THE INTERNATIONAL SOCIETY
OF UNIFIED SCIENCE

Periodicals Collection

Reciprocity
Volumes XXVI – XXVII
1997-1998

ISUS News
Volumes I – VIII
1983-1996

The Journal of the International Society of Unified Science
Notes on the Periodicals Collection

Bruce Peret, Editor

As an aid to locating a specific article, I have added a uniform page numbering system to the lower corners of each periodical. Each page number is composed of 4 components, the Collection “Set” letter, the Volume and Number of the issue, and the page number as it appears in that issue.

Reciprocity Format

B 14.2-10

ISUS News Format

E I:1.2-3

This numbering system allows you to flip through the bottom corner of the set to locate a specific article, without having to locate the cover and then locate the page. ISUS News issues, being published much later but having the same Volume-Number-Page format, are preceded with an “I:” to distinguish them from a Reciprocity issue.

Some issues of Reciprocity began page numbering starting with the cover page, while others began with the first article page. The latter will not have page numbers on the cover pages. Also, the last page was usually a short catalog of books. These have been replaced with a blank page, to avoid confusion with the current catalog.

There is also quite a variety of type styles and sizes. Many of the early issues were printed on 8½ x 11 paper, and folded in half, making the text very difficult to read because of the small size. These smaller issues were enlarged with a photocopier and I did the best I could to fill in many of the blurred and missing words and letters.

There are a number of places where there are handwritten corrections, which were sent to me by the authors. I corrected as many of these errors as I could, but there are undoubtedly many more—and many more yet to be made. As the former Editor, I have noticed that mistakes are invisible until you get several hundred copies made—then they stand right out. If you would like to report any errors you find, please report them via the ISUS website, www.rstheory.com.

Bruce Peret
Editor, Secretary, Webmaster
The International Society of Unified Science, Inc.
May 15, 1998; revised February 10, 2008
DEDICATION

This Collection is dedicated to the Memory of

Dewey B. Larson

for having the courage and determination to conceptually “go where no man has gone before,” and

Dorothy E. Larson

for her patience, understanding and steadfast support.
Reciprocity Master Index

New Science Advocates I, № 1 (Spring, 1971)

The New Science Advocates

Here is an important task for the Philosophy of Science

Editor A 0.0-1

Reciprocity I, № 1 (August, 1971)

Policies and Objectives

Douglas Cramer, Paul deLespinasse, George W. Hancock

Publication Assistance

Douglas Cramer, Paul deLespinasse, George W. Hancock

Gleanings from the Literature

Douglas Cramer, Paul deLespinasse, George W. Hancock

Do You Have a Question?

Dewey B. Larson A 1.1-2

Just What Do We Claim

Dewey B. Larson A 1.1-3

Let Us Hear From You

Douglas Cramer A 1.1-4

Reciprocity I, № 2 (September, 1971)

Special Issue

Professor Meyer's Paper on Perihelion Precession delayed

NSA Membership Information

ISUS, Inc. A 1.2-1

Philosophers Ahoy!

Editor A 1.2-2

The Question Box

If space-time is fundamental, how can you tell it's moving?

Editor A 1.2-3

A Thought for Today

Editor A 1.2-3

The Mailing List

Editor A 1.2-4

Reciprocity II, № 1 (January, 1972)

The View from Abroad

Editor A 2.1-1

Larson's November Lecture Tour

Editor A 2.1-1

Mathematics Can Be Simple

Editor A 2.1-2

Review of 'The Case Against the Nuclear Atom' From DISCOVERY (London), July, 1963

Unknown A 2.1-4

A Gap in the Armour of Science

Unknown A 2.1-4

Are we losing time in recognizing discoveries?

British Reviewer Concedes a Point

Prof. F. Schmeidler A 2.1-5

Reciprocity II, № 2 (December, 1972)

Palomar Astronomer Sees Evidence of New State of Matter

Editor A 2.2-1

The Changing of the Guard

Editor A 2.2-3

Those Wayward Particles

Editor A 2.2-3

The Test of Time

Editor A 2.2-5
Reciprocity III, № 1 (April, 1973)

Motion Applicable to Space? Prof. Frank H. Meyer A 3.1-1
Time Increase with Space Increase? Prof. Frank H. Meyer A 3.1-2
Time Thought-Dependent? Prof. Frank H. Meyer A 3.1-3
Larson's Latest Eastern Trip Prof. Frank H. Meyer A 3.1-5
Support Reciprocity Prof. Frank H. Meyer A 3.1-5
Acts to Come Prof. Frank H. Meyer A 3.1-6
Future Features Prof. Frank H. Meyer A 3.1-6

Reciprocity III, № 2 (September, 1973)

Space-Time Discrete or a Continuum? Prof. Frank H. Meyer A 3.2-1
Reader Comment Carla Rueckert A 3.2-3
On Frederick Ferre and Adolf Grunbaum Carla Rueckert A 3.2-3
Reader Comment Editor A 3.2-5
Rest Editor A 3.2-5
Additions to Reciprocity Staff Editor A 3.2-6
Support Reciprocity Editor A 3.2-6
Experimental Study of Time Editor A 3.2-6
Note on Professor Ferre Editor A 3.2-7
Larson on Gravitational Repulsion Editor A 3.2-7
Benjamin Franklin on Time Editor A 3.2-7

Reciprocity III, № 3 (December, 1973)

Gravitational Motion an Interaction? Prof. Frank H. Meyer A 3.3-1
Letter to the Editor Dewey B. Larson A 3.3-3
Relativity Theory Conceptually Valid? Editor A 3.3-3
Ferre-Grunbaum Controversy on Mind-Dependency of Time Editor A 3.3-4
Editorial Policy of Reciprocity for 1974 Editor A 3.3-5
Contradiction in Modern Theory; (An Addition) Herbert A. Bosch A 3.3-6
Support Reciprocity Editor A 3.3-7
Future Features Editor A 3.3-7

Reciprocity IV, № 1 (April, 1974)

Quasars and Pulsars Unknown A 4.1-1
Review reprinted from The Indian Journal of Physics Dr. Ronald Satz A 4.1-1
The Lorentz Transformation Dr. Ronald Satz A 4.1-6

Reciprocity IV, № 2 (July, 1974)

On Space Translation Dewey B. Larson, A 4.2-1
How It Is with Reciprocity Prof. Frank H. Meyer A 4.2-2
The Gravitational Formula at High Velocities Dr. Ronald Satz A 4.2-2
Eddington on deSitter vs Einstein Physics Prof. Frank H. Meyer A 4.2-6

Reciprocity IV, № 3 (October, 1974)

New Research Program Concerning Cohesion of Solids Prof. Frank H. Meyer A 4.3-1
Physics-On the Move? Fr. George Windolph A 4.3-2
Theory of Solids Dewey B. Larson A 4.3-5
Incorporation of NSA ISUS, Inc. A 4.3-8
Have You Seen Dr. E. L. Lippert A 4.3-8
**Reciprocity V, № 1 (March, 1975)**

- Development of the Reciprocal Theory Continues
  - Prof. Frank H. Meyer
  - A 5.1-1
- Neutron Stars, Black Holes, etc.; *Facts or Fiction?*
  - Prof. Frank H. Meyer
  - A 5.1-1
- Campaign to Incorporate New Science Advocates
  - Prof. Frank H. Meyer
  - A 5.1-2
- Astronomical X-ray Sources
  - Dewey B. Larson
  - A 5.1-3

**Reciprocity V, № 2 (May, 1975)**

- New Particles Puzzle Scientists
  - Prof. Frank H. Meyer
  - A 5.2-1
- Letter to the Editor
  - Dr. Frank A. Anderson
  - A 5.2-2
- Cosmic Rays and Elementary Particles
  - Dr. Ronald Satz
  - A 5.2-3
- Letter to the Editor
  - Dewey B. Larson
  - A 5.2-7

**Reciprocity V, № 3 (October, 1975)**

- Symmetry Between Three-Dimensional Time and Space
  - Prof. Frank H. Meyer
  - A 5.3-1
- Some Anniversary Thoughts
  - Dewey B. Larson
  - A 5.3-6
- The Two-Photon Problem
  - Dr. Ronald Satz
  - A 5.3-7

**Reciprocity VI, № 1 (March, 1976)**

- Problem of Swift 'Action at a Distance'
  - Dr. Rainer F. Huck
  - A 6.1-1
- Letter to the Editor; *The Crab Nebula Pulsar*
  - Dewey B. Larson
  - A 6.1-4
- NSA, Incorporated
  - ISUS, Inc.
  - A 6.1-4
- Benjamin Franklin's Concept of Time
  - Prof. Frank H. Meyer
  - A 6.1-5

**Reciprocity VI, № 2 (July, 1976)**

- Finite Gravitational Limits
  - Prof. Frank H. Meyer
  - A 6.2-1
- The Gravitational Attraction of the Galaxy
  - Dr. Ronald Satz
  - A 6.2-2
- First Annual NSA Conference, August 20-21, 1976
  - ISUS, Inc.
  - A 6.2-7
- Owre Hall Auditorium III, University of Minnesota, MN
- About the Non-existence of a Velocity Limit
  - Dr. Thomas Phipps
  - A 6.2-8
- Equal to the Speed of Light
- The Myth of the Quark
  - Editor
  - A 6.2-10

**Reciprocity VI, № 3 (September, 1976)**

- Relative Motion and Length Measurement
  - Steve M. Berline
  - A 6.3-3
- The Case of the Colliding Photons
  - Dewey B. Larson
  - A 6.3-9

**Reciprocity VII, № 1 (January, 1977)**

- The Mechanism of the Universe
  - Dewey B. Larson
  - A 7.1-6
- Four Scientific Mysteries Unraveled
  - Dr. Ronald Satz
  - A 7.1-20

**Reciprocity VII, № 2 (June, 1977)**

- Atomic Numbers Revalued
  - Prof. Frank H. Meyer
  - A 7.2-3
- White Lies About Black Holes
  - Dr. Ronald Satz
  - A 7.2-10
- Exchange on Perihelion Motion of Mercury
  - Prof. Frank H. Meyer, Leonid Sokolow
  - A 7.2-14
Reciprocity VII, № 3 (October, 1977)

Some Comments by H.F. Wuenscher at Second NSA Conference
Fr. Hans F. Wuenscher A 7.3-2
Some Decisions of the Second Annual NSA Conference
ISUS, Inc. A 7.3-3
Twenty Years' Progress
Dewey B. Larson A 7.3-4
Hubble's Law and the Reciprocal System
Dr. Ronald Satz A 7.3-18
Motion: The Substance of Space-Time and Matter
Prof. Frank H. Meyer A 7.3-20

Reciprocity VIII, № 1 (Winter, 1977)

Invitation to Join NSA Correspondence Club
ISUS, Inc. A 8.1-1
Ball Lighting
Dr. Rainer F. Huck A 8.1-4
The Doppler Shift and the Reciprocal System
Steve M. Berline A 8.1-8
Book Notices
ISUS, Inc. A 8.1-16
Stellar Energy Generation in the Reciprocal System
Dr. Ronald Satz A 8.1-17
Reference Systems
Dewey B. Larson A 8.1-23

Reciprocity VIII, № 2 (Spring, 1978)

Building the Reciprocal Correspondence Club
ISUS, Inc. A 8.2-1
A Model of Motion Equilibrium
Paul deLespinasse A 8.2-2
Dewey Larson comes to Utah
ISUS, Inc. A 8.2-3
Third Annual Conference of the New Science Advocates
ISUS, Inc. A 8.2-3
The Effect of Gravitation on Radiation
Dewey B. Larson A 8.2-4
What Is To Be Done?
Editor A 8.2-4
Theory and Design of the New Rational Combustion Engine
Prof. Frank H. Meyer, Dr. Ronald Satz A 8.2-5
Birth of the New Physics
Prof. Frank H. Meyer A 8.2-6

Reciprocity VIII, № 3 (Summer, 1978)

Publish D.B. Larson's Masterpiece
Dr. Frank A. Anderson A 8.3-1
More on Solid Cohesion Theory
Dewey B. Larson A 8.3-3

Reciprocity VIII, № 4 (Autumn, 1978)

Letter on Redshifts
Paul deLespinasse A 8.4-4
Memo on Presale of New Book
Phillip H. Porter A 8.4-6
The Fundamentals of Science in the 21st Century
Dewey B. Larson A 8.4-7
The Cohesive Energies of Crystals of the Elements
Dr. Ronald Satz A 8.4-18
Discussion of Larson's Gravitational Equation
Dr. Ronald Satz A 8.4-23
Comments on Some Issues Raised at the 1978 Conference
Dewey B. Larson A 8.4-25

Reciprocity IX, № 1 (Spring, 1979)

Announcement of Invited Larson Lecture
ISUS, Inc. A 9.1-1
Announcement of Fourth Annual NSA Conference
ISUS, Inc. A 9.1-1
Preparations for Fourth Annual NSA Conference
ISUS, Inc. A 9.1-1
1979, Einstein Centennial and Updating of Larson's Work
ISUS, Inc. A 9.1-2
Comment about Larson's Gravitational Equation
Fr. George Windolph A 9.1-3
Cosmic Radiation and Other Half of Physical Universe
Prof. Frank H. Meyer A 9.1-4
Nuclear Fusion in Heaven and on Earth?
Peter Kor A 9.1-14
Lost Neutrinos Show Up, But Puzzle Remains

Response to G. Windolph's Comment
Dr. Ronald Satz A 9.1-15
### Reciprocity IX, № 2 (Summer, 1979)

<table>
<thead>
<tr>
<th>Topic</th>
<th>Publisher</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>News of Coming Larson Lecture at Superior</td>
<td>ISUS, Inc.</td>
<td>A 9.2-1</td>
</tr>
<tr>
<td>Fourth Annual NSA Conference Program Notes</td>
<td>ISUS, Inc.</td>
<td>A 9.2-2</td>
</tr>
<tr>
<td>Directions in Physics</td>
<td>Prof. Frank H. Meyer</td>
<td>A 9.2-3</td>
</tr>
<tr>
<td>Time Region Particle Dynamics</td>
<td>Dr. Ronald Satz</td>
<td>A 9.2-12</td>
</tr>
<tr>
<td>Delay in Publication of Nothing But Motion</td>
<td>ISUS, Inc.</td>
<td>A 9.2-15</td>
</tr>
</tbody>
</table>

### Reciprocity IX, № 3 (Autumn, 1979)

<table>
<thead>
<tr>
<th>Topic</th>
<th>Publisher</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Developments of our NSA Movement</td>
<td>ISUS, Inc.</td>
<td>A 9.3-1</td>
</tr>
<tr>
<td>Promotion of Arnold Studtmann's Ph.D. Dissertation</td>
<td>ISUS, Inc.</td>
<td>A 9.3-2</td>
</tr>
<tr>
<td>The Interaction Velocity of the Electric Force</td>
<td>Dr. Rainer F. Huck</td>
<td>A 9.3-3</td>
</tr>
<tr>
<td>Science Without Apologies</td>
<td>Dewey B. Larson</td>
<td>A 9.3-10</td>
</tr>
<tr>
<td>Increase in Mass versus Increase in Force</td>
<td>Fred Jansen</td>
<td>A 9.3-21</td>
</tr>
<tr>
<td>Mass-to-Light Ratio of Quasars in the Reciprocal System</td>
<td>Dr. Arnold Studtmann</td>
<td>A 9.3-23</td>
</tr>
</tbody>
</table>

### Reciprocity X, № 1 (Winter, 1979)

<table>
<thead>
<tr>
<th>Topic</th>
<th>Publisher</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>NSA, Inc. at Huntsville in August</td>
<td>ISUS, Inc.</td>
<td>A 10.1-1</td>
</tr>
<tr>
<td>Letter of John W. Campbell to F.V. Meyer</td>
<td>Editor</td>
<td>A 10.1-2</td>
</tr>
<tr>
<td>Mass More Constant Than Force</td>
<td>Prof. Frank H. Meyer</td>
<td>A 10.1-3</td>
</tr>
<tr>
<td>Bioelectronics</td>
<td>Paul Little</td>
<td>A 10.1-6</td>
</tr>
<tr>
<td>Unified Physics</td>
<td>Sheila Linn</td>
<td>A 10.1-8</td>
</tr>
<tr>
<td>Availability of Dr. Studtmann's Dissertation</td>
<td>ISUS, Inc.</td>
<td>A 10.1-9</td>
</tr>
<tr>
<td>Letter to Editor, James E. Jackson</td>
<td>James E. Jackson</td>
<td>A 10.1-9</td>
</tr>
<tr>
<td>What Reciprocity Is For</td>
<td>Prof. Frank H. Meyer</td>
<td>A 10.1-10</td>
</tr>
<tr>
<td>Speculations in Science and Technology</td>
<td>David Halprin</td>
<td>A 10.1-11</td>
</tr>
<tr>
<td>Matter and Gravitation</td>
<td>Roman Skorski</td>
<td>A 10.1-12</td>
</tr>
<tr>
<td>Minutes of NSA Annual Convention Business Meeting</td>
<td>ISUS, Inc.</td>
<td>A 10.1-22</td>
</tr>
</tbody>
</table>

### Reciprocity X, № 2 (Spring, 1980)

<table>
<thead>
<tr>
<th>Topic</th>
<th>Publisher</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identification of Cosmic Particles</td>
<td>Prof. Frank H. Meyer, Dr. Ronald Satz</td>
<td>A 10.2-0</td>
</tr>
<tr>
<td>3695 MeV/c² and 3105 MeV/c²</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prospects for New Science Advocacy</td>
<td>ISUS, Inc.</td>
<td>A 10.2-1</td>
</tr>
<tr>
<td>Fifth Annual NSA Conference Preparations</td>
<td>ISUS, Inc.</td>
<td>A 10.2-4</td>
</tr>
<tr>
<td>Equation of State of Solid Matter</td>
<td>Dr. Ronald Satz</td>
<td>A 10.2-6</td>
</tr>
<tr>
<td>Some Thoughts and Ideas from Down Under</td>
<td>David Halprin</td>
<td>A 10.2-17</td>
</tr>
</tbody>
</table>

### Reciprocity X, № 3 (Autumn, 1980)

<table>
<thead>
<tr>
<th>Topic</th>
<th>Publisher</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motion: Mere Attribute of Matter?</td>
<td>Editor</td>
<td>A 10.3-1</td>
</tr>
<tr>
<td>Further Mathematics of the Reciprocal System</td>
<td>Dr. Ronald Satz</td>
<td>A 10.3-4</td>
</tr>
<tr>
<td>Letter to Editor: From Prof. K.V.K. Nehru, India</td>
<td>Prof. Nehru K.V.K.</td>
<td>A 10.3-15</td>
</tr>
<tr>
<td>Letter to Editor: From D.W. Chance, San Francisco</td>
<td>David W. Chance</td>
<td>A 10.3-16</td>
</tr>
<tr>
<td>New Science Advocates Fifth Annual Convention Minutes</td>
<td>ISUS, Inc.</td>
<td>A 10.3-18</td>
</tr>
<tr>
<td>Invitation to Join NSA, Study Reciprocal System</td>
<td>ISUS, Inc.</td>
<td>A 10.3-19</td>
</tr>
</tbody>
</table>
Reciprocity XI, № 1 (Spring, 1981)

Announcement of Sixth Annual NSA Convention ISUS, Inc. B 11.1-3
Letter of Hans to Director of Marshall Space Flight Center Fr. Hans F. Wuenscher B 11.1-3
Epitaph for Deceased NSA Leader, Hans Wuenscher ISUS, Inc. B 11.1-7
Some Comments on Satz's Paper Prof. Nehru K.V.K. B 11.1-8
Some Thoughts on the Reciprocal System Prof. Nehru K.V.K., Dewey B. Larson B 11.1-10
The Levels of Existence Dr. Ronald Satz B 11.1-21
Book Review Prof. Nehru K.V.K. B 11.1-28
Gravitational Deflection of Light Prof. Nehru K.V.K. B 11.1-32
Gravitational Redshift Prof. Nehru K.V.K. B 11.1-33
Presidents Column Prof. Frank H. Meyer B 11.1-34
Lifetimes of C-Atom Decays Prof. Nehru K.V.K. B 11.1-34

Reciprocity XI, № 2 (Summer, 1981)

Sixth Annual NSA Convention Program ISUS, Inc. B 11.2-3
Questions to D. B. Larson Homer Ballard B 11.2-5
Letter to H. Ballard Dewey B. Larson B 11.2-6
A Note by R. W. Satz on Prof. K.V.K. Nehru's Comments Dr. Ronald Satz B 11.2-7
Some Myths of Modern Physics Prof. Frank H. Meyer, Dr. Ronald Satz B 11.2-8
The Density Gradient in White Dwarf Stars Dewey B. Larson B 11.2-12

Reciprocity XI, № 3 (Autumn, 1981)

Prospects for Modern Physics Prof. Frank H. Meyer B 11.3-3
Scalar Motion Dewey B. Larson B 11.3-5
The Interaction of Alpha Particles and Gold Atoms Dr. Ronald Satz B 11.3-18
A New Explanation of Rutherford Scattering
The Lifetime of the Muon (C-Argon) Prof. Nehru K.V.K. B 11.3-29
Minutes of the Sixth Annual Conference of the New Science Advocates Dr. Ronald Satz B 11.3-32
"To Search, to Correct, to Add" Paul deLespinasse B 11.3-35

Reciprocity XII, № 1 (Winter, 1981)

A Proposal for a Crucial Experiment; Proving Rutherford Wrong Dr. Ronald Satz B 12.1-3
Solid Cohesion Dewey B. Larson B 12.1-4
Photoionization and Photomagnetization Dr. Ronald Satz B 12.1-19
Are Cosmic Rays Primary? Prof. Frank H. Meyer B 12.1-35

Reciprocity XII, № 2 (Autumn, 1982)

The Mythical Universe of Modern Astronomy Dewey B. Larson B 12.2-1
Another Look at the Pulsar Phenomenon Prof. Nehru K.V.K. B 12.2-18
Progress on the Theoretical Calculation of the Cohesive Energy of the Elements Dr. Ronald Satz B 12.2-27

Reciprocity XII, № 3 (Summer, 1983)

A Rejoinder to K.V.K. Nehru Dewey B. Larson B 12.3-2
Theoretical Evaluation of Planck's Constant Prof. Nehru K.V.K. B 12.3-6
Dimensions in the Universe of Motion Dewey B. Larson B 12.3-9
A Note on Metaphysics Dewey B. Larson B 12.3-12
### Reciprocity XIII, № 1 (Autumn, 1983)

- Theory of Electrons and Currents
  - Dr. Ronald Satz  B 13.1-1
- The Lifetime of the Neutron
  - Prof. Nehru K.V.K.  B 13.1-4
- Inter-Atomic Distances
  - Dewey B. Larson  B 13.1-8

### Reciprocity XIII, № 2 (Summer, 1984)

- Distances in Compounds
  - Dewey B. Larson  B 13.2-1
- Thoughts from Down Under
  - David Halprin  B 13.2-14
- Note on the Force of the Space-Time Progression
  - Dr. Ronald Satz  B 13.2-20

### Reciprocity XIII, № 3 (Winter, 1984)

- A Graphical Comparison of the Old and New Periodic Tables
  - Maurice Gilroy  B 13.3-1
- Relative Abundances of the Elements
  - Prof. Nehru K.V.K.  B 13.3-30
- The Properties of Materials; A Classification
  - Dr. Ronald Satz  B 13.3-38

### Reciprocity XIV, № 1 (Autumn, 1985)

- ISUS Call to Struggle
  - Unknown  B 14.1-1
- This Issue and Things to Come
  - Unknown  B 14.1-2
- Minutes of the Business Meeting of the 10th Annual Convention of the International Society of Unified Science
  - Dr. Ronald Satz  B 14.1-3
- Motion and the Schism in Physics
  - Prof. Frank H. Meyer  B 14.1-6
- Precession of the Planetary Perihelia Due to Co-ordinate Time
  - Prof. Nehru K.V.K.  B 14.1-11
- Motion, Not a Property of Matter
  - Prof. Frank H. Meyer  B 14.1-14

### Reciprocity XIV, № 2 (Winter, 1985)

- Gravitation and the Galaxies
  - Dewey B. Larson  B 14.2-2
- The Inter-regional Ratio
  - Prof. Nehru K.V.K.  B 14.2-5
- The Nature of Scalar Rotation
  - Prof. Nehru K.V.K.  B 14.2-10
- A New Taxonomy for Scientific Knowledge
  - Dr. Ronald Satz  B 14.2-21
- A New Mathematics for Scalar Motion?
  - Jan N. Sammer  B 14.2-30
- Can Gravitation Collapse Stars?
  - Prof. Frank H. Meyer  B 14.2-32

### Reciprocity XV, № 1 (Spring, 1986)

- The Dimensions of Motion
  - Dewey B. Larson  B 15.1-1
- New Light on the Gravitational Deflection of Radiation Path
  - Prof. Nehru K.V.K.  B 15.1-8
- The Dissociation Energy of Diatomic Molecules
  - Dr. Ronald Satz  B 15.1-11
- On the Recent Evolution of Sirius
  - Jan N. Sammer  B 15.1-15
- Ionization Potentials of Heavy Elements
  - Brian Fraser  B 15.1-16
- Existents and Interactions;
  - Dr. Ronald Satz  B 15.1-18
- An Intense Course on the Reciprocal System
- The XIth Annual Convention of the International Society of Unified Science
  - ISUS, Inc.  B 15.1-19

### Reciprocity XV, № 2 (Summer, 1986)

- Just How Much Do We Really Know?
  - Dewey B. Larson  B 15.2-1
- Electric Ionization
  - Prof. Nehru K.V.K.  B 15.2-16
- Correspondence
  - Prof. Nehru K.V.K.  B 15.2-27
- Announcement; Basic Properties of Matter almost done
  - ISUS, Inc.  B 15.2-28
### Reciprocity XVI, № 1 (Summer, 1987)

- Announcement of Next Summer's ISUS Conference: ISUS, Inc. C 16.1-1
- Revaluation of Modern Superconductivity Theory; An Editorial: Editor C 16.1-1
- New Book Announcement; Basic Properties of Matter: Editor C 16.1-2
- President's Message: Prof. Frank H. Meyer C 16.1-2
- Call for Support of ISUS and Reciprocity: Dewey B. Larson C 16.1-5
- Draft Letter to Friends of Science: Paul deLespinasse C 16.1-6
- Minutes of Twelfth Annual ISUS Conference: Dr. Ronald Satz C 16.1-16

### Reciprocity XVI, № 2 (Winter, 1987)

- Announcement of This Summer's ISUS Conference: Editor C 16.2-1
- Letter to the Editor: Edwin Navarro C 16.2-2
- Letter to the Editor: Prof. Frank H. Meyer C 16.2-4
- The Larsonian Concept of the Atomic Number: David Halprin, Prof. Frank H. Meyer C 16.2-5
- Globular Cluster Mechanics in the Reciprocal System: Dr. Ronald Satz C 16.2-17
- Space-Time and Motion; Their Connection/Equivalence: Prof. Frank H. Meyer C 16.2-22

### Reciprocity XVII, № 1 (Spring, 1988)

- The International Society of Unified Science: ISUS, Inc. C 17.1-1
- 13th Annual Convention AGENDA: Robin V. Sims C 17.1-2
- RE Accommodation for the ISUS Conference 1988: Prof. Frank H. Meyer C 17.1-3
- For Better Teaching the Reciprocal System; President's Message: Dewey B. Larson C 17.1-6
- Outline of the Deductive Development of the Theory of the Universe of Motion; Section I: Dewey B. Larson C 17.1-12
- Outline of the Deductive Development of the Theory of the Universe of Motion; Section II: Prof. Nehru K.V.K. C 17.1-20
- Intrinsic Variables, Supernovae and the Thermal Limit: Prof. Nehru K.V.K. C 17.1-22

### Reciprocity XVII, № 2 (Autumn, 1988)

- Commemoration of Dewey B. Larson's 90th Birthday: ISUS, Inc. C 17.2-1
- Issue of Reciprocity: Dr. Ronald Satz C 17.2-6
- A Note on the Cosmic Proton: Dewey B. Larson C 17.2-7
- Response to 'A Note on the Cosmic Proton': Dr. Ronald Satz C 17.2-8
- Permittivity, Permeability and the Speed of Light in the Reciprocal System: Prof. Nehru K.V.K. C 17.2-14
- Glimpses into the Structure of the Sun: Part I: Dewey B. Larson C 17.2-22
Reciprocity XVIII, № 1 (Winter, 1988)

The Current Status of Physical Theory
Letter of Frank Meyer to Maurice Gilroy about the Michelson-Morley Experiment
Symmetry between Space & Time, etc., March 11, 1989
Glimpses Into the Structure of the Sun, Part II
The Solar Interior and the Sunspots
The Unit of Magnetic Charge

Reciprocity XVIII, № 2 (Spring, 1989)

Case for Giving the Reciprocal System a Public Hearing
Time is the Essence
A Tall Tale: Review of A Brief History of Time
Accomodations for ISUS Portland 1989 Conference
What is a Photon?
Simple Vibratory Motion in the Reciprocal System
The Metaphysics of Motion
Letter of Chris Halvorson, March 24, 1989
With Questions About R.S.

Reciprocity XVIII, № 3 (Autumn, 1989)

A New Derivation of Planck's Constant
The "Arrow of Time"
The Law of Conservation of Direction
Supernova 1987A
Readers' Forum
The Rydberg Constant and Zeno's Paradox

Reciprocity XIX, № 1 (Spring, 1990)

How Accurate Can an Incorrect Theory Be?
The Photon: Displacement in a Second Scalar Dimension
Is Ferromagnetism a Co-Magnetic Phenomenon?
The Constitution of the United States of America and The Constitution of the Unified States of the Physical Universe
Absolute Magnitudes of Physics
Discussion of Satz' Derivation of Planck's Constant
1990 ISUS Annual Summer Conference

Reciprocity Master Index ix
Reciprocity XIX, № 2 (Summer, 1990)

Home Grown Unified Theory Yet to Rock World of Science Deston S. Nokes C 19.2-1
Letter of May 29th, 1990 to Dorothy Larson Dr. Ronald Satz C 19.2-4
The Photon: Displacement in a Second Scalar Dimension Thomas Kirk C 19.2-5
The Revision
Che Sara Sara; (Was Kann Sein, Soll Sein, Que Sera Sera) David Halprin C 19.2-13
Time Exploration Daeron P. N. Meyer, Prof. Frank H. Meyer C 19.2-18
Reader's Forum; Questioning the Law of Conservation of Direction Thomas Kirk C 19.2-20

Reciprocity XIX, № 3 (Autumn, 1990)

Superconductivity: A Time Region Phenomenon Prof. Nehru K.V.K. C 19.3-1
Discussion of Kirk's Explanation of the Photon Prof. Nehru K.V.K. C 19.3-7
Comments on Halprin's Article on the United States Prof. Nehru K.V.K. C 19.3-9
Correcting Discrete Time/Space Measurement Procedures Prof. Frank H. Meyer C 19.3-11
A Note on Scalar Motion Dr. Ronald Satz C 19.3-12
Rebuttal to Comments of Nehru on 'A New Derivation of Planck's Constant'

Reciprocity XIX, № 4 (Winter, 1990)

Editorial and Letter to the Editor Phillip H. Porter C 19.4-1
The Algebraic Structure of the Reciprocal System Edwin Navarro C 19.4-3
More on Planck's Constant Prof. Nehru K.V.K. C 19.4-7
Corrigenda to Superconductivity (Vol XIX, No 3, Autumn 1990) Prof. Nehru K.V.K. C 19.4-11
Questions of Origins and Nature of Light and Matter David Halprin C 19.4-8
Larson's Physics and Origins of Matter and Mind Keith R. Burgess C 19.4-12
Response to Nehru's Evaluation of Kirk's and Halprin's Photon Theories Thomas Kirk C 19.4-13
Cosmic Background Radiation Prof. Nehru K.V.K. C 19.4-20

Reciprocity XX, № 1 (Spring, 1991)

The Cosmic Background Radiation: Origin and Temperature Prof. Nehru K.V.K. C 20.1-1
Comments on the Manuscript of E. Navarro's Reciprocal Algebra Prof. Nehru K.V.K. C 20.1-6
Response to Nehru's Comments Edwin Navarro C 20.1-6
On the Nature of Rotation and Birotation Prof. Nehru K.V.K. C 20.1-8
Derivation of Reciprocal System Mathematics Thomas Kirk C 20.1-13
Derivation of Hydrogen Spectra Equations Thomas Kirk C 20.1-16

Reciprocity XX, № 2 (Summer, 1991)

Reference Systems and Speed Limits in the Reciprocal System Dr. Ronald Satz C 20.2-1
The Large-Scale Structure of the Physical Universe, Part 1 Prof. Nehru K.V.K. C 20.2-5
The Cosmic Bubbles
Radio Component Separation in Quasars Prof. Nehru K.V.K. C 20.2-9
The Essence and Fabric of Mathematics David Halprin C 20.2-11
Space-Time Progression or Big Bang? Prof. Frank H. Meyer C 20.2-18
Reciprocity XX, № 3 (Autumn, 1991)

Laws to Perception Based on Notions of Motions
Letter from A. Nonymous
Motion Fundamentals
Dissecting the Birotational Photon
Light Questions
The Large-Scale Structure of the Physical Universe, Part II
Electronic Networking and ISUS

David Halprin
Unknown
Thomas Kirk
Thomas Kirk
Charles W. Bonner
Prof. Nehru K. V.K.
Hoyt A. Stearns, Jr.

Reciprocity XX, № 4 (Winter, 1991)

An Introduction to the Fundamentals of Scalar Motion
The Old and New Periodic Tables - Again
A Constructive Approach to Multi-Model Logical Data Base Design
More Details for the Proposed Crucial Experiment
A Note on the Nature of Undisplaced Space-Time
Comment on A. Nonymous Letter

Lawrence E. Denslow
Jan N. Sammer
J. C. Cosgrove, Leonard L. Tripp
Dr. Ronald Satz
Dr. Ronald Satz
Paul Little

Reciprocity XXI, № 1 (Spring, 1992)

Motion Prior to Rest
Birotation and the Doubts of Thomas
The Case Against Symmetry
The Quasar Paradox
The Periodic Table
1992 ISUS Conference Information

Prof. Frank H. Meyer
Prof. Nehru K. V.K.
Thomas Kirk
Prof. Nehru K. V.K.
Robert V. Tucek
ISUS, Inc.

Reciprocity XXI, № 2 (Autumn, 1992)

Executive Orders from ISUS President
More Calculations with the R.S. Scattering Equation
How Space and Time are Inseparable
Periodic Table, Revisited

Dr. Ronald Satz
Dr. Ronald Satz
Prof. Frank H. Meyer
Thomas Kirk

Reciprocity XXII, № 1 (Spring, 1993)

How the Physical World is Quantized
Clock Space, Coordinate Space, Clock Time, Coordinate Time
What is the Difference?

Dewey B. Larson
Dr. Ronald Satz

Reciprocity XXII, № 2 (Autumn, 1993)

Detailed Steps for the Design and Performance of The Proposed Crucial Experiment
Wave Mechanics in the Light of the Reciprocal System
Minkowski vs. Einstein on Space Translation

Dr. Ronald Satz
Prof. Nehru K. V.K.
Prof. Frank H. Meyer

Reciprocity XXIII, № 1 (Spring, 1994)

How Light Speed is Constant
A Modified Explanation of the Reciprocal System of Theory
Reciprocal System in Brief

Dr. Rainer F. Huck, Prof. Frank H. Meyer
Prof. Nehru K. V.K.
Lawrence E. Denslow
ISUS, Inc.

Reciprocity Master Index xi
The Social and Technological Implications of the Reciprocal System of Theory
Dreams, Symbolism, and Allegory
The Effects of Life Units on Circulating Memory
Infinitude of the Private Person;
The Case for the Equality of Human Worth
The Roots of the Dilemmas
Postcard from The Scientific and Medical Network

Reciprocity XXVI, № 1 (Spring, 1997)

Changing Concepts of the Nature of Motion
Corrigenda for Volume XXV (3)
'Non-locality' in the Reciprocal System
Comments on "A Crucial Test of Pulsar Theory"
Are Motion and Space-Time Identical and Quantized?
The Space-Time Universe, Part IV
A Quasar in the Making?
Review of The Neglected Facts of Science
Review of Beyond Space and Time
As Published in NETWORK, the Scientific & Medical Network
The Twenty-Second Annual Meeting of the Members of the International Society of Unified Science

Hubble Finds Intergalactic Stars
Future Purposes of ISUS, Inc.
Letter to the Editor
Feb 18, 1997; Carla Rueckert to Frank H. Meyer
Letter to the Editor
Mar 22, 1997; Frank H. Meyer to Carla Rueckert
Letter to the Editor
Apr 2, 1997; Carla Rueckert to Frank H. Meyer
Letter to the Editor
Apr 9, 1997; Frank H. Meyer to Carla Rueckert
Letter to ISUS
KVK Nehru Offer for Lecture Tour in USA
Response to Dr. Ronald Satz's Resignation from ISUS, Inc.
What Attitude Should ISUS Take to PRT?
The Historical Emergence and State-of-the-Art of PRT Systems
Index to the Back Issues of Reciprocity

Reciprocity XXVI, № 2 (Summer, 1997)

From the Editor
High Energy Physics and the Reciprocal System
Evolving Views of Space and Time
Motion and Space-Time are Essentially Related and Quantized
Cold Fusion
Subversive Reflections on the Practice of Physics
The Space-Time Universe; Part V
Dewey Larson and the Way of One
l'Excursion d'Archives SUSI

Reciprocity Master Index  xiii
Reciprocity XXVI, № 3 (Winter, 1997)

From the Editor
Basic Properties of Matter; Chapter I: Solid Cohesion
The Minutes of the 22nd ISUS Conference
Solid Cohesion and the Expanding Universe
Is Motion Prior to Matter?
Some Thoughts on Spin
A Challenge to Project Omicron
Understanding the Reciprocal System
A True and Complete Theory of the Physical Universe Is Necessary
Understanding the Reciprocal System
Lesson I: Concepts of Mathematics, as currently used and with logical extensions
1998 ISUS Conference Information
Crossing the Quantum Boundary;
A Phenomenon of the Astral Plane?
Reflections of a New Member
Eulogy of Professor Otto H. Schmitt

Editorial: Physics at the Crossroads
RealAudio Lectures on the Web

Reciprocity XXVII, № 1 (Spring, 1998)

From the Editor
Remodeling the Big Bang
Scalar Motion versus AEther Velocity:
Two Views of the Same Phenomenon?
At The Earth's Core: The Geophysics of Planetary Evolution
Filler Needed
Language, Experience and Illusion
The Dimensions of Motion
Minutes of the 22nd Annual Meeting of the Members of the International Society of Unified Science
Wheel of Motion; A New Periodic Table for the RS
Basic Properties of Matter; Chapter II: Inter-Atomic Distances
Space-Time Geometry
Understanding the Reciprocal System
Lesson II: Postulates of the RST and some Initial Consequences
Action at a Distance; A Question of Viewpoint
The Interaction of Electromagnetism and Gravitation along Equipotential Lines
A Prelude to Advanced Energy and Propulsion Technology
ISUS News

Master Index

ISUS News I, № 1 (June, 1983)
ISUS News Announcement Editor E I:1.1-1
The Eighth Annual Convention of the International Society of Unified Science

ISUS News I, № 2 (September, 1983)
1983 Vancouver Conference Editor E I:1.2-1
Minutes of the Business Meeting of the Annual Convention of the International Society of Unified Science Dr. Ronald Satz E I:1.2-2

ISUS News I, № 3 (Spring, 1984)
To Members and Friends of ISUS Editor E I:1.3-1

ISUS News II, № 1 (Autumn, 1988)
Minutes of the Thirteenth Annual ISUS, Inc. Conference Dr. Ronald Satz E I:2.1-1
August 12-13, 1988
Role of the Amateur in Scientific Practice and Theory Prof. Frank H. Meyer E I:2.1-4
Proposed Hearing for ISUS and Dewey B. Larson Dr. J. Edward Anderson E I:2.1-8
Letter to Professor KVK Nehru, India from Prof. Edward J. Anderson, USA, Oct 1, 1988
Proposed Hearing at Boston University Dr. J. Edward Anderson E I:2.1-9
Letter to Dr. Lawrence Sulack from Professor J. Edward Anderson, USA, Oct 29, 1988
D.B. Larson's Qualifications as an Uncomitted Investigator Dr. Frank A. Anderson E I:2.1-11
Letter to Prof. J. Edward Anderson from Dr. Frank A. Anderson, Oct 22, 1988
D.B. Larson's Qualifications as an Uncomitted Investigator Dr. Frank A. Anderson E I:2.1-13
Letter to Mr. Patrick Young from Dr. Frank A. Anderson, Jan 31, 1988

ISUS News III, № 1 (Winter, 1988)
Editorial: Not Bad Editor E I:3.1-1
Announcement: Fourteenth Annual ISUS Convention, August 11-12, 1988
Phillip H. Porter E I:3.1-2
Letter of Prof. J. Edward Anderson to Dr. Lawrence R Sulak, Dr. J. Edward Anderson E I:3.1-3
Chairman, Physics Dept, Boston U, Oct 1988
Letter of Frank Meyer to Prof. Abner Shimony, Prof of Physics Dr. J. Edward Anderson E I:3.1-6
and Philosophy, Boston U, Dec 29,1988
Letter of Prof. Shimony to Mr. Frank Meyer, Jan 15, 1988
Letter of Prof Shimony to Prof Larry Sulak, Chairman, Physics Dr. Ronald Satz E I:3.1-7
Dept, Boston University, Oct 31, 1988
News about Matching Grant to ISUS, Inc. from St. Paul Edwin Navarro E I:3.1-12
Companies
Letter of Prof. Shimony to Dr. Lawrence R Sulak, Professor Nehru K.V.K. E I:3.1-10
Chairman, Physics Dept. Boston University, Oct 1988
Letter of Ronald W. Satz to Prof. J. Edward Anderson, Nov 15 Edwin Navarro E I:3.1-12
News about Matching Grant to ISUS, Inc. from St. Paul
Companies
Letter of Dr. KVK Nehru, Prof in Mechanical Engineering, JNT Edwin Navarro E I:3.1-12
University, Hyderabad, India, Dec 20, 1988
Letter of Lawrence E. Denslow, Teacher and Member, ISUS Lawrence E. Denslow E I:3.1-13
Board of Trustees, to Prof. Frank H. Meyer
Editor E I:3.1-16
Request from Edwin Navarro, ISUS Membership Director, about future publication of an ISUS Membership list

Edwin Navarro

**ISUS News III, № 2 (February, 1990)**

1990 Conference Announcement
Letter from the President
Research Interests at ISUS
Report on Cold Fusion Experiments
Videotapes of Past Conferences
1989 Conference Review
Minutes of 1989 Conference

**ISUS News IV, № 1 (Summer, 1991)**

Letter of Dorothy Larson to 16th Annual ISUS Convention at Drexel University
Invitation of II International Holistic Congress to Dewey Larson
Letter of L.M. Reilly, NPB, to Executive Secretariat Congress LTDA
Letter of Dr. Bill McCraw to Members of ISUS, Inc.
Letter of Congress organizer, Dr. Jose M. Martins to F.H. Meyer
Letter of F.H. Meyer, June 14, 1991 to Congress Organizer
Letter of Dr. Martins, June 27, 1991 to Frank Meyer
Letter of Frank Meyer, June 3, 1991 to Dr. Martins
Opening Remarks for 16th Annual ISUS Convention
Schedule of 16th Annual Convention, August 9-10
Minutes of 16th Annual Convention in Philadelphia
Letter of Philip M. Heggen, Energy General Press

**ISUS News V, № 1 (Spring, 1993)**

Eighteenth Annual Conference of ISUS, Inc.
August 1993. University of Denver, Colorado
Whole Human World Greater Than the Whole Material World
From The Universe of Motion
Some Observations on the 'Executive Orders'
Recent ISUS Executive Orders
Seventeenth Annual Convention of ISUS, Inc.
Minutes of the Business Meeting, August ’92, University of Utah, SLC
Updating Electronic Networking and ISUS
Future Progress of Human Rights on Earth

ISUS, Inc.
Dewey B. Larson
Prof. Nehru K.V.K.
Prof. Frank H. Meyer
ISUS News V, № 2 (Autumn, 1993)

What is the Use of a New Born Baby? Prof. Frank H. Meyer, E I:5.2-1
Eighteenth Annual Conference of ISUS, Inc. ISUS, Inc., E I:5.2-2
Minutes of the Business Meeting
Correspondence between two former ISUS, Inc. Presidents Dr. Frank A. Anderson, Prof. Frank H. Meyer, E I:5.2-8
Correspondence Between Maurice Gilroy and Robert Tucek Maurice Gilroy, Robert V. Tucek, E I:5.2-13
How to meet the New Age Ushered by the Reciprocal System? Prof. Nehru K.V.K., E I:5.2-19
PRT: Excerpt from University of Minnesota Research Review Dr. J. Edward Anderson, E I:5.2-23

ISUS News VI, № 1 (Spring, 1994)

Nineteenth Annual Conference of ISUS, Inc. Prof. Frank H. Meyer, E I:6.1-1
Scottsdale, Phoenix Metro Area, July 8-9, 1994
The Birth of a Breakthrough in Urban Transportation Dr. J. Edward Anderson, E I:6.1-4
Report by ISUS Sec’y, Lawrence E. Denslow on W.A.F. Motion Lawrence E. Denslow, E I:6.1-9
Letter of Keith Burgess, England, to Editor Keith R. Burgess, E I:6.1-10
Letter of David Halprin, Australia, to Editor David Halprin, E I:6.1-12
Letter of Editor to Dave Halprin Editor, E I:6.1-13
Ultimate Human Worth Prof. Frank H. Meyer, E I:6.1-14
From “Voices on the Threshold of Tomorrow”
Beyond Mechanistic Metaphysics: Reform Future Now Dr. J. Edward Anderson, E I:6.1-16

ISUS News VII, № 1 (Spring, 1995)

Twentieth Annual Conference of ISUS, Inc. Phillip H. Porter, E I:7.1-1
The Regency Hotel, Denver, Colorado, August 9-10, 1995
Special Meeting to Consider Contract Editor, E I:7.1-3
Proposed by Dorothy Larson
Messages from President R.W. Satz and Dewey B. Larson Dewey B. Larson, E I:7.1-8
Dr. Ronald Satz
Editor
Information Products about Reciprocal System Theory & Practice E I:7.1-12

ISUS News VII, № 2 (Autumn, 1995)

Larson's Humankind has a Purposeful Future Prof. Frank H. Meyer, E I:7.2-1
Minutes of the Twentieth Annual ISUS, Inc. Conference, 8/95 Lawrence E. Denslow, E I:7.2-3

ISUS News VIII, № 1 (Spring, 1996)

President Hoyt Stearn's Letter to ISUS, Inc. Hoyt A. Stearns, Jr., E I:8.1-1
Members and Friends
Twenty-First ISUS Annual Conference, Aug 12-13, Denver Editor, E I:8.1-5
Space-Time and Beyond Prof. Frank H. Meyer, E I:8.1-8

ISUS News Master Index xvii
<table>
<thead>
<tr>
<th>Title</th>
<th>Author(s)</th>
<th>Page(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minutes of The Twenty-Second Annual Meeting of the</td>
<td>Lawrence E. Denslow</td>
<td>E I:8.2-3</td>
</tr>
<tr>
<td>Members of the International Society of Unified Science</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The ISUS Retreat at the H Bar G Youth Hostel</td>
<td>Lawrence E. Denslow</td>
<td>E I:8.2-6</td>
</tr>
<tr>
<td>Monist or Dualist?</td>
<td>Dr. Ronald Satz</td>
<td>E I:8.2-7</td>
</tr>
<tr>
<td>Correspondence Between Ronald W. Satz and Dewey B. Larson</td>
<td>Dewey B. Larson,</td>
<td>E I:8.2-9</td>
</tr>
<tr>
<td>Regarding Larson's New Book, Beyond Space and Time</td>
<td>Dr. Ronald Satz</td>
<td></td>
</tr>
<tr>
<td>Evidence That Women and Men are Equals is True Infinitude of</td>
<td>Prof. Frank H. Meyer,</td>
<td>E I:8.2-13</td>
</tr>
<tr>
<td>the Private Person</td>
<td>Dr. Bruce Peret,</td>
<td></td>
</tr>
<tr>
<td>The Physical and the Human: Part and Whole</td>
<td>Otto H. Schmitt</td>
<td></td>
</tr>
<tr>
<td>Commentary on the ISUS Retreat</td>
<td>Dr. Bruce Peret</td>
<td>E I:8.2-18</td>
</tr>
<tr>
<td>Correspondence Between Frank H. Meyer and the Scientific &amp; Medical</td>
<td>Prof. Frank H. Meyer</td>
<td>E I:8.2-19</td>
</tr>
<tr>
<td>Network</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
NON-LOCALITY IN THE RECIPROCAL SYSTEM

An Exploration of Configuration Space, Infinite Speed and the EPR Paradox

Information on
The 22nd Annual Conference
of the Members of the
International Society of Unified Science
# Table of Contents

**Physical Science**
- Changing Concepts of the Nature of Motion .............................................. 3
- ‘Non-Locality’ in the Reciprocal System ............................................. 7
- Comments on A Crucial Test of Pulsar Theory ...................................... 14
- Are Motion and Space-Time Identical and Quantized? .......................... 15
- The Space-Time Universe, Part IV ..................................................... 19

**Book Review**
- Review of Beyond Space and Time as Published in NETWORK.................. 23

**ISUS News**
- The 22nd Annual Meeting of the Members of the................................ 25
- International Society of Unified Science............................................. 25

**Letters to the Editor**
- February 18, 1997, to Frank Meyer .................................................. 29
- March 22, 1997, to Carla Rueckert .................................................. 30
- April 2, 1997, to Frank Meyer ............................................................ 31
- April 9, 1997, to Carla Rueckert ....................................................... 32
- Bringing the Reciprocal System to Academia ....................................... 33

**Projects**
- What Attitude Should ISUS Take to PRT? ........................................... 36
- The Historical Emergence and State-of-the-Art of PRT Systems ............ 37

**Special**
- Index to the Back Issues of Reciprocity ............................................ 43

---

**THE INTERNATIONAL SOCIETY OF UNIFIED SCIENCE**

Hoyt A. Stearns  
President  
4131 East Cannon Drive  
Phoenix, AZ 85028, USA  
hoyt@isus.wierius.com

Lawrence E. Denslow  
Secretary/Treasurer  
P.O. Box 1034  
Highland City, FL 33846, USA

Rainer F. Huck  
Executive Director  
1680 East Atkin Avenue  
Salt Lake City, UT 84106, USA

---

**RECIROCITY**  

<table>
<thead>
<tr>
<th>Name</th>
<th>Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frank H. Meyer</td>
<td>Editor</td>
</tr>
<tr>
<td>K.V.K. Nehru</td>
<td>Associate Editor</td>
</tr>
<tr>
<td>Bruce M. Peret</td>
<td>Associate Editor</td>
</tr>
<tr>
<td>Dr. Ronald Blackburn</td>
<td>Highland Ranch, CO</td>
</tr>
<tr>
<td>Lawrence Denslow</td>
<td>Highland City, FL</td>
</tr>
<tr>
<td>David Halpin</td>
<td>North Balwyn, Australia</td>
</tr>
<tr>
<td>Dr. Ranier Hock</td>
<td>Salt Lake City, UT</td>
</tr>
<tr>
<td>Thomas Kirk</td>
<td>Walnut, CA</td>
</tr>
<tr>
<td>Prof. Frank Meyer</td>
<td>Minneapolis, MN</td>
</tr>
<tr>
<td>Prof. William Mitchell</td>
<td>Detroit, MI</td>
</tr>
<tr>
<td>Dr. K.V.K. Nehru</td>
<td>Hyderabad, India</td>
</tr>
<tr>
<td>Edwin Navarro</td>
<td>Mill Valley, CA</td>
</tr>
<tr>
<td>Bruce M. Peret</td>
<td>Crystal, MN</td>
</tr>
<tr>
<td>Phillip Porter</td>
<td>Denver, CO</td>
</tr>
<tr>
<td>Jan Sammer</td>
<td>Prague, Czech Republic</td>
</tr>
<tr>
<td>Robin Sims</td>
<td>Penticton, BC, Canada</td>
</tr>
<tr>
<td>Hoyt Steams</td>
<td>Phoenix, AZ</td>
</tr>
</tbody>
</table>

---

**ISUS BOARD OF TRUSTEES**

---

*Reciprocity* (ISSN 0276-4172) is published quarterly by The International Society of Unified Science, P.O. Box 1034, Highland City, FL 33846, USA. Membership dues $25.00 per year USA/Canada/Mexico, $35.00 per year International, $50.00 Contributing Membership, $150.00 Supporting Membership, and $300.00 Sustaining Membership. Copyright ©1997, The International Society of Unified Science. All rights reserved except where expressly waived. First class postage paid at Minneapolis, MN, and at additional mailing offices.

Please send address changes to: ISUS, c/o Lawrence Denslow, P.O. Box 1034, Highland City, FL 33846.
Changing Concepts of the Nature of Motion

Dewey B. Larson

When the theory of the universe of motion, the Reciprocal System of theory as we are calling it, was first being introduced to the scientific community in books and lectures, about twenty-five years ago, one of the principal obstacles with which we had to contend was the generally accepted concept of the nature of motion, in which motion is regarded as a continuous change in the position of some "thing" in a three-dimensional space that acts as a background or container. In the Reciprocal System of theory, motion is defined simply as a relation between space and time, which means that "things" do not participate in the simplest types of motion. For those who were not willing to entertain the possibility that their basic concept of the nature of motion might be wrong, this closed the door to any consideration of the new theory, in spite of the outstanding successes of that theory in dealing with the most recalcitrant and long-standing problems of physical science.

In the years that have followed, our activities aimed at promoting understanding of the theory have been directed primarily at those who are open-minded enough to recognize that the need for conceptual modifications cannot be ruled out. We have therefore been engaged mainly in extending the application of the theory and clarifying those points that have been questioned. However, now that a quarter of a century has elapsed, a new generation of scientists is coming in contact with these ideas, and the earlier questions about the basic concepts are resurfacing. A review of the fundamental situation therefore appears to be in order at this time.

This history of science clearly demonstrates that long-continued existence of a major scientific problem is rarely due to the lack of adequate methods of dealing with such problems, or to deficiencies in the abilities of the investigators. Almost without exception, when such a problem is finally solved it is found that the obstacle that has so long stood in the way of solution is an error in one of the fundamental concepts on which the previous thought has been based. Before any significant progress could be made it was necessary to change the conceptual base from which the problem had been viewed.

This is always a difficult undertaking. For example, the idea of inertia seems almost self-evident today, and even a schoolboy is able to grasp it. But, as Herbert Butterfield points out in his book The Origins of Modern Science, until the days of Galileo and Newton the problem that was finally solved by the formulation of this concept "defeated the greatest intellects for centuries." The then prevailing view of the nature of motion—the theory developed by Aristotle—"was hard for the human mind to escape from... because it was part of a system which was such a colossal intellectual feat in itself." Butterfield goes on to say:

We have to recognize that here was a problem of a fundamental nature, and it could not be solved by close observation within a framework of the older system of ideas—it required a transposition in the mind.

This experience with Galileo's discovery illustrates the fact that we actually know very little about the basic structure of the universe. The concepts on which thinking about such subjects is based are not products of scientific investigation and research. They are the ideas that our early ancestors derived from observation of the world about them, and they have achieved their present unquestioning acceptance only because they have remained unchallenged for so long a time. When we subject them to a critical examination we find that they are not, in fact, derived directly from empirical observations. Instead, they are assumptions suggested by those observations.

For example, we know practically nothing about the nature and properties of time. We have a vague impression that it is some kind of a moving forward, and that is all that we have to work with. But time enters into every physical activity in one way or another, so in order to deal with those activities, we have to make assumptions about the properties of this almost totally unknown entity. Not one of these
assumptions is free from doubts. Physical theory assumes that time is unidirectional, and one of our important physical principles, the Second Law of Thermodynamics, is based on this assumption, but the mathematics of motion are equally consistent with a reverse flow. The theory assumes, in nearly all applications, that the flow is uniform, but Relativity theory, which challenges this assumption in its field of application, is also generally accepted. The theory assumes that time is one dimensional, but the investigators working along the outer boundaries of science are continually advancing hypotheses that call for the existence of additional time dimensions.

Little more is actually known about the nature and properties of the other basic physical entities. The physicists cannot answer such questions as "What is matter?" or "What is an electric charge?" And the validity of the assumptions that are made about these entities is just as doubtful as that of the assumptions about time. No doubt many are valid statements of the physical facts. Perhaps most of them are. But it is totally unrealistic to take the stand that all of the assumptions that have been made about these poorly understood basic physical entities—at least 30 or 40 assumptions in all—are factual. And no one knows which ones are wrong. Furthermore, an error in one of these fundamental assumptions necessarily results in many errors in the structure of thought that rests on the fundamentals. Thus, there is no justification for rejecting a new theory simply because it conflicts with an existing idea or belief, or even if it conflicts with many aspects of previous thought. A conflict with the observed facts is, of course, fatal, but a conflict with previous theory, or assumption, is something that should be considered on its merits.

In Aristotle's concept of motion, it was assumed that continuous application of a force is necessary for production of a continuous motion. Galileo's conclusion from his experiments was that this assumption is wrong, and that motion continues on the same basis indefinitely unless a force is applied to change it. Direct verification of basic assumptions of this kind by means of observations is impossible, but we can develop the consequences of each of the rival assumptions and see which set of consequences agrees more closely with those observations. On this basis, Aristotle's concept was ultimately disproved and abandoned, after long and acrimonious controversy with those who refused to concede any possibility that their long-standing beliefs might be in need of revision.

The same kind of a situation now exists with respect to those aspects of motion that are redefined by the Reciprocal System of theory. Just as Galileo met an obstinate adherence to the dictum that "Continuous motion cannot exist without continuous application of force," so we are now told, just as positively, that "Motion cannot exist without something moving." Both of these confident pronouncements are pure assumptions. Neither has any support from observation. Indeed, both are specifically contradicted by modern astronomical observations. The motions of the planets, for instance, are incompatible with Aristotle's assumption. Similarly, the motions of the galaxies flatly contradict the assumption that underlies the twentieth-century motion concept.

The following assumptions enter into this concept:

1. The space and time that we observe constitute a container, or background, for the action of the universe.

2. All existences occupy specific locations in that space and time.

3. Motion is a change of location of some "thing" in that space during an interval of time.

The status of assumption 3 has always been somewhat dubious, in spite of its general acceptance, because there is no trace of the "something" in the mathematics of motion. It serves only to identify the motion under consideration. Where the motion can be identified in some other manner, the mathematics are equally applicable. The recent discovery of the recession of the galaxies has provided a definite refutation of the assumption. It is now generally conceded that the recession is not a movement of the galaxies themselves. The astronomers are agreed that they are being carried outward by what is called the "expansion of the universe."

This expression merely describes what is occurring; it does not explain anything. But whatever the nature of the "expansion" may be, it clearly must apply to all locations in space, not merely to those that are occupied by galaxies. Here, then, is a motion that is not a motion of any entity that could be called a "thing." Thus, the contention that there cannot be motion unless some "thing" is moving is refuted by actual observation. However, for the benefit of those to whom this kind of motion presents conceptual difficulties, we can legitimately say that it is motion of spatial locations. Each galaxy remains in a particular location, but the locations move outward.
Assumption 2 is likewise invalidated by the observed galactic recession. Galaxy X is receding from galaxy A, and at time t occupies a position on an extension of the line AX. But X is also receding from galaxy B, and at time t it also occupies a position on an extension of the line BX. When we take the other galaxies into account, it is evident that galaxy X does not occupy any specific position in the space of a universal “container.” The invalidation of assumptions 2 and 3 makes assumption 1 untenable.

When we take the other galaxies into account, we find that galaxy X occupies all positions in what we ordinarily call “space” at a certain distance from the initial point of the motion. This is obviously incompatible with the concept of “space” as a container in which each physical object has a specific location, as asserted by assumption number 1. Indeed, it can be seen that the “space” and “time” of our ordinary experience are not physical entities at all; they are merely mental constructs that constitute a reference system which we use for relating the quantities of space and time that do have an actual physical existence, those that take part in the various motions of which the universe is composed.

Furthermore, this is an incomplete reference system. It is not capable of representing the positions of the receding galaxies in their true character. It can represent only the positions relative to some reference point. Nor is this its only deficiency. Our investigations have shown that there are a number of other types of motions that, like the scalar motion of the galaxies, it cannot represent correctly, and still others, such as motion in more than one dimension, that it cannot represent at all. What we are up against here is a range of variability of physical motion (relations between space and time) that far exceeds the capability of any system of reference that has thus far been devised.

However, when the space and time of our ordinary experience, extension space, as we may call it, is viewed in its true capacity as a reference system, it is easy to see that there is no obstacle in the way of representing a simple motion, one that is not motion of anything. As defined by the theory of the universe of motion, this simple motion is a relation between a quantity of space and a quantity of time, and is measured as speed. If we specify an initial point we can represent the amount of space corresponding to any given amount of time by a line in the reference system extending away from the initial point. Obviously, there is no need to identify this line with any “thing.”

Thus, the conceptual basis of the explanation of the nature of motion embodied in the postulates of the Reciprocal System is just as rational and logical as that of the currently accepted theories. It is merely different. The question as to which of the two is correct is not a matter of which one we like better. It is an issue that can be settled by the same procedure that was used to resolve the analogous questions raised by Galileo; that is by developing the consequences of each hypothesis and comparing the results with the relevant observations and measurements. There can be no doubt of the verdict if all of the evidence is examined. As we have shown in our publications, the theory of the universe of motion produces the kind of a comprehensive and fully integrated general physical theory that has long been sought, but never before even approached.

In looking back on the history of the development of thought with respect to the nature of motion prior to the acceptance of the concept of inertia, a striking feature of the situation is the extent to which Aristotle and his disciples were forced to call upon the actions of “angels” and other hypothetical existences to take care of gaps in their explanations of physical phenomena. As Butterfield puts it, Aristotle’s universe was one “in which unseen hands had to be in constant operation.” The great achievement of Galileo and Newton was to put the science of mechanics on a sound physical, rather than metaphysical, basis.

Today, physics in general is the same kind of a position that mechanics occupied before Galileo. The physicists have built a structure of rather loosely related theories that have had some spectacular successes—another “colossal intellectual feat.” But like Aristotle’s system, “modern physics” has many gaps in its structure, and to fill those gaps, or at least to conceal them, the modern theorists have resorted to the same expedient that was employed by Aristotle. In their universe, too, as in his, “unseen hands” must be in continual operation.

Of course, present-day scientists do not speak of “angels” or “demons,” but the mysterious “forces” of modern physics are exactly the same things under different names. They are pure inventions, designed to overcome specific difficulties in accepted theory, with no other functions to perform, and with no independent evidence of their existence (that is, no evidence other than that they agree with the observations that they were specifically designed to fit). Aside from the name, there is nothing to distinguish the “nuclear force” that holds the hypothetical nucleus of the atom together for the modern physicist from the “angels” that pushed the
planets along in their paths for Aristotle. No reason is given for the existence of these strangely limited “forces,” nor are we given any explanation of how they operate. “We do not ask how mass gets a grip on space-time and causes the curvature which our theory postulates,” says Arthur Eddington.

The problems in mechanics could not be solved without paying the price—to many a very high price—of giving up some cherished ideas and beliefs of long standing. But, the rewards were enormous. Again quoting Butterfield:

> Once this question was solved in the modern manner, it altered much of one’s ordinary thinking about the world and opened the way for a flood of further discoveries... It was as though science or human thought had been held up by a barrier until this moment.

The world of science now faces the same kind of an issue. If the scientific community recognizes that a number of the basic assumptions of present-day physics have been invalidated by modern discoveries such as the recession of the galaxies and the interconvertibility of matter and non-matter, then some of the ideas that are now hailed as the “greatest achievements of science” must be discarded in favor of new—and to some, disturbing—concepts. But once more, as in Galileo’s day, the door will be opened to “a flood of further discoveries.”

---

**Corrigenda for Volume XXV, Number 3:**

**Inside Front Cover**

- The zip code for K.V.K. Nehru should be 500 028.

**The Photon as Birotation**

- Page 13, left col., line 1: ‘m - fm’ should be ‘m - fm1’.

- Page 13, right col., para. 4., line 4: ‘β’ should be ‘B’.

- Page 14, left col., line 10: ‘Rotary’ should be ‘Rotatory’.

**The Space-Time Universe**

- Page 17, left col., para. 3, line 2: ‘is’ should be ‘in’.

E 26.1-6
‘NON-LOCALITY’ IN THE RECIPROCAL SYSTEM

Prof. K.V.K. Nehru, Ph.D.
Jawaharlal Nehru Technological University, Hyderabad–500 028, India

Though quantum theory is phenomenologically successful, it fails to throw any light on the nature of the underlying physical reality. The Reciprocal System, true in its claim of a unified and general theory, not only covers the ground of the quantum theory, but also provides insight into the reality, basing on the new paradigm of motion as the sole constituent of the physical universe. Its most important finding is the existence of different domains of physical action, in which the rules of the game apparently differ. Larson resolves all the difficulties the conventional theory is facing, by the knowledge of the characteristics of these domains.

Thomas Kuhn, the renowned historian of science and its methodology, writing in The Structure of Scientific Revolutions, points out that as paradoxes and unsolved puzzles mount up in the science of an era, a state of crisis results. This initiates the development of new theories basing on a totally new paradigm. General acceptance of the new paradigm, however, is not automatic. Old theories die hard because emotional commitment, rather than pursuit of truth, invariably becomes the driving force. Continued endeavor to consider and study the new paradigm by open-minded students will gradually establish it in the scientific field. An interesting fact brought to light by Kuhn’s study is that as more and more human effort gets spent in understanding the new paradigm, it becomes easier and easier for all people to understand it—as though entire mankind is one at deeper levels. Kuhn also points out that as more people accept the new theory, more evidence of it appears. Therefore, consideration of the recalcitrant problems in science—especially, in physics—and showing how the Reciprocal System of theory resolves them should be of interest to us. We shall consider a few of these:

**Problem #1: Unification of the four fundamental forces of nature.** Scientists have not been successful in this enterprise of creating a grand unified theory; especially gravitation has not yielded to the unification efforts.

**Problem #2: The quantum measurement problem.** In essence, this may be described as follows: Consider, for example, the two-slit electron interference experiment. While the intensity of the wave function represents the probability of finding a particle, the actual measurement reveals the arrival of a particle somewhere on the detector—say, at \( x_1 \)—which is a discrete event. In a sequence of identical measurement situations, the location \( x_i \) where the \( i \)th particle makes its appearance on the detector screen is totally random. But, the relative proportion (frequency) of the particle appearances at any location strictly follows the wave pattern predicted by quantum theory. How do the later particles ‘know’ the history of the earlier particles, and maintain the overall pattern? Even though individual particles come at different times, there seems to be some sort of connection through time existing among these!

**Problem #3: Instantaneous connectedness in space.** Most accurate experimental verification of Bell’s theorem has positively established that correlated quantum entities—as in the EPR experiment—maintain a strong nonlocal connection, however far they are separated in space. The surprising feature of this nonlocality is that it is immediate, not attenuated by distance and not mediated by any medium. Even though quantum theory predicts the experimental results correctly, the inference of the existence of nonlocality is actually based on experimental facts—not on the quantum theory—plus Bell’s Inequality theorem. Therefore, nonlocality has to be explained by any new theory that might encompass the quantum theory in the future. Nonlocality has been one of the most baffling features of quantum phenomena, defying all attempts to understand the nature of the reality underlying them.

Larson has discussed problem #1 in great length in some of his works and developed the thesis sufficiently to establish that, in fact, the Reciprocal System is a unified and general theory. The application of the Reciprocal System to the study of the quantum domain, however, is urgently desiderative. Therefore, in the present discussion, we shall limit ourselves to the consideration of problem #2 and #3, only. Let us begin by briefly recapitulating the Reciprocal System of theory.
Conjugate Sectors of the Physical Universe

The two Fundamental Postulates of the Reciprocal System with which Larson starts are:

- **The physical universe is composed of one component, motion, existing in three dimensions, in discrete units, and with two reciprocal aspects, space and time.**

- **The physical universe conforms to the relations of ordinary commutative mathematics, its primary magnitudes are absolute, and its geometry is Euclidean.**

The motion which is the basic constituent of the physical universe is conceived by Larson as scalar motion, or speed, the ratio of space magnitude to time magnitude. All phenomena—radiation, matter, gravitation, electric charge, magnetism—come out as different possible modes of motion. Larson deduces the following:

- **Corollary #1 (quantization):** The two components of motion, namely space and time, are quantized;

- **Corollary #2 (reciprocity):** Space and time are reciprocally related to speed—an increase in space is tantamount to a decrease in time, and vice versa;

- **Corollary #3 (symmetry):** Both space and time have identical characteristics: time has three dimensions like space, and space, too, progresses like time does.

Further, we find that the possible speeds in the physical universe fall into two natural ranges: from speed zero to unity, and from unity to infinity. However, from the Reciprocal System we learn that speeds exceeding unity do not manifest as motion in space; instead, they manifest as **motion in time** (not the time travel of science fiction). Larson calls the domain of the physical universe in which the speeds range from zero to unity the **material sector**, and that in which the speeds range from unity to infinity (or what comes to the same thing, the **inverse speeds** range from zero to unity) as the **cosmic sector**. By virtue of the symmetry, all the phenomena of the material sector, which is the sector we inhabit, are duplicated in the cosmic sector with the roles of space and time interchanged.

Unit speed—which Larson identifies as the speed of light—is the boundary between the two sectors, and forms the background of the physical universe.

Larson refers to this ever-present space-time progression at unit speed as the **natural reference frame** (which we shall refer to as the N-frame). An immediate consequence of the space-time progression is the observed recession of the galaxies (which is being mistakenly attributed to a hypothetical 'big bang'). It also resolves the mystery of the propagation of radiation. Radiation is not propagated at all; the space unit, in which the photon is situated permanently, itself progresses.

For reasons explained by Larson, gravitation always acts in opposition to the ubiquitous progression of space-time. Since space-time progression acts outward in space (as well as outward in time), gravitation in the material sector acts **inward in space**, and gravitation in the cosmic sector (that is, cosmic gravitation) acts **inward in time**. So, to observers anchored to material aggregates, like we are, space appears stationary and three-dimensional, while time seems progressing one-dimensionally. The reference frame that is natural to us is the familiar stationary, three-dimensional spatial reference frame (which we shall refer to as the S-frame. See Figure 1).

In the cosmic sector, the result of cosmic gravitation acting **inward in time** is that the three dimensions of time and the one-dimensional progression of space stand out. The reference frame that is natural to the cosmic sector is the three-dimensional, temporal reference frame (which we shall refer to as the T-frame).

In passing, we might recall that cosmic background radiation is the radiation emitted by cosmic stars of the cosmic sector, and cosmic rays are the cosmic matter ejected from the cosmic quasars. The uniformity and isotropy of both these items—which have no good explanation in conventional theory—can be seen to stem from the fact that they originate from **cosmic matter** which aggregates in three-dimensional time, but is randomly distributed in the S-frame of the material sector.
The Time Region

Imagine two material particles moving towards each other in space. By virtue of the quantization corollary, less than one natural unit of space cannot occur in physical interactions. Therefore, the particles cannot approach each other nearer than one effective unit of space in the S-frame. However, they can accomplish the equivalent of this, by virtue of the reciprocity corollary, by moving outward in time. Inside an effective unit of space, there cannot be motion in space; all motion has to be in time only. For this reason, Larson refers to the domain of physical action inside the effective unit of space as the time region.

According to the Reciprocal System, the natural direction of the space-time progression is always away from unity. In the outer region (beyond unit space) away from unity is also away from zero, and hence the space-time progression acts outward (\(1/1\)). In the region inside unit space (the time region), however, away from unity is toward zero. Hence, the apparent direction of the space-time progression in the time region is inward (\(-1/1\)). Gravitation, as it always opposes the space-time progression, acts apparently outward in the time region. In the Reciprocal System, the physical state—not to be confused with the quantum mechanical state—is the result of reaching motion equilibrium between these two above motions in the time region, and pertains to the individual atom or molecule. It is not a group characteristic as in the conventional theory.

**Corollary #4 (physical state):** The solid state is the result of reaching motion equilibrium in the time region in all three dimensions. The liquid state results when the motion in at least one dimension comes out of the time region, and the gaseous state when the motion is outside the time region in all three dimensions (that is, it is entirely in the S-frame).

We have now come to an important juncture. Outside unit space, since all motion is in space, the appropriate frame of reference is the conventional, three-dimensional stationary reference frame (the S-frame). However,

**Corollary #5 (frame-inversion):** in the time region, since only motion in time can take place, the appropriate frame of reference that should be adopted is the three-dimensional temporal reference frame (the T-frame) (see Figure 2).

**Corollary #6 (spatial nonlocality):** the origin of the T-frame would be apparently at all places in our familiar S-frame and at the same time. In other words, it is nonlocal in space.

Furthermore,

**Corollary #7 (non-trajectory):** the concept of a particle trajectory in the S-frame is not applicable from the point of view of the T-frame, for the obvious reason that the origin of the T-frame is ‘everywhere’ in the S-frame.

In an earlier paper, *Wave Mechanics in the Light of the Reciprocal System*, we have shown that, by a consideration of the dynamical relationships,
Corollary #8 (w-p equivalence): a particle localized in the S-frame is equivalent to a plane monochromatic wave from the point of view of a T-frame and vice versa.

We further pointed out that even though one should adopt the T-frame for the description of the interactions in the time region, there is no way to accomplish this since we— as creatures of the material sector—are unavoidably anchored to the S-frame. However, we can achieve the same result by adopting the expedient of shifting from the particle picture to the wave picture by virtue of Corollary #8. We can now see that to depict a quantum entity as both a particle and a wave is wrong. It is a particle, as viewed from the S-frame, and a wave as viewed from the T-frame (See Reference 8).

Before proceeding further, we have to note that there are two significant differences between the T-frame of the time region, and the T-frame of the cosmic sector. Referring to Figure 3, we would like to point out:

(i) the speed and inverse speed ranges pertaining to the S-frame of the material sector and the T-frame of the cosmic sector respectively meet at unit magnitude;

(ii) the speed and inverse speed ranges pertaining to the S-frame of the material sector and the T-frame of the time region respectively meet at zero magnitude. The mathematical fact that while the inverse of unity is unity, the inverse of zero is infinity, introduces a profound difference here.

Firstly, the time region is the result of crossing the unit space boundary, while still in the material sector (S-frame), whereas the cosmic sector is the result of crossing the unit speed boundary in all the three dimensions of motion—mark it: three dimensions of motion, not three dimensions of space—and consequently moving out of the material sector, altogether. The motion germane to the cosmic sector is true motion in time, and cannot be represented in the S-frame. On the other hand, the motion in time germane to the time region, does not manifest to us as motion in time, per se, but, by virtue of the reciprocal corollary, shows up as equivalent motion in space (or as Larson puts it—motion in equivalent space, which is reciprocal space). This is, in fact, a general principle:

Corollary #9 (equivalent space): so long as the net speed is on the material sector side of the speed range, the motion in time that might occur as a minor component of the overall speed configuration, acts as a modifier of the motion in space which is the major component. In other words, it manifests as motion in equivalent space, rather than motion in time.

Secondly, we have seen by Corollary #6 that as we switch from the S-frame to the T-frame on entering the time region, the origin of the T-frame appears 'everywhere' at 'infinite speed.' Further, temporal dimensions are related to spatial dimensions only scalarly, that is, there is no geometrical (vectorial) relationship between temporal and spatial dimensions. Consequently, if we have a case of two distinct particles of the S-frame entering the time region, there is no reason why the three switched dimensions pertaining to one particle should hold any geometrical relationship to the three switched dimensions pertaining to the second particle. The origin (that is, the zero-point) of the two switched frames, however, is common since it is 'everywhere' at 'infinite speed.' So,

Corollary #10 (multiple dimensions): in the case of the frame-inversion (Corollary #5) of two interacting particles, unless inhibited by special conditions, we end up with six apparently different dimensions, three each of the two T-frames, respectively. Indeed, we require $3n$ dimensions to represent $n$ particles.

Scientists call this multi-dimensional manifold the configuration space to distinguish it from the conventional, three-dimensional space. We would like to emphasize here that this multiplicity of dimensions arises solely out of the scalar nature of the relation between temporal dimensions and spatial dimensions, and not because the physical universe has a plethora of dimensions. Their occurrence is limited only to the sub-regions.

Corollary #11 (temporal nonlocality): When the interaction eventually comes out from the time region back into the conventional frame, as at the measurement site, the reference frame has to be switched from the T-frame of the time region, back to the familiar S-frame. Like in the case of Corollary #6, this frame-switching entails the phenomenon of nonlocality. But this time, it is nonlocality in time, since the switching is T→S rather than S→T, and so the origin of the S-frame appears 'everywhen' at 'infinite inverse speed' from the point of view of the T-frame.

Quantum Interpretation Problem

The quantum theory has been successful and accurate in predicting the results of all the
experiments related to quantum phenomena. But, it is a theory that does not provide any insight into the nature of the physical reality underlying these phenomena. It merely works like a recipe book for cookery. Therefore, scientists have subscribed to different views regarding reality—varying all the way from the 'official' Copenhagen view, which denies the existence of any underlying reality, to the other extreme view of the 'many worlds' interpretation of Everett. The question is yet unsettled. We shall show how the Reciprocal System, with its new paradigm, resolves the mystery and knits all the strange and seemingly weird features of the quantum world into one, logical whole.

Let us first note two quantum facts:

(i) The attributes of the quantum entities fall into two types. The static attributes, like mass, spin and electric charge, are innate to the entity. The dynamic attributes, like position and momentum, seem to depend jointly on the entity and the reference frame of the measurement.

(ii) Even in the case of dynamic attributes, so long as the quantum entity is not forced to go through tiny holes, or confine itself to tiny volumes; the entity appears to have a definite position and momentum—like a classical entity.

Both these above facts are in total consonance with the Reciprocal System finding that the non-classical behavior stems from the entry into the time region, which is a sub-region (tiny hole, tiny volume) of the translational motion (position, momentum or velocity).

Let us consider the familiar electron interference experiment. We have an electron source that shoots a coherent beam of electrons toward a phosphor screen target. Initially, we find a bright spot on the screen where the electrons hit. We then introduce a barrier into the beam provided with two small slits. If the width of the slit is of the order of the wavelength of the electrons in the beam, we observe the light and dark fringes of the interference pattern on the screen, instead of the single, bright spot.

There are four versions of quantum theory: the Matrix Mechanics (Heisenberg), the Wave Mechanics (Schrödinger), the Transformation Theory (Dirac) and the ‘sum-over-histories’ approach (Feynman). All of these give the same final result, but Feynman’s method gives us a better clue as to the nature of the wave function than, for example, solving Schrödinger’s wave equation. Feynman makes two unusual assumptions, that:

(1) a single electron takes all possible paths, and
(2) no path has a greater preference.

He implements these by assigning the same amplitude to each path. The history of each path, then, determines its phase for any location on the target screen. Feynman then arrives at the amplitude of the electron’s wave function by summing up the wave amplitudes of all possible paths the electron can take to reach that particular location from its source.

Feynman’s assumptions, that the single electron takes all possible paths, at the same time and with equal probability, are extremely outlandish. But the conclusions that we reach from the deductions of the Reciprocal System are exactly the same! Firstly, on entering the time region, the particle picture is to be replaced by the wave picture, due to the frame-inversion and the p-w equivalence corollaries. Then, the simultaneous existence of all possible paths is the result of the spatial nonlocality corollary.

As the electron beam brightness is gradually reduced such that we have electron by electron hitting the target, rather than an ensemble all at one time, we fail to observe the interference pattern in real time. However, if we place a photographic plate adjacent to the phosphor screen and wait long enough for sufficient electrons to accrue, the pattern could once again be seen, despite the fact that the individual electrons that are arriving hit the screen at purely random locations. It appears as though it does not matter whether the electrons come at once as an ensemble, or they come at different times—the statistical wave pattern, observed in either case, is exactly the same. But, this is exactly what we should expect by the temporal nonlocality corollary! The same S-frame would appear to be present at all moments, nullifying the time delays between the individual electron events, as though merging them into a single ensemble.

The EPR Experiment

In certain atomic events, two correlated photons in what is called a twin state are emitted in opposite directions. In the particular experiment, the photons are polarization-correlated. In this state, either of the photons does not seem to have any definite polarization until measured, even though it is definite that they have mutually opposite polarization. Experiments show that, if we force one of them to take up a specific polarization direction at the first measurement site, the polarization of the twin invariably shows up (at the second measurement site) in the opposite direction, even if
the two photons are so far separated in space as to be beyond the reach of the signal that could travel at light speed between them. The results apparently indicate that twin photons are casually connected even if they are beyond the 'light cone.'

Discussing the primary motions in the physical universe, we have pointed out that an intrinsically scalar quantity (motion) can manifest in the reference system as a pair of oppositely directed vector quantities, and not as a lone vector. A bivector acts as a true scalar: it does not have a specific direction before manifestation, and can assume any bidirection on manifestation. The twin state is a state of bi-polarization-bi-momentum, in the EPR original version—which can split into two oppositely directed polarizations in any specified direction.

Explaining the EPR phenomenon, Larson states in a communication. "A photon occupies a position in the three-dimensional spatial reference system and also a position in the analogous three-dimensional temporal reference system. If two photons originate coincidentally in such a manner that they separate spatially, they may remain coincident in time; that is, in the same time unit or an adjacent unit. In this case, a change that takes place in one photon will cause an appropriate change in the photon to which it has a connection in time, just as it would if the two were connected in space.

This idea that contact in time is subject to the same considerations as contact in space is not new to the students of the Reciprocal System of theory. It enters into a number of physical situations, particularly in the reverse application, where contacts in space are maintained unchanged when separation takes place in time. As an example...[see] The Universe of Motion, in which I point out that this explains the containment of the high speed matter in the interiors of the giant galaxies.

The Junction of the Living and the Non-living

In Figure 3, we have depicted the various speed domains of the physical universe which we derived from the theory. We now pursue the logical deduction further. We have seen that the space-time progression in the time region is inward in space (-1/1), whereas in the space region of the cosmic sector it is inward in time (1/-1). The time region begins at the zero inverse speed of the T-frame, and ends at -1 inverse speed of the M-frame. Similarly, the space region begins at zero speed of the S-frame and ends at -1 speed of the M-frame. At unit level, speed and inverse speed are effectively identical (-1/1 = 1/-1). Consequently, we get the complete picture if we unify the M-frame of the space region and the M-frame of the time region. This is depicted in Figure 4.

Since gravitation always acts in opposition to the space-time progression, it acts outward in the time region. It also turns out that since the space-time progression acts inward in time in the space region
of the cosmic sector, cosmic gravitation in the space region acts outward, too.

**Corollary #12 (frame-merging)**

The final result is that the action of gravitation in the time region of the material sector, on one hand, and of cosmic gravitation in the space region of the cosmic sector on the other, are both outward.

Larson, in *Beyond Space and Time*\(^1\) extends the application of his theory to the realms of life and consciousness. He notes that in the material sector, all structures spontaneously move from states of greater organization (or order) to states of lesser organization. In other words, the *available energy* goes on decreasing. But, in the case of *living units*, like the cells or higher life, the organization level is either maintained or increases, against all odds. It is still an enigma how life is possible at all, in the material universe, if we stick to purely mechanistic explanations.

Larson notes that while available energy goes on decreasing in the material sector, the inverse is true in the cosmic sector, namely, the available *inverse energy* decreases spontaneously. That is, the available energy increases! He, therefore, discovers that what we call a *living cell* comes into being when the purely material structural unit is connected to and governed by a *control unit* built of the cosmic structures. By Corollary #12 above, we can readily see how the linking of the cosmic unit with the material unit is possible, and how they can interact, since the nature of the governing force (motion) is identical in both of them. This control, of course, appears nonlocal.

