How Do We Meet the New Age Ushered By the Reciprocal System?

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The student of the Reciprocal System is often beset with a peculiar difficulty, the nature of which he does not recognize readily. The result is that he does not even suspect that his progress is being blocked by this difficulty. I have written several times referring to this but find that it is by no means easy for the student to realize the point I am endeavoring to show. For instance, in a recent communication, circulated by Maurice Gilroy (Re: Message 17 of Conference 01 mailed August 19, 1993), we find Robert Tucek asking: "What observations correspond to a basic rotation of natural units?" (Please see the short note on STP at the end.) The context of his questioning was, of course, about the possibility of rotation as a primary motion as against linear translation. A little later he emphasizes, "Rotational motion, by definition, *requires* an object!"

The prevailing view in the ISUS seems to be that while linear motion can exist without any object, rotation is not possible without an object. We wish to show that this view is not applicable in the context of the universe of motion postulated by the Reciprocal System. Larson has repeatedly pointed out to us that the most basic component of the universe of motion is motion, not matter or any other "object." On the other hand, the most basic component of the universe of matter is matter: motion being regarded as something added on to these primary units, namely, matter. Let us highlight these:

Concept of the Universe of Motion:

Motion or space/time: the content of this universe; primary component

Concept of the Universe of Matter:

Matter: the content of this universe; primary component space/time: the background or container

Motion: something that could be acquired by objects, like matter.

Therefore, referring to the primary units of motion, in the context of the universe of motion, when we speak of rotational motion, we do not mean the rotational motion of an object, for the simple fact that there is no "object" logically prior to the primary motion. The term "primary component" implies logical priority. In fact, the expression "rotation of natural units," used by Tucek, as also by so many other students, is positively misleading: as though the natural units are first existing and then are given a rotation. The truth is that when we speak of *rotational space* unit (as against linear space unit) we do not mean "the rotation of the space unit," rather, we mean "the rotation *that is* the space unit."

Our preoccupation with the Cartesian (rectangular) co-ordinate frame has some biasing influence. Turning, instead, to the polar coordinates, r and θ, we find that the linear and rotational space are on equal footing. A scalar parameter has only magnitude and no direction in space. Examples are, wage ($/hr) or production (#/min) etc. Though speed (cm/sec)—in contrast to velocity is taken to be scalar, it is not scalar in the absolute sense of the previous examples (in the sense that dollars or numbers have no relation whatsoever to direction in space). This is because distance between two points, say, A and B, does have an *intrinsic direction*, namely, AB or BA (which wage or production does not have). "Scalar speed" merely means that this intrinsic direction is *not oriented* in any direction of the reference system. That is to say that there is no specific relation between this intrinsic direction and the

conventional reference frame. Thus we use the word "scalar" either in a strong (or absolute) sense or in a weak sense. Wage is an absolute scalar in that it does not have an intrinsic direction, whereas speed has a potential direction in space, that could be actualized in the context of a spatial reference frame.

In exactly the same manner a scalar speed could be rotational (radians/sec) instead of linear (cm/sec). Rotation also has an intrinsic direction, namely, the axis of rotation. Our preoccupation with rectangular reference frames might make us think that the direction germane to rotation is the ever-changing direction of the radius. But this is not correct. The intrinsic direction of rotation is that of its axis (adopting the right-hand screw convention). The problem is that we are not used to think of rotation without imagining a rotating object. Even if we are careful enough not to picture any gross physical object, we cannot help imagining a conceptual object, a sphere or disk of space, and see it rotate. The catch here is that we are still envisioning "the rotation of the disk," instead of "the rotation *that is* the disk," and so are back in the trap! But the truth is that in the case of rotational speed, $d\theta/dt$, there is no radius, r, involved. In the case of translational speed we can imagine dr/dt without any connection or reference to θ!

One useful exercise that might help us overcome this difficulty is first to imagine a rotating disk and then to visualize the disk to be shrinking progressively, such that we are ultimately left with only rotation (radians per sec). Having realized that the intrinsic direction of rotation is its axis, and not the changing direction of the radius, we see that rotation could be as much a scalar quantity as translation is, so long as the intrinsic direction, in either case, is not oriented in any specific direction of the conventional reference frame.

Tucek's assertion, which is a statement of the difficulty that is common to many other students, that "Rotational motion, by definition, requires an object," is true only in the context of the concept of the universe of matter, not in the context of the concept of the universe of motion. In the context of the universe of motion, primary motion whether translational or rotational—by definition, *does not require* an object. This is the implication of the expression "basic component of the universe." This demonstrates that it is by no means easy to dislodge our moorings to the concept of the universe of matter. We our generation—are born and bred in the context of this concept. So even though we are repeatedly cautioned we continually keep slipping back into the old view point.

When I talk of the primacy of motion either linear or rotational—as when saying: "Rotation is possible prior to the existence of 'things' or 'objects,'…" and if someone finds that either it is

(a) absurd,
(b) illogical, or
(c) impossible,

then it does not establish that I am wrong. It only indicates that either one of us is wrong. Therefore it becomes necessary to examine whether one has, by dint of inveterate habit, slipped back to the view point of the universe of matter. Our thinking is guided by the language, and the present grammatical patterns are thoroughly conditioned by the view point of the universe of matter. Great caution must be exercised in using ellipsis, metaphor or other figures of speech in our discourse. Tedious repetition of long expressions may have to be resorted to avoid misguiding, or evoking semantic responses incongruous to the new view point.

