discontinuity is that the materials are not the artist's hyungsang. There are other layers of relationship in between the artist's mind and the manipulation of the materials.

Further this type of explanation only really works if there is an unformed matter to be acted upon. Lee describes God's Hyungsang as that unformed matter, but when we try to apply this concept of the developmental base unchanged to observable existence we run into problems. We can only point out that change occurs, but cannot clearly point to the developmental relationship that caused it.

For instance, in our galaxy give and receive action takes place between its nucleus and about 200 billion stars. The shape of our galaxy has the form of a convex lens and is constant, and all the stars perform revolving motions while keeping their own particular orbits. From this perspective, the galaxy has an unchanging aspect. On the other hand, it is said that in the beginning the galaxy revolved slowly, but as time went on, it came to revolve faster and faster. Also, it is well known that old stars die and new stars are born. Thus, the galaxy has the aspect of change as well. Hence, there are aspects of both identity-maintaining give and receive action and developmental give and receive action in the galaxy.[19]

Lee also applies developmental give and receive action to the circular motion in time of successive generations,[20] and to the growth of living organisms.[21] However these also are just essentially pointing out that change occurs in created beings. Associating that change with a specific quadruple base and give and receive relationship is missing. In existing beings we cannot directly draw the developmental quadruple base

for the things that are changing. Ultimately this problem arises because the form and matter ontology does not describe how existing beings exist.

There is one place where Lee's explanation does somewhat fit what can be observed, and that is in the family. In the Theory of the Original Human Nature we find this passage.

The unity of the husband and wife resembles the harmony of subject and object within the Original Image; in other words, it resembles the identity-maintaining four position foundation within the Original Image, while the multiplication of children by a husband and wife resembles God's creation of human beings; in other words, it resembles the developmental four position foundation within the Original Image.[\[22\]](#)

This is the only place I have found in the text where we can explicitly draw a developmental quadruple base for existing beings. In this case there is the one relationship of husband and wife that can be identity maintaining or developing and results in the family or the multiplication of children. However, despite Lee's assertion that this resembles the Original Image, it does in fact present a completely different explanation for developmental change to that found in the rest of the text. In the Original Image developmental change begins with a change in *sungsang* that is subsequently manifest in an unformed *hyungsang*. This relationship of husband and wife does not follow this pattern at all. It is not a *sungsang-hyungsang* relationship. Everywhere else in the text Lee follows the basic description of developmental change as presented in the Original Image. So the explanation in the Original Image should be taken as his fundamental explanation of the developmental quadruple base, and this description of husband and wife is an anomaly.

Due to its derivation from form and matter ontology, the existing description of the developmental quadruple base in NEUT does not explain change in existing beings very well, and it does not at all explain change based on particles. The basic idea of a developmental quadruple base with a different result to the identity maintaining base is a good one. It is an important addition to EDP, which primarily seems to deal with identity maintaining relationships, and it is one that should be retained. The existing explanation is, however, so dependent on form and matter thinking that we cannot just develop the existing explanation, but rather have to begin from a different conceptual foundation. Developing such a foundation for a systematic approach to change in the context of NEUT is the task of the remaining part of this work. The husband and wife relationship mentioned in the passage above stands in contrast to Lee's basic description of change and gives us a hint as to the direction we need to take.

Though the final form of the explanation developed here changes, even this part of Lee's explanation the husband and wife relationship is based on particles and involves yang and yin beings.

## Collisions

One of the strengths of the scientific explanation of existence is a consistent understanding of an existing being that begins from its constituent particles. The understanding of existence and change in existing beings derives from an understanding of the behavior of particles. Even bulk properties of objects, such as their temperature, are statistical averages of the behavior of a multitude of individual small particles. Statistical thermodynamics and the statistical nature of quantum mechanics connect the microscopic behavior of small particles to macroscopic behavior and observable properties. In Chemistry we begin to introduce these concepts in Kinetic Molecular Theory[\[23\]](#) of gases. Kinetic Molecular Theory gives an explanation of the measurable properties of a gas in terms of the motion and energy of the constituent particles of the gas. It begins from a set of assumptions that describe an ideal gas.

1. The particles of the gas can be considered as points with no volume.
2. The particles of the gas are in constant random motion and frequently collide with other particles and the walls of the container.
3. The particles of the gas do not exert attractive or repulsive forces.
4. The average kinetic energy of the gas particles is proportional to the temperature of the gas.