**Conclusion**

The development of the Reciprocal System of theory finds space and time to be discrete, reciprocally related, and of symmetrical properties. It discovers another sector of the physical universe wherein the applicable speeds range above the speed of light. Inside the quantum of space there is a sub-region, called the time region, with non-trivial space-time characteristics that directly lead to peculiar quantum phenomena. To a large extent, the development is in consonance with the procedures of quantum theory. In addition, it supplies what quantum theory fails to offer—a lucid understanding of the nature of quantum reality.

The Reciprocal System has rational explanations for perplexing quantum issues like:

- wave-particle duality
- spatial nonlocality
- temporal nonlocality
- breakdown of the trajectory concept
- multi-dimensional configuration space
- connection between the living and the non-living

In closing, we need to remind ourselves that the Reciprocal System is not just another new theory, but one that stems from an entirely new paradigm.
The new paradigm, that motion is the sole and fundamental constituent of the physical universe, immediately repudiates the age-old practice of viewing space as a container for physical objects and time as a canvas on which the drama of the universe unfolds. Even though they appear so in the local environment, in reality they are the contents of the universe. The recognition that Reality need not be limited to what is representable in space and time opens the door for a truly scientific approach not only to the study of the physical universe, but also of living systems, para-psychological phenomena, and, indeed, consciousness itself.

References


Comments On

A Crucial Test of Pulsar Theory

K.V.K. Nehru, Ph.D.

A Crucial Test of Pulsar Theory,
R. J. Tucek,
Reciprocity, XXV (3), Winter 1996-1997, pages 21-22

Tucek writes: “...per the Reciprocal System, pulsars emit omnidirectional pulses...”. But Larson states in The Universe of Motion, page 237: “Since the pulsar radiation originates in a two-dimensional region, it is distributed two-dimensionally...”

This means that the emission is in a plane, and is not omni-directional as Tucek writes. This, however, is still different from the prediction of the conventional theory and therefore should provide an opportunity for experimental verification.
Are Motion and Space-Time Identical and Quantized?

Prof. Frank H. Meyer

An essay presented to the Spring, 1997 meeting of the Minnesota Area Association of Physics Teachers on the St. Paul Campus of the University of Minnesota

Space-time and motion are not unrelated, nor continuous. “Continuous” means “infinitely divisible,” however, motion and space-time are actually quantized (or finitely divisible), just as matter, electricity, and light are generally recognized to be since the beginning of this century. In fact, space-time and motion not only are quantized, they also are so inseparably related as to be more accurately described as identical, according to the Reciprocal System of physical theory of Dewey B. Larson.¹

However, motion and space-time appear neither identical nor quantized, according to the way physics ordinarily has been taught. On the contrary, most physicists usually have assumed that space-time and motion are infinitely divisible and unrelated. A consequence of adopting these questionable assumptions has been an unquestioning adopting of the unprovable paradigm that motion is merely a property of matter. So then, the universe is modelled as an infinite universe of matter and energy, contained within a four-dimensional envelope of space-time. Aristotle earlier put the matter this way in his Physics, “Now motion is supposed to belong to the class of things which are continuous, and the infinite presents itself first in the continuous.”²

A universe of matter paradigm also implies that matter is prior to motion. This dogmatic postulate was introduced into natural science centuries ago, during which it remained unquestioned. Aristotle put it this way, “Again, there is no such thing as motion over and above things.” I, myself, and I dare say you, were brought up to think that motion is impossible unless some thing is moving. I have never meant to say that undisplaced space-time progression at unit speed (the speed of light) is nothing; but only that it is no thing, but rather simply motion.

The Reciprocal System of physical theory retires the universe of matter paradigm, replacing it with the more evidentially sustained paradigm that motion is prior to matter. This theory postulates that the physical universe is composed of one component, motion, existing in three dimensions, in discrete units and in two reciprocal forms, space and time.

Larson’s discovery that the physical universe is a universe of motion provides a much more cogent account of the expanding universe than the Big Bang hypothesis. Dewey Larson agrees with Paul Davies, “The expanding universe is not the motion of the galaxies through space, but is the steady expansion of space.”³

While orthodox physics teaches that no finitely divisible units of motion, space and time can or do exist, Larson deduces from his fundamental postulate that the steady speed of scalar outward space progression with time progression is Nature’s infinitely divisible unit of speed. Its scalar magnitude is the speed of each light photon’s physical location. Larson defines motion as the relation between two uniformly progressing, reciprocal quantities, Space and Time. Motion, as defined, is measured by speed, the scalar magnitude of the relation between space and time. By reason of the postulated reciprocal relation between space and time, each individual unit of motion is a relation between one unit of space and one unit of time, motion at unit speed. If Larson’s Reciprocal Theory is correct, the whole physical universe is constituted from nothing but these individual units of motion. Photons, electrons, atoms, all physical entities are simply different compounds of these same units of motion.

Although undisplaced outward uniform space-time progression at the speed of light easily is as important a motion as gravitational, magnetic, electrical, or light motion, hitherto it has been ignored and so remained undiscovered until Larson first called attention to it in 1959.⁴ Space-time undisplaced progression Larson distinguishes as the primary motions, which he defines as those motions which can exist independently of displaced space-time progressions, such as light and gravitation.
Are Motion and Space-Time Identical and Quantized?

Is there evidence that space and/or time is each continuous?

Is it enough that physicists from Aristotle through Newton to Einstein have assumed that both space and time are continuous or infinitely divisible?

Is the truth clinched when a competent modern physicist, such as Dr. French of M.I.T., teaches, “Both space and time are assumed to be infinitely divisible—to have no ultimate structure?”

Is the truth further clinched when the distinguished modern author of the relativity theory space-time continuum postulate, Dr. Albert Einstein, in his later years wrote, “I am tending to believe that it is impossible to continue further with this continuum theory?”

Or when Dr. Einstein retires the space-time continuum postulate, as follows, “One can give good reasons why reality cannot at all be represented by a continuous field. From the quantum phenomena it appears to follow with certainty that a finite energy can be completely described by a finite set of numbers (quantum numbers). This does not seem to be in accord with a continuum theory and must lead to an attempt to find a purely algebraic theory for the description of reality. But nobody knows how to obtain the theory. (italics mine)”

Is this truth questionable when the competent Nobel prize-winning physicist, Dr. Richard Feynman, doubts that space is a continuum? “I believe that the theory that space is continuous is wrong, because we get these infinities and other difficulties, and we are left with questions of what determines the size of all particles. I rather suspect that the simple ideas of geometry, extended down into infinitely small space, are wrong.”

It is unfortunate that Larson’s Reciprocal Theory about the quantum nature and structure of the universe of space-time or motion was first published in 1959, only after Einstein died. Dewey Larson completely agreed with Albert Einstein that the physical universe is entirely finite and not at all in any way continuous. The finitude of the whole physical universe, enormous though it be, is an essential general corollary of Larson’s Reciprocal System of physical theory. He put it this way to me:

“Infinity is excluded from the physical universe, since we are defining motion, as a relation between a time magnitude and a space magnitude, and we deduce that the quantity of motion is finite. Since all physical entities and phenomena are manifestations of motion, they are all measured in terms of 1/n and n/1, where n is finite. No infinities are possible.”

Applying the Larson and Feynman finitude criterion to measure physical truth rules out the Big Bang hypothesis, since it postulates infinite density to begin with. The essence of Big Bang cosmology is that about 20 billion years ago, any two points were arbitrarily close together. The density of matter at this moment was infinite.”

Questioning the Truth that Motion and Space-Time are Unrelated

What evidence is available, as Newton claims, that “absolute, true and mathematical space in and of itself remains always the same and immovable?”

Does Einstein’s support of Newton’s opinion that the idea of motion is inappplicable to space constitute evidence of the opinion’s truth?

What is the evidence for Isaac Barrow’s opinion that motion and time are unrelated, that time does not imply motion?

To what extent is it evidence for the above opinions being true that competent modern physics teachers continue to accept and teach them? For example, Dr. K.W. Ford, “While fields and particles come and go, space and time lie inert, providing the stage upon which the actors come and go.”

Can these above opinions be summed up to mean that space, especially, but also time, is stationary, four-dimensional space-time constituting what used to be called a “stationary ether”?

Probably Herman Minkowski, who formulated the 4-dimensional space-time reference frame of the Einstein relativity theory, has asked the question most relevant to the issue of the relation of motion to space-time. Minkowski asked how “we may overcome the difficulty of never being able to decide from physical phenomena, whether space, which is supposed to be stationary, may not, after all, be in a state of uniform translation?” Larson’s answer to this question is that the unprovable supposition that space is or ever was stationary has been erroneous, just as the geocentric theory that our planet Earth must be immovably located at the center of the universe was wrong. Space will not be, is not, has not been stationary. Space has been, is, and will be
in scalar uniform translation or progression with time progression at a steady unit speed, at light speed rate of one natural unit of space per one natural unit of time.

Whether space is stationary (immovable), as Isaac Newton postulated or an aspect of motion, a progression with time progression at the speed of light, as Dewey Larson later postulated, has been settled for some time by the Michelson-Morley experiment. As reported by Albert Michelson, the outcome of the experiment by 1881 was unequivocal, “The interpretation of these results is that there is no displacement of the interference bands. The result of the hypothesis of a stationary ether is thus shown to be incorrect and the necessary conclusion follows that the hypothesis is erroneous.”

How Larson Identifies Motion, Time and Space Quanta

In Larson’s Reciprocal Theory, the speed of light in vacuo is not the steady speed of the photon of light through an immovable, stationary space, but rather the uniform speed of its physical location, in which each photon remains throughout its whole existence.

Larson learned how to measure Nature’s smallest time interval and shortest space length, after he discovered how to depict each physical location as an equable progression, at the rate of a natural unit of space per a natural unit of time, whose magnitude is that of the speed of light.

Mathematical unity, unit speed (the speed of light), not mathematical zero is the true physical zero, the reference origin Nature prefers. Unit speed involves equivalence between space and time quanta, both as to magnitude and dimensionality. Mathematical unity is the true physical zero, because the reciprocal character of the space-time relation also implies that all physical entities, beginning with the photon of radiation, result and emerge only from speed displacements below or above unit speed.

Larson thinks that the natural quantum of time is computable, if and when information is available about a unit photon, that is, one whose vibrating frequency involves an outward motion unit, followed by an inward unit, constituting a full cycle of oscillation in a measureable time interval. If the frequency of this photon is counted with the cgs unit of cycles per second, the duration of the time quantum is computed as follows:

Choosing cycles/second as the frequency unit assumes that frequency is a function of time only. Now frequency is equivalent to velocity, a ratio of space to time. So the natural unit of frequency is a ratio of space to time. Therefore, the natural unit of frequency is a space quantum divided by a time quantum. This is equivalent to a half cycle per time quantum, since the full cycle includes one outward motion unit and one inward. Larson finds that the frequency of the specified photon has been measured and given by Rydberg. Larson reports this frequency value as $3.2880 \times 10^{15}$ cycles/second. This measured value of the Rydberg fundamental frequency will be expressed as $6.576 \times 10^{15}$ half cycles/second. Larson goes on to say, “Expressing the frequency, which is actually a velocity, in terms of reciprocal time in this manner is equivalent to using the natural unit of space in combination with the cgs unit of time as the cgs unit of frequency. In other words, omitting consideration of the space term in selecting the unit of measurement has the same effect as giving it unit value. The natural unit of time in cgs terms is therefore the reciprocal of the Rydberg frequency, or $1.52 \times 10^{-15}$ seconds.

“We may now multiply this figure by the natural unit of velocity, $2.9979 \times 10^{10}$ cm/sec to get the natural unit of space, $4.55 \times 10^{-6}$ cm/sec.

Conclusion

Astrophysical advocates of the accepted prevalent explanation of the expanding universe claim that the evidence for their hypothesis, irreverently referred to as the "Big Bang," is so ample as to exclude all need for any alternative. But this theory rests on two unverified guesses: First, that the original state of the physical universe just before it began, was one of infinite density, since all physical stuff before exploding is located at a single, infinitely divisible physical location, and secondly, after exploding, the galaxies forming, move outward away from each other through an immovable or inert space-time.

Natural philosophers and physicists postulating that, since something should stay put in the universe of motion, space-time must be immovable, stationary, inert, or at rest, reminds me of our ancestors, obviating the necessity of the Copernican Revolution, because they had abundant evidence that our planet Earth is immovably located at the center of God's Universe.

Abundant evidence questions whether the prevalent "inertness" postulate of space-time with respect to motion and the space-time continuum postulate of relativity physics are true. Larson's physics discloses that the expanding universe of motion primarily is a
relation between two uniformly progressing reciprocal and discrete quantities, space and time, at unit speed, the speed of light in vacuo.

References
3. Davies, Paul, *Edge of Infinity*

In the ...maxim that space and time are infinitely divisible, we pass to an axiom the truth of which is extremely doubtful, even in the physical world. Specious space and time (that is, extension and duration as given in intuition, and space and time as defined geometrically) are indeed infinitely divisible. Scale in them is elastic and utterly unsubstantial, so that there is room for the most elaborate ideal event or object within the smallest fraction of time and space. But this hardly seems to be true in the chemical or animal or astronomical spheres, where scale is not variable fantastically.

George Santayana, *The Realm of Truth*

"Recapitulating, we may say that according to the general theory of relativity space is endowed with physical qualities; in this sense, therefore there exists an ether. According to the general theory of relativity, space without an ether is unthinkable; for in such space there would be not only no propagation of light, but also no possibility of existence for standards of space and time (measuring rods and clocks), nor therefore any space-time intervals in physical sense. But this ether may not be thought of as endowed with the quality characteristic of ponderable media, as consisting of parts which may be tracked through time. The idea of motion may not be applied to it."


"But does time not imply motion? Not at all, I reply, as far as its absolute, intrinsic nature is concerned; no more than rest; the quality of time depends on neither essentially; whether things run or stand still, whether we sleep or wake, time flows in its even tenor. Imagine all the stars to have remained fixed from their birth; nothing would have been lost to time; as long would that stillness have endured as has continued the flow of this motion."

The Space-Time Universe: Part IV

Prof. K.V.K. Nehru, Ph.D.

(Continued from Reciprocity XXV, Number 3, Winter, 1996-1997)

In the previous three articles of this series, we have firstly shown how the concept of the universe as consisting of units of matter contained in a framework provided by three-dimensional space and one-dimensional time leads theoretical physics into its present predicament. We have then traced the development of the first general physical theory, called the Reciprocal System, and shown that every aspect of the physical universe can be derived, without any ad hoc assumptions from occasion to occasion, from its fundamental concept, namely that the physical universe consists of units of motion. We have examined space and time, the phenomena of radiation, matter and gravitation, electricity and magnetism, from the point of view of this new basic concept.

The new understanding of magnetism leads also to a novel explanation of the origin of isotopes and the conclusion that the material atoms evolve in time. It points out that the nature of matter varies, in this respect, from location to location in the universe. One cannot fail to recall kindred statements in The Secret Doctrine (ii, p. 325-6) and The Mahatma Letters (p. 160).

It is not normally realized that the concept of space as extension permeates to a large extent almost all of our scientific and non-scientific thinking. For example, theosophists are inclined to imagine that the mental body 'extends' in space despite repeated admonitions from investigators like Arthur Ellison. We envision the universe of atoms, stars and galaxies as stretched out in a background of extension space. The new understanding of motion brought out by the Reciprocal System reveals some properties of space (and time) that are altogether not suspect hitherto. "When we are dealing with translatory motion, space manifests itself as extension. This is the familiar entity that we normally visualize whenever the term 'space' is used... When we characterize space as an aspect of motion, however, we introduce other kinds of space, since motion can be vibrational or rotational as well as translatory, and one of the two reciprocal aspects of this vibrational or rotational motion is space... even though such space does not constitute extension in the usual sense of the term." (D.B. Larson, New Light on Space and Time, p. 154. This leads Larson to explain, among others, the reduction in the velocity of light traversing a material medium, the electrical resistance, etc.)

The knowledge of the true nature of space, as a component of motion, and as not having existence independent of its reciprocal, time, shows that space, as we are prone to imagine it, is no such static background at all. We have already seen that the reason why we seem to see a stationary three-dimensional space is that the inward progression of gravity counterbalances the outward progression of space. In fact, space or time is not even physical: only motion, as asserted by Pythagoras. By overcoming this fallacious view, which misled science and common sense for over 4000 years, we become ready to take the next step onto the stage set by Larson to unravel further secrets of space-time.

The Conjugate Universe

We have seen that the material atoms and subatomic particles are vibratory time units rotating in space. Now, the symmetry and reciprocity between the properties of space and time postulated in the Reciprocal System thereby also require the existence of matter whose atoms are vibratory space units rotating in time, somewhere in the universe. Larson calls these structures which are exactly like the material atoms except that the roles of space and time are interchanged, the "cosmic atoms" (c-atoms), and cosmic atoms collectively as "Cosmic matter" (c-matter). This answers to what is conventionally referred to as anti-matter by scientists (of course, with a difference: anti-matter, in this view, is not an additive inverse but the multiplicative inverse of matter).

The reason why we do not see aggregates of anti-matter in our space is at once understandable and is no subject of idle speculation as in the conventional theory. This is because the gravitation of c-matter acts inward in time in view of the scalar rotation that constitutes a c-atom is rotation in time, and not inward in space (as in the case of a material atom with its scalar rotation in space). The cosmic gravitation, therefore, draws the c-atoms together in
time forming aggregates in 3-dimensional time! Thus we are led to the necessity of the existence of another half of the universe, the cosmic sector, so far not suspected of in the least, with the roles of space and time interchanged—a universe of c-matter, c-stars and c-galaxies distributed three-dimensionally in time but progressing outward in space (like our half is progressing outward in time).

Another reason for not being able to observe the c-sector of the universe is apparent now. Since the c-stars comprise of c-atoms aggregated in three-dimensional space but widely dispersed in three-dimensional space we do not see them as spatial aggregates at all. Further, since a c-atom is moving inward in time (due to the gravitation in time) while the material atom is moving scalarly outward in time, even the chance encounter between them does not last longer than for one natural unit of time (1.52 x 10^{-16} sec.). The sudden disintegration of the exceptionally stable particles like the protons that is currently the subject of intense theoretical and experimental activity in physics can be easily explained on the basis of their chance encounters with the atoms of the cosmic sector, moving inward in time. Thus we see that there is another half of the physical universe right here and right now but not observable by us. However, this does not mean that we have absolutely no communication or contact with the conjugate sector, as we will presently see.

In view of the reciprocal relationship between the respective constituents of the two sectors of the universe, the radiation from the c-stars at high inverse temperature shows up in our sector as radiation of low temperature. Moreover, such radiation, originating from c-stars which are not aggregates in space and not localized in space, does not seem to be coming from any one direction. It would be isotropic and uniform in space. We have exactly such phenomenon, namely, the absolutely isotropic and uniform background microwave radiation at 2.7° K, which is of course, currently being (mis)interpreted as the radiation left over by the hypothetical Big Bang with which our universe is assumed to have originated. Once again, like in the case of the recession of the galaxies, we find that there is absolutely no need to resort to ad hoc assumptions such as the Big Bang. I may note here that, due to lack of space, I am refraining from mentioning a host of the astronomical phenomena, which either stand unexplained or could be explained only with the help of ad hoc desultory assumptions by the conventional science, come out as logical conclusions from the fundamental postulates of the Reciprocal System.

**Galactic Death and the Quasars**

We have noted that atoms keep on evolving and eventually reach the upper limit (see part III of this article, *Reciprocity XXV* (3), p. 19) after a long period and disintegrate. Therefore, the central regions of very large galaxies, which are ipso facto very old, suddenly explode on reaching this upper limit of matter, thereby releasing stupendous quantities of energy. The Reciprocal System shows that the magnitude of these explosions is so gigantic that a fragment of the galaxy is ejected at speeds greater than that of light.

This greater than unit speed (unit speed in the Reciprocal System being the speed of light) does not manifest to us as a change of position in space, that is, as motion in space; instead, it involves motion in time, that is, change of position in coordinate time. We see such an object, with speed greater than that of light, as being stationary in our space. However, it manifests other peculiarities like, for example, a red shift greater than 1.0. One concept that needs elaboration here is that of 'empty time'. While an explosion in space creates empty space between the atoms and results in a decrease of density, an explosion in time creates empty time and gives rise to very high densities (since an increase in time is tantamount to a decrease in space in view of the reciprocal relationship between them). Such ultra high densities are actually observed in the White Dwarf stars, the pulsars and the quasars. It is, therefore, not necessary to take recourse to such ad hoc hypotheses like those of "degenerate" matter, black holes and the like.

Larson's identification of the ultra high speed components of the titanic explosion of the core of a galaxy with the quasars solves all the mysteries that surround these enigmatic astronomical objects, without stretching the physical theory beyond the limits of rationality. Their large redshifts, stupendous energy outpouring, distribution in space, extreme compactness, nature of the emission and absorption spectra—all of them quantitatively agree with the predictions of the Reciprocal System.

Remembering that the boundary between the cosmic sector (region of motion in 3-dimensional time) and our sector (region of motion in 3-dimensional space) is unit speed in all the dimensions, we see that the superluminary speeds imparted to the quasar material eventually transfer it to the cosmic sector, after the gravitation in space is finally overcome. When this happens, the quasar disappears from our view. Exactly the same state of affairs holds good in the cosmic sector of the universe; the c-matter
congeals into c-stars, the c-stars group themselves into c-galaxies and the c-galaxies eventually disintegrate explosively and part of the most evolved c-matter gets ejected into our material sector from the c-sector. Because they come from a region not localized in space, these c-atoms appear to be travelling in all directions isotropically and uniformly. Once again we have the observational confirmation of this in the cosmic rays, whose origin and characteristics are a great puzzle to the conventional theory. All the observed characteristics of the cosmic rays come out logically and naturally in the Reciprocal System.

Prediction of the other half of the universe and phenomena therefore can be classed as the outstanding achievement number eight of the Reciprocal System.

It is unfortunate that the hypothetical nature of concepts like that of quarks, gravitational waves or curvature of space-time is not well-recognized. Especially, the proliferation of the “elementary particles” with the advent of powerful atom-smashing machines is pressing the theoretical physicists to the verge of rational thinking and the conceiving of quarks in the shape of fundamental building blocks of matter seems to be a step away from reality than one toward it simply because of the ever-widening number of problems it creates more than it solves. Under these chaotic circumstances, Larson’s explanation of these various exotic particles as the evanescent manifestations of the different c-atoms ushers order and utmost relief into the field of physics.

The Grand Cycle of the Universe

Among other things, with the help of this concept of the conjugate sector of the universe, Larson explains how the universe always remains the same though always changing and evolving; a truth, once again, of the occult sciences.

Diffuse intergalactic nebulae and matter coalesce under the influence of gravity, form stars; stars aggregate into star clusters and clusters into small galaxies. These galaxies recede from each other due to the outward progression of space-time. The galaxies cannibalize smaller galaxies and become larger ones, which eventually undergo disintegration on reaching the upper stability limit of matter, ejecting part of the matter into the cosmic sector. In the cosmic sector, a similar sequence of events happen (with the roles of space and time interchanged, of course) and eventually the c-matter ejected from the c-galaxies recedes outward in time and enters our material sector at random locations and starts the material half of the evolutionary cycle as diffuse intergalactic nebulae and dust.

Thus, on the whole, the universe remains the same, though each half (the material and the cosmic) continually evolves. The material sector, expanding in space, evolves in time. The cosmic sector, on the other hand, expanding in time, evolves in space. Further, the end of evolution in one sector marks the beginning of evolution in the other sector, cyclically, reminding us of the Evolutionary Spiral. It is a “steady-state” universe but without the necessity to break the conservation laws unlike the Hoyle-Narlikar’s steady-state model. From another point of view, it is an oscillating universe: but the oscillation is not the banal expansion-contraction in space as envisaged by the cosmologists or the exoteric students of occultism. It is an oscillation between space and time—an oscillation that is non-reversing. The expansion toward infinite space in one sector completely counterbalances the expansion toward infinite time in the other sector (in view of the reciprocal relation between them) and on the grand scale of the dual-sector universe we have the entire physical manifestation on the one hand, and NOTHING on the other, on equal footing!

(to be concluded)

A Quasar in the Making?

The Hubble Space Telescope imaged an 800-light-year-wide spiral-shaped disk of dust fueling a supposed “massive black hole” in the center of galaxy NGC 4261 in Virgo. Press release STScI-PRC95-47a indicates, “By measuring the speed of gas swirling around the black hole, astronomers calculate that the object at the center of the disk is 1.2 billion times the mass of our Sun, yet concentrated into a region of space not much larger than our solar system. Hubble also reveals that the disk and black hole are offset from the center of NGC 4261, implying some sort of dynamical interaction is taking place, that has yet to be fully explained.”

If Larson is correct, this galactic equivalent of a white-dwarf is a new Quasar.

Bruce M. Peret
Review

The Neglected Facts of Science

Frank H. Meyer

This book performs a lasting service to all natural philosophers and physicists. It discloses why and how the physical universe is the world of space and time. Larson's work thus continues the important contribution of Einstein when he challenged and changed some of Newton's conjectures about the nature of space and time. Newton's scholia erroneously avowed that space and time are essentially unrelated (exist absolutely independently of one another). Einstein's space-time continuum postulate averred correctly that they are related essentially and inseparably, without revealing in what the relation between space and time physically consists. In the book, as in his other books, Larson convincingly discloses in what the unity of the world of space and time consists. Not its materiality, but instead its motion.

In spite of Parmenides, Leibnitz, Berkeley, Kant, Bradley, etc., no one after Larson will argue successfully that space and time are not real. Though not concrete, they are real. Nor will anyone later prove that space-time or motion is a merely property or form of the existence of matter. In fact, matter, magnetism, electricity, light, etc. are all motion and nothing but motion.

Larson has established beyond a reasonable doubt in all his books, including the latest, that motion is the ultimate reality of the physical universe. This Larsonian proposition implies the corollary fact that in the absence of either space or time no such universe could be or begin to be. Motion is a relation, actually an inverse or reciprocal relation, between space and time. Less space and more time mean slower motion. More space and less time mean faster motion. Larson calls his theory of physics the Reciprocal System of physics, for its recognition of the multiplicative inverse nature of the motion relation and because the whole nature of the physical world derives from this relation between time and space. Motion, furthermore and due to its reciprocal character, is a quite symmetrical scalar relation between space and time. Time, compared with space, is not one-dimensional, time has no dimensions in space. However, time, like space, has three dimensions of its own. For motion in time its three dimensions must be taken into account just as the three dimensions of space are taken into account for motion in space. Space may be regarded as a scalar only for motion in time. Similarly, time may be regarded as a scalar only for motion in space.

Space and time are nothing but motion. Space-time is neither immovable nor elastic. Since neither space nor time is infinitely divisible (continuous), space-time is a scalar progression at the absolute uniform speed of the space-time location of a photon, the unit speed of one natural unit of space per one natural time unit.

In his present work, Larson shows that the unity of the physical universe consists ultimately in its scalar motions, the source of the fundamental forces of physical nature. The latter specifically include: 1. the space-time progression force (the "repulsive" force of the (Hubble) recession of the material galaxies and also the attractive force of solid cohesion) and 2. the force of gravitational motion (the "repulsive" force of solid cohesion and also the attractive force of galactic, stellar, solar, planetary, etc. aggregation and cohesion).

The author of the Reciprocal System dares to challenge the established effort to unify physics on the reductionist basis of logical positivism and operational pragmatism. His theory is designed to describe the fact that the physical universe consists of two main sectors, a material sector and its multiplicative inverse, a cosmic sector (or "anti-matter" sector). There would be no objection to denoting the sector inverse to the matter sector the "anti-matter sector" if the term did not convey the misleading connotation that the inverse nature of the sector is additive rather than multiplicative. Larson has carefully chosen the term "cosmic sector" to denote the inverse sector, simply because the conspicuous evidence for its existence is cosmic radiation. The primary particle of cosmic rays is the cosmic proton (the "anti-proton"), not, as previous supposed, the proton.
Beyond Space and Time
by DEWEY B. LARSON

Review by Professors Frank H. Meyer and Otto H. Schmitt

Dewey B. Larson reports in Beyond Space and Time that humankind is hurt both in science and religion much more by what we know that isn't so than by what we don't know.

The author's inquiry discloses that arbitrary assumptions of the profession of ancient and modern physicists have led them to misrepresent the physical realm as the continuous or infinitely divisible whole of all natural existence, including the sole origin and being of the realm of humankind. In this model of Nature the whole of humankind becomes merely a small, entirely finite, incidental, even accidental, unessential, and purposeless part of a realm of matter and energy, enveloped by a four-dimensional space-time continuum. Unquantized motion unrelated to space-time, continuous or infinitely divisible, has been the principal error of knowing what is not so, shared by Aristotle, Newton and Einstein.

Beyond Space and Time is Larson's masterful revaluation of metaphysics, based on his successful revaluation and unification of the science of physics. Larson extrapolated his fundamental reciprocal postulate relating space and time to motion as the two multiplicatively inverse aspects of all motion from the well established fact that the measure of motion is speed, the scalar magnitude of this relation between space and time. The physical realm is evidently a universe of motion, rather than of matter, existing in three dimensions and in discrete units. By reason of the reciprocal relation between space and time, each individual unit of motion is a relation between one unit of space and one unit of time, a motion at unit speed (the speed of light).

In the context of the reciprocal system of theory, the relation of the human realm to the physical realm changes appreciatively. The realm inhabited by humankind is infinitely greater than the entirely finite and quantized physical realm. The physical realm is an essential, but relatively small part of the human realm. Beside the two physical sectors, the material and the cosmic (anti-matter) sectors, the human realm includes an infinitely divisible or continuous third non-physical sector.

With his discovery of the existence of this non-physical sector of the human realm, Dewey Larson's metaphysics vindicates the great moral and religious objective with which the United States of America began in 1776: democracy, predicated on the voluntary acknowledgement of the human equality of worth of the proper parts of humankind, all women and all men. "Equitable treatment of all is undoubtedly part of the Sector 3 code." This religion was first voiced in "A Declaration by the representatives of the United States of America in general Congress assembled", probably authored by Thomas Paine.

The existence of humankind's too often overlooked Sector 3, according to Larson, also upholds the religion of persons like Thomas Paine, Benjamin Franklin as well as Paul Dirac, while not ruling in the resurrection of the body, does not rule out the continuation beyond space and time in Sector 3 of human life after death which intuits death to be so natural, necessary, and universal that it cannot be designed as an evil to humankind. According to Larson, evil exists only in the physical sectors of the human realm; not at all in the Third Sector, which exists for the good purpose and end of all ethical humankind.

It is the non-physical Sector 3 that constitutes the ethical human realm an infinite continuous whole of natural existence in distinction from the quantized or finitely divisible physical realms, from which infinity is excluded. The human Sector 3 is not
simply or readily visible or audible, or tangible. It includes the meanings of all words and numbers, but not words themselves nor numerals. Humankind as a whole can and does learn about the being of our non-physical Sector 3 by virtue of our native ability to create and reproduce adequate physical entities to represent non-physical entities as well as physical entities: meanings by words, numbers by numerals, rights by ethics and religion.

Ultimate human worth is not finite, and therefore cannot be estimated with money, the conventional measure of commodity, and other finite material values; when this is done, it is a throwback to the days of chattel slavery in the USA and elsewhere & when. Humankind as a whole and in its proper parts, the private man and private woman, can and do participate in the infinitude of ultimate human worth only by way of our inhabiting the Third Sector of the human realm.

The proper parts of the infinite whole of humankind are ourselves, all women and all men. When counting an infinite whole, Thomas Paine and Georg Cantor have taught us to identify the proper part to establish that the whole is infinite and not finite. If such a whole is infinite and countable, then the whole is counted by setting it equal to the proper part. Human equality means each private ethical person is inherently equal in human worth to the whole of humankind and since entities equal to the same entity are equal to each other, all women, as well as all men, are in non-physical human worth created infinite independent and equal, as perhaps discovered by Jesus Josephson, and reaffirmed by Thomas Paine in the Declaration of Independence.

Persons are the most precious of all human wealth on earth. The total human worth of the humankind, the dead, the presently living, and the yet to be born, is infinitely greater than the total value of all the commodities presently in the global market. The proper parts of the infinite whole of humankind are our spaceless and ageless non-physical selves—our human spirits, if you like.

From our equal creation, we derive rights nowadays called human rights, inherent and unalienable, among which are the Preservation of Life and Liberty.

The future of human rights on Earth relates to how humankind practices the human rights we profess. A primary attitude change among all humankind is now required for the future of human rights to be brighter. The change has to be composed of a rational rejection of the materialist bromide that all men are by nature only finite physical dust and unequal in all respects, while women are less equal, together with the voluntary informed acknowledgement and positive affirmation that the human equality proposition, after all, is accurately true.

Readers wishing further information about Dewey Larson's work should write to The International Society of Unified Science, c/o Prof. Frank Meyer, 1103 15th Ave SE, Minneapolis, MN 55414, USA.

Email: meyer078@maroon.tc.umn.edu. The web site can be found at http://infox.eunet.cz/interpres/sr/isus/index.htm

---

Frank Meyer  
1103 15th Avenue, S.E.  
Minneapolis, MN 55414  
USA  

27 January, 1997  

Dear Frank,  

Thank you very much indeed for your letter and subscription cheque. The Network Review should reach you shortly and you will find your review in it. Do feel free to reprint it in a future issue of Reciprocity.

With every best wish,  

David Lorimer  
Director

Scientific  
& Medical  
Network  
Registered Charity No. 295267
The Twenty-Second Annual Meeting of the Members of the International Society of Unified Science

Bruce M. Peret, Carla Rueckert, & Frank H. Meyer

The 22nd ISUS Conference

The 22nd Annual Meeting of the Members of the International Society of Unified Science will be held on Friday, August 1st and Saturday, 2nd 1997, in Anchorage (near Louisville), Kentucky, U.S.A., and hosted by Carla Rueckert and Jim McCarty of L/L Research. ISUS Members are invited to spend Sunday, August 3rd with L/L Research for a one-day "retreat." The meeting is open to all ISUS members.

Call for Papers

They who desire and are prepared to contribute to the ongoing verification and further development of the first general system of natural science, the Reciprocal System of physical and metaphysical theory and practice, authored by Dewey B. Larson, are invited to do so by participating in the coming 1997 ISUS Conference.

As in our previous 21 Conferences, the main purpose and theme of our Meeting Discussion is carefully to reexamine, further develop and confidently promote the first general revalued system of theory and practice of the science of physics, originated by the engineer and author, Dewey B. Larson.

If and when you wish to contribute to this Discussion, let the conference Program Committee learn of your intention by mailing a no more than 75-word Abstract of, including its title, outline and your name, by July 14th to:

ISUS, Inc.
Larry Denslow, Secretary
P.O. Box 1034
Highland City, FL 33846
U.S.A.

or E-mail Prof. Frank H. Meyer at:

meyer078@maroon.tc.umn.edu

Some have been interested, have read and studied Dewey Larson's last great work, Beyond Space and Time, and may wish to express your response to any of the natural, non-physical issues raised by what Dewey calls Sector 3 of our human existence. In this case, also, you may do so in the history of ISUS for the first time by sending the appropriate Abstract to Larry or Frank by July 14.

Questions regarding food, transportation, availability of rooms, hotels, etc., can be addressed to:

Carla Rueckert & Jim McCarty
L/L Research
1504 Hobbs Park Road
Anchorage, KY 40223
USA
Fax/Phone: +1 502 245-6495
E-mail: rueckert@iglou.com

Food

Home Cooking

For a small charge of $12/day/person, Carla has volunteered to do the cooking for anyone whom wants three home-cooked meals a day. Please contact her at L/L Research if you will be taking meals there, and any special dietary requirements you may have, no later than July 25th. Be prepared to give a helping hand cleaning up after the meal.

Cook Your Own

Be your own chef–kitchen facilities are available for those who want to cook for themselves. Again, let Carla know by July 25th, so she can arrange proper use of the available facilities.

Restaurants

Anchorage and Louisville restaurants are plentiful. Information and directions will be available at the conference.
Accommodations

L/L Research Rooms

There are a few rooms available, right at L/L Research, on a first-come, first-serve basis, $20 per night. Contact Carla or Jim ASAP to reserve one.

Camping

L/L Research has a small meadow that could take tents nicely. There is a bathroom in the basement that is accessible from the outside which, helps tenters feel more beforehand with the world. Contact Carla or Jim for details.

Hotel

Best Western Regency
Louisville, KY
Phone: 502-267-8100

Single occupancy $57, Double occupancy $65 per night. There are other motels but none as close.

Travel Arrangements

Wendy Stearns of Classic Travel has volunteered to assist ISUS Members in making travel arrangements to the 22nd Annual Conference in Louisville, KY. Give Wendy a call for competitive pricing on air fares. Wendy can be reached at:

Wendy Stearns
Classic Travel
9393 N. 90th Street
Suite 109
Scottsdale, AZ 85258
U.S.A.
(602) 860-0090
Fax: (602) 860-0049
Telex: 4955451
Toll free: 1-800-975-0090
9:00am - 5:30pm, Mountain Standard Time
Monday thru Friday

(Note that most time zones in the United States are now on Daylight Savings Time, an hour ahead of standard time.)

Directions to L/L Research

L/L Research will be delighted to pick people up at the airport. Contact Carla or Jim at L/L Research to inform them of the time of your arrival. If you make arrangements thru Wendy Stearns, Wendy will try to coordinate arrival times at Louisville with other

people, to minimize the number of trips to the airport.

From the Airport

Follow signs to the Watterson Expressway east, go to I64 east, take it to the Blankenbaker exit north. Go north on Blankenbaker, follow it as it turns into Watterson Trail and wind around with it to Shelbyville Road. Go right (east) through a light, turn at second light, which is Evergreen Street. Go left (north) on Evergreen 1.1 miles, over railroad tracks, take a right at Hazelwood, go one block and take a left at Hobbs Park. We are the second house on the left, a white brick with a great deal of garden and stone work. Can't miss it.

From Interstate 65

Take I71 north; right after (southbound) or before (northbound) the bridge over the Ohio River. Exit at Gene Snyder Expressway (Hwy 841) south. Exit at Hwy 146, LaGrange Road, going toward Anchorage (west). Go about 2 miles to an abandoned Save-A-Step market. Turn right there, (north) onto Glenbrook. Take Glenbrook to Hazelwood, go left, turn right onto Hobbs Park.

Things to do in Kentucky

The Kentucky Derby Museum and Churchill Downs. There’s a Hillerich and Bradsby Museum, the Louisville Slugger was named because H&B’s factory is here. There is good jazz and other night life and culture—opera, theater, museums, galleries, orchestra, etc.—and plenty of pleasant places to eat and browse. And there are lovely gardens locally. It is just pretty to drive around in, also, which helps.
Future Purposes of ISUS, Inc.

Prof. Frank H. Meyer

D.B. Larson accomplished two great discoveries before he died. He has clearly shown that, just as Newtonian theory was mistaken when postulating that space and time are unrelated, so modern physics has mistakenly overlooked that space-time is not continuous, as postulated by relativity physics and not inert or stationary, as postulated by both relativity and quantum physicists. Larson’s revalued physics, his general reciprocal system of physics, teaches that space-time is identical with motion and quantized. Just as Copernicus helped our ancestors to discover that our planet Earth is not immovably located at the center of the universe, so Larson helps our generation to discover that we do not move about in an inert, immovable, continuous, structureless space-time.

As we approach the time of our Twenty-second Annual Conference, the 1st and 2nd days of August, 1997, we continue to develop and promote the far-reaching revaluation of the science of physics that has made possible his first great discovery: The Universe of motion is the relation between two uniformly progressing reciprocal quantities, space and time, at unit speed. All physical entities and phenomena are compound motions, resulting by speed displacements from unit speed, 1/n and n/1, where n is finite and the magnitude of unit speed is the speed of light in vacuo.

Larson’s successful revaluation of physics has made possible his second great discovery. The physical universe is not the whole of human existence. Humankind is related to, but distinguishable from biological life, and is no mere, incidental part, no accident of the physical realms. We do not exist for the sake of the physical world. Rather both the material and the cosmic physical sectors have been designed and constructed to make the human world and our living relatives among the plants and animals possible. Larson’s second great discovery, also culminating from his successful revaluation of the science of physics, is that the physical sectors have a significance and purpose beyond themselves in sustaining temporarily the bodies and minds of the members of our species, for the purpose of designing and producing in each of us, man and/or woman, Sector 3, the essential non-physical, immortal sector of human existence.

For the present let us note how modern science dismisses the whole Sector 3 concept. Natural scientists have but one argument for rejecting the possibility of existence outside of the physical universe. This argument is the premise that all existence is in space, and in time.

In the universe of motion, this is not true. Space and time do not constitute a container for the entities and phenomena of that universe; they are the contents of the universe.

Hubble Finds Intergalactic Stars

“NASA’s Hubble Space Telescope has found a long sought population of ‘stellar outcasts’—stars tossed out of their home galaxy into the dark emptiness of intergalactic space. This is the first time stars have been found more than 300,000 light-years from the nearest big galaxy.

“The isolated stars dwell in the Virgo cluster of galaxies, about 60 million light-years away. The results suggest this population of ‘lone stars’ accounts for 10 percent of the Virgo cluster’s mass, or 1 trillion Sun-like stars adrift among the 2,500 galaxies in Virgo.”

Press Release No. STScI-PR97-02

Or, as Larson suggests, are these actually new stars, formed from the dust of intergalactic space, about to be pulled into the galactic disk? The release also states “...the stars detected... are the brightest members of the red giant class...”—exactly what Larsonian astronomy predicts.

Bruce M. Peret
The more complete understanding of physical existence opens the door to an exploration of existence as a whole, including the non-physical areas that have hitherto had to be left to religion and related branches of thought. It is now evident that our familiar material world is not the whole of existence, as modern science would have us believe. It is only a part—perhaps a small part of a greater whole.

Dewey B. Larson, *The Universe of Motion*

I know that Dewey believed that “survival of the non-physical aspect of human personality beyond physical death is theoretically certain”. (Beyond Space and Time, Chapter 27). I hope for his sake and ours that that is correct.

Ronald W. Satz

Male and female are distinctions of nature, but Mankind is equal in the order of creation.

The world is my country, all mankind are my brethren and to do good is my religion.

*Thomas Paine*

The material and cosmic sectors contain the same types of aggregates—stars, planets, vegetation, animals and even people. Considering that they are reciprocally related, if Material man has “infinite human worth”, does Cosmic man have Zero human worth?

*Bruce Peret to Frank Meyer*

The blazing evidence of immortality is our disssatisfaction with any other solution.

*Ralph Waldo Emerson*

Religion is our human response to the dual reality of being alive and having to die.

*Forrester Church*

I can’t promise that it won’t get you beaten. I can’t promise you that it won’t get your home bombed. I can’t promise you that you won’t be scarred up, but we must stand up for what is right. If you haven’t discovered something worth dying for, then you haven’t found anything worth living for.

*Martin Luther King*

When I see nothing annihilated (in the works of God) and not a drop of water wasted, I cannot suspect the annihilation of souls or believe that He will suffer the daily waste of millions of minds already made that now exist and put Himself to the continual trouble of making new ones. Thus, finding myself to exist in the world, I believe I shall always exist; and with all the inconveniences human life is liable to, I shall not object to a new edition of mine—hoping, however, that the errata of the last may be corrected.

*Benjamin Franklin*

In all my lectures I have taught one doctrine—the infinitude of the private man (person).

*Ralph Waldo Emerson*
Letters to the Editor

Carla Lisbeth Rueckert
L/L Research
PO Box 5195
Louisville, KY 40205

18 February 1997

Hello there, Frank-

At last, I come to your Christmas letter and your question regarding Larson's BEYOND SPACE AND TIME, which Jim and I just finished reading together—we read it over a period of time during our morning offering. I am very pleased to say that the musings of Larson and those that Confederation sources such as Ra have given us remain unified in perspective.

Larson’s Sector Three is Ra’s Time/Space, or metaphysical universe. His Sector Two biological units are congruent with Ra’s view of our bodies as being physical vehicles for the consciousness within. His Sector Three ethical men are the same as Ra’s mind/body/spirit complexes. Both view the aim of life at moving from sector two or physical human status to Sector Three or metaphysical status, of choosing to accelerate the pace of the evolution of our own spirits.

I thought his book remarkable in that, without ever reading THE LAW OF ONE material, it sounded so many common chords. I only wish Don Elkins could be alive to receive this excellent volume. He thought so highly of Larson’s work—so he would not be surprised by his insight into spiritual realms of thought.

I know you have not met Jim McCarty, Frank—but you’d appreciate him, I know. We are doing fine, very much enjoying ourselves as we keep the faith here in Kentucky. We see ourselves and our work as being servants of the light. The L/L Research that we three started together remains for us the chief purpose of our lives. We have dedicated them entirely to keeping L/L’s doors open and the material available, and continue to feel that we are working for Don, whose vision was the birth of L/L. Jim has transformed our little acre of earth into stunning and profoundly peaceful gardens, and we feel infinitely blessed in our lives and work. We’re just now completing work on a fifth and final volume of THE LAW OF ONE, a volume of fragments of personal material we removed from the volumes back 16 years ago. We have decided, after much pressure, to publish these fragments along with our commentary on them. I am glad we are doing this, as it will allow us to say quite truly, “No, there’s nothing else Ra said—we’ve published all of it.” It also gives the reader a chance to see us as the bozos that we are, entirely human and flawed as are all of us here on Earth. I think it should put an end to any reader’s mixing us up with those of Ra!

After I complete my commentary—I’m about half done—for the BOOK V, I’ll get back to my WANDERERS’ HANDBOOK. I am still at the stage of collecting material for it. My feeling is that anyone who has awakened to her spiritual nature, identity and purpose is a Wanderer, so I do not distinguish between those who see themselves as Christian pilgrims or other accepted religious types, and those who perceive their nature as being those who are from elsewhere in the universe and have come here to serve on planet Earth as servants of the light. All, regardless of where this feeling of being the spiritual outsider comes from, experience the same sort of displacement from the “normal” life around them. They feel isolated, alienated and abandoned. They feel pressed towards a mission, but have great trouble identifying what that mission is. My feelings are that wanderers all have one mission: to live lovingly, moment by moment, upon this Earth palace. It is not what one does that is the deeper service, but the attitude with which one meets the moment; the way one does those things laid before her. A Wanderer’s job, once she has awakened, is to live centered in love. Just that. And this can be brought to any activity, so all services are equal. Changing the diaper and healing a multitude are equal, if one does them both with the same loving and open heart.

We are also moving ahead on other projects—a jointly channeled book by myself and the source “Qu’o”, and Barbara Brodsky and her source, Aaron, who unlike Qu’o is an inner planes being, a spiritual guide of Barbara’s. We instituted the joint sessions because we felt there would be an interesting dynamic since our
sources were dissimilar, but both were positive. We have found that positive info does indeed harmonize. Q’uo and Aaron love working together, and Barb and I do also.

Another project is a Book Of Days, using channeled material from my Holy Spirit channelings. Yet another is a video on L/L Research. This is something we have wished for, but two previous attempts failed to produce a good one. Now there is a reader who has some good contacts and has produced videos and other things, mostly CD’s of her music, who wants to make this video. She also wants to write music for the sound track of it. This is an interesting project which we are hoping will go forward this time. We shall see!

How do you fare? How is ISUS? As I said, Jim and I are just dandy, and enjoying our every moment. Today is so springlike, the sun gleaming golden through the windows, the air balmy and welcoming. We’ve seen robins, buntings, even our red-tailed hawk family is nesting again, so we are looking for an early and warm springtime. Our garden should be even lovelier than in past years—Jim planted 10 bushels of bulbs last fall, and several dozen new kinds of lilies and irises. We can hardly wait! And we have found a wonderful treat which grew out of what seemed a disaster—we had to replace our septic field—it had been put in in 1923, so it was due to fail! We sacrificed our little orchard to avoid having to dig up Jim’s many beautiful and established gardens in the back. In the process of clearing the orchard, the men inadvertently uncapped a wet weather spring we had no idea existed. Many would have viewed this as a calamity, as water got all over our yard, but not Jim—he has built a collecting pool, and plans to dig a pretty channel through the side and back yard and down into an old brick cistern we have underground at the other edge of our yard, which has a pipeway all the way to the storm drains in the next block. So the water will be a beautiful part of our newest gardens. I wish you could visit here some spring and enjoy the flowers with us!

You take care and be sweet, dear one. Many blessings and L/L until we speak again.

Carla

Frank H. Meyer
ISUS, Inc.
1103 15th Avenue S.E.
Minneapolis, MN 55414-2407

Dear Carla and Jim,

Thank you, Carla, for your interesting letter of 18 February, 1997 with your encouraging and splendid commentary about the relevance of Dewey Larson’s Beyond Space and Time to the philosophy and practice of the L/L Research Activity, led and conducted by Jim McCarty, your husband, and yourself.

With your permission and the recommendations of ISUS Board members, we would like to publish your Letter in the forthcoming Spring, 1997 issue of Reciprocity-ISUS News. While strategic and even expedient reasons were afoot a decade ago to justify your decision nominally to keep your L/L Research Inquiry apart from that of Dewey Larson, it appears to me and others of ISUS that this is no longer in the best interest of either of us. For one thing probably no other group I know of has given so much support during the past more than a decade to recruiting subscribers to Reciprocity and members to ISUS, Inc., as L/L Research through the circulation of your publications to persons outside and inside prisons of our country.

All of the above and more that it is better for the present to leave unsaid, has raised up a brainstorm among some of us, including myself: we of ISUS seek a new location, preferably east of our country’s Midwest to convene the Twenty-Second Annual Meeting of the Members of the International Society of Unified Science in your Kentucky in early August, 1997.

We wish to request that you as members in good standing of ISUS consider through your L/L Research Group hosting our 1997 Annual Meeting. To begin with, we ask only that you give some thought to this venture. You and we have until April 15 to decide. This is the deadline for preparing to circulate the Spring,
Dear Frank-

Well, knock ME over with a feather! I never expected to receive such an amazing letter from your august and honorable hands! You want us to host the convention? This will take some discussion, but I don’t say “no”, just have some questions:

* how many, approximately?
* how long would it be?
* would you want to meet in our house, which is L/L headquarters? Or were you thinking of some nearby facility like classroom space or motel conference rooms?
* would you want us to put the members up, or find accommodations in nearby motels?
* would we feed you, or would this be done elsewhere?
* does it have to be in August? Would July, for instance, work as well?

Our house, regarded as a physical plant, is set up to have meetings of no more than 10 to 15—say a dozen people. We have often put people up before; in fact our last workshop was attended by 13, and they all slept here. Some of these beds are nice, most are two-to-a-room, some are just functional—we added three makeshift bedrooms in the basement to handle our needs. And I have cooked for that many for the space of Fri. night through Sunday noon or so. So I know it can be done. But if we did it that way, we would have to ask everyone to pay us back for what we spend on groceries.

Perhaps it may seem irrelevant to you in the context of who we are, and how we are connected to you (that is by philosophy, not science), but neither Jim nor I has a clue about papers of the scientific kind, which will undoubtedly be the order of the day. Jim especially is concerned that we know so little of what ISUS treats of.

My E-mail number is rueckert@iglou.com, and my fax/phone number is 502-245-6495. If you wish, you are welcome to respond through one of these media, if time is of the essence. We do need to have an idea of what we need to do to prepare. I would personally be delighted to cook for you all and put you up, especially if money is a problem. But I need to know well ahead of time.

The trouble we have with the August date is simply that we are usually on serious vacation time in August—and could swing early September or June-July better than August, for that reason.

If you do meet here, I shall ask Prof Steve Tyman to present a paper on the metaphysics of Larson and The Law Of One, compared and contrasted. He is a Ph.D. in philosophy, and has published in his field. His treatment would be better than my own by far. However, for the present we are quite happy for you to publish my letter.

Let us know! We await your further thoughts. Meanwhile, many blessings to you and of course, always—L/L—

Carla Lisbeth Rueckert McCarty
Dear Carla,

This is to confirm that I have received your Letter of 2 April, 1997 in response to my Letter of March 22, 1997 to you and Jim McCarty. I and my associates are delighted with your response to our request that you consider volunteering to host our 1997 Twenty-Second ISUS Annual Conference in Kentucky during August, 1997.

Our 1996 Conference in Denver decided to include the issues of Dewey Larson’s BEYOND SPACE AND TIME along with the issues of his Reciprocal system of Physics for our promotion of Mr. Larson’s revaluation of natural science. Your Letter of February 18, 1997 has convinced me and many of my associates that you and L/L Research among our present members are indeed qualified to facilitate this transition. We think it is time to give some priority to the new natural science of metaphysics without retreating from our initial goal of recommending the splendidly truthful Dewey B. Larson revaluation of the old natural science of physics, known as the Reciprocal System of General Physics. Thanks to BEYOND SPACE AND TIME, metaphysics no longer remains only a part of philosophy, but also has become a new part of natural science.

Let me start by answering the questions of your Letter:

* **how many, approximately?** 15 or less.


* **would you want to meet in our house, which is L/L headquarters?** Yes.

* **were you thinking of some nearby facility like classroom space or find accommodations in nearby motels?** For a possible future ISUS 1999 Annual.

* **would you want us to put the members up?** Yes, how about $20/per member/per day? An optional bill, if you have one to propose?

* **would hosts feed members, or would this be done elsewhere?** Members would prefer the former; we gladly would pay the cost and share the routine with host in full management. How about a minimal charge for three daily meals of $12/day of each visitor?

* **does it have to be in August?** Yes, if ISUS Secretary, Larry Denslow, a teacher with a commitment to summer school can and is to be present.

Will Friday & Saturday, August 1-2, be satisfactory?

In answering your above questions, I’m acting in behalf of ISUS, Inc., and our principal officers, President Hoyt Stearns and ISUS, Inc. Executive Director, Dr. Rainer Huck. Shortly, each and every member of our ISUS Board will be informed to participate in making this decision to hold our 1997 ISUS Twenty-Second Annual Meeting in Anchorage, Kentucky during August 1-2. We appreciate your not saying “no” to our invitation to you, as bona fide ISUS members, to host our Twenty-Second Annual Gathering.. We hope to and can do everything that is wanted to insure your caring to say “yes” to this meaningful 1997 deed. You will be doing nothing less than aiding in further publicizing the remembered great work by Dewey Larson and Don Elkins of revaluing the whole of natural science for the better future of the whole of humankind.

By all means invite Prof. Steve Tyman to our Twenty-Second Conference critically to compare and contrast the metaphysics of Larson and the Law of One. As persons who have studied BEYOND SPACE AND TIME together, you, Carla, and Jim, should not feel shy about sharing in the Conference discussion, remembering, as Will Rogers said, “we all are ignorant except about different things.”

Our next issue of Reciprocity-ISUS News, publicizing our Twenty-Second ISUS Conference will be ready to go, so soon as you return your amended and approved terms of accommodations and meals arrangements and costs to myself or Bruce Peret, Associate Editor. We are willing to consider any choice and judgment you and
your associates may wish to offer whether and/or how to bring your organization name into this 1997 event, L/L Research, as co-sponsor or partner of ISUS, Inc. Are you incorporated? Am I right in assuming that you are non-profit, tax-exempt?

Please feel free to ask more questions if you have any. Please let us have your reply for Reciprocity-ISUS News as promptly as possible.

Best wishes for a fruitful collaboration in behalf of Dewey Larson and Don Elkins between you, Carla and Jim, and us,

With love, Winifred and Frank.

K.V.K. Nehru  
Prof. of Mechanical Engineering  
School of Energy  
Institute of Post Graduate Studies & Research  
Jawaharlal Nehru Technological University  
Mahaveer Marg, Hyderabad - 500 028. (A.P)  
India

Dear Bruce,

My recent trip to the U.S.A. has given me the impression that much needs to be done to bring the knowledge of the Reciprocal System to the academic community at large. Sooner or later it is they who have to carry out its application and further development. Almost all of the volunteer workers of the I.S.U.S. seem to have been weighed down by their personal responsibilities to work full-time on such an errand. But, without someone doing a little of personal sacrifice, I do not know how we can carry out such a mission.

I, therefore, wish to appraise you that I am willing to personally carry out a program of lecture tours in the U.S. academic institutions without seeking any remuneration, if some of you can co-operate and work out the mechanics. This requires corresponding with prospective institutions across the country, to win hearing to the proposed presentation(s), exploring financial support for travel and stay, planning and co-ordination. The sooner it is done the better.

Every new idea will have its right time. I feel that the time is ripe for the planting of the new paradigm of the Reciprocal System, as part of an endeavor to establish Truth, and thereby helping humanity as a whole towards a better future.

Yours Truly,

K.V.K. Nehru

cc:  Mr. Lawrence Denslow  
     Mr. Maurice Gilroy  
     Dr. Rainer F. Huck  
     Mrs. Dorothy Larson  
     Prof. Frank H. Meyer  
     Mr. Bruce M. Peret  
     Mr. Phillip H. Porter  
     Dr. Ronald W. Satz  
     Mr. Hoyt A. Stearns
Response to Dr. Ronald W. Satz’s Resignation from ISUS, Inc.

Frank H. Meyer

Former member Ronald Satz has some honest differences with some ISUS members, but the differences do not warrant his leaving ISUS with the claim that we who remain betray Dewey Larson’s seeking after Truth.

When Ronald asked Mr. Larson Q9, “Isn’t the seeking after Truth a very important human purpose too?”, Dewey’s answer was, “This is a pertinent question, and it illustrates the point that I am trying to make about my investigation in this area. Apparently you are raising the issue because you believe that the pursuit of knowledge ought to be one of our purposes. But this is a subjective conclusion. At the present stage of my investigation I see no way of deriving it from factual premises in the manner in which I am trying to make a start toward defining the non-physical aspects of existence. Acquisition of ethical knowledge is, of course, essential for progress toward our goal. We cannot do what is right consistently unless we know what is right. But, as matters now stand, I see no direct ethical significance in the acquisition of physical knowledge.”

Yet, when Dr. Satz was elected ISUS, Inc. President, he instructed, “Therefore all articles not directly related to the Reciprocal System of physical theory will not be accepted for publication in RECIPROCITY or ISUS News. Articles on human nature, new transportation systems, metaphysics, etc. are inappropriate. There are many other organizations devoted to causes in these areas. We have a specific unique mission: the promotion and advancement of D.B. Larson’s Reciprocal System of physical theory; there is enough work here for ISUS members to last hundreds of years.”

If the finite physical universe is unmysterious, and we continue to be engaged with examining and developing D.B. Larson’s revalued general Reciprocal System of physical theory, should we not expect to be able to complete this one non-ethical task in something less than centuries of time? This, then, would leave more time to learn the purpose for which the physical universe exists and how human life differs from biological life. (Beyond Space and Time, p. 279)

Meanwhile, in Beyond Space and Time, D.B. Larson reports, “Equitable treatment for all is undoubtedly part of the Sector 3 code. Our intuitive knowledge of elementary ethical principles assures us of this... Equitable treatment with respect to opportunity for ethical advancement, ...is vital, and would seem to be an essential part of the overall program. A series of successive existences is the only adequate solution to this equity problem that has yet been suggested.” (BST, p. 345).

Unlike Mr. Larson, Dr. Satz is indifferent to the issue of equity, since it is not an issue of physics, but of ethics. Mr. Larson teaches that the ‘man’ or ‘woman’, the proper parts of the whole of humankind, Larson does not mean the human animal, but the ethical person. He learned that the physical universe, including our bodies and minds, as well as the material and cosmic sectors 1 and 2, is finite. In every respect that we are physical, we are finite and unequal. Infinity is excluded from the physical Sectors 1 & 2, but not necessarily from Sector 3. It is abundantly clear to me that no person’s inherent human worth should be exclusively identified with his or her market worth, a finite physical value, measurable by the money standard of finite commodity and capital values. My research leads me to conclude that the 1776 heritage of the United States of America declares unequivocally that men and women are not inherently finite and unequal in non-physical human worth.

Before Dewey Larson was born, the author of the original draft of the 1776 Declaration of Independence by the Representatives of the United States of America in general Congress assembled, previously having learned how to count infinite wholes, as distinguished from finite wholes, affirmed these truths to be evident to himself that all men and women are created infinite, independent and inherently equal in human worth and from that equal creation they derive rights, inherent and unalienable, among which are the Preservation of Life and Liberty and the Pursuit of Happiness.

In arithmetical terms what this means, assuming the infinitude of the private person, is that each man and
each woman is not worth more than the whole of humankind nor worth less, but rather is equal to the whole of humankind. In this way that "all men are created equal" evidently can be, since entities equal to the same entity are equal to each other.

The Declaration affirmation of human equality does not apply to our physical nature, including human performance, opportunity or longevity. It applies only to the non-physical inherent human worth and dignity of each person, only to the infinitude of each private man and woman. You cannot equalize anything about human beings except their incomes, when you pay money to each woman or man what he or she is inherently worth.

Each one of us sees according to his or her own light. Thus, what appears as inappropriate nonsense to one is appropriate arithmetic to his neighbor.

In the same way, because it is an infinite collection you can count all the counting numbers, all the odd and even counting numbers with only the even counting numbers, since Thomas Paine and Georg Cantor among others have learned that the two sets can be put into one to one correspondence.

The concept of velocity understood as the ratio distance/time, is an integration of space and time; the metrizable variables of distance and time are united in velocity. That this union is not at all self-evident was shown by Piaget when he demonstrated that the ideas of space and time arise out of a child’s perception of motion, not that the idea of motion is synthesized from prior perception of distance and time.


IGNORATO MOTU IGNORATA NATURA
(Unless you understand motion, you cannot understand nature)

Leonardo da Vinci

From The Universe of Motion…

10. Is there anything outside (that is, independent of) the universe of motion?

This is probably the most important question that can be asked by members of the human race. Many persons, particularly those with strong religious ties, will be inclined to contest this assertion, having in mind issues that are more directly connected with their specific beliefs. But we can safely predict that if these alternative questions are carefully examined it will be found that they have no meaning unless this question number 10 can be answered affirmatively.

Conventional science gives us a negative answer. It regards space and time as constituting a background, or setting, in which physical entities exist, and in which physical activity takes place. All existence, according to this view, is in space and in time. It then follows that there cannot be any existence outside of space and time. The prevailing scientific opinion is that this is an incontrovertible conclusion. Furthermore, it is claimed that every fact to which we have access can reasonably be explained in terms of the physical universe alone, as would be expected on the basis of the foregoing assertions.

Although it is generally conceded that this is the verdict of science at the present stage of knowledge, it is, to most scientists, an unwelcome conclusion. The great majority of these individuals have some kind of religious or philosophical convictions about non-physical existence that they are not willing to give up, regardless of how strong a case against the reality of such an existence science may present. For some this has created a very difficult situation. As expressed by du Nouy:

It cannot be contested that the heart of many men is the stage of a conflict between the strictly intellectual activity of the brain, based on the progress of science, and the intuitive, religious, self. The greater the sincerity of the man, the more violent is the conflict.

The fact that the clarification of the physical relationships in our study of the universe of motion has opened the door to an extension of this study into the non-physical realm thus has a profound significance.
What Attitude Should ISUS Take to Member Anderson's Great Invention?

Frank H. Meyer

Dr. J. Edward Anderson, P.E., member of ISUS, Inc., some day in the near future will, like Thomas Edison and Henry Ford, join their ranks as one of the great American inventors of this century. Edward Anderson, a quarter century ago, led a team of his associates with the aid of the new computer technology to raise to the state of a fine art the new passenger transportation technology known as Personal Rapid Transit.

If we of ISUS practise what we and the heritage of our country profess, we shall wish to volunteer some of our time and energy to help accelerate the introduction of this intelligently conceived, better way of our, and our neighbors getting about than the existing ways. When all have this better way of getting around inside the physical realm, we shall have more time to spend living and growing in our non-physical realm outside the physical sectors, Larson's Sector 3.

Since the invention of PRT, we can now, if we wish, assure an equal right to transit of all persons. Since men and women are inherently equal in human worth, human rights apply equally to all, theoretically. However, while men and women are designed infinite and inherently equal in human worth, their sharing equally human rights is conditioned by the appearance of suitable technological innovation. For the first time in human history, it has been possible to have all persons have equal access to transit, since the inventor could, and did, focus on this objective.

It was wrong in the past of the U.S.A. to withhold and deny equitable treatment of men and women with respect to human rights, including the right to transit. To a considerable extent, the mistakes were the result of the absence of adequate technological innovation. However, let's prepare to learn from our ancestors' mistakes and learn to keep our own mistakes small; correct them promptly and go on making new mistakes; above all, don't keep making the same old mistakes over and over.

Please learn about the technological advantages of PRT, by which it can, and will, deliver faster, safer, healthier, while less costly, trips to all.

The Historical Emergence and State-of-the-Art of PRT Systems

References (continued from page 42...)


E 26.1–36
The Historical Emergence and State-of-the-Art of PRT Systems

J. Edward Anderson
President, Taxi 2000 Corporation

Introduction

The comfort, convenience, and privacy of the automobile has made it the preferred mode of travel in and around cities notwithstanding the extensive congestion and air pollution. Large numbers of automobiles produce and our increasing dependence on an uncertain supply of foreign oil. If the situation were to remain stable, it would be bad enough, but as population increases, it will become much worse and in the long term is unsustainable. We know that the automobile must be complemented by public transit modes, but a quarter century of experience in trying to do so by reviving old modes of public transit has shown that even with enormous federal expenditures, transit use still declines. There is and has been need for innovation. Extensive efforts are underway to innovate through intelligent transportation system (ITS) programs sponsored by the Federal Highway Administration; but, notwithstanding mention of public transit systems in this context, there is currently no visible federally sponsored work underway on innovative public transit systems. Automated highways promise increases in flow but that must imply a greater flow into the center city and therefore greater congestion on the city streets where improved traffic signaling and one-way streets provide some relief but, with increasing numbers of automobiles, not enough to increase the average speed of traffic.

The only way to reduce congestion in the inner city is to reduce the number of automobiles, which can with today's technology be done through congestion pricing or extremely high parking charges but at the expense of downtown viability. As mentioned, attempts have been made to reduce congestion by introducing conventional rail systems, but that has not worked.

Notwithstanding long delays due to congestion, great numbers of people still prefer to drive cars while city officials are being told again and again not to look at unproven transit systems, which prevents a market for such systems from even eventually developing. To whose benefit is this?

What is needed to complement intelligent highway systems is an affordable, land-efficient transit system that reduces travel time. That system is personal rapid transit (PRT). In this paper I trace some key aspects of the history of PRT, thereby describing what it is, why it needs to be on the agenda of city planners, and why PRT is one of the keys to bringing infrastructure costs for urban transportation into the range of fiscal practicality. I discuss key elements of the history up to the present time and briefly describe the current state of the art. I then advance the view that current work on instrumented vehicle highway systems will increase in value by being complemented by PRT networks in the central city where there is very little that IVHS can by itself do to relieve congestion.

Early Government Involvement in PRT

The problem of congestion was recognized in the 1960's when Congress established the Urban Mass Transportation Administration (UMTA) and directed it to "prepare a program of research, development, and demonstration of new systems of urban transportation that will carry people and goods within metropolitan areas speedily, safely, without polluting the air, and in a manner that will contribute to sound city planning."

This directive was added to the UMTA Act with the knowledge of several new systems under development with no government support. These new systems departed from conventional exclusive-guideway transit in that they apply the key advantage of the interstate expressway to transit, i.e., while they still had stations, the stations would be placed on bypass guideways so that each trip could be taken with no intermediate stops, thus more than doubling the average speed of travel without increasing the maximum speed. It became clear that infrastructure cost could be minimized by using very small vehicles, which would have to be automatically controlled, and it was realized that the small vehicles could be used by people traveling together by choice and on-demand, i.e., with the new configuration vehicles would wait at their "off-
Historical Emergence of PRT Systems

line® stations for people rather than people for vehicles and the people could travel either alone or with one or two traveling companions, not with strangers.

The Congressional directive in the UMTA Act resulted in the award of 17 studies at $500,000 each to investigate the new systems. An optimistic report of the findings was released in 1968 in a UMTA report entitled Tomorrow’s Transportation. One of these studies, performed by General Research Corporation of Santa Barbara, became widely known because it was published in Scientific American®. GRC compared the future of four U.S. cities (Boston, Hartford, Houston, and Tucson) if only conventional transit systems would be expanded with the future if the new systems, then called personal transit and later called personal rapid transit, would be installed. The conclusion was decidedly positive: Congestion would continue to worsen if only conventional systems were used, but could be reduced if the new PRT systems would be installed. Now, 28 years later, congestion has worsened substantially, but serious attempts to introduce PRT systems have stalled, not for technical reasons and not because these system would have adverse affects on communities. Indeed careful examination of the minimum use of land, material and energy possible with PRT systems and the high service level they afford shows that their impact on communities would be remarkably positive. They have been called an essential technology in a sustainable world.

The best of the PRT systems were so attractive that they were a serious threat to existing rail-transit interests. Several heavy rail programs were stopped because of interest in PRT and this ultimately caused the advocates of the old systems to lobby heavily to stop federal work on PRT, notwithstanding available information® showing that conventional rail systems, the service concept of which was set in the days when competition was a horse cart on a mud road, would not produce significant improvements.

Early PRT Development Efforts

The first person to set down all of the essential features of PRT was Donn Fichter®. In 1953, as a transportation graduate student, young and uncommitted to any existing transit mode, he began thinking about the practical transit needs of cities. He appreciated that a new system would have to run on an exclusive guideway if it was to avoid street congestion and that to minimize the cost and visual impact of the guideway, the passenger load would have to be distributed along the guideway in many small vehicles rather than a few large ones. He opted for one-passenger cars. He appreciated that since cities are areas, not corridors, the new system would have to be a network®an interconnected network so that a passenger could be carried without stopping between any pair of stations within walking distance of the origin and the destination of the trip.

He understood that the cars would have to be automatically controlled and that a method of rapid switching with no moving track parts would be needed to permit the cars to switch from mainline to station bypass line and from one main line to another. While Fichter did not have the resources needed to build a hardware system, his well-reasoned ideas had a strong effect on subsequent development programs.

It has often been observed that when the time is right, a logical set of ideas presents itself independently to more than one mind. So it was with PRT. Also in 1953, Edward O. Haltom, a Dallas contractor wrestling with the cost of a conventional train monorail guideway, also saw the advantage of deploying many small cars. He thus conceived of a hanging-vehicle PRT system he called “Monocab,” which gradually developed to the point of a full-scale test track in 1969. It was selected for deployment in Las Vegas in 1974 where a study by Peat Marwick showed that for a dollar fare it would make money.

Unfortunately foibles in human behavior combined to stop the project.

A group at General Motors in the late 1950’s turned a ground-effects machine designed for the Army into an air-suspended, linear-induction-motor propelled PRT vehicle. By 1969 a spin-off company, Transportation Technology, Inc., had built a test track in Detroit. One of their systems is still in operation at Duke University Medical Center. In 1960, completely independently, William Alden conceived of a fleet of automatically controlled vehicles that could travel both on the streets and on guideways. He also found resources to build a test track and operated a vehicle on it by 1969. His system formed the basis for a government-sponsored PRT program at Morgantown, West Virginia, where due to lack of understanding of the economics of PRT the vehicle size was increased to 20 passengers, which resulted in a much larger guideway, which cost so much that no similar systems were built. Also, the vehicles were propelled and braked through wheels running on a trough guideway, which required guideway heating in the winters of Morgantown, and that markedly increased the
operating cost. In 1962, also completely independently, Lloyd Berggren invented an air-suspended, air-propelled version of PRT and built a full-scale test system that operated in 1971 near Minneapolis.

Unfortunately, he found it necessary to enclose his vehicles in a tube, which after making all of the necessary engineering calculations was 7 feet wide by 14 feet high, presenting an unacceptable visual impact.

Work on PRT also began during the late 1960's in England with Cabtrack, in Japan with CVS (Computerized Vehicle System), in France with Aramis, in Germany with Cabinetaxi, and in Switzerland with ELAN. Cabtrack was tested at one-fifth scale; CVS, Aramis, and Cabinetaxi were tested full scale, and ELAN was presented in concept only. From my observations, Cabinetaxi was the most promising but it fell to the ax of a drastic budget cut in 1980.

The Aerospace Corporation PRT System

The most promising and hence from hindsight the most threatening PRT program was initiated by The Aerospace Corporation in the Los Angeles Area in 1968. Aerospace had perhaps the finest collection of scientific and engineering talent in the United States. They thoroughly absorbed the UMTA studies mentioned above, then embarked on their own comprehensive systems analysis of the needs, requirements, and technological possibilities. Like Fichter, they appreciated the need for a minimum-size guideway and for switching with no moving track parts. These needs resulted in a U-shaped guideway a bit less than one meter by one meter with vehicles riding above, and by 1970 they had built a one-tenth scale proof-of-principle system and had performed extensive analysis of the technology, planning and economics of their system. They simulated a PRT system for Los Angeles with 60,000 vehicles and 1000 stations and compared it directly with a rapid-rail plan for the same area, showing a remarkable improvement in cost-effectiveness and the feasibility of large PRT networks in handling a significant portion of the traffic in a large city.

At the University of Minnesota I was then coordinator of a Task Force on New Concepts in Urban Transportation working under a grant from the Minnesota State Legislature to develop a proposal to demonstrate an advanced form of public transportation in Minnesota. After several years of study and examination of all of the visible PRT programs around the world, in late 1973 we proposed to demonstrate the Aerospace PRT system at the Minnesota State Fair Grounds in St. Paul. In 1974, the Minnesota Legislature past an act S.F.No. 2703 that directed the development of a plan for an automated small-vehicle fixed-guideway system that would provide demand-activated origin-to-destination service. Aerospace was one of the bidders.

Instead of causing the companies who had been planning the Los Angeles rapid rail system to see the advantage of working with The Aerospace Corporation, those companies attempted to kill the PRT idea. The process was investigated and analyzed in great detail by Burke. The problem was that the rapid-rail planning companies, who looked forward to much larger construction-engineering contracts, were expert at rapid rail and knew nothing about PRT. Moreover, they had reasonable assurance that, in those Great Society days, the UMTA Capital Grant Program would yield the funds needed to build rapid-rail systems in all major cities in the U. S., whereas PRT would at best require a development program of perhaps seven years, during which time they would be able to realize far less income. The prospect of much greater income years down the road could not compensate for expected early profits. Moreover, in vigorously resisting encroachment on their turf, a climate was created in which it was dangerous to one's career to speak positively of PRT. Since these were the established transit experts, their voices were influential in stalling consideration of PRT. One must wonder what would have happened if, in the 1890's, there had been a federal capital grant program to fund the horse and buggy.

Government Support of High Capacity PRT

Not to be deterred, The Aerospace Corporation presented their ideas to the U. S. DOT and to the White House Office of Science and Technology, busy in 1970 developing a "New Technologies Initiatives Program." As the OST leadership and consultants had not been immersed in the conventional transit industry and their detailed questions of the Aerospace team were satisfactorily answered, they recommended and President Nixon announced in his Budget Message to Congress in January 1971 a program to develop a system along the lines that Aerospace had developed. The White House then directed UMTA to divert $20,000,000 into a High-Capacity PRT program, but UMTA leadership for their own reasons ignored the request; so OST interested NASA in PRT development. Consequently, a plan for a NASA Advanced
Personal Rapid Transit Development Program was born. By Fall 1972, OST had convinced DOT to cooperate with the NASA program; however, after the November 1972 election President Nixon replaced all of his appointees with new people, who had no commitment to the budding PRT program.

Notwithstanding a “Memorandum-of-Understanding” party at NASA in December 1972, within UMTA, the NASA PRT program stalled; however, on March 27, 1973 the new UMTA administrator Frank Herringer, in testimony to Congress, made the statement: “A DOT program leading to the development of a short, one-half to one-second headway, high-capacity PRT system will be initiated in fiscal year 1974”99. PRT development was within the charter of UMTA and they were not going to let another agency take the lead. In an unexpected way the objective of OST seemed to have been realized. The program was along the lines of The Aerospace Corporation plans. The request for proposals was ready to be released in August 1974, but, because of heavy lobbying from interests fearful of becoming irrelevant if a genuine PRT program became visible, the HCPRT program was diverted into a modest technology development program. From that time forward people interested in HCPRT were unable to obtain UMTA research funding. The door was closed, not for technical reasons, but for turf protection. While extremely disappointed, The Aerospace Corporation did a great service by publishing a book100 on their work, which provides an excellent foundation for future PRT development programs.

Continued Efforts

The idea of PRT would not die; it made too much sense.

DEMAG+MBB, the developers of the German Cabintaxi PRT system, continued to market their systems. Because they were still active and had been testing full scale since 1973, Cabintaxi was included in 1979 in a study of automated guideway transit systems for Downtown Indianapolis, funded by the Indiana State Assembly. The 3-passenger Cabintaxi system was found to be the most cost-effective of systems having vehicle capacities of 100, 60, 40, 20, 12 and 3 persons. The study verified the result that the total cost per passenger-mile decreased as vehicle capacity decreased. There are many reasons for this conclusion, which became apparent from a comprehensive study of the cost per passenger-mile of all transit systems11. Unfortunately, a severe economic crisis in 1980 caused the Federal Republic of Germany to cancel support of the Cabintaxi program; however, it is still being marketed in the United States, and I wish them success. The Cabintaxi people did a great deal of useful work that is of considerable value to that or any future PRT development program12. This is true also of many other PRT programs, most of which are reported in the proceedings of the International Conferences on PRT13.

After the Cabintaxi program was canceled, my colleague transportation engineer, Raymond MacDonald, and I saw an opportunity to combine in a new PRT design what we had learned over the past dozen years about PRT related to required performance, design criteria, and technological advances and limitations. Beginning with the Fall Quarter of 1981, I was able to start such a design as a project in the senior mechanical engineering design program at the University of Minnesota. By Winter 1982 basic ideas I thought may be patentable had clarified and we began the patent disclosure process. By June 1982, the University of Minnesota Patent Office was sufficiently impressed that they gave me a $100,000 patent development grant, which enabled two of my best graduate students and me to spend full time for a year developing and costing the design. In June 1983, with the help of University administrators, a company was formed, which was later called Taxi 2000 Corporation. This action provided funds to enable us to continue to work full time on the project. In the Winter of 1984 the Davy McKee Corporation Chicago office became sufficiently interested to fund a larger engineering effort, which significantly advanced the details and credibility of the design. But it turned out to be difficult to raise the kind of funds needed to design and build a test system.

During the Summer of 1986, I was attracted to Boston University with the prospect of finding the necessary backing. There I had time to further the design, teach courses that attracted able students to PRT, and to make contacts with engineers in the Boston Area. From Raytheon Company, the Transportation Systems Center of the U.S. DOT, Arthur D. Little, and other organizations I found it possible to attract an excellent team of engineers and planners to further advance the design in our own free time, excited to be contributing to something really worthwhile. Within a year, because of the interest of Professor Charles Harris, we were also working with a Land Development Studio at Harvard University, which added greatly to our credibility mainly by sparking the interest of a Dutch development group. The single key factor that made progress possible in the 1980's without financial support was the ability of each of us to own
Reciprocity, Volume XXVI, Number 1, Spring 1997

a personal computer essential for the many calculations needed to round out the design. We were soon working with Raytheon executives who provided additional credibility and modest but essential resources.

As a result of contacts made in Chicago while working at Davy McKee, in May 1989 we were able to meet Gayle Franzen, recently appointed Chairman of the Northern Illinois Regional Transportation Authority. He and his predecessor Sam Skinner had been saying that they knew they could not solve the problems of transportation in the Chicago Area with only more roads and conventional rail systems and that there must be a new idea that could help. A year before, the Advanced Transit Association had completed a comprehensive study of PRT\textsuperscript{14} and had concluded that they should urge that a PRT system be demonstrated. With the essential aid of Tom Floyd\textsuperscript{15}, then Chairman of ATRA, Franzen did his own investigation and became sufficiently impressed that he started a process that led in April 1990 to a request for proposals for two parallel PRT system designs.

Twelve companies submitted proposals. In cooperation with Taxi 2000 Corporation, Stone & Webster won one of the contracts, the other going to the Swiss firm Intamin A.G. The system design phase was started in March 1991 and the results were completed in Summer 1992. Unfortunately S&W could not provide matching funds for the next phase, so, in October 1992 Raytheon Company, cooperating with Taxi 2000 Corporation, was able to reenter the picture. In January 1993 Raytheon agreed to propose to be prime contractor for the second phase, which was to build a test facility and to test a PRT system based on the results of the design phase. In June 1993, the RTA awarded the test phase to Raytheon, which was underway on October 1, 1993. Raytheon redesigned the system and expects to be ready in Fall 1996 to test a system with three vehicles and one off-line station on a half-mile oval guideway at their facility in Marlborough, Massachusetts.

Largely as a result of the Chicago initiative, interest in PRT is expanding rapidly to the point that a conference will be held in Minneapolis on November 18-21 called the International Conference on PRT and Other Emerging Transportation Systems.

Work on PRT or Dual Mode systems is now underway in Sweden, England, Denmark, Finland, France, Korea, Australia, Canada and in several locations in the United States. There is now a substantial body of literature on PRT and related systems and a wide variety of implementations are being considered, some of which seem to me to have a bright future, others of which don't. The feasibility of PRT, with the right set of features, has long been shown, but there is too little agreement on the features needed to minimize costs while maintaining adequate performance.

Advice for Future PRT Developers

PRT development involves the integrated design of control systems, vehicles, guideways, stations, and maintenance facilities. Today the state of the art in microprocessors, variable-frequency drives, composites, computerized design tools, and fault-tolerant software make the development of PRT much easier than it was in 1973. From my experience, the most commonly misunderstood factor is that the design of a PRT guideway is not routine. Its cost must be minimized while meeting a complex range of criteria (I accumulated about 25 such criteria). PRT guideway design is a highly challenging task requiring the best structural engineers that can be found willing to become informed of all factors that affect the acceptability and cost-effectiveness of a design. Making use of all of the prior sources I could find, I attempted in the mid 1970's to assemble the required knowledge in a textbook\textsuperscript{16}, which, as a result of further research and teaching in the area of transit systems analysis and design, I have frequently updated. Such knowledge needs to be expanded through government-sponsored research, which is now happening at least in Sweden and England.

The design and test of an economically viable PRT system that can meet all of the requirements of capacity, safety, reliability, personal security, comfort, and visual impact is a challenging task that is yet to be completed successfully. That such a design is practical I have no doubt. The problem is highly interdisciplinary and requires that the engineering team be experienced in planning PRT systems in many specific settings, working thereby with planners, developers and interested citizens so that the criteria for a successful design can be thoroughly understood.

PRT and Intelligent Vehicle Highway Systems

At the beginning of this paper, I mentioned the extensive work currently being done on intelligent vehicle highway systems.

While descriptions of that work mentions public
transit systems, the only existing government support today is for planning and construction of existing transit systems notwithstanding their proven incapability of solving key problems of congestion and air pollution. In the early 1970's the U.S. Federal Government and the Minnesota State Legislature understood the advantages of PRT systems and attempted to develop them, but at a time when there was not enough hard evidence of the inadequacy of conventional transit systems and when it was believed that money was available to deploy such systems. Today, budget balancing is the order of the day and much evidence is available of the ineffectiveness of rail systems in all but the densest cities. It needs to be recognized that a combination of IVHS, buses and PRT is the most promising means available for the solution of urban transportation problems.

In the lower-density portions of a city, automobiles and buses are essential. The problem comes in reducing congestion and air pollution in the central city. Surface-level streetcars take too much space, cause too many accidents, are too slow, and are too expensive for the ridership they generate, and subways are prohibitively expensive. A PRT system connected with parking structures on low-cost land on the periphery of the central city can act as an efficient circulator within the central city, thus creating a remarkably improved inner-city environment. A number of studies of such systems have been made and need to be correlated with the extensive research underway on IVHS. Only in this way, I believe, can many of the problems of the inner city, which are usually transportation-related, be solved.

