Neglected Facts of Science - Commentary

Dewey B Larson (Copyright 1982)

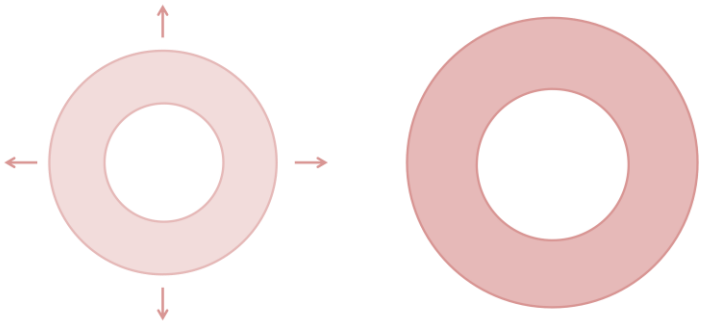
Commentary by: Dr. Gopi Krishna Vijaya

This work on the Reciprocal System, unlike several others written by Larson, focuses more on physical *facts* rather than on physical *theory*. Therefore, it serves as a good starting point for those researchers who would like to explore the Reciprocal System with the question: What are the available facts that are not conventionally understood but are explained through the facts themselves? Based on these facts, whose import, as Larson explains, is not always fully recognized, a better foundation is provided for the Reciprocal System in its ability to explain phenomena.

A chapter by chapter summary will be provided below.

Chapter 1: Fundamentals

The first neglected fact highlighted is of uniform motion that occurs in *all directions*, rather than in one particular direction. Larson calls this "scalar" motion, as opposed to that of vectorial motion, which has a specific direction only. An overall increase or overall decrease of magnitude, rather than the direction, is the key feature of this motion. This type of motion has been inferred in the case of galactic recession, and directly observed when substances are heated. Various visual descriptions, such as "expanding balloon", "photographic expansion", "zooming in and out" are used when galactic recession or heating is explained, but the uniqueness and fundamental nature of this motion is not normally emphasized.



Scalar expansion in a heated ring

It is then pointed out that the only motion that somewhat matches an outward motion is that of an explosion, therefore the conventional view presumes a Big Bang to account for this motion. But its identification in widely different phenomena such as heating and galactic recession shows that there is more to this than mere explosion. It is also possible for the motion to be a contracting one, where the object shrinks. Thus there are two "directions" of a sort – not real directions in terms of "northwest" or "east" but more in terms of increase or decrease of magnitude.

The way a vector relates to a scalar is described by the "coupling to a reference system". This is quite simple to understand: if in the diagram above, the right edge of the disc is pinned down, during expansion, the left edge moves leftwards. But if the left edge is pinned down, the right edge moves rightwards. Both these movements are the *same* outward scalar motion. Yet one vectorial motion is towards left and one is towards right, because of one edge being pinned down, or "coupled to a reference system".

In case of contraction, one has a decrease in magnitude, or shrinkage. However, this inward scalar motion is conventionally known by a different name: ***gravity***, which is seen as a ***force***. Hence Larson argues that all the so-called fundamental forces of nature are in reality different scalar motions (outward or inward), whose nature has not been recognized as such. The nature of forces and force-fields are now related to the coupling of a scalar motion to a reference system.

Chapter 2: Multi-Dimensional Motion

"Scalar" motion has to do with magnitudes more than directions. Vectorial motion has to do with magnitude *and* direction. However, the three dimensional nature of space is entirely a result of there being three perpendicular or independent *directions* to vectorial motions. Hence in vectorial motion, direction is predominant, and these three directions are represented as dimensions. The next logical question is, *is there a dimensionality based on magnitude*, in the same way that there is a dimensionality based on direction? In other words, is there a dimension of intensity rather than a dimension due to direction?

Larson points to the fact that in a Doppler shift spectrum, one has a magnitude only with no vectorial direction as a counterpart. Similarly, in modern quantum mechanics, there are quantum numbers that indicate the magnitudes of splitting of the spectrum under certain conditions. These indications show that it is indeed possible to have multi-dimensional scalar motion. Once again, existence of this form of multi-dimensionality is not noticed as much as traditional XYZ dimensions, and is hence a neglected fact.