Of particular note here is assumption number two and the constant collisions between the gas particles. The collisions are of particular importance for this work. It is through collisions that gas pressure is exerted, that energy is distributed throughout the gas, that sound is propagated, or that heat is added. It is only through collisions between the particles that any kind of change can affect the whole of any gas sample. Collisions between particles are ubiquitous in science and are fundamental to an understanding of change in pretty much all contexts. This, then, is the starting point of my attempt to understand the developmental quadruple base without the form and matter ontology. That is to start from the premise that developmental give and receive

action is fundamentally related to collisions between the particles, rather than the giving of form to an unformed matter.

Let us begin by briefly looking at some physics of collisions before returning to chemistry in the next section. The simplest kind of collision is between two particles where no work is done, such a collision is said to be elastic. In a perfectly elastic collision the particles bounce off each other without the kinetic energy being converted to any other form of energy. The collisions in our ideal gas are considered to be perfectly elastic. In practice atoms have elastic collisions but anything larger does not. So monatomic gases such as helium would have perfectly elastic collisions, but molecular gases such as oxygen or any larger particles would not. However in order to get a conceptual grasp on elastic collisions we think about idealized billiard balls that we consider to have perfectly elastic collisions.

So we conceptualize two ideal billiard balls sitting on an ideal pool table. The ideal billiard balls are like the particles of our ideal gas writ large, and the ideal pool table has no friction. Then we mentally roll the two billiard balls towards each other such that they collide. In the collision they will bounce off each other and their direction of motion is altered in specific ways that we can calculate. The change depends on the speeds, angles, and masses involved. No kinetic energy is lost as heat, we ignore the rolling itself, and the total kinetic energy of the two balls is the same before and after the collision. The developmental change in this collision is the change in the direction of motion of each ball and a transfer of kinetic energy between them.<sup>[24]</sup> Before the collision, just as for the particles of our ideal gas, we assume that there are no forces acting between our billiard balls. Consequently there is no relationship between them before they collide. At the moment of collision contact forces operate between the two balls and it is at this point that we actually have the developmental relationship. The contact forces are momentary. The force acting on each ball changes its direction and then they are off again.

In my previous paper<sup>[25]</sup> I examined identity maintaining relationships from the perspective of force and circular motion. In this identity maintaining situation the forces operating between two particles act attractively through the center of mass of the particles. The attractive nature of the force is a requirement for circular motion. The attractive forces operate through fields and for two particles the force on particle one from the field of particle two is equal and opposite to the force on particle two from the field of particle one. This is an application of Newton's Third Law. In our collision we have a contact force, which is a different type of force from our identity maintaining situation. This contact force in the collision acts repulsively rather than attractively. In addition there is no circular motion in the relationship. Newton's Third Law still applies. So the force acting on billiard ball one from billiard ball two is equal and opposite to the force acting on billiard ball two from billiard ball one. Now, however, the force is directed away from the point of contact whereas in the identity maintaining situation the force is directed toward the center of mass of the two particles. The forces operate in opposite directions in the two types of relationship. In other words we are dealing with two totally distinct types of relationship, and not an identity maintaining relationship that becomes developmental. The commonality between the two types of relationship is that force is a prerequisite for both.

This kind of change is called a physical change because the composition of the balls themselves is unaffected, only their direction of motion and individual kinetic energy change. Physical change through collisions is important throughout science and there are many types of collisions. Variations occur when work is done in the collision and collisions become inelastic. In developing our explanation of the developmental quadruple base, however, our next step is to look at chemical change. In chemical change the chemical composition of the interacting compounds undergo a change and we can begin to see more clearly what we mean by developmental give and receive relationship.

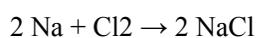
## Chemical Developmental Change

If all gases were ideal gases there would be no liquids or solids and we would not exist. Real gases break some of the ideal gas assumptions. Particularly they break the first and the third assumptions. Real gas particles have a measurable volume and they do exert forces on surrounding particles. These intermolecular forces allow liquids and solids to form. Allowing for these real particles kinetic molecular theory is extended to also explain physical changes in the liquid and solid states. It explains vaporization, vapor pressure, and boiling, as well as melting, freezing, and solution formation in terms of the constituent particles of the solid or liquid. Explanation of physical change in terms of the behavior of particles in this way is reminiscent of the philosophical atomism of Democritus and Leucippus. They too explained some of the same kinds of change in terms of the motions of

their uncuttable particles. One important extension of kinetic molecular theory is used to explain chemical reactions. This is appropriately called Collision Theory.