Based on past experience, it is essential that any government program involving PRT be managed out of an organization devoted only to R&D, not to providing capital grants for existing systems. Political deadlines must be avoided. In a manner similar to the old National Advisory Committee for Aeronautics, the predecessor of NASA, such an organization should do the analysis and testing needed to optimize PRT systems but should leave the demonstration of such systems to private industry.

PRT and IVHS people can and need to work together for the benefit of cities everywhere. To adapt an old phrase: “United we can succeed, divided we will fail.”

References


Continued on Page 36...
# Index to the Back Issues of Reciprocity
The First Quarter Century, Volumes I thru XXV

<table>
<thead>
<tr>
<th>Article</th>
<th>Author(s)</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Volume I, Number 1 (August, 1971)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gleanings from the Literature</td>
<td>Paul deLepinsasse, George W. Hancock,</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Douglas Cramer</td>
<td></td>
</tr>
<tr>
<td>Publication Assistance</td>
<td>Paul deLepinsasse, George W. Hancock,</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Douglas Cramer</td>
<td></td>
</tr>
<tr>
<td>Policies and Objectives</td>
<td>Paul deLepinsasse, George W. Hancock,</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Douglas Cramer</td>
<td></td>
</tr>
<tr>
<td>Do You Have a Question?</td>
<td>Dewey B. Larson</td>
<td>2</td>
</tr>
<tr>
<td>Just What Do We Claim</td>
<td>Dewey B. Larson</td>
<td>3</td>
</tr>
<tr>
<td>Let Us Hear From You</td>
<td>Douglas Cramer</td>
<td>4</td>
</tr>
<tr>
<td><strong>Volume I, Number 2 (September, 1971)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Special Issue</td>
<td>Editor</td>
<td>1</td>
</tr>
<tr>
<td>Professor Meyer's Paper on Perihelion Preccession &amp; NSA Membership Information</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Philosophers Ahoy!</td>
<td>Editor</td>
<td>2</td>
</tr>
<tr>
<td>The Question Box</td>
<td>Unknown</td>
<td>3</td>
</tr>
<tr>
<td><em>If space-time is fundamental, how can you tell it's moving?</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Volume II, Number 1 (January, 1972)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Larson's November Lecture Tour</td>
<td>Editor</td>
<td>1</td>
</tr>
<tr>
<td>The View from Abroad</td>
<td>Editor</td>
<td>1</td>
</tr>
<tr>
<td>Mathematics Can Be Simple</td>
<td>Editor</td>
<td>2</td>
</tr>
<tr>
<td>A Gap in the Armour of Science</td>
<td>Unknown</td>
<td>4</td>
</tr>
<tr>
<td><em>Are we losing time in recognizing discoveries?</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Review of 'The Case Against the Nuclear Atom'</td>
<td>Unknown</td>
<td>4</td>
</tr>
<tr>
<td><em>From DISCOVERY (London), July, 1963</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Review by Prof. F. Schmeidler of the University of Munich</td>
<td>F. Schmeidler</td>
<td>5</td>
</tr>
<tr>
<td><em>Published in Naturwissenschaftliche Rundschau, Sep. 1966,</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td>English version translated by Prof. Stuart Smith</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Volume II, Number 2 (December, 1972)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Palomar Astronomer Sees Evidence of New State of Matter</td>
<td>Editor</td>
<td>1</td>
</tr>
<tr>
<td>Those Wayward Particles</td>
<td>Editor</td>
<td>3</td>
</tr>
<tr>
<td>The Changing of the Guard</td>
<td>Editor</td>
<td>3</td>
</tr>
<tr>
<td>The Test of Time</td>
<td>Editor</td>
<td>5</td>
</tr>
<tr>
<td><strong>Volume III, Number 1 (April, 1973)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Space, Time and Motion</td>
<td>Frank H. Meyer</td>
<td>1</td>
</tr>
<tr>
<td><strong>Volume III, Number 2 (September, 1973)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Space-Time Discrete or a Continuum?</td>
<td>Frank H. Meyer</td>
<td>1</td>
</tr>
<tr>
<td>On Frederick Ferre and Adolf Gruenbaum</td>
<td>Carla Rueckert</td>
<td>3</td>
</tr>
<tr>
<td>Volume, Number, Issue</td>
<td>Article</td>
<td>Author(s)</td>
</tr>
<tr>
<td>-----------------------</td>
<td>------------------------------------------------------------------------</td>
<td>----------------------------------</td>
</tr>
<tr>
<td>Volume III, Number 3</td>
<td>Gravitational Motion an Interaction?</td>
<td>Unknown</td>
</tr>
<tr>
<td></td>
<td>Letter to the Editor</td>
<td>Dewey B. Larson</td>
</tr>
<tr>
<td>Volume IV, Number 1</td>
<td>Quasars and Pulsars</td>
<td>Unknown</td>
</tr>
<tr>
<td></td>
<td>Review reprinted from <em>The Indian Journal of Physics</em></td>
<td>Editor</td>
</tr>
<tr>
<td></td>
<td>The Lorentz Transformation</td>
<td>Editor</td>
</tr>
<tr>
<td>Volume IV, Number 2</td>
<td>On Space Translation</td>
<td>Dewey B. Larson, Frank H. Meyer</td>
</tr>
<tr>
<td></td>
<td>The Gravitational Formula at High Velocities</td>
<td>Ronald W. Satz</td>
</tr>
<tr>
<td></td>
<td>How It Is with Reciprocity</td>
<td>Editor</td>
</tr>
<tr>
<td></td>
<td>Eddington on deSitter vs Einstein Physics</td>
<td>George Windolph</td>
</tr>
<tr>
<td>Volume IV, Number 3</td>
<td>New Research Program Concerning Cohesion of Solids</td>
<td>Editor</td>
</tr>
<tr>
<td></td>
<td>Physics-On the Move?</td>
<td>George Windolph</td>
</tr>
<tr>
<td></td>
<td>Theory of Solids</td>
<td>Dewey B. Larson</td>
</tr>
<tr>
<td></td>
<td>Have You Seen</td>
<td>E. L. Lippert</td>
</tr>
<tr>
<td></td>
<td>Incorporation of NSA</td>
<td>ISUS</td>
</tr>
<tr>
<td>Volume V, Number 1</td>
<td>Neutron Stars, Black Holes, etc.; Facts or Fiction?</td>
<td>Editor</td>
</tr>
<tr>
<td></td>
<td>Development of the Reciprocal Theory Continues</td>
<td>Editor</td>
</tr>
<tr>
<td></td>
<td>Campaign to Incorporate New Science Advocates</td>
<td>Editor</td>
</tr>
<tr>
<td></td>
<td>Astronomical X-ray Sources</td>
<td>Dewey B. Larson</td>
</tr>
<tr>
<td>Volume V, Number 2</td>
<td>New Particles Puzzle Scientists</td>
<td>Editor</td>
</tr>
<tr>
<td></td>
<td>Letter to the Editor</td>
<td>Frank A. Anderson</td>
</tr>
<tr>
<td></td>
<td>Cosmic Rays and Elementary Particles</td>
<td>Ronald W. Satz</td>
</tr>
<tr>
<td></td>
<td>Letter to the Editor</td>
<td>Dewey B. Larson</td>
</tr>
<tr>
<td>Volume V, Number 3</td>
<td>Symmetry Between Three-Dimensional Time and Space</td>
<td>Frank H. Meyer</td>
</tr>
<tr>
<td></td>
<td>Some Anniversary Thoughts</td>
<td>Dewey B. Larson</td>
</tr>
<tr>
<td></td>
<td>The Two-Photon Problem</td>
<td>Ronald W. Satz</td>
</tr>
<tr>
<td>Volume VI, Number 1</td>
<td>Problem of Swift ‘Action at a Distance’</td>
<td>Rainer F. Huck</td>
</tr>
<tr>
<td></td>
<td>NSA, Incorporated</td>
<td>ISUS</td>
</tr>
<tr>
<td></td>
<td>Letter to the Editor; <em>The Crab Nebula Pulsar</em></td>
<td>Dewey B. Larson</td>
</tr>
<tr>
<td></td>
<td>Benjamin Franklin’s Concept of Time</td>
<td>Frank H. Meyer</td>
</tr>
<tr>
<td>Volume VI, Number 2</td>
<td>Finite Gravitational Limits</td>
<td>Frank H. Meyer</td>
</tr>
<tr>
<td></td>
<td>The Gravitational Attraction of the Galaxy</td>
<td>Ronald W. Satz</td>
</tr>
<tr>
<td></td>
<td>First Annual NSA Conference, August 20-21, 1976</td>
<td>ISUS</td>
</tr>
<tr>
<td></td>
<td>*Owre Hall Auditorium III, University of Minnesota, MN</td>
<td></td>
</tr>
<tr>
<td></td>
<td>About the Non-existence of a Velocity Limit Equal to the Speed of Light</td>
<td>Thomas E. Phipps</td>
</tr>
<tr>
<td></td>
<td>The Myth of the Quark</td>
<td>Editor</td>
</tr>
<tr>
<td>Volume VI, Number 3</td>
<td>Relative Motion and Length Measurement</td>
<td>Steve M. Berline</td>
</tr>
<tr>
<td></td>
<td>The Case of the Colliding Photons</td>
<td>Dewey B. Larson</td>
</tr>
</tbody>
</table>
## Index of Reciprocity, Volumes I thru XXV

### Volume VII, Number 1 (January, 1977)
- The Mechanism of the Universe ........................................... Dewey B. Larson .............................................. 6
- Four Scientific Mysteries Unraveled ................................. Ronald W. Satz .............................................. 20

### Volume VII, Number 2 (June, 1977)
- Atomic Numbers Revalued ............................................. Frank H. Meyer .............................................. 3
- White Lies About Black Holes .................................... Ronald W. Satz .............................................. 10
- Exchange on Perihelion Motion of Mercury ...................... Frank H. Meyer .............................................. 14
- Hubble’s Law and the Reciprocal System ......................... Ronald W. Satz .............................................. 18
- Motion: The Substance of Space-Time and Matter ............ Frank H. Meyer .............................................. 20

### Volume VII, Number 3 (October, 1977)
- Some Comments by H.F. Wuenischer at Second NSA Conference ........ Hans F. Wuenischer .............................................. 2
- Some Decisions of the Second Annual NSA Conference \( \ldots \) ISUS .............................................. 3
- Twenty Years’ Progress ............................................. Dewey B. Larson .............................................. 4
- Book Notices ......................................................... ISUS .............................................. 16
- Stellar Energy Generation in the Reciprocal System .......... Ronald W. Satz .............................................. 17
- Reference Systems .................................................. Dewey B. Larson .............................................. 23

### Volume VIII, Number 1 (Winter, 1977-1978)
- Invitation to Join NSA Correspondence Club ................. ISUS .............................................. 1
- Ball Lighting ......................................................... Rainer F. Huck .............................................. 4
- The Doppler Shift and the Reciprocal System ................... Steve M. Berline .............................................. 8
- What Is To Be Done? ................................................... Editor .............................................. 4
- Theory and Design of the New Rational Combustion Engine .... Ronald W. Satz .............................................. 5
- Birth of the New Physics .............................................. Frank H. Meyer .............................................. 6

### Volume VIII, Number 2 (Spring, 1978)
- Building the Reciprocal Correspondence Club ................. ISUS .............................................. 1
- A Model of Motion Equilibrium .................................... Paul deLespinasse .............................................. 2
- Third Annual Conference of the New Science Advocates .... ISUS .............................................. 3
- Dewey Larson comes to Utah ....................................... ISUS .............................................. 3
- What Is To Be Done? ................................................... Editor .............................................. 4
- Theory and Design of the New Rational Combustion Engine .... Ronald W. Satz .............................................. 5
- Birth of the New Physics .............................................. Frank H. Meyer .............................................. 6

### Volume VIII, Number 3 (Summer, 1978)
- Publish D.B. Larson’s Masterpiece .............................. Frank A. Anderson .............................................. 1
- More on Solid Cohesion Theory .................................... Dewey B. Larson .............................................. 3

### Volume VIII, Number 4 (Autumn, 1978)
- Letter on Redshifts .................................................... Paul deLespinasse .............................................. 4
- Memo on Presale of New Book .................................... Phillip H. Porter .............................................. 6
- The Fundamentals of Science in the 21st Century ............ Dewey B. Larson .............................................. 7
- The Cohesive Energies of Crystals of the Elements .......... Ronald W. Satz .............................................. 18
- Discussion of Larson’s Gravitational Equation ............... Ronald W. Satz .............................................. 23
- Comments on Some Issues Raised at the 1978 Conference .... Dewey B. Larson .............................................. 25

### Volume IX, Number 1 (Spring, 1979)
- Preparations for Fourth Annual NSA Conference ............. ISUS .............................................. 1
- Announcement of Fourth Annual NSA Conference ............. ISUS .............................................. 1
- Announcement of Invited Larson Lecture ....................... ISUS .............................................. 1
- 1979, Einstein Centennial and Updating of Larson’s Work ... ISUS .............................................. 2
- Comment about Larson’s Gravitational Equation ............. George Windolph .............................................. 3
- Cosmic Radiation and Other Half of Physical Universe .... Frank H. Meyer .............................................. 4
- Nuclear Fusion in Heaven and on Earth? ......................... Peter Kor .............................................. 14

*Lost Neutrinos Show Up, But Puzzle Remains*
<table>
<thead>
<tr>
<th>Article</th>
<th>Author(s)</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Response to G. Windolph’s Comment</td>
<td>Ronald W. Satz</td>
<td>15</td>
</tr>
<tr>
<td><strong>Volume IX, Number 2 (Summer, 1979)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>News of Coming Larson Lecture at Superior</td>
<td>ISUS</td>
<td>1</td>
</tr>
<tr>
<td>Fourth Annual NSA Conference Program Notes</td>
<td>ISUS</td>
<td>2</td>
</tr>
<tr>
<td>Directions in Physics</td>
<td>Frank H. Meyer</td>
<td>3</td>
</tr>
<tr>
<td>What Reviewers Say About Earlier Larson Books</td>
<td>ISUS</td>
<td>11</td>
</tr>
<tr>
<td>Time Region Particle Dynamics</td>
<td>Ronald W. Satz</td>
<td>12</td>
</tr>
<tr>
<td>Delay in Publication of Nothing But Motion</td>
<td>ISUS</td>
<td>15</td>
</tr>
<tr>
<td><strong>Volume IX, Number 3 (Autumn, 1979)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Developments of our NSA Movement</td>
<td>ISUS</td>
<td>1</td>
</tr>
<tr>
<td>Promotion of Arnold Studtmann’s Ph.D. Dissertation</td>
<td>ISUS</td>
<td>2</td>
</tr>
<tr>
<td>The Interaction Velocity of the Electric Force</td>
<td>Rainer F. Huck</td>
<td>3</td>
</tr>
<tr>
<td>Science Without Apologies</td>
<td>Dewey B. Larson</td>
<td>10</td>
</tr>
<tr>
<td>Increase in Mass versus Increase in Force</td>
<td>Fred Jansen</td>
<td>21</td>
</tr>
<tr>
<td>Mass-to-Light Ratio of Quasars in the Reciprocal System</td>
<td>Arnold Studtmann</td>
<td>23</td>
</tr>
<tr>
<td><strong>Volume X, Number 1 (Winter, 1979-1980)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NSA, Inc. at Huntsville in August</td>
<td>ISUS</td>
<td>1</td>
</tr>
<tr>
<td>Letter of John W. Campbell to F.V. Meyer</td>
<td>Editor</td>
<td>2</td>
</tr>
<tr>
<td>Mass More Constant Than Force</td>
<td>Frank H. Meyer</td>
<td>3</td>
</tr>
<tr>
<td>Bioelectronics</td>
<td>Paul Little</td>
<td>6</td>
</tr>
<tr>
<td>Unified Physics</td>
<td>Sheila Linn</td>
<td>8</td>
</tr>
<tr>
<td>Letter to Editor, James E. Jackson</td>
<td>James E. Jackson</td>
<td>9</td>
</tr>
<tr>
<td>Availability of Dr. Studtmann’s Dissertation</td>
<td>ISUS</td>
<td>9</td>
</tr>
<tr>
<td>What Reciprocity Is For</td>
<td>Frank H. Meyer</td>
<td>10</td>
</tr>
<tr>
<td>Speculations in Science and Technology</td>
<td>David Halprin</td>
<td>11</td>
</tr>
<tr>
<td>Matter and Gravitation</td>
<td>Roman Skorski</td>
<td>12</td>
</tr>
<tr>
<td>Minutes of NSA Annual Convention Business Meeting</td>
<td>ISUS</td>
<td>22</td>
</tr>
<tr>
<td><strong>Volume X, Number 2 (Spring, 1980)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Identification of Cosmic Particles 3695 MeV/C² and 3105 MeV/C³</td>
<td>Ronald W. Satz, Frank H. Meyer</td>
<td>1</td>
</tr>
<tr>
<td>Prospects for New Science Advocacy</td>
<td>ISUS</td>
<td>4</td>
</tr>
<tr>
<td>Fifth Annual NSA Conference Preparations</td>
<td>ISUS</td>
<td></td>
</tr>
<tr>
<td>Equation of State of Solid Matter</td>
<td>Ronald W. Satz</td>
<td>6</td>
</tr>
<tr>
<td>Some Thoughts and Ideas from Down Under</td>
<td>David Halprin</td>
<td>17</td>
</tr>
<tr>
<td><strong>Volume X, Number 3 (Autumn, 1980)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Motion: Mere Attribute of Matter?</td>
<td>Editor</td>
<td>1</td>
</tr>
<tr>
<td>Further Mathematics of the Reciprocal System</td>
<td>Ronald W. Satz</td>
<td>4</td>
</tr>
<tr>
<td>Letter to Editor: From Prof. K.V.K. Nehru, India</td>
<td>K.V.K. Nehru</td>
<td>15</td>
</tr>
<tr>
<td>Letter to Editor: From D.W. Chance, San Francisco</td>
<td>David W. Chance</td>
<td>16</td>
</tr>
<tr>
<td>New Science Advocates Fifth Annual Convention Minutes</td>
<td>ISUS</td>
<td>18</td>
</tr>
<tr>
<td>Invitation to Join NSA, Study Reciprocal System</td>
<td>ISUS</td>
<td>19</td>
</tr>
<tr>
<td><strong>Volume XI, Number 1 (Spring, 1981)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Letter of Hans to Director of Marshall Space Flight Center</td>
<td>Hans F. Wuenscher</td>
<td>3</td>
</tr>
<tr>
<td>Announcement of Sixth Annual NSA Convention</td>
<td>ISUS</td>
<td>3</td>
</tr>
<tr>
<td>Epitaph for Deceased NSA Leader, Hans Wuenscher</td>
<td>ISUS</td>
<td>7</td>
</tr>
<tr>
<td>Some Comments on Satz’s Paper</td>
<td>K.V.K. Nehru</td>
<td>8</td>
</tr>
<tr>
<td>Some Thoughts on the Reciprocal System</td>
<td>Dewey B. Larson, K.V.K. Nehru</td>
<td>10</td>
</tr>
<tr>
<td>The Levels of Existence; Book Review</td>
<td>Ronald W. Satz, K.V.K. Nehru</td>
<td>21</td>
</tr>
<tr>
<td>Gravitational Deflection of Light</td>
<td>K.V.K. Nehru</td>
<td>28</td>
</tr>
<tr>
<td>Gravitational Redshift</td>
<td>K.V.K. Nehru</td>
<td>32</td>
</tr>
</tbody>
</table>
# Index of Reciprocity, Volumes I thru XXV

<table>
<thead>
<tr>
<th>Article</th>
<th>Author(s)</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Presidents Column</td>
<td>Frank H. Meyer</td>
<td>33</td>
</tr>
<tr>
<td>Lifetimes of C-Atom Decays</td>
<td>K.V.K. Nehru</td>
<td>34</td>
</tr>
<tr>
<td><strong>Volume XI, Number 2 (Summer, 1981)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sixth Annual NSA Convention Program</td>
<td>ISUS</td>
<td>3</td>
</tr>
<tr>
<td>Questions to D. B. Larson</td>
<td>Homer Ballard</td>
<td>5</td>
</tr>
<tr>
<td>Letter to H. Ballard</td>
<td>Dewey B. Larson</td>
<td>6</td>
</tr>
<tr>
<td>A Note by R. W. Satz on Prof. K.V.K. Nehru's Comments</td>
<td>Ronald W. Satz</td>
<td>7</td>
</tr>
<tr>
<td>Some Myths of Modern Physics</td>
<td>Ronald W. Satz,</td>
<td>8</td>
</tr>
<tr>
<td>Frank H. Meyer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The Density Gradient in White Dwarf Stars</td>
<td>Dewey B. Larson</td>
<td>12</td>
</tr>
<tr>
<td><strong>Volume XI, Number 3 (Autumn, 1981)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prospects for Modern Physics</td>
<td>Frank H. Meyer</td>
<td>3</td>
</tr>
<tr>
<td>Scalar Motion</td>
<td>Dewey B. Larson</td>
<td>5</td>
</tr>
<tr>
<td>The Interaction of Alpha Particles and Gold Atoms</td>
<td>Ronald W. Satz</td>
<td>18</td>
</tr>
<tr>
<td>A New Explanation of Rutherford Scattering</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The Lifetime of the Muon (C-Argon)</td>
<td>K.V.K. Nehru</td>
<td>29</td>
</tr>
<tr>
<td>Minutes of the Sixth Annual Conference of the New Science Advocates</td>
<td>Ronald W. Satz</td>
<td>32</td>
</tr>
<tr>
<td>“To Search, to Correct, to Add”</td>
<td>Paul deLespinsasse</td>
<td>35</td>
</tr>
<tr>
<td><strong>Volume XII, Number 1 (Winter, 1981-1982)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A Proposal for a Crucial Experiment; Proving Rutherford Wrong</td>
<td>Ronald W. Satz</td>
<td>3</td>
</tr>
<tr>
<td>Solid Cohesion</td>
<td>Dewey B. Larson</td>
<td>4</td>
</tr>
<tr>
<td>Photoionization and Photomagnetization</td>
<td>Ronald W. Satz</td>
<td>19</td>
</tr>
<tr>
<td>Are Cosmic Rays Primary?</td>
<td>Frank H. Meyer</td>
<td>35</td>
</tr>
<tr>
<td><strong>Volume XII, Number 2 (Autumn, 1982)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The Mythical Universe of Modern Astronomy</td>
<td>Dewey B. Larson</td>
<td>1</td>
</tr>
<tr>
<td>Another Look at the Pulsar Phenomenon</td>
<td>K.V.K. Nehru</td>
<td>18</td>
</tr>
<tr>
<td>Progress on the Theoretical Calculation of the Cohesive Energy of the Elements</td>
<td>Ronald W. Satz</td>
<td>27</td>
</tr>
<tr>
<td><strong>Volume XII, Number 3 (Summer, 1983)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A rejoinder to K.V.K. Nehru</td>
<td>Dewey B. Larson</td>
<td>2</td>
</tr>
<tr>
<td>Theoretical Evaluation of Planck's Constant</td>
<td>K.V.K. Nehru</td>
<td>6</td>
</tr>
<tr>
<td>Dimensions in the Universe of Motion</td>
<td>Dewey B. Larson</td>
<td>9</td>
</tr>
<tr>
<td>A Note on Metaphysics</td>
<td>Dewey B. Larson</td>
<td>12</td>
</tr>
<tr>
<td><strong>Volume XIII, Number 1 (Autumn, 1983)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Theory of Electrons and Currents</td>
<td>Ronald W. Satz</td>
<td>1</td>
</tr>
<tr>
<td>The Lifetime of the Neutron</td>
<td>K.V.K. Nehru</td>
<td>4</td>
</tr>
<tr>
<td>Inter-Atomic Distances</td>
<td>Dewey B. Larson</td>
<td>8</td>
</tr>
<tr>
<td><strong>Volume XIII, Number 2 (Summer, 1984)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Distances in Compounds</td>
<td>Dewey B. Larson</td>
<td>1</td>
</tr>
<tr>
<td>Thoughts from Down Under</td>
<td>David Halprin</td>
<td>14</td>
</tr>
<tr>
<td>Note on the Force of the Space-Time Progression</td>
<td>Ronald W. Satz</td>
<td>20</td>
</tr>
<tr>
<td><strong>Volume XIII, Number 3 (Winter, 1985-1986)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A Graphical Comparison of the Old and New Periodic Tables</td>
<td>Maurice Gilroy</td>
<td>1</td>
</tr>
<tr>
<td>Relative Abundances of the Elements</td>
<td>K.V.K. Nehru</td>
<td>30</td>
</tr>
<tr>
<td>The Properties of Materials; A Classification</td>
<td>Ronald W. Satz</td>
<td>38</td>
</tr>
<tr>
<td><strong>Volume XIV, Number 1 (Autumn, 1985)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ISUS Call to Struggle</td>
<td>Unknown</td>
<td>1</td>
</tr>
<tr>
<td>This Issue and Things to Come</td>
<td>Unknown</td>
<td>2</td>
</tr>
<tr>
<td>Minutes of the Business Meeting of the 10th Annual Convention of the International Society of Unified Science</td>
<td>Ronald W. Satz</td>
<td>3</td>
</tr>
<tr>
<td>Article</td>
<td>Author(s)</td>
<td>Page</td>
</tr>
<tr>
<td>------------------------------------------------------------------------</td>
<td>-----------------------------</td>
<td>------</td>
</tr>
<tr>
<td>Motion and the Schism in Physics</td>
<td>Frank H. Meyer</td>
<td>6</td>
</tr>
<tr>
<td>Precession of the Planetary Perihelia Due to Co-ordinate Time</td>
<td>K.V.K. Nehru</td>
<td>11</td>
</tr>
<tr>
<td>Motion, Not a Property of Matter</td>
<td>Frank H. Meyer</td>
<td>14</td>
</tr>
<tr>
<td><strong>Volume XIV, Number 2 (Winter, 1985-1986)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gravitation and the Galaxies</td>
<td>Dewey B. Larson</td>
<td>2</td>
</tr>
<tr>
<td>The Inter-regional Ratio</td>
<td>K.V.K. Nehru</td>
<td>5</td>
</tr>
<tr>
<td>The Nature of Scalar Rotation</td>
<td>K.V.K. Nehru</td>
<td>10</td>
</tr>
<tr>
<td>A New Taxonomy for Scientific Knowledge</td>
<td>Ronald W. Satz</td>
<td>21</td>
</tr>
<tr>
<td>A New Mathematics for Scalar Motion?</td>
<td>Jan N. Sammer</td>
<td>30</td>
</tr>
<tr>
<td>Can Gravitation Collapse Stars?</td>
<td>Frank H. Meyer</td>
<td>32</td>
</tr>
<tr>
<td><strong>Volume XV, Number 1 (Spring, 1986)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The Dimensions of Motion</td>
<td>Dewey B. Larson</td>
<td>1</td>
</tr>
<tr>
<td>The Gravitational Deflection of Radiation Path</td>
<td>Dewey B. Larson</td>
<td>8</td>
</tr>
<tr>
<td>The Dissociation Energy of Diatomic Molecules</td>
<td>Ronald W. Satz</td>
<td>11</td>
</tr>
<tr>
<td>On the Recent Evolution of Sirius</td>
<td>Jan N. Sammer</td>
<td>15</td>
</tr>
<tr>
<td>Ionization Potentials of Heavy Elements</td>
<td>Brian Fraser</td>
<td>16</td>
</tr>
<tr>
<td>Existsents and Interactions</td>
<td>Ronald W. Satz</td>
<td>18</td>
</tr>
<tr>
<td><strong>An Intense Course on the Reciprocal System</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The XI(^{st}) Annual Convention of the International Society of Unified Science</td>
<td>ISUS</td>
<td>19</td>
</tr>
<tr>
<td><strong>Volume XV, Number 2 (Summer, 1986)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Just How Much Do We Really Know?</td>
<td>Dewey B. Larson</td>
<td>1</td>
</tr>
<tr>
<td>Electric Ionization</td>
<td>K.V.K. Nehru</td>
<td>16</td>
</tr>
<tr>
<td>Correspondence</td>
<td>K.V.K. Nehru</td>
<td>27</td>
</tr>
<tr>
<td>Announcement; <em>Basic Properties of Matter</em> almost done</td>
<td>ISUS</td>
<td>28</td>
</tr>
<tr>
<td><strong>Volume XVI, Number 1 (Summer, 1987)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Revaluation of Modern Superconductivity Theory</td>
<td>Editor</td>
<td>1</td>
</tr>
<tr>
<td><strong>An Editorial</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Announcement of Next Summer’s ISUS Conference</td>
<td>ISUS</td>
<td>1</td>
</tr>
<tr>
<td>President’s Message</td>
<td>Frank H. Meyer</td>
<td>2</td>
</tr>
<tr>
<td>New Book Announcement; <em>Basic Properties of Matter</em>*</td>
<td>Editor</td>
<td>2</td>
</tr>
<tr>
<td>Call for Support of ISUS and Reciprocity</td>
<td>Editor</td>
<td>5</td>
</tr>
<tr>
<td>Draft Letter to Friends of Science</td>
<td>Dewey B. Larson</td>
<td>6</td>
</tr>
<tr>
<td>Towards a Larsonian Model of Superconductivity</td>
<td>Paul deLespinasse</td>
<td>13</td>
</tr>
<tr>
<td>Superconductivity Letter to 1987 Conference</td>
<td>Dewey B. Larson</td>
<td>14</td>
</tr>
<tr>
<td>Response Letter to D.B. Larson</td>
<td>Frank H. Meyer</td>
<td>15</td>
</tr>
<tr>
<td>Minutes of Twelfth Annual ISUS Conference</td>
<td>Ronald W. Satz</td>
<td>16</td>
</tr>
<tr>
<td>Announcement of This Summer’s ISUS Conference</td>
<td>Editor</td>
<td>1</td>
</tr>
<tr>
<td>Letter to the Editor</td>
<td>Edwin Navarro</td>
<td>2</td>
</tr>
<tr>
<td>Letter to the Editor</td>
<td>Frank H. Meyer</td>
<td>4</td>
</tr>
<tr>
<td>The Larsonian Concept of the Atomic Number</td>
<td>Frank H. Meyer,</td>
<td>5</td>
</tr>
<tr>
<td>The Gravitational Limit and The Hubble’s Law</td>
<td>K.V.K. Nehru</td>
<td>11</td>
</tr>
<tr>
<td>Globular Cluster Mechanics in the Reciprocal System</td>
<td>Ronald W. Satz</td>
<td>17</td>
</tr>
<tr>
<td>Space-Time and Motion; <em>Their Connection/Equivalence</em>*</td>
<td>David Halprin,</td>
<td>22</td>
</tr>
<tr>
<td></td>
<td>Frank H. Meyer</td>
<td></td>
</tr>
<tr>
<td><strong>Volume XVII, Number 1 (Spring, 1988)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The International Society of Unified Science</td>
<td>ISUS</td>
<td>1</td>
</tr>
<tr>
<td>13(^{th}) Annual Convention AGENDA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Announcement RE Accommodation for the ISUS Conference 1988</td>
<td>Robin V. Sims</td>
<td>2</td>
</tr>
<tr>
<td>For Better Teaching the Reciprocal System</td>
<td>Frank H. Meyer</td>
<td>3</td>
</tr>
<tr>
<td>Article</td>
<td>Author(s)</td>
<td>Page</td>
</tr>
<tr>
<td>------------------------------------------------------------------------</td>
<td>-------------------------</td>
<td>------</td>
</tr>
<tr>
<td>President's Message</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Outline of the Deductive Development of the Theory of the Universe of Motion</td>
<td>Dewey B. Larson</td>
<td>6</td>
</tr>
<tr>
<td>Section I</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Outline of the Deductive Development of the Theory of the Universe of Motion</td>
<td>Dewey B. Larson</td>
<td>12</td>
</tr>
<tr>
<td>Section II</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intrinsic Variables, Supernovae and the Thermal Limit</td>
<td>K.V.K. Nehru</td>
<td>20</td>
</tr>
<tr>
<td><strong>Volume XVII, Number 2 (Autumn, 1988)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Commemoration of Dewey B. Larson's 90th Birthday</td>
<td>ISUS</td>
<td>1</td>
</tr>
<tr>
<td>Comments on Letter from Edwin Navarro in Winter 1987-88 Issue of Reciprocity</td>
<td>Dewey B. Larson</td>
<td>2</td>
</tr>
<tr>
<td>A Note on the Cosmic Proton</td>
<td>Ronald W. Satz</td>
<td>6</td>
</tr>
<tr>
<td>Response to 'A Note on the Cosmic Proton'</td>
<td>Dewey B. Larson</td>
<td>7</td>
</tr>
<tr>
<td>Permittivity, Permeability and the Speed of Light in the Reciprocal System</td>
<td>Ronald W. Satz</td>
<td>8</td>
</tr>
<tr>
<td>Glimpses into the Structure of the Sun: Part I</td>
<td>K.V.K. Nehru</td>
<td>14</td>
</tr>
<tr>
<td><strong>The Nature of the Stellar Matter</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Outline of the Deductive Development of the Theory of the Universe of Motion</td>
<td>Dewey B. Larson</td>
<td>22</td>
</tr>
<tr>
<td>Section III</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Volume XVIII, Number 1 (Winter, 1988-1989)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The Current Status of Physical Theory</td>
<td>Dewey B. Larson</td>
<td>6</td>
</tr>
<tr>
<td>Letter of Frank Meyer to Maurice Gilroy about the Michelson-Morley Experiment</td>
<td>Frank H. Meyer</td>
<td>14</td>
</tr>
<tr>
<td><strong>Symmetry between Space &amp; Time, etc., March 11, 1989</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Glimpses Into the Structure of the Sun, Part II</td>
<td>K.V.K. Nehru</td>
<td>21</td>
</tr>
<tr>
<td><strong>The Solar Interior and the Sunspots</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The Unit of Magnetic Charge</td>
<td>Ronald W. Satz</td>
<td>32</td>
</tr>
<tr>
<td><strong>Volume XVIII, Number 2 (Spring, 1989)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Case for Giving the Reciprocal System a Public Hearing</td>
<td>Frank H. Meyer</td>
<td>1</td>
</tr>
<tr>
<td>Time is the Essence</td>
<td>Dewey B. Larson</td>
<td>4</td>
</tr>
<tr>
<td>A Tall Tale: Review of A Brief History of Time</td>
<td>Ronald W. Satz</td>
<td>10</td>
</tr>
<tr>
<td>Accomodations for ISUS Portland 1989 Conference</td>
<td>Phillip H. Porter</td>
<td>14</td>
</tr>
<tr>
<td>What is a Photon?</td>
<td>Frank H. Meyer</td>
<td>15</td>
</tr>
<tr>
<td>Simple Vibratory Motion in the Reciprocal System</td>
<td>David Halprin</td>
<td>24</td>
</tr>
<tr>
<td>The Metaphysics of Motion</td>
<td>Maurice Gilroy</td>
<td>31</td>
</tr>
<tr>
<td>Letter of Chris Halvorson, March 24, 1989</td>
<td>Chris Halvorson</td>
<td>37</td>
</tr>
<tr>
<td><strong>With Questions About R.S.</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>New Edition of The Case Against the Nuclear Atom Model Ready</td>
<td>ISUS</td>
<td>40</td>
</tr>
<tr>
<td>Suggestions for Building More Models of R.S. Entities</td>
<td>Lawrence E. Denslow</td>
<td>41</td>
</tr>
<tr>
<td><strong>Volume XVIII, Number 3 (Autumn, 1989)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A New Derivation of Planck's Constant</td>
<td>Ronald W. Satz</td>
<td>1</td>
</tr>
<tr>
<td>The “Arrow of Time”</td>
<td>Dewey B. Larson</td>
<td>2</td>
</tr>
<tr>
<td>The Law of Conservation of Direction</td>
<td>K.V.K. Nehru</td>
<td>3</td>
</tr>
<tr>
<td>Supernova 1987A</td>
<td>Dewey B. Larson</td>
<td>7</td>
</tr>
<tr>
<td>Readers' Forum; The Rydberg Constant and Zeno's Paradox</td>
<td>Dewey B. Larson,</td>
<td>8</td>
</tr>
<tr>
<td>Jan N. Sammer, Frank H. Meyer, Pierre Marechal</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Volume XIX, Number 1 (Spring, 1990)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>How Accurate Can an Incorrect Theory Be?</td>
<td>Edwin Navarro</td>
<td>1</td>
</tr>
<tr>
<td>The Photon: Displacement in a Second Scalar Dimension</td>
<td>Thomas Kirk</td>
<td>3</td>
</tr>
<tr>
<td>Is Ferromagnetism a Co-Magnetic Phenomenon?</td>
<td>K.V.K. Nehru</td>
<td>6</td>
</tr>
<tr>
<td>Article</td>
<td>Author(s)</td>
<td>Page</td>
</tr>
<tr>
<td>------------------------------------------------------------------------</td>
<td>--------------------</td>
<td>------</td>
</tr>
<tr>
<td>The Constitution of the United States of America and</td>
<td>David Halprin</td>
<td>9</td>
</tr>
<tr>
<td>The Constitution of the United States of the Physical Universe</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Absolute Magnitudes of Physics</td>
<td>Frank H. Meyer</td>
<td>14</td>
</tr>
<tr>
<td>Discussion of Satz' Derivation of Planck's Constant</td>
<td>K.V.K. Nehru</td>
<td>19</td>
</tr>
<tr>
<td>1990 ISUS Annual Summer Conference</td>
<td>ISUS</td>
<td>21</td>
</tr>
<tr>
<td><strong>Volume XIX, Number 2 (Summer, 1990)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Home Grown Unified Theory Yet to Rock World of Science</td>
<td>Deston S. Nokes</td>
<td>1</td>
</tr>
<tr>
<td>Letter of Deston S. Nokes, June 19, 1990</td>
<td>Frank H. Meyer</td>
<td>3</td>
</tr>
<tr>
<td>Letter of May 29th, 1990 to Dorothy Larson</td>
<td>Ronald W. Satz</td>
<td>4</td>
</tr>
<tr>
<td>The Photon: Displacement in a Second Scalar Dimension</td>
<td>Thomas Kirk</td>
<td>5</td>
</tr>
<tr>
<td>The Revision</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Che Sara Sara</td>
<td>David Halprin</td>
<td>13</td>
</tr>
<tr>
<td><em>(Was Kann Sein, Soll Sein, Que Sera Sera)</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time Exploration</td>
<td>Frank H. Meyer,</td>
<td>18</td>
</tr>
<tr>
<td>Daeron P. N. Meyer</td>
<td>Thomas Kirk</td>
<td></td>
</tr>
<tr>
<td><strong>Questioning the Law of Conservation of Direction</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Volume XIX, Number 3 (Autumn, 1990)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Superconductivity; A Time Region Phenomenon</td>
<td>K.V.K. Nehru</td>
<td>1</td>
</tr>
<tr>
<td>Discussion of Kirk's Explanation of the Photon</td>
<td>K.V.K. Nehru</td>
<td>7</td>
</tr>
<tr>
<td>Comments on Halprin's Article on the United States</td>
<td>K.V.K. Nehru</td>
<td>9</td>
</tr>
<tr>
<td>Correcting Discrete Time/Space Measurement Procedures</td>
<td>Frank H. Meyer</td>
<td>11</td>
</tr>
<tr>
<td>A Note on Scalar Motion</td>
<td>Ronald W. Satz</td>
<td>12</td>
</tr>
<tr>
<td>Rebuttal to Comments of Nehru on 'A New Derivation of Planck's Constant'</td>
<td>Ronald W. Satz</td>
<td>13</td>
</tr>
<tr>
<td>Editorial and Letter to the Editor</td>
<td>Phillip H. Porter</td>
<td>1</td>
</tr>
<tr>
<td>The Algebraic Structure of the Reciprocal System</td>
<td>Edwin Navarro</td>
<td>3</td>
</tr>
<tr>
<td>More on Planck's Constant</td>
<td>K.V.K. Nehru</td>
<td>7</td>
</tr>
<tr>
<td><strong>Corrigenda to Superconductivity (Vol XIX, No 3, Autumn 1990)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Questions of Origins and Nature of Light and Matter</td>
<td>David Halprin</td>
<td>8</td>
</tr>
<tr>
<td>Larson's Physics and Origins of Matter and Mind</td>
<td>Keith R. Burgess</td>
<td>12</td>
</tr>
<tr>
<td>Response to Nehru's Evaluation of Kirk's and Halprin's Photon Theories</td>
<td>Thomas Kirk</td>
<td>13</td>
</tr>
<tr>
<td>Cosmic Background Radiation</td>
<td>K.V.K. Nehru</td>
<td>20</td>
</tr>
<tr>
<td><strong>Volume XX, Number 1 (Spring, 1991)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The Cosmic Background Radiation: Origin and Temperature</td>
<td>K.V.K. Nehru</td>
<td>1</td>
</tr>
<tr>
<td>Comments on the Manuscript of E. Navarro's Reciprocal Algebra</td>
<td>K.V.K. Nehru</td>
<td>6</td>
</tr>
<tr>
<td>Response to Nehru's Comments</td>
<td>Edwin Navarro</td>
<td>6</td>
</tr>
<tr>
<td>On the Nature of Rotation and Birotation</td>
<td>K.V.K. Nehru</td>
<td>8</td>
</tr>
<tr>
<td>Derivation of Reciprocal System Mathematics</td>
<td>Thomas Kirk</td>
<td>13</td>
</tr>
<tr>
<td>Derivation of Hydrogen Spectra Equations</td>
<td>Thomas Kirk</td>
<td>16</td>
</tr>
<tr>
<td><strong>Volume XX, Number 2 (Summer, 1991)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reference Systems and Speed Limits in the Reciprocal System</td>
<td>Ronald W. Satz</td>
<td>1</td>
</tr>
<tr>
<td>The Large-Scale Structure of the Physical Universe, Part 1</td>
<td>K.V.K. Nehru</td>
<td>5</td>
</tr>
<tr>
<td><strong>The Cosmic Bubbles</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Radio Component Separation in Quasars</td>
<td>K.V.K. Nehru</td>
<td>9</td>
</tr>
<tr>
<td>The Essence and Fabric of Mathematics</td>
<td>David Halprin</td>
<td>11</td>
</tr>
<tr>
<td>Space-Time Progression or Big Bang?</td>
<td>Frank H. Meyer</td>
<td>18</td>
</tr>
<tr>
<td><strong>Volume XX, Number 3 (Autumn, 1991)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Laws to Perception Based on Notions of Motions</td>
<td>David Halprin</td>
<td>1</td>
</tr>
<tr>
<td>Letter from A. Nonymous</td>
<td>Unknown</td>
<td>8</td>
</tr>
<tr>
<td>Motion Fundamentals</td>
<td>Thomas Kirk</td>
<td>10</td>
</tr>
</tbody>
</table>
Index of Reciprocity, Volumes I thru XXV

<table>
<thead>
<tr>
<th>Article</th>
<th>Author(s)</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dissecting the Birotational Photon</td>
<td>Thomas Kirk</td>
<td>14</td>
</tr>
<tr>
<td>Light Questions</td>
<td>Charles W. Bonner</td>
<td>20</td>
</tr>
<tr>
<td>The Large-Scale Structure of the Physical Universe, Part II</td>
<td>K.V.K. Nehru</td>
<td>23</td>
</tr>
<tr>
<td>Mathematical Aspects of the Cosmic Bubbles</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electronic Networking and ISUS</td>
<td>Hoyt A. Stearns Jr.</td>
<td>28</td>
</tr>
</tbody>
</table>

Volume XX, Number 4 (Winter, 1991-1992)

<table>
<thead>
<tr>
<th>Article</th>
<th>Author(s)</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>An Introduction to the Fundamentals of Scalar Motion</td>
<td>Lawrence E. Denslow</td>
<td>1</td>
</tr>
<tr>
<td>The Old and New Periodic Tables - Again</td>
<td>Jan N. Sammer</td>
<td>7</td>
</tr>
<tr>
<td>A Constructive Approach to Multi-Model Logical Data Base Design</td>
<td>Leonard L. Tripp, J. C. Cosgrove</td>
<td>14</td>
</tr>
<tr>
<td>More Details for the Proposed Crucial Experiment</td>
<td>Ronald W. Satz</td>
<td>22</td>
</tr>
<tr>
<td>A Note on the Nature of Undisplaced Space-Time</td>
<td>Ronald W. Satz</td>
<td>24</td>
</tr>
<tr>
<td>Comment on A. Nonymous Letter</td>
<td>Paul Little</td>
<td>25</td>
</tr>
</tbody>
</table>

Volume XXI, Number 1 (Spring, 1992)

<table>
<thead>
<tr>
<th>Article</th>
<th>Author(s)</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motion Prior to Rest</td>
<td>Frank H. Meyer</td>
<td>1</td>
</tr>
<tr>
<td>Birotation and the Doubts of Thomas</td>
<td>K.V.K. Nehru</td>
<td>6</td>
</tr>
<tr>
<td>The Case Against Symmetry</td>
<td>Thomas Kirk</td>
<td>10</td>
</tr>
<tr>
<td>The Quasar Paradox</td>
<td>K.V.K. Nehru</td>
<td>15</td>
</tr>
<tr>
<td>The Periodic Table</td>
<td>Robert V. Tucek</td>
<td>20</td>
</tr>
<tr>
<td>1992 ISUS Conference Information</td>
<td>ISUS</td>
<td>21</td>
</tr>
</tbody>
</table>

Volume XXI, Number 2 (Autumn, 1992)

<table>
<thead>
<tr>
<th>Article</th>
<th>Author(s)</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Executive Orders from ISUS President</td>
<td>Ronald W. Satz</td>
<td>1</td>
</tr>
<tr>
<td>More Calculations with the R.S. Scattering Equation</td>
<td>Ronald W. Satz</td>
<td>3</td>
</tr>
<tr>
<td>How Space and Time are Inseparable</td>
<td>Frank H. Meyer</td>
<td>5</td>
</tr>
<tr>
<td>Periodic Table, Revisited</td>
<td>Thomas Kirk</td>
<td>10</td>
</tr>
</tbody>
</table>

Volume XXII, Number 1 (Spring, 1993)

<table>
<thead>
<tr>
<th>Article</th>
<th>Author(s)</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>How the Physical World is Quantized</td>
<td>Dewey B. Larson</td>
<td>1</td>
</tr>
<tr>
<td>Clock Space, Coordinate Space, Clock Time, Coordinate Time</td>
<td>Ronald W. Satz</td>
<td>5</td>
</tr>
<tr>
<td>What is the Difference?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Volume XXII, Number 2 (Autumn, 1993)

<table>
<thead>
<tr>
<th>Article</th>
<th>Author(s)</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Detailed Steps for the Design and Performance of</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The Proposed Crucial Experiment</td>
<td>Ronald W. Satz</td>
<td>1</td>
</tr>
<tr>
<td>Wave Mechanics in the Light of the Reciprocal System</td>
<td>K.V.K. Nehru</td>
<td>8</td>
</tr>
<tr>
<td>Minkowski vs. Einstein on Space Translation</td>
<td>Frank H. Meyer</td>
<td>14</td>
</tr>
</tbody>
</table>

Volume XXIII, Number 1 (Spring, 1994)

<table>
<thead>
<tr>
<th>Article</th>
<th>Author(s)</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>How Light Speed is Constant</td>
<td>Rainer F. Huck, Frank H. Meyer</td>
<td>1</td>
</tr>
<tr>
<td>Corrections in Reciprocity, Vol. XXII, No. 2, Autumn, 1993 for</td>
<td></td>
<td></td>
</tr>
<tr>
<td>K.V.K.’s Wave Mechanics in Light of the Reciprocal System</td>
<td>K.V.K. Nehru</td>
<td>9</td>
</tr>
<tr>
<td>A Modified Explanation of the Reciprocal System of Theory</td>
<td>Lawrence E. Denslow</td>
<td>10</td>
</tr>
<tr>
<td>Reciprocal System in Brief</td>
<td>ISUS</td>
<td>20</td>
</tr>
</tbody>
</table>

Volume XXIII, Number 2 (Autumn, 1994)

<table>
<thead>
<tr>
<th>Article</th>
<th>Author(s)</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Liquid State in the Reciprocal System: The Volume/Pressure Relation</td>
<td>Ronald W. Satz</td>
<td>1</td>
</tr>
<tr>
<td>A Contemporary Mathematical Treatment, Part 1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Volume XXIII, Number 3 (Winter, 1994-1995)

<table>
<thead>
<tr>
<th>Article</th>
<th>Author(s)</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Are Motion and Space-Time Quantized?</td>
<td>Rainer F. Huck, Frank H. Meyer</td>
<td>1</td>
</tr>
</tbody>
</table>

Volume XXIV, Number 1 (Spring, 1995)

<table>
<thead>
<tr>
<th>Article</th>
<th>Author(s)</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>'Quantum Mechanics' as the Mechanics of the Time Region</td>
<td>K.V.K. Nehru</td>
<td>1</td>
</tr>
</tbody>
</table>

E 26.1-51
### Index of Reciprocity, Volumes I thru XXV

<table>
<thead>
<tr>
<th>Article</th>
<th>Author(s)</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Volume XXIV, Number 2 (Autumn, 1995)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time is the Essence</td>
<td>Dewey B. Larson</td>
<td>1</td>
</tr>
<tr>
<td>The Liquid State in the Reciprocal System: The Volume/Pressure Relation</td>
<td>Ronald W. Satz</td>
<td>7</td>
</tr>
<tr>
<td><em>A Contemporary Mathematical Treatment, Part 2</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Update Values for Unit Space and Unit Time</td>
<td>Bruce M. Peret</td>
<td>12</td>
</tr>
<tr>
<td>Sub-atomic Mass Recalculated</td>
<td>Bruce M. Peret</td>
<td>13</td>
</tr>
<tr>
<td>Laws of Mechanics in a 3-Dimensional Universe</td>
<td>Lawrence E. Denslow</td>
<td>17</td>
</tr>
<tr>
<td>Outward Equable Speed of Space-Time Progression</td>
<td>Unknown</td>
<td>21</td>
</tr>
<tr>
<td><strong>Volume XXV, Number 1 (Spring, 1996)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The Space-Time Universe; <em>Part I</em></td>
<td>K.V.K. Nehru</td>
<td>1</td>
</tr>
<tr>
<td>Finitude of the Physical</td>
<td>Frank H. Meyer</td>
<td>4</td>
</tr>
<tr>
<td>Sub-atomic Mass Recalculated Update</td>
<td>Bruce M. Peret</td>
<td>8</td>
</tr>
<tr>
<td><strong>Volume XXV, Number 2 (Autumn, 1996)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The Physical Nature of Space</td>
<td>Dewey B. Larson</td>
<td>3</td>
</tr>
<tr>
<td>Glimpses Into A New Paradigm</td>
<td>K.V.K. Nehru</td>
<td>7</td>
</tr>
<tr>
<td>Six Representational Modes and the Structure of the Photon</td>
<td>Lawrence E. Denslow</td>
<td>13</td>
</tr>
<tr>
<td>Sub-Atomic Particle Array; <em>A Revised Hypothesis</em></td>
<td>Thomas Kirk</td>
<td>17</td>
</tr>
<tr>
<td>The Space-Time Universe; <em>Part II</em></td>
<td>K.V.K. Nehru</td>
<td>22</td>
</tr>
<tr>
<td>Sub-atomic Mass Recalculated Update</td>
<td>Bruce M. Peret</td>
<td>25</td>
</tr>
<tr>
<td>Research Programme for ISUS</td>
<td>Ronald W. Satz</td>
<td>28</td>
</tr>
<tr>
<td>Outline of the Deductive Development of the Theory of the Universe of Motion..</td>
<td>Dewey B. Larson</td>
<td>30</td>
</tr>
<tr>
<td><strong>Section IV</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Volume XXV, Number 3 (Winter, 1996-1997)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A New Format for RECIPROCITY</td>
<td>Bruce M. Peret, Frank H. Meyer</td>
<td>3</td>
</tr>
<tr>
<td>Reciprocity Publication Policy</td>
<td>Thomas Kirk, Frank H. Meyer, Bruce M. Peret</td>
<td>4</td>
</tr>
<tr>
<td>Dr. Arnold Studtmann Has Been Found</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The Conceptual Foundations of Physical Science</td>
<td>Dewey B. Larson</td>
<td>6</td>
</tr>
<tr>
<td>Computing the Gravitational Constant</td>
<td>Hoyt A. Stearns Jr.</td>
<td>7</td>
</tr>
<tr>
<td>The Photon as Birotation</td>
<td>K.V.K. Nehru</td>
<td>10</td>
</tr>
<tr>
<td>The Space-Time Universe; <em>Part III</em></td>
<td>K.V.K. Nehru</td>
<td>11</td>
</tr>
<tr>
<td>A Crucial Test of Pulsar Theory</td>
<td>K.V.K. Nehru</td>
<td>17</td>
</tr>
<tr>
<td>The Social and Technological Implications of the Reciprocal System of Theory...</td>
<td>Robert V. Tucek</td>
<td>21</td>
</tr>
<tr>
<td>Dreams, Symbolism, and Allegory</td>
<td>Bruce M. Peret</td>
<td>23</td>
</tr>
<tr>
<td><em>The Effects of Life Units on Circulating Memory</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Infinitude of the Private Person</td>
<td>Otto Schmitt, Frank H. Meyer, Bruce M. Peret</td>
<td>27</td>
</tr>
<tr>
<td>The Roots of the Dilemmas</td>
<td>J. Edward Anderson</td>
<td>35</td>
</tr>
<tr>
<td>Postcard from The Scientific and Medical Network</td>
<td>David Lorimer</td>
<td>41</td>
</tr>
</tbody>
</table>

### To the Authors of Past Issues of Reciprocity

There are a number of articles in the earlier issues that do not indicate an author—if anyone knows who actually wrote them, please let me know ASAP.

All back issues will be available for purchase, as a bound set, this summer, and should be announced in the next issue of *Reciprocity*. Please send any corrigenda (to be applied to the bound sets before publication) to:

**Bruce M. Peret**  
7201 36th Avenue North  
Apt 221  
Crystal, MN 55427-2150  
USA

E-mail: bruce.peret@pobox.com
High Energy Physics and the Reciprocal System

22nd ISUS Conference Papers
Dewey Larson and the Way of One
Reciprocity (ISSN 0276-4172) is published quarterly by The International Society of Unified Science, P.O. Box 1034, Highland City, FL 33846, USA. Membership dues $25.00 per year (USA), $35.00 per year (other countries), $50.00 Contributing Membership, $150.00 Supporting Membership, and $300.00 Sustaining Membership. Copyright ©1997, The International Society of Unified Science. All rights reserved except where expressly waived. First class postage paid at Minneapolis, MN, and at additional mailing offices. Please send address changes to: ISUS, c/o Lawrence Denslow, P.O. Box 1034, Highland City, FL 33846.
# Table of Contents

From the Editor

**PHYSICS**

- Basic Properties of Matter, *Table of Contents and Preface*  
  Dewey B. Larson ........................................ 5
- High Energy Physics and the Reciprocal System  
  K. V. K. Nehru ........................................ 7
- Evolving Views of Space and Time  
  Bruce M. Peret ........................................ 14
- Motion and Space-Time are Essentially Related and Quantized  
  Frank H. Meyer ........................................ 15
- Cold Fusion  
  Thomas Kirk ........................................... 19
- Subversive Reflections on the Practice of Physics  
  K. V. K. Nehru ........................................ 21
- The Space-Time Universe, Part V  
  K. V. K. Nehru ........................................ 25

**BEYOND SPACE AND TIME**

- Dewey Larson and the Way of One  
  Stephen Tyman ........................................ 27

**ISUS NEWS**

- Corrigenda for *Reciprocity* XXVI, No. 1, Spring, 1997  
  K. V. K. Nehru ........................................ 18
- Additional Information on *The Ra Material*  
  L/L Research .......................................... 31
- The ISUS Archives  
  K. V. K. Nehru ........................................ 33
- Announcing the Availability of  
  *Fundamentals of Scalar Motion in a Multiple Reference Point Universe of Motion*  
  Lawrence E. Denslow .................................... 36

---

**Announcing**

The *Reciprocal System Research Site* on the World-Wide Web

http://www.randomc.com/~rs/

Lifetime ISUS member Mike Wells has donated the resources to ISUS for an Internet Research Site on Dewey Larson’s *Reciprocal System* of theory. The site contains books, articles, and new research into the Reciprocal System, which will be made available to scientists and researchers world-wide. Currently on-line are a number of articles published in prior issues of *Reciprocity*, and the complete texts of the books *The Structure of the Physical Universe* (Preliminary Edition, 1959) and *The Case Against the Nuclear Atom*. Additional materials will be available as time permits. Please send submissions, in HTML format, to the Editor; questions, comments, and suggestions to the Webmaster.
From the Editor

Bruce M. Peret

First off, I'd like to bid a fond farewell to Prof. Frank H. Meyer, who has resigned from his position of Editor. Frank has been involved in the editing and production of Reciprocity for a good many years, and though he is now off to pursue writing a book about his ideas on human ethics, Frank will continue to supply his advice and assistance, as time permits, in an associate editorial capacity, and as Vice President of ISUS.

So Frank, we wish you an infinite amount of good luck in your finite endeavors—though I'm still convinced the 3rd sector is quantized!

Officers and Editorial Staff Changes

The Board meeting at the 22nd ISUS Conference brought about a few minor changes in the ISUS and Editorial staff. Hoyt Stearns was re-elected as President, Frank H. Meyer is taking the role of Vice President, Larry Denslow continues on as Secretary, and we would like to welcome Jennifer Hafer as our new Treasurer and Board member.

Editing Reciprocity is yours truly, Bruce Peret, assisted by long-time contributing members K.V.K. Nehru and Frank H. Meyer. I would also like to welcome to the Reciprocity staff Russell Kramer and Tobey Wheelock, who are joining the team as associate editors.

I would like to apologize for getting the summer issue out so late, but my appointment to Editor coincided with a move from Minnesota to Tennessee, so my equipment and resources were unavailable, having been packed up for the move. I am now resettled (though still looking for things in boxes), and the Autumn issue of Reciprocity will be following this one, shortly.

Reciprocity Back Issues

The Reciprocity Back Issues project is nearing completion. With the help of Rainer Huck and Frank Meyer, I have located all the missing issues, and have reformatted the irregularly-sized issues to the standard 8½x11 format, for consistency. I am currently applying corrigenda supplied by K.V.K. Nehru and David Halprin, and am more than half way complete. The Back Issues will be available in 4 sets, spanning the first 25 years (Volumes I thru XXV)—a total of 1,420 pages. The sales price will be determined by the cost of reproduction, and should be in the $120 (US) range, for the entire set.

22nd ISUS Conference

I would like to thank Carla Rueckert and Jim McCarty for their hosting of our 22nd ISUS conference at L/L Research. I know I speak for all the attendees when I say that your hospitality was unparalleled, and the food was excellent!

I, personally, am encouraged by the fact that we had twice the attendance over last years conference in Denver. Many papers were presented, followed by discussion and experiential groups continuing late into the night.

This issue contains the papers presented on physics. The material on geophysics, electrogravitics, and metaphysics will appear in upcoming issues, as they address a number of new conclusions from the Reciprocal System that require some peer review to clarify the presentation of the concepts.

WWW Research Site

In order to promote the Reciprocal System to both amateurs and professionals globally on the Internet, ISUS is opening up its Research Site as a repository for on-line articles, books and lectures to provide enough information to satisfy the curious, and share research with the Internet community. The site can be browsed at http://www.random.com/~rsl. It is still under construction, so expect some links to be broken.

Basic Properties of Matter

While going thru the back issues of Reciprocity, I found permission from Dewey Larson to publish his book, Basic Properties of Matter, as a series of articles in Reciprocity. Since there are a good number of errors in the book, we are taking the opportunity to correct those errors, and publish each chapter, with the corrections, starting with this issue.

***
# BASIC PROPERTIES OF MATTER

Volume II
of a revised and enlarged edition of
THE STRUCTURE OF THE PHYSICAL UNIVERSE

By

DEWEY B. LARSON

## CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preface</td>
<td>vii</td>
</tr>
<tr>
<td>1 Solid Cohesion</td>
<td>1</td>
</tr>
<tr>
<td>2 Inter-atomic Distances</td>
<td>12</td>
</tr>
<tr>
<td>3 Distances in Compounds</td>
<td>25</td>
</tr>
<tr>
<td>4 Compressibility</td>
<td>38</td>
</tr>
<tr>
<td>5 Heat</td>
<td>56</td>
</tr>
<tr>
<td>6 Specific Heat Patterns</td>
<td>67</td>
</tr>
<tr>
<td>7 Temperature Relations</td>
<td>82</td>
</tr>
<tr>
<td>8 Thermal Expansion</td>
<td>94</td>
</tr>
<tr>
<td>9 Electric Currents</td>
<td>102</td>
</tr>
<tr>
<td>10 Electrical Resistance</td>
<td>112</td>
</tr>
<tr>
<td>11 Thermoelectric Properties</td>
<td>122</td>
</tr>
<tr>
<td>12 Scalar Motion</td>
<td>133</td>
</tr>
<tr>
<td>13 Electric Charges</td>
<td>144</td>
</tr>
<tr>
<td>14 The Basic Forces</td>
<td>156</td>
</tr>
<tr>
<td>15 Electrical Storage</td>
<td>166</td>
</tr>
<tr>
<td>16 Induction of Charges</td>
<td>177</td>
</tr>
<tr>
<td>17 Ionization</td>
<td>187</td>
</tr>
<tr>
<td>18 The Retreat From Reality</td>
<td>198</td>
</tr>
<tr>
<td>19 Magnetostatics</td>
<td>210</td>
</tr>
<tr>
<td>20 Magnetic Quantities and Units</td>
<td>219</td>
</tr>
<tr>
<td>21 Electromagnetism</td>
<td>230</td>
</tr>
<tr>
<td>22 Magnetic Materials</td>
<td>241</td>
</tr>
<tr>
<td>23 Charges in Motion</td>
<td>253</td>
</tr>
<tr>
<td>24 Isotopes</td>
<td>261</td>
</tr>
<tr>
<td>25 Radioactivity</td>
<td>268</td>
</tr>
<tr>
<td>26 Atom Building</td>
<td>278</td>
</tr>
<tr>
<td>27 Mass and Energy</td>
<td>288</td>
</tr>
<tr>
<td>References</td>
<td>298</td>
</tr>
</tbody>
</table>
Basic Properties of Matter

Preface

Dewey B. Larson

This volume is the second in a series in which I am undertaking to develop the consequences that necessarily follow if it is postulated that the physical universe is composed entirely of motion. The characteristics of the basic motion were defined in Nothing But Motion, the first volume of the series, in the form of seven assumptions as to the nature and interrelation of space and time. In the subsequent development, the necessary consequences of these assumptions have been derived by logical and mathematical processes without the introduction of any supplementary or subsidiary assumptions, and without introducing anything from experience. Coincidentally with this theoretical development, it has been shown that the conclusions thus reached are consistent with the relevant data from observation and experiment, wherever a comparison can be made. This justifies the assertion that, to the extent to which the development has been carried, the theoretical results constitute a true and accurate picture of the actual physical universe.

In a theoretical development of this nature, starting from a postulate as to the fundamental nature of the universe, the first results of the deductive process necessarily take the form of conclusions of a basic character: the structure of matter, the nature of electromagnetic radiation, etc. Inasmuch as these are items that cannot be apprehended directly, it has been possible for previous investigators to formulate theories of an ad hoc nature in each individual field to fit the limited, and mainly indirect, information that is available. The best that a correct theory can do in any one of these individual areas is to arrive at results that also agree with the available empirical information. It is not possible, therefore, to grasp the full significance of the new development unless it is recognized that the new theoretical system, the Reciprocal System, as we call it, is one of general application, one that reaches all of its conclusions all physical fields by deduction from the same set of basic premises.

Experience has indicated that it is difficult for most individuals to get a broad enough view of the fundamentals of the many different branches of physical science for a full appreciation of the unitary character of this new system. However, as the deductive development is continued, it gradually extends down into the more familiar areas, where the empirical information is more readily available, and less subject to arbitrary adjustment or interpretation to fit the prevailing theories. Thus the farther the development of this new general physical theory is carried, the more evident its validity becomes. This is particularly true where, as in the subject matter treated in this present volume, the theoretical deductions provide both explanations and numerical values in areas where neither is available from conventional sources.

There has been an interval of eight years between the publication of Volume I and the first complete edition of this second volume in the series. Inasmuch as the investigation whose results are here being reported is an ongoing activity, a great deal of new information has been accumulated in the meantime. Some of this extends or clarifies portions of the subject matter of the first volume, and since the new findings have been taken into account in dealing with the topics covered in this volume, it has been necessary to discuss the relevant aspects of these findings in this volume, even though some of them may seem out of place. If, and when, a revision of the first volume is undertaken, this material will be transferred to Volume I.

The first 11 chapters of this volume were published in the form of reproductions of the manuscript pages in 1980. Publication of the first complete edition has been possible through the efforts of a group of members of the International Society of Unified Science, including Rainer Huck, who handled the financing, Phil Porter, who arranged for the printing, Eden Muir, who prepared the illustrations, and Jan Sammer, who was in charge of the project.

D. B. Larson
December, 1987

† The revised chapters of Basic Properties of Matter will be published in future issues of Reciprocity, as they become available.

―Editor
High Energy Physics and the Reciprocal System

Prof. K. V. K. Nehru, Ph.D.

Professor, School of Energy, J. N. T. University, Hyderabad – 500 028, India

"...during times of crisis new theories arise. Meanwhile, adherents of the old paradigm in crisis fight to retain it against the revolutionaries who are outrageously explaining anomalies by treating nature as if she were a rabbit or squirrel instead of what every self-respecting scientist knows she is: a duck."

—J.P. Briggs and F.D. Peat, Looking Glass Universe, p. 28

Great advances in technology in the recent decades of this century have made it possible to amass a wealth of experimental data of unprecedented scope and variety. Theory in the areas of Particle Physics and Astrophysics has been subjected to repeated revisions to cope up with the observed facts. Especially in the field of High Energy Physics (HEP) exciting things have been happening. The Orthodoxy is becoming more tolerant to wild, if not crazy ideas and inventions of thought. In this backdrop, it might be desirable to survey the vicissitudes of the physical theory, hoping that we might learn something from the history.

Little Fleas on Little Fleas on Little Fleas on...

Physicists recognize two revolutionary experiments in the 20th century that resulted in significant revision of the previous ideas about the fundamental particles. One was the Rutherford scattering experiment of 1911, which revealed that the atom was not a uniform solid object it was thought to be, but is largely hollow with a compact solid nucleus which is nearly five orders of magnitude smaller than the atom itself. Subsequent theory conjectured that the nucleus is made up of particles even more fundamental, namely, the protons and the neutrons. The second experiment was the electron-proton scattering experiment of 1968 at Stanford. With the probing energies scaled up to the MeV range the scattering pattern revealed that the proton and the neutron were not the solid compact objects they were thought to be, but are largely hollow with extremely compact, point-like objects inside. The theoreticians named these point-like particles the quarks.

Originally only three quarks (‘u,’ ‘d’ and ‘s’) were invented to explain protons, neutrons and pions. But soon, a theoretical inconsistency cropped up as the unstable hadron resonance known as $\Delta^{++}$ was experimentally discovered. According to the existing quark scheme this resonance has to be composed of three u-quarks in a configuration that is symmetric under interchange of any two quarks. This, however, was not in accordance with the well-established Pauli Exclusion Principle, which states that no two fermions can be in the same quantum state. Therefore, instead of abandoning the quark model, the inconsistency was evaded by inventing purely ad hoc, a new quantum attribute—fancifully called the ‘color’ charge—which serves to distinguish the three u-quarks.

That now we have u, d and s quarks each in three color states is, of course, not the end of the story. The discovery in 1974 of the J or $\Psi$ particle required the positing of a fourth quark (the ‘c’), and in 1977 of the Upsilon particle necessitated another quark with a brand new quantum attribute (the ‘b’). At the present time, we have as the fundamental particles six types of quarks, each in three different color states, along with equal number of antiquarks. In addition, the Standard Model (SM) propounds the existence of six leptons—particles which do not experience the ‘strong’ force. These are the electron, the muon and the $\tau$-particle and their corresponding neutrinos $\nu_e$, $\nu_\mu$ and $\nu_\tau$ along with, of course, the antiparticles of all of these.

Problems in the Current Theory

Though the SM is a highly successful theory of the HEP and covers the ‘weak,’ the electromagnetic and the ‘strong’ interactions, its most flagrant shortcoming is the omission of gravitation. Physicists have come up with the characteristic length at which ‘quantum gravity’ is expected to manifest as nearly $10^{-35}$ m. This is seventeen orders of magnitude smaller than the characteristic length of the ‘weak’ interaction, namely, about $10^{-18}$ m. Such a stupendous scale difference is quite baffling to them.
It is an embarrassing fact that free quarks have never been observed. Consequently it is theorized that interactions between quarks must be extraordinarily strong and perhaps irrevocably confining. The theorists do not know whether quarks are truly fundamental entities or have further structure. Nor do they know if quarks are ever-lastingly stable or decay spontaneously. Further, the SM contains many parameters, such as the masses of the quarks and leptons, the values of the fundamental charges etc. which cannot be derived from the theory but have to be taken as given. Then there is the generation problem: even though only two quarks (u and d) and two leptons (e⁻ and νₑ) occur preponderantly in nature, yet nature possesses two more copies (four more quarks and four more leptons) of this basic structure, which latter are assumed to be relevant, if at all, in the first few seconds after the so-called Big-bang.

Occurrence of infinities plagues the mathematics of the theory, at the various levels of the energy ranges. Solving one problem introduces new problems at the new levels. For instance, solving the mass problem of the ‘weak’ bosons, W⁺ and Z⁺, by the Higgs mechanism involves the prediction of a new particle—the Higgs boson—the experimental discovery of which is an outstanding problem. The concept of supersymmetry—wherein all bosons have fermionic superpartners and vice versa—is invented to circumvent the infinities. However, in the bargain, a host of new particles are predicted, generating new ignorances at the same rate as developing new understanding.

Finally, the theorists are investing great hopes in the superstring theories, in which one-dimensional singularities, instead of point-like particles, are envisaged as the ultimate constituents of the universe. Supersymmetry is an essential ingredient of the theory. One of the problems besetting the superstring theory is the occurrence of several versions of it, without a clear hint of the actual one. The theory requires the superstrings to exist in large number of space-time dimensions (like 10). This requires figuring out ways of reducing the superabundance of the dimensions.

Vindication of these ideas comes from experimental confirmation and the future of HEP is threatened by a serious crisis. The range of energies that would be needed to test the new theories is 10⁷ to 10⁹ GeV. The known acceleration technologies can take us up to the 10⁴ GeV level in the coming decade. Beyond that, the veterans in the field fear that the HEP is near its end. The deepening crisis is making the physicists look for unconventional ideas, no matter how weird they might appear. Unfortunately, they are looking for these new ideas still within the ambit of the old paradigm only. They seem to be committing the mistake of the proverbial drunkard, who was found searching in the middle of the night, right under the street light, for something he lost in the darkness beyond! Recognition of the truth of the Reciprocal System of theory, which is based on a totally new basic paradigm, is getting procrastinated because it upsets some of our most cherished notions. But this is what a paradigm change at the most basic level is bound to do. Planck’s discovery of the quantum nature of energy is a good example. It was greeted with indifference and disbelief, if not open hostility.

The Deepening Crisis

It is now apparent that applying iteratively the program that ‘particles are built out of more fundamental particles’ has resulted in the proliferation of ‘fundamental’ particles and led us from complex theory to more complex theory. The situation is reminiscent of the accumulation of epicycles in the Ptolemaic system. Once again it might be pointing out to us, if we are able to take the hint, that the basic paradigm underlying the whole edifice of the HEP has been wrong.

Particle physicists have innovated the concept of force, which was originally defined as acceleration times mass. The idea of action-at-a-distance was repugnant to the modern scientist who thought it was spooky and belonged to the dark era of scientific ignorance. He rather believed in the locality of interaction: a force could be passed on from A to B only if A is physically touching (contiguous in space to) B, or through some other thing touching both. This belief logically led him to the idea of ‘exchange force,’ that when two entities are separated in space a force could be transmitted between them only through the intermediary of a particle—the field quantum—propagating in space. This is part of the paradigm on which the superstructure of modern physics has been erected. The physicists have even disregarded factual information from their own field and subscribed unstintingly to this paradigm. For example, there is no empirical evidence that gravitation is propagated at finite speed or that it is propagated at all. But current Orthodoxy presumes that gravitation has a field quantum, the graviton, and that it propagates at the speed of light.

Meanwhile a new factor has emerged into the situation. Carefully conducted experiments in the recent decades have established beyond doubt that
quantum non-locality is a fact—particles widely separated in space are able to influence each other, without the need for any medium or intermediary and without any effects of attenuation by distance, even when they are beyond each other’s light cone. Since this is a factual finding, it must be incorporated into whichever theory of physics that might come into ascendency if it has to be true.

Notwithstanding these developments HEP has continued on its program of building particles out of more fundamental particles, postulating at each structural level the existence of ‘carriers of interaction’—the mesons, the ‘intermediate vector bosons,’ the gluons and the like. Now the question arises whether there is a way to build physical theory basing on established facts including non-locality without having to re-introduce the unacceptable spooky action-at-a-distance? Well, this is exactly what Larson has accomplished!

The New Paradigm

Larson has laid out, in his published works1–6 the general outline of his theory, covering all the physical fields. All of the phenomena whose origin is a mystery in the current theory—like that of the high energy cosmic rays—come out as logical deductions from his fundamental Postulates about the characteristics of motion. He has carried out the development far enough to establish a prima facie case for a general theory. However, considerable amount of theoretical work still needs to be done to extend the application of the Reciprocal System to greater detail.

Following the lead given by observational facts, and not based on speculations, Larson has endeavored to review the entire physical situation and come up with a new structure of physical theory, which has come to be called The Reciprocal System of theory. Larson’s principal finding is that the physical universe is composed entirely of discrete units of motion. Space and time occur only as the two reciprocal aspects of motion and are quantized. In the new paradigm, space-time plays the role of the content of the physical universe, instead of that of the container or framework in which the physical universe exists. A consideration of the relations between the characteristics of space and time leads him logically to the development of a truly general theory, in which every aspect of the physical universe turns out to be a modification of the one fundamental component, namely, motion—in fact, scalar motion.

Larson points out that the reason why previous thinkers, like Eddington and Hobbes, who attempted to build a general theory based on motion as the fundamental constituent failed is that they did not recognize that this basic constituent is scalar motion, and not vectorial motion.

In the short space of an article it is impossible to delineate the complete theoretical development. We shall therefore limit ourselves to highlighting certain of its findings that are relevant to the present subject-matter. We have already described elsewhere’ how the phenomena of non-locality manifest logically in the Reciprocal System. Since all the physical phenomena are different manifestations of motion, and that occurs in discrete units of finite size, the Reciprocal System is intrinsically free from singularities.

New Insights

From the two fundamental Postulates of the theory Larson finds that there is no need to break away from the original definition of force, as an aspect of motion, and that all known interactions—gravitation, electricity, magnetism etc.—are different aspects of the basic scalar motions of the physical universe. The continual expansion of space, apparent to us as the recession of the distant galaxies, comes out as the first corollary of the properties of scalar motion. There is no need for the ad hoc assumption of a big-bang. The ubiquitous expansion of space (actually, space-time) acts as an outward force, in opposition to the inward force of gravitation and accounts for facts such as the unexplained stability of the Globular Clusters and the large-scale structure of the aggregates of matter.

Atoms come out as rotational displacements in the three scalar dimensions of motion. Larson repudiates the iterative dogma ‘particles are built out of more fundamental particles,’ cutting it out at the first iteration itself; he finds the atom to be a unit of compound motion and without parts. All the observed features of gravitational fields (alluded to earlier) follow as logical conclusions, including the apparent action-at-a-distance.

Larson calls the region of the physical universe in which the possible speeds (space/time) range from zero to unity (unit speed being identified as the speed of light in the natural reference frame) the material sector, and the region in which they range from unity to infinity (or equivalently, the inverse speeds (time/space) range from zero to unity) the cosmic sector. The theory shows that while the phenomena of the material sector could be depicted in the three-dimensional spatial reference frame,
those of the cosmic sector could be truly depicted only in a three-dimensional temporal reference frame. The speeds beyond the unit speed, which pertain to the cosmic sector, do not manifest to us as motion in space: they are actually motion in time (not, of course, the 'time travel' of science fiction).

Powerful Type II stellar explosions are energetic enough to propel part of the matter into ultra-speed range (beyond the unit speed). The consequent expansion into co-ordinate time manifests in the conventional reference frame as contraction in space, due to the reciprocal relation, and results in ultra-high density product. While the low speed component appears as a Red Giant, the ultra-speed component appears as a White Dwarf or a Pulsar. In addition, these ultra-speed phenomena account for the peculiar characteristics of the galactic cores, Seyferts, Radio Galaxies and the observations being mistakenly attributed to the purely hypothetical blackholes. The peculiar characteristics of scalar motion, brought to light by Larson's research, show that it is totally unnecessary to resort to non-Euclidean geometry.

By virtue of the symmetry between the characteristics of space and time and their reciprocal relation to motion, we find that all the phenomena of the material sector are duplicated in the cosmic sector with the roles of space and time interchanged. The atoms of the cosmic sector, the c-atoms, are the rotational inverses of the material atoms. They comprise the antimatter, but with this difference that they are the multiplicative inverses of matter—not the additive inverses as envisioned in the conventional theory. While gravitation in the material sector pulls atoms inward in space, the gravitation of the cosmic sector pulls the c-atoms inward in three-dimensional time to form c-stars, c-galaxies etc. Even though c-matter is as plentiful as the ordinary matter, the reason why we do not encounter it normally is that it forms aggregates in three-dimensional time, not in three-dimensional space. Moreover, while ordinary matter is moving outward in time, c-matter is moving inward in time and the chance encounters between the two types of atoms do not last longer than one natural unit of time (~10^{-16} s).

Radiation moves at unit speed (= unit inverse speed) and is therefore at the boundary between the two sectors. We actually observe the radiation from the c-stars. But since it enters our sector from a region not localized in three-dimensional space it appears absolutely uniform and isotropic—the cosmic microwave background (CMB). Its black-body nature and temperature could be derived. It also follows that in the Reciprocal System there is no need to reconcile the perfect isotropy of the CMB with the lumpiness of the material aggregates.

Larson identifies explosive processes operating at galactic cores that directly impart greater than unit speeds to matter. Quasars turn out to be the ejecta of such ultra-speed explosion processes. The excess speed in the explosion dimension shows up as the non-cosmological redshift. These objects eventually reach the limiting speed of the material sector and leave it altogether, entering the cosmic sector. Similar state of affairs holds good in the cosmic sector and mature c-quasars, on reaching the limiting (inverse) speed of that sector exit it and emerge into our sector. Once again, as the c-atoms (of the c-quasars) are coming in from a region not localized in three-space, they emerge uniformly and isotropically throughout the expanse of three-dimensional space. These, of course, are the original cosmic ray particles. They tunnel through the unit-speed boundary and manifest to us at near-light speeds. The most abundant c-element in them is c-hydrogen. Though c-atoms do not have mass in the conventional sense, they possess the equivalent of inverse mass. While the mass of a material atom is given by A (the atomic weight), the mass-equivalent of the corresponding c-atom would be a function of 1/A. In fact it is given by

\[(G + 4/A_c) \times 931.15 \text{ MeV},\]

where \(A_c\) is the atomic weight of the c-atom and G is the number of units of material gravitational charge (a component of mass arising out of oscillatory rotational motion in the theory, which is also responsible for radioactive decay). Table I lists Larson's identification of the cosmic ray decay particles along with the theoretical masses. There are several collateral factors which influence the mass calculation but are omitted from consideration in this preliminary treatment. In spite of this, the agreement between the calculated and the observed values is striking.

In the case of the cosmic rays, since the incoming c-atoms possess extremely high energy—both rotational and translational—they give this up through the decay and the fragmentation processes. On the other hand, Larson points out that in the high energy environment of the particle accelerators the reverse processes of consolidation and building take place. Starting with the production of c-atoms of high atomic number, the aufbau process results in c-atoms of progressively lower atomic numbers.
Larson was able to identify the c-atoms that correspond to the known Resonances. Examples of the Sigma Series of the Baryon Resonances and the Meson Resonances are listed in Tables II and III respectively. They should serve to demonstrate how a true theory can bring order into the welter of high energy particles, without the need to make ad hoc assumptions ad infinitum.

**Conclusion**

As we approach the end of this century we find the rank and file of the physics profession openly acknowledging the impending crisis in the HEP. They are frantically looking for promising alternative ideas in theory and experimental techniques. We suggest that the reason why the physical theory has been becoming more and more complex is that it has to make up for a wrong basic paradigm on which it is built.

We submit that the Reciprocal System of physical theory, originated by Dewey B. Larson, is a true, complete and easily understandable general theory, founded on a new fundamental paradigm. The present view is that the phenomena of the physical universe exist in a framework of space and time. In contrast, the Reciprocal System asserts that scalar motion or speed, i.e. space/time, is the content of the physical universe—the sole content. It should be realized that this is a conceptual revolution of unprecedented nature throughout recorded history. No matter what conceptual innovations the previous thinkers have introduced into the physical theory, including the latest efforts, they have all been, without exception, based on this age-old paradigm of viewing the phenomena as existing in space and in time. Therefore it must be recognized that the Reciprocal System is not just another theory, but one that is based on a totally new paradigm which no previous thinker could ever divine.

Larson discovers that there are several speed (motion) regions of the physical universe which cannot be legitimately represented in the conventional three-dimensional spatial reference frame. In all the cases where theory is encountering serious difficulties, the trouble arises because of the Procrustean attempts to fit all physical processes into the limited three-dimensional spatial frame. There is a conjugate sector of the universe, the cosmic sector, which can only be represented in the analogous three-dimensional temporal reference frame. Most of the mysterious astronomical phenomena that have no proper explanation in the conventional theory turn out to be the normal cosmic sector phenomena as they appear to us. High energy cosmic rays, CMB and gamma ray bursts are typical examples. Larson identifies that some of the cosmic sector processes have wider implications to life sciences too. Then he also finds that there is a large segment of the physical universe, the scalar zone, that cannot legitimately be depicted either in the three-dimensional spatial frame or in the three-dimensional temporal frame. All the bizarre aspects of the quantum phenomena follow from the discrete nature of space and time. The Reciprocal System provides an easily understandable picture of the reality underlying the quantum phenomena.

Larson has covered a large ground in his work—truly immense for a single individual to have done—from the atomic to the astronomical, and developed theory far enough to establish that it is truly general. It is time that a concerted international effort is directed to evaluate the truth and merit of the Reciprocal System by open-minded members of the scientific community. Sooner or later, the mounting pressure of the crisis in the HEP is itself going to
bring this to happen. But if a Foundation or Trust
dedicated to mankind’s betterment through science
and technology can sponsor such a project to
evaluate the Reciprocal System, it would save
enormous amount of funds and human resources
from further getting squandered on unfruitful
scientific enterprises based on the wrong paradigm.