With these dimensions of scalar motion, it is not possible to directly observe them in the same sense that one can swing an arm up, down and sideways. Since the variations are in magnitude, one can usually only measure the net effect as the total magnitude, e.g. the length of a vector in XYZ space. This lack of distinction between a net magnitude and a magnitude that is composed of different dimensions of magnitudes means that *only one* of the scalar dimensions can be properly represented in vectorial space. This is a limitation that has to be taken into account. It is almost as if one cannot distinguish the *intensities* of magnitudes properly, and can only measure the net effect in most cases.

There is, however, one all-important fact of nature that shows these intensities in their true light: the ratio of electric to magnetic to gravitational forces. The vast difference in intensity between electric and magnetic force, and magnetic and gravitational force, shows that there is a physical meaning to scalar dimension. In addition, since in the Reciprocal System the speed of light forms the common ratio between dimensions, it explains the large differences in force magnitudes. Therefore, facts of nature inherently point to three-dimensionality in scalar motion. It is further described how "charge" is the name given to these intensities, and also why inertial and gravitational mass are exactly the same when one adopts motion as the common denominator.

Chapter 3: Distinctive Properties

During a discussion about the incompleteness of several modern theories, the words of several scientists who accept the incompleteness are quoted. Following that, the chapter proceeds to identify the distinctive properties of scalar motion.

The first is that scalar motion is a *mutual* motion, i.e. it is not A going to B or B going to A, but A and B *approaching* or *receding from* each other. This property explains why mass-less light is deflected by gravity, where scalar motion of gravity is distributed between the star and the passing light. Another example is with respect to one-dimensional scalar motion: electric charge. In this case, the motion flips between A to B and B to A, and hence one motion *induces* another in the vicinity, leading to the phenomenon of *induction*. The two-dimensional version of this is magnetic charge.

There is then the issue of direction. Pointing a flashlight at the ground would mean that the light goes in the same direction as a falling stone. However, light is *outward* scalar motion while gravity is *inward* scalar motion. To distinguish the two motions when their vectorial direction is the same, Larson uses "reference points" (these aren't points per se, but the word just denotes a datum):

From a negative reference point outwards: Radiation.

From a positive reference point inwards: Gravitation.

In charged systems, one portion of the motion is from a positive reference, the other is from a negative reference, so one has all the phenomena like repulsion, screening, and induction occurring.

An additional important point is that when the motion in a single scalar dimension is cancelled, then this offers a chance for the unrepresented "second scalar dimension" to manifest itself in a specific direction. However, in accordance with the laws of the vectorial system, this direction has to be perpendicular to the original motion that got cancelled. This is the origin of the magnetic force being perpendicular to that of electric, a fact that is simply accepted without adequate examination today.

Chapter 4: Speed Limits

Bücherer and Kaufmann's results on accelerating electrons seemed to show that it is not possible to push them beyond light speed. Larson points out that it only shows that it is not possible to do so *via electrical means*, and hence it is not necessarily an absolute limit. It only shows that the limit is for one-dimensional scalar motion, which is precisely what electricity involves.

Accepting the speed of light as an absolute limit meant that astronomers, for instance, were forced to revise their formulae with a correction factor when the red-shift data in quasars showed the existence of speeds greater than that of light. In fact, in a three-dimensional system, the limit that is possible is c (speed of light) for each dimension, or $3c$ in total. The existence of high red-shifts show that speeds greater than that of light are not observed as separation of spatial coordinates, but through a direct measurement of a magnitude that is affected by the speed greater than light as well.