In Collision Theory chemical change is seen to occur through collisions between the molecules, ions, or atoms that are reacting. This takes the basic features of collisions that we discussed in the last section and adds some new concepts. In particular collision theory adds something called the activation energy. Most chemical reactions require an input of energy in order for the reaction to take place. To change the chemical composition of something means we first have to break existing bonds, remove electrons from atoms, or break atoms out of a solid structure. The input of energy needed to do this constitutes the activation energy. When these initial changes have occurred the reaction can proceed and the new bonds and configurations be formed. The question then becomes; where does the energy come from to supply the activation energy in order for the reaction to proceed. No prizes for guessing the answer; collisions provide the energy. The reacting particles must collide in order to react.

In our ideal billiard ball collision none of the kinetic energy of the colliding balls was lost. Now, in our chemical reaction, some of the kinetic energy of the colliding particles is transformed to provide the activation energy for the reaction. To illustrate the process let us look at a simple chemical reaction, the formation of sodium chloride (table salt) from its constituent elements. This is a direct synthesis type of reaction between sodium (a metal) and chlorine (a non-metal). The chemical reaction is represented by the following chemical equation.



If you put some metallic sodium in a jar of chlorine gas not very much happens. The activation energy is too high for the reaction to proceed when both elements are at room temperature. If on the other hand you heat the sodium and start it burning in air first and then put it in chlorine the reaction is almost an explosion. Lots of heat and light is given off and you are left with a white powder of sodium chloride covering the inside of the jar. Let's look at what happened.

Heating the sodium supplies a lot of the required activation energy, it gives the atoms more kinetic energy and vaporizes some of them. So now when a hot gaseous sodium atom collides with a chlorine atom in a molecule there is sufficient energy in the collision for the reaction to proceed. The chlorine molecule is split into two chlorine atoms, an electron is removed from the sodium atom, and the electron is absorbed by one of the chlorine atoms. This transfer of an electron is the actual change, and now instead of neutral sodium and chlorine atoms we have a positively charged sodium ion and a negatively charged chloride ion. The ions experience a strong electrostatic attraction that was not present between the neutral atoms, and they release a lot of potential energy in the form of heat as they condense, along with billions of others, to form solid sodium chloride crystals. The released heat vaporizes more sodium atoms and the reaction becomes vigorous (a chemist's euphemism for explosive) and self sustaining. The final state of sodium chloride is less energetic than that of the original atoms.

From the relational perspective we have the basic features of our billiard ball collision with momentary repulsive contact forces, but now we have something extra. The sodium atom loses an electron that is received by the chlorine atom, and both the sodium atom and the chlorine atom are changed into ions. This allows us to clearly assign subject and object positions in the developmental relationship. In giving the electron the sodium atom is thus the yang subject and in receiving the electron the chlorine atom is the yin object in this developmental quadruple base of our collision. This collisional explanation of developmental give and receive relationship also most closely resembles the fundamental understanding of yang and yin from the Book of Changes.

The nature of the creative (yang) is movement to unite and provide the seed for guiding development, and the nature of the receptive (yin) is the pure receptivity that lies at the origin of new existence. [\[26\]](#)

Here, in the Book of Changes, the essential understanding of the two cardinal principles as they become embodied in existing beings derives from the male giving of the seed and the female receiving it in the sexual relationship. Since the Book of Changes is primarily dealing with change we would perhaps expect it to connect to more to developmental situations, and for me this correspondence is a sign we are on the right track.

## Consequences for Unification Thought

Regarding developmental relationships to be fundamentally related to collisions in this way has a number of consequences for our relational description of existence based on Unification Thought. It makes a conceptual

break from Lee's explanation of developmental relationships in two main ways. First it suggests that identity maintaining and developmental quadruple bases derive from two different types of give and receive action, not one, and secondly it shifts the explanation of the developmental quadruple base from one based on sungsang and hyungsang to one based on yang and yin. Lee's explanation requires an already existing identity maintaining relationship between sungsang and hyungsang that subsequently becomes developmental as a result of a change in sungsang. He thus regards the developmental base as a secondary development from the pre-existing identity maintaining relationship that is based on the relationship of sungsang and hyungsang.