References


<table>
<thead>
<tr>
<th>c-Element</th>
<th>Gravitational Charges</th>
<th>Inter-stage</th>
<th>Mass (MeV/c²)</th>
<th>Theor.</th>
<th>Obs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>c-N¹⁴</td>
<td>1</td>
<td></td>
<td>1197</td>
<td>1190</td>
<td></td>
</tr>
<tr>
<td>c-Be⁸</td>
<td>1</td>
<td></td>
<td>1397</td>
<td>1385</td>
<td></td>
</tr>
<tr>
<td>c-Be⁷</td>
<td>1</td>
<td></td>
<td>1463</td>
<td>1480</td>
<td></td>
</tr>
<tr>
<td>c-Li⁶</td>
<td>1</td>
<td>a</td>
<td>1552</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c-Li⁵</td>
<td>1</td>
<td>a</td>
<td>1604</td>
<td>1620</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1676</td>
<td>1670</td>
<td></td>
</tr>
<tr>
<td></td>
<td>a</td>
<td></td>
<td>1728</td>
<td>1750</td>
<td></td>
</tr>
<tr>
<td></td>
<td>b</td>
<td></td>
<td>1779</td>
<td>1765</td>
<td></td>
</tr>
<tr>
<td></td>
<td>c</td>
<td></td>
<td>1831</td>
<td>1840</td>
<td></td>
</tr>
<tr>
<td></td>
<td>d</td>
<td></td>
<td>1882</td>
<td>1880</td>
<td></td>
</tr>
<tr>
<td>c-Kr⁷²</td>
<td>2</td>
<td></td>
<td>1914</td>
<td>1915</td>
<td></td>
</tr>
<tr>
<td>c-At³⁶</td>
<td>2</td>
<td></td>
<td>1965</td>
<td>1940</td>
<td></td>
</tr>
<tr>
<td>c-Mg³⁴</td>
<td>2</td>
<td></td>
<td>2017</td>
<td>2000</td>
<td></td>
</tr>
<tr>
<td>c-Ne³⁰</td>
<td>2</td>
<td></td>
<td>2048</td>
<td>2030</td>
<td></td>
</tr>
<tr>
<td>c-F¹⁸</td>
<td>2</td>
<td></td>
<td>2069</td>
<td>2070</td>
<td></td>
</tr>
<tr>
<td>c-O¹⁶</td>
<td>2</td>
<td></td>
<td>2095</td>
<td>2080</td>
<td></td>
</tr>
<tr>
<td>c-N¹⁴</td>
<td>2</td>
<td></td>
<td>2128</td>
<td>2100</td>
<td></td>
</tr>
<tr>
<td>c-B¹⁰</td>
<td>2</td>
<td></td>
<td>2234</td>
<td>2250</td>
<td></td>
</tr>
<tr>
<td>c-Li⁶</td>
<td>2</td>
<td></td>
<td>2483</td>
<td>2455</td>
<td></td>
</tr>
<tr>
<td>c-Li⁵</td>
<td>2</td>
<td></td>
<td>2607</td>
<td>2620</td>
<td></td>
</tr>
<tr>
<td>c-Ne³⁰</td>
<td>3</td>
<td></td>
<td>2979</td>
<td>3000</td>
<td></td>
</tr>
<tr>
<td>c-Element</td>
<td>Gravitational Charges</td>
<td>Inter-stage</td>
<td>Mass (MeV/c^2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-----------</td>
<td>-----------------------</td>
<td>-------------</td>
<td>----------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c-Li^6</td>
<td>0</td>
<td>a</td>
<td>621</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>673</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>700</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c-Li^5*</td>
<td>0</td>
<td>a</td>
<td>745</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>797</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>784</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>d</td>
<td>952</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(951)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c-Kr^72*</td>
<td>1</td>
<td></td>
<td>983</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(986)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c-Ar^36*</td>
<td>1</td>
<td></td>
<td>1034</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(1031)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c-Mg^24</td>
<td>1</td>
<td></td>
<td>1086</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(1090)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c-Ne^20*</td>
<td>1</td>
<td></td>
<td>1117</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1116</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c-O^16</td>
<td>1</td>
<td></td>
<td>1164</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(1165)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c-N^14*</td>
<td>1</td>
<td></td>
<td>1197</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1197</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c-C^12</td>
<td>1</td>
<td></td>
<td>1241</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(1240)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c-C^11</td>
<td>1</td>
<td></td>
<td>1270</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(1274)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c-B^10*</td>
<td>1</td>
<td></td>
<td>1303</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1310</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c-B^9</td>
<td>1</td>
<td></td>
<td>1345</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c-Be^8</td>
<td>1</td>
<td></td>
<td>1397</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c-Be^7*</td>
<td>1</td>
<td>a</td>
<td>1463</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(1455)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c-Li^6</td>
<td>1</td>
<td></td>
<td>1515</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1516</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>a</td>
<td>1552</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1540</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c-Li^5*</td>
<td>1</td>
<td>b</td>
<td>1676</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(1674)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>c</td>
<td>1779</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(1773)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1831</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(1840)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c-Kr^72*</td>
<td>2</td>
<td></td>
<td>1914</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1930</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c-O^16</td>
<td>2</td>
<td></td>
<td>2095</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c-B^10*</td>
<td>2</td>
<td></td>
<td>2234</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2200</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c-B^9</td>
<td>2</td>
<td></td>
<td>2276</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2275</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c-Be^8</td>
<td>2</td>
<td></td>
<td>2328</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2360</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c-Be^7*</td>
<td>2</td>
<td></td>
<td>2394</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2375</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c-Kr^72*</td>
<td>3</td>
<td></td>
<td>2845</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2800</td>
<td></td>
<td></td>
</tr>
<tr>
<td>½ c-Kr</td>
<td>1½</td>
<td></td>
<td>1423</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(1427)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Decay sequence; @ Average values in parentheses
Evolving Views of Space and Time

Bruce M. Peret

Modern physics continues to view space as a container in which the material universe is constructed, and time merely as an 'inconvenience', being no more than a linear measurement of change, and not considered to be part of the constructs of space.

The Reciprocal System altered this view by making space and time aspects of motion, and motion as both the container, and containee, of the constructs of the universe.

Modern physics still considers all manifestation to be composed of 3-D coordinate space, which is both infinite and unbounded, as shown in Figure 1. There is nothing else to the universe, except what is manifest in 3-D space.

![Figure 1](image1.png)

Conventional Scientific View of the Universe

When Larson discovered the reciprocal relationship between space and time, and that all units are discrete, an important step was taken. Space and time, composing the physical universe, became inseparable, isotropic, and finite. An entirely new sector of the universe opened up, the Cosmic sector, with its three dimensions of coordinate time. Larson's physical universe, as shown in Figure 2, is composed of two 3-D sectors of space and time—both finite, yet unbounded. Infinity, with all its inherent mathematical problems, disappeared from the constructs of the physical universe.

![Figure 2](image2.png)

Reciprocal System of Physical Theory

Having described the properties of space and time in a finite context, Larson found other phenomena in mankind's experience that continued to remain a mystery. To account for these phenomena, he postulated a "3rd Sector", totally non-physical, that exists outside both space and time, yet still interacts with the physical universe. It is in this 3rd Sector that infinity makes its return to the Reciprocal System.

![Figure 3](image3.png)

Reciprocal System of Metaphysical Theory

By examining these evolving views of the universe, we can conclude that as a sector of the universe is explored and its properties determined, it makes a transition from being infinite, to being finite. This can be seen in the original view of 3-D space being infinite, then as quantum phenomena were investigated, space moved towards the finite, with the quantum region becoming non-local, and infinite. The discovery of 3-D time region as the region of quantum mechanics altered the infinite quantum realm back to the finite realm of the time region, and infinity became assigned to the only place that remained in the context of the theory—that which is non-physical—the 3rd Sector. In other words, you will always find an infinity where you find an area that is not properly understood, unexplored, or just plain 'unknown'.

This is fairly obvious in the postulates of Larson's 3rd Sector, which vary greatly from the postulates of the first 2 sectors. However, if we were to continue with Larson's initial premise that the universe is composed solely of motion, and the universe is also consistent, it is possible to theorize the next logical step in the evolutionary view of space, time, and beyond.

Continued on Page 20...
Motion and Space-time are 
Essentially Related and Quantized

Prof. Frank H. Meyer
Physics Professor Emeritus, University of Wisconsin-Superior

The essence of this doctrine was presented to the Fall Meeting of the Minnesota Area Association of Physics Teachers, October 25, 1997 in the Physics Building, Room 210, of the University of Minnesota, Minneapolis campus.

Dewey B. Larson's
Reciprocal System of General Physics

The best evidence that motion is a reciprocal relation between space and time, is the everyday way physicists all over the Earth use speed to measure motion. All agree that speed of a motion is given by a multiplicatively inverse relation between space and time and/or between time and space. The physical universe is entirely composed of one component, motion, existing in three dimensions, in discrete units and in two reciprocal forms, space and time.

Until and unless motion exists, neither space nor time exists nor can exist. Time and space are the only two essential aspects of all motion as such. That is, space and time not only are the necessary conditions, they are the sufficient conditions of motion of the material and cosmic sectors of our physical world. Space and time do not exist at all, apart from motion. Space and time have no properties but those they have in relation to one another.

Is the Space-Time Continuum Postulate True or False?

The two allegedly modern physical theories—relativity physics theory and quantum physics theory—share two ancient, questionable fundamental axioms:

1. Space-time and motion are infinitely divisible or continuous and have no structure.

The MIT teacher of Physics, Professor A. P. French speaks for both relativity and quantum physicists when he writes in his text on Newtonian Mechanics: "Both space and time are assumed to be infinitely divisible—to have no ultimate structure."

2. Space-time is inert, stationary, immovable, different from and not closely, if at all, related to motion.

The elementary particle physicist, Professor K. W. Ford speaks for both quantum and relativity physicists when he says in his treatise on elementary particles: "While fields and particles come and go, space and time lie inert, providing the stage upon which the actors play their roles."

The consensus among the present physics profession, as I understand us, is that motion, space and time are not quantized or finitely divisible but continuous or infinitely divisible.

Few modern physicists, including most quantum physicists, have questioned the space time continuum postulate of relativity physics. One who has is the Nobel-prize winning physicist, Professor Richard Feynman: "I believe that the theory that space is continuous is wrong, because we get all these infinities and other difficulties... I rather suspect that the simple ideas of geometry, extended down into infinitely small space are wrong."

Another Nobel-prize winning physicist, who began in his later years to question the space-time continuum assumption, is Dr. Albert Einstein: "One can give good reasons why reality cannot be represented by a continuous field. From the quantum phenomenon it appears to follow with certainty that a finite energy can be completely described by a finite set of numbers [quantum numbers]. This does not seem to be in accord with a continuum theory and must lead to an attempt to find a purely algebraic theory for the description of reality. But nobody knows how to obtain the theory."

The writer considers that this testimony of Drs. Feynman and Einstein is strong evidence that the space-time continuum postulate can be false or
mistaken, and therefore wrong.

What appears to make the modern physics profession very reluctant to question this postulate is that this is not merely a modern assumption, but an very old one together with the assumption that motion also must be continuous. Aristotle\(^6\) never dreamed that time and space might not be continuous, because he believed time to be an aspect of motion and he assumed motion to be continuous: "Now motion is supposed to belong to the class of things which are continuous, and the infinite presents itself in the continuous. ... Again, there is no such thing as motion over and above things."

From Aristotle, Newton\(^6\) probably derived his attitude that motion, space and time are continuous, and have little to do with one another. From Aristotle, Newton's contemporary, Isaac Barrow\(^7\) perhaps derived his attitude that motion does not apply to time. From Newton, Einstein\(^8\) probably got his idea that motion does not apply to space.

**Are Space and Time An Inert Stage or An Uniform Progression At Unit Speed?**

When the teacher, Albert Einstein, died in 1955, he died believing 'nobody knows how how to obtain the theory' that space and time are quantized or infinitely divisible, instead of being continuous or infinitely divisible, as was taken for granted for more than 25 centuries. Four years later, in 1959, an Engineer, Dewey B. Larson\(^9\), published the theory that space and time are not continuous, but rather infinitely divisible or quantized. This new theory has so far been dismissed without examination as "amateurish" by the physics profession.

The Larson Reciprocal System of physics not only challenges the space-time continuum assumption. It also challenges an even more entrenched and more ancient platitude of the natural science of yesterday. This plausible platitude is variously expressed: Motion is impossible without things; there is no such thing as motion over and above things; motion is only a property of matter. Also, it challenges the materialist metaphysical proposition that matter is prior to motion. Blind acquiescence in these propositions has had much to do with precluding natural scientists, until now, from examining the hypothesis that the physical universe is a universe of motion, rather than one of matter and energy.

One can obtain a cogent physical theory about the universe of motion, as Larson has done, by excluding infinite divisibility from the physical and rejecting the dogma that motion is impossible without matter. Think of the physical world as a universe of motion, where and when motion is possible without matter. For example, the photon of light is not matter, but rather is simply a compound unit of motion. Furthermore, the physical location of a photon is no thing, it is an outward translating unit of motion, progressing uniformly in vacuo at unit speed (the speed of light), whether or not occupied by a photon. Note how our account of this phenomenon compares with Einstein's\(^8\).

We postulate that this universe of motion is composed entirely of one component, motion, existing in three dimensions, and in discrete units. Motion is defined to be the relation between two uniformly progressing, reciprocal quantities, space and time. By reason of the reciprocal character of the relation between space and time, each individual unit of motion is a relation between one unit of space and one unit of time, motion at unit speed. Since we are defining motion as a relation between a time magnitude and a space magnitude, we deduce that the quantity of motion is finite and conserved. Since all physical entities and phenomena are expressed in terms of \(1/n\) and \(n/1\), where \(n\) is finite, no infinities are possible.

In the universe of motion space and time play a quite different role from that assigned to them in the conventional universe of matter. In the universe of motion, space and time progress together at unit speed. They are the sole constituents of the units of motion, from which all physical entities and phenomena are integrated. Because of the reciprocal character of the relation between space and time, two consequences flow: 1) The unit of space of length \(4.55 \times 10^{-4}\) cm is equivalent to the unit of time \(1.52 \times 10^{-16}\) sec, their ratio giving the speed of each unit of motion the magnitude of the speed of light in vacuo. 2) The multiplicative inverse relation between space and time also implies that all physical entities result from finite speed displacements, from below or above unit speed. Units of motion combine so that 1 unit of space can associate with \(n\) units of time, resulting in motion in space of the material sector and also 1 unit of time can associate with \(n\) units of space, resulting in motion in time, in the reciprocal sector, which Larson calls the Cosmic sector.

A fair test to find out if space-time is inert and stationary, as the conventional universe of matter perspective views them, or whether space progresses with time progression at the speed of light, as the universe of motion perspective views them, is available to learn which perspective is more truthful.
Few physicists have yet considered that space-time can progress together, independently of matter. One who has is Dr. Minkowski, Einstein’s partner in composing the 4-dimensional mathematics of Einstein’s relativity theory. In his famous essay, Raum und Zeit, Minkowski asked how “we may overcome the difficulty of never being able to decide from physical phenomena, how space, which is supposed to be stationary, may not after all, be in a state of uniform translation?”

Another who has considered that space-time involves a progression of space rather than an immovable or stationary space is Professor Paul Davies[4]: “The expanding universe is not the motion of the galaxies through space, but is the steady expansion of space.”

The steady expansion of space is represented in Larson’s Reciprocal System of physics as an outward uniform scalar progression of physical locations, space with time progression at unit speed (the speed of light).

At relatively short distances gravitation predominates, and the net motion is inward. Since the gravitational motion decreases with distance, while the outward progression remains constant, the opposing motions reach equality at some greater distance, which Larson has named the gravitational limit. Beyond this distance the net motion is outward, increasing with distance and approaching unit speed (the speed of light) at extreme distances.

This theoretical pattern of net speeds is verified observationally by measurements of the Doppler shift in the radiation received from the distant galaxies.

This is the alternative explanation of the “expansion of the universe” to the Big Bang hypothesis offered by the astronomers’ about the observed recession of the distant galaxies. An advantage of the reciprocal physical theory over the Big Bang hypothesis is that the latter does not avoid invoking and importing infinities into its mathematical structure; while the reciprocal system avoids infinities when dealing with the physical.

The essence of the Big Bang has been well stated by Silk[5]: “The central thesis of Big Bang cosmology is that 20 billion years ago, any two points were arbitrarily close together. The density of matter at this moment was infinite.”

The Reciprocal System of general physics implies that no infinities are possible, that is, no infinities can occur in the physical universe, as has been previously discussed. Therefore, unless the reciprocal physics is mistaken, the central thesis of the Big Bang cosmology is not true.

Unity, that is unit speed, c, the speed of light, is the true physical zero of Nature. The scalar space-time progression is always away from unity, and gravitational motion is always toward unity. In the macroscopic physical region, gravitation plays the role of the universal force of attraction, since “toward unity” generally occurs outside the unit of space of $4.55 \times 10^6$ cm length, while space-time progression away from unity plays the role of the universal force of repulsion.

In the sub-microscopic physical regions, the roles of the two universal forces reverse. This is the world of the solid state of matter and solid cohesion. Three centuries ago, Newton theorized that the newly discovered gravitational force must be the force of attraction between the atoms in a crystal of matter. Newton postulated that when God made atoms, he made them absolutely hard and impenetrable and so this constituted the repulsive force of solid cohesion. Newton’s solid cohesion theory was ruled out at the beginning of this century when X-ray crystallographers discovered that when atoms approach each other quite closely in crystals, coming much closer generally than $10^{-6}$ cm, they do not touch each other. However, in the light of the reciprocal physical theory, it turns out that Newton was not altogether mistaken when believing that gravitational force should have a role in solid cohesion as well as cosmology. What Newton did not and could not know, and what Dewey Larson has discovered, is that solid cohesion is an affair that occurs inside the natural unit of space. Toward unity inside the unit of space assigns gravitational force the role of the force of repulsion, while away from unity assigns the role of attraction force to the space-time progression force in solid cohesion.

“...it becomes plain that psychic health must result when the three ‘parts’ of the soul are brought into a state of harmony, which is not to say a state of equality. Rather, this state of balance could be seen as a state of attunement, where each part receives what it is due.”

—Plato
References

6. Newton, I., *Principia scholium*: "Absolute true and mathematical space, in its own nature and without relation to anything external, remains always the same and immovable."
   "But does time not imply motion? Not at all, I reply, as far as its absolute, intrinsic nature is concerned; no more than rest; the quality of time depends on neither essentially, whether things run or stand still, whether we sleep or wake, time flows in its even tenor. Imagine all the stars to have remained fixed from their birth; nothing would have been lost to time; as long would that stillness have endured as has continued the flow of this motion."
   "Recapitulating, we may say that according to the general theory of relativity space is endowed with physical qualities; in this sense, therefore, there exists an ether. According to the general theory of relativity, space without an ether is unthinkable; for in such space there would be not only no propagation of light, but also no possibility of existence for standards of space and time (measuring rods and clocks), nor therefore any space-time intervals in a physical sense. But this ether may not be thought of as endowed with the quality of ponderable media, as consisting of parts which may be tracked through time. *The idea of motion may not be applied to it* [italics mine]."

Corrigenda for

*Reciprocity XXVI, № 1
Spring, 1997*

Page Item
9 Figure 2: Delete duplicate "T-frame" on right side, above "speed" legend—
12 Figure 3: In the "Legend", the directions of the cross-hatching in the top left box and the right—bottom box should be interchanged.
20 Right column, paragraph 3, 2 up from bottom: change "quantatively" to "quantitatively".
21 Left column, paragraph 2, line 2: change "therefore" to "thereof".
Cold Fusion

Thomas Kirk

Beginning with Larson's atomic structure model,

The Deuterium atom: 2-1-(1)

An object one unit short of the more stable state of the inert gas, helium, 2-1-0. Deuterium is somewhat unstable just in its own right, as hydrogen much prefers the mass one state in nature. Deuterium is relatively rare.

The Lithium atom: 2-1-1

An object one unit above the more stable state of helium. Again, a somewhat unstable element in its propensity to react with other elements and also readily ionize.

If these two atoms were pressed into an extremely close association, it is plausible that the outer mass structures that separate these elements from the stable helium state, would tend to exchange between atoms. In other words, the extra increment on the outer structure of the lithium atom would have a tendency to shift to the deuterium atom, shifting both atoms to the highly stable helium state, a lower energy state. The expected result would be a release of energy, but with conservation of mass.

\[
2-1-(1) + 2-1-1 = 2 \times 2-1-0 + \text{Energy}
\]

Now consider that Larson's atomic model consists of a 2/1 (1-dimensional) photon rotating in a 3 dimensionally distributed manner, with each such increment of rotation yielding one mass unit. The inward 1-dimensional motion which is the photon is distributed three dimensionally to a \( t^2/s^3 \) motion structure. Each atom is a double system and so the increment is actually 2 units of mass, though in this discussion the increment will be referred to as a single increment to avoid confusion. It will be understood that addition of one mass unit applies to both units in the 2 unit structure. The transfer from lithium to deuterium would be a transfer of one of these units of rotation. It is a transfer of the rotation of the rotational base at the core of the atom, not requiring transfer of the central photon or any internal portion of the central atomic structure. It can be compared to two spinning billiard balls on impact; one may transfer some of its spin to the other, without any special significance for the internal structure of the balls. The point here is that though an atom is a singular compound motion, its exterior region can be modified without disturbing the internal structure. This fully conforms to Larson's theory.

Discussion

We have derived a potential new method to release energy, but will it actually work? The mathematical physics involved is too complex to determine under what circumstances it could occur, but experimentation can also prove the feasibility. In the Pons-Fleischmann experiments at the University of Utah, a palladium cathode was used in an electrolysis setup in liquid deuterium with lithium as an ion in solution. Palladium, based on Larson's model again, has a lot of potential space within its outer structure, represented by the (8) in 4-3-(8). The negatively charged cathode draws positive ions of lithium and deuterium into the structure. The palladium grows twice its volume in the experiment and it is easy to imagine the tremendous forces exerted by the interatomic bonds between palladium atoms acting against the atoms drawn into its crystal structure. This should be a good test of the highly pressed association of these atoms. It seems clear that the experiment worked and proved that lithium can exchange a mass increment with deuterium under the proper conditions, because energy was released by the experiment, and excess helium was detected within the cathode.

We see that conventional physicists are correct that fusion of deuterium into helium is not the process involved in cold fusion. They do not however know that it is a really a form of atomic transmutation. Scientists perform atomic transmutation in producing technetium, a material not found in nature but produced by bombarding molybdenum with deuterons. The molybdenum acquires a mass unit from the deuterons in a fashion very reminiscent of the cold fusion transmutation. There may be many other forms of atomic transmutation. Larson's atom building process is entirely dependent on transmutation of one given element into a higher mass element.

Another thing that Larson's theory predicts is that
nickel should make a reasonable substitute for palladium in a cathodic transmutation experiment. Its structure is 3-3-(8); again with a large amount of space within the outer structure. In fact, an experiment of electrolysis-transmutation was successful with plain water, a nickel cathode and potassium ions, 3-2-1. The result was production of very significant heat and calcium, which was not present at the outset of the experiment. This process is particularly interesting, because evidently hydrogen mass one ions provided the mass unit to bring potassium up to the calcium, 3-2-2 state, meaning that the mass unit in the hydrogen atom was essentially eliminated, as follows:

\[
\begin{align*}
3-2-1 & \quad \text{Potassium} \\
+1-1 & \leftrightarrow (1)-1 \quad \text{Hydrogen (proton/anti-neutrino)} \\
3-2-2 + 1-0 + (1)-1 + \text{Energy} & \\
\text{Calcium/positron/anti-neutrino} &
\end{align*}
\]

Note that I have used the anti-neutrino as the associate of the proton in the hydrogen structure (contrary to Larson's neutrino), because I feel strongly that this is correct, but will not proceed with proof at this time. Those interested should review my article on the subatomic array in the Autumn, 1996 issue of Reciprocity, where I also reveal the array of coding for subatomic particles as used here.

There are some interesting questions concerning this reaction:

1) What is the fate of the positron, that is the rotational base within atoms? It would seem that a free positron in a cathode (negative pole) would be annihilated by an electron, yielding significant energy, more than that of the shift from potassium to slightly higher stability of calcium. The energy from this experiment is quite substantial, and the experiment is quite reproducible.

2) The anti-neutrino should be released to the environment, but of course is exceedingly difficult to detect. As discussed in my previous article, the Subatomic Array, a positron would not have the 3-dimensional structure capable of retaining the anti-neutrino against its tendency to progress at unit speed. The uniting of the anti-neutrino with an electron might form a muon neutrino, but the probability that both the calcium atom and muon neutrino would form simultaneously without any necessity for that to occur makes it extremely unlikely.

---

**Evolving Views of Space and Time**

*Continued from page 14...*

First off, the concept of *motion* must be taken as a more generalized concept—that of motion being an *inverse relationship between two aspects* regardless of what the aspects are named. Physical motion can then be defined as having the aspects of space and time; *metaphysical motion* can be defined as having the aspects of the *physical* and the *non-physical*.

Secondly, the process of *complexity of motion* must be considered. In the physical universe, motion starts off as linear vibration. To this, a 1-dimensional rotation is added to produce the sub-atomic particles, then a 2-dimensional rotation forming the atoms. To either rotation, a rotational vibration can be added to produce magnetic and isotopic effects. Because the system is limited to three dimensions, no other types of motion can be added to a compound motion, though the magnitude of existing motions can increase. But this, too, has a limit (atomic number 117). For complexification to continue, another *type* of motion must occur.

Rotation is essentially a reciprocal relationship between two axes. If you examine a point moving around the circumference of a circle, as the absolute magnitude of one axis diminishes, the other increases. Therefore, rotation deals with complexification of *coordinate* dimensions. Since we have used all possibilities of coordinate dimension, the next *type* of motion that can occur is the scalar equivalent of rotation—*recursion*—motion defined with the aspects of the physical and the non-physical.

Physical rotation is shown in Figure 4, with the aspects of space and time:

*Continued on page 26...*
Subversive Reflections on the Practice of Physics

K. V. K. Nehru, Ph.D.

"The transition from a paradigm in crisis to a new one is far from a cumulative process. Rather it is a reconstruction of the field from new fundamentals."

—Thomas S. Kuhn, The Structure of Scientific Revolutions, pp. 84-85

In the article High Energy Physics and the Reciprocal System¹ we indicated that high energy physics is a field approaching a crisis, and therefore, the Reciprocal System, originated by Dewey B. Larson, has greater chances of getting heard since it offers a truly general theoretical framework resolving long-standing problems. We believe that the dawning of a New Century is particularly propitious for new ideas—as it always has been—and the Reciprocal System, with its new paradigm of scalar motion as the sole content of the physical universe, has much to contribute. The need of the times is a good number of interface articles that could bring the knowledge of the Reciprocal System to the Orthodoxy, or at least to those iconoclastic thinkers in its ranks.

The title of this article is adopted from that of an article² written by A. J. Leggett in the Indian journal of Current Science. I shall quote extensively from this article, giving the page numbers in parentheses.

Prof. Leggett is well-known in the field of condensed matter physics. He advances in the above article forceful arguments against reductionist viewpoint in science. Reductionism implies that the behavior of macroscopic systems is in principle entirely determined by the behavior of their microscopic constituents. Leggett is not alone in drawing attention to the limitations of reductionism. Since the pioneering work of the celebrated thermodynamicist and Nobel laureate, Ilya Prigogine, there has been a growing awareness of the limited applicability of the reductionist viewpoint in the fields of physics and life sciences.

Epistemology of Reductionism

Leggett observes that the reductionist argument goes like this: "We have analyzed the properties of macroscopic bodies in terms of those of atoms and molecules: these systems in turn behave as they do because of the properties of the electrons and nuclei: the behavior of the nuclei is determined by that of their constituent nucleons: and now we trace the properties of the nucleon itself to that of its constituent quarks. What could be more obvious than that the behavior at each level is determined by that of the constituents at the next level below?" (p. 787).

He then tracks down that “our experience of ‘understanding how things work’ starts with mechanical devices made by other human beings, and that the most natural way of achieving such an understanding is precisely to take the device apart into its constituent parts, since these are what the maker started with. Does this experience subconsciously color our perception of what constitutes an ‘explanation’ of natural phenomena as well as of human artifacts?” (p. 787)

He questions that would it be really obvious “that the behavior of complex bodies is entirely determined by that of their constituents” (p. 792) were it not for this subconscious conditioning about what constitutes ‘explanation.’ “Reductionism is probably as deeply ingrained in the thinking of most of us as any single element in the whole of our scientific world view.” (p. 792)

Who Put Reductionism in Nature?

Let us inquire, says Leggett, what most of the contemporary experimentalists and theorists in the field of high energy physics are involved in.

“Most high-energy experimentalists are engaged in a single enterprise which, conceptually if not technically, has a very simple structure. Namely, they accelerate particle A and particle B so as to hit one another, and watch where they and/or particles C, D, E emerge, and with what energy and (sometimes) spin. In particular, the experiment is designed so that, as nearly as possible, the incoming beams are each described by quantum-mechanical pure states of definite momentum; and while the theory certainly predicts that, in certain cases at least, the outgoing states are not simple classical ‘mixtures’ of products of plane wave states, but have built into them subtle quantum correlations of the
type which are important in Bell’s theorem, the whole setup is designed precisely so that such subtleties can be neglected.” (p. 787)

Now when the particle physicists claim that experiments show that Nature is actually simpler at higher energies, might it not be due, Leggett wonders, at least partly “to the fact that we have chosen to ask her only questions which by their very construction, allow no subtlety in the answers?” (p. 787)

Referring to the theoretical front he says: “A few years ago, at least, there were high hopes (I am not clear how far those at the forefront of the field now share them) that in the ‘super-string’ picture the constraints imposed by the need for self-consistency would be so severe that they would uniquely determine the parameters of the theory, including as outputs not only the masses and coupling constants of the known elementary particles but even the ‘true’ dimensionality of space-time.” (p. 788)

He then raises the genuine epistemological quandary: “Can mathematics—a subject which is usually taken to be concerned with analytic truth—really put constraints on how Nature can behave?” (p. 788)

The Whole is the Sum of the Parts—Or is it?

Leggett now surveys the evidence for and against reductionism in science. He points out: “So long as one is dealing with those phenomena, and only those, where we believe that the predictions of quantum mechanics are well approximated by those of classical physics, then the evidence for the reductionist point of view is very strong, and moreover there is absolutely no a priori, internal reason to challenge it.

“For example, in a typical ‘macroscopic quantum effect’ in the conventional sense, such as the Josephson effect, what we are actually seeing is the effect of a macroscopically large number of Cooper pairs behaving in identical fashion; the observed supercurrent is simply the sum of the supercurrents carried by the individual pairs of electrons. Similarly, in laser diffraction, we are simply seeing the coherent sum of the behavior of many individual photons. So long as we are dealing with the summed effects—even the summed quantum effects—of a large number of small groups, there seems no reason to doubt a reductionist approach.” (p. 793)

He continues: “It is only when we come to intrinsically quantum phenomena that we have a problem. First the positive evidence in favor of reductionism in this regime is much less strong than it looks at first sight, and secondly there are indications which are intrinsic to the quantum formalism itself that the reductionistic program not only might but must eventually fail.

“Let us start with the phenomenon usually known as the Aharonov-Bohm effect. In this, the current flowing through a region of metal which encloses a hole turns out to be affected by the magnetic flux through the hole, even though the magnetic field vanishes everywhere within the metal itself. In other words, the electrons carrying the current are sensitive to the conditions in a region which they never enter, but only enclose with their paths! This already demonstrates that quantum mechanics forces us to give up some of our classical notions about the ‘locality’ of physical effects.” (p. 793)

As the next example he considers Bell’s theorem and the related experiments: “given that we make our normal assumptions about local causality in the sense of special relativity theory, and about the statistical properties of ensembles being determined entirely by the initial conditions, then what Bell’s theorem and the associated experiments show is that even though two regions of the universe may be spatially separated and physically noninteracting, we nevertheless cannot ascribe to each of them individual properties; any ‘realization’ of properties takes place only at the level of the combined system.” (p. 793)

What Bell’s theorem experiments have shown us is that, in the context of reductionism which implies that ‘the behavior of macroscopic systems is entirely determined by that of their atomic-level constituents,’ we are not justified in assuming that the concept of ‘constituent’ is necessarily associated with spatially localized region. So Leggett exclaims that “the Bell’s theorem experiments are a death-knell for reductionism.” (p. 793)

The Quantum Measurement Paradox

There is one more feature of the current quantum mechanics world view to which Leggett draws attention, which gives us reason to doubt the validity of reductionism—the quantum measurement paradox.

“Consider an ensemble of systems which can go from some initial to some final state by either of two paths B and C. At the microlevel, we believe that despite the fact that ‘measurement’ of the path followed by any individual system will always show
that it followed either B or C, the quantum formalism must nevertheless be interpreted as in some sense saying that if no measurement was made, it simply is not the case that one (unknown) possibility out of B and C was realized; rather, both possibilities are in some sense represented in the correct description. As a matter of experimental fact, the properties of our actual ensemble are not identical to those which we would obtain from a combination of the two ensembles obtained by allowing only B and only C respectively; i.e., we verify, experimentally, the phenomenon of interference between the two paths. So it seems that the quantum formalism in some sense either ascribes 'reality' to both the possibilities B and C, or ascribes it to neither.” (p. 794)

“At the macrolevel the formalism of quantum mechanics remains exactly the same; but there is now no direct experimental evidence against the hypothesis that one of the possibilities B or C has been realized in each particular case.

“We have here a case in which we have two maps of reality—the quantum-mechanical map which we apply to atomic phenomena, and the 'common-sense,' classical map which we use for the macroscopic, everyday world. The problem is that they claim in principle to describe the same level of reality—the world of counters, cats etc.—and yet no one has succeeded in showing that they are compatible.” (p. 795)

Now, Leggett's penetrating insight into this enigma, which first fastened our attention onto his article, was the realization that "under appropriate circumstances if we extrapolate [the quantum] formalism up from the microlevel to the macrolevel, there is no point at which any natural discontinuity occurs." (p. 794) [my emphasis]

He is unequivocal in his conclusion: "My own belief is that the quantum measurement paradox can have no solution within our current reductionist worldview.” (p. 795) He opines that the quantum field theory is only a half-way house, sure to be supplanted by "a radically new picture of physical reality whose nature we cannot at present even guess.” (p. 795) He adds: “I for one intend to use my best efforts to hasten that day.”

**Enter the Reciprocal System**

The Reciprocal System, with its new paradigm that (scalar) motion is the sole constituent of the physical universe, resolves all the difficulties. Larson's finding that space and time are discrete in nature and quantized answers the crucial question raised by Leggett above, that "there is no point at which any natural discontinuity occurs." Such a natural discontinuity does occur at the boundary of the natural unit of space. We have explained in detail in a previous article how at the boundary between the Time Region (the region inside unit space) and the familiar three-dimensional spatial region a discontinuity occurs, and how the apparent directions of the forces applicable (the gravitation and the space-time progression) change from outward to inward and vice versa. We have shown that this gives rise to the solid, liquid and the gaseous states.

Larson's discovery that space and time are reciprocally related had been a crucially important finding. This led to the discovery of the existence of coordinate time analogous to the familiar coordinate space. We have shown that the phenomenon of spatial non-locality arises due to the switching from the spatial reference frame to the temporal reference frame on entering the Time Region. This makes for the equal possibility of all the alternative paths, at the microlevel. At the macrolevel, however, this is not the case since the interaction is no longer in the Time Region but is in the conventional spatial frame. We have further explained the concept of temporal non-locality which is responsible for producing the statistical pattern out of the independent microlevel events of an ensemble.

Larson pointed out the fact that correlated particles—like in the EPR experiment—maintain contiguity either in space (if separated in time) or in time (if separated in space).

We also note that in the Reciprocal System there are two kinds of time: the coordinate time and the clock time. These are respectively the reversible time, t, which occurs in the equations of classical physics and quantum mechanics, and the irreversible time, T, which is relevant to living processes and consciousness. This distinction arises naturally and logically in the Reciprocal System, whereas in the world view of the current science, as Prigogine finds, it is to be introduced as an ad hoc necessity. Analogous to coordinate time and clock time we also find that there are two kinds of space: the familiar coordinate space and what Larson terms the clock space. The latter manifests to us as an irreversible and continual expansion, as is evidenced in the recession of the distant galaxies. In the Reciprocal System there is no need for the purely ad hoc assumption of the 'big-bang' to account for the galactic recession!
The Reciprocal System repudiates reductionism at the very outset. Larson finds the atom to be a unit of compound motion, and without parts. The so-called sub-atomic particles turn out to be incomplete atoms, and without parts. In the Reciprocal System there is no need for quarks and gluons, not even for nucleons. We can identify the cosmic ray decay particles and the exotic particles generated in the accelerators to be the transient apparitions of the atoms of the conjugate sector of the physical universe, which Larson refers to as the cosmic sector. The cosmic sector is a complete duplicate of our material sector with the roles of space and time interchanged.

Larson was able to explain the characteristics peculiar to biological systems by the possibility of conjoining the structural units pertaining to the cosmic sector with the material structures. Remember that the structural units of the cosmic sector are not aggregates in space. Rather, they are aggregates in time, and hence their control on the cells, for example, appears totally nonlocal. This makes it possible for the logical inclusion of self-organization and creativity among other things.

All these insights about the quantum phenomena which the Reciprocal System is able to provide acquire even greater significance when we realize that its creator, Dewey Larson, had never explicitly thought out these aspects when he originally developed the theory. A perusal of his early correspondence with other students even reveals that he looked upon these quantum-mechanical phenomena, like the tunneling, with hesitation. (This, however, does not mean to underestimate his genius: he was so pre-occupied with the overall development of the theory so as to establish its generality, accuracy and cogency that he hardly ever had the time to go into the quantum subtleties. He used to do all his typing work himself, and imagine that his typewriter didn’t even have the ‘+’ key: he used to type ‘−’, then backstep and overtype ‘+’.) Be that as it may, the actual fact is that the logical development of the Reciprocal System of theory comes up to match with the requirements to be satisfied by the ‘new picture of physical reality’ we are looking for, and whose nature could not even be guessed by the scientists. The next question, therefore, is since such a theory did appear now, whether or not we can see the truth of this!

References


———

The effect of making men think in accordance with dogmas, perhaps in the form of certain graphic propositions, will be very peculiar: I am not thinking of these dogmas as determining men’s opinions but rather as completely controlling the expression of all opinions. People will live under an absolute, palpable tyranny, though without being able to say they are not free. I think the Catholic Church does something rather like this. For dogma is expressed in the form of an assertion, and is unshakable, but at the same time any practical opinion can be made to harmonize with it; admittedly more easily in some cases than in others. It is not a wall setting limits to what can be believed, but more like a brake which, however, practically serves the same purpose; it’s almost as though someone were to attach a weight to your foot to restrict your freedom of movement. This is how dogma becomes irrefutable and beyond the reach of attack.

—Ludwig Wittgenstein
The Space-Time Universe: Part V

Prof. K.V.K. Nehru

(Continued from Reciprocity XXVI, Number 1, Spring, 1997)

In the previous parts of this article we have endeavored to sketch the development of the Reciprocal System of physical theory created by Dewey B. Larson. As it was impossible to deal with the whole of the theory, attempt has been made to present the salient features that have a broad enough scope to enable the interested reader to appreciate its potentialities.

New Light on Quantum Phenomena

Since in the time region (the region inside the quantum of space) only motion in time can truly exist, the appropriate reference frame that ought to be adopted for the description of the physical phenomena is the three-dimensional temporal reference frame, and not the conventional, spatial reference frame. The origin of the conventional reference frame is at zero speed, whereas the origin of the temporal reference frame is at zero *inverse speed*, which is tantamount to infinite speed in the context of the conventional spatial frame. Consequently, a location pertaining to the temporal reference frame is found not localized in the conventional reference frame and *vice versa*. This is the origin of the non-locality characteristic so perplexing in the quantum phenomena. The reciprocal (inverse) relation between these two types of reference frames also explains why a localizable particle in the context of a spatial reference frame needs to be regarded as an endless repetition, namely, as a wave, in the context of the temporal reference frame. This insight resolves the vexed problem of the wave-particle duality.

There are yet unforeseen insights brought to light by the Reciprocal System. In the outside region, that is, in the context of the three-dimensional spatial reference frame, speed (=space/time) is directional (vectorial). However, in the inside region, that is, the time region, inverse speed (=time/space) is the quantity that is ‘directional’ while speed appears scalar. This ‘direction,’ of course, pertains to the realm of the three-dimensional time and has nothing to do with direction in space. In the universe of motion all physical quantities can be reduced to space-time terms. Larson, in a major overhaul of the dimensions of the various physical entities, arrives at the conclusion that the dimensions of energy are those of inverse speed, namely, time/space. Consequently, energy needs to be represented by complex numbers in the time region, and negative energy states are as natural in the time region as negative speeds (velocities) are in the spatial reference frame.

Conclusion

We have attempted to present some of the important contributions of the Reciprocal System to the understanding of the physical universe starting from a new paradigm—the concept of a universe of motion, in place of the current one of a universe of matter embedded in a framework of space and time. The examples cited here are expected to convey a broad enough scope of the theoretical system and establish that a *prima facie* case exists for a general theory. It is only fair to record that some of the more esoteric aspects of the Theory, like multi-dimensional motion, the scalar regions of the universe, etc., have entirely to be omitted for pedagogic reasons. Mention must also be made of the fact that Larson finds the basic constituent of the universe according to the new paradigm, namely, to be *scalar motion*. Even though the existence of this kind of motion has been recognized, it has played a minor and insignificant role in physical theory hitherto. So Larson carries out a full-scale investigation of the properties and possibilities of scalar motion and discovers that this type of motion plays the central role in the drama of physical phenomena. He finds, for example, that some of the unexplained physical facts are really the unfamiliar features of certain types of scalar motion. For instance, all the observed characteristics of the gravitational field—like the instantaneous action, the lack of shielding effect, equality of the inertial and the gravitational mass, etc.—come out logically from the properties of scalar motion of a particular type. There is no need to resort to *ad hoc assumptions* like the curving of space-time and the finite speed of propagation of the gravitational influence, which have absolutely no observational support. Consequently, the Reciprocal System is free from all singularities—like black holes, cosmic strings, and the like—that plague conventional
astronomy theory. Indeed, the occurrence of these singularities indicates a defective theory. Before the advent of the Reciprocal System, there has been no theory that truly depicted the facts about gravitation. Therefore, theories not fitting the facts have been allowed to pass off, and stupendous amount of research has been side-tracked.

The real reason for omitting the description of some of the significant features of the Reciprocal system alluded to in the above paragraph from this introductory Article is—as has been hinted at the outset—no matter how simple and logical the new conclusions are from the viewpoint of the new paradigm, since one is habituated to the old paradigm, some of them might look nothing short of preposterous. Having invested one’s entire professional career in the existing paradigm, one’s mind does not take kindly to the prospect of a basic paradigm change. The first few contacts are the most difficult ones, as Kuhn points out. One would not be inclined even to pay attention to the new conclusions, much less evaluate them on their own merit. It has been found wise to discuss first those features that could be assimilated easily on a first encounter.

Evolving Views of Space and Time

Continued from page 20...

![Figure 4 - Rotational Motion](image)

Figure 4 - Rotational Motion

Figure 5 shows inter-sector recursive motion, with its aspects of the physical and the non-physical. Note that both Sectors 1 and 2 comprise the physical aspect of this type of motion, and as such, recursive motion functions to link the physical-type motions of the Material and Cosmic sectors into a single, more complex motion. In other words, recursion allows a Material structure to link to a Cosmic structure—thru motion—and forms a new type of unit, which Larson describes as a *Life Unit*.

![Figure 5 - Recursive Motion](image)

This also infers that the non-physical sector has the same attributes and characteristics of the physical sector, just as time has the same attributes and characteristics of space.

To a researcher unfamiliar with the dimensional aspects of time, the time region appears non-local, and hence infinite. The same applies to the non-physical region of a life unit. It will also appear as non-local to the physical, and appear to be infinite.

By the identification of recursive motion in the evolving views of space and time, we can now determine what the higher-level structures look like beyond the 3rd sector. Most theologies and philosophies state that there is a 7-fold structure behind all manifestation. If we assume this to be correct, the application of recursion to the existing metaphysical aspects of the Reciprocal System yields this structure:

![Figure 6 - Sevenfold Recursive Structure](image)

It is from this point that a detailed investigation of the 3rd Sector as a finite, discrete system of motion can begin, and the attributes of other potential sectors separated out, quantized, and identified, producing a true Universe of Motion. No additional postulates should be required, and a complete metaphysical universe can be theorized using the same techniques that worked so well for the physical universe of the Reciprocal System.
Dewey Larson and The Way of One

Stephen Tyman

Presented by Carla Rueckert McCarty of L/L Research

We consider the relationship between Dewey Larson’s *Beyond Space and Time* and Ra’s *The Law of One*. Larson’s *sectors* of being are singled out for emphasis. This division is grounded in an understanding of time/space as a metaphysical domain. A parallel between Larson’s sectors and what Ra calls the densities is explored. The suggestion is given that there may be further sectors beyond Larson’s three, and that when properly understood, this has consequences for Larson’s third sector, especially with regard to the problem of evil, and the issue of the continuity between the sectors.

I have been asked to speak to the question of the relationship between the thought of Dewey Larson and the material presented in the name of Ra under the title of the *Law of One*. I do so in all humility, for I am well aware of how daunting is the task of bringing together these two unusually compelling sources.

Before anything else is said, I feel it is necessary to remark on the truly exceptional situation that has come about, where fully invested physicists have come to the point where a meaningful dialogue has been opened with fully invested mystics. Only seldom in the history of Western thought has this been the case, and since the growth of positivism in the twentieth century, almost never has such a collaboration been even thinkable. What has brought this about is, of course, a convergence of certain central themes shared by these assembled physicists and mystics. But vastly more remarkable than this is the fact that the thought of Dewey Larson itself has prepared the way to an acceptance of the possibility of the kind of telepathic contact represented by the dialogue with Ra and other allied social memory complexes.

Rather than attempt a synoptic account of each of two positions subsequently to be compared, I prefer to speak primarily to those issues which arise in the context of Larson’s thought, and which have a particular resonance from the point of view of the Ra Material. Though this is not my area of expertise, and will not be my primary focus, it should be noted that a strong basis for this comparison can be found in the original work done by the Reciprocal System in the field of physics, proper.

In this connection I would simply point out the two most salient points. The first is the recognition that the essential “stuff” of the universe is nothing but motion, which, when it acquires a certain inner complexity or critical “mass” grounded in balanced patterns of interlocking motion, is said to result in matter. For its part, matter is said to be *displaced* into a second frame of reference generally invisible to the first, or visible, universe. This, then, leads to the second major point, namely that there is such a second dimensional zone, and that it may be explored and characterized as distinct from the so-called space/time continuum that has become familiar since the advent of relativity theory. Larson dubs the second dimensional frame of reference time/space, and does so advisedly, for he means to indicate a certain inverse symmetry that obtains between time/space and space/time. To suggest the active and dynamic nature of this symmetry, Larson chooses the term “reciprocity” to describe the relationship.

Now at no time does Larson propose that the motion and the reciprocity hypotheses can be separated from one another. We may note, however, that Larson was not the first to propose motion as the most basic quantity in the universe; this thesis was put forward by the sixteenth-century Serbian Jesuit, Roger Boscovich and again later by the nineteenth century German, Gustav Fechner. But only when Larson made clear the difference between scalar and translational motion, and brought these into the context of the space/time and time/space reciprocity thesis did the motion thesis acquire the staggering explanatory power that it assumes in the Reciprocal System.

I do not believe that I have anything of significance to add to the understanding of the physical implications of Larson’s thought, especially to the august gathering of physicists present here. I would...
point out, however, one unavoidable asymmetry in the Reciprocal System. This is that, in the field of space/time, much of what follows from the reciprocal postulate is observationally verifiable in a direct way, whereas time/space is observationally inaccessible and therefore its specific features are describable only indirectly, and are featured primarily as they come into play in providing the key to what in space/time is not otherwise explicable. The net result of this experiential asymmetry is that, while the basic structure of time/space seems to have been rather safely surmised with respect to the most basic physical motions, there is much of the inner articulation of this sector of the universe that, from a purely physical point of view, remains entirely inaccessible.

Now had Larson decided to leave this inaccessible region in relative obscurity, certainly no one could have blamed him, for to refuse to go beyond what is demanded by a certain hypothesis is often considered a great virtue in the fields of science. To his credit, however, Larson chose to go further, to attempt to put the whole enterprise of physical explanation of the universe in the context suggested to him by his discovery of the corridor to time/space. Thus, in the newly release work, Beyond Space and Time, Larson has vastly expanded the horizons of his work.

The first step that any physicist could take beyond the established parameters of the discipline is in the direction of the phenomenon of life, which is in overt violation of Newton’s second law of thermodynamics, the principle of entropy. I seem to recall Stephen Hawking, for precisely this reason, in A Brief History of Time, declaring life to be something of a backwater eddy in the greater current of cosmic reality. Though this is not an atypical move in physics, from a philosophical point of view, which I confess to occupy, this seems to be a very peculiar position to have come to, especially on the part of one who, after all, is living. Any biologist who would attempt to use this as leverage against the physicists, however, would face a similar situation with regard to the issue of the way life in general at some point in its development gives way to self-consciousness. Nor are the psychologists, who are the principle scientific purveyors of self-awareness, exempt from these dynamics, for at some point they run up against the issue of spirituality, for which nothing in their discipline specifically prepares them.

Now if we gaze back at the basic pattern revealed here, a general trend begins to appear. Within each discipline certain basic elements and ways of functioning are identified, their principles of operation isolated, generalized, and eventually proposed as universal laws. Subsequently, specific events can be “explained” by reference to the laws. Ideally, any particular event could be adequately explained by invoking the right laws; but it is important to recognize that the ideal of science does not permit this process of invoking the right law to be considered an art-form: rather it, too, must be put on a scientific basis. Thus, there must be laws for invoking the right laws, and laws for invoking the right laws for invoking laws, and so forth. This goes on to higher and higher degrees of universality at least asymptotically approaching the ideal of a science of one single, all-embracing law. Now in point of fact, no science has yet attained to this ideal. Physics, for example (at least the last time I looked), still had its strong and weak nuclear forces, its gravitation and its electro-magnetic force, without an overarching explanation showing how all four are essentially dispositions of one more basic force. Meanwhile, there is an ambiguity in the very term “force” if, in order to define it, we need to resort to four fundamentally different modes of manifestation. Nevertheless, within physics as elsewhere in science, there is a prevailing commitment to what is fundamental, that is, something of a cognitive faith that every phenomenon in particular as well as all phenomena collectively are ultimately susceptible of explanation, and that if and when this is achieved it will be by virtue of a process that relates what is less fundamental to what is more fundamental. This scientific fundamentalism proceeds to its explanations, then, by projecting specific events or event-configurations backward to the more general configurations representative of its type, thereby sacrificing, in the interests of understanding it, the uniqueness of an event to its type-structure. Now we in philosophy, who have answers for nothing but names for everything, sometimes call this cognitive posture reductivism. The basic principle of reductivism, then, is that all “higher” or more complex phenomena can be explained by reference to a few “lower”, more elementary or generic laws, of activity. The ideal here, once again, presumes that if we only had an adequate grasp of the applicable laws, every event in the universe could in principle not only be explained, but could have been predicted.

Now this commitment to reductivism, which has been lurking at the heart of science since the Enlightenment, crosses all boundaries of discipline. But this sets up an interestingly unstable situation within the division of the sciences themselves, and has worked to create an impression concerning the
priority of physics throughout the scientific community. Take biology, for example. The principle of reductivism as it comes into play here suggests that "higher" biological operations can be viewed as developments or "functions" of lower ones, the limits of the possibilities of the higher being already prefigured in the constitution of the lower. But by parity of reasoning, even the lowest of the biological functions could be said to be developments or derivations of that which is not yet biological, but only physical in a more generic sense. Understood negatively, this would suggest only that no biological function could violate the laws of physics. But it is when this application is put in a more directly positive sense that biologists begin to squirm. For this implies that, when physics is fully comprehended, all the possibilities of biology will also be grasped, and grasped in a manner that is more fundamental than the biologists are able to reach. It is thus only the current lack of development in physics that renders biology necessary. Now while the biologists are typically more than happy to have this same principle be applied to psychology, to show that ultimately it reduces to biology, they are often not nearly so enthusiastic to make this sacrifice themselves. Instead, they wish to have the freedom to frame their own laws and procedures as they perceive them best to fit their subject matter, and moreover to have this freedom be laid down not as a mark of the lack of development of a more fundamental discipline like physics, but as a matter "grounded" in the nature of the reality which they have chosen to study. The first premise of biology, then, whether this is made explicit or not, is that biology must be free of the constraints of the discipline of physics.

If an ontological grounding for this premise is sought it would thus have to invoke the concept of freedom itself in a rather direct way. The biological realm, though not antagonistic to the physical, is still nevertheless free enough of it to have its own distinctive principles of operation. Now when we move into the psychological arena, the freedom-principle becomes even more important. For here it is no longer simply a question of noticing that biological organisms are able to organize their behavior around principles unique to the biological realm, but of noticing that with the advent of self-consciousness, with which psychology inevitably deals, free and deliberate activity has reached the level of individual determination. Now as a matter of fact, this point is not usually featured in academic psychology, for precisely the reason that completely free activity would seem to leave nothing actually to be studied, for it would be resistant to being brought under the rule of law. And if one views this as Larson does, in the Kantian manner of a law one gives to oneself, one has already entered the sphere of moral life, which exists outside the parameters of conventional science. For Larson, this means metaphysics.

Metaphysics

Beyond Space and Time represents an effort to reflect directly upon the metaphysical world, that is, the world which in the context of his physics had come to be called time/space. As Larson proceeds to unpack the notion of the time/space zone, if we may call it this, he increasingly finds it necessary to introduce factors seemingly alien to physics. Thus, while the time/space conception he had elaborated in his physical works continued to function dazzlingly well at the level of the operation of the inanimate world of matter, in order to expand his thinking into the living world, Larson had to become aware of a whole set of further considerations in large part discontinuous with the first. Nor is this discontinuity gratuitous or arbitrary, for it reflects precisely the division between physics and biology that we have just elaborated, with the concomitant problemization of the entropy principle, etc. When Larson decides, in the name of the time/space domain, to move into the biological sphere, he effectively steps from one frame of reference to another which no longer functions in the same way or according to the same set of rules. There is, in short a discontinuity between the physical and the biological sectors, or Sector I and Sector II, as Larson comes to call them. Later, Larson will identify a second discontinuity between the biological and moral domains, Sectors II and III, as they are designated.

Larson himself is quite adamant in distinguishing the dynamics which describe each gestalt. He insists that the principles of operation identifying each sector are discrete and self-contained, and that to move from one framework to another would involve taking a leap. For instance, in the area of physics, the law of entropy is not to be contravened, while it holds no sway in biology; and in biology the law of survival reigns supreme, but is not a factor in the moral calculus of Sector III.

One might well remark, however, that these are descriptive continuities quite accurately generated, but visualized from the standpoint of space/time (or what is manifest) and not from the standpoint of time/space. It remains theoretically not only possible but necessary from the point of view of the horizon opened up by Larson's analysis, to acknowledge that time/space itself constitutes an inner continuity that

E 26.2–29
would permit it to be called a continuum even while its refractions or distortions into space/time inevitably yield irreducibly discontinuous laws of manifestation and behavior.

It is, in fact, precisely the question of how these discontinuities are to be thought that I would like to take up the standpoint of what the Ra Material had to offer. The message that Ra brings is that of an underlying continuity of all things reaching to the very limit of unity itself. We may speak here of an intelligent source, an infinite and all-embracing origin, but we may also speak as Ra emphatically does, of a living spiritual principle of our own consciousness, a kind of creative nusus or inner longing, running through us and throughout the creation in its many-layered ways of existing. To be sure, the Way of One is deeply shrouded in a mystery unfathomable even to intelligence far beyond our own. Nevertheless, a small beginning may be made on this Way by fastening upon that hidden strand within us all, that Ariadne's thread which is in effect an instinct or drive to move beyond our present level of awareness, our present manner of existing.

In this regard, it is perhaps appropriate to begin not with the principle of intelligent unity itself, but with the way that longing is registered in human life. And here we encounter a set of issues that, when cast back in the light of what is manifest, suggests yet another discontinuity, another sector of beingness, a Sector IV, as it were. In his invocation of the possibility of telepathic communication, Larson already anticipated this move, though he did not carry it forth to the full extent of its implication. The difference between Sector III and Sector IV principles of organization will provide us with a means of access into the further teachings of Ra.

Notice, first of all, that in the Sector III world, where the laws of morality obtain, transcendence of the merely biological realm is achieved by means of an individual's resolve to act in accordance with the perceived values of the moral domain. This entails interacting with other individuals after the manner of the golden rule, in effect respecting their rights and obligations as separate individuals. In this context, no one individual may make any presumptions upon the person or property of another, and the distance separating individuals must be respected, since no one may make incursions into the thought processes of others. The rule of law, then, obtains in a fully general sense of this level. In a completely rule-governed society, everything is explicit, nothing is tacit. Now I would ask you to reflect for a moment upon the point that no one actually can live this way, but rather we all to one extent or another move beyond explicitness to tacitness at least in the case of those we know and trust. At the level of the Sector III behavioral analysis, however, to move beyond the rule of explicitness is to fall short of it. The possibility of an informed and fruitful tacitness moving with a suppliance unimaginable by any ratiocinative process remains as much a paradox for Sector III as the surmounting of entropy of the law of survival does for Sectors I and II.

But tacitness itself is but the smallest step towards that greater possibility of interconnectedness represented by genuinely telepathic communication. For here the boundaries of the sense of the isolated self break down, and instead of a free rational agent serving as a unit of being in a larger totality that is only the sum of the units it embraces, every unit is nourished and expanded by the immediate contact it enjoys with that whole which is greater than the sum of the parts. We can thus say in a general sense that Sector IV development entails precisely the breakdown of those barriers of individuality which are essential to Sector III development, and that where moral judgements, rights and duties are the order of the day in Sector III, Sector IV features compassion, forgiveness, and solicitude. If these latter turn out to be already familiar values, this only suggests that perhaps Sector III was not as self-contained as one might have supposed, as indeed perhaps no sector is a closed system, but rather a stage on the way to a higher striving.

We need to conclude by speaking briefly to the question of the subject of this striving, usually called the soul, the issue of its continuity as it develops or evolves through the sectors, and of the prospect of further sectors to come. But first a word about a matter that is dark and difficult for many of us to bear.

The thought of Dewey Larson is pervaded by such optimism and positivity that one feels worse than Ebenezer Scrooge in even bringing up the problem of evil. But it cannot be helped if one is to give more than just half the picture of the movement from Sector III to Sector IV. The way that Larson characterizes the third sector of being, by means of the moral world order, is typical of those who are well meaning and positive in orientation, and whose fundamental inclination is to be of service to the rest of humanity. The truth is, however, that not all souls share this disposition, nor do they choose to use its principles as a basis for further evolution. Nevertheless, they are still able to evolve. Instead of taking up a moral set of desiderata to use as a basis for a set of disciplines leading to a higher capacity
of service to others, these souls choose to conceive themselves to be part of a world order the salient currency of which is power and greed. Serving the self thus becomes the surrogate for the golden rule. There are, to be sure, many lessons and skills to be learned in order to become adept on this path, and when this choice is taken as a foundation, Sector IV experience is broached with a very different coloration than that of compassion and fellow-feeling. One thus does not reach into the soul of another in order to provide nurture and support, but in order to rape and plunder. To those who have taken the positive path, this kind of negativity is generally very disorienting, and, to the extent that this is possible, they often choose to ignore altogether its essential possibility. One does this at one’s peril, however, for one thereby risks more than simple naiveté. One fails to grasp the essential task of a soul traversing the treacherous terrain of Sector III, namely, that its most fundamental demand is that of the choice. But only on the basis of this choice which chooses the essential principle of its own further development is any further evolution possible. This is the kernel of what in the Ra Material is called the need for polarity. Much more could be said on this topic, but this is perhaps not the forum for that discussion.

We return now to the question of the broader nature and destiny of the soul and the sense in which it provides the overarching continuity rendering intelligible in a broader framework the regional discontinuities of the sectors. Here again I find myself compelled to resort to a teaching from Ra for which there is partial but incomplete preparation in Larson. To be sure, Larson is inclined to support not only the minimal thesis of the immortality of the soul, but even the more developed theory of reincarnation. He writes (p. 347): “The balance of probabilities, as it appears at the moment, is definitely in favor of a succession of existences, in which the individual metaphysical entities play many different roles…” When we place this theory of reincarnation, which for us is far more than a balance of probabilities, in the perspective of evolution through the sectors, we find that to reflect on how many different roles we play in the course of our development is to court a well-boggled mind. For the real continuity of the creation lies in the fact that its smallest modicum of being is destined to evolve through the entire framework of what Larson calls sectors and what Ra calls densities. This is the continuity of incessant striving, in which the lower is continually being reintegrated to a higher meaning and a higher purpose. In short, the higher conditions the lower rather than vice versa, as post-Enlightenment science would have us believe. As for the higher stages of this progression, we have it from the Ra Material that there is, beyond the fourth, a fifth, and again a sixth, and again a seventh sector or density. Of course, the further removed from the third sector, the more these beggar description from the standpoint of third-sector intelligence. And as for the highest step in the progression, we also have it from Ra that what Larson could not commit to is indeed true, that is, that there is a One Infinite Creator as root and branch of all. But this is perhaps something given more by way of inspiration than information, for in the absence of that faith which reaches through a very very dark night to a very very bright light within, the full meaning of this “claim” on behalf of deity may well fail to construe. For my part, I am willing to accept that, where information grows quite thin, inspiration is quite welcome indeed.

I have been able today to make only a baby-step towards introducing the content of the Ra Material, and I would invite any who have further questions to impose upon Jim and Carla McCarty, who have made a life’s work of service in this area. They will be able to attend to you much better than I. Adonai.

Additional Information on The Ra Material

The Ra Material
An Ancient Astronaut Speaks
Don Elkins, Carla Rueckert, James Allen McCarty

Who are the ancient astronauts? Why did they first come to Earth? Why are they returning now? What part did they play in building the great monuments of antiquity? What part did they play in the formation of present and earlier civilizations? With what other beings do we share our universe? And where does the Earth fit into the cosmic scheme of things?

Almost twenty years of experimental work with telepathy led to the “breakthrough” contact recorded in this
book. **THE RA MATERIAL** is an account not only of the events leading up to this contact, but of over 200 pages of verbatim transcripts of each and every conversation!

This book consists of an exact transcript from tape recordings of twenty-six sessions of an experiment designed to communicate with an extraterrestrial being. With clear logic and precise definitions it describes how the creation works from the photon to duality and includes a biography of our Earth, Atlantis, Mu, and before, how the ancients healed and learned using the pyramids, UFO visits on both positive and negative, beginning healing exercises, how your daily routine is related to your chakras, and how all of this culminates in a very important choice that each of us will make as the purpose of our life. This is the first of four books in **THE LAW OF ONE** series.

**The Law of One: Book II**

In **Book Two** of **THE LAW OF ONE**, the nature of each of the densities or dimensions of this octave of creation is explored in detail with special emphasis given to how evolution from our third density to the fourth density is accomplished. The relationship between the densities of creation and the energy centers of the body is investigated so that each experience can be used as a catalyst for growth to balance and to crystallize the energy centers or chakras of the student of evolution. Wonders, sexual energy transfers, the physics of Dewey B. Larson, Polarization in consciousness, ritual magic, and the nature and function of the Higher Self are all explored as they are related to the Law of One. **Book Two** contains Sessions #27 through #50.

**The Law of One: Book III**

**Book Three** of **THE LAW OF ONE** builds on the information presented in Books One and Two, continuing the exploration of the nature and balancing of the energy centers or chakras, sexual energy transfers, healing, reincarnation, meditation, and Wanderers. The nature of psychic prophecy is explored in **Book Three**, as are the nature and ramifications of what are usually called psychic attacks. A good deal of information is given on the principles of ritual magic in general and white magic in particular, and a beginning is made in the study of the archetypical mind, which is the mind of the Logos and serves as a kind of blueprint for our evolutionary process and which serves as the foundation concept for each of our individual minds.

**The Law of One: Book IV**

**Book Four** of **THE LAW OF ONE** is the last of the books in **THE LAW OF ONE** series. **Book Four** explores in great detail the archetypal mind which is the framework provided by our Logos or Sun body to aid each of us in the evolution of mind, body, and spirit. Tarot, astrology, and ritual magic are three paths offering the study of the archetypal mind, and in **Book Four** a study of that rich resource is undertaken using the tarot, which Ra gave to the Egyptians 11,000 years ago. Information is also uncovered on the nature and purpose of the veil that we experience between the conscious and the unconscious minds and the process of “forgetting” that occurs during each incarnation in our third-density experience. In **Book Four** the path of the adept becomes more clear as Ra elucidates the adept's use of experience to balance its energy centers and penetrate the veil of forgetting.

**Secrets of the UFO; Don Elkins, Carla Rueckert;** Summary of 25 years of philosophical study that preceded the Ra contact. Progresses from physical sightings to metaphysical implications.

**A Channeling Handbook; Carla L. Rueckert;** Written for those who serve as channels or who would like to. Topics: What is Channeling? Why channel? Psychic attacks, temptations, ethics, channeling and Christianity.

| The Ra Material; An Ancient Astronaut Speaks | $12.95 |
| The Law of One; Book II | $9.95 |
| The Law of One; Book III | $12.95 |
| The Law of One; Book IV | $12.95 |
| Secrets of the UFO | $10.95 |
| A Channeling Handbook | $10.95 |

Available from:

L/L Research
1504 Hobbs Park Road
Anchorage, KY 40223
ruckert@igloo.com
l’Excursion d’Archives SUSI

K.V.K. Nehru

After the demise of Dewey Bernard Larson, the creator of the Reciprocal System of theory, the first truly General Theory of physics, all his Manuscripts were transshipped to the headquarters of the ISUS at Salt Lake City, Utah, for safe-keeping.

During the latter half of 1996 I and my wife Rajni have had the good fortune to visit the Archives. It was a pleasure to go through this material, organizing it and helping in publishing valuable Papers out of this, for the benefit of the future students of the Reciprocal System. We are giving here an idea of the material available and where is it located.

We are very grateful for the help and hospitality given by Dr. Rainer F. Huck, Executive Director of the ISUS, and his magnanimous wife, Maria in making our researches possible and enjoyable.

* * *

The visitor will find here

All old Issues of Reciprocity, ISUS News and All of MSS of Dewey B. Larson.

The MSS of Larson are organized into 12 Boxes labeled A through L, and a Filing Cabinet with 4 Drawers.

The contents of the Boxes and the Filing Cabinet are as follows:

BOX-A
- MSS of Universe of Motion — 2 cartons
- Figures of Quasars and Pulsars — 1 set
- Theories of Globular Clusters,” (later included in Universe of Motion)
- Working Diagrams of Universe of Motion
- Pre-publication MS of Nothing but Motion
- MSS of Chapters I–XI of Basic Properties of Matter
- MS in pencil of Basic Properties of Matter
- “Outline of the Deductive Development of the Theory of the Universe of Motion”
- Xerox of book Science at the Cross-roads by Herbert Dingle
- Xerox of book Physical Significance of Quantum Theory by F. A. Lindemann
- Papers on Inter-atomic Forces by Lindemann

BOX-B
- “The Liquid State” Papers in # 1 and # 2 cartons
- Nearly 2700 sheets of Tables of calculations

BOX-C
- File # 22: Photo-electrical Relations and Work Function calculations (published in The Structure of the Physical Universe, pp. 118-121)
- File # 23: Large set of calculations (could not be identified—see my Notes stuck in red)
- File # 24: Calculations of Relative Abundance of Isotopes and lots of Spectroscopic calculations (no theoretical analyses given)
- File # 25: Calculations of Melting Point vs. Pressure

BOX-D
- 1000’s of calculations on loose sheets

BOX-E
- Pamphlets on The Structure of the Physical Universe, New Light on Space and Time, Beyond Newton and The Case Against the Nuclear Atom
- Jackets of Neglected Facts of Science and Nothing but Motion
- Original MSS of Nothing but Motion (partly) and Basic Properties of Matter (partly)
- Articles on Science and its Methods
- Chapters III–XII of Beyond Space and Time
- Reviews by David Halprin and Prof. Schmeidler
- Copies of “Astronomical X-ray Sources”

BOX-F
- 1000’s of Mailing Addresses on cards

BOX-G
- Rubber Stamps
- Chapters XVII to References of The Universe of
Motion
- "Quasars – How Big are They?"
- "Quasars – Three Years Later"
- "Just How Much Do We Really Know?"
- Some old Issues of Reciprocity

BOX-H
- More Mailing Lists

BOX-I
- Master copies of The Universe of Motion
- Laser originals of "Outline of Deductive Development of the Theory of the Universe of Motion"
- "The Liquid State" Papers

BOX-J
- More calculations on loose sheets

BOX-K
- "Mechanism of the Universe" (Envelope #14)
- "Motion" (Envelope #14)
- ISUS accounts (Envelope #15)
- MSS of Basic Properties of Matter (Envelopes #20–34)
- Diagrams and removed papers from The Road to Full Employment

BOX-L
- More Mailing Lists

FILING CABINET

Top Rack
The following Files are present

FILE MISCELLANEOUS–I
- "The Physical Nature of Space"
- "The Superconducting Supercollider"
- "The Conceptual Foundations of Physical Science"
- "Changing Concepts of the Nature of Motion"
- "Theoretical Interpretation of Recent Cosmic Ray Results" plus Jan Sammer's Tabulation of Cosmic Resonances
- "Supernova 1987A"
- "Arrow of Time"
- "Physical Fundamentals"
- "Dimensions in the Universe of Motion"
- "The New View of Space and Time"
- "Astronomical X-ray Sources"
- "Quasars – How Big are They?"
- "Quasars – Three Years Later"
- "The Other Side of the Picture"
- "The Properties of Scalar Motion"
- "The Physics of Motion" form Frontiers of Science
- "Motion" (presumably rejected by some scientific journal)
- "A New Theory of the Physical States of Matter"
- Some calculations of basic physical quantities
- "Twenty Years’ Progress"
- Summary of argument in Road to Full Employment
- "The Case of the Colliding Photons"
- "Energies at High Speeds"
- "Around Unexpected Corners" (an autobiographical sketch of how Larson came upon the Reciprocal System)

FILE MISCELLANEOUS–II
- "The Fundamentals of Science in the Twenty-first Century"
- "Just How Much Do We Really Know?"
- "The Mechanism of the Universe"
- "Science without Apologies"
- "The Historical Perspective"
- "What Causes Inflation?"

FILE MISCELLANEOUS–III
- Reviews of Neglected Facts of Science by H. A. Hoff and of Quasars and Pulsars by North Pacific Publishers
- Review by David Halprin in Scientific Australian
- Review by Prof. F. Schneidler in Naturwissenschaftliche Rundschau
- 8 Pamphlets on Larson's books
- "Some Reflections and Comments"
- "In Search of the Ultimate"
- "A New Theory of Gravitation"
- "Verification of Scientific Theories"
- "Explanation of Anomalous Redshifts"
- "Determination of the General Physical Constants"
- "A Step Beyond Descartes and Hobbes"
- "The Relativity Paradox"
- Adrian Speech

FILE MISCELLANEOUS–IV
FILE CORRESPONDENCE WITH
LINUS PAULING

FILES AND CORRESPONDENCE WITH
HALTON ARP

FILE CORRESPONDENCE WITH
OTHERS – 1

• Answers to Questions on Gravitation (Jan Sammer)
• On Dimensional Re-orientation of Electrons
  (Rainer F. Huck)
• ‘Superbubble’ around CYGNUS–X (Hans F.
  W. W. Weenscher)
• Reactive Force on Emission of Photon (W. H.
  Ballard Jr.)
• “F = m × a” at high speeds (Fred Jansen)
• Variation of Mass with Velocity (Todd Kelso)
• Ideas on Superconductivity (Paul deLespinaise)
• Biodata
• Astronomical Applications of Reciprocal
  System (Martin Harwit)
• To the Editor of Science Digest
• Radio-active Half-life (Herald Heinze)
• Gravitation, Progression & Doppler Shift
  (Steven Berline)
• Discouraging Relativistic Doppler Shift (Steven
  Berline)
• Ref: Hoyle’s Article, to Editor, Science News
• Lucid Explanation of Dimensional Units (Frank
  H. Meyer)
• Inter-atomic Distance; Vibration—Two (Frank H.
  Meyer)
• Controversy on PSI–3695 & Decay (Ronald W.
  Satz)
• Questions on Sunspots (Charles W. Bonner)
• Gravitational Equilibrium; Motion beyond
  Gravitational Limit: Negative Isotopic Mass
  (Todd Kelso)
• Some Philosophical Objections (Tom Settle)

FILE CORRESPONDENCE WITH
OTHERS – 2

• Discussion on ‘Nuclear’ Force, Gravitation etc.
  (J. G. Wolfe)
• Saw-tooth vs. Sine Curve (F. A. Johnson)
• Larson’s difficulties in The Liquid State
  (Lippett)
• Denying ‘Tunneling’ and ‘Gravitational Waves’
  (Paul deLespinaise)
• Optical Direction vs. Gravitational Direction
  (Paul deLespinaise)
• The Beginning of Biological Life on Earth as a
  “Discontinuity” (daughter Linda)
• Astronomical Correspondence (Otto Struve)

• Some Geophysical Conclusions (G. J. F.
  MacDonald)
• With Astronomer G. C. McVittie
• With Astronomer G. R. Burbidge
• Substantiation of his Gravitational Theory
  (Gravity Research Foundation)
• Flowchart of the Deductive Development
  (Manson)
• With Isaac Asimov

FILE PAPERS BY RONALD W. SATZ

• “An Intensive Course on Reciprocal System”
• “Further Mathematics of the Reciprocal
  System”
• “Calculation of the Dissociation Energy of
  Diatomic Molecules”
• “The Interaction of Alpha Particles and Gold
  Atoms: a New Explanation of Rutherford
  Scattering”
• Questions on Beyond Space and Time and
  Answers by Dewey B. Larson
• “A Note on the Cosmic Proton”
• “Permittivity, Permeability and Speed of Light
  in the Reciprocal System”
• “Time Region Particle Dynamics”
• “The Cohesive Energy of Elements”
• “Stellar Energy Generation in the Reciprocal
  System”
• “The Gravitational Attraction of the Galaxy”
• “The Black Art of Black Holes”
• Spectral calculations

FILE (I) PAPERS ON RECIPROCAL
SYSTEM BY OTHERS

• Letter to President Reagan (Jan Sammer)
• On Quasar Indices (Jan Sammer)
• Periodic Table in 3-D (Jan Sammer)
• “On the Recent Evolution of Sirius” (Jan
  Sammer)
• “Zeno’s Paradox and the Reciprocal System”
  (Jan Sammer)
• A Sonnet dedicated to Larson (Paul
  deLespinaise)
• On Magnetic Ionization Level (David Halpin)
• Criticism against Stellar Energy Generation
  Explanation in the Reciprocal System (Brian
  Fraser)
• Some Methodological Objections (H. A. Hoff)
• Formation of NSA – 1975
• “Nature of Existence” (Maurice D. Gilroy)
• Repulsive Aspects of Gravity (not RS) (Chiang
  et al)
• “Time Dimensionality and Space Expansion”
  (Frank H. Meyer)
• “Proposals to Teach Reciprocal System in

E 26.2–35
Announcing the Availability of

Fundamentals of Scalar Motion in a
Multiple Reference Point Universe of Motion

Lawrence E. Denslow

The Fundamentals of Scalar Motion in a Multiple Reference Point Universe of Motion is an attempt to provide a clear, straightforward presentation of some of the simpler aspects of the Reciprocal System of theory. Some of the concepts introduced and the terminology used in this volume are completely new and different from that familiar to most students of the physical sciences.

Identification of the origin of certain fundamental concepts that are assumed as a result of general familiarity with mathematics are reviewed, while extending that conceptual basis so as to provide a firm mathematical basis for the logical development of the consequences of the postulates of the Reciprocal System of theory. A developmental description for the structure of atoms, sub-atomic particles, and photons of radiation is followed by a short discussion of some of the concepts of chemical association. The origins of the phenomena of heat, electric charge, and magnetic force relationships are discussed along with the nature of the electric current with sufficient mathematical analysis to validate the claim for the Reciprocal System as a complete general theory for the structure of the physical universe.

144 pages, index, appendix, softcover.
Solid Cohesion
Bonding with a Single Concept

Some Thoughts on Spin
Solid Angles
**Reciprocity**

**Staff**

<table>
<thead>
<tr>
<th>Name</th>
<th>Address</th>
<th>Email</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bruce M. Peret</td>
<td>5456 Hwy 321, Butler, TN 37640</td>
<td><a href="mailto:bruce.peret@pobox.com">bruce.peret@pobox.com</a></td>
</tr>
<tr>
<td>Editor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>K.V.K. Nehru</td>
<td>P.G. School, J.N.T. University, Hyderabad 500 028, India</td>
<td><a href="mailto:kvkn@hotmail.com">kvkn@hotmail.com</a></td>
</tr>
<tr>
<td>Associate Editor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Frank H. Meyer</td>
<td>1103 15th Avenue SE, Minneapolis, MN 55414</td>
<td><a href="mailto:meyer078@garnet.tc.umn.edu">meyer078@garnet.tc.umn.edu</a></td>
</tr>
<tr>
<td>Associate Editor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Russell Kramer</td>
<td>723 Camino Place, Suite 173, San Bruno, CA 94066</td>
<td><a href="mailto:syndyne@hotmail.com">syndyne@hotmail.com</a></td>
</tr>
<tr>
<td>Associate Editor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tobey Wheelock</td>
<td>5 Littlefield Lane, Boston, VA 22713</td>
<td><a href="mailto:yowee@summit.net">yowee@summit.net</a></td>
</tr>
<tr>
<td>Associate Editor</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**THE INTERNATIONAL SOCIETY OF UNIFIED SCIENCE**

<table>
<thead>
<tr>
<th>Name</th>
<th>Address</th>
<th>Email</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hoyt A. Stearns, Jr.</td>
<td>4131 East Cannon Drive, Phoenix, AZ 85028</td>
<td><a href="mailto:hoyt@lsus.wierius.com">hoyt@lsus.wierius.com</a></td>
</tr>
<tr>
<td>President</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Frank H. Meyer</td>
<td>1103 15th Avenue SE, Minneapolis, MN 55414</td>
<td><a href="mailto:meyer078@garnet.tc.umn.edu">meyer078@garnet.tc.umn.edu</a></td>
</tr>
<tr>
<td>Vice President</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rainer F. Huck</td>
<td>1680 East Atkin Avenue, Salt Lake City, UT 84106</td>
<td></td>
</tr>
<tr>
<td>Executive Director</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lawrence E. Denslow</td>
<td>Highland City, FL 33846</td>
<td><a href="mailto:hafer@gte.net">hafer@gte.net</a></td>
</tr>
<tr>
<td>Secretary</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jennifer Hafer</td>
<td>18 Valencia Court, Winter Haven, FL 33880</td>
<td><a href="mailto:hafer@gte.net">hafer@gte.net</a></td>
</tr>
<tr>
<td>Treasurer</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**ISUS Board of Trustees**

<table>
<thead>
<tr>
<th>Name</th>
<th>City, State/Province</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr. Ronald Blackburn</td>
<td>Sunnyvale, CA</td>
</tr>
<tr>
<td>Lawrence E. Denslow</td>
<td>Highland City, FL</td>
</tr>
<tr>
<td>Jennifer Hafer</td>
<td>Winter Haven, FL</td>
</tr>
<tr>
<td>David Halprin</td>
<td>North Balwyn, Australia</td>
</tr>
<tr>
<td>Dr. Ranier F. Huck</td>
<td>Salt Lake City, UT</td>
</tr>
<tr>
<td>Thomas Kirk</td>
<td>Walnut, CA</td>
</tr>
<tr>
<td>Prof. Frank H. Meyer</td>
<td>Minneapolis, MN</td>
</tr>
<tr>
<td>Prof. William Mitchell</td>
<td>Detroit, MI</td>
</tr>
<tr>
<td>Edwin Navarro</td>
<td>Mill Valley, CA</td>
</tr>
<tr>
<td>Prof. K.V.K. Nehru</td>
<td>Hyderabad, India</td>
</tr>
<tr>
<td>Bruce M. Peret</td>
<td>Butler, TN</td>
</tr>
<tr>
<td>Phillip H. Porter</td>
<td>Denver, CO</td>
</tr>
<tr>
<td>Jan N. Sammer</td>
<td>Prague, Czech Republic</td>
</tr>
<tr>
<td>Robin V. Sims</td>
<td>Penticton, British Columbia</td>
</tr>
<tr>
<td>Hoyt A. Stearns, Jr.</td>
<td>Phoenix, AZ</td>
</tr>
</tbody>
</table>

**World Wide Web & Internet**

<table>
<thead>
<tr>
<th>ISUS Web Site</th>
<th>Reciprocal System Research Site</th>
</tr>
</thead>
</table>

**Jan Sammer**
Webmaster
interp@login.cz
Graficka 30, 150 00 Praha 5 Czech Republic

**Michael Wells**
Webmaster
rs@randomc.com
3450 Breckinridge Blvd, Apt 1506 Duluth, GA 30136 U.S.A.

Reciprocity (ISSN 0276-4172) is published quarterly by The International Society of Unified Science, P.O. Box 1034, Highland City, FL 33846, USA. Membership dues: $25.00 per year (USA), $35.00 per year (other countries), $50.00 Contributing Membership, $150.00 Supporting Membership, and $300.00 Sustaining Membership. Copyright ©1998, The International Society of Unified Science. All rights reserved except where expressly waived. First class postage paid at Minneapolis, MN, and at additional mailing offices. Please send address changes to: ISUS, c/o Lawrence Denslow, P.O. Box 1034, Highland City, FL 33846.
## Table of Contents

From the Editor .............................................. 4

**PHYSICS**

- Basic Properties of Matter, *Chapter I, Solid Cohesion* .......................... Dewey B. Larson ........................................ 5
- Solid Cohesion and the Expanding Universe ........................................... Frank H. Meyer .......................................... 13
- *Is Option Prior to Matter?* (commentary) .......................................... Bruce M. Peret ............................................. 14
- Some Thoughts on Spin ........................................................................... K.V.K. Nehru .................................................. 15
- A Challenge to *Project Omicron* ......................................................... Bruce M. Peret ............................................. 18
- Understanding the Reciprocal System .................................................... Lawrence E. Denslow ........................................ 19
  - *A True and Complete Theory of the Physical Universe Is Necessary*
    - Lesson I: Concepts of Mathematics, as currently used and with logical extensions Lawrence E. Denslow ........................................ 21

**METAPHYSICS**

- Crossing the Quantum Boundary ................................................... George Hamner, Jr ........................................ 25
  - *A Phenomenon of the Astral Plane?*

**ISUS NEWS**

- The Minutes of the 22nd ISUS Conference ......................................... Bruce M. Peret ............................................. 12
- 1998 ISUS Conference Information ...................................................... Jennifer Hafer ............................................. 24
- Reflections of a New Member .............................................................. George Hamner, Jr ........................................ 29
- Eulogy of Professor Otto H. Schmitt .................................................. William E. Davies, Frank H. Meyer, Bruce M. Peret ........................................ 31
- Editorial: *Physics at the Crossroads* ................................................ K.V.K. Nehru .................................................. 34
- RealAudio Lectures on the Web .......................................................... Bruce M. Peret ............................................. 32

## Announcing


Thanks to Jan Sammer, Mike Wells, and Joe Dannemiller for the scanning and OCR work.
From the Editor

Bruce M. Peret

Another year is upon us, and a number of interesting developments are happening in the scientific community, particularly in the field of astronomy. Many of the new discoveries from the Hubble Space Telescope, now "rocking the astronomical world," are easily identified within the Reciprocal System. Two things of particular interest are the discovery that the expansion of the universe is accelerating, not slowing down as predicted by the "big bang" theory. This, of course, is a fundamental principle within the Reciprocal System theory—we just call it "progression of the natural reference system." We also have the advantage of knowing that this acceleration will not leave "huge voids" between galaxies—because incoming matter, in the form of cosmic rays, gamma ray bursts and background radiation, will eventually create a great deal of matter, stars, and galaxies to fill in those "voids."