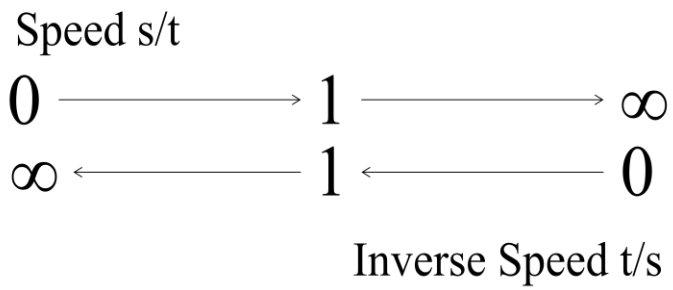
A criticism of inventive theories follows this discussion. The errors that creep in when some essential information is missing are rectified only when that information becomes available, such as the red-shift data in this case.

Chapter 5: Further Fundamentals

The question of discreteness is taken up. Due to the experimental fact that electric charge is discrete, it is concluded that one-dimensional scalar motion occurs in discrete units. And since the three dimensions of scalar motion are equivalent, *all* scalar motion occurs in discrete units. Hence, the discrete nature of magnetism, gravitation, light etc. is a natural consequence of this fact. Since charges are uniform, scalar motion exists in discrete uniform units. In other words, the experimental fact of charge guides the structure of scalar motion.

The uniform discrete nature is explained with the analogy of a chain. A chain can be *bent* only at its linkage, but all parts of the chain can be *identified*. Similarly, variations of scalar motion occur only at the end of a discrete unit, but the motion itself is uniform. And since motion can be represented as a ratio of space to time, space and time are *reciprocal aspects* of motion. The uniform discrete nature applies to them as well.

After this follows a discussion that is a little confusing. Since scalar direction, i.e. increase (positive) or decrease (negative), is true for scalar motion, the scalar direction is attributed to space and time as well. Hence space or time can increase or decrease, generating different ratios and therefore, different speeds. With these ratios, the total magnitude of speeds that are possible stretch in two directions:



The speed (s/t) greater than 1 corresponds to inverse speeds less than 1, and vice versa. When the system is in "balance", s/t=t/s=1, and this forms the *datum* or *baseline* for scalar motion. Hence, the natural reference system is one based on speed, and is different from the one based on spatial position that is conventionally used. Therefore the natural datum of scalar motion is "unit speed" and not "zero point". The outward motion at unit speed is also called the progression.

In contrast with theories that treat time as a sort of pseudo-space within a 4-dimensional space-time framework, time is here treated with equal status as space as the real *reciprocal of space in all respects, including dimensions*. The three dimensions of motion therefore gain an expression either in three-dimensional space or *three-dimensional time*. This is what is distinguished as "motion in space" and "motion in time". Time registered on a clock is hence only one aspect of time in general.

With this recognition of speeds and inverse speeds, one can also recognize that our observation is where speeds are usually less than that of light (1), which can be called the *material sector*. And the "region" of speeds greater than unity, forms the *cosmic sector*. The size of the physical universe is hence doubled.

Chapter 6: The General Picture

The two reciprocal aspects of the physical universe – the material sector and the cosmic sector – have a transition between the two extremes. There are three scalar motions that get generated. One basic one is the outward progression. A second basic one is inward gravity. The third is the outward translation that it is possible to superimpose on the combination of basic inward and outward. In each case, the net result is restricted between +1 (outward) or -1 (inward), since unit motion is the limit. Diagram A from this chapter is particularly useful:

DIAGRAM A

		Motion	In	Out	Net	
(1)	Photon	Progression		→	+1	Limits of Basic Motions
(2)	At grav. limit	Progression Gravitation	←	→	0	
(3)	At maximum gravitation	Progression Gravitation	←	→	-1	
(4)	At zero net speed	Progression Gravitation Translation	←	→	0	Limits of Modified Motions
(5)	At unit net speed	Progression Gravitation Translation	←	→	+1	

Motion (1) holds in the far reaches of the galaxy and motion (3) approximately holds on the surface of the earth. Motion (2) is the zone of gravitational stability where the two are balanced. However, Progression and Gravitation are active in all motions, making them the basic reciprocal motions constituting the physical universe. This provides

the explanation for the existence of equilibrium distances among astronomical objects, such as between stars of globular cluster, multiple star systems, etc. Such equilibria cannot be explained on the basis of a gravitational system alone. The existence of this progression at an equal status as that of gravitation is something has been another neglected fact.