In our ideal collision of billiard balls there is no relationship between them before they collide. For collisions a prior relationship is not a prerequisite for developmental change even though it may be present. This feature of collisions completely distinguishes developmental and identity maintaining relationships. They are two completely distinct types of relationship. Though each type of relationship can be described by a quadruple base of center (purpose), subject, object, and result, we can immediately see the distinction between the two types when we consider the forces involved. In identity maintaining relationships the forces are attractive resulting in lasting circular motion (permanence). Whereas in developmental relationships the forces are repulsive, there is no circular motion, and the relationship is only momentary (change).

Perhaps more significant is that when the two types of relationship are separated in this way the developmental base is no longer required to be a relationship between the same set of dual characteristics as the identity maintaining base. The discussion derived from chemistry indicates that rather than sungsang and hyungsang the best description of developmental relationship depends on yang and yin. Though, as we can see with the formation of table salt, sungsang and hyungsang do change too. This leads us to a situation where sungsang and hyungsang are the primary dual characteristics for the existence of a being in the identity maintaining quadruple base, but yang and yin are the primary dual characteristics for explaining change in the developmental quadruple base. It is possible to view the first and second Blessings of EDP[27] from this perspective. The first Blessing is identity maintaining, based on sungsang and hyungsang, and the second Blessing could be seen as developmental, based on yang and yin.

The consideration of collisions leads to additional ramifications that are best elucidated by further consideration of our formation of sodium chloride from its elements. Prior to the reaction there is no relationship between the sodium atoms and the chlorine atoms, but the neutral sodium atoms are inherently yang beings because they easily give up electrons. The neutral chlorine atoms are inherently yin beings because they naturally accept electrons. This too is different to the understanding in NEUT where, due to his use of form and matter ontology and the concept of substances that derives from it, Lee does not accept inherently yang or yin beings. Instead he sees them to arise from a preponderance of yang or yin correlative characteristics. However this explanation does not work for things like electrically neutral atoms that have no preponderance of yang or yin correlative characteristics, but that nevertheless can still be considered to be yang or yin beings.

In the chemical reaction the sodium atom gives up an electron to the chlorine atom. In this developmental relationship the sodium atom is clearly the yang subject and the chlorine atom the yin object. Generally we can say that in the developmental situation yang gives something of itself and yin receives it. This is the basic meaning of yang and yin or male and female. In terms of electrical charge when a plus is created in the formation of the positively charged sodium ion, a minus automatically appears in the formation of the negatively charged chloride ion. That is during this developmental relationship the neutral atoms are changed to electrically charged ions. This development of charged ions is a result of the action of yang and yin in the chemical reaction rather than a cause of the developmental interaction. The resulting charged ions experience a strongly attractive electrostatic force that binds them together in the sodium chloride product. In the product there is now a new identity maintaining quadruple base with sungsang and hyungsang as the primary dual characteristics. In the identity maintaining situation yang and yin are secondary correlative attributes of the existing being. So the criteria for identifying yang and yin in the identity maintaining relationship of the sodium chloride product are different to the criteria in the developmental relationship.

In the identity maintaining situation yang and yin can be seen as correlative aspects of the circular motion. Yang is the center of the resulting circular motion as determined by the center of mass of the relationship. If one partner is sufficiently massive the center of mass lies within it and we can consider it the yang center of the relationship.[28] The yang center of circular motion in the identity maintaining situation is not necessarily the yang subject in the developmental relationship as Lee's structure suggests. For example there is a whole range of possibilities for binary compounds of alkali metal halides like our sodium chloride table salt. The stable extremes are characterized by rubidium fluoride and lithium iodide. In rubidium fluoride the metal ion is

heavier and consequently is the yang subject in the compound. In lithium iodide the non-metal ion is heavier than the metal ion.

Consequently in lithium iodide the non-metal ion should be regarded as the yang subject in the identity maintaining relationship within the compound. So while the neutral metal atom, regardless of size, is always the yang subject in the developmental relationships of its chemical reactions, the positively charged metal ion is not always the yang subject in the resulting identity maintaining relationship in the compound that is formed. This is a consequence of distinguishing the two types of relationship. In Lee's formulation with only one give and receive relationship that has two results the metal would always be regarded as the yang subject.