The second interesting discovery is that no matter how far the telescopes reach, they keep finding the same distribution of galaxies and types of galaxies that they see in the immediate vicinity. They have had to triple the size of the universe upon the initial observations, and I have just read an article where they now theorize an "expontial expansion," which would put the limits of the universe well beyond man's ability to observe. The steady-state reciprocal exchange between the Material and Cosmic sectors continues to be the most viable explanation of modern astronomical observation.

On the Editorial front, I have taken over the copying and mailing of Reciprocity from Frank Meyer in Minnesota, which will now be done from Tennessee. We are in process of getting our bulk rate permit for the local post offices here, but it takes time, and the next couple of issues may be mailed book rate, or first class, depending on cost. This means that only members in good standing will be receiving Reciprocity (including information requests), so please keep your membership current.

Member Numbers and Expiration Dates

When you renew your membership, please send an E-mail to the Editor (bruce.peret@pobox.com), so I can update the mailing database immediately, as notification from the secretary can sometimes take months. Your membership status can be determined by the mailing label on the envelope. The upper left corner contains two pieces of information: your membership grade (a single letter), followed by your member number. The right side contains your membership expiration date, or "(life)" if you are a lifetime member.

Membership grades are:

- R Regular, annual membership
- C Contributing
- U Supporting
- L Lifetime
- S Student/Science Club (free)
- T Trial membership (free, 6 months)
- P Prisoner Study Group (free)

We currently continue to mail Reciprocity for 6 months after your membership has expired, so please keep track until we can get some type of "renewal notification" mechanism in place.

Back Issues

I have now finished the Back Issues Bound Set, and they are now being checked for omissions and other typesetting problems. They should be available for purchase by June 1, 1998. This will be announced on the Reciprocal System Research site, and via e-mail. If you wish to be on the e-mail announcements list, please send me an e-mail. Postcards will be sent to members without internet access.

The Ethics of Taxation?

During a discussion on Larsonian ethics at the last conference, I was challenged to find the law requiring US citizens to pay income taxes. Checking the Internet, I found a man who claimed to be "the foremost expert on taxation in the United States"—Irwin Schiff. Calling his office in Nevada, I was quite surprised to be told that there is no law, income tax is voluntary, and that Mr. Schiff, himself, would donate $5000.00 to ISUS, if any member could find this supposed "law." I spent the last few months at the local Law Library, IRS Office, writing, e-mailing, and calling my Representatives and various government agencies, only to get hung up on, and ignored. I can't find this "law"—if you can, call Irwin Schiff at 800-TAX-NOMORE, and have him make his check payable to "ISUS, Inc."!
CHAPTER 1  
Solid Cohesion

Dewey B. Larson

The consequences of the reversal of direction (in the context of a fixed reference system) that takes place at unit distance were explained away in Chapter 8 of Volume I. As brought out there, the most significant consequence is that the establishment of an equilibrium between gravitation and the progression of the natural reference system becomes possible.

There is a location outside unit distance where the magnitudes of these two motions are equal: the distance that we are calling the gravitational limit. But this point of equality is not a point of equilibrium. On the contrary, it is a point of instability. If there is even a slight unbalance of forces one way or the other, the resulting motion accentuates the unbalance. A small inward movement, for instance, strengthens the inward force of gravitation, and thereby causes still further movement in the same direction. Similarly, if a small outward movement occurs, this weakens the gravitational force and causes further outward movement. Thus, even though the inward and outward motions are equal at the gravitational limit, this is actually nothing but a point of demarcation between inward and outward motion. It is not a point of equilibrium.

In the region inside unit distance, on the contrary, the effect of any change in position opposes the unbalanced forces that produced the change. If there is an excess gravitational force, an outward motion occurs which weakens gravitation and eliminates the unbalance. If the gravitational force is not adequate to maintain a balance, an inward motion takes place. This increases the gravitational effect and restores the equilibrium. Unless there is some intervention by external forces, atoms move gravitationally until they eventually come within unit distance of other atoms. Equilibrium is then established at positions within this inside region: the time region, as we have called it.

The condition in which a number of atoms occupy equilibrium positions of this kind in an aggregate is known as the solid state of matter. The distance between such positions is the inter-atomic distance, a distinctive feature of each particular material substance that we will examine in detail in the following chapter. Displacement of the equilibrium in either direction can be accomplished only by the application of a force of some kind, and a solid structure resists either an inward force, a compression, or an outward force, a tension. To the extent that resistance to tension operates to prevent separation of the atoms of a solid it is commonly known as the force of cohesion.

The conclusions with respect to the nature and origin of atomic cohesion that have been reached in this work replace a familiar theory, based on altogether different premises. This previously accepted hypothesis, the electrical theory of matter, has already had some consideration in the preceding volume, but since the new explanation of the nature of the cohesive force is basic to the present development, some more extensive comparisons of the two conflicting viewpoints will be in order before we proceed to develop the new theoretical structure in greater detail.

The electrical, or electronic, theory postulates that the atoms of solid matter are electrically charged, and that their cohesion is due to the attraction between unlike charges. The principal support for the theory comes from the behavior of ionic compounds in solution. A certain proportion of the molecules of such compounds split up, or dissociate, into oppositely charged components which are then called ions. The presence of the charges can be explained in either of two ways: (1) the charges were present, but undetectable in the undissolved material, or (2) they were created in the solution process. The adherents of the electrical theory base it on explanation (1). At the time this explanation was originally formulated, electric charges were thought to be relatively permanent entities, and the conclusion with respect to their role in the solution process was therefore quite in keeping with contemporary scientific thought. In the meantime, however, it has been found that electric charges are easily created and easily destroyed, and are no more than a transient feature of matter. This cuts the ground from under the main support of the electrical theory, but the theory has persisted because of the lack of any available alternative.

Obviously some kind of force must hold the solid
aggregate together. Outside of the forces known to result directly from observable motion, there are only three kinds of force of which there has heretofore been any definite observational knowledge: gravitational, electric, and magnetic. The so-called "forces" which play various roles in present-day atomic physics are purely hypothetical. Of the three known forces, the only one that appears to be strong enough to account for the cohesion of solids is the electric force. The general tendency in scientific circles has therefore been to take the stand that cohesion must result from the operation of electrical forces, notwithstanding the lack of any corroboration of the conclusions reached on the basis of the solution process, and the existence of strong evidence against the validity of those conclusions.

One of the serious objections to this electrical theory of cohesion is that it is not actually a theory, but a patchwork collection of theories. A number of different explanations are advanced for what is, to all appearances, the same problem. In its basic form, the theory is applicable only to a restricted class of substances, the so-called "ionic" compounds. But the great majority of compounds are "non-ionic." Where the hypothetical ions are clearly nonexistent, an electrical force between ions cannot be called upon to explain the cohesion, so, as one of the general chemistry texts on the author's shelves puts it, "A different theory was required to account for the formation of these compounds." But this "different theory," based on the weird concept of electrons "shared" by the interacting atoms, is still not adequate to deal with all of the non-ionic compounds, and a variety of additional explanations are called upon to fill the gaps.

In current chemical parlance the necessity of admitting that each of these different explanations is actually another theory of cohesion is avoided by calling them different types of "bonds" between the atoms. The hypothetical bonds are then described in terms of interaction of electrons, so that the theories are united in language, even though widely divergent in content. As noted in Chapter 19, Volume I, a half dozen or so different types of bonds have been postulated, together with "hybrid" bonds which combine features of the general types.

Even with all of this latitude for additional assumptions and hypotheses, some substances, notably the metals, cannot be accommodated within the theory by any expedient thus far devised. The metals admittedly do not contain oppositely charged components, if they contain any charged components at all, yet they are subject to cohesive forces that are indistinguishable from those of the ionic compounds. As one prominent physicist, V.F. Weisskopf, found it necessary to admit in the course of a lecture, "I must warn you I do not understand why metals hold together." Weisskopf points out that scientists cannot even agree as to the manner in which the theory should be applied. Physicists give us one answer, he says, chemists another, but "neither of these answers is adequate to explain what a chemical bond is."

This is a significant point. The fact that the cohesion of metals is clearly due to something other than the attraction between unlike charges logically leads to a rather strong presumption that atomic cohesion in general is non-electrical. As long as some non-electrical explanation of the cohesion of metals has to be found, it is reasonable to expect that this explanation will be found applicable to other substances as well. Experience in dealing with cohesion of metals thus definitely foreshadows the kind of conclusions that have been reached in the development of the Reciprocal System of theory.

It should also be noted that the electrical theory is wholly ad hoc. Aside from what little support it can derive from extrapolation to the solid state of the conditions existing in solutions, there is no independent confirmation of any of the principal assumptions of the theory. No observational indication of the existence of electrical charges in ordinary matter can be detected, even in the most strongly ionic compounds. The existence of electrons as constituents of atoms is purely hypothetical. The assumption that the reluctance of the inert gases to enter into chemical compounds is an indication that their structure is a particularly stable one is wholly gratuitous. And even the originators of the idea of "sharing" electrons make no attempt to provide any meaningful explanation of what this means, or how it could be accomplished, if there actually were any electrons in the atomic structure. These are the assumptions on which the theory is based, and they are entirely without empirical support. Nor is there any solid basis for what little theoretical foundation the theory may claim, inasmuch as its theoretical ties are to the nuclear theory of atomic structure, which is itself entirely ad hoc.

But these points, serious as they are, can only be regarded as supplementary evidence, as there is one fatal weakness of the electrical theory that would demolish it even if nothing else of an adverse nature were known. This is our knowledge of the behavior of positive and negative electric charges when they are brought into close proximity. Such charges do
Reciprocity, Volume XXVI, Number 3, Winter 1997-1998

not establish an equilibrium of the kind postulated in the theory; they destroy each other. There is no evidence which would indicate that the result of such contact is any different in a solid aggregate, nor is there any plausible theory as to why any different outcome could be expected, or how it could be accomplished.

It is worth noting in this connection that while current physical theory portrays positive and negative charges as existing in a state of congenial companionship in the nuclear theory of the atom and in the electrical theory of matter, it turns around and gives us explanations of the behavior of antimatter in which these charges display the same violent antagonism that they demonstrate to actual observation. This is the kind of inconsistency that inevitably results when recalcitrant problems are “solved” by ad hoc assumptions that involve departures from established physical laws and principles.

In the context of the present situation in which the electrical theory is challenged by a new development, all of these deficiencies and contradictions that are inherent in the electrical theory become very significant. But the positive evidence in favor of the theory is even more conclusive than the negative evidence against its predecessor. First, and probably the most important, is the fact that we are not replacing the electrical theory of matter with another “theory of matter.” The Reciprocal System is a complete general theory of the physical universe. It contains no hypotheses other than those relating to the nature of space and time, and it produces an explanation of the cohesion of solids in the same way that it derives logical and consistent explanations of other physical phenomena: simply by developing the consequences of the basic postulates. We therefore do not have to call upon any additional force of a hypothetical nature to account for the cohesion. The two forces that determine the course of events in the region outside unit distance also account for the existence of the inter-atomic equilibrium inside this distance.

It is significant that the new theory identifies both of these forces. One of the major defects of the electrical theory of cohesion is that it provides only one force, the hypothetical electrical force of attraction, whereas two forces are required to explain the observed situation. Originally it was assumed that the atoms are impenetrable, and that the electrical forces merely hold them in contact. Present-day knowledge of compressibility and other properties of solids has demolished this hypothesis, and it is now evident that there must be what Karl Darrow called an “antagonist,” in the statement quoted in Volume I, to counter the attractive force, whatever it may be, and produce an equilibrium. Physicists have heretofore been unable to find any such force, but the development of the Reciprocal System has now revealed the existence of a powerful and omnipresent force hitherto unknown to science. Here is the missing ingredient in the physical situation, the force that not only explains the cohesion of solid matter, but, as we saw in Volume I, supplies the answers to such seemingly far removed problems as the structure of star clusters and the recession of the galaxies.

One point that should be specifically noted is that it is this hitherto unknown force, the force due to the progression of the natural reference system, that holds the solid aggregate together, not gravitation, which acts in the opposite direction in the time region. The prevailing option that the force of gravitation is too weak to account for the cohesion is therefore irrelevant, whether it is correct or not.

Inasmuch as the new theoretical system applies the same general principles to an understanding of all of the inter-atomic and intermolecular equilibria, it explains the cohesion of all substances by the same physical mechanism. It is no longer necessary to have one theory for ionic substances, several more for those that are non-ionic, and to leave the metals out in the cold without any applicable theory. The theoretical findings with respect to the nature of chemical combinations and the structure of molecules that were outlined in the preceding volume have made a major contribution to this simplification of the cohesion picture, as they have eliminated the need for different kinds of cohesive forces, or “bonds.” All that is now required of a theory of cohesion is that it supply an explanation of the inter-atomic equilibrium, and this is provided, for all solid substances under all conditions, by balancing the outward motion (force) of gravitation against, the inward motion (force) of the progression of the natural reference system. Because of the asymmetry of the rotational patterns of the atoms of many elements, and the consequent anisotropy of the force distributions, the equilibrium locations vary not only between substances, but also between different orientations of the same substance. Such variations, however, affect only the magnitudes of the various properties of the atoms. The essential character of the inter-atomic equilibrium is always the same.

As indicated in the original discussion of gravitation, even though the various aggregates of matter do not actually exert gravitational forces on
each other, the observable results of their gravitational motions are identical with those that would be produced if such forces did exist. The same is true of the results of the progression of the natural reference system. There is a considerable element of convenience in expressing these results in terms of force, on an “as if” basis, and this practice has already been followed to some extent in the previous volume. Now that we are ready to begin a quantitative evaluation of the interatomic relations, however, it is desirable to make it clear that the force concept is being used only for convenience. Although the quantitative discussion that follows, like the earlier qualitative discussion, will be carried on in terms of forces, what we will actually be dealing with are the inward and outward motions of each individual atom.

While the items that have been mentioned add up to a very impressive case in favor of the new theory of cohesion, the strongest confirmation of its validity comes from its ability to locate the point of equilibrium; that is to give us specific values of the inter-atomic distances. As will be demonstrated in Chapter 2, we are already able, by means of the newly established relations, to calculate the possible values of the inter-atomic distance for most of the simpler substances, and there do not appear to be any serious obstacles in the way of extending the calculations to more complex substances whenever the necessary time and effort can be applied to the task. Furthermore, this ability to determine the location of the point of equilibrium is not limited to the simple situation where only the two basic forces are involved. Chapters 4 and 5 will show that the same general principles can also be applied to an evaluation of the changes in the equilibrium distance that result from the application of heat or pressure to the solid aggregate.

Although, as stated in Volume I, the true magnitude of a unit of space is the same everywhere, the effective magnitude of a spatial unit in the time region is reduced by the inter-regional ratio. It is convenient to regard this reduced value, 1/156.44 of the natural unit, as the time region unit of space. The effective portion of a time region phenomenon may extend into one or more additional units, in which case the measured distance will exceed the time region unit, or the original single unit may not be fully effective, in which case the measured distance will be less than the time region unit. Thus the inter-atomic equilibrium may be reached either inside or outside the time region unit of distance, depending on where the outward rotational forces reach equality with the inward force of the progression of the natural reference system. Extension of the inter-

atomic distance beyond one time region unit does not take the equilibrium system out of the time region, as the boundary of that region is at one full-sized natural unit of distance, not at one time region unit. So far as the inter-atomic force equilibrium is concerned, therefore, the time region unit of distance does not represent any kind of a critical magnitude.

As we saw in our examination of the composition of the magnetic neutral groups, however, the natural unit as it exists in the time region (the time region unit) is a critical magnitude from the orientation standpoint. An explanation of this difference can be derived from a consideration of the difference in the inherent nature of the two phenomena. Where the inter-atomic distance is less than one time region unit, the rotational forces are acting against the inward force of the progression of the reference system during only a portion of the unit progression. Similarly, where the inter-atomic distance is greater than one time region unit, the unit inward force is acting against only a portion of the greater-than-unit outward rotational forces. The variations in distance thus reflect differences in the magnitudes of the rotational forces. But the orientation effect has no magnitude. It either exists, or does not exist. As we have noted in the previous discussion, particularly in connection with the structure of the benzene molecule, this effect, if it exists, is the same regardless of whether it acts at short range or at long range. The essential requirement that it must meet is that it must be continuously effective. Otherwise, the orientation is destroyed during the off period. Where the rotational forces extend beyond one time region unit, so that the unit orientation effect is coincident with only a portion of the total rotational forces, the orienting effect is not continuous, and no orientation takes place.

In this chapter we are dealing mainly with what we are calling "rotational forces." These are, of course, the same "as if" forces due to the scalar aspect of the atomic rotation that were called "gravitational" in some other contexts, the choice of language depending on whether it is the origin or the effect of the force that is being emphasized in the discussion. For a quantitative evaluation of the rotational forces we may use the general force equation, providing that we replace the usual terms of the equation with the appropriate time region terms. As explained in introducing the concept of the time region in Chapter 8 of Volume I, equivalent space 1/t replaces space in the time region, and velocity is therefore 1/t². Energy, the one-dimensional equivalent of mass, which takes the place of mass in the time region expression of the force equation, because the
three rotations of the atom act separately, rather than jointly, in this region, is the reciprocal of this expression, or \( t^2 \). Acceleration is velocity divided by time: \( 1/t^3 \). The time region equivalent of the equation \( F = ma \) is therefore \( F = t^2 \times 1/t^3 = 1/t \) in each dimension.

At this point we will need to take note of the nature of the increments of speed displacement in the time region. In the outside region additions to the displacement proceed by units: first one unit, then another similar unit, yet another, and so on, the total up to any specific point being \( n \) units. There is no term with the value \( n \). This value appears only as a total. The additions in the time region follow a different mathematical pattern, because in this case only one of the components of motion progresses, the other remaining fixed at the unit value. Here the displacement is \( 1/x \), and the sequence is \( 1/1, 1/2, 1/3, \ldots 1/n \). The quantity \( ln \) is the final term, not the total. To obtain the total that corresponds to \( n \) in the outside region it is necessary to integrate the quantity \( 1/x \) from \( x = 1 \) to \( x = n \). The result is \( ln \), the natural logarithm of \( n \).

Many readers of the first edition have asked why this total should be an integral rather than a summation. The answer is that we are dealing with a continuous quantity. As pointed out in the introductory chapters of the preceding volume, the motion of which the universe is constructed does not proceed in a succession of jumps. Even though it exists only in units, it is a continuous progression. A unit of this motion is a specific portion of this continuity. A series of units is a more extended segment of that continuity, and its magnitude is an integral. In dealing with the basic individual units of motion in the outside region it is possible to use the summation process, but only because in this case the sum is the same as the integral. To get the total of the \( 1/x \) series we must integrate.

To evaluate the rotational force we integrate the quantity \( 1/t \) from unity, the physical datum or zero level, to \( t \):

\[
F = \int_1^t \frac{1}{t} \, dt = ln \, t \quad (1-1)
\]

If the quantity \( ln \, t \) is below unity in any dimension there is no effective outward force in that dimension, but the natural logarithm exceeds unity for all values of \( t \) above 2, and the atoms of all elements have a rotational displacement of 2 (equivalent to \( t = 3 \)) or more in at least one dimension. Consequently, all have effective rotational forces.

The force computed from equation 1-1 is the inherent rotational force of the individual atom; that is, the one-dimensional force which it exerts against a single unit of force. The force between two (apparently) interacting atoms is

\[
F = ln \, t_a \, ln \, t_b \quad (1-2)
\]

For a two-dimensional magnetic rotation this becomes

\[
F = ln^2 \, t_a \, ln^2 \, t_b \quad (1-3)
\]

As we found in Chapter 13, Volume I, the equivalent of distance \( s \) in the time region is \( s^2 \), and the gravitational force in this region therefore varies inversely as the fourth power of the distance rather than the square. Applying this factor to the expression for the force of the two-dimensional rotation, together with the inter-regional ratio, the ratio of effective total force derived in the same chapter, we obtain the effective force of the magnetic rotation of the atom:

\[
F_m = (0.006392)^4 \, s^4 \, ln^2 \, t_a \, ln^2 \, t_b \quad (1-4)
\]

The distance factor does not apply to the force due to the progression of the natural reference system, as this force is omnipresent, and unlike the rotational force is not altered as the objects to which it is applied change their relative positions. At the point of equilibrium, therefore, the rotational force is equal to the unit force of the progression. Substituting unity for \( F_m \) in equation 1-4, and solving for the equilibrium distance, we obtain

\[
s_0 = 0.006392 \, ln^4 \, t_a \, ln^4 \, t_b \quad (1-5)
\]

The inter-atomic distances for those elements which have no electric rotation, the inert gas series, may be calculated directly from this equation. In the elements, however, \( t_a = t_b \) in most cases, and it will be convenient to express the equation in the simplified form:

\[
s_0 = 0.006392 \, ln \, t \quad (1-6)
\]

The values thus calculated are in the neighborhood of \( 10^8 \) cm, and for convenience this quantity has been taken as a unit in which to express the inter-atomic and inter-molecular distances. When converted from natural units to this conventional unit, the Angstrom unit, symbol \( \AA \), equation 1-6 becomes

\[
s_0 = 2.914 \, ln \, t \, \AA \quad (1-7)
\]
In applying this equation we encounter another of the questions with respect to terminology that inevitably arise in a basically new treatment of any subject. The significance of the quantity \( t \) as used in the foregoing discussion and in the equations is obvious from the context—it is the magnitude of the effective rotation—but the question is: What shall we call it? The basic quantity with which we are dealing, the rotational speed displacement, does not enter into the equations directly. The mathematical structure of these equations requires us to enter them with values that include the initial unit which constitutes the natural zero datum. Furthermore, each double vibrational unit rotates independently, and when the rotation extends to a second such unit the increment in the value of \( t \) is only one half unit per added unit of displacement. Under these circumstances, where the relation of the term \( t \) to the displacement is variable, it seems advisable to give this term a distinctive name, and we will therefore call it the specific rotation.

As brought out in the discussion of the general characteristics of the atomic rotation in Chapter 10, Volume I, the two magnetic displacements may be unequal, and in this event the speed distribution takes the form of a spheroid with the principal rotation effective in two dimensions and the subordinate rotation in one. The average effective value of the specific rotation under these conditions \( (1/2) t_2 \). In this case we are dealing with the properties of a single entity, and the mathematical situation seems clear. But it is not so evident how we should arrive at the effective specific rotation where there is an interaction between two atoms whose individual rotations are different. As matters now stand it appears that the geometric mean of the two specific rotations is the correct quantity, and the values tabulated in Chapters 2 and 3 have been calculated on this basis. It should be noted, however, that this conclusion as to the mathematics of the combination is still somewhat tentative, and if further study shows that it must be modified in some, or all, applications, the calculated values will be subject to corresponding modifications. Any changes will be small in most cases, but they will be substantial where there is a large difference between the two components. The absence of major discrepancies between the calculated and observed distances in combinations of atoms with much different dimensions therefore gives some significant support to the use of the geometric mean pending further theoretical clarification.

The inter-atomic distances of four of the five inert gas elements for which experimental data are available follow the regular pattern. The values calculated for these elements are compared with the experimental distances in Table 1.

<table>
<thead>
<tr>
<th>Atomic Number</th>
<th>Element</th>
<th>Specific Rotation</th>
<th>Distance Calc</th>
<th>Distance Obs</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>Neon</td>
<td>3-3</td>
<td>3.20</td>
<td>3.20</td>
</tr>
<tr>
<td>18</td>
<td>Argon</td>
<td>4-3</td>
<td>3.76</td>
<td>3.84</td>
</tr>
<tr>
<td>36</td>
<td>Krypton</td>
<td>4-4</td>
<td>4.04</td>
<td>4.02</td>
</tr>
<tr>
<td>54</td>
<td>Xenon</td>
<td>4\1/2-4\1/2</td>
<td>4.38</td>
<td>4.41</td>
</tr>
</tbody>
</table>

Helium, which also belongs to the inert gas series, has some special characteristics due to its low rotational displacement, and will be discussed in connection with other elements affected by the same factors. The reason for the appearance of the 4\1/2 value in the xenon rotation will also be explained shortly. The calculated distances are those which would prevail in the absence of compression and thermal expansion. A few of the experimental data have been extrapolated to this zero base by the investigators, but most of them are the actual observed values at atmospheric pressure and at temperatures which depend on the properties of the substances under examination. These values are not exactly comparable to the calculated distances. In general, however, the expansion and compression up to the temperature and pressure of observation are small. A comparison of the values in the last two columns of Table 1 and the similar tables in Chapters 2 and 3 therefore gives a good picture of the extent of agreement between the theoretical figures and the experimental results.

Another point about the distance correlations that needs to be taken into account is that there is a substantial amount of variation in the experimental results. If we were to take the closest of these measured values as the basis for comparison, the correlation would be very much better. One relatively recent determination of the xenon distance, for example, arrives at a value of 4.39, almost identical with the calculated distance. There are also reported values for the argon distance that agree more closely with the theoretical result. However, a general policy of using the closest values would introduce a bias that would tend to make the correlation look more favorable than the situation actually warrants. It has therefore been considered advisable to use empirical data from a recognized selection of preferred values. Except for those values identified by asterisks, all of the experimental distances shown in the tables are taken from the extensive compilation by Wyckoff. Of course, the use of these values selected on the basis
of indirect criteria introduces a bias in the unfavorable direction, since, if the theoretical results are correct, every experimental error shows up as a discrepancy, but even with this negative bias the agreement between theory and observation is close enough to show that the theoretical determination of the inter-atomic distance is correct in principle, and to demonstrate that, with the exception of a relatively small number of uncertain cases, it is also correct in the detailed application.

Turning now to the elements which have electric as well as magnetic displacement, we note again that the electric rotation is one-dimensional and opposes the magnetic rotation. We may therefore obtain an expression for the effect of the electric rotational force on the magnetically rotating photon by inverting the one-dimensional force term of equation 1-2.

\[ F_a = \frac{1}{(\ln t^t_A \ln t^t_B)} \tag{1-8} \]

Inasmuch as the electric rotation is not an independent motion of the basic photon, but a rotation of the magnetically rotating structure in the reverse direction, combining the electric rotational force of equation 1-8 with the magnetic rotational force of equation 1-4 modifies the rotational terms (the functions of \( t^t \)) only, and leaves the remainder of equation 1-4 unchanged.

\[ F = (0.006392)^4 \frac{\ln^2 t_A \ln^2 t_B}{s^4 \ln t_A \ln t_B} \tag{1-9} \]

Here again the effective rotational (outward) and natural reference system progression (inward) forces are necessarily equal at the equilibrium point. Since the force of the progression of the natural reference system is unity, we substitute this value for \( F \) in equation 1-9 and solve for \( s_0 \), the equilibrium distance, as before.

\[ s_0 = 0.006392 \frac{(\ln^h t_A \ln^h t_B)}{(\ln^{u4} t_A \ln^{u4} t_B)} \tag{1-10} \]

Again simplifying for application to the elements, where \( A \) is generally equal to \( B \),

\[ s_0 = 0.006392 \ln t / \ln^h t \tag{1-11} \]

In Angstrom units this becomes

\[ s_0 = 2.914 \ln t / \ln^h t \text{ Å} \tag{1-12} \]

As already noted, when the rotation is extended to a second (double) vibrational unit, to vibration two, we may say, each added displacement unit adds only one half unit to the specific rotation. Inasmuch as 8 electric displacement units distributed three-dimensionally bring the rotation to a, new zero point, and cause the rotational motion to revert to the translational status, the change to vibration two in the electric dimension must take place before the displacement reaches 8. Specific rotation 8 (displacement 7) is therefore followed by 8½, 9, 9½, etc. But the first effective rotational displacement unit is necessarily one-dimensional, and the linear equivalent of the 8-unit limit is 2 units. Thus this first unit has already reached the one-dimensional limit. The succeeding displacement units have the option of continuing on the one-dimensional basis and extending the rotation to vibration two rather than extending it into additional dimensions. The change to vibration two therefore may take place immediately after the first displacement unit. In this case specific rotation 2 (displacement 1) is followed by 2½, 3, 3½, etc. The lower value is commonly found where it first becomes possible; that is, displacement 2 normally corresponds to rotation 2½ rather than 3. The next element may take the intermediate value 3½, but beyond this point the higher vibration one value normally prevails.

In the first edition it was indicated that the one or two vibrational displacement units being rotated did not necessarily constitute the entire vibrational component of the basic photon, inasmuch as these one or two units are capable of being rotated independently of the remaining vibrational units, if any. Further consideration now leads to the conclusion that one or two units of a multi-unit photon frequency can, in fact, be set in rotation independently, as previously indicated, and that the original photon may have had an excess of vibrational units, but that in such an event the rotating portion of the photon begins moving inward, whereas the non-rotating portion continues moving outward by reason of the progression of the natural reference system. The two portions therefore separate, and the rotating portion retains no non-rotating vibrational component.

The general pattern of the magnetic rotational values is the same as that of the electric values. The tendency to substitute specific rotation 2½ for 3 applies to the magnetic as well as to the electric rotation, and in the lower group combinations (both elements and compounds) that follow the regular electropositive pattern the specific magnetic rotations are usually 2½-2½ or 3-2½, rather than 3-3. But the upper limit for specific magnetic rotation on a vibration one basis is 4 (three displacement
units) instead of 8, as the two-dimensional rotation reaches the upper zero level at 4 displacement units in each dimension. Rotation 4½ therefore follows rotation 4 in the regular sequence, as we saw in the values given for Xenon in Table 1. It is possible to reach rotation 5 in one dimension, however, without bringing the magnetic rotation as a whole up to the 5 level, and 5-4 or 5-4½ rotation occurs in some elements either in lieu of, or in combination with, the 4½-4 or 4½-4½ rotation.

**References**


---

**The Minutes of the 22nd ISUS Conference**

Bruce M. Peret, Editor

Since I have not yet received the minutes from the 22nd ISUS Conference in Anchorage, KY, USA from our secretary, I will summarize the Board meeting from the notes I took.

- The new format for Reciprocity, publication policy and metaphysics research unanimously approved.

- Life Memberships for exceptional contributions to ISUS were granted to:
  - Prof. K.V.K. Nehru of Hyderabad, India
  - Jan Sammer of Prague, Czech Republic
  - Bruce Peret of Butler, Tennessee, USA

- Two years of free membership granted to David Halprin of North Balwyn, Australia, for all the materials he sent to aid Back Issues preparation.

- International membership rate of US$ 35.00 was approved (outside USA, Canada, and Mexico), to help defray the costs of mailing overseas.

- Larry Denslow will have Dewey Larson’s audio cassette lecture on The Structure of Scientific Revolution copied, and made available for US$ 8.00.

- Agreed to revise and reprint The Structure of the Physical Universe. Larry Denslow to head review committee.

- Mike Wells has donated a new Internet Web site to be used for research into the Reciprocal System. Approved to put books, articles, and other RS material on-line, to get Larson’s theory known, by scientists and researchers world-wide.

- Larry Denslow will head a committee comprised of himself, Russell Kramer, and Laura Jean Frame to revise and update the By-Laws of ISUS, combining updates from past Board meetings into a single document. Frank H. Meyer volunteered to provide back issues of ISUS News for reference.

- Approved a 10% discount for members on all materials sold by ISUS (excluding memberships).

- Dropped the vacant position of “Executive Researcher.”

- Larry Denslow to head a review and error-correction committee for Basic Properties of Matter, prior to its republication. Send any errors found to Larry, at the ISUS address in Florida.

- Approved changing of ISUS catalog address from Salt Lake City, to Highland City, FL.

- Voting for offices and Board:
  - Hoyt Stearns, Jr. re-elected President.
  - Frank H. Meyer elected Vice President
  - Rainer H. Re-elected Executive Director
  - Larry Denslow re-elected Secretary
  - Jennifer Hafer elected Treasurer
  - Bruce Peret elected Editor
  - Jennifer Hafer elected to Board of Directors
  - William Mitchell re-elected to Board of Directors.
Solid Cohesion and the Expanding Universe

Prof. Frank H. Meyer

Three centuries ago, Newton suggested that the cohesion of atoms in a solid or crystal could be explained by postulating that their inward gravitational motion, newly discovered by himself, provided the attractive force; and that when God made the atoms, he made them absolutely hard and impenetrable, so providing the repulsive force of solid cohesion. No known theory of solid cohesion has prevailed longer than this one. But, after 1912 when the work of Max von Lau and the Braggs made X-ray diffraction patterns disclosed that while the separation distances of atoms in the microstructure were in the order of $10^{-8}$ cm, no amounts of compression make the atoms touch one another.

An electrical theory of solid cohesion, based on the nuclear atom model, then appeared early in this century in the wake of the discredited Newtonian theory. This modern theory arbitrarily substituted an electrical principle that "unlike charges attract" as the attractive force of solid cohesion. No repulsive force was postulated, without which no stable equilibrium of solid cohesion can exist.

The revaluation and unification of physics, available from Dewey Larson's creation of the Reciprocal System of physics, disclosed two new essential relations of gravitational motion to the structure of our physical universe:

1. Gravitational motion is not the sole universal motion operating throughout the physical world; it is one of two universal motions. Larson reported in 1959 his discovery of the progression at unit speed (the speed of light).

2. Universal gravitational motion plays the role of attractive force in the expanding universe together with universal space-time progression, which plays the role of repulsive force in the macroscopic world. Newton, however, was not altogether mistaken in also assigning a role to universal gravitational motion in solid cohesion. For the Reciprocal System of physics, gravitational motion in solid cohesion plays the role of the repulsive force, while space-time progression plays the role of the attractive force.

How can this be? This can be, and is, because space-time and motion are not infinitely divisible and continuous, and are not unrelated, as conventional physicists, led by Einstein and Newton mistakenly assumed. They are rather finitely divisible, quantized and reciprocally related, as correctly postulated by Dewey B. Larson. Speed, the measure of motion, reveals all motion as nothing more than a reciprocal relation, a multiplicatively inverse relation between space and time. All motion, as defined, is measured by speed, the scalar magnitude of the relation between space and time. In Larson's Reciprocal System, the physical universe appears not as a universe of matter, but as a universe of motion. This means that the physical universe is not simply composed of atoms and the void, as Leucippus and Democritus supposed. Instead, atoms, electrons, photons, etc., are compounds of units of motion and each individual unit of motion is a relation between one unit of space and one unit of time, motion at unit speed.

Besides magnitude, motion manifests direction. Now the direction of motion is much affected by whether the motion occurs outside the natural unit of space or occurs inside this unit of space. Larson estimates the natural, quantized unit of space to be approximately 45.6 nanometers ($4.56 \times 10^{-8}$ cm). It is the universal characteristic of both Three-Dimensional Space-Time Progression and Three-Dimensional Gravitational Motion that each is a scalar motion with invariant scalar direction. When a motion is scalar, it is uniformly distributed over all directions and has no specific or inherent direction.

```
\[1 \rightarrow 2, 3, 4, 5, 6, \ldots\]
```

What then does Larson mean when distinguishing direction difference between these two universal scalar motions? It is essential to keep in mind that the natural reference system of the reciprocal theory does not count direction from zero, but rather from unity. Larson means by unity the unit speed of the space-time progression, which he regards as the primary universal natural motion or "force". (Do not forget that in Larson's physics, motion is prior to matter and that you do not have gravitational motion until displacements from the primary universal motion produce matter). The initial point of the progression of an individual unit of motion is zero.
As the distance between two points cannot be less than zero, it follows that the primary motions are necessarily outward, increasing the distances relative to the initial points. Thus, the invariant sense of the scalar space-time progression is invariably away from unity or unit speed.

The invariant sense of universal scalar gravitational motion is invariably toward unity or unit speed. Because of the equivalence of the unit of space and the unit of time (Larson estimates the duration of the natural, quantized unit of time to be approximately 152 attoseconds, or $1.52 \times 10^{-16}$ seconds), the initial point of all physical activity is at unity, not at the mathematical zero. Inasmuch as gravitational motion, by reason of its inherent nature, invariably acts in the sense opposite to that of space-time progression, and equivalent reversal from outside the unit of space to inside the unit of space occurs also in the sense of scalar gravitational motion. Outside the unit of space, the gravitational motion is inward toward unity. Inside the unit of space, the gravitational motion is outward toward unity. The expanding universe occurs exclusively outside the unit of space; hence gravitational motion in the expanding universe plays the role of the attractive force, permitting unstable equilibrium with the space-time progression at the gravitational limit. Solid cohesion occurs exclusively inside the space unit; hence gravitational motion in solid cohesion plays the role of repulsive force, enabling stable equilibrium in the solid state.

As a Research Physicist in industry and medicine for half a century, and as a member of the American Physical Society in good standing, I wish to declare my judgment that Dewey Larson's Reciprocal System of physical theory and practice adequately accounts both for solid cohesion and the cyclical expanding universe.

---

**Is Motion Prior to Matter?**

Bruce M. Peret

Frank Meyer raises the question of "motion prior to matter" in this article. This concept is derived from the progression of the natural reference system—1 unit of space per 1 unit of time—the motion of "nothing" which is assumed to exist prior to any displacement resulting in the formation of matter.

The ratio of 1/1 equals 1, unity. "Unity," being composed of two aspects, is the ultimate oxymoron.

The question I pose for consideration, is, "does the duality of space/time exist, prior to matter?"

In my personal opinion, no. In one of Larson's lectures, he describes motion as a container exemplified by a box, with "space" as the outside, "time" as the inside, and the box being the unit boundary. "Motion" is all of the components: inside, outside, and the box itself. Thus, if you have a box, you must have an inside and an outside. If you have an inside and outside, you must have a box. In essence, motion cannot be separated from its aspects, and when motion exists, something is manifest. In this view, "motion" cannot be prior to matter, because it would be like having an "inside" and "outside", but no box! Conversely, "matter" cannot be prior to "motion", because that would define a box, without an inside or outside!

Since it is impossible to measure unit motion, it may be a moot point, but nonetheless, an interesting exercise in abstraction.
Some Thoughts on Spin

Prof. K.V.K. Nehru, Ph.D.

Detailed study of the characteristics of the so-called nucleus of the atom has not been carried out by Larson. Therefore we have undertaken this much needed investigation and been reporting our results. It has been our experience that such investigation hardly ever proceeds in a strictly serial manner. Rather, it is more akin to the process of fitting the pieces of a jigsaw puzzle together. Nascent understanding gradually builds up and evolves from various seemingly diverse starting points, the concepts on each line of thinking modifying the ones on other lines, and in turn themselves getting modified by the latter. Eventually a nexus of coherent structure ensues. The thoughts presented in this article too constitute such a preliminary group of ideas that might serve to crystallize some of the earlier concepts enunciated on the topic of the so-called atomic nucleus.

§1. Spin-1 and Spin-½. The one-dimensional rotational space (angle) as well as the two-dimensional rotational space (solid angle), both are customarily regarded as dimension-less in the context of the conventional three-dimensional spatial reference system (the time-space region). This practice, therefore, does not distinguish between one-dimensional spin (angular momentum) and two-dimensional spin (angular momentum). We end up measuring both in units of erg-sec. In order to clarify the issue let us first note that the dimensions of momentum are energy/speed. In the present case these are Planck’s constant, \( h \), divided by space unit. If the motion is translational, the space unit concerned is taken as centimeter. If the motion is rotational, the space unit concerned is taken as radians. The basic unit (quantum) of one-dimensional angular momentum is taken as \( \hbar \) erg-sec (spin-1), which is the same thing as \((h \text{ ergs})/(2\pi \text{ radians/sec})\). The denominator, \( 2\pi \) radians/sec, can be seen to be one-dimensional rotational speed. On this basis the quantum of two-dimensional angular momentum is to be taken as \((\hbar \text{ ergs})/(4\pi \text{ steradians}/\text{sec})\), which is the same thing as \(\frac{1}{2}\hbar \) erg-sec (spin-½). We can immediately see that particles like photons (the bosons), which have integral spin, are based on one-dimensional rotation, whereas those like proton and electron (the fermions), which have half-odd integral spin, are based on two-dimensional rotation.

* See Appendix.

In the conventional theory it is recognized that the quantum state of the integer-spin particles cycles at \( 2\pi \) radians and that of the half-odd-integer-spin particles cycles at \( 4\pi \) radians. What is needed to clarify the physical fundamentals is to recognize that in the latter case the value is \( 4\pi \) steradians rather than \( 4 \) radians—and hence it really pertains to two-dimensional rotation.

§2. Unbounded Phase. There is yet another unforeseen feature of rotation in the Time Region. In the conventional time-space region, after rotating through an angle of \( 2\pi \) radians one comes back to the starting point. An angle of \( \theta \) radians cannot be distinguished from an angle of \( \theta + 2n\pi \) radians. In the Time Region, however, this need not be true. Speaking of spin-½ particles Bhandari states: "...studies... bring out the additional fact that phase changes of \( 2\pi \) are real, physical and measurable, something that is often ignored. For example, our experiments make it obvious that the difference between \(+\pi\) and \(-\pi\) or the difference between \(\pi\) and \(3\pi\) is measurable and that it is unnatural to restrict the value of the phase that is being continuously monitored to be between 0 and \(2\pi\). The need to incorporate this unbounded nature of the phase variable presents a promising program for the future." 4

§3. Non-degenerate Spin. A one-dimensional spin is represented by a single spin coordinate, say \( \sigma_1 \), and could be either \( \{+\} \) or \( \{-\} \). The two-dimensional spin requires two spin coordinates, \( \sigma_1 \) and \( \sigma_2 \), and is categorized into four domains: \( \{+\} \), \( \{-\} \), \( \{++\} \) and \( \{+-\} \). From the point of view of the time-space region there is a degeneracy: \( \{+\} \) and \( \{-\} \) are effectively identical, and \( \{-\} \) and \( \{+\} \) are effectively identical. However, these four domains remain distinct in the three-dimensional zone of the Time Region itself, necessitating a quaternion representation rather than one of an ordinary complex number.

§4. Helicity. Unlike in the case of the one-dimensional rotation, there is an internal chirality or handedness arising in the case of the two-dimensional rotation out of the multiplication of the two constituent one-dimensional rotations. Thus the combinations \( \{++\} \) and \( \{-\} \) both result in the positive sign and may be treated as Right-handed. In similar manner, the combinations \( \{+\} \) and \( \{-\} \)
both result in the negative sign and may be treated as left-handed. The Quantum theorists recognize the existence of this internal chirality when they posit the characteristic of Helicity. They do not, of course, have the benefit of the insight given by the Reciprocal System regarding its origin.

§5. Photon Wave. According to the Reciprocal System the photon is situated permanently in the space unit (of its origin) of the background space-time progression. As these space units are ever moving scalarly outward, away from one another, no two photons can ever contact each other. However, both may be able to contact a gravitating particle since the latter is moving scalarly inward, and can enter the space unit in which a photon is situated. That bosons, the class of particles of which the photon is a member, do not interact with each other is an observed fact. If this is so, one may ask, how do we explain the phenomena like interference and diffraction, wherein the waves associated with the photons are apparently interacting? The answer from the Reciprocal System has already been explained in detail in the paper, Non-locality in the Reciprocal System, where we have shown that the photon interacts with itself, by virtue of the nonlocality feature of the Time Region. The wave associated with the photon is actually in the Time Region and is to be represented by complex vibration rather than a real vibration. The projection on the real axis appears sinusoidal.

§6. Point Particles. The reason why photons and electrons appear to measure as point particles is this: they are units of rotational space—not of linear space.

§7. Complex Wave. The wave function \( \phi \) of a particle in the one-dimensional zone (that is, the zone of one-dimensional rotation) of the Time Region is to be represented by a complex wave. This follows from the fact that the equivalent speeds pertaining to this zone that correspond to the one-dimensional speeds of the conventional spatial reference frame (the time-space region) are two-dimensional. Thus

\[
\phi = \{ \phi_1, i\phi_2 \},
\]

where \( \phi_1 \) and \( \phi_2 \) are real and the symbol \( i \) represents the operation of orthogonal rotation, from the real to the imaginary axis, such that \( i^2 = -1 \). It must be noted that \( \phi \) denotes a one-dimensional rotation. The probability density as applicable in the time-space region is, of course, given by the square of the modulus, \( |\phi|^2 \) (or \( \phi^*\phi \) where \( \phi^* \) is the complex conjugate of \( \phi \)).

§8. Quaternion Wave. What we have called the three-dimensional zone of the Time Region is the zone of two-dimensional rotation of the atom. We have shown that the equivalent speeds pertaining to this zone that correspond to one-dimensional speeds of the time-space region are four-dimensional. Consequently, the wave function germane to this zone needs to be represented by a four-component mathematical object. Since we have represented the one-dimensional rotation pertaining to the Time Region by a complex quantity \( \{ \phi_1, i\phi_2 \} \), we recognize that to represent two-dimensional rotation (pertaining to the Time Region) we need to introduce an additional imaginary dimension \( j \). Thus, replacing \( \phi_1 \) and \( \phi_2 \) respectively by \( \psi_1 \) (= \( \{ \psi_1, j\psi_2 \} \)) and \( \psi_2 \) (= \( \{ \psi_1, j\psi_2 \} \)) which are complex, we have for the wave function of this zone

\[
\psi = \{ \psi_1, i\psi_2 \} = \{ \{ \psi_1, j\psi_2 \}, i\{ \psi_1, j\psi_2 \} \}
\]

\[
= \{ \psi_1, i\psi_2, j\psi_2, k\psi_2 \},
\]

where we define \( k = ij \), and \( \psi_1, \psi_2, \psi_3 \), and \( \psi_4 \) are all scalar.

As can be seen this is a quaternion, with the following basal elements: the identity operator \( 1 \) (which keeps a quantity unchanged) and the three orthogonal rotation operators \( i \), \( j \), and \( k \). The properties of the operators are:

\[
i^2 = 1; \quad li = il = i; \quad lj = jl = j; \quad lk = kl = k;
\]

\[
j^2 = j^2 = k^2 = -1;
\]

\[
ij = -ji = k; \quad jk = -kj = i; \quad ki = -ik = j.
\]

The probability density, once again, is given by

\[
\psi^*\psi = \psi_1^2 + \psi_2^2 + \psi_3^2 + \psi_4^2.
\]

In the conventional theory, the theorists find that the speeds of the nucleons approach light speed because of the large 'nuclear' interaction energies (on the order of tens of MeV) concerned. In view of these large speeds they find it necessary to resort to the Relativistic Quantum Mechanics. Some of the celebrated theoreticians who worked on the relativization of the wave equation, like Paul Dirac, were led by mathematical necessity to adopt wave functions with four components like we have been talking of.

§9. Dimensionality of Space. In a closed group of operators, like \( \{1, i, j, k\} \), the result of the combination of any number of the basal elements is also a
member of the same group. The result of any such combination can be known only if all the possible binary combinations of the elements are first defined in terms of the basal elements i, j and k themselves (besides, of course, the identity operator, 1). Let there be n basal elements (excluding the unit operator 1) in a group. Then the number of unique binary combinations of these elements, in which no element occurs twice, is \( n(n-1)/2 \). We can readily see that a group becomes self-sufficient (finite) only if the number of binary combinations of the basal elements is equal to the number of those basal elements themselves, that is

\[ n(n-1)/2 = n. \]

The only definite solution for \( n \) is 3. (Zero and infinity are other solutions.) Therefore if we regard space (time) as a group of orthogonal rotations, its dimensionality has to be three in order to make it self-sufficient dimensionally. Otherwise the number of dimensions either has to shrink to zero, or proliferate to infinity.

References


Appendix
Note on Solid Angle

The angular separation between two directions in space is usually measured in radians. It is a measure of one-dimensional rotational space, like the centimeter is a measure of one-dimensional linear (or translational) space.

![Figure 1](image_url)

Imagine a circle drawn with two radii, CB and CD, parallel to the two given directions, C being the center (fig. 1). The angle between the directions CB and CD is defined as the ratio of the arc length BD to the radius of the circle,

\[ \theta = \frac{\text{arc BD}}{r} \text{ radians.} \]

By this, it may be seen, that the largest angle that could be subtended at any point in a plane has to be the ratio of the total circumference of the circle to its radius,

\[ (2\pi/r) = 2\pi \text{ radians.} \]

When we move from the consideration of angle in a plane to that of angle in three-dimensional space we come to the concept of solid angle. In this case, imagine a sphere of radius \( r \) drawn with center C. Let an area, A, be given on the spherical surface. Consider the conical shaped volume of the solid sphere obtained by joining all the points of area A to the center (fig. 2). The bunch of directions in space (three dimensions) pointing from the center C to every point on this area A situated on the sphere is termed the solid angle, just like the bunch of
directions in a plane (two dimensions) pointing from the center to every point on the arc BD (fig. 1) is called an angle. It is, therefore, a measure of two-dimensional rotational space. The relation between steradian and radian in rotational space is identical to the relation between plane area and straight line in translational space. In analogy with the definition of angle, the solid angle is defined as the ratio of the area, A, on the spherical surface to the square of the radius of the sphere,

$$\omega = A/r^2,$$

and is designated as steradians. A steradian is a measure of two-dimensional rotational space like a square-centimeter is a measure of two-dimensional translational space. Now it could readily be seen that the largest solid angle that could be subtended at a point in three-dimensional space would be the ratio of the total surface area of the sphere to the square of its radius,

$$(4\pi^2)/r^2 = 4\pi \text{ steradians.}$$

Figure 2: Solid Angle

It so happens that in the system of measurements we adopt, both radians and steradians turn out to be pure, dimensionless, numbers. Therefore in fundamental investigations we might confuse one for the other. This is especially the case since, before the advent of the Reciprocal System, nobody came upon the fundamental role of the two-dimensional rotation in the basic physical processes.

---

**A Challenge to**

**Project Omicron**

"The Place Where Gravity Control Will Be Solved"

Project Omicron has a number of members that are also members of the International Society of Unified Science (ISUS), studying Dewey B. Larson's Reciprocal System of Theory. As such, the Reciprocal System theory division is putting out a challenge to the Project Omicron theory division, to come up with a number for this newly discovered acceleration of the Universe, based on theory alone.

The Reciprocal System predicted, and published, the idea of the accelerating universe (referred to as the "progression of the natural reference system") in the 1959 publication, The Structure of the Physical Universe. The acceleration was calculated and published over a decade ago by Prof. KVK Nehru of Hyderabad, India. We have since updated the value, based on more accurate measurements of the gravitational constant, and what we term "unit space".

The Reciprocal System predicts the value of the acceleration to be: $1.0458494877 \times 10^{-11}$ cm/s$^2$

We await Project Omicron's determination...

Bruce Peret  
Editor, Reciprocity Journal  
ISUS, Inc.

Information on Project Omicron can be obtained from:

James E. Tracy  
Project Omicron Administrator  
email: omicron@cwo.com  
http://www.cwo.com/~omicron/
Understanding the Reciprocal System

A True and Complete Theory of The Physical Universe Is Necessary

Lawrence E. Denslow

The world in which we live and with which we interact seems to be a world of matter that has an interactive characteristic referred to as energy. No one has been able to show precisely what energy is, just that it is quantifiable and its form is interchangeable. Everything with which we come in contact moves and is changeable, but always is composed of matter in some form. Thereby, it has become an undeclared assumption that matter is the basic building block of our world and of our universe. All procedures grouped within the fields of science depend on using that assumption along with numerous experimentally observed facts. If predictions concerning the outcome of any given experimental procedure are desired the presence of matter is required to explain the facts derived therefrom. Experimental confirmation of the assumption appears to be 100%, until we try to develop theoretical consequences for the idea. Physical theories for the structure and properties of matter have ranged from spirit through vortices of force, to ultimate fundamental particles interacting to form the observed atoms and sub-atoms of matter. The entire preceding century has been devoted with increasing frustration in the search for a generally applicable theory based upon the idea that matter is the fundamental building block of the physical universe; that space and time are nothing more than the parameters for a container in which matter is to be placed; and that the universe had a beginning in a “big bang” and, therefore, must have an end.

No theoretical system can ever be proven correct, it can only be shown to be consistent with the observed facts or be shown to be inconsistent and, therefore, flawed in some manner. Many inconsistencies of consequence and, therefore, flaws of assumption or development have been noted and ignored or overcome through principles of impotence for the purpose of retaining the matter based concepts for theory construction. For every course of study in each field of science certain assumptions were made and the best guess of the students who later became the professors generated the body of so called “knowledge” in that field. For acceptance into the society formed by those professors unquestioned endorsement of the basic ideas upon which that discipline rests is required of all neophytes. Those who do not so conform are either ostracised or simply ignored. The psychological necessity for acceptance into the society of one’s peers seems to have caused a rigorous search for more consistent ideas to have vanished. In spite of this essential aspect of human nature, there is the occasional person who retains a basic curiosity about the true nature of reality by recognizing failures, inaccuracies, or simple inconsistencies, within popularly available developments of theoretical concepts. These are the ones for whom these topics are being developed and presented.

The first step in any analysis is to **define the parameters of the system by which the analysis is to be conducted**, one of which must be mathematical. The second step of the analysis requires **identifying one or more variables from which other variables and/or specific consequences can be derived**. The fundamental definition and properties assigned to that variable are often of greater importance than the system by which analysis is to be conducted since no interpretation of mathematical results is possible without knowing the characteristics of the variable. The simpler the starting variable, of course, the more likely the consequences are to be self-consistent and consistent with the experimental procedures that identified the variable.

Priority of expression is considered to be the means by which something in the present is validated or worthy of continued use. A quotation attributed to Etienne Bonnot de Condillac by Antoine Lavoisier in his Elements of Chemistry [1789] that “languages are true analytical methods. ...The art of reasoning is nothing more than a language well arranged.” provides considerable priority of expression for the use of language as a tool for scientific analysis of our world and universe. The third step of an analysis is the interpretive stage. In any new development there must always be a continuing analysis of the mathematics and any statements of meaning developed from an everyday sense interpretation for.
the words used, as well as for any new concepts or restrictions of definition being introduced.

The following outline is for a course of study for an understanding of the basic concepts and development of the Reciprocal System of Theory.

I. Concepts of Mathematics, as currently used and with logical extensions
II. Postulates of the Theory and Initial Consequences
III. Photons, Sub-atoms, and Atoms of Motion
   a. Radiation
   b. Sub-atoms
   c. Atoms
IV. Basic Chemistry of Atoms of Motion
   a. Why do atoms ever get together?
   b. What holds atoms together?
   c. Atomic Orientation, Requirements for holding atoms together
V. Basic Mechanics and Heat Phenomena
VI. Photon - Atom Interactions
VII. Electric and Magnetic Phenomena
VIII. Fundamental Astronomical Concepts
IX. Other Basic Properties of Matter
X. Beyond Space and Time

Before embarking directly into the development of the course of study it seems reasonable to first examine the logic used in developing all systems of scientific theories. Logical processes, like most everything else in this world, are seen in terms of opposites. The most obvious opposites in logic are induction and deduction. An inductive argument derives its results from specific known pieces of information, that are provable thru experimental procedures, using the technique of back-tracking to a possible generalization. This is sometimes referred to as top-down thinking.

A deductive argument starts with a premise or proposition and derives all results by progressing toward the phenomenal result in accord with agreed upon step-wise procedures. The usual procedures for a deductive argument require complete consistency of showing that certain results, its conclusions, necessarily follow from the starting premise. This is often referred to as bottom-up thinking and is usually much more difficult to verify. Properly carried out with valid premises, a deductive argument can only lead to valid conclusions.

An inductive argument cannot claim that its premises provide complete truth of its conclusions. An inductive argument can only claim that its premises provide some support for the observed conclusion. Many of the steps within an inductive argument may be deductive in nature, but the tenuous character of the premises for induction cannot guarantee the validity of any conclusion.

Because both logic processes use observation as a guide for verifying a result, many people become confused as to which process is being used in a given procedure. Starting from known facts, experimentally observable quantities, and attempting to derive a general principle therefrom, is induction. It must be remembered that even in the event that the premises for an inductive argument are literally true and correct, absolute truth of its conclusion is not guaranteed, those conclusions are merely more probable than some other conclusion. Deduction starts with a general principle or idea that may not be obviously correct, although it must be literally true and correct. Derivation of specific "facts" which are subsequently shown by correlation with experimental observation to be correct confirms the truth and validity of the argument and, thereby, that the development was indeed deductive.

The rules or procedures of ordinary mathematics are the results of induction; they work in this world in which we carry out our investigations because they were devised in this world, not because we know them to have intrinsic correctness, we can never know that. The question of whether something works and has reasonably close correlation with the observed world is the principal criteria by which scientists make their judgements. "Science" is a human endeavor by which mankind attempts to derive reasonable, if not correct, explanations for the phenomena of the physical universe. "To initiate any fruitful inquiry, three qualities are requisite: One must be familiar with current theories, observant of new facts, and uncomfortable in the presence of any conflict or gap between fact and [existing] theory."

Previous theoretical results from the use of inductive logic indicate that the meanings of each and every word used in an analysis must be carefully considered. The possibility of ambiguity for any word demands clarification of meaning before understanding of combinational meanings can be successfully accomplished whether the argument at hand is inductive or deductive. In either kind of argument, the use of language is the key to success.

Currently available theories are often touted as having been deductively derived. You will have noticed that both deductive and inductive arguments use the same procedures of logical development. The principle difference is in the source and statement of the premises and the necessary conclusions. For the premises to be those of a deductive argument their logical development must
lead to full complete and consistently true explanations for all results. If those same proposals lead to inconsistencies or fail to provide complete explanations without subsequent modification of the premises, not only were the original premises incorrect, but they were the premises of an inductive argument. Only a true and correct postulate or premise can lead by deductive development of its necessary consequences to a completely true and correct conclusion with complete confidence in the validity of the premises and its conclusions. The conclusions of a deductive argument are not merely more probable than those of an inductive argument, they are literally true and correct.

In an inductive argument there is usually some bit of observational evidence in the fundamental premises which implies that deductive development of the consequences for that premise may seem to be a totally deductive development as long as no error is found in any of its conclusions. If errors are ever found then that which was previously considered to have been a deductive argument is thrown into the category of inductive arguments because its conclusions were merely more probable than any others until the error was discovered. Therefore, if the necessary consequences of the logical development of any premise ever leads to any inconsistency, the argument can no longer be thought of as having been deductive. As a direct result of the present state of confusion in the consequences derived from the premise of a matter based universe dispersed for observation in a four dimensional continuum, that premise and its development have been inductive arguments rather than deductive. The many additions, modifications, and outright ad hoc nature of those additions and modifications show further the extremely tenuous character of the concept of a matter based universe.

Understanding the Reciprocal System
Lesson I
Concepts of Mathematics,
As Currently Used and with Logical Extensions
Discussion by Lawrence E. Denslow

1. This system has numerals that represent numbers and other symbols that represent operations to constitute an arithmetical system.
   a. The numbers in this system correspond to the normal whole counting numbers and their negatives; i.e., the whole numbers.

   The notation used to depict numerical quantities uses a positional method of multiplicative grouping relations and is constructed using a base quantity of identifiable symbols: specifically that quantity referred to as ten; i.e., 1, 2, 3, 4, 5, 6, 7, 8, 9, and a 0 to act as a place holder. The positional notation makes it possible to depict very large and very small quantities by the positions of the numerals with respect to each other rather than having to have special symbols to indicate specific multiples of the base quantity ten (10).

2. The mathematical system uses dimensional characteristics in conjunction with arithmetical principles:
   a. Three mutually perpendicular linear directions and their opposites define three mutually perpendicular dimensions.

   b. The dimensional system defines relative positions by assigning relative values of deviation from a specific position, the point of intersection of the three mutually perpendicular dimensions. Any point within
a generalization of the dimensional system can be called a reference point by translation and/or rotation of axes.

For adequate specification of any point or direction in a specific system or a generalized system, all available dimensions must be specified with a conventionally agreed upon sequence of deviations from the previous stated reference point. This includes both the numerical sequence and the order of dimensional notational sequence; i.e., left handed or right handed digital sequence.

3. The rules for using the system of numbers, dimensions, and operations are categorized under six main headings:

a. arithmetic:

a.1. The category called arithmetic involves actual known quantities of identifiable variables and of non-variable quantities of scalar multipliers. Arithmetical operations are defined as commutative operations in which sequence and or order are immaterial, or as non-commutative operations in which the sequence of operations is critical.

Commulative combinations are all resolved by addition, symbolized with a “+” between the addends. The reverse of the addition operation is called subtraction symbolized with a “-” between an addend and the subtrahend, but is not commutative because operational sequence is critical. Multiple commutative additions are called multiplication and symbolized with an “x” or with a dot at mid-line between the multiplicand and the multiplier. Division is also symbolized in either of two ways, by a “/” mark or by the symbol “+” between the dividend and the divisor. Division may be commutative if defined as multiplication by the reciprocal of the divisor, but otherwise is not commutative for the same reason that subtraction is not commutative; operational sequence is critical. Various grouping symbols are often used to eliminate ambiguities.

a.2. Rules for manipulating values involving relative notational over-under positions relate to the arithmetical behavior of values less than unity and for intermediate positions between whole counted positions. Very large values and extremely small quantities can be provided for through fractional notation of this sort.

The notation expressing a numerator quantity divided by a denominator quantity is not a further operation and does NOT imply that either notational position can be eliminated by reduction of the value represented in that position to zero. A zero in either position leads to undefined relational values because zero is a non-quantity. Carrying out the indicated operation merely reduces the denominator to the whole number value one (1), which is the minimum quantity of any available analyzable component allowable in any system of quantification. By merely having this type of notation available, it is seen that all quantitative determinations require the expression of their results in a manner that is fundamentally a fractional type of notation.

b. algebra: The category involving rules for manipulating non-specific quantities is called algebra. Algebra is a generalized way of following the rules of arithmetic so that numerical values can be obtained from the result of the algebraic manipulations.

c. geometry: The category of rules for using a combination of numbers and dimensional positioning of the numbers for relative shapes resulting from specific values and arrangements is called geometry; either in one plane or in all three dimensions; i.e., plane geometry, solid geometry, or spherical geometry.

d. trigonometry: The category of relations among specific geometrically related values derived from certain three sided figures is called trigonometry. This may be in a single plane or in all three dimensions specified in cartesian coordinates or in spherically related coordinates.

e. calculus: The category of relations involving small incremental differences derived for various shapes resulting from specific values and positional arrangements of scalar quantities and quantities of variables is called finite calculus. The calculus may also be used as a general tool to correlate dynamic changes among shapes and positional relations, as well as, other dynamic relations of definable variables.

f. probability: The category of rules derived from patterns of occurrence of numbers in various positional relations and distributions is called probability. Expectations derived from these patterns is called statistics.
It should be noted that the underlying central idea of all relevant branches of mathematics is to quantify the concept of sequential change in the accepted three dimensional system of coordinates. By using that part of the mathematical system described in 3.a.2, fractional notation for values between the elements of the real number set along with the fundamental concept of change, it becomes obvious that the series of all possible values represents a virtually continuous sequence that can be used to describe and define a mathematical meaning for the idea of continuity. Because the concept of change is fundamental to the system of mathematics, the concept of change is applicable to both the analysis of observed phenomena and the way phenomena may be thought to occur.

Arithmetical consequences define quantitative, statistically defensible relations and quantities from a static point of view. Seldom do quantitative results give any indication of a necessarily dynamic view by which to derive an active picture of a dynamic system. Abstract equational results derived by the operations of 3b, 3c, 3d, and 3e often point out the direction an interpretation should take, but it is the properties of the variables being analyzed which in fact dictate interpretations of both static and dynamic results of mathematics. It must be assumed that general familiarity with the actual mathematical procedures and operations mentioned above are within the purview of the reader.

Interpretation of mathematical results must be approached with extreme care so as to not use undeclared assumptions in making those interpretations. So as to remove all ambiguity from the mathematical system of analysis, verbal differentiation must be made between specific geometric coordinate systems and generalized geometric coordinate systems. Up to the present time it has not been necessary to make any analytical distinction of this kind.

Use of such distinction without discussing it first would constitute an undeclared assumption.

Direction is always taken to be a mathematical characteristic analogous to the directionality of vectors, but directionality for representation of a quantity in a three dimensional coordinate system is more than the linear directionality of vectors. Direction around an axis, as in rotation of an object, is as indisputable a description for a direction relative to a reference line as is away from or toward a point. Even though the word rotation may imply that "some thing" is rotating about an axis, rotational as a directionality requires only that the quantity be oriented around one or more of the axes of the reference point coordinate system rather than directly out from or straight in toward the origin of the axes. The application of the idea of positive and negative arithmetical direction to geometric directionality is also a valid use of the concept.

The requirement for the effect of a quantity within an individual reference point coordinate system to be represented in a generalized system is logically subordinate to the representation of the quantity in the individual coordinate system; therefore, all effects caused in a generalized system of coordinate axes of quantities represented at, in, or around individual coordinate systems must be considered to be consequential rather than causative in nature. Consideration of what this might mean is simplified greatly thru the realization that any direction outward from a specific reference point is apparently inward toward any other reference point and, consequently, seems to involve a change of algebraic sign. To avoid this confusion of interpretation for reference point notations, it must be recognized that whatever quantity is represented at a specific reference point is strictly specifiable while the resultant effect in a generalized system is always with respect to that specific reference point and not to all reference point coordinate systems because of the possibility of random orientation of one system with respect to any and all others. An effect in a generalized system is, therefore, a scalar function having only those directional characteristics resulting from the location of the specific reference point in the generalized system of all possible specific points and the nature of the variable being analyzed. The directionality in the generalized system may seem to have very little to do with directionality within the individual reference point system, but the general is always a consequence of the individual cause.

Representation of a quantity in or around an individual reference point coordinate system must also follow the logic of the number system for magnitudes and directions. This means that to represent a quantity of "one" at a specific reference point, both the magnitude and the orientational direction must be the first possible. Orientation of direction linearly inward toward the origin or linearly outward from the origin is dimensionally simpler than around any dimensional axis; therefore, the first representation of direction must designate linear directionality before rotational directionality. Linear directionality with respect to the origin must be outward before it can be in toward that origin and, therefore, outward must precede inward in any direction.
To represent the magnitude of "two" requires a combination of "one" and "one" together at that reference point. This can be accomplished in several ways, one of which is the simplest and, therefore, the most probable. A quantity "one" represented in one direction linearly outward and the other quantity "one" represented one directionally linearly outward along a perpendicular dimension requires "two" dimensions rather than just the one previously required. This simple perpendicularity has the potential for separating the two quantities rather than keeping them together for a magnitude of "two". "Two" dimensional for a single directionality must be dependent upon the consequences of the addition and not upon the simple sequence of numbers. A two directional linearly inward quantity completely negates the placement of a one directional linearly outward quantity in both directions of any dimension along which the combination is placed. The second "one" quantity cannot be placed in the same dimension as the first "one" if oriented inwardly because this would reduce the net value represented at that reference point to something less than "two"; i.e., nothing. Placement of the second unit of quantity, a two direction linearly inward quantity "one", along one of the perpendicular dimensions to that in which the first unit of quantity is represented linearly outward provides a stable combination of total quantity "two" because of the restriction of outward directionality to one of two possible dimensions rather than one of three, to say nothing about two of three. Here the use of the second dimension provides no potential separation and thus is stable. This becomes the most probable arrangement in which two units of quantity can exist together in a stable combination at a specific three dimensional reference point.

For quantities greater than this to be discussed the nature of the quantity being represented must be known and entered into the analysis. The upshot of this is that pure arithmetic can go only so far in providing any kind of picture of possible results for an analysis of anything.

The next topic identifies the simplest possible variable from among analyzable variables identified by experimental analysis of the phenomena of this world. Selection of any variable for the purpose of analysis is always made in accordance with some set of postulates concerning the nature of the system being analyzed.

---

1998 ISUS Conference Information

Central Florida, U.S.A.
Jennifer Hafer, Treasurer

After discussion with ISUS Secretary, Larry DenDenslow, the 1998 ISUS Convention will occur between mid-October and mid-November. The proposed schedule is arrival on Wednesday, papers presented Thursday with a group dinner at one of the dinner attractions, free day Friday, business meeting Saturday, go home Sunday. This will allow the Saturday night stay airlines require for reduced rates. Hotel/motel has not been set. The more confirmations I have for people attending, the more bargaining power I have on reduction of room rates. The hotel/motel will be in the Winter Haven/Lakeland area. The rates are lower away from the tourist area of Orlando/Kissimmee.

I would like to estimate a head count for the 1998 convention, so please write, call, or E-mail me, at:

Jennifer Hafer
18 Valencia Court
Winter Haven, FL 33880-1041
U.S.A.
+1 941 965-8423
E-mail: hafer@gte.net

The meetings will take place at either the hotel/motel or at the local college. The final location to be determined. Tampa International Airport and Orlando International Airport are about equal distance from where everyone would be staying. I will be looking at entertainment/tourist attraction prices and availability. For those who will drive, I can provide directions to the hotel/motel when it is set, and to other locations/attractions if requested. Florida is wonderful in the fall, but it can get cool, so remember the light jackets.
Crossing the Quantum Boundary

A Phenomenon of the Astral Plane?

George F. Hamner, Jr.

Abstract

In this short article the author makes the case that Dewey Larson’s assertion of space and time as fundamentally quantized is an equal contribution to his much better known “motion as the sole constituent of the physical universe.” In addition, the phenomena of boundary crossing, required by all quantum concepts, is shown to be a process of much under-appreciated complexity and importance. Finally, the author speculates that crossing the quantum boundary may be a phenomena of the “Astral Plane.”

Larson’s RS theory

Dewey B. Larson’s Reciprocal System of theory is most noted for its concept of replacing “a universe contained in space and clocked by time” with “a universe of motion composed of space and time.” Equal to this contribution however, is his bold assertion that space and time themselves are composed of discrete units or quanta. It is interesting that Larson almost never uses the term quantum and, as was pointed out in the last issue of Reciprocity, “...he looked upon these quantum-mechanical phenomena, like the tunneling, with hesitation.”

The question about whether space and time are continuous, infinitely divisible, or come in chunks has been argued for thousands of years. The most basic mathematics of modern science, the (infinitesimal) Calculus, was highly controversial when first proposed by Leibniz, Barrow, and Newton for just this reason. Just as it is much easier to build a wall with bricks than with sand, Larson must have figured it would be easier to build a physical universe with quanta rather than with “infinitesimals.”

Now, to the very basics...

It’s hard to decide where to start, but to the mystics in the ISUS audience, it would be easy. If you lean toward Egyptian mythology, you would begin with Tum creating Atum out of Nun. For the students of Vedanta, one would turn to Brahma, Vishnu and Shiva. But this, after all, is an article for an advanced physics journal.

There is not time in a short article for even a brief introduction to number mysticism, but we’ll need a little bit to be able to get started. A good reference is Serpent in the Sky, John Anthony West’s introduction to R. A. Schwaller de Lubitz’s Egyptological ideas. In what de Lubitz calls the “Primordial Scission”, One, the Absolute or Unity, becomes conscious of itself and creates Polarity or Duality. Duality by itself, unchecked, is an invitation to chaos, but Duality is reconciled by the simultaneous creation of Three—the Trinity. One cannot become Two without becoming Three, because becoming is the third force. Bruce Peret, among others, believes this principle is behind the three-dimensional fundamentalism of Larson’s universe.

One can argue that the Primordial Scission is forever unfathomable and incomprehensible to human faculties, but all beyond this first act is, in principle, open to inquiry and understanding.

The Primordial Scission

In the author’s work, the “first unity breaking” of the Unity of Source is considered to be the duality between The Word and The Void. (See Figure 1) The third or reconciling principle is Divine Creation. The Word could be thought of as Divine Consciousness or perhaps the Tao. It is, of course “The Word” referred to by the beautiful first line of John’s gospel in the Christian Bible. The Word reaches into the Void to begin the process of divine creation. It is wonderful that the RS theory agrees so completely that the first physical creation results in “let there be Light.”

Since this is a physics article, and physicists are mainly concerned with physical things, we will ignore all the richness of phenomena that result from the “second unity breaking” that occurs when The Word creates duality out of itself. This means we’ll not discuss Divine Love, Divine Knowledge, Divine
Will; or the Mental Body, Emotional Body, and Etheric Body which comprise three-fourths of a human. We'll not touch on Co-Creation with Source, and most of all, we'll not even consider the major question of why would we have created this messy physical universe of reduced dimensionality in the first place.

This is great because there is much to be written in future articles.

**Out of the Void**

Almost all creation stories begin with creation *ex nihilo*—"out of nothing." While this seems paradoxical at first, when it is considered deeply, one realizes that the polar opposite of *Nothing is Everything!* So the Void is defined as "nothing and everything at the same time." Note how our language starts to fail us as we seem to need a temporal expression to somehow bang the two ends together into one "at the same time."

Some people think of the Void as both a *vacuum* and a *plenum.* Another interesting conception of the Void is that it is composed of *total random,* for only total random could be *perfect order.* It is also a state of *being,* which is incomprehensible. This is tongue-in-cheek, but note that the Void is all "hardware," as the "software" is contained in the Word. The hardware is infinitely capable, but is capable of nothing without the software.

Another light-hearted explanation of creation *ex nihilo* is given by G. Spencer-Brown in the Preface to the 1994 Edition of his *Laws of Form:* "The idea that the creation must be a consequence of 'something' is moronic. No 'thing' can have any consequence whatever. If there were originally 'something', it would poison the whole creative process. Only 'nothing' is unstable enough to give origin to endless concatenations of different appearances."

**The Second Unity Breaking**

There are numerous dualities which could be created out of the Unity of the Void to construct a universe, but let's consider two of the most fundamental. (See figure 2) We are incapable of dealing with a "*being*" universe, only an eternally *becoming* one. In order to understand becoming, we must contrast *change*
Figure 2: The Second Unity Breaking

against permanence. One way to do this is to create motion out of space and time. Now we have something that can “become.” This part of the construction of the RS theory is well known.

The other “second unity breaking” is more subtle, but is quite necessary when you think about it. It goes something like this:

In order for nothing to become something, without becoming everything, it must have a boundary.

You can’t bring “something” out of the Void unless you can define where it begins and ends! It looks like the need for a quantum is pretty fundamental after all. Spencer-Brown also says, “…every duality implies triplicity: what the thing is, what it isn’t, and the boundary between them.” (italics mine)

The idea of a “boundary crossing” seems so ordinary that we rarely pay much attention to it. But in the case of the boundary between the S-frame of the Material Sector and the T-frame (and the equivalent in the Cosmic Sector) we have a “boundary crossing” of extraordinary importance.

The RS theory is justifiably proud of the fact that it has eliminated many of the infinities that plague the current mainstream theory. However, when interactions take place in less than one unit of space (or time), we encounter a “zero-crossing” region. The origin of the S-frame is considered to be at zero speed.

This produces a “you can’t get there from here” sort of problem: In the Material Sector, speed would be defined as S/T. Therefore, to be able to get to zero, S must go to zero or T to infinity. S can’t go to zero due to the Quantum Postulate, and an infinite T means we have bumped up against a “higher reality.” Dr. Nehru’s article in Rectprocty, Volume XXVI, No. 1, explains how this boundary crossing produces the phenomena of Quantum Non-locality, since this boundary is both “everywhere” and “everywhen.”

Generally when we encounter phenomena with these types of infinities, it means we have bumped up against some sort of “higher dimensionality”, like when the inhabitants of a two-dimensional plane world run across five circles whose boundaries exhibit really strange effects. Only later do they
learn that it was some three-dimensional human who had stuck his hand part way into their world. It would be hard for the Flatlanders to realize that the five separate circles were connected to a higher reality.

**The Astral Plane**

If you study the "planes of existence", "composition of entities", etc. in the classical (and modern) esoteric literature, you will discover a wide variation in the names of the layers and even the number and purpose of each layer. Most systems have seven layers, which relates back to number mysticism, and there is even a modern seven-layer version called the Open Systems Interconnection (OSI) Model. One wonders if the "protocol stacks" which route our digital data through the worldwide Internet know they have such an ancient heritage.

One major concept of these systems is that the higher planes "interpenetrate" the lower planes. For the purpose of this discussion, let's consider an existence of just three layers. At the bottom is the Physical Plane, which is best described by Larson's RS system. The concept of a "Life Unit" borrowed from our sister universe, the Cosmic Sector, to make our cells disaggregate/divide when gravitation is telling them to do just the opposite is most intriguing, but in this current construction it is probably still part of the physical layer—and definitely needs further study.

Just beneath the Primordial Scission is the Spiritual Plane, full of angels, other wonderful things, and much closer to the Unity of Source. How we got from there to this messy physical existence is the subject of endless speculation.

In between those two planes is a layer which we call the Astral Plane. We might note that the Astral layer of classic Theosophy generally translates to the "Emotional Body" in our system. The concept of the Astral Plane as the interface between the Spiritual and the Physical is largely taken from Barbara Brennan's work.

Since time and space form the fundamental basis for our physical existence, they do not exist in the Astral Plane at all. So whatever goes on there, would from our physical perspective, appear to be eternal. And vice versa, from the vantage point of the Astral Plane, all time and all space of this universe would be instantly visible.

So what goes on in the Astral Plane? Certainly the struggles of Larson's "Ethical Man" take place there. (Don't forget, because the Astral interpenetrates the Physical, "there" is also "here") Even though time and space do not exist in the Astral Plane, Duality certainly exists, perhaps even evil and good. Our Emotional and Mental Bodies live there. "Astral travel" takes place when these guys go wandering around and leave the physical body at home. This is not so odd as it sounds - most of us do this every night when we dream. Our system considers the "Etheric Body" to be the interface layer between the Astral and Physical world, and connects to the Chakra system.

**Conclusion**

Since crossing the quantum boundary produces non-local effects with infinite implications, and since the Astral Plane is, by definition, the next higher dimensionality, we would like to offer that these phenomena take place in the Astral Plane.

An interesting consequence of this hypothesis is the following calculation: Since the space-time Progression is flying along at the speed of light, and since we are inextricably bound to the material aggregates of this corner of the galaxy, then each atom of our physical body must enter and exit a unit of space-time every $1.52 \times 10^{-16}$ seconds. That means that every atom of our body crosses the quantum boundary $(2 \times 1/1.52)$ or $1.32 \times 10^{16}$ times a second!

Think of it, every atom of your body gets to take a brief (very brief) "Astral holiday" away from this mundane physical existence many (very many) times a second.

But then, time and space do not exist in the Astral Plane,... so what do "very brief" and "very many" mean there?

We hope that this article has piqued the reader's interest that our hard science might benefit from consideration of the higher planes, that "boundary crossing" is more complex than most would consider, and that the RS "quantum" theory is a major contribution to the understanding of our exciting world.

"...our expansion into the universe is not just an expansion of men and machines. It is an expansion of all life, making use of man's brain for her own purposes."

—Freeman Dyson
Reflections of a New Member

George F. Hamner, Jr.

Within a minute or two after opening the book I knew it was exactly what I had been searching for. The wonderful thing about a real library is that one might find, among the musty books on dusty shelves, exactly the book you need, even if it was not the one the computerized card catalog sent you to. On March 23, 1997, I had discovered Dewey B. Larson’s Reciprocal System of theory. There, among the many quaint and curious volumes of relativistic quantum field theory, was Beyond Newton, An Explanation of Gravity. When he said in the Preface, “I should perhaps explain why the title is Beyond Newton and not Beyond Einstein...” I knew I was on the right track.

After 30 years of a mostly industrial business career, my wife and I had returned to our native deep south and I had obtained a position at the University of Alabama in the Manufacturing Extension Program. This job is a great combination of helping graduate student and faculty teams perform applied research for business clients, and an academic environment where I can pursue the research for a book I am attempting to write. I had graduated from this same university in 1966 with a degree in, of all things, Physics. I must have somehow known the current theory was flawed, for I never pursued my chosen field. I kept a low-key interest in “how the universe works” all my career, but in the last 3-4 years I have become intensely interested in learning more.

My “studies” have taken me from Vedanta through Theosophy to the work of P.D. Ouspensky, and now I have discovered Larson. Needless to say, I have read everything on the “new physics.” I tell my friends that I want to make a contribution at the intersection of physics and metaphysics. I have studied the “levels of existence” in the esoteric literature, and believe that the phenomena of the Astral Plane—the interface layer between the Physical and the Spiritual Plane—are much more relevant to our existence than generally perceived.

I quickly obtained almost all of Larson’s books through the Inter-Library Loan system. It was clear that I had finally found the absolute best foundation on which to build a physical universe, but I also found Larson tedious to read. He spends a lot of time lamenting the current state of knowledge, and he is forever telling the reader that he can’t explain something just yet, because it will come later, or is not appropriate for the treatment of the present book. It is interesting that he almost never uses the word “quantum” when it is obvious that his is the most basic quantum theory of all. Discussions of the RS theory would be greatly benefited by pictures and diagrams, of which the original work has very few.

One of the best stories of my early study of Larson’s RS theory is I was reading The Case Against the Nuclear Atom in my hotel room the evening before our organization was to visit the former top secret labs of the Oak Ridge National Laboratory in Tennessee. What a supreme irony, that this book went in my car on the reservation where our country’s early work in “nuclear” technology was performed!

I found the original web site and sent my $25 to join the ISUS. After a couple of months the canceled check finally showed up but nothing else. I tracked down Rainer Huck on the telephone and really enjoyed him telling me how he was going to have to cut the salaries of the Society’s staff in order to get them to work faster! (Of course the Society staff is all volunteer) I also enjoyed the story about Rainer riding his BMW motorcycle out to see Mr. Larson the first time. But best of all, he sent me a couple of back issues of Reciprocity and other publications, including the Collected Writings of K.V.K. Nehru. It was wonderful! For the first time I was able to read what others had to say about the RS theory.

An Incredible “Synchronicity”

It appeared to me that Dr. Nehru was a major contributor to the current state of the Society’s research and I wanted to write to him and introduce myself. I still find it incredible that a favorite graduate student of mine, Ravindra Ganti, has his family home only a few miles from Dr. Nehru’s university. Some people would call this a “synchronicity”, a non-accidental opening that the universe provides to us. I wrote a letter to Dr. Nehru and, “as would have been done in a more gracious era long forgotten,” I had the letter delivered personally to him by Ravi’s brother, Sashank.

Even though I had a math minor a million years ago,
I am a very poor mathematician. But I and a few others have a vague feeling that the Quaternion Calculus, invented by Hamilton in 1843 and generally discarded soon after the turn of the century, has a role to play somehow in understanding the workings of the universe. Quaternions seem to be able to depict scalars and vectors in some deeper manner.

So, in that hand-delivered letter, I sent Dr. Nehru some material on the Quaternion Calculus. In the first e-mail I received from him he had this to say:

"It is mysterious what prompted you to send that material on quaternions! At the time of working on the Paper "Quantum Mechanics as the Mechanics of the Time Region" (Reciprocity, XXIV (1), Spring 1995, p. 1), it became apparent to me that while we need complex numbers for working in the area of what I have termed the 'one-dimensional zone' of the Time Region (which deals with the 'electronic' energy states of the atom), we require quaternions for working in the area of the 'three-dimensional zone' of the Time Region (which deals with the so-called nuclear energy states). I have been looking for quite some time, unsuccessfully, for the sort of material you have now sent!"

Don't tell me that the universe doesn't work in mysterious ways!

The Photon as Birotation contribution of Dr. Nehru was a big help to me. The original "vibrating photon" always seemed a bit incomplete. It was not until I read the Collected Writings that I realized how controversial this new idea was within the Society.

ISUS and Metaphysics

Dr. Nehru introduced me to Bruce Peret and I have struck up an e-mail correspondence with him, discovering some similar interests to mine. I found the new web page and discovered a wealth of metaphysical material, even an article dealing with "channeled" information! My feelings could not be expressed any better than this quote from the article, Dewey Larson and The Way of One by Stephen Tyman (presented by Carla Rueckert McCarty of L/JL Research):

"Before anything else is said, I feel it is necessary to remark upon the truly exceptional situation that has come about, where fully invested physicists have come to the point where a meaningful dialogue has been opened with fully invested mystics. Only seldom in the history of Western thought has this been the case, and since the growth of positivism in the twentieth century, almost never has such a collaboration been even thinkable."