For the conventional scientists of our generation (let us call them Group A) there is no difficulty: they are wedded to the view point of the universe of matter from the beginning to the end. For the scientists of the future generation (Group B) there is no difficulty either: from birth they would be raised in the context of the view point of the universe of motion, and the view point of the universe of matter would

only be a matter of historical interest. The difficulty is only for those of our generation (Group C) who, while having been bred in the view point of the universe of matter, are promoting the study of the Reciprocal System that requires the new view point, namely, that of the universe of motion. We keep slipping back to the conventional view point. And trying to study the universe of motion from the background of the concept of the universe of matter leads to absurd results. While persons of Groups A and B might be intelligent, those of Group C have not only to be intelligent in the conventional way, they must be intelligent in a different way too. This latter involves an ability to perceive whether, down the line, one has involuntarily reverted to the view point of the universe of matter. "Illogical," "absurd," "nonsensical" and "impossible" are some of the watchwords that should alert us to this. Surreptitious pride of one's intellectual superiority is the first stumbling block. An attitude of cock-sureness and finality is the second impediment. The tendency to take the unfamiliar for the inadmissible is the third. Reliance on majority opinion is the fourth.

In the chain of deduction from the Fundamental Postulates, far down the line, work is not so difficult. So some of us might have published "learned" Papers or literature on the Reciprocal System. The true difficulty is nearer the Fundamental Postulates, most at the first step, in deducing the primary motions. This is where the clash between the view point of the universe of motion that needs to be adopted and the view point of the universe of matter to which we keep slipping back (unconsciously) has the most deleterious effects.

Advocating censorship has good intentions. But implementing it is tricky: we might be unwittingly jeopardizing the very cause which we are professing to promote. We, in our eagerness to reject all that is alien to the Reciprocal System, might commit the mistake of rejecting all that is alien.

In the recent ISUS Newsletter (*ISUS News*, V(1), Spring 1993, pp. 5-8) I have discussed point by point how the President was misguided in his ruling.[1] However, I know that truth cannot be forced, it must dawn on oneself. Only he who has been able to extricate himself from thinking in terms of the inadmissible view point of the universe of matter and is constantly on vigil to see if he has slipped back to this view point, either in own study or in criticizing others' work, is the right person to censor. The prevailing correspondence clearly shows that not one of us is equal to the task.

The Space-Time Progression

The question is often raised that if rotational motion is as primary as linear motion, what is the observable effect, in the case of rotation, which corresponds to the outward progression of space-time (STP) in the case of linear motion.

The natural reference system manifests in the conventional reference frame as a one-dimensional scalar outward progression. Let a length AB grow to AB_1 in x (natural) units of time, such that $BB_1 = x$ units of space. We make the following observations:

Observation I: Since the STP is scalar, it is independent of (i) any direction and (ii) any reference point of the conventional reference frame.

Observation II: The effect of the non-dependence on direction is to distribute the progression into spherical symmetry.

Observation III: The effect of the non-dependence on reference point is to distribute the increase in length, namely, the x units of space, uniformly throughout the original length AB. That is, it is not the case that a length BB_1 is added to the end of the original length AB at B, but additional

1 Ronald Satz's "Executive Orders," censoring all ideas that he did not approve of.

linear space emerges between every two adjacent points (locations) on AB. Suppose M was the midpoint of AB. After x units of time it occupies location M such that it is still the midpoint of AB_1. It is extremely important to distinguish this type of increase of length from an increase that is merely appended to the end of an existing length. Both the ubiquity of the STP and the "action-at-a-distance" of gravitation stem from this non-dependence of scalar motion on reference point.

The same state of affairs holds good in the case of rotational motion too, but first we must note the following correspondences between translational and rotational motions:

(i) Length is measured between two points, one of which is a reference point. Angle is measured between two directions, one of which is a reference direction.

(ii) The scalar speed cm/sec has an intrinsic direction that may be oriented in any direction of the conventional reference frame. The scalar speed radians/sec has an intrinsic direction that may be oriented in any direction of the conventional reference frame.

Now we are ready to make three observations in the case of rotation as we did in the case of translation above. Let $\angle$POQ be an angle φ, such that O is the origin, OQ the reference direction and OP another direction. In y units of time let φ increase by y units of angle.

Observation I: Since the rotational counterpart of the STP is scalar, it is independent of (i) any rotational direction and (ii) any reference direction of the conventional reference frame.

Observation II: The effect of the non-dependence on rotational direction is to distribute the rotation into spherical symmetry.

Observation III: The effect of the non-dependence on reference direction is to distribute the increase in angle, namely, the y units of angle, uniformly throughout the original angle $\angle$POQ. That is, it is not the case that an angle y is added to the end of the original angle $\angle$POQ at OP, but additional angular space emerges between every two adjacent directions in $\angle$POQ.

It is extremely important to distinguish this type of increase of angle from an increase that is merely appended to the end of an existing angle. Now a complication arises that the conventional reference frame cannot accommodate more than 2π radians of angle (or 4π steradians of solid angle). Therefore, in the case of the former type of increase, as soon as this limit is reached no further observable effect manifests. Thus the rotational counterpart of the linear STP is seen as no (or zero) rotation. On the other hand, since no such limitation exists for accommodating linear space we observe an unlimited outward progression in the linear case.