For translation in motion (5), the two units cover one unit of speed ($s/t = 0 \rightarrow 1$) and one unit of inverse speed ($t/s = 1 \rightarrow 0$ or $s/t = 1 \rightarrow \infty$). This inverse speed is identified with energy, without further discussion that belongs to theoretical development. Three zones of speeds – $0 < v < c$, $c < v < 2c$, and $2c < v < 3c$ – are identified as *low speed*, *intermediate speed* and *ultra high speed zone* respectively. The term *high speed* refers to speeds approaching c in the first zone. These three regions are also labeled 1-x, 2-x and 3-x. The further splitting of each range between speed and energy creates a total of six levels between the material and the cosmic extreme, which are mediated by a transition zone. The last distinction of these regions is where either space or time is fixed at unit magnitude, which is called *time region* or *space region* respectively. It must be clearly noted even though the words "region" or "zone" evoke a spatial image, they are always to be understood in a generic sense.

These ideas are introduced in order to help *identify* a new set of facts, and not to develop the theory itself. The 2-x speed zone will be particularly relevant for astronomical identifications.

Chapter 7: Astronomical Identifications

Low speed (1-x) phenomena can be fully represented in the XYZ system, but those of 2-x and 3-x are observed only indirectly. In fact, a good picture of the different "zones" mentioned earlier is obtained through the study of these phenomena in astronomy.

When some components of a stellar explosion (supernova) move into the 2-x zone, they expand in time, rather than in space i.e. they *contract* in space at a single location, creating a *compact* explosion product: the white dwarf. Even their density gradient is observed to be inverted – being less dense towards the center and denser at the surface. When a much stronger explosion occurs at the galactic level, speeds move into the 2-x *and* the 3-x zone. Those parts which move into intermediate speed, give the entire galactic explosion product a white-dwarf-nature. This ought to create a small compact galaxy, with enormous energy content. The red-shift must have contributions from the 3-x zone as well, which makes it much higher than usual. These properties are all present in the *quasar* – another astronomical phenomenon that provides factual support to the Reciprocal System.

Just as there are two types of supernova – type I and type II – there are two types of ultra-high speed explosion products: quasars and pulsars. The nature of pulsars matches precisely from what is expected of a purely ultra-high-speed end product. Those products that bypass even the 3-x zone leave the material sector altogether, and as part of the cosmic sector they are *widely dispersed in space* but *concentrated in time*. When "inverse" gravitation finally creates an evolution in that sector as well, they "rain down" into the material sector. This is the cyclical nature of the evolution of the physical universe.

Chapter 8: Cosmological Conclusions

This chapter compares the Big Bang and Steady State theories of the universe with that derived from the Reciprocal System. The main feature of the Big Bang theory that provided an edge over the rival Steady State theory was the existence of blackbody radiation. However, Larson points out that both theories have several features that are introduced ad-hoc, and do not explain the general features of astrophysical phenomena, such as the isotropy in the universe.

The description of the continuous cycling between the material and cosmic sectors has all the features of aggregation and dispersion currently observed in stellar and galactic formation. For instance, the continuity between globular clusters, dwarf galaxies, and large galaxies indicate them as consequent stages in an evolutionary pattern. Stellar

evolution is also clarified with younger stars occurring in globular clusters and the older stars occurring in larger aggregates. The process of acquisition of a globular cluster by an existing galaxy also helps explain features of globular cluster distribution, presence of open clusters within the plane of the galaxy, how they "fall into" the galaxy, etc.

It is pointed out that assumptions regarding the nature of generation of energy have led to a wrong classification of stellar evolution sequence. The stars *begin* as cool red giants, and make their way up to the main sequence towards yellow, white and blue. The current theory has to have old stars with young formations of matter – clearly an untenable situation.

At the end of it all, the large-scale action of the universe is summarized thus:

Location	Process	Final State
3-dimensional space	aggregation	concentrated in space
Intermediate region	ejection	dispersed in time
3-dimensional time	aggregation	concentrated in time
Intermediate region	ejection	dispersed in space