Also on the new web page, I was delighted to see the article Electrogravitics Research by Russell Kramer. I am convinced that one of the technological spin-offs of the RS theory will be practical levitation devices (which I am convinced were possessed by the Atlantean civilization). Another spin-off I hope will be an ability to more easily tap the energy of the quantum vacuum.

I don't know if it is just the receptive, open nature of the members of the ISUS, or the fact that Larson wrote Beyond Space and Time before he died, but whichever it is, I am thankful. Many groups, after the death of their founder, become dogmatic in their beliefs and close the boundaries to all that was not handed down from the Master. In almost all cases this would be the last thing the founder of the group would want. In any case, the possession of the most advanced physics available and an openness to pursue the frontiers beyond the legacy of Mr. Larson, even to venture into the mystic tradition, give the ISUS the means to get at the ultimate truth.

The Road Ahead

Do not, however, underestimate the difficulty of the undertaking. Not only are we a challenge to the orthodox physics professionals, but the RS theory disturbs the "consensus reality" of the entire planet. I like to think of the belief system of a discipline or way of thinking as a literal "group field" that binds together the members of the group. A disturbance to this group field is very painful to the members of the group.

Because my interests were in other places, I didn't get to the astronomy, astrophysics, and cosmology aspects of the RS theory until just recently. Here I discovered, to my delight, but also with horror, that 1) There is no need to hypothesize a "big bang", 2) There probably are no "black holes", and 3) The entire stellar evolutionary sequence is BACKWARDS!

If you attack a physical object it is likely to weaken. If you pound on a rock with a hammer, it will eventually start to chip and then disintegrate. If you attack a non-physical object—an idea—you get just the opposite reaction. You will often find that the idea becomes stronger.

Let's keep this in mind as we "attack" the total consensus reality of this beautiful planet.
Eulogy of Professor Otto H. Schmitt

William E. Davies, Frank H. Meyer, Bruce M. Peret

Professor Otto Herbert Schmitt, 84, Professor Emeritus in Biophysics, Biomedical Engineering, Electrical Engineering, Mathematics, Physics and Zoology at the University of Minnesota, and long-time promoter of the Reciprocal System and member of ISUS, died on January 5, 1998 of pneumonia. Otto Schmitt was born on April 6, 1913 in St. Louis, Missouri, USA, and married in 1937 to Viola (deceased), his devoted spouse of 58 years.

Otto Schmitt had been a professor of biophysics, biomedical engineering, and electrical engineering since 1939. Technically retired at age 70 in 1983, he went on teaching graduate students and doing research until 1994. He often said that if one learns the “figures of thought” used in other fields, you become an expert in those fields as well, because all knowledge is transferable. In this way, he saw “connections” that the rest of us fail to notice. His philosophy allowed that if you use their language, you can learn from everyone. He had no need to kill the mocking bird, to find out how it sings.

A multi-disciplinary man, with more than 70 patents in his name, including the Schmitt trigger: an electrical circuit that simulates nerves—now used in computers, biomedical apparatus, television, and many other devices in use by the military, industry, and the home. An invention used by the military in World War II located German submarines which were devastating Allied shipping. Another protected ships from mines. Many were classified TOP SECRET. He had to re-invent some of them for use outside the military. More went unpatented during his life. He purposely allowed his inventions to be stolen, to “get the thing in service without having to do all the financial and government mess” so that the public would benefit from them.

He founded the Biomedical Engineering Society, the Biophysical Society, and was a founding member of the AAMI, from which he received the Laufman Prize in 1992. Part of the credit for his success he gave to four Nobel prize winners, who had been his teachers as a teenager at the Dashlemendorf branch of what is today the Max Planck Institute of Biology in Berlin. Contacts like this only sparked his desire to present ideas of initiative and invention in the early life of every child.

He was also a multi-dimensional man, who knew from childhood that life is eternal, when his “gross mutter” [grand mother] came to him after she had died, to say good-bye. His wife, Viola, slept in his arms every night when they were together for 58 years, and she died in his arms during a night in 1994. After her leaving, they shared another evening together at the dining room table in their unpretentious home. He and Viola were very like the home they lived in.

Throughout his life, he communicated with colleagues while asleep and confirmed data the next day by telephone. He had a method for teaching students how to access the fourth dimension by the use of color. Figuring he had another 10 years, one of his many goals was a program for teaching children, in their early years in school, to access other dimensions so that they would develop a continuity of consciousness.

In an interview for the University of Minnesota Technolog in 1986, he said that we need to promote the assumption that “your students will be brighter than you” and “If I can’t teach my students in 2 years what it took me in 3, then I’m not doing a good job.” His purpose was to broaden everyone’s horizon to become aware of the exceptional talents and abilities of each individual.

Beginning as a young child of 5, he knew from his experiences with Civil War veteran Jacob Silers, who educated him in philosophy, comparative religions, science, mathematics, medicine, etc., that children exposed to multi-disciplinary learning have a greater awareness of what they can do in life, because they have self esteem and confidence within themselves regarding their own abilities. Awakening them to the spiritual force within would open them to the Universe itself. He wanted this taught to every child, in every school. To achieve this goal, he would use the “gradualness principle” which he had learned from Pavlov, and which he thought was of greater importance than the salivating of dogs. To get an idea or concept accepted, one puts forward only enough to disturb and challenge. Then, wait a period of time before adding more to the challenge. Continue the process until it becomes acceptable. The task of fulfilling this goal has now been left to others.

He felt comfortable and at home with members of
the Theosophical Society which he joined in February of 1986, as a prelude to his first lecture for the Minneapolis branch. He was a speaker on a number of occasions. One evening, he took the evening's speaker aside and to ask if he had ever been on 7 planes at one time. He also had a way of communicating with his own body to know what was going on and/or what he should do for it, or asking questions to understand some of the problems he needed to solve.

Like all truly great men, Otto exhibited all the fruits of the spirit. He was humble, kind, thoughtful, courteous, considerate, open, and receptive to everyone with whom he came in contact.

Editorial

Physics at the Crossroads

Prof. K.V.K. Nehru

Great technological advances of the 20th century have pushed the limits of observation into the domains of the very small, the very large and the very fast in an unprecedented manner. The resulting observational and experimental discoveries have been exerting a steadily increasing pressure on the physical theory. To say that the state of the physical theory has reached a critical stage might surprise the uninformed but is a closely guarded secret.

Old theories often fail as new empirical knowledge accrues. The growing inability of the existing theory to explain new facts leads to a sort of crisis, a cul-de-sac. New theories will take over only to be supplanted by others as the horizon of empirical facts expands. Once in a time the crisis would be of such a proportion that no new theory would be adequate to resolve it—nothing short of a new theory based on an entirely new paradigm. Planck's introduction of the quantum of action is an example of such a paradigm revolution.

In this context we might say that a paradigm is a way of looking at nature. What is required to resolve long-standing puzzles is to be able to look at them from a new angle. Since it is hard to come out of inveterate patterns of thinking, the new paradigm invariably looks unnatural, weird or impossible. Even if it is true—that is, it completely resolves all the previous paradoxes, explains the phenomena and produces the correct quantitative results—the scientific establishment of the time does not accept it readily. Planck laments in his autobiography that a new generation would have to come to appreciate his findings. But luckily truth prevails: sooner or later the new paradigm will gradually get established and understood. In the meantime we will have to do all that is in our power to disseminate the knowledge of the new paradigm—the Reciprocal System—to humanity.

Just In... Audio Lectures on the Web

Member Mike Wells has been able to digitize the audio track from Frank H. Meyer's and Dewey Larson's speeches from the ISUS 3rd Conference video, and place it on the Reciprocal System research site, http://www.random.com/~rs/, as two RealAudio files. RealAudio, now RealPlayer, is a free, public domain plug-in for Web browsers available from their site at http://www.real.com. The audio files can be found in the Library section of the Research Site. In the first file, Frank H. Meyer gives a 12-minute introduction on epicycles, and the second contains Dewey Larson's full 65-minute lecture on inductive and deductive reasoning, and the creation of the Reciprocal System of Theory.
Reciprocal System
Geophysics

Analysis of the
Inner Core
and the
Scalar
Expansion
of
Planetary Bodies
**Reciprocity Staff**

<table>
<thead>
<tr>
<th>Name</th>
<th>Address/Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bruce-Michael Peret</td>
<td>c/o 5456 Hwy 321 Butler, Tennessee, U.S.A.</td>
</tr>
<tr>
<td>K.V.K. Nehru</td>
<td>P.G. School, J.N.T. University Hyderabad 500 028, India</td>
</tr>
<tr>
<td>Frank H. Meyer</td>
<td>1103 15th Avenue SE Minneapolis, MN 55414</td>
</tr>
<tr>
<td>Russell Kramer</td>
<td>33 Ranch Road Falmouth, MA 02536</td>
</tr>
<tr>
<td>Tobey Wheelock</td>
<td>5 Littlefield Lane Boston, MA 22713</td>
</tr>
</tbody>
</table>

**The International Society of Unified Science**

<table>
<thead>
<tr>
<th>Name</th>
<th>Address/Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hoyt A. Stearns, Jr.</td>
<td>4131 East Cannon Drive Phoenix, AZ 85028 <a href="mailto:hoyt@isas.wierius.com">hoyt@isas.wierius.com</a></td>
</tr>
<tr>
<td>Frank H. Meyer</td>
<td>1103 15th Avenue SE Minneapolis, MN 55414 <a href="mailto:fhmisus@daeron.com">fhmisus@daeron.com</a></td>
</tr>
<tr>
<td>Rainer F. Huck</td>
<td>1680 East Atkin Avenue Salt Lake City, UT 84106</td>
</tr>
<tr>
<td>Lawrence E. Denslow</td>
<td>33 Ranch Road Falmouth, MA 02536</td>
</tr>
<tr>
<td>Rainer F. Huck</td>
<td>1680 East Atkin Avenue Salt Lake City, UT 84106</td>
</tr>
</tbody>
</table>

**ISUS Board of Trustees**

<table>
<thead>
<tr>
<th>Name</th>
<th>Address/Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr. Ronald Blackburn</td>
<td>Highland Ranch, Colorado Highland City, Florida</td>
</tr>
<tr>
<td>Lawrence E. Denslow</td>
<td>Highland City, Florida North Balwyn, Australia</td>
</tr>
<tr>
<td>Jennifer Hafer</td>
<td>Salt Lake City, Utah Walnut, California</td>
</tr>
<tr>
<td>David Halprin</td>
<td>Minneapolis, Minnesota Detroit, Michigan</td>
</tr>
<tr>
<td>Dr. Ranier F. Huck</td>
<td>Edwin Navarro</td>
</tr>
<tr>
<td>Thomas Kirk</td>
<td>Mill Valley, California Hyderabad, India</td>
</tr>
<tr>
<td>Prof. Frank H. Meyer</td>
<td>Prof. K.V.K. Nehru</td>
</tr>
<tr>
<td>Prof. William Mitchell</td>
<td>Dr. Bruce M. Peret</td>
</tr>
<tr>
<td></td>
<td>Phillip H. Porter</td>
</tr>
<tr>
<td></td>
<td>Jan N. Sammer</td>
</tr>
<tr>
<td></td>
<td>Robin V. Sims</td>
</tr>
<tr>
<td></td>
<td>Hoyt A. Stearns, Jr.</td>
</tr>
</tbody>
</table>

**World Wide Web & Internet**

- **Reciprocal System Research Site**: [http://www.randomc.com/~rs/](http://www.randomc.com/~rs/)

**Webmaster**

<table>
<thead>
<tr>
<th>Name</th>
<th>Address/Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan Sammer</td>
<td>Gratnicka 30, 150 00</td>
</tr>
<tr>
<td></td>
<td>Praha 5</td>
</tr>
<tr>
<td></td>
<td>Czech Republic</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Name</th>
<th>Address/Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Michael Wells</td>
<td>2850 Delk Road, Apt 5-E</td>
</tr>
<tr>
<td></td>
<td>Marietta, GA 30067</td>
</tr>
<tr>
<td></td>
<td>U.S.A.</td>
</tr>
</tbody>
</table>

*Reciprocity* (ISSN 0276-4172) is published quarterly by The International Society of Unified Science, 1680 East Atkin Avenue, Salt Lake City, UT 84016, USA. Membership dues $25.00 per year (USA), $35.00 per year (other countries), $50.00 Contributing Membership, $150.00 Supporting Membership, and $300.00 Sustaining Membership. Copyright ©1999, The International Society of Unified Science. All rights reserved except where expressly waived. First class postage paid at Hampton, TN, and at additional mailing offices. Please send address changes to: ISUS, 1680 East Atkin Avenue, Salt Lake City, UT 84106.
# Table of Contents

**From the Editor**

<table>
<thead>
<tr>
<th>Article</th>
<th>Author</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remodelling the Big Bang</td>
<td>Dewey B. Larson</td>
<td>5</td>
</tr>
<tr>
<td>At the Earth's Core, <em>The Geophysics of Planetary Evolution</em></td>
<td>Bruce Peret</td>
<td>9</td>
</tr>
<tr>
<td>Language, Experience and Illusion</td>
<td>K. V. K. Nehru</td>
<td>22</td>
</tr>
<tr>
<td>The Dimensions of Motion</td>
<td>Dewey B. Larson</td>
<td>27</td>
</tr>
<tr>
<td>Wheel of Motion, <em>A New Periodic Table for the RS</em></td>
<td>Douglas L. Bundy</td>
<td>35</td>
</tr>
<tr>
<td>Basic Properties of Matter, <em>Chapter II: Inter-Atomic Distances</em></td>
<td>Dewey B. Larson</td>
<td>37</td>
</tr>
<tr>
<td>Understanding the Reciprocal System: Lesson II <em>Postulates of the Reciprocal System of Theory, and some Initial Consequences</em></td>
<td>Lawrence E. Denslow</td>
<td>47</td>
</tr>
</tbody>
</table>

**SIMILAR SYSTEMS OF THEORY**

<table>
<thead>
<tr>
<th>Article</th>
<th>Author</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Action at a Distance, <em>A Question of Viewpoint</em></td>
<td>Josef Hasslberger</td>
<td>51</td>
</tr>
</tbody>
</table>

**ISUS NEWS**

<table>
<thead>
<tr>
<th>Article</th>
<th>Author</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minutes of the 22nd Annual Meeting of the Members of the International Society of Unified Science</td>
<td>Lawrence E. Denslow</td>
<td>33</td>
</tr>
</tbody>
</table>

---

**Announcing**

*Reciprocity Back Issues* collection is now available for purchase. Check enclosed catalog for pricing.


Discussion lists! There are two Internet mailing lists for ISUS and the Reciprocal System:

- ISUS-Announce@egroups.com for general ISUS announcements
- ISUS-Discuss@egroups.com for discussions and questions regarding the *Reciprocal System*.

Go to http://www.egroups.com/ to sign up via the Web.
From the Editor
Dr. Bruce Peret

This issue of Reciprocity is a combination of all four issues for 1998, lumped under one cover. We have had no money in the editorial account for publishing for over a year; this issue is coming out because of the generosity of Rainer Huck, who has loaned ISUS the necessary funds for publication.

I do not have the details of what is going on with the officers of ISUS, however I have been informed that Rainer Huck has taken over as treasurer, and we are switching back to the old mailing address in Salt Lake City. This issue reflects those changes.

Back Issues

On the bright side, the Reciprocity Back Issues collection is complete, and available for purchase. See enclosed catalog for details.

E-Mail Lists

We have also set up a couple of e-mail lists, for the discussion of Reciprocal System theory, and general announcements. Both lists are available on the Egroups server, http://www.egroups.com/ and are called:

ISUS-Announce (business, editorial announcements, few messages, moderated)
ISUS-Discuss (general discussion on Reciprocal System theory, open to all).

Also, for those who are interested in the metaphysical side of the Reciprocal System, L/L Research has their “Wanderers” discussion group on the Ra Material, part of which concerns the application of the Reciprocal System to higher levels of existence. Refer to http://www.llresearch.org/ for details on list membership.

Membership Database

The current ISUS membership database is “Year 2000” compliant, so membership information (expiration dates, etc.) will not be lost over the year 2000 transition. (Not the “millennium”, which does not occur until 2001, as there is no CE year zero).

Support for Sovereign Citizens

We have also added support for alternate name formats, and non-domestic mailing addresses within these united States of America. The default is to use your common name, and federal mailing zone (state abbreviations and ZIP codes). The name formats are (using myself as an example):

Common name: Bruce M. Peret
Given/Christian appellation: Bruce-Michael..Peret
Federal/State nom de guerre: BRUCE M PERET

(Note that the nom de guerre refers to a fictitious person; not the sovereign Citizen).

Also supported is the Non-Domestic address format within these united States of America, which allows postal mail to be delivered “care of” domestic mail.

Domestic mail format (within the United States):

ISUS, Inc.
1680 East Atkin Avenue
Salt Lake City, UT 84106

Non-Domestic format (within these united states):

ISUS, Inc.
c/o 1680 East Atkin Avenue
Salt Lake City, Utah state USA

(The United States refers to the Federal legislative democracy, having venue in the District of Columbia and all its territories and enclaves, whereas these united States of America refers to the Constitutional Republic whose venue is a union of 50 independent sovereign states, not including the District of Columbia, territories or enclaves.)

Please contact the editor (preferably via e-mail) if you wish to use one of the alternate name formats, or non-domestic mail.

I am not aware of any other country where this “dual government” exists; if there is, please contact the editor with information on how to structure postal addresses appropriately.
Remodelling the Big Bang

Dewey B. Larson

Unquestionably, the most significant development that has taken place in cosmology in recent years is the replacement of the original Big Bang theory by a totally different hypothesis. The drastic nature of the conceptual change that is involved is well illustrated by comparing the following two statements:

According to this [Big Bang] theory, the outward motion of the galaxies was caused by an exploding *atome primitif* which ejected them in all directions.

—H. Alfven, 1966

Many people (including some scientists) think of the precession of the galaxies as due to the explosion of a lump of matter into a pre-existing void, with the galaxies as fragments rushing through space. This is quite wrong the expanding universe is not the motion of the galaxies *through* space, away from some centre, but is the steady expansion of space.

—Paul Davies, 1981

While the new hypothesis still goes by the name of the Big Bang in most of the current literature, its conceptual basis is obviously very different from that of the original Big Bang. The objective of the change was to extricate cosmological theory from the multitude of difficulties that have been experienced in developing the original Big Bang theory in detail. To a large degree, the new hypothesis accomplishes this objective, but it does so at the expense of eliminating the explanatory content of the original theory.

The observed fact that calls for some kind of an explanation is that the portion of the universe within the current observational limits is expanding in the context of the conventional spatial reference system. Some attempts have been made to extend the explosion concept to the space expansion hypothesis, and we occasionally hear expressions such as explosion of space itself. But an explosion is a process of a specific nature, one in which energy in a concentrated form is suddenly converted to kinetic energy and applied to acceleration of the residual products. Inasmuch as the revised Big Bang is something of a totally different character, it is not an explosion. It is a purely hypothetical concept for which there is no known physical justification. Aside from this clearly unacceptable suggestion, the new hypothesis simply accepts the expansion as a given feature of the universe, and makes no attempt at explanation.

It is evident that we will have to look further for any real explanation of the observed situation. Now that the original explosion explanation has been discarded, we need to find some other means of accounting for the observed outward motion of the galaxies. In approaching this task, the first point that should be considered is whether we have correctly identified the problem, specifically whether the galaxies are actually moving outward in the manner described by the astronomers. The principal evidence for this expansion is the Doppler shift in the frequencies of the radiation received from the distant galaxies. It is generally conceded that this frequency shift is sufficient to establish the reality of the outward movement. There is some controversy with respect to the applicability of the usual redshift-distance relation in certain special cases, but there appears to be adequate support for the conclusion that the normal galaxies are actually receding from our location at the speeds indicated by the redshifts. However, this does not settle the issue as to whether the present interpretation of the motions of the galaxies is correct. We still have to consider the deeper question as to whether we are using the correct reference system.

It is ordinarily assumed that the stationary spatial coordinate system to which we customarily refer the motions of the galaxies is the *natural* reference system, the one to which physical activity actually conforms. On the basis of previous experience, this
appears to be a logical assumption; Indeed, it seems so obvious that the possibility that it might be erroneous has seldom, if ever, been examined. But nature does not always agree with the results of human thinking, and when we are confronted with a difficult problem we always need to explore the possibility that our assumptions with respect to the factors that enter into this problem may be invalid.

The question arises, How can we determine whether nature prefers one reference system over another? The first step toward arriving at an answer to this question is to define the natural reference system. This presents no problem. Once the issue is raised, it is obvious that the natural reference system is that system in which an object that is, in fact motionless, does not move. We may further say that any object which has no independent capability of motion, and is not acted upon by any external force is, if fact, motionless. By definition, such an object must remain stationary in the natural system of reference.

What we need to do, then, is to identify some physical objects of this kind and see how they behave relative to our conventional system of reference. Once class of such objects consists of the photons of light and other electromagnetic radiation. So far as we know, these photons have no capability of independent motion. No mechanism for the propagation of radiation has ever been discovered. Einstein is often credited with having provided an explanation of this phenomenon, but what he actually did was to dismiss the problem as too difficult. In The Evolution of Physics, he discusses the difficulties, and concludes that:

Our only way out seems to be to take for granted the fact that space has the property of transmitting electromagnetic waves, and not to bother too much about the meaning of this statement.

By this time, after long years of effort have failed to find any trace of a motion-generating property in electromagnetic radiation, we may legitimately conclude that the photon is incapable of independent motion. In the absence of any evidence that it is, or can be, acted upon by any agency in open space, it can therefore be identified as motionless in the natural system of reference. But it is not motionless in the conventional reference system. In this system, photons move outward from their points of origin at the speed of light, if not subjected to external forces. Neutrinos and other massless particles follow the same pattern. Furthermore, the same is true of the galaxies at extreme distance. The matter of which these galaxies are composed does have a property, gravitation, which is capable of causing motion to take place, but this is the only such property that it possesses, so far as we are able to determine, and when the gravitational effect has been reduced to a negligible level by extreme distance, the galaxies, too, move outward at the speed of light.

If only one such class of objects was involved, we would have to consider the possibility that the objects of this class might contain a concealed motion-producing mechanism. But since three different classes of objects follow the same pattern, this possibility can be ruled out on probability grounds. We must therefore conclude that the objects of these three classes are, in fact, not moving; that is, they are motionless relative to the natural reference system. The reason why they have no mechanism for causing motion (or effective motion, in the case of the distant galaxies) is then evident. Objects that do not move have no need for a motion-producing mechanism.

Each of these motionless objects that is represented in the conventional system of reference as moving outward at the speed of light is observed to be moving in a definite direction in that reference system. It can be shown, however, that this direction is a result of the manner in which the motion is coupled to the reference system, and is not an inherent property of the motion itself. For this purpose, let us review what we know about the motions of the galaxies. Since all of the distant galaxies are moving outward away from us, it follows that, unless our galaxy is the only stationary object in the universe, a hypothesis that no scientist accepts today, we must be moving outward away from all other galaxies. Consequently, we are moving outward in all directions. This means that our motion has no specific direction. Inasmuch as there is no reason to believe that our galaxy is unique in this respect, we can conclude that this is a general property of the galaxies, and that all galaxies (except those that are quite close, and are therefore subject to relatively strong gravitational forces) are moving outward without any specific direction. Such motion, which as magnitude only, and no inherent direction, is scalar motion.

The existence of scalar motion is not recognized by conventional science. In fact, motion is customarily defined in vectorial terms. But the motions of the galaxies, as we observe them, are definitely scalar, and the information now available regarding the motions of the photons and massless particles indicates that these are motions of the same kind. For present purposes it is important to recognize that scalar motions cannot be represented in their true
character in the conventional reference system. This limitation of the capability of the reference system is new to science, and some may find it hard to accept, but its existence can easily be verified by a further examination of the galactic situation.

We can represent the motions of the distant galaxies in the usual manner, as radially outward from our location, only if we assume (1) that our galaxy is motionless, and (2) that each of the other galaxies has a specific direction of movement. But we know that both of these assumptions are false. Aside from the exception stated, all galaxies, including ours, are moving outward in all directions. It follows that the representation of the motion of any galaxy in the conventional reference system can only show the change of position relative to some one location in that system of reference. We take our galaxy as the reference location, and we see galaxy X as moving in the direction AX, where A represents our location. But observers in galaxy B see galaxy X as moving in a totally different direction BX, those in galaxy C see it moving in the direction CX, and so on.

We may generalize the relation between scalar motion and the conventional reference system by saying that scalar motion can be represented in this reference system only by the use of a reference point, a point in the moving system that is coupled to the stationary reference system by arbitrarily assuming that it is motionless (from the scalar standpoint) in that system of reference. As has been indicated, the usual reference point for the motion of the galaxies is the position of our own Milky Way galaxy. For the photons and the massless particles, the reference point is the point of origin, and the direction taken by each individual particle is determined by chance.

All of the objects that we have identified as motionless in the natural reference system are observed in the conventional system of reference as moving outward from their respective reference points in the same manner and at the same speed, the speed of light. It follows that this is the relative motion of the two systems; that is, the natural system of reference is moving outward at the speed of light relative to the conventional system.

This outward movement of the natural reference system carries all physical entities with it, the consequence being that objects which are motionless in the conventional reference system are, in fact, moving inward at the speed of light. This finding revolutionizes the problem of identifying the motion mechanisms. Instead of having to look for one mechanism whereby electromagnetic radiation is propagated, another to account for the motion of massless particles, and still another to explain the recession of the most distant galaxies, all that we need to do is to identify a mechanism whereby the atoms and particles of matter are able to move inward toward each other. This is easily done. It is true that the nature of this mechanism whereby matter is capable of self-generated motion has never been identified by previous investigators, but the existence of such a mechanism is incontestable. This mechanism is gravitation, a known property of matter that accomplishes exactly what is required in order to counterbalance all or part of the effect of the outward progression of the natural reference system. It moves each gravitating object toward all others.

From the fact that the gravitational motion is the inverse of the outward motion, or progression, of the natural reference system, it can be recognized as an inward scalar motion. It is generally regarded as a force, but there is no conflict here, as force is defined in such a way (by Newton's Second Law of Motion) that it is a property of a motion. Einstein's "principle of equivalence," the key feature of his General Theory of Relativity, asserts that gravitation is equivalent to a motion. On the basis of the findings that have been described herein, we can go a step farther and say that it is not only equivalent to a motion; it is a motion. But it is not vectorial motion, the only kind of motion that Einstein appears to have recognized. Identification of gravitation as an inward scalar motion accounts for the observed radial character of the gravitational force field, and eliminates the need for postulating a distortion of space by the presence of matter, one of the most questionable expedients employed in the construction of the General Theory.

Because it is generated by a fixed relation between the two reference systems, the outward movement of physical objects due to the progression of the natural system always has the same magnitude: the speed of light. But the gravitational effect varies with the distance between the objects, the interaction of these two opposing scalar motions under different conditions is therefore capable of explaining a wide variety of results within the conventional reference systems, all the way from net speeds that approach the speed of light in the outward direction to net speeds that approach the speed of light in the inward direction. In particular, the range of speeds involved in the galactic recession, the specific subject of the present inquiry, is fully explained by the combination of the two oppositely direction scalar motions. At great distances, the gravitational
attraction is weak, and the outward motion, observable as the galactic recession, predominates. As the distance decreases, the gravitational force becomes stronger, and the net outward motion decreases, until at a certain point, the gravitational limit, we may call it, the inward and outward motions are equal, and the net motion is zero. Inside this limit there is a net gravitational (inward) motion.

Here, then, we have arrived at an explanation of what is currently regarded as the primary cosmological problem, that apparent expansion of the universe, and we have reached it purely on the basis of existing knowledge, without introducing anything new or making any special assumptions. Like Copernicus in his day, all that we have found necessary is to look at our problem from a different point of view, to use a reference system that gives us a more complete and correct picture of the factors that are involved. The universe, we find, is not expanding. On the contrary, the general direction of movement is inward. The aggregates of matter, the galaxies, are growing. The cannibalism that is currently being attributed to the giant galaxies in the centers of relatively dense clusters is not peculiar to the giants; it is a general feature of the universe that applies to aggregates of all sizes.

---

**Scalar Motion versus Æther Velocity**

_Two Views of the Same Phenomenon?_

**Dr. Bruce M. Peret**

Many researchers have formed a view of the universe based on what is called æther theory. The basic premise of the theory is that there is an all-pervasive æther, a fluid-like “substance” providing the medium of E-M propagation. Having reviewed several of the æther theories, I find a number of common premises:

- Æther motion is expressed a single, scalar velocity.
- Æther forms “threads” (and thus has direction, though it may constantly change).
- Motion is _continuous_—it does not proceed in discrete units.
- The theories deal with “space” only, as does conventional physical theory.
- Infinites are present.
- _Time_ is still undefined, and sometimes considered a “4th dimension.”

Larson’s concept of _motion_ is, in many ways, similar to the concept of æther, both being _velocity_. The primary difference is that Larson’s “motion” retains _both aspects_ of space and time, whereas æther tends to be the value of the ratio. Since motion is defined as a displacement from the natural datum of 1.0 (unity), it is possible to have a displacement of zero in either the space or time aspect of velocity. Not a problem for the _Reciprocal System_, as motion is represented by _two_ numbers—the spatial displacement and the temporal displacement.

However, since æther divides the two aspects to produce a single number, a zero temporal displacement will result in an infinity (s/0). Since all measurements are made using space as a “setting,” æther theories tend to have an infinite velocity, instead of a unit velocity (speed of light), as their natural datum, and hence can explain phenomenon such as the EPR paradox by using “infinite velocity.”

What it amounts to is this:

![æther velocity](image)

with the _Reciprocal System_ tracking both the spatial and temporal axes, whereas æther theory deals with the ratio of space/time displacements.

Either system is an accurate representation of the universe, given its premises. The problems arise when one system attempts to use the precepts of the other to interpret data. Both views have specific advantages and disadvantages, and the best approach is the ability to translate _between_ the systems, _retaining_ the original precepts.
At the Earth's Core

The Geophysics of Planetary Evolution

Dr. Bruce M. Peret

Very little is actually known about the Earth's interior. Actual research is limited to what is pulled up from a scant few miles of the crust, by deep mines and drilling rigs. Volcanoes provide some additional insight as to the existence of a molten plastic-like layer between the crust and mantle known as the asthenosphere. However, the bulk of data beyond this point comes from the distant echoes of earthquakes, and the seismographic machines that plot their deviations as they traverse the depths of the Earth's interior.

"Like a magnet, the Earth has two magnetic poles. From time to time, the magnetic poles reverse polarity. ...No one knows why this happens."

Until now.

Background

Prior to examining the geophysics of planets, it is necessary to determine how planets were formed. This will reveal the processes involved in planetary phenomena, by identifying the components that generate them.

Geophysics can be considered an intersection between physics and astronomy—the boundary between physical processes of atoms and chemistry, and the stellar ones—otherwise known as, "the planet." The Reciprocal System of Dewey B. Larson covers a great deal of ground in both areas; yet the Reciprocal System, itself, has never before delved into the construct of worlds; only a brief summary of their formation, and the physical processes that occur at the atomic level.

This paper is a summary of a preliminary investigation into the natural consequences of the Reciprocal System, applied to the study of geophysics. Here, I will propose a model of solar system formation, and the evolution of planets and biospheres, as a natural result of Larson's "backwards" stellar evolutionary sequence (as compared to modern astronomical theory). From this planetary model, all of the observed Earthly phenomenon follow as logical consequence: plate tectonics, "drifting" continents, weather systems, the shifting of the poles, magnetic reversals, global cataclysms,... even the whereabouts of the mythical lost continents of Atlantis, Mu and Lemuria, and what lies ahead in the next evolutionary stage.

Stellar Evolution

Modern astronomy differs from Reciprocal Astronomy in one major aspect: the stellar combustion process. An important aspect, for it is the combustion process that determines the stellar evolutionary sequence.
Modern astronomy relies on the fusion of hydrogen to helium, the process observed within the photosphere (the outer layers of a star). This process starts out with a bang—a novae—which forms a blue giant star, that gradually cools down, moves down the Main Sequence, and burns out (due to lack of hydrogen fuel). At the end of its life cycle, a number of strange things occur, such as its sudden bloating up to a red giant, then re-condensing down to a white dwarf, or altogether vanishing from the universe in a "black hole."

Reciprocal System astronomy is a bit more straightforward, akin to heating up a piece of metal. The only thing required to build a star is "matter" and gravitation does the rest.

Stars in the Reciprocal System, start out as large clouds of dust, emitting infra-red light from the sparse collisions of atoms. The gas and dust are pulled together by gravitation, and collisions become more frequent, heating the aggregate up so it glows dull red—a red supergiant. As more matter is pulled in, the gravitational pull of the star increases, reducing its size and increasing its temperature, moving down thru orange giant stars, and on to the Main Sequence. From this point, the stellar matter can no longer be compressed, so the star becomes physically larger, and moves up the Main Sequence towards the blue giant—exactly the opposite evolutionary path as modern astronomy.

The most important aspect of the stellar evolutionary system that we are considering is the death of a star—the supernova. In the Reciprocal System, it comes in two varieties, both of which are observed by modern astronomers. The first occurs when the star reaches its thermal limit, and explodes as a "Type I" supernova. This only happens to the blue giant O-class stars, for only they are hot enough to reach the thermal limit.

The second stellar death can happen to any class star—the age limit. When the matter composing the star reaches a certain age (determined by isotopic mass), it explodes. When a large enough chunk of matter does this at the same time, a "Type II" supernova forms. The Type II supernova is more violent than the Type I, and typically propels matter into the ultra-high speed range (designated 3-x), moving far in excess of the speed of light.

The supernova explosion throws the outer layers of the sun off into space, comprised mostly of gases and light elements. The explosion also forces an implosion of the heavy elements in the core. (A spatial "implosion" in the Reciprocal system is a temporal explosion—the imploiding matter expands in time, and contracts in space.)

As mentioned, stars are created from simple aggregates of dust and rock in space, so the obvious result of a supernova is a large cloud of expanding matter, which will eventually slow, stop, and re-condense to form another star at the center of gravity of the debris field, usually quite near where the original supernova occurred.

The second supernova byproduct—the imploded stellar core—forms a white dwarf star, with all of its unusual characteristics: inverse density gradient, intense magnetic field, quantized emission, and all the phenomenon associated with intermediate-speed (2-x) motion.2

The supernova can be considered a "birthing process" of either a binary star system (red giant/white dwarf pair), or a single star with a planetary system, depending on its generation. (A "generation" being the number of times a star has been thru the supernova/reformed star phase.)

**Solar System Formation**

In The Universe of Motion, Larson proposes that the solar system was formed by a Type II supernova,
where there was insufficient "Substance B" (stellar core) to form a white dwarf, so the cool remains were distributed out across space in a linear form. This is one possible explanation, though it is difficult to accept that the imploding core of a star would suddenly decide to move linearly outward in space, and break into fragments. I offer an alternate explanation.

First generation stars, as those found in young aggregates such as globular clusters and dwarf galaxies, will not have any planetary systems, because their gravitation would simply pull in any nearby matter that would be the prospective planets. Even if a large rock were able to establish orbital velocity, it would decay fairly rapidly, because both the rock, and the sun, would be increasing in mass and gravitational attraction. The orbit would quickly degenerate to an ellipse, then the rock would be pulled into the sun, adding to its mass.

These first generation stars lead a solitary existence. Since they are composed of primarily "young" matter, they are most likely to continue to build mass, move up the main sequence, reach the thermal limit in the B and O-Class range, and become a Type I supernova. We see evidence of this in numerous open clusters (a globular cluster that has been pulled into the disk of the galaxy, and broken up), such as the Pleiades, that contain mostly blue stars, which are about to become supernova, and enter the binary and planet forming stages.

![Diagram of a supernova with core, outer layers, red giant, and white dwarf.]

After the first generation star becomes a Type I supernova, the common binary star system is formed. Initially, neither component is visible. The original debris cloud is widely disbursted, and does not generate enough heat or light to detect, unless illuminated by nearby stars. The stellar core, imploded in space (and hence exploded in time), is too hot to observe, for its radiative emissions have moved into the X-ray band, well outside of the visible light and infrared.

From this point, gravitation takes over, and begins to condense the debris cloud, heating it up and creating a red supergiant (which we will refer to as the "A component"). Conversely, temporal gravitation takes effect on the stellar core remnant, pulling its components together in time, and expanding it in space, causing it to cool. Its emissions then move into the visible spectrum, forming the visible white dwarf star (which we will refer to as the "B component"). At this point, we have a red giant/white dwarf binary system—the second generation, and one of the most common star systems observed in this region of the galaxy. And the "parents" of an upcoming solar system.

However, the process of "giving birth" to a planetary system requires the death of the parents—another supernovæ. Examining the characteristics of the candidates, we find that it is more likely that the A component will reach its age limit and become a Type II supernova, before the B component can reach either the thermal or age limit.

The matter in the debris field that forms the A component will have been exposed to neutrinos, so the isotopic mass of the elements will be high. Though the B component was also exposed, its temporal motion, and inverse thermal motion, will cause isotopic mass to drop, thus making the matter "younger". By the time the A component forms a stellar object, the star will be prime for an age-limit explosion, just waiting on sufficient core density and magnetic ionization.

So, by the time the A component reaches the orange giant (M or K stellar class), there is a high probability that it will become a Type II supernova.

The A component explodes, in a much more violent fashion than its predecessor, reaching into the ultra-high (3-x) speed ranges. Because of the proximity of the B component, the supernovæ will accelerate the white dwarf into the ultra-high speed range of the pulsar, and also shattering it into a number of pieces, from explosive shock wave.

This white dwarf fragments will behave like mini-pulsars, with the same "anti-gravity" motion, moving outward away from the center of mass of the system—which is the center of the supernovæ debris field; the former location of the A component star.

Thus, the second generation binary star system is destroyed, and the third, planet-bearing generation begins to form. The core of the Type II supernovæ, being in the ultra-high speed range, will be a small pulsar. However, because of the lack of heavy materials at the core, it will be a very small object, and rapidly disappear from the Material Sector, to
add to the background radiation of the Cosmic sector. Its vanishing point will, for some time, leave its mark as one focii of the elliptical orbits of the later planets.

Two other by-products of the Type II supernovae are a ring structure, composed of intermediate (2-x) and ultra-high speed (3-x) matter, and a large cloud of low-speed (1-x) debris. The low-speed debris will eventually recondense to another red giant sun, forming the third generation star.

The matter forming ring structure will eventually cool, lose its ultra-high speed motion, and drift back towards the center of gravity (the newly forming sun). Gravitational attraction within the ring itself will create larger aggregates of matter within the ring, forming an asteroid belt. The white dwarf fragments, subject to the same conditions as the ring matter, will take up position on either side of this asteroid belt, depending on the velocity they achieved during the supernovae explosion. Being of intermediate and ultra-high speed motion, the position of the asteroid belt, and planets, will form a quantized relationship—identified as the Titus-Bode Law. (A complete description of the Reciprocal System interpretation of the Titus-Bode Law can be found in The Universe of Motion, page 92.)

The Planets

The remnants of the white dwarf companion, shattered into pieces and distributed in a narrow conic section outwards into space, will take up orbital positions around the newly formed giant star. Unlike low-speed matter which will simply be sucked into the gravitational whirlpool of the star, the white dwarf fragments will maintain broad, slightly elliptical orbits, using the new giant sun as one focii, and the vanished core of the supernovae as the other. The orbit is maintained because the white dwarf fragment possesses ultra-high speed motion, and like a true pulsar, will generate a motion in the same direction as the progression of the natural reference system—away from all gravitational sources. So, with gravity pulling in, and ultra-high speed motion pushing away, the planets enjoy a very stable, nearly circular orbit.

After the dust of the 2nd supernovae has settled, we find a red giant star, condensing and heating up, moving towards the main sequence, surrounded by a ring of rock, and typically 8 large fragments of the former white dwarf, in the sequence 4 small fragments, asteroid ring, 4 large fragments, and finally the rock, dust, and bits and pieces that were expelled far out from the original supernovae, of both A and B component matter (low and intermediate-speed range, as not all the “heavy” matter had settled into the core when the supernovae explosion occurred).

The solar system will contain two general regions of planetary formation, on opposite sides of the asteroid belt. The larger fragments, having a more ultra-high speed motion (and thus a larger “outward” or anti-gravity movement), will be further out, past the asteroid belt, and will be called the “outer planets”. The smaller fragments that exist between the sun and the asteroid belt will be designated as the “inner planets”.

In the early stages of cooling, the outward motion of the white dwarf fragments will prevent any large amount of dust and debris from accreting on their surfaces. The cooling of the fragment itself, will, however, produce hydrogen and helium gases in its core which, like its stellar counterpart, will occasionally “novae,” and expel these gases and other matter onto its surface, producing a bright, combustive flare. As cooling continues, heavier elements will be produced, as more matter drops into the low speed range, and this matter will allow meteors, dust, and debris to begin to accumulate on the surface of the fragment.

The Inner Planets

The smaller fragments forming the inner planets will allow them to cool faster than the outer planets, and build a gravitational field more rapidly. As a result, they will have a chance to capture more debris from the supernovae cloud than the outer planets will. Due to the close proximity to the sun, there will also be more of the heavier elements present, because the lightest elements get thrown the furthest out during an explosion. Once a blanket of debris surrounds the white dwarf fragment, the cooling process slows—for the layers of rock acts as insulation.

Given a typical 4-inner-planet system, what we find is the innermost planet, Planet 1, will remain mostly “white dwarf”, as being exposed to the heat of the sun will slow the cooling process. Its surface will be composed of the heavy metals (remembering that the white dwarf has an inverse density gradient, and the highest density is on the surface), in a near molten state. Meteoric dust will add a very small quantity to this, as the proximity to the sun will also pull most debris past this small world.

Planets #2 and #3 will cool at a similar rate, and collect a reasonable amount of debris from meteor aggregation. They will be similar in size (based on
their fragment size), and collect a reasonable amount of dust and rock on their surfaces. Planet #2 will have a smaller core, but more mantle than Planet #3.

Planet #4, however, being near to the neutral point of the asteroid belt, will pick up some debris, but not nearly as much. It will cool faster than the other three, and will be the first planet of a system capable of harboring life, as the sun will still be in the giant phase, and providing sufficient heat and light for a reasonable, life-bearing environment.

Thus, the size distribution of the inner planets will be: small, medium, medium, small, with planet #4 developing life first, followed by #3, then #2 as the sun moves into the main sequence. Planet #1 will never form the water-based ecosystems that the three other planets will, as the sun will start to get hotter and larger (moving up the main sequence) before the surfaces of these planets cool sufficiently to retain water in liquid form. This, however, does not preclude the possibility of life based on other ecosystems.

As the sun grows in size and temperature, the inner planets slowly become uninhabitable, succumbing to solar heat, radiation, and charged particles, vaporizing their seas, and creating dry, arid climates.

In our system, Planets #1 thru #4 are Mercury, Venus, Earth and Mars. Mars will be the first world to develop water-based life, followed by the Earth, then Venus. By the time Venus moves into the habitable range, Mars will have moved out of it, and Earth will be in its early habitable stage. Each planet’s evolution is unique—Venus has one, short life stage, Earth has one long one, and Mars has two different stages, early and late.

**The Outer Planets**

The larger fragment sizes of the outer planets will put them in a relatively simple inverse distribution pattern—the largest fragment will be nearest the asteroid belt, and the smallest the furthest out.

If we continue our numbering system, again with a 4-planet spread going from #5 near the asteroid belt, to #8 at the outer limits of the solar system, we can determine some of the basic geophysics.

Most of the heavy elements will not have made it past the asteroid belt layer, so the bulk of material available to the outer planets will be the lighter materials, particularly hydrogen, helium, lithium, beryllium, boron, carbon, nitrogen, oxygen, florine, and neon. A number of compounds will also occur, namely the hydrocarbons, such as methane, from the natural interaction of these elements.

The accumulation on Planets #5-#8 will be in standard spherical distribution; the planets closest to the sun will get the most debris, and hence develop the largest atmosphere. The white dwarf fragments will also be producing these gasses in abundance, so the 4 outer planets will be “gas giants”, having a thick gaseous atmosphere, surrounding a hot, white dwarf core will a small amount of heavy matter. The ratio of atmosphere to core will decrease as we move outwards to Planet #8. These planets will look like small suns, because they actually are small suns, without the miles of rock covering up the cores, as found in the inner planets.

Because these are larger fragments, they remain hot for a longer time, and hence “repel” any white dwarf debris. But gravity still pulls, so the larger chunks of debris end up in orbit around these bodies, as moons. The moons then aggregate the bulk of the supernovae debris trapped in orbit, and become small “inner-type” planets, rather than having the characteristics of the host planet. The outer planets will have a large number of moons, whereas the inner planets will tend to have few to none.

When the white dwarf debris that makes up the core of a moon drops entirely into the low speed range, it can no longer resist the pull of the host planet, and breaks apart in the gravitational tide, forming a planetary ring, or rings.

In our system, Planets #5 thru #8 are Jupiter, Saturn, Uranus, and Neptune.

**The Pluto / Charon System**

Our solar system also has one other member, which thru recent observation has proved out to be a dual-planetary system. Pluto, and its moon Charon, have an elliptical orbit that takes the pair inside the orbit of Neptune. Due to this more highly elliptical orbit, and the closeness of Pluto to Charon, it is reasonable to assume that this pair was a small white dwarf fragment that may have chipped off the fragment forming the core of Neptune during the 2nd generation supernovae, but at a distance from the sun. As such, it shares a near orbital path, but being small in size, has rapidly cooled off. Deprived of the ultra-high speed motion in its core that kept it in a stable orbit, the orbit has begun to decay. The eventual fate of Pluto/Charon will have Charon crashing into Pluto, forming a single planet, which will have an orbit that is more cometary, than planetary. And like all cometary orbits, it will
eventually decay, and fall into the sun (or hit another planet).

**The Geophysics of Planets**

Having taken a quick exploration of the general planetary characteristics, we will now focus on the geophysics of planets, which may have some rather startling conclusions for your average geophysicist.

To understand the structure and behavior of the planets, it is necessary to understand the foundation upon which it is built—the white dwarf star. The most important characteristic of the white dwarf is that it is an implosion product, rather than an explosion product. As such, its atoms have expanded in time, rather than in space. There are several important consequences to consider with the white dwarf star:

1) The dwarf star has an inverse density gradient. The heaviest elements are on the surface of the star, and the lightest at the center.

   Also, since the atoms are disbursted in time rather than space, they cannot be measured using spatial detection methods, and the star itself, appears to be composed of what is viewed on the surface: a solid, metallic ball.

2) It is very hot. So hot that its radiation is well into the X-ray band.

3) A normal sun will condense and heat up over time, the white dwarf (being inverse) will cool down and expand over time.

4) As with all super-luminal matter, transitions occur in quantized jumps, rather than a continuous transition.

5) As matter cools and drops back into space, it appears as light gases in the center of the star. When gas pressure in the white dwarf builds up, it erupts onto the hot surface, combusting, and producing a "novae" flare.

6) The intermediate speed range within the white dwarf will produce a intense magnetic field.

7) The ultra-high speed ranges at the surface of the star will produce thredules, a co-magnetic phenomenon.

The white dwarf fragment that forms the core of the planets exhibit all of these characteristics. Applying this knowledge to what we know about the interior of planets allows us to explain a number of "inexplicable" phenomenon that occurs on this world.

Applying white-dwarf structure to the planetary core fragments, we can determine some of the early geophysical structure. Starting with the "bare fragment" itself, the first process will be cooling and expanding. The original fragment may have only been a few miles in diameter, but would appear to have the full mass of the current planet. As the core cools and expands, gas and light elements will make their way to the surface, changing the white dwarf to a "brown dwarf": a hot, liquid body with a rarefied atmosphere of hydrogen, methane and ammonia (the light gases).

The atom-building process is not exempt from white dwarf fragments. Eventually, the lighter elements will become heavier elements, and sink to the core forming a "normal" density gradient over the inverse density gradient of the core. The region of highest density will be at the core boundary—not the center of the planet!

As a depth of matter builds over the core, it will eventually create sufficient insulation to become solid near the outer regions, retaining a liquid metal "outer core" around the white dwarf fragment, which is now the "inner core". Most of this will be in the nickel-iron elemental range, as heavier elements will be combusted, as in the inner workings of a star.

As a result, several thermal ranges will develop. In the outer regions of the outer core, liquid metals will exist, in the low temperature ranges (low temperatures for stars, that is). The central regions of the outer core will have thermal motion in the intermediate speed ranges, generating intense magnetic fields. Right at the boundary of the outer core, ultra-high temperature ranges form, driven by the thermal motion of the white dwarf fragment.

The outer region of the inner core is basically the "stellar interior" of a white dwarf, having an inverse density gradient. It will have motion in the ultra-high speed range as well. Hence, there are two areas from which thredules (co-magnetism) can form. The central regions of the inner core would be in the intermediate speed ranges, again generating an intense magnetic field.

One of the direct results of this structure will be a planetary magnetic field, in two large "belts", generated from the intermediate speed ranges of the outer and inner core, respectively.
As stated in consequences #4 and #5 above, the inner core will flare up at a regular interval, and send hot, explosive gasses into the outer core, where they will detonate, shattering the solid structures above, allowing magma to seep thru the cracks, and form a light layer of magma over the surface of this solid portion.

Meteoric dust and rock are also crashing into the surface, and being mostly of the stony type, are made of light materials that will float on this coating of magma, eventually crusting it over. The constant expansion of the inner core will utilize the outer core as a hydraulic ram, and split the crust into a large number of plates, just like dried mud smeared over the surface of an expanding balloon.

So far, we have identified the geology of the planets as:

1. An inner core, composed of a fragment of a white dwarf sun, having an inverse density gradient, intermediate and ultra-high speed ranges generating magnetic and co-magnetic effects, and anti-gravitational motion.

2. An outer core, composed of liquid nickel-iron, having a normal density gradient, but three distinct temperature zones—a thin, ultra-high temperature region adjacent to the inner core creating short-term, co-magnetic threedules, an intermediate temperature zone, generating a large magnetic field, and a low temperature zone, forming the transition from molten to solid mantle.

3. A solid mantle, surrounding the outer core, of fractured rock, making the outer core boundary irregular.

4. A layer of magma that has seeped thru the cracks in the mantle—the asthenosphere.

5. A solid layer of magma above the asthenosphere that has "crusted over", forming the simatic crust.

6. A thin crust of light materials from meteoric aggregation, cracked into large “tectonic” plates, forming the sialic crust of continents.

So far, we have a fairly accurate description of the geophysics of Mercury, Venus, Earth and Mars, when we compensate for the relative proportions of heat and white dwarf fragment size.

Mercury is mostly “outer core”, with a thin mantle that is constantly melted by the proximity of the sun. Little to no crust, or atmosphere, exists.

Venus is much like the Earth at a later stage. All the components are present, in approximately the same ratios.

Mars has a thin outer core and mantle, because of the smaller core size. Otherwise, it is very similar to Earth, and most likely had a hydrosphere and breathable atmosphere in the past, when the sun was larger and nearer to the planet.

The outer planets follow a similar design, but the actual “planet” is buried beneath thousands of miles of lighter compounds. Due to the larger fragment sizes, the outer planets are still in a stage of having a molten surface, covered by a light liquid/gaseous “mantle.” Because there is insufficient insulation between the inner core and the hard surface, a crust cannot form—it is consumed instead.

**Magnetic Fields and Poles**

The bulk of the data regarding planetary magnetic fields, and the motion of the magnetic poles comes from a study of the Earth. The features recognized are:

1. The magnetic field reverses polarity, at fairly regular intervals.

2. The poles wander about the surface, sometimes appearing in equatorial regions.

3. Two distinct “Van Allen” belts of radiation, formed by charged particles running along magnetic lines of force.

4. Occasional disruption of magnetic fields on the surface of the Earth, typically associated with severe weather, either hurricanes, tornados, or supercell thunderstorms.

The geologic structure of the inner and outer cores explain all of these phenomena. Some familiarity, however, is needed with Prof. K.V.K. Nehru’s research on the interior of the sun, the seven states of matter, and the nature of sunspots.⁸

In quick summary, Nehru identifies seven states of matter: solid, liquid, gas, inverse gas, inverse liquid, and inverse solid, and “thredule.” The one of interest concerning the magnetic phenomena of the Earth is the last, the thredule—termed “co-magnetic”, and is a 1-dimensional magnetic field where like poles attract, and unlike poles repel, are an inward
motion (normal magnetism is outward), and form the solar phenomena known as sunspots.

Motion in the ultra-high speed ranges produce the thredule phenomena. In our sun, they originate at the very center from two magnetic sheaths, projecting out like rays. When they pass thru the intermediate ranges in the sun's outer core, a second set of thredules is induced, of the opposite polarity.

The same happens in the white dwarf core of planets, with a couple of important changes. Whereas our sun is a normal, "A component" star, the core of planets are "B component", the inverse of the A component. As such, some of the magnetic operations are "flipped around," and occur multiple times.

Normally, the thredule sheaths form in the very center of a star. In the white dwarf, they form on the surface, not the core, because the surface is the white dwarf "stellar interior," where the highest thermal motion takes place.

At the Earth's core, there are two thredule-generating areas. The outer region of the inner core, and the inner region of the outer core. The sheaths formed maintain the same, alternating magnetic polarities:

![Diagram of Earth's Core](image)

The thredules from the inner core, being generated from the dwarf fragment component moving in time, are long-duration, existing for perhaps several thousand years. These sheaths form thredules, one projecting north, the other south, and form the magnetic poles (the magnetic poles will never coincide with the rotational poles). The toroidal shape of the magnetic field is due to this co-magnetic motion of the polar thredules.

Both the inner and outer cores generate intense magnetic fields, due to their intermediate-speed motion. However, because of the random motions involved in the constituent atoms, the magnetic field has no inherent direction, so it should be a spherical distribution. However, enter the thredules from the inner core—a 1-D magnetic pull, in the opposite scalar direction as normal magnetism. This gives the two magnetic fields a "favored direction"—like a child sticking his fingers in opposite sides of a balloon—and produces a toroid, with a definite north or south orientation.

![Diagram of Magnetic Fields](image)

Just as the sunspot cycles reverse magnetic polarity every sunspot "season", so do planetary magnetic fields, for the same reason. When a magnetic pole first forms, call it the North pole, it will be in the 50-55° latitude range, then drift northward towards the rotational axis. Unlike its sunspot equivalent, there will be only a "North" projected—the south pole will not appear from thredule, because of the inverse density gradient of the inner core—the south half of this thredule will project into the center of the planet, not its surface.

The south pole will be generated by the inner sheath of thredules, again with south pole thredule projecting only (with no induced thredule), and will manifest near the rotational pole, drifting to equatorial regions towards the 50° latitude range.

The time for a polar magnetic reversal can be determined by the locations of the poles. Once the north reaches the 15° area, the inner sheath will start to take dominance, and create a new magnetic pole cycle, of the opposite magnetic polarity. At this time, the planets magnetic field will appear to collapse—it does not. The magnetic field is still there, as intense as ever, but has become random, because the co-magnetic pull of the inner core at the poles is no longer providing sufficient bias to orient the field, so it slips back to a random, spherical distribution.

**Outer Sheath Thredules**

The thredules in the lower regions of the outer core are far less energetic than their brethren of the inner core. They have a short life span, and are greatly affected by the sun's magnetic field. The planets, not running precisely along the sun's equatorial projection, will be exposed to the north magnetic field of the sun for half their year, and the south for the other half. This creates a bias in the formation of thredules in the outer core, so there occurs two
periods of thrtleule formation each year, during the transition, which occur during our spring and autumn seasons.

The short-lived thrtleules of the outer core form, project thru the crust of the planet, and die off quickly, seldom lasting more than a few days. They are of the opposite polarity of the polar hemisphere they are in—south poles occur in the northern hemisphere, and north in the southern. However, their effect on the surface of the world can be somewhat extreme.

The outer core thrtleules, on Earth, project thru the sismic crust (ocean floor) with little to no distortion, and upwards into the sky. When projecting thru the continents, both the sismic and sialic crusts, the thrtleule is scattered and broken down into a number of smaller thrtleules, spread over a wider area, from the irregular concentration of elements in the sialic crust.

What the thrtleules do, being a 1-D inward motion in the inverse temperature gradient range, is to produce a super-cold column of air at high altitudes. When over the ocean, this cold air drops to the water, creating updrafts, lifting great quantities of vapor, and forming dense cloud layers, rotating around the original thrtleule projection, which remains a “clear eye” of downdraft—a hurricane.

When over land, the result is similar—but due to a lower quantity of water vapor, it produces super-cell storms, with tornados resulting from the scattered thrtleule projections. As such, tornados are more likely to form over flat ground, than mountainous regions, though no topography is excluded.

Even when the thrtleule dissipates, hurricanes can continue onward from the processes generated during its initiation, but dissipate rather quickly. Hurricanes also dissipate quickly over land, as the thrtleule driving the center becomes scattered, and the hurricane breaks down into an intense rain storm.

Thrtleule formation continues for about 3 months, before it weakens to the point where only minor effects on weather take place. When the Earth slides to a new solar polarity, the cycle starts again.

Since the inner core rotates at a slightly different rate than the mantle and crust, there is a general shifting of this phenomena, creating the weather “cycles” that occur over a number of years.

Where Did All the Water Come From?

Earth is unique in our solar system for having an enormous quantity of surface water. Given that the inner core is constantly expanding, and thus the surface area of the Earth is also expanding, and considering that ocean water levels are continuing to rise (as demonstrated by the continental shelf, which was once above the surface and is now 600’ below), where does all the water come from?

There is another attribute our world has that is not found on the other worlds of our system—we are covered with life, and an enormous variety of forms. Water and Life must be related.

As it turns out, most land-based ecosystems produce more water than they consume. Plant bacteria in particular, excrete water as a “waste product” by consuming oxygen and hydrocarbons. It is reasonable to assume that our hydrosphere is a by-product of the life of the land. As the amount of life increases, so does the depth of the water. It is a good thing that the Earth is expanding, or we would be a water world by now.

Considering that water is generated by life, rather than a geological process, we can now proceed to refine our view of the crust of the Earth.

Examining the crust, we find that under its original formation, the top layers of the molten asthenosphere solidify, as the lighter elements move to the surface. Over this solid crust of gabbro basalt, meteoric dust and rock fall, forming a second, lighter crust mainly of silica and aluminum (stony meteorites). This is a typical crustal formation of a planet like Venus, where no hydrosphere exists. Geophysicists name these two crustal layers “Sismic” and “Sialic”, after the primary elements of their composition—Silicon / Magnesium (gabbro basalt, SIMA for short), and Silicon / Aluminium (or SIAL for short).

The Earth expands; the outer crust (both layers) crack open, and thru the cracks pour magma, which solidifies to more SIMA. We now have a surface where the SIMA is exposed, and at a lower elevation than the surrounding SIAL sitting on top of the SIMA. These great basins become the repositories for the water generated by the microscopic life forms existing in the SIAL layer, and develop into seas and oceans. The SIMA thus forms an underlying, global crust with large cracks, making tectonic plates. The SIAL forms the continents.

The interesting conclusion—life did not form in the
oSceans, life started out on the land, and formed the oceans, in which higher forms of life evolved, which moved back on to the land. Since the amount of water is constantly increasing on the planet, as the continental shelves were at one time exposed to the air, it is an indication that the time may be near for another quantum expansion of the planet.

**Pangaea**

Modern theory believes the continents all started out lumped together in a single, supercontinent called Pangaea, where the rest of the world was ocean. Given the analysis of the crust, we find this is incorrect. Indeed, there was at one time, a supercontinent of Pangaea, but the Earth was only a fraction of its current size—the whole of the land mass was Pangaea comprising the entire surface of the planet. The oceans had not yet formed.

The expansion due to the cooling of the core cracked Pangaea into a number of large pieces, with magma breaking thru those cracks to fill in the gaps. A core flare occurred (the planetary core equivalent of a nova; flare of a white dwarf star. Same cause and reason). The eruption of the explosive gases pushed the Americas apart from Eurasia, along what is now the mid-Atlantic fault. This formed the first ocean bed—the Atlantic.

Water eventually filled the basin, and formed the Atlantic Ocean.

The next core flare occurred in the Pacific basin, pushing Russia apart from North America. Leaving two super-continents, North America-South America-Antarctica (then off the west coast of the Americas), and Europe-Africa-Asia-Australia. This created a great number of weak fracture areas in the Pacific basin, which continue to exhibit the bulk of the expansion of the Earth.

A later core flare separated Antartica from the Americas, rolling it off South America to its more southerly position, eventually disconnecting it from the continents, altogether.

If you look at a topography map of the ocean floor, the stretch lines are obvious. Continents are not sliding towards or away from each other vectorially, they are all sliding away from each other, in a scalar fashion—because the Earth is expanding. Oceans will grow wider. Other fractures occur as the surface area of the Earth increases, breaking up the large continents into smaller ones. Eventually, the Earth will be a large, ocean world with many large islands, and no major continents.

**Lost Continents**

There are three cycles to the expansion of the Earth. The first, and most mild, is the gradual cooling of the core, causing a slow expansion, and minor volcanic and earthquake activity worldwide, as things re-settle.

The second is the intermediate speed matter from the inner core dropping into the low speed (1-x) range. This is not done in a smooth, continuous motion. A threshold is reached, then there is an avalanche effect that causes a great deal of matter to drop out of motion in time, back to motion in space. Take, for example, motion defined as s/t. A motion of 5 units, in time, would be defined as 1/5, or as it would appear in space, 0.20. When those 5 temporal units invert, and become 5 units of space, 1/5 becomes 5/1—that was 0.2 meters, is now 5 meters—a major expansion in volume occurs at the core of the planet.

This causes the plates, world-wide, to separate and exposes the magma of the asthenosphere to whatever is above, typically water. With wide gaps between the plates sitting on the molten sphere, slippery asthenosphere are free to move, in relation to each other, as well as over the mantle of the crust.

Because the Earth is rotating, the plates will seek the “least energy” configuration. The largest continental bulge will tend to become equatorial. In most cases, this is one of the polar ice caps, with ice piled miles high. Thus, the plates containing these ice caps will slide to equatorial positions, normally turning the surface of the Earth 90° from its prior position. This would be a regular, and predictable, phenomenon.

The final cycle of expansion is the “core flare”, when enough gas is produced in the center of the core (the low density area), to generate sufficient gas pressure to break thru the inner core, and into the molten outer core, and explode—the core flare. This has a devastating effect on the surface of the planet. The thermal release will break thru a section of the mantle, literally blowing a several-mile-wide volcano in the surface of the planet to release the pressure. Enormous quantities of material will be pushed to the surface, causing another sudden increase of surface area, but localized to a region, rather than distributed globally. This outburst would most likely coincide with the second cycle, but not always occur. Again, it would probably be at a fairly regular interval, with a number of Cycle 2 events occurring between.

The results of this core flare could split a section off
a continent, and push it several hundred miles away from its parent in a matter of a few days.

Consider a tribe living in a coastal area, with a large island visible to the west. The core flare occurs, and volcanism and earthquakes flare up all around for several days. The activity dies down, and they look to their west, and see nothing but muddy waters of the ocean, bubbling with volcanic remnants. Their reasonable conclusions: the gods have gotten angry, and sank the island continent to the west. In reality, the coast was the fracture zone, and that island just moved over the horizon, where it can no longer be seen, and will probably continue to move rapidly for several decades. The volcanoes and muddy waters make it look like the continent had sunk; in reality, it just moved a great distance in a short time.

We find evidence of this in the legends of Mu, Atlantis, Lemuria, and "Ancient Lanka (Ceylon)". Ancient Lanka was supposed to exist off of the west coast of India, where a series of islands now exist. However, since the water levels were much lower then, those islands were part of the coastal mountains of India. The topography of the ocean floor at that point indicates only smatic crust—no continental mass. However, by following the fracture zones and stretch marks, the ancient island of Lanka can be found.

Lanka is also known by the name Lemuria, named after the Lemurs found in both India and Africa, but not in any of the intervening lands. It was assumed a land bridge once spread between Africa and India, allowing these creatures to cross freely. And so was the case. Consider:

"Because many of its animals, plants and rocks resemble those of Africa, some think that... was at one time connected to that continent. But it has also plants and animal seemingly of East Indian origin. This is the basis for supposing it to be a remnant of a continent called Lemuria, which is believed to have filled, in ages gone by, the central basin of the Indian Ocean."
[Comptons Encyclopaedia, Vol 9, 1946]

When the Earth's size is reduced, as it was ages ago, and island does connect India to Africa—the island of Madagascar. Madagascar IS Lemuria/Ancient Lanka. (The island seemed much bigger, then, because it Earth was smaller).

The same is true for Atlantis. Prior to the last major expansion, Antartica was tropical and much closer to Africa and South America. North America was at the North Pole, and in an "Ice Age" (Ice Ages occur when the crust is reoriented so the place having the ice age is near one of the polar points), Antartica IS Atlantis. And Atlantis will "rise again", when the next core flare occurs, as it now has the bulk of the elevated mass of the planet piled up in its ice sheets. When the crust slips, that bulk will become equatorial, and melt. However, all the remains of Atlantis are now crushed into sand, by the massive sheets of ice.

Continuing extrapolation shows that Mu was the continent of North and South America combined with Antartica, just after the formation of the Pacific basin. The core flare formed the basin, and pushed Antartica off of America, rolling it south. Those survivors in America saw the continent of the west disappear, leaving only mud and volcanism. But it really isn't gone, just relocated.

**Predicting Cycles of Destruction**

Of the three cycles identified, the latter two can be predicted—and perhaps have been for many generations. If we look to India, there are records going back many thousands of years. They indicate that there are two cycles, known as "Yugas." A minor yuga is about 6,000 years. A major yuga is 4 minor yugas, or 24,000 years. I believe these represent approximations of the 2nd and 3rd destructive cycles of the core.

On the other side of the world, we have the sacred calendar of the Aztec and Maya, handed down from their ancestors, the Toltec, handed down from the people of Iltar, who migrated there when their home of Aztlan was destroyed. The Maya also have similar cycles, but hold a great deal more precision. The minor cycle occurs every 1,872,000 days, or about 5,125 years. The major cycle is 5 of the minor cycles, or 25,627 years (which is also a very close figure for the precession of the equinoxes).

Both systems indicate that the current major cycle will end within the next 20 years, around 2000 for the Yuga cycle, and on December 23, 2012 for the Mayan cycle. The Mayan date, though precise, may not be as accurate as hoped for, because there are errors in the current Julian calendar that may have caused an erroneous start date for the Mayan calendar. The actual Mayan 'end time' could be as early as 2003.

As for a more scientific determination, it is difficult, as there is no prior data to base a theory on. Several features can be isolated, to aid in determining a date.
For example, there will be a large drop in the Earth's magnetic field (the geomagnetic field has dropped 38% in the last 2000 years). A new south magnetic pole will begin to form in the northern hemisphere, near 50° N latitude (according to KVK Nehru's sunspot research, extrapolated for the Earth's core). This new south pole will cause some unusual phenomenon, as being co-magnetic in nature, will cause the existing magnetic field to collapse at that point, allowing gamma rays to penetrate to ground level, causing sterility in the area of the new pole, as well as unusual magnetic, electric, and gravitational effects. There is one particular area on the Earth, at 52° N latitude, that fits this description—the Salisbury plains in England, in the area of Stonehenge, where the crop circle phenomenon is building. Observation agrees with mysticism—a “pole shift” is coming sometime soon.

**Post-Cataclysm Earth**

What will happen if a core flare occurs say, for example, in the springtime of 2003? Mayan records indicate that the earth trembled with volcanoes and earthquakes for 3 days. The sun and moon stopped in the sky, then moved “crazily” in different directions. Then they were blocked out by clouds, and the sun did not shine again on the land for 26 years (due to the volcanic ash and dust thrown into the atmosphere).

The Hopi describe it as:

> "The twins [the two gods who hold the rotational poles in place] had hardly abandoned their stations when the world, with no one to control it, teetered off balance, spun around crazily, then rolled over twice. Mountains plunged into the seas with a great splash, seas and lakes sloshed over the land; and as the world spun through cold and lifeless space it froze into solid ice."\(^{10}\)

The equatorial paradise of the ancient Hopi had been relocated to the artic region of the new poles.

In Norse mythology, "Sibyl's Vision" says of Ragnarok (the final battle, where the gods are destroyed), "The sun will go black, earth sink into the sea, heaven be stripped of its bright stars; smoke rage and fire, leaping the flame lick heaven itself."\(^{11}\)

From the Christian Bible, Revelation 6:12:

> "And I beheld when he had opened the sixth seal, and, lo, there was a great earthquake; and the sun became black as sackcloth of hair, and the moon became as blood; and the stars of heaven fell unto the earth, even as a fig tree casteth her untimely figs, when she is shaken of a mighty wind. And the heaven departed as a scroll when it is rolled together; and every mountain and island were moved out of their places."

Virtually all mythos has a similar description of the “end times”, which seem to recur. The native tribes of the Americas describe 4 such destructions in their history. The Yuga system describes 3 such cycles, others describe many more. All the recent destructions seem to fit near these time frames, obtained from ancient records. Note that the dates do not correspond with geologic time scales.

<table>
<thead>
<tr>
<th>Ancient Records (BCE)</th>
<th>Geologic Period (BCE)</th>
<th>Era / Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>75,000</td>
<td>100,000,000</td>
<td>Cretaceous breakup of Mu</td>
</tr>
<tr>
<td>50,000</td>
<td>65,000,000</td>
<td>Paleocene 2(^{nd}) breakup of Mu</td>
</tr>
<tr>
<td>24,000</td>
<td>45,000,000</td>
<td>Eocene 1(^{st}) breakup of Atlantis</td>
</tr>
<tr>
<td>16,000</td>
<td>12,000,000</td>
<td>Oligocene 2(^{nd}) breakup of Atlantis</td>
</tr>
<tr>
<td>9,600</td>
<td>10,000</td>
<td>Modern Lemuria disappears</td>
</tr>
<tr>
<td>3,114</td>
<td>4,000</td>
<td>Modern Start of Mayan calendar</td>
</tr>
</tbody>
</table>

It is interesting to note how the “ancient records” greatly differ in time scales from modern geologists. When examining the methods of long-term dating, I did discover that there is a cumulative, exponential error in geologic dating that relies on radioactive decay. Anything beyond the 5,000-year range of carbon dating may be drastically wrong, and the Earth may be much younger than ever conceived—by as much as a factor of 1,000:1. The 4.6 billion year age of the Earth, may be as little as 500 million, and mankind may have been present when dinosaurs walked the Earth, as actually shown etched in ancient Peruvian stone tablets. Also, recent fossil evidence in Texas is supporting this hypothesis—much to the objection of anthropologists—having found human footprints petrified in rock next to dinosaur tracks, as though the humans were hunting the dinosaurs. Originally thought a hoax, until they discovered the tracks continued under a large cliff, and when excavated, showed the same human/dinosaur prints.
It appears that a major disruption of the Earth's surface is due, as well as a magnetic pole shift. It may be possible to determine where the breaks will occur; plate tectonics are fairly well defined, but typically limited to oceans. Breaks under the continental crust can also be identified by the separation of land masses, and mountain ranges.

Conclusion

This preliminary investigation into Reciprocal

References

5. Larson, Dewey B., Density Gradient of White Dwarf Stars (paper).
8. ibid. Also http://www.random.com/~rs/ Articles/SunPartI.html

Filler Needed

Quite frequently, articles do not take up all the space they could, to fill to the bottom of a page. The gap left over is called “filler”.

Filler is used to present quick quotes, brief opinions, interesting tidbits of information, and other comments that are not part of the general article structure of Reciprocity. What you are now reading is “filler.”

There is always a need for filler in each issue of Reciprocity, and it can take some time to dig up interesting bits of information, quotes, or commentary, as I am doing right now—looking for things to put in the blank spaces after articles.

So, if you have a comment on something, an observation, a favorite quote, a plug for the Reciprocal System, or a new idea you haven't quite flushed out yet, write up a paragraph or two, and send it in to the editor as filler. Anything from a few words, to about a page and a half is fine.

It is easiest to e-mail the filler, using either plain text or rich text format (please use 11-point “Times” font). “Rich Text” supports boldface, italic, and underline for emphasis and highlighting.

Please respect copyright laws. We cannot publish full articles without permission. However, copyright law does allow us to quote a few paragraphs for editorial or review purposes.

—Bruce Peret, Editor
Language, Experience and Illusion
Prof. K.V.K. Nehru, Ph.D.

[Originally published in The Theosophist, (June 1993, pp. 339–345) under the title “Language, the Slayer of the Real.” The article is revised (1998) and adopted for Reciprocity since it brings to light some of the epistemological difficulties that beset the dissemination of a new basic paradigm as in the case of the Reciprocal System.]

One of the many obstacles that a serious student of spirituality has to face is language. One uses it not only for communication, but to organize one’s thinking, to direct reason and analyze nature. Sooner or later, he has to come to a clear and thorough understanding of how language distorts truth. As members of the human Brotherhood we are divided by thousands of languages. Not only man is alienated from man by language, but also more sinisterly, man is alienated from Reality by the language he uses. There are two functional levels in language: the lexical and the patternment. The lexical level is more directly concerned with meaning in expressing and communicating. There are plenty of traps in this. We would like to dwell, in this article, on the patternment level, which conditions us more deeply, through grammatical forms and other structural features.

The January and April issues of The Theosophist of 1942 carry a momentous article entitled ‘Language, Mind and Reality’ by Benjamin Lee Whorf. Whorf was a Theosophist and an authority in linguistics. He began his career by working for an insurance company. Once while investigating the case of a fire in a fuel company stockyard, he noticed a signboard there written ‘empty barrels.’ He found that those words tended to misguide, making one believe that ‘empty’ barrels are dangerous, leading someone to throw a lighted cigarette butt. The residual fuel from the unsealed empty barrels, evaporated in the heat of the day, had charged the atmosphere with inflammable mixture that resulted in the fire. Whorf realized how much one’s behavior is controlled by language, and he turned to study linguistics and he came up with valuable discoveries.

Whorf and his teacher Edward Sapir state: “Human beings do not live in the objective world alone, nor alone in the world of social activity as ordinarily understood, but are very much at the mercy of the particular language which has become the medium of expression for their society... The fact of the matter is that the ‘real world’ is to a large extent unconsciously built up on the language habits of the group... We see and hear or otherwise experience very largely as we do because the language habits of our community predispose certain choices of interpretation."

The Actual and the Factual

We are inclined to think of a world of facts as against a world of words that describe these facts. Dr. Friedrich Weissmann points out: “What is called a fact depends on the linguistic medium through which we see it... What rebels in us against such a suggestion is the feeling that the fact is there objectively no matter in which way we render it. I perceive something that exists and put it into words. From this it seems to follow that fact is something that exists independent of and prior to, language... What we are liable to overlook here is that the way we see a fact—that is, what we emphasize and what we disregard—is our work... A fact is something that emerges out from, and takes shape against a
background... Language supplies us with a means of comprehending and categorizing, and different languages categorize differently."[2]

Noticing a fact may be likened to seeing a face in a cloud. Certainly, that is not inventing it. But one would not have noticed it unless he had already had the experience of faces earlier. Similarly, noticing a fact may not mean inventing it but one might not perceive it if one does not have certain forms of comprehension ready at hand, which language has supplied previously. Thus "language contributes to the formation and participates in the constitution of a fact; which, of course, does not mean that it 'produces' the fact."[3]

Suppose we consider a description without sentences, say a map, a mime or a musical notation. Then we are not tempted to regard the country, or the story unravelled in the mime, or the melody as facts. Here we begin to see that it is not true that the real world is made up of a cluster of facts, as a wall is of bricks. "Reality is undivided," says Dr. Weissmann, and since language contains units, namely, sentences, he points out: "In describing reality by using sentences we draw, as it were, lines through it, limit a part and call what corresponds with such a sentence a fact. In other words, language is the knife with which we cut out facts."[4]

Research on young children and the uneducated congenital deaf of all ages shows that they observe, think and express themselves naturally in terms of events as a whole, and not in terms of words referring to one thing at a time. R.A.S. Paget remarks: "In fact we never see 'one thing at a time'... but we have learnt to pretend that we do, and to ignore the surroundings of each selected element. We can then give each element a name or symbol, and thus acquire an entirely new power—namely, that of recombining old symbols in our minds so as to form new patterns—the power of imagining and inventing. This was man's greatest discovery, and the basis of all verbal language; we learn it at our mother's knee, but it is not natural to man, it has to be learnt."[5]

Whorf demonstrates that we use grammatical patterns—like plurality, gender, tenses, voices, and the 'parts of speech'—not only to interpret experience, but also to understand 'time,' 'space' and the 'external universe.' It would be enlightening to see how this happens by considering several of these grammatical categories. Since remaining within the tradition of our own language (or family of languages) is never going to make us realize its conditioning, linguists advocate the study of languages of altogether different grammatical structures in order to discern the nature of the conditioning of our own language. Whorf uses the American Indian Hopi for comparison.

**Plurality and Numeration**

In our so-called developed languages we have what may be termed the real and the imaginary plurals: e.g., 'five trees' and 'five days.' Five trees are or could be perceived as five in one group perception: but we experience only one day, today. Our language has but one form to express them both. "Cyclicity brings the response of imaginary plurals," points out Whorf, "but a likeness of cyclicity to aggregates is not unmistakably given by experience prior to language."[6]

Our awareness of time does contain something subjective and immediate, the basic feeling of 'becoming later and later.' We use cardinal numbers to represent actual aggregates. These are counted on discrete entities. Ordinal numbers differ in that they represent the process of counting itself—a sequence. The latter, therefore, could legitimately be used to refer to the imaginary plurals, like the days or the moments of time, by virtue of their sequential nature. But since our language does not distinguish between the real and the imaginary plurals, it objectifies the latter, making us imagine that they are just as much 'counted on something' as are the former. Thus our concept of time loses contact with the reality of the subjective feeling of 'becoming later:' time gets treated as a countable quantity. Language assists us to imagine time as 'consisting' of so many moments, like the units in a length. Whorf points out in Hopi an altogether different linguistic situation: our length of time is not regarded as a length but 'a relation between two events in lateness.' The Hopi, therefore, are never alienated from the subjective experience of time.

**Nouns of Physical Quantity**

In our language we have two kinds of nouns denoting physical items: nouns indicating individual things and nouns for a mass of things. Water, wood, sand, air are examples of the latter. Such nouns denote a uniform medium without implied boundaries. Convenience demands that these nouns be individualized by some further linguistic tool. Consequently we say a 'glass of water,' a 'bag of sugar,' or a 'dish of food.' In all these cases the nexus 'of' denotes contents.

But the formula does not lend itself to a 'heap of sand,' a 'block of ice,' a 'stick of wood' or a 'lump
of sugar.’ In these cases, if we withdraw the contents we are left with no container. But the linguistic pattern is identical and so while it denotes contents in the obvious cases, it suggests contents in the other, inobvious cases. The heaps, blocks, sticks and lumps seem to contain something, a ‘stuff’ so to say. In fact, the philosophic notion of substance or matter can be seen to arise out of this naïve linguistic practice.

Whorf explains: “Our language patterns often require us to name a physical thing by a binomial that splits the reference into a formless item plus a form... Thus with our binomial formula we can say and think a ‘moment of time,’ a ‘second of time,’ or a ‘year of time.’... the pattern is simply that of a ‘bottle of milk’ or a ‘piece of cheese.’ Thus we are assisted to imagine that a ‘summer’ actually contains or consists of such-and-such a quantity of ‘time.’

“In Hopi... one does not say ‘it’s a hot summer’ or ‘summer is hot;’ summer is not hot, summer is only when conditions are hot... one does not say ‘this summer,’ but ‘summer now’ or ‘summer recently.’ There is no objectification, as a region, an extent, a quantity, of the subjective duration feeling. Nothing is suggested about time except the perpetual ‘getting later’ of it. And so there is no basis here for a formless item answering to our ‘time’.”[7]

**Temporal Verbs**

The three-tense system of past, present and future is in congruence with this objectified time, and colors all our thinking about time. In Hopi, on the other hand, one finds a two-tense system, of earlier and later, which corresponds better with the actual experience of duration. “If we inspect consciousness we find no past, present or future but a unity embracing complexity. Everything is in consciousness, and everything in consciousness IS and is together... Where real time comes in is that all this in consciousness is ‘getting later,’ changing certain relations in an irreversible manner... We can of course construct and contemplate in thought a system of past, present and future, in the objectified configuration of points on a line. This is what our general objectification tendency leads us to do and our tense system confirms.”[8]

**Adjectives Doing for Verbs**

Consider, for example, how we express color: we render it by adjectives. We say ‘the green pasture.’ This practice makes us see color as a ‘quality’ or ‘attribute’ of things. This enables us to abstract color and see it in artificial isolation, ‘greenness’ by itself. Now in Russian and Italian color is rendered by verbs, something like ‘the pasture greens.’ Color is seen as an activity or modification that cannot be abstracted out from the thing. We say ‘the light shines,’ ‘the stream shimmers’ or ‘the teeth gleam.’ In this usage we cannot detach the glitter or the gleam from the thing, like a smile cannot be from the face. Thus, adjectival and verbal modes of rendering represent two different worlds of thought and the whole way in which a fact articulates itself is contingent on the linguistic modes adopted.

**Spatial Metaphors**

We say ‘a long time,’ ‘a short while,’ ‘deep sorrow,’ ‘an elevating influence;’ we say ‘we do not grasp the line of so-and-so’s thinking, since he never comes to the point’. This pattern is part of our objectification syndrome. It suggests an imaginary space into which we are inveigled to locate non-spatial items and see them there. But in Hopi abundant linguistic devices express intensity, tendency and duration directly, and there is no space term to be pressed into service when space is not involved. Thus the Hopi thought-world has no imaginary space. It does not locate a thought dealing with real space anywhere but in real space. It does not therefore see that physical things are in any way insulated from the powers of thought and life.

**Nouns versus Verbs**

Nouns and verbs have different grammatical and logical properties. English prefers nouns, Hopi, verbs. We tend to say ‘I had a bad dream’ rather than ‘I dreamt badly.’ It is part of our objectifying tendency. Sadly, this strips what is being talked about of all vividness. Consider the noun ‘dream’ and the verb ‘to dream’ or ‘dreaming.’ In the former we objectify, isolate and look at ‘dream’ as though it were a ‘thing.’ Spontaneity, the distinguishing quality of life from form is conveyed by the verb, whereas the noun refines it into a thing. Regrettably, in English, some of the most important words that denote or ought to denote activity per se have no seminal verb at all! Examples are: ‘awareness,’ ‘consciousness,’ ‘intelligence’ and ‘wisdom.’ If we can coin ‘consc’ and ‘intellige’ as the verb forms of ‘consciousness’ and ‘intelligence,’ we see what a world of difference it makes to say ‘I consc’ or ‘the creature consc’ or ‘he intellige.’

Our preference for nouns lands us in another oddity. We first ‘de-integrate’ the whole and then look at it as a sum of its parts. For example, in a fountain, a river and a pond, we are able to see water as the
common element. This makes us see a river as water plus flowing. Thus we fail to see the reality as it is. In Hopi, on the contrary, a fountain, a river and a pond, not only have different names but the linguistic pattern does not instigate them to abstract any ‘thing,’ like ‘water,’ from a fountainous form or a rivory flow. They appreciate each situation holistically.

Whorf observes that while the habitual thought of speakers of our language (with its preference for nouns) analyzes reality largely in terms of ‘things’ or bodies plus formless items like ‘matter’ or ‘substance,’ the Hopi thought-world analyzes largely in terms of ‘events,’ or more aptly ‘eventings.’ He remarks: "From the form-plus-substance dichotomy...belong materialism, psychophysical parallelism...and dualistic views of universe in general... Newtonian space, time and matter are no intuitions. They are receipts from culture and language. That is where Newton got them."[9] Hard to believe, but true!