## Conclusion

In proposing collisions as the basis for understanding developmental relationship, I am making my first major break with the existing NEUT text. This is a consequence of the reliance of Lee's explanation on traditional form and matter ontology. Removing form and matter ontology from Lee's description of identity maintaining relationship required some reworking of the concepts, but did not overly affect the structures presented in the text. Removing form and matter ontology from Lee's explanation of developmental relationship has proven more difficult. It has required a complete reworking of the explanation from a new starting point in collision theory of particles. As well as bringing the explanation in line with science it also unexpectedly draws the explanation closer to the concepts of yang and yin found in the Book of Changes.

Adopting an understanding of change as occurring through collisions between particles has proven fruitful. It can provide the basis for a systematic explanation of change in the developmental quadruple base that connects directly to what can be observed. Taken together with the concept of identity maintaining quadruple bases, we do now have a consistent explanation for both permanence and change in the context of relationship that is compatible with a particle based understanding of existence. In identity maintaining relationships within existing beings it is the sungsang and hyungsang relationship that gives the primary description of the existing being, but in developmental relationships between beings yang and yin are primary. This also adds some additional depth to our standard discussion of dual characteristics because it makes additional distinctions not found in NEUT. The basic features of a developmental collision are momentary repulsive forces, no circular motion, and a transfer of something from the yang subject to the yin object.

There are of course additional kinds of change than those discussed here, such as growth and evolution, but even in these additional types of change the basic developmental features from collisions can be adapted to apply. Growth, for example, would result from totally inelastic collisions where the particles stick together after the collision. Evolution in its broadest sense is simply continuing change over time applied to pretty much anything, and we can regard it as a succession of developmental collisions. Living beings add more complexity and in living beings we can consider the collision to be symbolic of the sexual relationship between male and female. The sexual relationship is similarly a momentary developmental giving and receiving, and we can describe the meeting of men and women in marriage in terms similar to the reaction of sodium and chlorine. Before marriage boys and girls tend to associate with their own sex (elemental state) until meeting their partners in an explosion of love in marriage.

## Notes

[1] *Exposition of the Divine Principle* (Seoul: Sung Hwa Publishing., 1996), p. 35.

[2] Sang Hun Lee, *New Essentials of Unification Thought* (Tokyo: Kogensha, 2006), p. 48.

[3] David Burton, "What is the Matter? Understandings of Matter in Unification Thought and Modern Physics," *Journal of Unification Studies* 6 (2004-2005): 150-53.

[4] David Burton, "Force and Relationship in Unification Thought and Classical Physics," *Journal of Unification Studies* 11 (2010): 185-98.

[5] David Burton, "What is the Spirit? Some Physics of Spiritual Existence," *Journal of Unification Studies* 8 (2007): 119-22.

[6] Evolution would thus be impossible in traditional ontology.

[7] Correlative characteristics of an existing being arise solely from the accident of a being's existence rather than any property of the "stuff" of the being. Correlative characteristics would include such things as convex and concave surfaces, center and periphery of circular motion, or top and bottom, left and right, etc.

[8] David Burton, "Yang and Yin: Unification Thought, Science, and the Book of Changes," *Journal of Unification Studies* 9 (2008): 163-83.

[9] Lee, *New Essentials*, p. 111.

[10] *Ibid.*, 40.

[11] *Ibid.*, 48.

[12] I use these terms slightly differently than does Lee.

[13] Lee, *New Essentials*, p. 41.

[14] *Ibid.*, p. 101.

[15] *Ibid.*, p. 53.

[16] *Ibid.*, p. 80.

[17] Etienne Gilson *The Christian Philosophy of Saint Augustine* (New York: Vintage Books, 1967), pp. 197-98.

[18] Lee, *New Essentials*, p. 303.

[19] *Ibid.*, p. 129.

[20] *Ibid.*, p. 138.

[21] *Ibid.*, p. 140.

[22] *Ibid.*, p. 160.

[23] Sometimes called just Kinetic Theory.

[24] Subject and object can be discerned from the direction of transfer of energy, but it is easier to see which is subject and which is object in chemical reactions. We will deal with chemical reactions in the next section.

[25] Burton, "Force," 185-98.

[26] Burton, "Yang and Yin," 163-83.

[27] *Exposition*, pp. 44-45