Rūpa and Arūpa Levels

Whorf[10] recognizes two principal levels in a language structure, the rūpa and the arūpa levels of the plane of manas. He identifies the lower level with the process of giving names to the parts of the whole flux of experience, with the rūpa or the realm of name and form (form meaning organization in three-dimensional space). By naming, these parts are made to stand in an artificial isolation. See, for example, how the words ‘hill’ or ‘swamp’ entice us to regard them as referring to discrete things in themselves, while in truth they are nothing more than local variations in altitude or soil consistency as the case may be.

The next level of language he calls the level of ‘patternment’ and identifies with the arūpa levels of mind. Arūpa, formless, means that there is no reference to the spatial form (visual shape), which is the salient feature of the rūpa levels. It is a realm of syntactical patterns and grammatical structures. Whorf notes: “Such patterns are not like the meanings of words, but they are somewhat like the way meaning appears in sentences... Because of the systematic, configurative nature of the higher mind, the ‘patternment’ aspect of language always overrides and controls the ‘lexation’ or name-giving aspect... The context or sentence pattern determines what sort of object the...word refers to.”

For example, the sentence ‘I hold it’ has the same pattern as that of ‘I lift it,’ ‘I push it’ or ‘I hit it,’ all of which depict overt action. However, ‘hold,’ does not imply any action or movement. It is rather a statement of relative positions. Nonetheless, we imagine—nay, we see—‘hold’ depicting action in the above sentence. This is simply because the proposition is set up on the same pattern as that of the other examples that do denote action or movement.

The formula, “substantive + verb = actor + his action,” is implicit in our sentence structure. This pattern prompts us to read into nature non-existent actors or agents simply because our sentence structure (when not imperative) demands a substantive for a verb. We say ‘it rains,’ when ‘rains’ itself suffices for the reality: we set up an actor ‘it’ to perform the action. To quote Whorf: “Hopli can have verbs without subjects...we unknowingly project the linguistic patterns of a particular type of language upon the universe, and SEE them there, rendered visible on the very face of nature... A change in language can transform our appreciation of the cosmos...science...has not yet freed itself from the illusory necessities of common logic which are only at bottom necessities of grammatical pattern in Western Aryan grammar; necessities for substances which are only necessities for substantives in certain sentence positions, necessities for forces, attractions, etc. which are only necessities for verbs in certain other positions, and so on.”

James Jeans, the Astronomer Royal, quoting Bertrand Russell states: “...grammar and ordinary language are bad guides to metaphysics...In illustration he mentions Descartes, who thought that there could not be motion unless something moves, nor thinking unless someone thought...This view springs from a notion—usually unconscious—that the categories of grammar are also the categories of reality.

“When it had become clear that light was of an undulatory nature, physicists argued that if there were undulations, there must be something to undulate—one cannot have a verb without a noun. And so the luminiferous ether became established in scientific thought as the nominative of the verb ‘to undulate,’ and misled physics for over a century.”[11]

When Dewey Larson propounded the Reciprocal System of Theory, the first completely successful general theory of physics, which postulates that the most basic (and the only) constituent of the physical universe is motion, scientists came up with the same objection that there can be no motion without anything moving. It took quite some time for them to realize that in a universe of motion the primary
entity ought to be motion, and that all the 'things' of the universe—matter, electricity, magnetism, radiation, gravitation etc.—are different manifestations of the primary motion.

The noun-dominated languages, with their tendency to objectify and isolate are well suited for conceptualization and the progress of science. But in the same proportion, they cause us to recede from Reality.

References

3. Ibid., p.141
4. Ibid., p.140
7. Ibid., p. 142–3
8. Ibid., p. 143
9. Ibid., p. 153
10. Ibid., pp. 246–270

---

**THE ROUGH RIDER**

"Far better it is to dare mighty things, than to take rank with those poor, timid spirits who known neither victory nor defeat."

—Theodore Roosevelt, 1899

**"One small step for man... One giant leap, for Mankind."**

—Neil Armstrong, 1969

---

As an aggregate of matter, man is still dwarfed by his physical surroundings, but this investigation has revealed that the physical aspect is a relatively unimportant facet of human existence, and that the size and the performance of physical functions, are wholly invalid. According to our findings, the physical universe accomplishes nothing on its own account; it exists only for the purpose of facilitating the development of the more advanced aspects of intelligent life: to aid man and his relatives on other planets to make progress toward their final goal.

Our universe of motion is only one portion—perhaps no more than a very small portion—of a larger system. But we human beings are not limited to this small portion of the whole; we are citizens of the greater cosmos, and we will find our ultimate destiny in that wider field.

—Dewey B. Larson, 1990
The Dimensions of Motion

Dewey B. Larson

[This article includes references to “the preceding article”, but I have not been able to determine what that article was. —Ed.]

Now that the existence of scalar motion has been demonstrated, it will be appropriate to examine the consequences of this existence. Some of the most significant consequences are related to the dimensions of this hitherto unrecognized type of motion. The word “dimension” is used in several different senses, but in the sense in which it is applied to space it signifies the number of independent magnitudes that are required for a complete definition of a spatial quantity. It is generally conceded that space is three-dimensional. Thus three independent magnitudes are required for a complete definition of a quantity of space. Throughout the early years of science this was taken as an indication that the universe is three-dimensional. Currently, the favored hypothesis is that of a four-dimensional universe, in which the three dimensions of space are joined to one dimension of time.

Strangely enough, there does not appear to have been any critical examination of the question as to the number of dimensions of motion that are possible. The scientific community has simply taken it for granted that the limits applicable to motion coincide with those of the spatial reference system. On reviewing this situation it can be seen that this assumption is incorrect. The relation of any one of the three space magnitudes to a quantity of time constitutes a scalar motion. Thus three dimensions of scalar motion are possible. But only one dimension of motion can be accommodated within the conventional spatial reference system. The result of any motion within this reference system can be represented by a vector (a one-dimensional expression), and the resultant of any number of such motions can be represented by the vector sum (likewise one-dimensional). Any motions that exist in the other two dimensions cannot be represented.

Here again we encounter a shortcoming of the reference system. In our examination of the nature of scalar motion we saw that this type of motion cannot be represented in the reference system in its true character. The magnitude and direction attributed to such a motion in the context of the reference system are not specifically defined, but are wholly dependent on the size and position of the object whose location constitutes the reference point. Now we find that there are motions which cannot be represented in the reference system in any manner. It is therefore evident that the system of spatial coordinates that we use in conjunction with a clock as a system of reference for physical activity gives us a severely limited, and in some respects inaccurate, view of physical reality. In order to get the true picture we need to examine the whole range of physical activity, not merely that portion of the whole that the reference system is capable of representing.

For instance, gravitation has been identified as a scalar motion, and there is no evidence that it is subject to any kind of a dimensional limitation other than that applying to scalar motion, in general. We must therefore conclude that gravitation can act three-dimensionally. Furthermore, it can be seen that gravitation must act in all of the dimensions in which it can act. This is a necessary consequence of the relations between gravitation and mass. The magnitude of the gravitational force exerted by a material particle or aggregate (a measure of its gravitational motion) is determined by its mass. Thus mass is a measure of the inherent negative scalar motion content of the matter. It follows that motion of any mass m is a motion of a negative scalar motion. To produce such a compound motion, a positive scalar motion v (measured as speed or velocity) must be applied to the mass. The resultant is mv, now called momentum, but known earlier as "quantity of motion," a term that more clearly expresses the nature of the quantity. In the context of a spatial reference system, the applied motion v has a direction, and is thus a vector quantity, but the direction is imparted by the coupling to the reference system and is not an inherent property of the motion itself. This motion therefore retains its positive scalar status irrespective of the vectorial direction.

In the compound motion mv, the negative gravitational motion acts as a resistance to the positive motion v. The gravitational motion must therefore take place in all three of the available dimensions, as any one of the three may be parallel to the dimension of the reference system, and there
would be no effective resistance in any vacant dimension. We may therefore identify the gravitational motion as three-dimensional speed, which we can express as \( s^3/t \), where \( s \) and \( t \) are space and time respectively. The mass (the resistance that this negative gravitational motion offers to the applied positive motion) is then the inverse of this quantity, or \( t^3/s^3 \). Since only one dimension of motion can be represented in a three-dimensional spatial coordinate system, the gravitational motion in the other two dimensions has no directional effect, but its magnitude applies as a modifier of the magnitude of the motion in the dimension of the reference system.

We now turn to a different kind of “dimension.” When physical quantities are resolved into component quantities of a fundamental nature, these component quantities are called dimensions. The currently accepted systems of measurement express the dimensions of mechanical quantities in terms of mass, length, and time, together with the dimensions (in the first sense) of these quantities. But now that mass has been identified as a motion, a relation between space and time, all of the quantities of the mechanical system can be expressed in terms of space and time only. For purposes of the present discussion the word “space” will be used instead of “length,” to avoid implying that there is a some dimensional difference between space and time. On this basis the “dimensions,” or “space-time dimensions” of one-dimensional speed are space divided by time, or \( s/t \). As indicated above, mass has the dimensions \( t^3/s^3 \).

The product of mass and speed (or velocity) is

\[ t^3/s^3 \times s/t = t/s \]

This is “quantity of motion,” or momentum. The product of mass and the second power of speed is

\[ t^3/s^3 \times s^2/t = s \]

which is energy. Acceleration, the time rate of change of speed, is

\[ s/t \times 1/t = s/t^2 \]

Multiplying acceleration by mass, we obtain

\[ t^3/s^3 \times s/t^2 = t/s^2 \]

which is force, the “quantity of acceleration,” we might call it. The dimensions of the other mechanical quantities are simply combinations of these basic dimensions. Pressure, for instance, is force divided by area,

\[ t/s^2 \times 1/s^2 = t/s^4 \]

When reduced to space-time terms in accordance with the foregoing identifications, all of the well-established mechanical relations are dimensionally consistent.

To illustrate this agreement, we may consider the relations applicable to angular motion, which take a different form from those applying to translational motion, and utilize some different physical quantities. The angular system introduces a purely numerical quantity, the angle of rotation \( \theta \). The time rate of change of this angle is the angular velocity \( \omega \), which has the dimensions

\[ \omega = \theta/t = 1/t \]

Force is applied in the form of torque, \( L \), which is the product of force and the radius, \( r \).

\[ L = Fr = t/s^3 \times s = t/s \]

One other quantity entering into the angular relations is the moment of inertia, symbol \( I \), the product of the mass and the second power of the radius.

\[ I = mr^2 = t^3/s^3 \times s^2 = t^3/s \]

The following equations demonstrate the dimensional consistency achieved by this identification of the space-time dimensions:

\[ \text{energy} (t/s) = L \theta = t/s \times 1 = t/s \]

\[ \text{energy} (t/s) = \frac{1}{2} I \omega^2 = t/s \times 1/t^2 = t/s \]

\[ \text{power} (1/s) = L \omega = t/s \times 1/t = 1/s \]

\[ \text{torque} (t/s) = \frac{1}{2} I \omega^2 = t^3/s \times 1/t^2 = t/s \]

The only dimensional discrepancy in the basic equations of the mechanical system is in the gravitational force equation, which is expressed as

\[ F = Gmm'/d^2 \]

where \( G \) is the gravitational constant and \( d \) is the distance between the interacting masses. Although this equation is correct mathematically, it cannot qualify as a theoretically established relation. As on physics textbook puts it, this equation “is not a defining equation... and cannot be derived from defining equations. It represents an observed
relationship." The reason for this inability to arrive at a theoretical explanation of the equation becomes apparent when we examine it from a dimensional standpoint. The dimensions of force in general are those of the product of mass and acceleration. It follows that these must also be the dimensions of any specific force. For instance, the gravitational force acting on an object in the earth's gravitational field is the product of the mass and the "acceleration due to gravity." These same dimensions must likewise apply to the gravitational force in general. When we look at the gravitational equation in this light, it becomes evident that the gravitational constant represents the magnitude of the acceleration at unit values of m' and d, and that these quantities are dimensionless ratios. The dimensionally correct expression of the gravitational equation is then F = ma, where the numerical value of "a" is Gm'/d².

The space-time dimensions of the quantities involved in current electricity can easily be identified in the same manner as those of the mechanical system. Most of the measurement systems currently in use add an electric quantity to the mass, length and time applicable to the mechanical system, bringing the total number of independent base quantities to four. However, the new information developed in the foregoing paragraphs enables expressing the electrical quantities of this class in terms of space and time only, in the same manner as the mechanical quantities.

Electrical energy (watt-hours) is merely one form of energy in general, and therefore has the energy dimensions, t/s.

Power (watts) is energy divided by time, t/s × 1/t = 1/s.

Electrical force, or voltage (volts) is equivalent to mechanical force, with the dimensions t/s².

Electric current (amperes) is power divided by voltage. I = 1/s × s²/t = s/t. Thus current is dimensionally equal to speed.

Electrical quantity (coulombs) is current multiplied by time, and has the dimensions Q = I t = s/t × t = s.

Resistance (ohms) is voltage divided by current, R = t/s² × t/s = t²/s³. This is the only one of the basic quantities involved in the electric current phenomenon that has no counterpart in the mechanical system. Its significance can be appreciated when it is noted that the dimensions t²/s³ are those of mass per unit time (t²/s³ × 1/t = t²/s³).

The dimensions of other electrical quantities can be obtained by combination, as noted in connection with the mechanical quantities. As can be seen from the foregoing, the quantities involved in the current electricity are dimensionally equivalent to those of the mechanical system. We could, in fact, describe the current phenomena as the mechanical aspects of electricity. The only important difference is that mechanics is largely concerned with the motions of individual units or aggregates, while current electricity deals with continuous phenomena in which the individual units are not separately identified.

The validity of the dimensional assignments in electricity, and the identity of the electrical and mechanical relations, can be verified by reducing the respective equations to the space-time basis. For example, in mechanics the expression for kinetic energy (or work) is \( W = \frac{1}{2}mv^2 \), the dimensions of which are t/s³ × s²/t² = t/s. The corresponding equation for the energy of the electric current is \( W = I^2t \). As mentioned above, the product \( I^2t \) is equivalent to mass, while \( I \), the current, has the dimensions of speed, s/t. Thus, like the kinetic energy, the electrical energy is the product of mass and the second power of speed, \( W = I^2t = s^2t^2 \times t^2/s^3 \times t = t/s \). Another expression for mechanical energy is force times distance, \( W = Fd = t/s^2 \times s = t/s \). Similarly, relations of current electricity are likewise dimensionally consistent, and equivalent to the corresponding mechanical relations, when reduced to space-time terms.

Identification of the space-time dimensions of electrostatic quantities, those involving electric charge, is complicated by the fact that in present-day physical thought electric charge is not distinguished from electrical quantity. As we have seen, electric quantity is dimensionally equivalent to space. On the other hand, we can deduce from the points brought out in the preceding article that electric charge is a one-dimensional analog of mass, and is therefore dimensionally equivalent to energy. This can be verified by consideration of the relations involving electric field intensity, symbol E. In terms of charge, the electric field intensity is given by the expression \( E = Q/s^2 \). But the field intensity is defined as force per unit distance, and its space-time dimensions are therefore t²/s³ × 1/s = t/s³. Applying these dimensions to the equation \( E = Q/s^2 \), we obtain \( Q = Es^2 = t/s^3 \times s^2 = t/s \).

As long as the two different quantities that are called by the same name are used separately, their practical
application is not affected, but confusion is introduced into the theoretical treatment of the phenomena that are involved. For instance in the relations involving capacitance (symbol C), \( Q = \frac{V}{s} \) in the basic equation \( C = \frac{Q}{V} = \frac{t}{s} \times \frac{s^2}{t} = s \). The conclusion that capacitance is dimensionally equivalent to space is confirmed observationally, as the capacitance can be calculated from geometrical measurements. However, the usual form of the corresponding energy equation is \( W = QV \), reflecting the definition of the volt as one joule per coulomb. In this equation, \( Q = \frac{W}{V} = \frac{t}{s} \times \frac{s^2}{t} = s \). Because of the lack of distinction between the two usages of \( Q \) the quantity \( CV \), which is equal to \( Q \) in the equation \( C = \frac{Q}{V} \) is freely substituted for \( Q \) in equations of the \( W = Q/V \) type, leading to results such as \( W = C/V^2 \), which are dimensionally incorrect.

Such findings emphasize the point that the ability to reduce all physical relations to their space-time dimensions provides us with a powerful and effective tool for analyzing physical phenomena. Its usefulness is clearly demonstrated when it is applied to an examination of magnetism, which has been the least understood of the major areas of physics. The currently accepted formulations of the various magnetic relations are a mixture of correct and incorrect expressions, but by using those that are most firmly based it is possible to identify the space-time dimensions of the primary magnetic quantities. This information then enables correcting existing errors in the statements of other relations, and establishing dimensional consistency over the full range of magnetic phenomena.

In carrying out such a program we find that magnetism is a two-dimensional analog of electricity. The effect of the added dimension is to introduce a factor \( t/s^2 \) into the expressions of the relations applicable to the one-dimensional electric system. Thus the magnetic analog of an electric charge, \( t/s \), is a magnetic charge, \( t^2/s^3 \). The existence of such a charge is not recognized in present-day magnetic theory, probably because there is no independent magnetically-charged particle, but one of the methods of dealing with permanent magnets makes use of the concept of the “magnetic pole,” which is essentially the same thing. The unit pole strength in the SI system, the measurement system now most commonly applied to magnetism, is the weber, which is equivalent to a volt-second, and therefore has the dimensions \( t/s^2 \times t = t^2/s^3 \). The same units and dimensions apply to magnetic flux, a quantity that is currently used in most relations that involve magnetic charge, as well as in other applications where flux is the more appropriate term. Current ideas concerning magnetic potential, or magnetic force, are in a state of confusion. Questions as to the relation between electric potential and magnetic potential, the difference, if any, between potential and force, and the meaning of the distinctions that are drawn between various magnetic quantities such as magnetic potential, magnetic vector potential, magnetic scalar potential, and magnetomotive force, have never received definitive answers. Now, however, by analyzing these quantities into their space-time dimensions we are able to provide the answers that have been lacking. We find that force and potential have the same dimensions, and are therefore equivalent quantities. The term “potential” is generally applied to a distributed force, a force field, and the use of a special name in this context is probably justified, but is should be kept in mind that a potential is a force.

On the other hand, a magnetic potential (force) is not dimensionally equivalent to an electrical potential (force), as it is subject to the additional \( t/s^2 \) factor that relates the two-dimensional magnetic quantities to the one-dimensional electric quantities. From the dimensions \( t/s^2 \) of the electric potential, it follows that the correct dimensions of the magnetic potential are \( t^2/s \times t^2/s^2 = t^2/s^3 \). This agrees with the dimensions of magnetic vector potential. In the SI system, the unit of this quantity is the weber per meter, or \( t^2/s^2 \times 1/s = t^2/s^3 \). The corresponding cgs unit is the gilbert, which also reduces to \( t^2/s^3 \). The same dimensions should apply to magnetomotive force (MMF), and to magnetic potential where this quantity is distinguished from vector potential. But an error has been introduced into the dimensions attributed to these quantities because the accepted defining relation is an empirical expression that is dimensionally incomplete. Experiments show that the magnetomotive force can be calculated by means of the expression \( MMF = nI \), where \( n \) is the number of turns in a coil. Since \( n \) is dimensionless, this equation indicates that MMF has the dimensions of electric current.

The unit has therefore been taken as the ampere, dimensions \( s/t \). From the discrepancy between these and the correct dimensions we can deduce that the equation \( MMF = nI \), from which the ampere unit is derived, is lacking a quantity with the dimensions \( t^2/s^2 \times t/s = t^2/s^3 \).

There is enough information available to make it evident that the missing factor with these dimensions is the permeability, the magnetic analog of electrical resistance. The permeability of most substances is unity, and omitting has no effect on the numerical results of most experimental measurements. This has led to overlooking it in such
relations as the one used in deriving the ampere unit for MMF. When we put the permeability (symbol μ) into the empirical equation it becomes MMF = μNI, with the correct dimensions, t²/s⁴ × s/t = t/s². The error in the dimensions attributed to MMF carries over into the potential gradient, the magnetic field intensity. By definition, this is the magnetic field potential divided by distance, t²/s⁴ × 1/s = t²/s⁵. But the unit in the SI system is the ampere per meter, the dimensions of which are s/t × 1/s = 1/t. In this case, the cgs unit, the oersted, is derived from the dimensionally correct unit of magnetic potential, and therefore has the correct dimensions, t²/s⁵.

The discrepancies in the dimensions of MMF and magnetic field intensity are typical of the confusion that exists in a number of magnetic areas. Much progress has been made toward clarifying these situations in the past few decades, both active, and sometimes acrimonious, controversies still persist with respect to such quantities as magnetic moment and the two vectors usually designated by the letters B and H. In most of these cases, including those specifically mentioned, introduction of the permeability where it is appropriate, or removing it where it is inappropriate, is all that is necessary to clear up the confusion and attain dimensional validity.

Correction of the errors in electric and magnetic theory that have been discussed in the foregoing paragraphs, together with clarification of physical relations in other areas of confusion, enables expressing all electric and magnetic quantities and relations in terms of space and time, thus completing the consolidation of all of the various systems of measurement into one comprehensive and consistent system. An achievement of this kind is, of course, self-verifying, as the possibility that there might be more than one consistent system of dimensional assignments that agree with observations over the entire field of physical activity is negligible.

But straightening out the system of measurement is only a small part of what has been accomplished in this development. More importantly, the positive identification of the space-time dimensions of any physical quantity defines the basic physical nature of that quantity. Consequently, any hypothesis with respect to a physical process in which this quantity participates must agree with the dimensional definition. The effect of this constraint on theory construction is illustrated by the findings with respect to the nature of current electricity that were mentioned earlier. Present-day theory views the electric current as a flow of electric charges. But the dimensional analysis shows that charge has the dimensions t/s, whereas the moving entity in the current flow has the dimensions of space, s. It follows that the current is not a flow of electric charges.

Furthermore, the identification of the space-time dimensions of the moving entity not only tells us what the current is not, but goes on to reveal just what it is. According to present-day theory, the carriers of the charges, which are identified as electrons, move through the spaces between the atoms. The finding that the moving entities have the dimensions of space makes this kind of a flow pattern impossible. An entity with the dimensions of space cannot move through space, as the relation of space to space is not motion. Such an entity must move through the matter itself, not through the vacant spaces. This explains why the current is confined within the conductor, even if the conductor is bare. If the carriers of the current were able to move forward through vacant spaces between atoms, they should likewise be able to move laterally through similar spaces, and escape from the conductor. But since the current moves through the matter, the confinement is a necessary consequence.

The electric current is a movement of space through matter, a motion that is equivalent, in all but direction, to movement of matter through space. This is a concept that many individuals will find hard to accept. But is should be realized that the moving entities are not quantities of the space with which we are familiar, extension space, we may call it. There are physical quantities that are dimensionally equivalent to this space of our ordinary experience, and play the same role in physical activity. One of them, capacitance, has already been mentioned in the preceding discussion. The moving entities are quantities of this kind, not quantities of extension space.

Here, then, is the explanation of the fact that the basic quantities and relations of the electric current phenomena are identical with those of the mechanical system. The movement of space through matter is essentially equivalent to the movement of matter through space, and is described by the same mathematical expressions. Additionally, the identification of the electric charge as a motion explains the association between charges and certain current phenomena that has been accepted as evidence in favor of the "moving charge" theory of the electric current. One observation that has had considerable influence on scientific thought is that an electron moving in open space has the same magnetic properties as an electric current. But we can now see that the observed electron is not merely
a charge. It is a particle with an added motion that constitutes the charge. The carrier of the electric current is the same particle without the charge. A charge that is stationary in the reference system has electrostatic properties. An uncharged electron in motion within a conductor has magnetic properties. A charged electron moving in a conductor or in a gravitational field has both magnetic and electrostatic properties. It is the motion of physical entities with the dimensions of space that produces the magnetic effect. Whether or not these entities—electrons or their equivalent—are charged is irrelevant from this standpoint.

Another observed phenomenon that has contributed to the acceptance of the "moving charge" theory is the emission of charged electrons from current-carrying conductors under certain conditions. The argument in this instance is that if charged electrons come out of a conductor there must have been charged electrons in the conductor. The answer to this is that the kind of motion which constitutes the charge is easily imparted to a particle or atom (as anyone who handles one of the modern synthetic fabrics can testify), and this motion is imparted to the electrons in the process of ejection from the conductor. Since the uncharged particle cannot move through space, the acquisition of a charge is one of the requirements for escape.

[Note: the "charged electron" is "charge × electron" = \( t/s \times s = t \). When an electron acquires a charge, it appears as "i" (matter), not space. Since the relationship of matter to matter does not constitute motion, the electron can no longer move through the atoms, but only through the space between them. Due to thermal motion and microfractures in conductors, there is sufficient space for these charged electrons to repel each other, and make their way to the surface of the conductor. Hence, current (uncharged electrons) is proportional to the cross sectional area, and "static electricity" (charged electrons), is proportional to the circumference of the conductor. Also, since air is composed of matter which will prevent the escape of charged electrons from the conductor, the most efficient condition for charged electrons to escape is a vacuum—the basis for the filament of a vacuum tube. —B. M. Peret]

In addition to providing these alternative explanations for aspects of the electric current phenomena that are consistent with the "moving charge" theory, the new theory of the current that emerges from the scalar motion study also accounts for a number of features of the current flow that are difficult to reconcile with the conventional theory. But the validity of the new theory does not rest on a summation of its accomplishments. The conclusive point is that the identification of the electric current as a motion of space through matter is confirmed by agreement with the dimensions of the participating entities, dimensions that are verified by every physical relation in which the electric current is involved.

The proof of validity can be carried even farther. It is possible to put the whole development of thought in this and the preceding article to a conclusive test. We have found that mass is a three-dimensional scalar motion, and that electric current is a one-dimensional scalar motion through a mass by entities that have the dimensions of space. We have further found that magnetism is a two-dimensional analog of electricity. If these findings are valid, certain consequences necessarily follow that are extremely difficult, perhaps impossible, to explain in any other way. The one-dimensional, oppositely directed flow of the current through the three-dimensional scalar motion of matter neutralizes a portion of the motion in one of the three dimensions, and should leave an observable two-dimensional (magnetic) residue. Similarly, movement of a two-dimensional (magnetic) entity through a mass, or the equivalent of such a motion, should leave a one-dimensional (electric) residue. Inasmuch as these are direct and specific requirements of the theory outlined in the foregoing paragraphs, and are not called for by any other physical theory, their presence or absence is a definitive test of the validity of the theory.

The observations give us an unequivocal answer. The current flow produces a magnetic effect, and this effect is perpendicular to the direction of the current, just as it must be if it is the residue of a three-dimensional motion that remains after motion in the one dimension of the current flow is neutralized. This perpendicular direction of the magnetic effect of the current is a total mystery to present-day physical science, which has no explanation for either the origin of the effect or its direction. But both the origin and the direction are obvious and necessary consequences of our findings with respect to the nature of mass and the electric current.

There is no independent magnetic particle similar to the carrier of the electric current, and no two-dimensional motion of space through matter analogous to the one-dimensional motion of the current is possible, but the same effect can be produced by mechanical movement of mass through a magnetic field, or an equivalent process. As the theory requires, the one-dimensional residue of such
motion is observed to be an electric current. This process is electromagnetic induction. The magnetic effect of the current is electromagnetism.

On first consideration it might seem that the magnitude of the electromagnetic effect is far out of proportion to the amount of gravitational motion that is neutralized by the current. However, this is a result of the large numerical constant, $3^1$ in cgs units (represented by the symbol "c"), that applies to the space-time ratio $s/t$ where conversion from an n-dimensional quantity to an m-dimensional quantity takes place. An example that, by this time is familiar to all, $E=mc^2$, is the conversion of mass $(t^3/s^2)$ to energy $(t/s)$. In that process, where the relation is between a three-dimensional quantity and a one-dimensional quantity, the numerical factor is $c^3$. In the relation between the three-dimensional mass and the two-dimensional magnetic residue the numerical factor is $c$, less than $c^3$ but still a very large number.

Thus, the theory of the electric current developed in the foregoing discussion passes the test of validity in a definite and positive manner. The results that it requires are in full agreement with two observed physical phenomena of a significant nature that are wholly unexplained in present-day physical thought. Together with the positively established validity of the corresponding system of space-time dimensions, this test provides a verification of the entire theoretical development described in this article, a proof that meets the most rigid scientific standard.

MINUTES of the Twenty Second Annual Meeting
of the Members of the
INTERNATIONAL SOCIETY of UNIFIED SCIENCE

President Hoyt A. Stearns formally opened the meeting 8:30 A.M. August 2, 1997, in the conference room of the home of J. A. McCarty and C. Rueckert, 1504 Hobbs Park Road, Anchorage, Kentucky, USA.

Members Present

Larry Denslow
Laura Jean Fremauw
Russell Kramer
James McCarty
Frank H. Meyer
Frank V. Meyer
Bruce Peret
Carla Rueckert
Robert Staehling
Hoyt Stearns
Tobey Wheelock

Reports

Motion by Frank Meyer to dispense with the reading of the minutes of last year's meeting due to prior publication of the minutes, second by L. J. Fremauw, passed unanimously.

Treasurer's Report

Total, as of July 30, 1997, $5,422.10.
Liability for royalties on D.B.L. books to Mrs. Larson due in December, estimate undetermined.
Motion to accept Treasurer's Report as given;
seconded; passed unanimously.

Editor's Report

Total expenditures for the year $930. Reciprocity account balance of $540 is insufficient to publish more than one more issue due to increases in reproduction costs. 168 copies of "Beyond Space and Time" purchased by Frank Meyer to be disbursed by Rainer Huck as an ISUS available book. Frank is to be reimbursed for this expenditure. As of June 1997 Frank Meyer completed his term as the editor of Reciprocity, the life blood of ISUS. Bruce Peret was elected to the post of Editor of Reciprocity later in this meeting.

Secretary's Report

Minutes approved as published. Polling of members of the Board as requested obtained approval for Anchorage, KY. Business Cards vs. Membership Cards discussion resolved, new membership cards to be available ASAP. Dewey B. Larson's tape "The Structure of Scientific Revolution," from the University of Wisconsin lecture is available for $8.00.

President's Report

Political intrigue persists regarding status of a certain member who has resigned. Other material discussed that had little to do with ISUS.
Elections
Board Members and Officers


General meeting declared ended to proceed directly into Board of Directors meeting

Hoyt Stearns nominated to continue as President, seconded, elected unanimously. Frank Meyer nominated for Vice-Presidency, seconded, elected unanimously. Jennifer Hafer nominated for the position of Treasurer, seconded, elected unanimously. Larry Denslow nominated to continue as Secretary, seconded, elected unanimously. Rainer Huck nominated to continue as Executive Secretary, seconded, elected unanimously.

Bruce Peret nominated to the position of Editor of Reciprocity, seconded, elected unanimously. K.V.K. Nehru nominated to continue as an Associate Editor, seconded, elected unanimously. Frank Meyer nominated to the position of Assistant Editor, seconded, elected unanimously. Russell Kramer and Tobey Wheelock nominated to positions as an Associate Editors, seconded, elected unanimously.

Business of the Society

Discussion of issues dealing with the Journal, Reciprocity. The format of the journal and its contents were discussed and it was decided that the new format be accepted, as proposed by the editorial staff.

The question of granting life memberships to K. V. K. Nehru, Jan Sammer, and Bruce Peret was discussed and approved unanimously.

Membership rate structure was briefly discussed followed by unanimous approval for increasing membership dues to $35 for outside North American continent to assist in covering increased production costs as well as additional mailing costs.

Remastering of back issues of Reciprocity has been completed and is now available thru normal ISUS publication channels. In addition to life membership for some of those involved, normal overseas membership is extended by two years for David Halprin.

Discussion of price structure of books and tapes; results to appear as the prices in the new price list of available supplies and publications.

The position of “Executive Researcher” was dropped since the person holding that position has resigned from membership in ISUS.

Agreement that “The Structure of the Physical Universe”, the original 1959 publication of the Reciprocal System of theory, be made available by listing with the other materials available thru ISUS. Revision and/or corrections committee to be chaired by L. E. Denslow. No publication date established for revision.

Discussion of internet web site donated by lifetime member Mike Wells. Approval to put books, articles, and previously published ISUS materials on line at this site: www.randomc.com/~rs/.

By-Laws revision committee established to be chaired by L.E.Denslow. Russell Kramer, Laura Jean Fremauw and other volunteers to assist as needed.

Discussion of and unanimous approval of a 10% discount on catalog materials to be granted to all current members.

Review and error correction committee for “Basic Properties of Matter” to prepare corrigenda prior to re-printing. All readers are requested to send appropriate corrections to the Secretary and/or Editor.

Preparation of all inclusive index for Reciprocity is in preparation. Missing author information is particularly important.

Discussion of how to finance K. V. K. Nehru’s lecture tour. No resolution.

Discussion of when to have the annual meeting; i.e., should the meeting of members be annual or biennial? Motion for location of meeting to be in Florida. Motion for specific location followed by extensive discussion; no resolution. Motion for 1998 meeting to be in Florida passed unanimously; during the period between mid-October to mid November preferably over a weekend. Other subsidiary motions died for lack of seconds.
Wheel of Motion

A New Periodic Table for the Reciprocal System

Douglas L. Bundy

For many, Dewey Larson’s Reciprocal System theory is so superior to modern physical theory that it represents no less than a new gateway to reality. Out of the fog of long tradition, emerges this refreshing, stimulating clarity that beckons us to the future, a future of immense new possibilities fashioned entirely from the combinations of motion.

The wheel is a more natural way to represent the “periodic” nature of the progression of physical elements than a table as can readily be seen from a cursory glance at it. Beginning at the center, the completion of each successive circle represents an addition of a magnetic unit of motion in each of two dimensions.

As devised by Mr. Larson, the three position notation, appearing at the 0 and 180 degree points of each circle, shows the values of the two magnetic dimensions in the first two positions on the left. The third position represents the value of an element’s electrical displacement. To determine the configuration of the motion for a particular element, append its value of electrical displacement to the two values of magnetic motion shown for the element at the top of the circle in which the element appears. For example, iron, Fe, would have the value 3-2-8, the values of magnetic motion shown for argon (3-2) plus the electrical value shown for iron (8).

Proceeding clockwise at the 0 degree point and adding motion, in increments of electrical displacement, to an element’s existing value of
motion, produces the successive elements of atomic numbers until the 180 degree position of the circle is reached. At this point, the magnetic equivalent of electrical displacements is fulfilled and the notation again shows 0 electrical units with the appropriate magnetic dimension incremented. Thus, the notation always shows a 0 value for electrical displacement at the 12 o'clock and 6 o'clock positions of each circle.

The same notation again appears at the 3 o'clock and 9 o'clock positions. This is to accommodate the observation of Mr. Larson that units of motion follow laws of probability and do not form combinations that are highly unsymmetrical and thus unlikely. Therefore, the element carbon, at the 3 o'clock position in circle 2 for example, is just as likely to take an alternate, but equivalent, form of its motion combination.

This alternate combination of motion is formed by incrementing the motion in a magnetic dimension to its full value at this point, but then compensating for it by adding an equivalent value of electrical displacement in time (indicated by placing parenthesis around the value). Since, in the RS theory, time is the inverse of space, this effectively balances the combination of motion by bringing the total back to the value represented by the original notation. In other words, 2-2-(4) = 2-1-4 for carbon.

As the series progresses, the alternate form of motion combination becomes more likely. Therefore, in each circle, at the 3 o'clock and 9 o'clock positions, the notation switches to the alternate form and the electrical displacement value of each element is shown as units of time displacement descending to zero at the 6 o'clock and 12 o'clock positions.

Successive units of magnetic displacement have an increased value of equivalent electrical displacement by virtue of the nature of the motion itself. Since magnetic motion is actually comprised of two 2 dimensional motions (the first two dimensional motion can be conceived as forming a disk and the second as a rotation of the disk), the equivalent 1 dimensional electrical motion (displacement) of any magnetic motion is two times the value of the magnetic motion squared.

But atoms, according to the RS theory, are actually double units of magnetic motion joined together (as indicated in positions 1 & 2 of the notation). Therefore, the number of total electrical displacements in a circle, and thus the total number of element positions available in a circle, is twice the electrical equivalent of the magnetic motion that produces the unit of speed displacement at that point in the progression. So, the first unit (1st circle) has twice 2 times 1 squared or four positions. However, in the first circle, only the fourth position, hydrogen, is represented. The first three positions are not shown, but if they were shown, position one would have the value 1-0-0, position two, 1-0-1, and position three, 1-1-0.

The total electrical displacement value of the second unit (2nd circle), starting with helium, is 2 times 2 squared or 8 electrical units in each of the two magnetic motion combinations, for a total of 16. The value of the third unit (3rd circle), starting with argon, is 2 times 3 squared or 18 units of equivalent electrical motion in each magnetic motion combination, for a total of 36. The value of the fourth unit, starting with xenon, is 2 times 4 squared or 32 units of equivalent electrical motion in each of the two magnetic motion combinations, for a total of 64.

So, starting with element number 1, hydrogen, we add one electrical displacement to its value of 1-1-1 which produces helium, 2-1-0 and then proceed around the circle as previously described.

"If the American people ever allow private banks to control the issue of their currency, first by inflation and then by deflation, the banks and the corporations that will grow up around them will deprive the people of all property until their children wake up homeless on the continent their fathers conquered."

—Thomas Jefferson

"We must take away from this the stigma of private enterprise. We must convince the people that it is a governmental agency. We must call it the Federal Reserve System. Then everybody will think that it is a government organization and that it is constitutional. But actually it will be in the control of the bankers for their own private benefits."

—Paul M. Warburg, first chairman of the Federal Reserve
Basic Properties of Matter

Chapter II: Inter-atomic Distances

Dewey B. Larson

As equation 1-10 indicates, the distance between any two atoms in a solid aggregate is a function of the specific rotations of the atoms. Since each atom is capable of assuming any one of several different relative orientations of its rotational motions, it follows that there are a number of possible specific rotations for each combination of atoms. This number of possible alternatives is still further increased by two additional factors that were discussed earlier. The atom has the option, as we noted in Chapter 10, Volume I, of rotating with the normal magnetic displacement and a positive electric displacement, or with the next higher magnetic displacement and a negative electric increment. And in either case, the effective quantity, the specific rotation, may be modified by extension of the motion to a second vibrating unit, as brought out in Chapter 1.

It is possible that each of these many variations of the magnitude of the specific rotation, and the corresponding values of the inter-atomic distances, may actually be realized under appropriate conditions, but in any particular set of circumstances certain combinations of rotations are more probable than the others, and in ordinary practice the number of different values of the distance between the same two atoms is relatively small, except in certain special cases. As matters now stand, therefore, we are able to calculate from theoretical premises a small set of possible inter-atomic distances for each element or compound.

Ultimately it will no doubt be advisable to evaluate the probability relations in detail so that the results of the calculations will be as specific as possible, but it has not been feasible to undertake this full treatment of the probability relationships in this present work. In an investigation of so large a field as the structure of the physical universe there must not only be some selection of the subjects that are to be covered, but also some decisions as to the extent to which that coverage will be carried. A comprehensive treatment of the probability relations wherever they enter into physical situations could be quite helpful, but the amount of time and effort required to carry out such a project will undoubtedly be enormous, and its contribution to the major objectives of this present undertaking is not sufficient to justify allocating so much of the available resources to it. Similar decisions as to how far to carry the investigation in certain areas have had to be made from time to time throughout the course of the work in order to limit it to a finite size.

It might be well to point out in this connection that it will never be possible to calculate a unique inter-atomic distance for every element or combination of elements, even when the probability relations have been definitively established, as in many cases the choice from among the alternatives is not only a matter of relative probability, but also of the history of the particular specimen. Where two or more alternative forms are stable within the range of physical conditions under which the empirical examination is being made; the treatment to which the specimen has previously been subjected plays an important part in the determination of the structure.

It does not follow, however, that we are totally precluded from arriving at definite values for the inter-atomic distances. Even though no quantitative evaluation of the relative probabilities of the various alternatives is yet available, the nature of the major factors involved in their determination can be deduced theoretically, and this qualitative information is sufficient in most cases to exclude all but a very few of the total number of possible variations of the specific rotations. Further-more, there are some series relations by means of which the range of variability can be still further narrowed. These series patterns will be more evident when we examine the distances in compounds in the next chapter, and they will be given more detailed consideration at that point.

The first thing that needs to be emphasized as we begin our analysis of the factors that determine the inter-atomic distance is that we are not dealing with the sizes of atoms; what we are undertaking to do is to evaluate the distance between the equilibrium positions that the atoms occupy under specified conditions. In Chapter 1 we examined the general nature of the atomic equilibrium. In this and the following chapter we will see how the various factors involved in the relations between the
rotations of the (apparently) interacting atoms affect the point of equilibrium, and we will arrive at values of the inter-atomic distances under static conditions. Then in Chapters 5 and 6 we will develop the quantitative relations that will enable us to determine just what changes take place in these equilibrium distances when external forces in the form of pressure and temperature are applied.

As we have seen in the preceding volume, all atoms and aggregates of matter are subject to two opposing forces of a general nature: gravitation and the progression of the natural reference system. These are the primary forces (or motions) that determine the course of physical events. Outside the gravitational limits of the largest aggregates, the outward motion due to the progression of the natural reference system exceeds the inward motion of gravitation, and these aggregates, the major galaxies, move outward from each other at speeds increasing with distance. Inside the gravitational limits the gravitational motion is the greater, and all atoms and aggregates move inward. Ultimately, if nothing intervenes, this inward motion carries each atom within unit distance of another, and the directional reversal that takes place at the unit boundary then results in the establishment of an equilibrium between the motions of the two atoms. The inter-atomic distance is the distance between the atomic centers in this equilibrium condition. It is not, as currently assumed, an indication of the sizes of the atoms.

The current theory which regards the interatomic distance as a measure of "size" is, in many respects, quite similar to the electronic "bond" theory of molecular structure. Like the electronic theory, it is based on an erroneous assumption—in this case, the assumption that the atoms are in contact in the solid state—and like the electronic theory, it fits only a relatively small number of substances in its simple form, so that it is necessary to call upon a profusion of supplementary and subsidiary hypotheses to explain the deviations of the observed distances from what are presumed to be the primary values. As the textbooks point out, even in the metals, which are the simplest structures from the standpoint of the theory, there are many difficult problems, including the awkward fact that the presumed "size" is variable, depending on the nature of the crystal structure. Some further aspects of this situation will be considered in Chapter 3.

The resemblance between these two erroneous theories is not confined to the lack of adequate foundations and to the nature of the difficulties that they encounter. It also extends to the resolution of these difficulties, as the same principles that were derived from the postulates of the Reciprocal System to account for the formation of molecules of chemical compounds, when applied in a somewhat different way, are the general considerations that govern the magnitude of the inter-atomic distance in both elements and compounds. Indeed, all aggregates of electronegative elements are molecular in their composition, rather than atomic, as the molecular requirement that the negative electric displacement of an atom of such an element must be counterbalanced by an equivalent positive displacement in order to arrive at a stable equilibrium in space applies with equal force to a combination with a like atom. As we saw in our examination of the structural situation, electropositive elements are not subject to this restriction, but in many cases the molecular (balanced orientation) type of structure takes precedence over the electropositive structure by reason of collateral factors that affect the relative probability. Because of this fact that the distances follow the structural pattern, the various ways of orienting the atomic rotations that were discussed in Chapter 18, Volume I, with a few modifications due to the special conditions that exist in the elemental aggregates, determine the manner in which the atoms of an element are able to combine with each other, and the effective values of the specific rotations in these combinations.

In the electropositive elements the specific rotations are based, in the first instance, on the rotational displacements as listed in Chapter 10, Volume I. Where the inter-atomic orientation is the normal positive arrangement, the displacements as listed are translated directly into specific rotations by addition of the initial unit and reduction of the incremental values where the rotation extends to vibration two. Except for the elements of group 2A, which, as already noted, are subject to some special considerations because of their low magnetic displacements, the elements of Division I all follow the regular electropositive pattern of specific rotations. The only irregularities are in the electric rotations of the second and third elements of each group, where the point of transition to vibration two varies between groups. The inter-atomic distances in this division are listed in Table 2.

The regular electropositive pattern is also applicable in Division II, and a number of the Division II elements of Group 3A crystallize on this basis, with inter-atomic distances determined in the same manner as in Division I. As noted in Volume I, however, the Division II elements generally favor the magnetic type of orientation in chemical
compounds because the normal positive orientation becomes less probable as the displacement, increases. The same probability considerations operate against the positive orientation in the elements of this division, but instead of employing the magnetic orientation as the alternate, these elements utilize a type of orientation that is available only where all rotations of each participant in a combination are identical with those of the other. This arrangement reverses the effective directions of the rotations of alternate atoms. The resulting relative rotation is a combination of $x$ and $8-x$ (or $4-x$), as in the neutral orientation, and the effective specific rotations are 10 for vibration one and 5 for vibration two. A combination value 5-10 is also common.

<table>
<thead>
<tr>
<th>Group</th>
<th>Atomic Number</th>
<th>Name</th>
<th>Specific Rotation</th>
<th>Distance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Magnetic</td>
<td>Electric</td>
</tr>
<tr>
<td>2B</td>
<td>11</td>
<td>Sodium</td>
<td>3-2½</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>12</td>
<td>Magnesium</td>
<td>3-2½</td>
<td>2½</td>
</tr>
<tr>
<td></td>
<td>13</td>
<td>Aluminum</td>
<td>3-2½</td>
<td>3</td>
</tr>
<tr>
<td>3A</td>
<td>19</td>
<td>Potassium</td>
<td>4-3</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>20</td>
<td>Calcium</td>
<td>4-3</td>
<td>2½</td>
</tr>
<tr>
<td></td>
<td>21</td>
<td>Scandium</td>
<td>4-3</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>22</td>
<td>Titanium</td>
<td>4-3</td>
<td>5</td>
</tr>
<tr>
<td>3B</td>
<td>37</td>
<td>Rubidium</td>
<td>4-4</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>38</td>
<td>Strontium</td>
<td>4-4</td>
<td>2½</td>
</tr>
<tr>
<td></td>
<td>39</td>
<td>Yttrium</td>
<td>4-4</td>
<td>3½</td>
</tr>
<tr>
<td></td>
<td>40</td>
<td>Zirconium</td>
<td>4-4</td>
<td>5</td>
</tr>
<tr>
<td>4A</td>
<td>55</td>
<td>Cesium</td>
<td>4½-4½</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>56</td>
<td>Barium</td>
<td>5-4½</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>57</td>
<td>Lanthanum</td>
<td>4½-4½</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>58</td>
<td>Cerium</td>
<td>5-4½</td>
<td>5</td>
</tr>
<tr>
<td>4B</td>
<td>89</td>
<td>Actinium</td>
<td>4½-5</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>90</td>
<td>Thorium</td>
<td>4½-5</td>
<td>5</td>
</tr>
</tbody>
</table>

This reverse type of structure makes its appearance in body-centered cubic crystal forms of Chromium and Iron, which coexist with the regular positive hexagonal or face-centered cubic structures. Vanadium and Niobium, the first Division II elements of their respective groups, combine the positive and reverse orientations. Beyond Niobium the positive orientation does not appear in the common Division II forms of the elements, the structures to which the present discussion is limited, and all elements take the reverse orientation, except Europium and Ytterbium, which combine it with a unit-specific rotation; that is, no electric-rotational displacement at all, as in the inert gas elements.

On the basis of the considerations discussed in Chapter 1, the average effective specific rotation for such rotational combinations has been taken as the geometric mean of the two components. Where the orientations are the same, and the only difference is in the magnitude, as in the 5-10 combination, and in the combinations of magnetic rotations that we will encounter later, the equilibrium is reached in the normal manner. If two different electric rotations are involved, the two-atom pairs cannot attain spatial equilibrium individually, but they establish a group equilibrium similar to that which is achieved where $n$ atoms of valence one each combine with one atom of valence $n$.

The Division II distances are shown in Table 3.

Because of the greater probability of the electropositive types of combinations, the characteristics of Division II carry over into the first elements of Division III, and these elements, Nickel, Palladium, and Lutetium, are included in the table. Some similar modifications of the normal division boundaries have already been noted in connection with other subjects.
Table 3: Distances - Division II

<table>
<thead>
<tr>
<th>Group</th>
<th>Atomic Number</th>
<th>Name</th>
<th>Specific Rotation Magnetic</th>
<th>Specific Rotation Electric</th>
<th>Distance Calculated</th>
<th>Distance Observed</th>
</tr>
</thead>
<tbody>
<tr>
<td>3A</td>
<td>23</td>
<td>Vanadium</td>
<td>4-3</td>
<td>6-10</td>
<td>2.62</td>
<td>2.62</td>
</tr>
<tr>
<td></td>
<td>24</td>
<td>Chromium</td>
<td>4-3</td>
<td>7</td>
<td>2.68</td>
<td>2.72</td>
</tr>
<tr>
<td></td>
<td>25</td>
<td>Manganese</td>
<td>4-3</td>
<td>8</td>
<td>2.59</td>
<td>2.58</td>
</tr>
<tr>
<td></td>
<td>26</td>
<td>Iron</td>
<td>4-3</td>
<td>8½</td>
<td>2.56</td>
<td>2.57</td>
</tr>
<tr>
<td></td>
<td>27</td>
<td>Cobalt</td>
<td>4-3</td>
<td>10</td>
<td>2.46</td>
<td>2.48</td>
</tr>
<tr>
<td></td>
<td>28</td>
<td>Nickel</td>
<td>4-3</td>
<td>9½</td>
<td>2.52</td>
<td>2.51</td>
</tr>
<tr>
<td></td>
<td>3B</td>
<td>Niobium</td>
<td>4-4</td>
<td>6-10</td>
<td>2.83</td>
<td>2.85</td>
</tr>
<tr>
<td></td>
<td>41</td>
<td>Molybdenum</td>
<td>4-4½</td>
<td>10</td>
<td>2.72</td>
<td>2.72</td>
</tr>
<tr>
<td></td>
<td>42</td>
<td>Technetium</td>
<td>4-4½</td>
<td>10</td>
<td>2.73*</td>
<td>2.73</td>
</tr>
<tr>
<td></td>
<td>43</td>
<td>Ruthenium</td>
<td>4-4½</td>
<td>10</td>
<td>2.73</td>
<td>2.70</td>
</tr>
<tr>
<td></td>
<td>44</td>
<td>Rhodium</td>
<td>4-4½</td>
<td>10</td>
<td>2.66</td>
<td>2.69</td>
</tr>
<tr>
<td></td>
<td>45</td>
<td>Palladium</td>
<td>4-4½</td>
<td>10</td>
<td>2.73</td>
<td>2.76</td>
</tr>
<tr>
<td></td>
<td>46</td>
<td>Neodymium</td>
<td>5-4½</td>
<td>5</td>
<td>3.61</td>
<td>3.64</td>
</tr>
<tr>
<td></td>
<td>59</td>
<td>Praseodymium</td>
<td>5-4½</td>
<td>5</td>
<td>3.61</td>
<td>3.65</td>
</tr>
<tr>
<td></td>
<td>60</td>
<td>Samarium</td>
<td>5-4½</td>
<td>5</td>
<td>3.61</td>
<td>3.62*</td>
</tr>
<tr>
<td></td>
<td>61</td>
<td>Europium</td>
<td>4½-5</td>
<td>1-5</td>
<td>3.96</td>
<td>3.96</td>
</tr>
<tr>
<td></td>
<td>62</td>
<td>Gadolinium</td>
<td>5-4½</td>
<td>5</td>
<td>3.61</td>
<td>3.62</td>
</tr>
<tr>
<td></td>
<td>63</td>
<td>Terbium</td>
<td>5-4½</td>
<td>5</td>
<td>3.61</td>
<td>3.59</td>
</tr>
<tr>
<td></td>
<td>64</td>
<td>Dysprosium</td>
<td>5-4½</td>
<td>5</td>
<td>3.61</td>
<td>3.58</td>
</tr>
<tr>
<td></td>
<td>65</td>
<td>Holmium</td>
<td>4½-5</td>
<td>5</td>
<td>3.52</td>
<td>3.56</td>
</tr>
<tr>
<td></td>
<td>66</td>
<td>Erbium</td>
<td>4½-5</td>
<td>5</td>
<td>3.52</td>
<td>3.53</td>
</tr>
<tr>
<td></td>
<td>67</td>
<td>Thulium</td>
<td>4½-5</td>
<td>5</td>
<td>3.52</td>
<td>3.52</td>
</tr>
<tr>
<td></td>
<td>68</td>
<td>Ytterbium</td>
<td>4½-4½</td>
<td>1-5</td>
<td>3.86</td>
<td>3.87</td>
</tr>
<tr>
<td></td>
<td>69</td>
<td>Lutetium</td>
<td>4½-5</td>
<td>5</td>
<td>3.52</td>
<td>3.50*</td>
</tr>
<tr>
<td></td>
<td>70</td>
<td>Protactinium</td>
<td>4½-5</td>
<td>5-10</td>
<td>3.22</td>
<td>3.24*</td>
</tr>
<tr>
<td></td>
<td>71</td>
<td>Uranium</td>
<td>4½-4½</td>
<td>10</td>
<td>2.87</td>
<td>2.85</td>
</tr>
<tr>
<td></td>
<td>72</td>
<td>Neptunium</td>
<td>4½-4½</td>
<td>5</td>
<td>3.43</td>
<td>3.46*</td>
</tr>
<tr>
<td></td>
<td>73</td>
<td>Plutonium</td>
<td>4½-4½</td>
<td>5-10</td>
<td>3.14</td>
<td>3.15*</td>
</tr>
<tr>
<td></td>
<td>74</td>
<td>Americium</td>
<td>4½-4½</td>
<td>5</td>
<td>3.43</td>
<td>3.46*</td>
</tr>
<tr>
<td></td>
<td>75</td>
<td>Curium</td>
<td>4½-4½</td>
<td>5-10</td>
<td>3.14</td>
<td>3.10*</td>
</tr>
<tr>
<td></td>
<td>76</td>
<td>Berkelium</td>
<td>4½-4½</td>
<td>5</td>
<td>3.43</td>
<td>3.40*</td>
</tr>
</tbody>
</table>

The net total rotation of the material atom is a motion with positive displacement—that is, a speed less than unity—and as such it normally results in a change of position in space. Inside unit space, however, all motion is in time. The orientation of the atom for the purpose of the space-time equilibrium therefore exists in the three dimensions of time. As we saw in our examination of the inter-regional situation in Chapter 12, Volume I, each of these dimensions contacts the space of the region outside unit distance individually. To the extent that the motion in a dimension of time acts along the line of this contact it is a motion in equivalent space. Otherwise it has no spatial effect beyond the unit boundary. Because of the independence of the three dimensions of motion in time the relative orientation of the electric rotation of any combination of atoms may be the same in all spatial dimensions, or there may be two or three different orientations.

In most of the elements that have been discussed thus far the orientation is the same in all spatial dimensions, and in the exceptions the alternate rotations are symmetrically distributed in the solid structure. The force system of an aggregate of such elements is isotropic. It follows that any aggregate of atoms of these elements has a structure in which the constituents are arranged in one of the Geometrical patterns possible for equal forces: an isometric crystal. All of the electropositive elements (Divisions I and II) crystallize in isometric forms, and, except for a few which apparently have quite complex structures, each of the crystal forms of these elements belongs to one or another of three
types: the face-centered cube, the body-centered cube, or the hexagonal close-packed structure.

We now turn to the other major subdivision of the elements, the electronegative class, those whose normal electric displacement is negative. Here the force system is not necessarily isotropic, since the most probable arrangement in one or two dimensions may be the negative orientation, a direct combination of two negative electric displacements, similar to the all-positive combinations. It is not possible to have negative orientation in all three dimensions, and wherever it does exist in one or two dimensions the rotational forces of the atoms are necessarily anisotropic. The controlling factor is the requirement that the net total rotational displacement of a material atom as a whole must be positive. Negative orientation in all three dimensions is obviously incompatible with this requirement, but if the negative displacement is restricted to one dimension the aggregate has fixed atomic positions in two dimensions, with a fixed average position in the third because of the positive displacement of the atom as a whole. This results in a crystal structure that is essentially equivalent to one with fixed positions in all dimensions. Such crystals are not usually isometric, as the inter-atomic distance in the odd dimension is generally different from that of the other two. Where the distances in all dimensions do happen to coincide, we will find on further investigation that the space symmetry is not an indication of force symmetry.

If the negative displacement is very small, as in the lower division IV elements, it is possible to have negative orientation in two dimensions if the positive displacement in the third dimension exceeds the sum of these two negative components, so that the net result is still positive. Here the relative positions of the atoms are fixed in one dimension only, but the average positions in the other two dimensions are constant by reason of the net positive displacement of the atoms. An aggregate of such atoms retains most of the external characteristics of a crystal, but when the internal structure is examined the atoms appear to be distributed at random, rather than in the orderly arrangement of the crystal. In reality there is just as much order as in the crystalline structure, but part of the order is in time rather than in space. This form of matter can be identified as the glassy, or vitreous, form, to distinguish it from the crystalline form.

The term “state” is frequently used in this connection instead of “form,” but the physical state of matter has an altogether different meaning based on other criteria, and it seems advisable to confine the use of this term to the one application. Both glasses and crystals are in the solid state.

In beginning a consideration of the structures of the individual electronegative elements, we will start with Division III. The general situation in this division is similar to that in Division II, but the negativity of the normal electric displacement introduces a new factor into the determination of the orientation pattern, as the most probable orientation of an electronegative element may not be capable of existing in all three dimensions. As stated earlier, where two or more different orientations are possible in a given set of circumstances the relative probability is the deciding factor. Low displacements are more probable than high displacements. Simple orientations are more probable than combinations. Positive electric orientation is more probable than negative. In Division I all of these factors operate in the same direction. The positive orientation is simple, and it also has the lowest displacement value. All structures in this division are therefore formed on the basis of the positive orientation. In Division II the margin of probability is narrow. Here the positive displacement x is greater than the inverse displacement 8-x, and this operates against the greater inherent probability of a simple positive structure. As a result, both the positive and reverse types of structure are found in this division, together with a combination of the two.

In Division III the negative orientation has a status somewhat similar to that of the positive orientation in Division II. As a simple orientation, it has a relatively high probability. But it is limited to one dimension. The regular division III structures of Groups 3A and 3B are therefore anisotropic, with the reverse orientation in the other two dimensions. A combination of these two types of orientation is also possible, and in copper and silver, the first Division III elements of their respective groups, the crystals formed on the basis of this combination orientation have cubic symmetry. As in Division II, the elements of Division III in Groups 4A and 4B crystallize entirely on the basis of the reverse orientation. Table 4 lists what may be considered as the regular inter-atomic distances of the elements of Division III.

Although the probability of the negative orientation is greater in Division IV than in Division III, because of the smaller displacement values, this type of structure seldom appears in the crystals of the lower division. The reason is that where this orientation exists in the elements of the lower displacements, it exists in two dimensions, and this
Table 4: Distances - Division III

<table>
<thead>
<tr>
<th>Group</th>
<th>Atomic Number</th>
<th>Name</th>
<th>Specific Rotation</th>
<th>Distance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Magnetic</td>
<td>Electric</td>
</tr>
<tr>
<td>3A</td>
<td>29</td>
<td>Copper</td>
<td>4-3</td>
<td>8-10</td>
</tr>
<tr>
<td></td>
<td>30</td>
<td>Zinc</td>
<td>4-4</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>31</td>
<td>Gallium</td>
<td>4-4</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>5-3</td>
<td></td>
<td>4-3</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td></td>
<td>4-3</td>
<td>10</td>
</tr>
<tr>
<td>3B</td>
<td>47</td>
<td>Silver</td>
<td>4-5</td>
<td>8-10</td>
</tr>
<tr>
<td></td>
<td>48</td>
<td>Cadmium</td>
<td>5-4</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>49</td>
<td>Indium</td>
<td>5-4</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>5-4</td>
<td></td>
<td>6</td>
<td>3.33</td>
</tr>
<tr>
<td></td>
<td>6-10</td>
<td></td>
<td>5-4</td>
<td>3.21</td>
</tr>
<tr>
<td>4A</td>
<td>72</td>
<td>Hafnium</td>
<td>4-4½</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>73</td>
<td>Tantalum</td>
<td>4½-4½</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>74</td>
<td>Tungsten</td>
<td>4-4½</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>75</td>
<td>Rhenium</td>
<td>4-4½</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>76</td>
<td>Osmium</td>
<td>4-4½</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>77</td>
<td>Iridium</td>
<td>4-4½</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>78</td>
<td>Platinum</td>
<td>4-4½</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>79</td>
<td>Gold</td>
<td>4½-4½</td>
<td>10</td>
</tr>
<tr>
<td>80</td>
<td>80</td>
<td>Mercury</td>
<td>4-4½</td>
<td>5-10</td>
</tr>
<tr>
<td></td>
<td>81</td>
<td>Thallium</td>
<td>4½-4½</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>4½-4½</td>
<td>5</td>
</tr>
</tbody>
</table>

produces a glassy or vitreous aggregate rather than a crystal. The reverse orientation is not subject to any restrictive factor of this nature, but it is less probable at the lower displacements, and except in Group 4A, where it continues to predominate, this orientation appears less frequently as the displacement decreases. Where it does exist it is increasingly likely to combine with some other type of orientation. As a result of these limitations that are applicable to the inherently more probable types of orientation, many of the Division IV structures are formed on the basis of the secondary positive orientation, a combination of two 8-x displacements.

The secondary positive orientation is not possible in the electropositive divisions, as 8-x is negative in these divisions, and like the negative orientation itself, an 8-x negative combination would be confined to a subordinate role in one or two dimensions of an asymmetric structure. Such a crystal structure cannot compete with the high probability of the symmetrical electropositive crystals, and therefore does not exist. In the electronegative divisions, however, the 8-x displacement is positive, and there are no limitations on it, aside from those arising from the high displacement values.

The effective displacement of this secondary positive orientation is even greater than might be expected from the magnitude of the quantity 8-x, as the change of zero points for the two oppositely directed motions is also oppositely directed, and the new zero points are 16 displacement units apart. The resultant relative displacement is 16-2x, and the corresponding specific rotation is 18-2x. In Division IV the numerical values of the latter expression range from 10 to 16, and because of the low probability of such high rotations, the secondary positive orientation is limited to one or one and one-half dimensions in spite of its positive character. In Division III the 8-x displacements are lower, but in this case they are too low. A two-unit separation of the zero points (16 displacement units) cannot be maintained unless the effective displacement is at least 8 (one full three-dimensional unit). The secondary positive orientation is therefore confined to Division IV.

A special type of structure is possible only for those electronegative elements which have a rotational displacement of four units in the electric dimension. These elements are on the borderline between Divisions III and IV, where the secondary positive and reverse orientations are about equally probable. Under similar conditions other elements crystallize in hexagonal or tetragonal structures, utilizing the different orientations in the different dimensions. For these displacement 4 elements, however, the two orientations produce the same specific rotation: 10.
<table>
<thead>
<tr>
<th>Group</th>
<th>Atomic Number</th>
<th>Name</th>
<th>Specific Rotation</th>
<th>Distance Calculated</th>
<th>Distance Observed</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Magnetic</td>
<td>Electric</td>
<td></td>
</tr>
<tr>
<td>2B</td>
<td>14</td>
<td>Silicon</td>
<td>3-3</td>
<td>5-10</td>
<td>2.31</td>
</tr>
<tr>
<td></td>
<td>15</td>
<td>Phosphorus</td>
<td>3-3</td>
<td>10</td>
<td>2.19</td>
</tr>
<tr>
<td></td>
<td>16</td>
<td>Sulfur</td>
<td>3-3</td>
<td>10</td>
<td>3.46</td>
</tr>
<tr>
<td></td>
<td>17</td>
<td>Chlorine</td>
<td>3-3</td>
<td>16</td>
<td>2.11</td>
</tr>
<tr>
<td></td>
<td>3A</td>
<td>Germanium</td>
<td>3-3</td>
<td>1-16</td>
<td>3.21</td>
</tr>
<tr>
<td></td>
<td>33</td>
<td>Arsenic</td>
<td>4-3</td>
<td>10</td>
<td>1.92</td>
</tr>
<tr>
<td></td>
<td>34</td>
<td>Selenium</td>
<td>4-3</td>
<td>14</td>
<td>2.48</td>
</tr>
<tr>
<td></td>
<td>35</td>
<td>Bromine</td>
<td>4-3</td>
<td>16</td>
<td>2.46</td>
</tr>
<tr>
<td>3B</td>
<td>50</td>
<td>Tin</td>
<td>4½-4</td>
<td>10</td>
<td>2.37</td>
</tr>
<tr>
<td></td>
<td>51</td>
<td>Antimony</td>
<td>5-4</td>
<td>10</td>
<td>2.46</td>
</tr>
<tr>
<td></td>
<td>52</td>
<td>Tellurium</td>
<td>5-4½</td>
<td>4-10</td>
<td>2.32</td>
</tr>
<tr>
<td></td>
<td>53</td>
<td>Iodine</td>
<td>5-4½</td>
<td>1-16</td>
<td>3.46</td>
</tr>
<tr>
<td>4A</td>
<td>82</td>
<td>Lead</td>
<td>5-4</td>
<td>1</td>
<td>3.22</td>
</tr>
<tr>
<td></td>
<td>84</td>
<td>Polonium</td>
<td>4½-4½</td>
<td>5</td>
<td>2.94</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>5-4½</td>
<td>10</td>
<td>2.83</td>
</tr>
<tr>
<td></td>
<td>85</td>
<td>Bismuth</td>
<td>4½-4½</td>
<td>5</td>
<td>3.34</td>
</tr>
<tr>
<td></td>
<td>84</td>
<td>Polonium</td>
<td>4½-4½</td>
<td>5-10</td>
<td>3.32</td>
</tr>
</tbody>
</table>

The inter-atomic distance in these crystals is therefore the same in all dimensions, and the crystals are isometric, even though the rotational forces in the different dimensions are not of the same character. The molecular arrangement in this crystal pattern, the diamond structure, shows the true nature of the rotational forces. Outwardly this crystal cannot be distinguished from the isotropic cubic crystals, but the analogous body-centered cubic structure has an atom at each corner of the cube as well as one in the center, whereas the diamond structure leaves alternate corners open to accommodate the abnormal projection of forces in the secondary positive dimension.

In those of the lower elements of Division IV that are beyond the range of the inverse type of orientation, there is no available alternative for combination with the secondary positive orientation. The crystals of these elements therefore have no effective electric rotation in the remaining dimensions, and the relative specific rotation in these dimensions is unity, as in all dimensions of the inert gas elements. The most common distances in the aggregates of the Division IV elements are shown in Table 5.

Up to this point, no consideration has been given to the elements of atomic number below 10, as the rotational forces of these elements are subject to certain special influences which make it desirable to discuss them separately. One cause of deviation from the normal behavior is the small size of the rotational groups. In the larger groups the four divisions are distinct, and, except for some overlapping, each has its own characteristic force combinations, as we have seen in the preceding paragraphs. In an 8-element group, however, the second series of four elements, which would normally constitute Division III, is actually in the Division IV position. As a result, these four elements have, to a certain extent, the properties of both divisions. Similarly, the Division I elements of these groups may, in some cases, act as if they were
Table 6: Distances - Lower Group Elements

<table>
<thead>
<tr>
<th>Group</th>
<th>Atomic Number</th>
<th>Name</th>
<th>Specific Rotation</th>
<th>Distance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Magnetic</td>
<td>Electric</td>
<td>Calculated</td>
</tr>
<tr>
<td>1B</td>
<td>1</td>
<td>Hydrogen</td>
<td>3(1)</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>Helium</td>
<td>3(1)</td>
<td>1</td>
</tr>
<tr>
<td>*2A</td>
<td>3</td>
<td>Lithium</td>
<td>2½-2¼</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>Beryllium</td>
<td>3(2)</td>
<td>2½</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>Boron</td>
<td>3(2)</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>C (diamond)</td>
<td>3(1½)</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>C (graphite)</td>
<td>3(2)</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>Nitrogen</td>
<td>3-3</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>Oxygen</td>
<td>3(1½)</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>9</td>
<td>Fluorine</td>
<td>3(2)</td>
<td>1</td>
</tr>
</tbody>
</table>

members of Division III.

A second influence that affects the forces and the crystal structures of the lower group elements is the inactivity of the rotational forces in certain dimensions that was mentioned earlier. A specific rotation of two units produces no effect in the positive direction. The reason for this is revealed by equation 1-1. By applying this equation we find that the effective rotational force (ln t) for t = 2 is 0.693, which is less than the opposing space-time force 1.00. The net effective force of specific rotation 2 is therefore below the minimum value for action in the positive direction. In order to produce an active force the specific rotation must be high enough to make ln t greater than unity. This is accomplished at rotation 3.

The specific magnetic rotation of the 1B group, which includes only the two elements hydrogen and helium, and the 2A group of eight elements beginning with lithium, combines the values 3 and 2. Where the value 2 applies to the subordinate rotation (3-2), one dimension is inactive; where it applies to the principal rotation (2-3), two dimensions are inactive. This reduces the force exerted by each atom to 2/3 of the normal amount in the case of one inactive dimension, and to 1/3 for two inactive dimensions. The inter-atomic distance is proportional to the square root of the product of the two forces involved. Thus the reduction in distance is also 1/3 per inactive dimension.

Since the electric rotation is not a basic motion, but a reverse rotation of the magnetic rotational system, the limitations to which the basic rotation is subject are not applicable. The electric rotation merely modifies the magnetic rotation, and the low value of the force integral for specific rotation 2 makes itself apparent by an inter-atomic distance which is greater than that which would prevail if there were no electric displacement at all (unit specific rotation).

Theoretical values of the inter-atomic distances of the lower group elements are compared with measured values in Table 6.

The figures in parentheses in column 4 of this table indicate the effective number of dimensions. Thus the notation 3(1) shown for hydrogen means that this element has a specific magnetic rotation of 3, effective in only one dimension.

Except where the crystals are isometric, there is still much uncertainty in the distance measurements on these lower group elements, and many other values have been reported in addition to those included in the table. This situation will be discussed at length in Chapter 3, where we will have the benefit of measurements of the distances between like atoms that are constituents of chemical compounds.

As indicated in the introductory paragraphs of this chapter, we are not yet in a position where we can determine specifically just what the inter-atomic distance will be for any given element under a given set of conditions. The theoretical considerations that have been discussed actually do lead to specific values in many cases, but in other instances there is an uncertainty as to which of two or more theoretically possible rotational arrangements corresponds to the observed crystal structure. Continuing progress is being made in both the
experimental and the theoretical fields, and it can be expected that these uncertainties will gradually diminish toward the irreducible minimum that was mentioned earlier. In the course of this process there will necessarily be some changes in the identifications of the observed inter-atomic distances with the theoretically possible structures. A comparison of Tables 1 to 6 with the corresponding tabulations of the first edition should therefore be of interest as an indication of the nature and magnitude of the changes that have taken place in our view of this interatomic distance situation in the last twenty years, and by extension, an indication of the amount of change that can be expected in the future.

Such a comparison shows that the modifications of the original conclusions that now appear to be required, in the light of the additional information that has been made available, are confined almost entirely to those which have resulted from a better theoretical understanding of the behavior of the specific magnetic rotation above an effective value of 4. Few changes are required in either the magnetic or electric values in those rotational combinations where the specific magnetic rotation is 4-4 or less.

One of the puzzling features of the rotational situation as it appeared at the time of the original publication was the apparent retrograde progression of the specific magnetic rotation in Groups 4A and 4B. It was recognized at that time that both the 4½ and 5 values of the specific rotation correspond to the same displacement, 4, the difference being that in the case of the 4½ value the rotation extends to two units of vibration, and the last increment of specific rotation in this case is only half size. The next half unit increment, if such an increment were possible, would bring the 4½ rotation back to the 5 value. It would therefore appear that the sequence of specific rotations beyond 4½-4 should be 4½-4½, 5-4½, 5-5, and so on. But the tendency is in the opposite direction. Instead of moving toward higher values as the atomic number increases, there is actually a decreasing trend. This was already evident at the time of publication of the first edition, as the low inter-atomic distances of the series of elements from Tungsten to Platinum could not be accounted for unless the specific magnetic rotation dropped back to 4-4½ from the higher levels of the preceding elements of the 4A group. This decreasing trend has become even more prominent as distances have become available for additional elements of Group 4B, as some of these values indicate specific magnetic rotations of 4-4, or possibly even 4-3½.

As it happens, the continuation of the trend toward lower values in the more recent data has had the effect of clarifying the situation. It is now evident that the 5-5 specific rotation is not reached within the accessible portion of Groups 4A and 4B. (Considerations that will be discussed later show that the specific rotation of 5-5 would be unstable.) The lower values in the 4A and 4B groups do not result from a decrease in the magnetic displacement, but from a shift of the existing displacement units from vibration one to vibration two, a process which reduces the specific rotation of the units by one half. On a vibration one basis, rotational displacements 4-3 correspond to specific rotations 5-4. Conversion of successive units of displacement to vibration two, without change in the number of displacement units, results in a series of specific rotations, 5-4, 4½-4, 4-4½, 4-4, and so on. A similar series with one additional displacement unit goes through the values 5-4½, 4½-5, 4½-4½, 4½-4, and then follows the same route as the series with the lower displacement.

The modifications that have been made in the theoretical rotational values applicable to the elements of these two highest rotational groups since the publication of the first edition are the result of a review of the situation in the light of this new understanding of the trend of the specific rotation. The general pattern in group 4A is now seen to be that of the series from 5-4½ to 4-4½, with a return to 4½-4½ in the lower electronegative elements. So far as can be determined at this time, Group 4B follows the same pattern one step farther advanced; that is, it begins with 4½-5 rather than 5-4½.

The difference in the inter-atomic distance corresponding to one of the steps in this conversion process is relatively small, and in view of the substantial variation in the experimental values it has not appeared advisable to take into account the possibility of combinations such as 4½-5 specific rotation of one atom of a pair and 4½-4½ in the other. It seems clear that such combinations do exist in some of the lower group elements, Sodium, for example, and they probably play some part in the higher groups. Most of the reported distances for Holmium and Erbium, for instance, agree more closely with a combination of 5-4½ and 4½-5 than with either individually. However, all of these values are theoretically possible, and the only question at issue in this and many other similar cases is which theoretical value corresponds to the observed distance. Definitive answers to identification questions of this kind will have to wait until the theoretical probabilities are specifically evaluated, or the experimental uncertainties are resolved.
Many questions concerning alternate crystal structures will also have to wait for more information from theory or experiment, particularly where crystal forms that exist only at high temperatures or pressures are involved. There is, however, a large body of information already available in this area, and it can be tied into the theoretical picture as soon as someone has the time and the inclination to undertake the task.

---

**Space-Time Geometry**

**Dr. Bruce M. Peret**

One of the basic premises of the *Reciprocal System* is that of "unity natural datum," the default motion of one unit of space per one unit of time, which we identify scientifically as the speed of light. All of the *Reciprocal System* material assumes that this also implies that a single unit of space is connected to a single unit of time, to form that unit of motion.

At the 1996 Denver retreat, I presented a concept which I referred to as "perpendicular time"—the idea that space and time were not "parallel" progressions, but had a 90° phase relationship, as the X and Y axes of a graph do. With further research, what I have found is that both cases are true.

For example, the 1/3 photon in a "parallel" system would be:

<table>
<thead>
<tr>
<th></th>
<th>in</th>
<th>out</th>
<th>in</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>out</td>
<td>out</td>
<td>out</td>
<td></td>
</tr>
</tbody>
</table>

whereas the "perpendicular" system would be:

<table>
<thead>
<tr>
<th></th>
<th>in</th>
<th>out</th>
<th>in</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>out</td>
<td>out</td>
<td>out</td>
<td></td>
</tr>
</tbody>
</table>

composed of $1/(\frac{1}{2}+2+\frac{1}{2}) = 1/3$. The problem with this is the loss of the "quantized" aspect of dealing solely with discrete units of motion. (Though Larson does use $\frac{1}{2}$ units quite frequently in *Basic Properties of Matter*).

Referring to Larson's research on inter-atomic distances, one finds that a temporal displacement manifests in space as the *integral* of that displacement (in the case of atoms, the $1/x$ series integrates into the natural logarithm). The primary motion is the *vibration*, represented by the *cosine* function (the zero-degree reference—the unit boundary—is 1.0, and therefore cosine is more appropriate a representation than sine). Thus, a temporally displaced "vibration" will manifest in space as the integral of the cosine—the *sine wave*.

From this we can theorize that all temporal events are out of phase by 90° from all spatial events, when viewed from the Material Sector.

We can also deduce that the Cosmic Sector, the sector of the universe with 3-dimensional time and clock space, is not far away in another half of the universe, but simply co-exists with the Material Sector, and is "rotated" 90° from our perception.

As the Y axis on a graph can only intersect the X axis at a single point (perpendicular lines are never concurrent), the Cosmic Sector can only intersect the Material at a single point—the scalar magnitude known as "clock time." So we only perceive the 3-dimensionality of the Cosmic Sector moving thru our Material Sector as a net motion, kind of like a background breeze.

Of course, the same holds true for the Cosmic Sector constructs, with the Material Sector passing thru it, 90° out of phase, manifesting as "clock space" in that half of the universe.

In summary, though motion is composed of discrete units, linked one-on-one, one aspect will always appear 90° out of phase with the other, when viewed from either the Material or Cosmic Sectors.

"The immaterial is known by means of scientific thought, the Material by scientific perception."

—Speusippus
Understanding the Reciprocal System
Lesson II

Postulates of the Reciprocal System of Theory
and some Initial Consequences

Lawrence E. Denslow

The basic postulates of the Reciprocal System of Theory from which a complete theoretical physical Universe of Motion has been developed are:

1. The physical universe is composed entirely of one component, motion, existing in three dimensions, in discrete units, and in two reciprocal forms [aspects], space and time.

As implied in this postulate motion is defined as the relation between two uniformly progressing reciprocal quantities, space and time. According to this postulate neither space nor time has separate existence apart from the concept of motion in which each is the conceptual reciprocal of the other. Even though WE cannot perceive motion without something moving, the concept of motion is not dependent upon the presence of matter for its definition and use.

2. The physical universe conforms to the relations of ordinary commutative mathematics, its primary magnitudes are absolute, and its geometry is Euclidean.

Space and time are the reciprocal aspects of each other, existing together and only in the relation that is “motion”. Complete reciprocity of the two aspects requires that time be three dimensional just like space. The dimensions of time must have temporal relationship to each other in exactly the same way spatial dimensions are related in space. The dimensions OF time are dimensions IN time, NOT in space. The dimensions OF space are dimensions IN space. The characteristics of each are merely the reciprocals of those of the other.

The three principal characteristics of unitary motion are:

(1) All motion progresses with respect to reference positions in individual reference systems in which those units of motion exist and are represented. Motion cannot be represented without the use of some kind of reference and it is obvious that many references can exist simultaneously.

All units of primary motion progress in an outward or positive direction from positions of reference and all units of displacement motion progress inward or negatively with respect to reference positions in the individual dimensional reference systems.

(2) Motion is continuous and continuity exists between contiguous units of motion as well as within individual units of motion.

Each identifiable “thing” in the physical universe whether thought of as an atom, sub-atomic particle, or an individual photon exists at an identifiable reference point in a generalized coordinate system of space. Each “thing” is composed of units of motion. Each “thing” is a reference point from which the outward progression of primary motion exists; i.e., both primary space and primary time progress outward from each and every reference point or is observed by the movement of certain reference points with respect to other reference points. Measurements of the quantities normally referred to as space and time are part and parcel, the essential expressions of, the natural progression of primary motion originating at each and every reference point in a generalization of space and in a generalization of time. There is no absolute space in the sense previously argued in scientific circles; neither the space nor the time of observation is an arbitrary immovable construct in which something can be placed or located. Continuity of progression is one of the principal characteristics of primary motion and absolute magnitude is another.

(3) Primary motion causes no change of location in the natural reference system.

Primary motion is an everpresent outwardly progressing reference from which displacements from uniform outward progression can be
recognized as something and be evaluated. Locations in the natural reference system cannot change with respect to each other. Existence of a unit of primary motion represented in a dimensional system for the purpose of supporting displacement units of motion must not cause any change in the location of that unit of primary motion in the natural reference system in order for the progression of primary space to be recognized as conventional space in a three dimensional generalization of that concept. By this requirement all points in the entire physical universe of motion are at the same stage of the natural progression of the fundamental background of the natural reference system. It is this background, the natural reference system, that is absolute. With respect to a spatially or temporally fixed reference system the background of primary motion is an incessant outward progression, but within itself it is absolutely unchanging. Without this condition it would be impossible to determine the speed of progression of light or anything else.

The Postulates, definition, and characteristics of motion require that for motions to exist they must be represented in a three dimensional mathematical system by representationally placing them relative to dimensions that are geometrically perpendicular. The geometric perpendicularity of three dimensions require that the dimensions of each reference point be relative to the dimensionality of either space or of time, since motion is posited to be three dimensional. This means that if the reference point is dimensional in the space aspect, then for the time aspect of motion, only the scalar progressive character of time can be observed relative to that reference point.

Since all reference points of which WE have any awareness are in the dimensionality of space, WE can experience only the scalar progression of time. Conditions would be reversed if our existence were in a three dimensional temporal reference system. The principal consequence of this condition is that the physical universe is composed of two reciprocal sectors; the Material Sector and the Cosmic Sector. The space of the Material Sector of the physical universe would be the time of the Cosmic Sector, and in exactly the same manner our time becomes the space of the Cosmic Sector. Sentient beings in either sector of the physical universe cannot determine which sector they are in because both sectors have the same characteristics. Both sectors are identical from that sector's viewpoint. Thus, there is for each and every reference point phenomena an apparent four dimensionality, three geometric dimensions and one scalarly progressive dimension. That is why those equations work, not because matter is dispersed in a four dimensional space-time continuum. The universe as we observe it is like a continuum because motion is continuous, not because of an infinite divisibility of either space or time; motion is posited to be unitary. Failure to recognize the three dimensionality of time has led to the false conclusion that time and space are variable.

A realization that must be maintained if any general understanding is to be gained of this system of theory is that units of motion are fundamentally all alike. A displacement unit of motion is merely oriented in opposition to a primary unit of motion in one aspect or the other. The opposition may be with respect to the spatial aspect of primary motion or it may be in opposition to the temporal aspect of primary motion. The necessity for representation of motion in a dimensional system of coordinates causes the requirement of representing all units of motion in a manner having direction.

The stipulation that a commutative system of mathematics be used to show the variety of ways in which those units of motion can be represented at individual reference points requires modes of motion beyond those which can be represented in a generalized portrayal of the characteristics of all possible orientations of many such reference points with respect to each other.

ALL generalized dimensional reference systems fail to represent any directional difference between primary motion of the natural reference system and any coexisting opposition to or displacement from primary progression. All observable motion in a generalized dimensional system relative to any reference position is confined to being represented by one directional linear movement from the reference point outward in the generalized apparently fixed reference system of space. All unobservable motion is unobservable because the general system cannot represent it as anything other than as a scalar quantity having no specific directionality; i.e., the phenomena of energy, charge, mass, etc..

Logic requires a point to exist prior to a line which includes that point. Logic also requires primary motion to exist prior to any possible opposition to primary motion and, therefore, unopposed primary motion must always be present and representable relative to every reference point coordinate system. One of six linear directions must be specifiable as the direction for the progression of the primary motion of the natural reference system relative to each identifiable reference point because “one” precedes all other numerical quantities; i.e., one of
two linear directions along any one of the three dimensions of the reference point coordinate system must be representable as the direction in which primary motion is being represented. Therefore, a dimension must be left open, undisplaced linearly, for representation of primary motion in each individual coordinate system if at all possible. Conditions will be discussed somewhat later in which such representation is not possible. A specific phenomena is exhibited as a result of having each specific kind of displacement in that dimension. The question of whether the representation of opposition to linear primary motion results in movement of the reference point with respect to other reference points in a generalization of the three dimensional system is a function of the scalar magnitude of the combination of displacements at each reference point under consideration.

The necessity for unique directionality of representation of each unit of displacement motion, relative to a three dimensional coordinate system in which they are being represented, is a result of having to represent the motion in a three dimensional coordinate system. The sequentiality of the number system which is the principal determining factor for the sequence, once a displacement must be represented. Units of motion at a reference point must be represented in accord with the total effective magnitude of displacement caused by the mode and direction of each next unit. Once uniqueness of representation within the reference point coordinate system is accomplished, consideration of the effect of random orientation of the coordinate systems causes maximum distribution of the effects in a generalization of the coordinate systems; i.e., in either dimensional space or dimensional time. Random orientation causes most of the modes of representing the motions at each reference point to have an overall scalar effect with respect to the motions at other reference points due to lack of congruent alignment.

The inability of the generalized system of coordinates to differentiate between inward and outward, and the fact that all directions are outward from each reference point in a generalized system requires designation of reference point types as an auxiliary device by which to facilitate derivation of mathematical expressions for the phenomenal results caused by each different mode and direction of representation of displacement motion.

In the previous article discussing concepts of mathematics it was found that quantities represented within specific coordinate systems could be one directional or two directional; i.e., both directions concurrently. Remember that so far as the representation of motion is concerned at a specific reference point, that point is the only thing in its universe and no two units of motion can be represented in exactly the same way. Several units may be of the same mode, but if so, they are not oriented in exactly the same way. As a consequence of representation possibilities for quantities at individual reference points and identifying motion as the variable undergoing analysis, the realization that the quantities being referred to are units of motion means that there can be no a priori requirement for a unit of motion in an individual reference point coordinate system to be limited to one linear direction under any conditions other than that caused by its position in the sequence of representations.

The actual sequence of modes of representation for units of displacement motion at individual reference points is fixed due to probability relations among the modes up through certain of those modes. From that point in the sequence the random distribution of effects in the generalized coordinate system of space causes some variation among possible combinations; this is a net scalar magnitude effect and the fact that motion is unitary. Where variations can occur each possibility is observed with the resultant effect of a given combination at a specific reference point remaining fixed for a measurable amount of time, some combinations indefinitely long. This makes it possible to identify the phenomena associated with each possible combination.

Modes of motion possible at individual reference points are:

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>TYPE</th>
<th>displacement dir.</th>
</tr>
</thead>
<tbody>
<tr>
<td># directions</td>
<td># displacements</td>
<td></td>
</tr>
</tbody>
</table>

$L^\ast$, the normal progression of the natural reference system required of all reference systems individual and generalized,

$1^\ast L^\ast$ or $L^\ast$, one dimensional, two directional linear displacement in either the positive (toward smaller values of motion) or negative (toward larger values of motion) direction from unity.

$2^\ast R^\ast$, two dimensional one direction rotational displacement in either the positive or negative direction from unity.


\[ \{1, R^*\} \text{, one dimensional one direction rotational displacement in either the positive or negative direction from unity of an entire previously represented structure having } \{1, R\} \text{ displacement.} \]

\[ \{1, L^*\} \text{, one dimensional one direction linear displacement of an entire previously existing compound rotationally represented structure; the displacement is in opposition to the unit of linearly represented primary motion with which the compound motion structure is currently associated.} \]

\[ \text{inward toward unity} \]

\[ \{1, L^+\} \text{, one dimensional two directional linear displacement of an entire previously existing compound rotationally represented structure; the displacement is in opposition to the unit of primary motion with which the compound motion structure is currently associated.} \]

\[ \text{\{2, R^*\}, two dimensional two direction rotational displacements added to specific two dimensional one directional rotationally represented displacements of certain compound motion structures (all two dimensionally rotationally represented structures cannot support these displacements).} \]

\[ \text{\{2, R^+\}, one dimensional two directional rotational displacements added to specific one dimensional one directional rotationally represented displacements of most rotationally represented compound motion structures.} \]

It is not necessary to require motion to be limited to the four modes of motion observable for conglomerates of complex motion structures. Direction is a mathematical property that is observable in a generalized three dimensional coordinate system as a result of the compounding of units of motion in specific individual coordinate systems. \{1, L^+\} units of motion added to individual reference point coordinate systems, individually or individually within aggregates of such systems in generalized space, have the effect of moving the individual system or the aggregate vectorially with respect to a previous location of the system/aggregate in generalized space.

Specific combinations of displacement motions will be discussed in other articles in the series.

---

**American Military Training Manual TM 200025 (1928)**

**DEMOCRACY:** A government of the masses. Authority derived through mass meeting or any other form of direct expression. Results in a mobocracy. Attitude toward property is communistic, negating property rights. Attitude toward law is that the will of the majority shall regulate whether it be based upon deliberation or governed by passion, prejudice and impulse without restraint or regard to consequences. Results in demogogism, license, agitation, discontent, anarchy.

**REPUBLIC:** Authority is derived through the election of public officials best fitted to represent them. Attitude toward property is respect for laws and individual rights, and a sensible economic procedure. Attitude toward law is the administration of justice in accord with fixed principles and established evidence, with a strict regard to consequences. A greater number of citizens and extent of territory may be brought within its compass. Avoids the dangerous extreme of either tyranny or mobocracy. Results in statesmanship, liberty, reason, justice, contentment and progress.
Action at a Distance

A Question of Viewpoint

Josef Hasslberger

Abstract

A philosophical description is proposed, of the basic mechanisms of physical universe and especially of the nature of matter, that is compatible with such phenomena as instantaneous action at a distance. It is proposed that material existence in physical space is conditioned and indeed dependent upon the existence of energy patterns necessary for matter to manifest and that interactions occur not between the material manifestations but between the primary energy patterns themselves.

Philosophies

Action at a distance would seem eminently possible if not probable, providing we integrate our purely physical picture of the universe with a concept of energies originating from a non-physical-universe source. As foreign as this may be to physics, we may need to start considering the possibility of a “spiritual ingredient” or “consciousness ingredient” in all things physical.

Eastern philosophic concepts have long held all material things to be filled with or interpenetrated by a life force (Ki, Prana). It would seem to me that our “scientific” denial of those things we are not able to measure is severely limiting our understanding and our ability to conceptualise existence in the material world. To be sure, there is a timid opening of western science to these concepts, witness books by Fritjof Capra and others, but by and large, anything that is not immediately accessible to measurement is still not welcome.

Shiuji Inomata has proposed to integrate the current scientific paradigm with a “consciousness” parameter. He outlines the necessary shift of paradigm in a paper entitled “Science of Consciousness and new scientific world view—we are in the midst of the second Copernican revolution”. Inomata proposes a triangular relationship between matter, energy and a consciousness parameter designated as “Q”.

In line with the work of Inomata and others, I would like to propose here a concept by which instantaneous action at a distance could be explained and I am asking the reader to forgive me if I am requiring you to stretch your imagination into an area that would seem to lay outside the province of physics. Some may even experience the ideas put forth in this paper to be a bit “unsettling” to their understanding of universe, based on the conventional scientific view.

Dimensions

Our physical world is said to be three-dimensional, with reference to the basic three degrees of freedom of movement we find to exist in a right-angle-coordinated cube-based spatial reference system as first proposed by Descartes (up-down, left-right and forward-backward, to express this in simple terms).

Although I assent to use the word three-dimensional to indicate physical space, I have shown that one could with profit describe physical space in a four-dimensional tetrahedron-based spatial reference system just by changing from 90 degree co-ordination to 60 degree co-ordination. The advantage of such a system would be an immediate orientability in physical space having to consider only four vectors, instead of six vectors (as above) of the Cartesian system.

The word three-dimensional, although in general use, is thus not an indication of any real physical properties inherent in space. It is merely a conventional way of looking at and describing space, based in Euclidean geometry. In fact, Euclid taught a progression from point (dimensionless) to line (one-dimensional) to plane (two-dimensional) and finally to space (three-dimensional). I propose that this system of geometry does not have any real physical significance and is merely an abstract way of conceptualising physical space.

We may however use Euclid’s concept of the (two-dimensional) plane and its relation to (three-dimensional) space as an analogy useful to the understanding of what follows here. As inhabitants of physical (“three-dimensional”) space we would have an inherent advantage over a hypothetical inhabitant of a two-dimensional universe contained
within our universe. We would in fact be able to observe, from our vantage point, any point of the plane and thus be able to accede to any point of that universe without having to “travel it’s space” like the inhabitant of the two-dimensional universe. This, to our two-dimensional friend, would be somewhat of a miracle, he would call it "instantaneous action at a distance" on our part.

In this same way, we should imagine a “four-dimensional” entity to exist, which contains within itself our “three-dimensional” universe and which has a similar advantage of being able to accede to and act at any point in our space, without having to traverse our space in the way we need to traverse space to arrive at our destination. I believe that one could call that “four-dimensional” entity hyperspace.

**Motion**

In an unusually insightful manner, Gian Piero Godone has proposed his “Fourth Principle of Dynamics,” adding to our concepts of motion and dynamics codified in the days of Newton. The principle was first presented in Fivizzano, Italy in October 1994 and reads:

- “Motion of bodies through space is directly mediated, in a sequential fashion, by all those particular basic elements which permit the very existence of the bodies in the first place.”

Subsequently, Godone has re-stated the principle in a more articulated way. The following is the latest (February 1998) version of Godone’s Fourth Principle of Dynamics:

- “Any possible motion of all bodies is due directly to the natural motion of their basic elements, which by their specific sequential behaviour ensure the stable existence of the bodies; such sequentiality being the consequence of constant interaction with ever new basic elements arriving in an orderly fashion from space and subsequently returning to it.”

But if we reason with Godone, and I tend to agree with him on this count, there is really no such thing as motion in the way we imagine it, there is only an appearance of motion. Each material body consists primarily of a stable energy pattern, which is the cause of the manifestation we call matter. When in motion, the physical manifestation of the body is being successively re-constructed out of new “basic particles” each time it changes position.

An excellent analogy of this apparent motion would be our familiar TV. We see pictures in motion, but what really happens is that an electron beam lights up successive points of phosphorescent material on the inside of a glass screen, giving us the idea of a picture. By successively lighting up different sets of points, that picture on the screen seems to come to life, it seems to move.

**Particles of Matter**

As Godone succinctly implies with his principle of dynamics, a very similar mechanism is at work in our physical world. Particles are actually created and constantly re-created by an energetic pattern which is maintained and sometimes animated by what I would call "life force".

Space is not empty. It is a plenum. Matter is a special state of the plenum of space. It has recently been proposed by Paul E. Rowe in an interesting series of articles printed in *Infinite Energy* magazine, that space is filled by kind of a Bose-Einstein condensate of hydrogen, that is, by a close-packed matrix, a “soup” of electrons and protons.

Rowe bases this conclusion on the fact that hydrogen can be created from space under certain energetic conditions, as described in his papers. “Rowe’s soup”, which in practice fills all space, supplies the “basic particles” that according to Godone are necessary for matter to exist and to move.

**Energy**

We are using electric energy in our daily lives without having a firm understanding of what this energy actually is. To be sure, we have a working knowledge of how electricity behaves, we can engineer applications of it, but ask anyone to explain the basic principles behind electricity or magnetism—if you dig far enough for a basic explanation, you will get an embarrassed silence.

Thomas E. Bearden explains, in a recent article, that there is a great disparity between the energy that
flows from a dipole and that actually captured and put to use in our electric or electronic apparatus. The energy flow from a battery or a generator is much larger; something on the order of $10^{13}$ times the amount of conventionally used energy. According to Bearden, there are some basic flaws in our way of explaining and utilising electrodynamics. One might agree with Bearden or not, but to be sure, there are fundamental shortcomings in our theoretic understanding of energetic processes that are at the basis of what is generally called “free energy.”

Torsion fields are another case in point. They are highly penetrative energies which have been demonstrated to “propagate” at superluminal velocities. Our knowledge of these fields is based largely on research done in Russia⁶ by A. Akimov and G. Shipov. A recent summary of relevant research has been published by Donald Reed⁷. We are still grappling to find a mechanism that allows such speeds in physical space and are theorising “wormholes” and “time reversal.”

There may however be a much simpler explanation for these phenomena, if we can take the step and open our mind’s eye to the possibility that the universe does not only consist of matter and energy located in and operating through space, but that at least part of that energy is resident in and operating out of what I described as hyperspace.

**Life force**

I propose that all matter is created and continuously re-created by what I would call “life force.” This force provides patterns of energy which “materialise” parts of the medium that fills space, coagulating it into what we perceive to be particles of matter.

There is a vast range of complexity of these particles from hydrogen to the heavy elements. There is as well a vast range of extension, from single particles to planetary and stellar masses. And there is another distinction, between what we call “dead” matter and what we call “animated” or “full-of-life” matter, such as plants, animals and human bodies.

The differences however are only quantitative, not qualitative. It is the same life force or life energy in different quantities and different degrees of mobility and individual consciousness that is responsible for the various manifestations of matter.

**Interactions**

Electric, magnetic and gravitational interactions between matter are mediated by energy. Patterns of energy associated with matter are postulated as being provided by life force. Consequently, the interactions would appear to be between the energy patterns, rather than between the particles of the bodies themselves.

Life force is not part of our three-dimensional space but, residing as it were in hyperspace it is, as discussed above, one step above the dimensionality of space. It is not bound to travel “through space” and thus is capable of manifesting it’s effects in distant and diverse locations at the same instant. Consequently, interactions that are energy-pattern interactions are not limited by speed of light.

We thus have not only a possibility of “instantaneous action at a distance” but also of particles disappearing in one spot and reappearing in another, which agrees with recent experimental evidence. From here it is a simple step to extend the concept and include phenomena such as telepathy, telekinesis and teleportation, which so far have been relegated to the margins of science. These will, one day in the not too distant future, become normal occurrences quite within the province of scientific investigation.

**Bibliography**

3. Gian Piero Godone, private communication to the author.
Diagram 9 of

The Interaction of Electromagnetism and Gravitation along Equipotential Lines
The Interaction of Electromagnetism and Gravitation along Equipotential Lines

A Prelude to Advanced Energy and Propulsion Technology

Russell Kramer

When I first encountered the Reciprocal System of Theory it absorbed my attention immediately with its myriad of dynamic concepts. These include motion in time, rotationally distributed scalar motion, the three dimensions of time corresponding to the three dimensions of space and the reciprocal relation between space and time which is motion itself. Larson’s ability to integrate all this and many more key insights into an integrated general holistic theory is truly an outstanding achievement. All of these and many more viable insights into universal a priori physical events led me at one to reconcile The Reciprocal System of Theory with various other geometric systems also based on scientifically verifiable phenomenon. This includes ‘Synergetic Geometry’ and The ‘BiRadial matrix’. These will be explained in the proper context later in this paper.

While exploring the vast world of possibilities opened up to us by The Reciprocal System of Theory, I am also synthesizing this with the aforementioned Synergetic Geometry, The BiRadial matrix and related systems. There is a common purpose for this and more to this story; we shall begin.

Preface

There are technological applications of the Reciprocal System of Theory, which deal with clean energy and propulsion. This has enormous potential benefit for mankind. In order to develop a specific basis for describing these technologies (both new and prior arts) geometric models will be employed extensively. Larson, in reference to The Reciprocal System of Theory states: “...it lends itself readily to representation by pictures and models.” There are certain descriptions of atomic structure, three dimensionally rotationally distributed scalar motion and the space time progression. These models are very useful and they will be developed, refined and interpreted in this paper.

The geometric modeling used throughout this work represents a parallel, partially overlapping development to the Reciprocal System and was conceived independently. Any conclusions derived from this, which are consistent with the Reciprocal System of Theory, will only further validate both systems. Here is a direct relation between the present work and ‘Synergetics’, as originally propounded by the late Buckminster Fuller. His nature based coordinate system gave rise to a detailed system he named “Synergetic Geometry”. There are profound similarities and equally profound differences between these two systems. Also there are two key aspects of the present work. The BiRadial matrix itself which is a concise geometric model as such consisting of lines, angles and so on, and the subsequent physical interpretation of this model as it relates both to the Reciprocal System of Theory and observed physical phenomenon. There are two basic premises in using the geometric topological models illustrated in the following:

1) There is a direct correspondence between the known motions of the Universe (otherwise known as “forces”) and the geometric-topological elements including lines, angels, genus, inwardness and outwardness.

2) Our own perceptual and conceptual apparatus (our means of interacting with our surroundings) is directly interrelated to the three dimensions of space and the three dimensions of time. (This second premise will be dealt with in a later article. This is an important adjunct to one or both of the fundamental postulates of The Reciprocal System of Theory.

It will be demonstrated that the operational principals of certain unconventional energy and propulsion technology result from the interaction of electromagnetic and gravitational forces along equipotential lines. There are various “N” machines that are reported to have attained “over
unity" energy output. "N" machines, as I have come to understand the term, are based on the original homopolar generator constructed by Michael Faraday. It consists of a cylindrical conducting disc immersed in an axial magnetic field that can be used as a generator with sliding brushes extracting current caused by the voltage induced between the outer and inner regions of the disc when the rotational energy is from an external driving source. Later scientists, including Bruce DePalma, have constructed N machines based on variations of Faraday's original design with varying degrees of over unity energy output reported.

Many of these machines are presently explained in terms of the "tachyon" theory and other related theories. There are also the "aether" theory (past and present), "Zero point energy" and various extensions of quantum and relativity theory. The Reciprocal System, The BiRadial matrix, along with Synergetic geometry and related systems in concert with each other offer, I believe a more generalized and comprehensive foundation for explaining these machines, including how these phenomenon are related to the innate geometry and topology of the universe.

Moreover there are a number of "electro-gravitic" energy and propulsion systems whose underlying process and performance characteristics can be readily explained by the present systems combined. The sudden bursts of acceleration and stops along with right angle turns and other difficult maneuvers with the presence of radiation are often noted during or just after sightings of "Unconventional Flying Objects" (UFO's). The present work will provide a foundation upon which such a propulsion system and related energy systems with radical performance characteristics can, in principle be built with our present technology on a sound scientific basis.

Larson states: "Gravitational energy is not interchangeable with other forms of energy... It is true a change in location results in the release or absorption of energy, but the gravitational energy at point A cannot be converted to any other type of energy at point A nor can the gravitational energy be transferred unchanged to any other point B [except along equipotential lines]." (Italics mine) This is important and the very nature of these equipotential lines and a geometrical interpretation of these in light of Larson's statement will be explained in due course.

Abstract

The technological applications of The Reciprocal System are enormous. From quantum mechanics and Relativity came photo-voltaics and atomic "nuclear" energy in wide spread applications. The Reciprocal System and its co-existing geometrical counterparts are a major development since Relativity and Quantum Theories evolved. Are there technologies that constitute an analogous improvement over existing technology based on the Reciprocal System of Theory? How can The Reciprocal System be translated from theory to practical benevolent technology?

The Reciprocal System, in addition to predicting the existence of phenomenon inaccessible to observation (motion in time for example), also anticipates novel forms of energy and propulsion technology. What new technologies will arise from the Reciprocal System? What light does this shed on the understanding of "Over Unity" energy and "zero point" energy? How can it shed light on the technical challenges we face in:

- Permanent Magnet motors?
- Methods for harnessing "atomic" energy?
- Designing new propulsion systems?
- Cold Fusion?

Requirements for the Technological Applications

Properly establishing the technological applications of the Reciprocal System for radical energy and propulsion systems requires evaluating the three basic laws governing electricity, magnetism, and gravitation with a review of the term "F". In terms of electricity "equipotential" describes points in an electric field, which are at the same electrostatic potential. An equipotential line traverses all those points with the same electrostatic potential and is in 90-degree orientation in relation to the field lines. The electrostatic potential at a point is the work done against the forces of the electric field in bringing unit positive charge from a point at zero potential to the assigned point. There are analogous magnetic and gravitational "equipotentials" to be dealt with presently.

Three fundamental inverse square laws for attraction and repulsion.

\[ F_g = \frac{G \cdot M_1 \cdot M_2}{d_n^2} \]  

\[ G = \text{Gravitational Constant} \]
\[ F = \text{Force of Gravity} \]
\[ M_1 = \text{Mass 1} \]
\[ M_2 = \text{Mass 2} \]
\[ d_n = \text{Distance between centers of } M_1 \text{ and } M_2 \]
Magnetism

\[ F_n = A P_1 P_2 / d^2 \]

Eq. (2)

- \( A \) = Constant of proportionality
- \( F \) = Force of magnetism
- \( P_1 \) = Pole 1
- \( P_2 \) = Pole 2
- \( d \) = distance between centers of \( P_1 \) and \( P_2 \)

Electricity

\[ F_e = K Q_1 Q_2 / d^2 \]

Eq. (3)

- \( K \) = constant of proportionality
- \( F_e \) = electrical force
- \( Q_1 \) = point charge 1
- \( Q_2 \) = point charge 2
- \( d \) = Distance between centers \( Q_1 \) and \( Q_2 \)

Diagram one represents a gravitational mass whose center is at \( N_1 \). The direction of the field is everywhere radially inward and the spacing of the lines shows the field is stronger at the surface and weaker away from the surface. As many radial lines as desired can be drawn to represent the field but they must be equally spaced. The more lines, the greater the corresponding mass.

These diagrams represent an “ideal mass”; that is one with uniform distribution of mass. Rotation can be imparted in one or more axis (corresponding to rotationally distributed scalar motion). We will momentarily freeze this motion to glimpse at the geometrical and topological structure of gravitation. In diagram 1 there are 36 equi-spaced radial lines. The specific units of measure (e.g. metric tons, micrograms, etc.) will be dealt with later. The model consisting of concentric radial lines is employed extensively by Buckminster Fuller in his epochal work “Synergetics”, in which he develops a comprehensive model of nature's coordinate system. The extensive use of equi-spaced radial lines through out both volumes (Synergetics 1 and 2) is including detailed explanation as to how these radial inward-outward lines correspond to gravitation and radiation respectively. This same model us employed in more conventional textbooks as well. For now let us allow that the number of equi-spaced radial lines corresponds to “mass” in some way.

Referring again to diagram 1, \( N_1 \) = number of rays from \( N_1 \) and \( N_2 \) = number of rays from \( N_2 \). The following point is crucial. That is the model of a gravitational mass (a single pole with equi-spaced radial lines) found in textbooks appears to be derived from a thought process not unlike the following: Observation indicates that objects fall towards the Earth's center (of gravity). Also the rate of acceleration of falling objects from the same elevation above sea level any place on Earth is the same; therefore the gravitational field of the Earth is uniform (in theory). This is thus represented by the uniformly distributed equiangular radially inward lines. The closer the lines are the stronger the force of gravity or the “denser” the gravitational field. This is generally consistent with observation. This model is further reinforced by the following facts: the rate of a falling object toward the Earth conforms to an inverse square law. In geometry, as a concentric surface (sphere or a regular polyhedron) contracts toward or expands from a central point or “pole,” the area of the surface changes by the square of the distance from the center; thus also conforming to an inverse square law. (See diagrams 4 & 5 and equations 1, 2, & 3.

From all of the aforementioned (and likely other factors as well) it is concluded that gravity is monopolar (i.e. emanating from or centered about a single source or point.) This is hardly ever stated, yet it is implied in most extant theories and models dealing with gravitation. While it is true that the inverse square relation in diagrams 4 & 5 holds true for most if not all polyhedrons, and while it is also true that Newton’s law of gravitation (equation) is also an inverse square law, it does not follow that the former is the basis of the latter. At some point it was concluded that since gravity and the monopolar surface expansion and contraction phenomenon both obey an inverse square law that gravity must be monopolar. I believe this is a basic epistemological error that has greatly hampered our efforts to relate gravity with electromagnetism in a precise and quantifiable manner; as will be demonstrated.

When observing objects “falling” towards the Earth, (Newton’s legendary apple, for example) because of the relative vastness of the Earth in relation to the apple (among other possible factors) it is assumed that the Earth’s center of Gravity is the sole reference point which the apple is falling towards. Again this model assumes ideal conditions where the density of a given mass is uniform. In any case the Earth is (if only to a slight degree) “falling” towards the apple. In fact an observer on the apple would measure the Earth falling toward the apple at 32 feet per second squared. The point is that any attempt to measure the Earth’s, or any other body of mass’s gravitational field means introducing another instrument (as simple as a falling apple). This instrument is not measuring the Earth’s gravitation; rather it is measuring the (apparent) interaction of the Earth’s gravitation with its own gravitation.
complete with its own center of gravity. With regards to the Reciprocal System, Larson states that gravity is not an interaction or "action at a distance" as such. "Like the gravitational motion, the motion which gives rise to the electric or magnetic forces is a motion of the individual atom or particle with respect to the general structure of space time, not an action of this unit on some other charged or uncharged object as it appears to be." Returning to equations 1, 2 and 3 it becomes clear, or at least entirely plausible, that the two poles of gravity are the two masses $M_1$ and $M_2$. This is a critical distinction. It clearly reveals that gravity has at least a bipolar (BiRadial) structure if it is not entirely bipolar or multi-polar. It appears to suggest that gravity, as expressed in equation 1, requires the presence of (at least) two masses and in this respect can be considered bipolar or "BiRadial". Buckminster Fuller states "Unity is plural and at minimum twofold". In the present context this suggests that to have unity (unification) of a field requires the presence of two masses or poles of some sort. We will in fact arrive at an inverse square equation based on BiRadial geometry.

Once it is established that gravity has bipolar, even multi-polar properties, the geometrical and mathematical unification of gravitation and electromagnetism is closer at hand. In fact, for a single equation to unify the three above equations would require at least two qualities: first it would need a variable in place of the three constants contained in the three separate equations. (The variable would correspond to either one of the three constants.) Also, there would need to be a variable unit of measure, which would correspond to electricity, magnetism or gravity. As we know from the Reciprocal System, the units of measure are rotationally distributed scalar motion, which can be further simplified into discrete space-time relationships.

Diagram 3 represents two identical masses separated by a distance "D". Diagram 6 shows the intersection points of field 1 and 2. What is the significance of these points? How do they relate to gravitation or Electromagnetism? They are reminiscent of the points on the expanding balloon used by Larson and others to represent scalar motion and the outward space time progression. This array has both a macroscopic and microscopic physical analog. For example if we view the distance between the poles as very great and increasing over time this model depicts the outward scalar motion of the universe. If we view the distance between the poles as extremely minute, we can view this array as depicting the highly concentrated "Lines of force" present on the atomic and sub-atomic level. There is a direct relationship of these points to scalar motion to be further elaborated on. There are several symmetrical patterns, which can be derived from this array.

This investigation will examine two variations that relate directly to novel forms of energy and propulsion. Emphasis will be placed on the physical interpretation of the patterns. Certain assumptions are made and rigorously justified before moving on to subsequent analysis and conclusions. Interconnecting the nodes by a certain criterion (which relates to describing the curve mathematically), yields diagram 7. This represents what appears to be a magnetic field (attraction mode), resulting from two opposite poles attracting each other. Interconnecting the nodes by a similar criterion yields diagram 8. This represents what appears to be a magnetic field resulting from two like poles repelling each other. The original rays can be extended in three dimensions, allowing for a more comprehensive model. There is a very distinct relationship between these attraction and repulsion lines and actual magnetic lines of force. This demonstrates the utility of The BiRadial Matrix in revealing basic physical properties of "fields". The criterion for connecting the "lines of force" is crucial and involves deriving actual BiRadial equations describing the quantized "lines of force," discovered by Faraday and easily revealed with iron filings in close proximity to a magnet.

We have developed this model to illustrate to masses and the gravitational interaction surrounding them, after having rigorously justifying the use of this model as a viable analogy to gravitation. Could it be that gravitation has a geometrical and topological structure similar to magnetism and also a quantized structural basis for its description within the BiRadial Matrix? The concept of a quantized description of gravitation is a major goal in modern physics. Any complete physical system, be it a theory or model, must account for the specific geometrical and topological structure of primary "motions" of nature. Also it must explain both the similarities and differences between their properties.

As regards to the similarity of the conventional models, such as the electric "dipole", it should be noted that this similarity is not exact. The distance $D$ in the conventional dipole is equal to zero and the related math is divergent from the inherent math in the matrix. Returning to Diagram 3, we can assign specific variables and derive a number of simple yet revealing equations including equation 4. Upon close analysis of this equation it becomes apparent that it has the same form as Equations 1, 2 and 3 and
helps reveal the relationship between all these three equations showing the interrelationship between gravitation and electromagnetism. Derivations aside for now we have:

\[ I = \sin \beta / \sin \alpha + \sin \alpha / \sin \beta - \cos \theta (a \ b) / D^2 \]

Eq. (4)

There is a variable in place of the three constants—in place of the force factor on the left side there is a "1". How is this to be interpreted?

Syndyne is conducting research and development in this area with a firm conviction that extensive analysis of the BiRadial Matrix and related math can reveal such interactions and provide a greater subtlety of understanding the basic "forces" of nature. What is happening is that both the inherent geometry of the matrix along with the related math are both simultaneously pointing to the interrelationship between gravity and electromagnetism; there being total internal consistency. As will be further elaborated upon, the BiRadial and PolyRadial Matrix explains the structural aspects of the interaction between gravitation and electromagnetism. While the Reciprocal System addresses this, and thoroughly explains other related issues such as why gravity cannot be shielded, and by integrating the BiRadial Matrix, the Reciprocal System, Synergetic Geometry and related systems, a true comprehensive approach to investigating the Unified Field along with its verifiable and measurable effects (including "cold fusion," "zero point energy" and radical propulsion, for example) is possible.

Returning to equation 4, there is an obvious reciprocal relationship being expressed, which shows a direct relation to the Reciprocal System; the variables a and b are prominent. So far as I can determine, a and b are related both geometrically and mathematically to the equipotential lines referred to by Larson, and equation 4, with the corresponding diagrams, strongly suggest that electromagnetism and gravitation are indeed capable of interaction along equipotential lines. In fact there are numerous relationships, which directly emanate from this basic system of modeling, of which this is but one example.

The matrix is indicating a coupling effect between electromagnetism and gravitation. This is consistent with current explanations of electro-gravitic energy and propulsion devices and related experiments. At its utmost, this matrix can provide a thorough and detailed foundation for describing primary field interactions, clean energy and propulsion technology, both existing and under development.

When the distance "D" between N₁ and N₂ (see diagrams 3, 6, 7 and 8) decreases, this predicts a collapsing field and enormous inward accelerations of energy. When the distance "D" increases, this predicts an expanding field, and enormous outward accelerations of energy. Also in Diagram 6, by increasing N₁ and N₂ (the number of rays from each pole) to higher values a series of finer wave interference patterns emerge. The relationship of these to the distance between the poles expresses the basic harmonic sequence. Harmonics are logically integrated with the BiRadial Matrix and related to electromagnetism and gravitation. In fact, there is a key contingency of researchers who are keenly focused on the relation between harmonics and gravitation.

The BiRadial Matrix describes this phenomenon implicitly. Just as electricity and magnetism can be derived from each other, the results of the present investigation predict that (electro)magnetism and gravitation, in various states (forms), can be derived from each other is an analogous way and that they are both related to harmonics. This will be elaborated upon in the next article. To be sure the technological applications of this are enormous. It stands to reason that this is the empirical basis for the conversion of gravitation to electromagnetism (i.e. the interaction of gravitation and electromagnetism along equipotential lines.) When we regard the distance "D" as very small on the atomic scale, corresponding to the atomic mass, the repulsive "lines of force" depict a concentrated magnetic potential. The "forces" on the atomic scale are highly concentrated and exist over short distances. By decreasing the number of rays from each pole (corresponding to lower masses such as electrons) and decreasing D, this yields a highly concentrated pattern, which exists over a very short distance. Further illustrations continue to reveal this fact. By following this geometric analogy concisely this model helps explain the unique property and how it differs from magnetism and electricity. Further interpretation accounts for the inter-atomic region often referred to as the "nucleus" and shows how it is a concentrated form of the same basic fields being discussed at present.

During my presentation of this BiRadial matrix at the I.S.U.S. 22nd annual meeting, Frank Meyer commented on what the definitions of the "lines of force" are. Much has been observed of these by notable experimental scientists such as Michael Faraday, Nicola Tesla and others. In the present context I am compelled to reevaluate the precise
meaning of “force lines” as they play such a pivotal role in the BiRadial and PolyRadial Matrices.

From what has been revealed thus far, we know that they obey certain mathematical formula which greatly simplify the equations, as compared to the Cartesian mathematical equivalent. We know that these lines of force are quantized. From the Reciprocal System, we can add to this fact that the so-called “force” is really a form of rotationally distributed scalar motion. We know that the precise pattern of these initial “Lines of force” are not exactly similar to the electric “dipole,” for instance, and that the BiRadial Matrix takes into account the discrete interaction of forces. As discussed in my previous article, fusion, as such, is not what is occurring in the sun or on the subatomic level. Advanced prototypes of the present model yield a more general set of equations accounting for both the microscopic and macroscopic phenomena including the inter-atomic region. This model has an enormous ability to predict numerous process and physical relationships based on “trans-discrete superstructures”. The corresponding mathematics is much simpler using essentially algebra, trigonometry and primary number structural patterns. This is in keeping with the Reciprocal System.

The lines of force in diagram 8 clearly illustrate a repulsive phenomenon, which is the apparent basis for “anti-gravity” propulsion. There will be more on this in the next article. Diagram 9 has a direct relation to atomic structure and provides a detailed description or analogy of the inter-atomic region. It is one of a series of related diagrams where the number of poles “N” can vary from N=2 through N=92 and perhaps beyond. It is a logical extension and generalization of the BiRadial Matrix, and shows further relationships concerning the fundamental motions or “forces” of nature. The general concept, in any case, is that the motions prevalent on the atomic scale are the same basic “lines of force” as electromagnetic and gravitational “Lines of force”; the distinctions are in the relative configuration of the lines of force and their density and degree of rotational scalar motion. In all cases, the common denominators are the lines of force consisting of their quantized segments and angular progressions. Both of these directly result from the geometrical constraints of their finite number of rays emanating from (in this instance) the 12 poles. An entirely new picture of the atom emerges where the surrounding poles form the central region as opposed to the center “attracting” the outer region of the atom. At the same time this model is clarifying the relationship between quantum physics with both electromagnetism and gravitation. This is a major step and the precise mathematical equations along with the geometric structure (as in the BiRadial and PolyRadial matrix) along with related systems, and the theoretical construct (as in the Reciprocal System) are now both in place to proceed on course to bring this research to fruition and culminate in a thorough assessment and description of the “Unified Field” and its unlimited applications. Further in depth explorations of the BiRadial and PolyRadial matrices and there relation to the Reciprocal System is in progress and shows great promise.

Summary

- Review of the applications of the Reciprocal System.
- Various geometrical models of the Reciprocal System were cited mainly: atomic structure, scalar motion and the space-time progression.
- A working definition of equi-potential lines was given.
- A geometric model consisting of equi-spaced radial lines was introduced as an equivalent to mass. The assumptions on which this was based were justified.
- The three primary inverse square laws were reviewed.
- Two distinct geometric models for deriving inverse squares laws were shown.
- A case was made for why a BiRadial system should be incorporated in the treatment of gravitation.
- A quantized attraction vector matrix was derived, as was a quantized repulsion vector matrix, solely from geometrical and topological considerations, in particular a BiRadial matrix.
- Numerous physical interpretations presented themselves. These models were interpreted in light of the Reciprocal System and other models including the harmonic sequence.
- A unique inverse square relation was derived from the model, which offers some clue on how electromagnetism and gravitation can interact along equi-potential lines.
- Once the physical relation to the model was
established, possible applications in clean energy and propulsion were discussed.

Epilog

Enormous possibilities lie ahead. We are on the thresh hold of a great era of understanding in science and technology. Progress on both the theoretical and technological fronts is unfolding at a spectacular pace. It is crucial that theoretical and applied physics is integrated and the direct relation between them fortified. The structural aspects of the primary "forces" (equipotential lines among them) are a vital link between physics theory and application.

Post script

The present author, through his company Syndyne, is seeking mathematicians, scientists, engineers, computer programmers and sponsors to accelerate the research on the BiRadial Matrix and related technologies. Those interested please contact Russell Kramer at: Syndyne@hotmail.com.

Bibliography

Mono-Polar Concentric Surface Area Expansion and Contraction According to Inverse Square Law

As the radius doubles for example the surface area has a four fold increase where:

\[ S = \text{Surface area} \]

\[ R = \text{Radius} \]

\[ R = \sqrt[3]{2} \quad S = 16 \]

\[ R = 2\sqrt[3]{375} \quad S = 16 \]

\[ R = 4\sqrt[3]{375} \quad S = 64 \]

\[ R = \sqrt[3]{3} \quad S = 64 \]

Diagram 4)

Diagram 5)

It is common knowledge that as the radius of a sphere or a regular polygon (which has a single center or "pole") changes, its surface area changes by the square of the radius and thus conforms to an inverse square law.

It is also known that as the distance from the center of gravity of a given mass changes this strength of the "gravitational field" changes according to the square of the distance from the center of gravity.

It has been tacitly assumed that because both of these facts are true that gravity must, as a consequence, be monopolar (i.e. emanating from or centered about a single source or "pole"; unlike electricity and magnetism which are inherently bipolar or "bi-radial" ergo positive, negative and north, south.

The present investigation shows that gravity, like electricity and magnetism is also bipolar or bi-radial. Once this is firmly established, the unification of electromagnetism and gravitation is greatly simplified and the means of harnessing electromagnetic energy propulsion from gravity is in principle technologically feasible.
Diagram 6)
Diagram 8)

For Diagram 9, see page 54.
ISUS NEWS

June 1983

In the course of the past two years our organization has gone through some major structural changes: not only did we acquire a new name -- we have made substantive alterations in the way our journal *RECIROCITY* is produced. During this period of transition it has not been possible to publish *RECIROCITY* on a quarterly schedule. But members of ISUS and subscribers to *RECIROCITY* should be assured of receiving the number of issues for which they paid; the present subscription period has been extended to the end of 1983. The journal will continue to be published in its present format, but the number of pages will be reduced to sixteen. By this we hope to ensure both the financial viability of the journal and its regular publication four times a year. In addition we will be sending out *ISUS NEWS* eight times a year, so that ISUS members and subscribers to *RECIROCITY* will be receiving monthly mailings from our organization.

The new issue of *RECIROCITY* Volume XII, Number 2 has now been sent out. It contains the transcript of Dewey Larson's talk at the Philadelphia Convention in August of 1983, a paper by Dr. K.V.K. Nehru on pulsars, and one by Dr. Ronald Satz with the latest results of his work on the properties of the elements. We have received a rejoinder by Dewey Larson to Dr. Nehru's paper; it will appear in Volume XII, Number 3. Also scheduled for the next issue is a paper by Dr. Nehru on the theoretical derivation of Planck's constant.

THE EIGHTH ANNUAL CONVENTION
OF THE INTERNATIONAL SOCIETY OF UNIFIED SCIENCE

The 1983 annual convention will be held at the University of British Columbia, Vancouver, Canada, August 18-21 1983. Meetings will be held in room 304 Hennings Building, Physics Block. The Program Chairman is Dr. Rainer Huck. The Co-chairman is Phil Porter.

ACCOMODATIONS -- A block of 20 rooms has been reserved in the University's Gage Complex. The residence overlooks Burrard Inlet, offers comfortable rooms, and is within easy walking distance of the meeting room and other facilities. The cost per single room is C$25.44/night (C$1.00 = ca. U$1.20).

AIRPORT -- Vancouver International Airport is the port of entry. Taxi service to UBC is C$15 to C$20. Rental cars are available and local city buses also run to UBC.
CONVENTION SCHEDULE

18 August (Thursday)
12 noon to 5 pm  Registration and orientation, room 304.
6 pm               Welcome party, room 304.

19 August (Friday)
9 am to 12 noon  Meeting, room 304
12 noon         Lunch, Cafeteria
1:30 pm to 5 pm  Meeting, room 304
7 pm             Banquet, Faculty Club (music Room)

20 August (Saturday)
9 am to 12 noon  Meeting, room 304
12 noon         Lunch, Cafeteria
1:30 pm to 4 pm  Meeting, room 304
5 pm to 7 pm    Tour of TRIUMF Cyclotron Facility
8 pm             Buffet party at the home of
                 Robin and Vivian Sims in Burnaby.

PAPERS -- Please submit your papers for the conference to Dr.
Rainer Huck, 1195 South Windsor Street, Salt Lake City, Utah
84105.

RESERVATIONS -- Please mail your deposit of C$25.44 for the
first night's accommodation to Conference Coordinator Robin V.
Sims, 4738 East Hastings Street, Burnaby, B.C., Canada V5C
2K4, by July 15th. Balance of room cost will be payable to
UBC Gage Complex. Full payment must be made on arrival at
Gage. Please note Gage does not accept credit cards, but does
honor personal or travellers' checks.

To ISUS, INC., 1195 So. Windsor Street, Salt Lake City, Utah 84105

Please send me the following:

_____ RECIPROCITY for one year @$5.00
_____ copies of NOTHING BUT MOTION @ $9.50
_____ copies of BEYOND NEWTON @$5.00
_____ copies of THE NEGLECTED FACTS OF SCIENCE (hardcover) @$9.00
_____ copies of THE NEGLECTED FACTS OF SCIENCE (paperback) @$7.50
_____ copies of THE UNMYSTERIOUS UNIVERSE @$3.50
_____ copies of TOWARD A UNIFIED COSMOLOGICAL PHYSICS @$23.50

Total

Payment enclosed □    Bill me □

Name

Address

E I:1.1-2
ISUS NEWS

Volume 1, Number 2  September 1983

Those who attended the Eighth Annual Convention of ISUS in Vancouver would probably agree that good progress was made both in further exploring the scientific implications of the Reciprocal System and in charting the future course of our organization. Some of the decisions made at the meeting are described in the Minutes in this issue of ISUS NEWS.

The long-delayed advertising campaign is at last underway, with the first series of ads to appear in School Science and Mathematics beginning with the November issue. Further ads are planned and will be announced in due course. Those responding to the ad will receive a four-page brochure describing some of the points of divergence between the Reciprocal System and conventional physical theory. The brochure is also available on request from ISUS.

Among the decisions made at the convention (see the Minutes 6. f.) is the setting up of a course on the Reciprocal System. It is expected to take the form of an week-long seminar aimed primarily at training instructors. Further details will be announced as they become available.

Dewey Larson has let us know that the third volume of the revised edition of The Structure of the Physical Universe, entitled The Universe of Motion is nearing completion, with twenty-six out of thirty-one chapters already written. At the occasion of a gathering at the home of Robin Sims on the evening of August 20th, Larson described several of his new findings — among them the explanation within the framework of the Reciprocal System of the characteristic dumbbell-shape of radio galaxies. Plans are being made for the publication of this important work.

Among the issues raised at the convention was the need for a mathematical formulation of the fundamental postulates of the Reciprocal System, and for a series of equations that would make it possible to derive its conclusions without recourse to verbal reasoning. It was generally agreed that the language in which the RS has been presented thus far is specific enough to allow for such mathematization in the future. It was even suggested that a computer program might be devised capable of constructing a true and complete representation of the physical universe unencumbered by the error-prone human reasoning process.

Among the papers read at the convention were:

- Phil Porter on electrical phenomena, including superconductivity.
- Tom Lo Bello: "The New Reciprocity: A Radical Overview of the RS Cosmic Sector."

Some of these papers will appear in future issues of Reciprocity.
MINUTES OF THE BUSINESS MEETING OF THE ANNUAL CONVENTION
OF THE INTERNATIONAL SOCIETY OF UNIFIED SCIENCE

Saturday, August 20, 1983, in Room 304, Henning Physics Building, University of British Columbia, Vancouver. The business meeting of the International Society of Unified Science was called to order at 11:07 by Frank Meyer, president. Nine members were present.

1. A motion was made and carried to skip the reading of the minutes of the previous convention. The minutes, copies of which all members had, were approved.

2. Next, treasurer Rainer Huck presented his report. The current net balance of ISUS, as of August 17, 1983, was $886.26. The treasurer's report was approved.

3. Senior editor of Reciprocity Jan Sammer gave his report. The quantity printed of the last two issues of Reciprocity: 200 and 250. It is hoped that we will soon be back on a quarterly schedule. A brief newsletter might be issued 8 times a year to supplement Reciprocity. The editor's report was approved.

4. The president then asked for Old Business. The only old business brought up concerned the advertisement for ISUS and the Reciprocal System. Sammer and Meyer gave the circulation and advertising cost for the following journals (originally suggested by Dewey Larson): School Science and Mathematics, Journal of College Science Teaching, The Science Teacher, The Sciences, and Space World. Huck moved and Sims seconded that ISUS contribute $300 for ads in the upcoming year for the magazines listed. North Pacific Publishers would match this amount, so long as Dewey and Jan work out all the details. The motion carried. Then Porter moved and Sims seconded that the Board be empowered to spend up to an additional $500 if the campaign were found to be successful. The motion carried.

5. Porter moved to have the Board elections precede new business. The motion carried. The new nominations to the Board included Halprin, Blackburn, Porter, LoBello, Schumacher, and Elkin. The following were elected: Curtin, Halprin, Blackburn, Porter, and Schumacher. Thus the 1984 Board consists of the following individuals: Sims, Norby, Nehru, Sammer, and Gilroy, all up for re-election next year; Anderson, Huck, Meyer, Satz, and Studtmann, all with one year left at the end of next year; Curtin, Halprin, Blackburn, Porter, and Schumacher, all with two years left at the end of next year.

6. The president then called for New Business.

a) Sims proposed and Satz seconded that Larson's policy proposals for Reciprocity be adopted. Porter then moved to amend this motion as follows: the editor of Reciprocity shall respond to all submitters within three months with intention to publish or with reasons for rejection. Rejections may be appealed to the Board of ISUS which shall have the final authority to determine what shall be published. To appeal a rejection, the submitter shall send copies of all correspondence and the paper to all
members of the Board. The Board shall make a decision by a majority of those responding to the president who shall inform the submitter of the decision within six months' time. The motion, as amended, carried. Satz then moved, and Huck seconded, that the policy for contributions to Reciprocity, expressly items 1, 3, 4, and the introduction, be printed on the inside back cover of Reciprocity. Porter and Schumacher amended this motion to allow the editor to place the policy statement anywhere in the journal. The motion, as amended, carried.

b Huck moved and Porter seconded that Sammer become the new editor-in-chief of Reciprocity, with Meyer as senior editor and Nehru as associate editor. The Board approved this new arrangement.

c The next item of business was the discussion of how to respond to member Halprin's letter, sent to a number of Board members. It was decided that one or two of Halprin's last papers would be edited for inclusion in Reciprocity. The secretary of ISUS was chosen to draft a letter of response to Halprin, which would also be sent to all Board members.

d Sims moved and Satz seconded that we have four levels of membership: regular, $15/year; contributing, $50/year; supporting, $150/year; and sustaining, $300/year. The motion carried. Huck moved and LoBello seconded that contributing, supporting, and sustaining members be publicized (for instance, in Reciprocity or ISUS News). The motion carried.

e Next, Schumacher discussed some new ideas for promoting the Reciprocal System: writing a novel with the Reciprocal System as the accepted theoretical system, finding unusual book publishers or distributors (such as Loompanics Unlimited); sending papers to unconventional journals (such as The Connection).

f Porter moved and Sims seconded that the Board set up an education committee to offer a course on the Reciprocal System. The first instructor would be Satz. The motion carried. Then Satz proposed that the education course immediately precede the Annual Convention. The motion carried.

7. The president then asked for nominations for the location of next year's convention. The following were named: Salt Lake City, Eugene, Louisville, and Vancouver. After discussion, the members chose Salt Lake City. Huck will be host. The date will be in mid-August and start with the "school."

8. Elections for officers were held. All present officers were re-elected by acclamation: Meyer for president, Blackburn for vice-president, Satz for secretary, and Huck for treasurer.

9. Satz moved and Huck seconded to have ISUS officially thank our hosts, Robin and Vivian Sims, for their splendid job in sponsoring the conference. The motion carried by acclamation.

10. The meeting was adjourned at 4:56.

Ronald W. Satz: Secretary, ISUS
International Society of Unified Science, Inc.

OFFICERS
Prof. Frank Meyer, President; Dr. Ronald Blackburn, Vice President; Ronald W. Satz, Secretary; Dr. Rainer Huck, Treasurer.

MEMBERSHIP
Membership is open to all persons interested in the advancement of scientific knowledge. Dues, including a subscription to RECIPROCITY, are $15 per year.

AVAILABLE LITERATURE
Periodical: The ISUS publishes a quarterly journal, RECIPROCITY, subscription price $5.00 per year.

Books: by D. B. Larson

Nothing But Motion (1979) 308 pages $9.50 (postpaid)
The first volume of a comprehensive description of the theoretical system, replacing the original 1959 edition.

Beyond Newton (1964) 160 pages $5.00 (postpaid)
A study of gravitation

The Neglected Facts of Science (1982)
(140 pages, postpaid) $7.50 (paperback)
A derivation of many of the theoretical conclusions from purely factual premises.

by Ronald W. Satz

The Unmysterious Universe $3.50
A clear, concise overview of the Reciprocal System includes 17 figures; 80 pages

by Arnold Studtmann

Toward a Unified Cosmological Physics (1979) 636 pages $23.50
Astrophysical aspects of the theory (Ph.D. dissertation)

For convenient ordering, use the coupon below.

To ISUS, INC., 1195 So. Windsor Street, Salt Lake City, Utah 84105
Please send me the following:

_____ RECIPROCITY for one year @$5.00
_____ copies of NOTHING BUT MOTION @ $9.50
_____ copies of BEYOND NEWTON @$5.00
_____ copies of THE NEGLECTED FACTS OF SCIENCE (hardcover) @$9.00
_____ copies of THE NEGLECTED FACTS OF SCIENCE (paperback) @$7.50
_____ copies of THE UNMysteresous UNIVERSE @$3.50
_____ copies of TOWARD A UNIFIED COSMOLOGICAL PHYSICS @$23.50

Total ____________________________

Payment enclosed □ Bill me □

Name ____________________________________________________________

Address _________________________________________________________

E I:1.2-4
NEWS
of the
INTERNATIONAL SOCIETY OF UNIFIED SCIENCE

Spring 1984
Volume 1, Number 3

To Members and Friends of ISUS:

As you no doubt know, the objective of this organization is to promote understanding and acceptance of the Reciprocal System of physical theory, the theory of the universe of motion originated by Dewey B. Larson. One of the most important aspects of our activities is to help make possible the publication of books and articles dealing with the theory. We are, of course, particularly interested in securing publication of Larson's books, which are the primary source of detailed information about the application of the theory. Accordingly, we have made arrangements with the publishers to proceed with the publication of Larson's latest book, The Universe of Motion, which he has just completed. Included in these publishing arrangements is a provision which enables us to offer a very substantial discount on prepaid pre-publication orders to our members and previous purchasers of Larson's books.

This new work extends the physical principles and relations developed in Nothing But Motion and Larson's other publications to the astronomical and cosmological fields. As in the earlier work, all of the conclusions that are reached are derived entirely by development of the necessary consequences of the postulates that define the universe of motion, without introducing anything from any other source. This book therefore gives us a purely physical view of the astronomical universe, completely independent of any information from astronomical sources. The relevant observational results are described, but they are not used in the development of the theoretical picture of the universe; they are employed only for the purpose of showing that the theoretical results agree, item by item, with the observations.

As could be expected in a field where factual information is scarce, and existing theory is largely speculation, this new development, based on physical principles that have been positively verified in fields readily accessible to observation, gives us a picture that is very different in many respects from that which we get from the astronomers. New, fully verified, explanations for such phenomena as quasars and pulsars, the galactic recession, the white dwarf stars, and supernovae, eliminate the need for the fantastic products of the imagination — degenerate matter, singularities, black holes, etc. — that the astronomers are now calling upon to provide answers to the problems posed by the latest observational discoveries. In addition to returning these more recently discovered phenomena to the land of reality, the new, fully integrated, and solidly based theoretical development uncovers some serious errors in the currently accepted concepts of the evolutionary paths of stars and galaxies. Correction of these errors eliminates many of the long-standing astronomical problems.
This clarification of the astronomical situation is not only an important addition to scientific knowledge, but also has a major significance in relation to the physical laws and principles derived from the postulates that define the universe of motion, because astronomy is the great testing ground for physical theories. If a theoretical proposition is wrong, or incomplete, its shortcomings become apparent when they are greatly magnified by the extremes of size, speed, temperature, and pressure to which astronomical objects are subjected. The fact that the answers to the major astronomical questions emerge easily and naturally from this theoretical development, even in those cases, such as the quasar situation, where the astronomers have been completely baffled, thus adds another dimension to the already strong confirmation of the validity of the fundamental postulates of the theory of the universe of motion.

The following reproduction of the Table of Contents indicates the scope of the work:

THE UNIVERSE OF MOTION

1 Introduction
2 Galaxies
3 Globular Clusters
4 The Giant Star Cycle
5 The Later Cycles
6 The Dwarf Star Cycle
7 Binary and Multiple Stars
8 Evolution—Globular Cluster Stars
9 Gas and Dust Clouds
10 Evolution—Galactic Stars
11 Planetary Nebulae
12 Ordinary White Dwarfs
13 The Cataclysmic Variables
14 Limits
15 The Intermediate Regions
16 Type II Supernovae
17 Pulsars
18 Radiative Processes
19 X-ray Emission
20 The Quasar Situation
21 Quasar Theory
22 Verification
23 Quasar Redshifts
24 Quasar Evolution
25 The Quasar Populations
26 Radio Galaxies
27 Pre-Quasar Phenomena
28 Inter-Sector Relations
29 The Non-Existent Universe
30 Cosmology
31 Implications

If you are interested in astronomy, either as such, or because of its relevance to physics, we believe you will want this book sooner or later. Placing an order now will assure prompt shipment on publication (scheduled for July or August) and will save $4.00 per copy.

To ISUS, Inc., 1195 S. Windsor St., Salt Lake City, Utah 84105

Enclosed is _____ for which send me _____ copies of Larson's The Universe of Motion on publication, at the special pre-publication price of $15.00. (Regular price $19.00).

Name__________________________

Address________________________

E I:1.3-2
News of the International Society Of Unified Science, Inc.

Volume II, Number 1  Autumn, 1988

Few will deny that it is relatively easy in science to fill in the details of a new area, once the frontier has been crossed. The critical event is turning the unexpected corner. This is not given to most of us to do ... By definition, the unexpected corner cannot be turned by any operation that is planned.

If you want advances in the basic theories of physics and chemistry in the future comparable to those of the last two centuries, then it would seem essential that there continue to be people, in a position to turn unexpected corners. Such a man I have ventured to call the uncommitted investigator.

Dr. James B. Conant

NEXT ISUS ANNUAL CONFERENCE  Early August, 1989  PORTLAND, OR

CONTENTS:

1

Minutes of Thirteenth Annual ISUS, Inc. Conference
August 12-13, 1988  Portland, Oregon

ROLE OF THE AMATEUR IN SCIENTIFIC PRACTICE AND THEORY
by Frank H. Meyer

4

PROPOSED HEARING FOR ISUS AND DEWEY B. LARSON
Letter to Professor K.V.K. Nehru, India from

8

PROPOSED HEARING AT BOSTON UNIVERSITY
Letter to Dr. Lawrence Sulack from Professor

9

D.B. LARSON'S QUALIFICATIONS AS AN UNCOMMITTED INVESTIGATOR
Letter to Dr. J. Edward Anderson from
Dr. Frank A. Anderson, Oct. 22, 1988

11

Letter to Mr. Patrick Young from
Dr. Frank A. Anderson, Jan. 31, 1988

13
MINUTES OF THE BUSINESS MEETING OF THE 13TH ANNUAL CONVENTION OF 
THE INTERNATIONAL SOCIETY OF UNIFIED SCIENCE 

Saturday, August 13, 1988 at room 317 of the Jade Tree Motel, 
Portland, Oregon. The business meeting of the International 
Society of Unified Science was called to order at 2:14 pm by 
Frank Meyer, president. Nine members were present: Frank Meyer, 
Rainer Huck, Ronald Satz, Ron Blackburn, Robin Sims, Phil Porter, 
Larry Denslow, Hoyt Stearns, and Dave Chance. 

1. A motion was made to dispense with the reading of the minutes 
of last year's meeting and approve them as printed in 
Reciprocity. The motion carried. 

2. Treasurer Rainer Huck then read his report (which was 
prepared with the help of Robin Sims). As of August, 1987 the 
balance was $4111.83. The income for 1988 was $2144.29 and the 
expenses were $2248.66. So the balance as of August, 1988 is 
$4007.46. ISUS is in excellent financial condition. The 
treasurer's report was approved. 

3. The president then asked for Old Business. The following 
topics were discussed. 

   a. mailing list: member Ed Navarro now has responsibility 
      for both the membership and subscription lists. He has printed 
      out a state-by-state listing of members and subscribers and has 
      also printed out sets of mailing labels. 

   b. advertising: no ISUS/North Pacific Publishers 
      advertising was done this past year. 

   c. gift subscriptions: member Porter moved and member Huck 
      seconded that the staff of Reciprocity decide who gets free 
      issues. The motion carried. 

   d. editor's report: Frank Meyer is now the managing editor 
      of Reciprocity. Members Nehru, Porter, and Sammer are associate 
      editors. Two issues were published last year; 1 issue has been 
      published this year, with more to come. The printing cost is 2 
      1/2 #/page, and the postage amount is 8 1/2 # per copy mailed. 
      The publishing of ISUS News is scheduled to be resumed. 
      Currently 250 copies of Reciprocity are mailed out per issue, and 
      Meyer's goal is eventually to mail out 500 copies. The editor's 
      report was approved. 

4. The president then called for New Business. The following 
topics were discussed. 

   a. back issue ordering: member Sims moved (with amendments 
      by member Porter) and member Blackburn seconded, to make 
      available back issues of Reciprocity, at the rate of $4 for one 
      issue, $3 for two to five issues, and $2 for six or more. The 
      price for the whole set is to be determined at the 

Autumn, 1988 ISUS News Page 1
rate of $2/issue. Member Huck is to handle this service. A
caveat is to be added to orders, stating that not all papers
published are to be considered "canonical": i.e., many of the
papers are "work-in-progress" only. An order form with index is
to be put in Reciprocity annually. The motion carried.

b. cosmic proton mass: At the urging of Dennis Cravens, an
outside DOD observer, member Blackburn moved and member Porter
seconded that Larson and Satz calculate the theoretical mass of
the cosmic proton (and publish the result in Reciprocity). If
possible this is to be done before the upcoming experiment to
measure its mass. Member Sims and Larson himself, who was
sitting in at the meeting, urged extreme caution. Nonetheless
the motion carried.

c. Boston University meeting: President Meyer then
discussed Prof. Ed Anderson's forthcoming invitation to ISUS to
send a representative to Boston University for a meeting with the
physics faculty. Meyer read letters from members Nehru and
Halprin on this subject, and member Chance made some additional
remarks. Larson stated that for himself one session would be
sufficient to provide an introduction to the theory and, in any
event, we have to "take what we can get." In the long run a
"court of inquiry" would be best. Member Porter moved and member
Huck seconded that Larson be the representative and Satz be the
alternate for this very important meeting. The motion carried.

d. promotion of Reciprocal System: President Meyer stated
that ultimately we would like to have our own school to teach the
Reciprocal System. Member Satz stated that another long term
goal would be to produce a two hour animated film which would
graphically show how the system operates. Member Huck moved and
member Sims seconded that member Denslow make a video tape of his
basic teaching of the Reciprocal System; ISUS would fund the
rental of the equipment. The motion carried. President Meyer
agreed to rewrite one of the current ISUS brochures, and member
Satz agreed to study the feasibility of writing and mailing a 3
or 4 page press release to the hundreds of science and
engineering magazines here and abroad. Member Stearns suggested
that we seek foundation grants. Member Denslow suggested that we
think about developing a logo for ISUS.

e. reprint: Member Huck moved and member Sims seconded that
ISUS undertake to reprint Larson's Case Against the Nuclear Atom,
subject to a $1000 cap on expenses (for approximately 500
books). (North Pacific agreed to give permission for this
project). The motion carried.

f. liquid state papers: Member Satz asked if the liquid
state papers are ready to be published. Larson responded that
they will indeed be ready soon, but not this coming year.
g. conference video taping: Member Chance video taped most of this conference and suggested that the highlights be made available for sale. Member Porter moved and member Huck seconded that Chance proceed as he wishes and split the profits with ISUS. The motion carried.

h. rebinding: The bookbinding of Basic Properties of Matter has turned out to be unsatisfactory. It was agreed to rebind those volumes not yet sold and any that are sent back. (But no announcement will be made).

5. Next the elections were held.

a. Board Elections: Members Anderson, Huck, Long, Meyer, Satz, and Studtmann were up for reelection (and there was one additional opening). The following were nominated: Anderson, Meyer, Huck, Satz, Stearns, Denslow, and Mitchell (William). The nominations were closed and a vote was taken for election by acclamation. It carried unanimously. So, the 1988-1989 Board consists of the following individuals: Anderson, Meyer, Huck, Satz, Stearns, Denslow, and Mitchell (with two years to go at the end of next year); Nehru, Porter, Sammer, and Sims (with one year to go at the end of next year); and Blackburn, Curtin, Halprin, and Navarro (up for reelection next year).

b. Elections of Officers: The offices of president, secretary, and treasurer were uncontested; Meyer, Satz, and Huck retained their offices unanimously. For vice president, members Halprin and Blackburn were nominated, and Blackburn won in a close vote.

6. Next Year's Convention: Only one nomination got seconded--Portland, Oregon, the home of Dewey Larson. The convention will probably be held August 11th and 12th, at a nearby college with suitable facilities (dormitory rooms, cafeteria, blackboards, and overhead transparency projectors). Member Porter agreed to be in charge of making arrangements.

7. Acclamations: The membership unanimously acclaimed the Larsons' for graciously inviting us over for two evenings, Dewey for finishing Basic Properties of Matter, members Sammer and Porter for their fine work in producing the book, member Chance for video taping the conference, and the Jade Tree Hotel and Multnomah Library for the free meeting rooms.

The meeting was adjourned at 6:03 pm.

Ronald W. Satz
Secretary, ISUS

Autumn, 1988
THE ROLE OF THE AMATEUR IN MODERN PHYSICAL SCIENCE PRACTICE & THEORY

Frank H. Meyer, Long-Time Member, American Physical Society

The Oxford Dictionary discloses that the word 'amateur' is a French word, derived from the Latin, *amator*, A LOVER: also from *amare*, to love.

The dictionary mentions several connotations. I note two of them of present interest:
1. one who cultivates any study or art, from taste or attachment, without pursuing it professionally.
2. a person who does something more or less unskillfully.

Dewey B. Larson at 90 has been and is a professional engineer and a life-long amateur physicist in the first sense of this word.

I think that we of ISUS, INC. have ample evidence that a number of my professional physics colleagues, who have heard about Mr. Larson and his Reciprocal System of physical science, without bothering beyond a perfunctory glance to examine him or it, prefer to dismiss its author with contempt as an amateur in the second derogatory sense of this term.

In my opinion as a professional research physicist and/or physics and philosophy professor for more than half a century, Dewey B. Larson, in fact, has done what my profession has professed it would do and has not yet begun to do: he has successfully revalued and unified physical science. I and my associates of ISUS, INC., make a claim that we think we can sustain with an abundance of evidence: that the Reciprocal System of physical science, originated by Dewey B. Larson, is the only unified general theory of physics.

The modern profession of physicists generally has not lately acknowledged that anyone other than the professional physics experts can have made or have made any lasting contribution to the production of the science of physics. This attitude is due more to ignorance of the history of science, particularly the history of physical science, than to anything else.

As the cartographer, Charles H. Hapgood, in the Preface to his MAPS OF THE ANCIENT SEA KINGS, has pointed out:
"I have....long felt that the amateur has a much more important role in science than is usually recognized. I teach the history of science, and have become aware of the extent to which the most radical discoveries(sometimes called 'breakthroughs') have been opposed by experts in the affected fields. It is a fact, obviously, that every scientist is an amateur to start with. Copernicus, Newton, Darwin were all amateurs when they made their principal discoveries...."

In the nineteenth century people without the benefit of a doctorate or any other graduate or even undergraduate degree in physics have made great contributions to the development of physics. Michael Faraday has made forever possible the major process by which electrical power is commercially produced not only in Great Britain and the U.S.A., but also elsewhere on earth. So far as I
know, Mr. Faraday earned no college degree at all and began his career in natural philosophy as a glass washer in Humphrey Davy's Laboratory. People from other professions in previous centuries, like Dewey Larson in this century, amateurs in physics or uncommitted investigators in natural philosophy, have made as great contributions to the evolution of physical science as any professional physicist. Physicians, such as Thomas Young, Hermann Helmholtz, Julius Robert Mayer, with little formal education in physics, nevertheless, made contributions to the creation of new physics comparable with those made by any living member of the American Physical Society. Sadi Carnot, a professional engineer in the military at the age of 18, also was an uncommitted investigator or amateur in physics, who discovered the second law of thermodynamics and so contributed to establishing the physical science of thermodynamics.

With a doctorate earned at the Polytechnic Academy in Zurich in 1905, Albert Einstein in the same year reported four great discoveries in physics: the photon theory of light, the equivalence (not the identity) of mass and energy, the theory of Brownian motion and the special theory of relativity. While these discoveries are included now in the graduate education of the professional physicist, the credit for them first belongs appropriately to Einstein, the student, the amateur, the uncommitted investigator, rather than to his professors.

Let's examine the last listed of Einstein's discoveries, the special theory of relativity. In formulating the relativity theory, Einstein was opposed by his contemporary profession, because he dared to question the theory of space and time, postulated more than two centuries earlier by another uncommitted investigator, Isaac Newton. Newton assumed that space and time are absolutely unrelated and that motion is merely a property of matter. While Einstein agreed with Newton that matter is prior to motion, he chose to question Newton's mistaken surmise about the unrelatedness of time and space. Einstein expressed his skepticism about this conjecture of Newton by assuming instead that space and time are inseparably related in a 4-dimensional stationary space-time continuum, to which the concept of motion is not applicable, certainly not directly. It appears to be not well-known even among physicists that in the later years of his life, Einstein came to doubt the truth of this basic premise of his relativity theory:

"I am tending to the belief that it is impossible to advance further with the continuum theory." – Albert Einstein

Thus, unlike many of his followers among professional physicists, Albert Einstein remained an uncommitted investigator in a profession, in which the amateur is rare, at least in this century, and usually is regarded as a suspicious character, no matter what his achievements, and often is even ostracized.

There are several good reasons for questioning the continuum postulate of relativity theory indeed:
1. It implicitly denies that space is a progression with time and has led some relativists into the absurdity of denying that time flows equably with space, thus repudiating the common sense and Newtonian view that time at least is or may be a progression.
2. Perhaps Einstein's greatest contribution to the theory of space-time was his recognition that space and time somehow must be and are related, since this challenged and led eventually to the overthrow of the mistaken proposition that they are not. Einstein's own theory about how space and time function together, however, requires further examination and is questionable. Einstein died without ever comprehending that
motion constitutes the essential physical relation between space and time, since Einstein followed Newton unquestioningly in supposing that matter is prior to motion as well as to space. In fact, space-time and motion are identical. The Reciprocal System of physical science defines motion as the relation between two uniformly progressing reciprocal quantities, space and time. That is, space-time is prior to matter and is primarily related to motion. Space-time progression at unit speed(speed of light) and speed displacement from unit speed, including light, electricity, magnetism, matter(gravitational motion), so-called 'anti-matter'(named 'cosmic matter' in the R.S.) are so many diverse forms of motion.

3. The reciprocal character of the relation between space and time as motion excludes the postulated asymmetrical dimensionality of space(3) and time(1), assumed in the theory of relativity, since the character of the relation implies that the dimensions of time(3) must be and are the same as the dimensions of space(3).

4. Finally, the physical space-time continuum is not a simple continuum, like the real number system, because physical space-time, unlike spe-cious space and time, are not infinitely divisible. The universe, according to the Reciprocal System, is composed entirely of one component, motion, EXISTING in three dimensions and in discrete units. By reason of the reciprocal character of the relation between space and time, each individual unit of motion is a relation between one unit of space and one unit of time, motion at unit speed, which the R.S. identifies as the speed of light.

In the endeavor to unify physics quantum mechanics had better be reexamined as well as relativity physics. The supporters of the Reciprocal System observe that generally the quantum physicists and the relativistic physicists mutually and unquestioningly support each other's paradigms. The workers in quantum mechanics see no inconsistency in accepting the infinite divisibility of space and time, while teaching the finite divisibility of light, electricity, magnetism and matter. The supporters of the R.S., however, see the discreteness of light, electricity, magnetism and matter as a necessary consequence of the existence of discrete units of motion and finitely divisible units of space and time.

On this score a challenge to all who work to revalue and unify physical science has been proposed by Albert Einstein:
"From the quantum phenomenon it appears to follow with certainty that a finite system of finite energy can be completely described by a finite set of numbers[quantum numbers]. This does not seem to be in accordance with a continuum theory and must lead to an attempt to find a purely algebraic theory for the description of reality. But nobody knows how to obtain the basis of such a theory."

I know somebody who has discovered, learned and knows how to obtain the basis of such a theory. The Reciprocal System of physics, authored by Dewey B. Larson, provides a description of physical reality, employing only finite mathematics and quantum numbers, e.g. a triplet of quantum numbers to characterize and distinguish any atom of any chemical element of matter. In truth, one of the main essential features of the Reciprocal System of physics is that it begins by excluding infinity from the physical universe:
"Infinity is excluded from the physical universe, since we are defining motion as a relation between a time magnitude and a space magnitude and we deduce that the quantity of motion is finite. Since all physical entities and phenomena are manifestations of motion, they are measured in terms of 1/n and n/1, where n is finite. No infinities are possible. This is one of the many places where the Reciprocal System of physics has the advantage over conventional theory, in which infinities are a considerable source of embarrassment. As Richard Feynman put it: 'If we get infinity, how can we ever say that this agrees with nature?'

-Dewey B. Larson

Because of the lack of awareness among present professional physicists that a unified general physics is presently in actual existence, the practice of the science of physics, including relativity and quantum physics, is quite unable to exclude infinities from the modern theories of physics.
October 1, 1983

Professor K. V. K. Nehru
Department of Mechanical Engineering
P.G. School, J.N.T. University
Hyderabad - 500 029, India

Dear Professor Nehru:

I am sorry to be so slow to respond to your letter of September 3. Dr. Arthur G. B. Metcalf, Chairman of the Board of Trustees of Boston University, based on my conversations with him about the Reciprocal System, has expressed willingness to sponsor a seminar at Boston University by a proponent of RS. I have been in correspondence with Frank Meyer about this matter and based on discussions at the ISUS meeting in August he has informed me that the ISUS board recommends that Dewey Larson himself be the seminar speaker. I have thus conveyed this information to Dr. Metcalf, who, through the appropriate channels, has extended an invitation to the Head of the BU Physics Department to invite Mr. Larson to give a seminar. The matter now rests in the Physics Department, and I am still waiting to hear from them. A colleague of mine who is a theoretical physicist knows the relativists and has promised to inquire.

At the present time, my position, that of my colleague, and that of Dr. Metcalf is that, while we have not had the opportunity to study RS enough so that any of us can staunchly claim to be advocates, we are advocates of learning about new (to us) ideas. I myself have studied some of Dewey Larson writings to the point that I find them most fascinating and most difficult to dismiss. I have also read some of your papers in Reciprocity, but have not been able to dig enough into the fundamentals enough to be able to derive results like yours myself. I have been deeply involved in another area involving gaining acceptance of a new technology, and cannot allow myself to be distracted in the major way that I think I would need to really come to grips with RS.

It is therefore much too early to honor requests like yours. Wishing you the best, I am

Sincerely yours,

Edward Anderson
Professor

cc: Frank Meyer

Page 8 ISUS News Autumn, 1988
October 29, 1988

Dr. Lawrence R. Sulack
Chairman
Department of Physics
590 Commonwealth Ave.

Dear Professor Sulack:

It has been about a month since we had a brief discussion about the possibility of inviting Dewey Larson to a Physics Seminar at Boston University.

While I haven't had the opportunity to study Larson's theory in enough detail to be a strong advocate, I have studied it enough and have read and talked to enough others to believe that Larson may well have an approach worthy of the attention of the physics community. I enclose several reviews of Larson's books by scientific journals.

As I understand it, Larson developed his framework of physical theory, which he calls the Reciprocal System, out of extensive analysis relationships between properties of matter, much of it in the study of crystalline material. After decades of work, he began to see that the relationships could be understood only on the basis of a new view of space-time, and that all could be derived from two fundamental postulates, stated in the enclosed review by David Halprin. Over more decades, Larson found that, without the aid of any supplementary or subsidiary assumptions, and without bringing in anything from experience, he could produce a complete qualitative and quantitative description of the basic features of the physical universe from the depths of the atom to quasars and black holes.

The fact that, while much has been written by and about Larson and his Reciprocal System, it has not yet become generally accepted by the physics community, is not necessarily surprising. From what I have read thus far, thorough study of his work requires at least three attributes in one very intelligent person: a willingness to expend a great deal of intellectual energy with no guarantee of success, the humility to set aside what one "knows" long enough to follow through on the new ideas, and the emotional strength and self confidence needed to resist possible admonishments of colleagues who would dismiss the new ideas based on cursory analysis.
While not a physicist myself, I spent most of my time as a doctoral student at M. I. T. studying physics, particularly relativity theory and quantum mechanics, out of interest in understanding how the physical world works, and I have been most interested in following developments in physics through the years thereafter. I am aware that a number of top physicists have commented that fundamentally new ideas are needed and that, while modern physics can calculate a remarkably wide range of phenomena, a unifying theory is still a mystery. Dewey Larson, as an uncommitted investigator outside the cultural domain of physics seems quite possibly to have developed such a theory. If he is correct, and there is a whole organization of people called the International Society of Unified Science that believe he is, he must go down in history as perhaps the greatest scientist of all time. I urge you to give him a hearing.

Sincerely yours,

J. Edward Anderson
Professor

encl.
FRANK A. ANDERSON, Ph.D.  
Registered Professional Engineer  
410 South 11th Street  
Oxford, Mississippi 38655  

Wednesday, October 12, 1988

Dr. J. Edward Anderson  
College of Engineering  
Boston University  
110 Commonwealth Street  
Boston, Massachusetts 02215

Dear Dr. Anderson:

I am writing to you at the suggestion of Professor Frank Meyer, President of the ISUS, and would like to introduce myself. I am Associate Dean Emeritus and Professor Emeritus of Chemical Engineering, School of Engineering, The University of Mississippi. I am also a long-time member of the Board of Directors of the International Society of Unified Science and have served a term as President of the ISUS. Although I am in my tenth year of "retirement" I am still active in some academic and professional areas as well as in church and civic affairs. In recent years my ISUS activity has been confined to occasional lectures on basic Reciprocal System theory and to writing letters to selected individuals in an effort to promote interest in the RS. My academic background is in chemistry and chemical engineering and is weak in fundamental physics theory. Consequently I am not in the best possible position to espouse a rethinking of physics fundamentals.

In his last two letters to me Frank Meyer has spoken highly of you and your interest in advancing the cause of the ISUS. I sincerely appreciate your efforts on behalf of the ISUS and especially your effort to obtain a hearing for the RS at Boston University. I tried to do the same thing a number of years ago here at the University of Mississippi with limited success. It appears that the physicists and other scientists who attended our symposium, held in connection with the annual convention of the Society, were interested only in their own specific research and were not willing to take the time to return to a study of fundamentals, i.e. analyze the foundations of modern physics.

Despite my admitted weakness in physics fundamentals I have long had a "gut" feeling that something was wrong in physics, a feeling that was reinforced when I learned about the Reciprocal System and Dewey Larson's tremendous 50 year-plus effort to develop a logical structure for the science of physics. Because I feel strongly that the science "establishment" has the responsibility to study and evaluate all serious investigations and ideas concerning the structure of science, especially physics, I have been baffled and disappointed in the unwillingness of the establishment to study and put the RS to test. If there is a basic flaw in Dewey Larson's development it needs to be pointed out and the RS dumped on the mountain of wrong ideas and theories that characterize the course of science during the past 3000 years. If, on the other hand, the
RS is a valid structure and has produced the long-sought unified theory then the science establishment, if it is to be true to itself, must acknowledge Larson's tremendous achievement and "get right".

One of the high points in my life was getting to meet Dewey Larson in person and listening to him discuss his development of the RS. I have all of his publications and have tried to distill the essence from each despite the fact that I cannot follow much of his reasoning. His works bear out the fact that Dewey Larson is an unusually gifted individual. Never have I run across anyone whose thinking is as devastatingly logical as his. Yet he is modest and free of the arrogance which characterizes so many of the great. He appears to understand his position as a maverick and to accept without bitterness the failure of the establishment to give his life's work a respectable hearing. If the RS is shown to be a correct representation of the physical structure of the universe Larson will go down in history as one of the most brilliant thinkers ever to have appeared on the face of the earth. At the same time the establishment will be ridiculed for not offering Larson his day in court. All Larson has ever asked of the establishment is to be shown where his development is wrong and he has gone astray. If Larson is wrong, and nobody has yet found a fatal flaw in his work, it will not be because he is a fraud or charlatan.

For your information I am enclosing a copy of one of the letters I have sent out during the past 10-12 years in the hope of getting Larson and the RS a hearing in the scientific world. In this case, and in most cases, I have never even gotten an acknowledgement of one of my letters.

I sincerely hope you will have success in helping to get Larson the hearing he so richly deserves. If I can provide you with helpful information or be of assistance to you in any way, please do not hesitate to call on me.

Sincerely,

Frank A. Anderson

cc: Professor Frank Meyer
Mr. Patrick Young  
Chief Science and Medical Correspondent  
Newhouse News Service  
c/o Editor  
Science Digest  
888 Seventh Avenue  
New York, New York 10106

Dear Mr. Young:

Congratulations on your excellent article, "A Maverick Inventor Who Fought and Won", which appears in the January 1984 issue of SCIENCE DIGEST.

As I read your fascinating story about Stanford Ovshinsky my thoughts kept drifting back to an 80-plus year old friend and lone investigator, Dewey B. Larson, who, over a span of about 60 years, has developed a challenging and exciting unified theory of the physical universe. His first book dealing with his work was published in 1959 and bore the title, "The Structure of the Physical Universe". Since that time he has published five additional books devoted to his analyses and findings, the latest one bearing the title, "Nothing But Motion". Not so strangely, the members of the scientific establishment have ignored Larson's brilliant work. It has proven to be almost impossible to persuade any of the leading scientific journals and magazines to review his books, let alone accept an article for publication. There is a small handful of scientists who support and try to promote Larson's concepts through an organization now called the International Society for Unified Science. So far as I know, no one who has taken time to examine Larson's postulates and findings has been able to find a flaw in his basic reasoning. I consider Larson to be one of the most brilliant and devastatingly logical thinkers I have run across in my 40 years of work as a scientist-engineer-educator.

Larson's thesis, in a nut shell, is that our universe is NOT a universe of matter, as Einstein postulated, but a universe of MOTION, a universe in which the basic reality is MOTION, and all physical entities and phenomena, including matter, are merely manifestations of motion. On this basis, for instance, the atom is simply a combination of motions. Radiation is motion and so is gravitation and the electric charge. Larson starts with two postulates that define the characteristics of the fundamental motion, and then demonstrates that a development of the consequences of these postulates, without the aid of any supplementary or subsidiary assumptions, and without bringing in anything from experience, produces a complete qualitative and quantitative description of the basic features of the physical universe and the relations between them. Larson's brilliant analyses...
range from the depths of the atom to the quasars and black holes of space.

Because my background in present-day physics is very limited (I was educated as a chemical engineer in the late 30's and 40's), I find it difficult to follow much of Larson's work. However, I have a powerful "gut" feeling that his basic work is correct and that it should be given careful, serious consideration by qualified members of the scientific establishment. Isn't this what the establishment is supposed to do - analyze all theories, discard those that prove to be wrong, and refine those that appear to have merit or are correct? Frankly, I am very disappointed in the establishment because Larson's work has not been subjected to critical evaluation. Larson, it is interesting to note, is much more tolerant of the failure of the establishment to critique his work than I am. Larson deserves a serious hearing by the experts. If they can find anything wrong with his postulates and reasoning therefrom, all Larson wants is to be told where or why he is wrong.

My objective in writing to you is to call Larson and his work to your attention in case you do not know of him and his Reciprocal Theory (motion = space/time, a relationship which points out the reciprocal nature of the two poorly understood concepts of space and time). Because of the tone of your excellent article about Stanford Ovshinsky, I believe you have the feeling and ability to understand and write about another scientific maverick, Dewey B. Larson. If Larson is correct, as some of us in ISU believe, Larson will go down in history as one of the greatest theoreticians of all time and his unified theory will finally establish a firm basis for an understanding of the physical universe, a goal that has been sought for about 3000 years.

If you would like to learn more about Larson and his work which has led to the FIRST GENERAL UNIFIED PHYSICAL THEORY, a theory which derives the laws and principles of ALL the major branches of science from the SAME few premises, I will be glad to send you a complimentary copy of NOTHING BUT MOTION. After reading this 292-page treatise, I hope you would want to meet Larson and to consider writing his fascinating story, a story which could prove to be one of the most important science stories of all time. Or should you like to communicate immediately with this remarkable individual and uncommitted investigator, you can write to him as follows:

Dewey B. Larson  
755 N.E. Royal Court  
Portland, Oregon 97232

Thank you for your attention to this letter and congratulations once again on your excellent article on Ovshinsky.

Sincerely,

Frank L. Anderson  
Associate Dean Emeritus  
School of Engineering  
University of Mississippi

Page 14

ISUUS News  
Autumn, 1988

E I:2.1-14
News of the International Society Of Unified Science, Inc.

FORTIETH ANNUAL ISUS, INC. CONVENTION  August 11-12, 1989  Portland. OR
Volume III, Number 1  Winter 1988-1989

Nor is time a mysterious illusion of the intellect. It is an essential feature of the universe. G.J. Whitrow, Natural philosophy of Time.

Oost thou love life? Then don't squander time, for it is the stuff life is made of. Benjamin Franklin, Autobiography.

In the .maxim,. that space and time are infinitely divisible, we pass to an axiom the truth of which is extremely doubtful, even in the physical world. George Santayana, The Realms of Being.

----------------------------------------------

PAGE

Editorial about THE RECIPROCAL SYSTEM NOT BAD  1

ANNOUNCEMENT: FORTIETH Annual ISUS CONVENTION, August 11-12, 1989  2

Letter of Professor J. Edward Anderson to Dr. Lawrence R. Sulak, Chairman, Physics Department, Boston University, October 29, 1988  3

LETTER OF Professor Ed Anderson to Dr. Arthur G.B. Metcalf, Boston University Board Chairman, November 2, 1988  5

Letter of Frank Meyer to Professor Abner Shimony, Professor of Physics and Philosophy, Boston University, December 29, 1988  6

Letter of Prof. Shimony to Mr. Frank Meyer, January 15, 1989  7

Letter of Professor Shimony to Professor Larry Sulak, Chairman, Physics Department, Boston University, October 31, 1988  8

Letter of Ronald W. Satz to Professor J. Edward Anderson, November 15, 1988  9

Letter of Dr. K.V.K. Nehru, Professor in Mechanical Engineering, J.N.T. University, Hyderabad, India, December 20, 1988  10

Letter of Lawrence E. Qenslow, Teacher and Member, ISUS Board of Trustees, to Prof. Frank H. Meyer  11

NEWS about Matching Grant to ISUS, INC. from St. Paul COMPANIES  12

REQUEST from Edwin Navarro, ISUS Membership Director, about future publication of an ISUS Membership List  18

ISUS MEMBERSHIP and SOME AVAILABLE LITERATURE ABOUT THE RECIPROCAL SYSTEM OF PHYSICAL SCIENCE  19

IGNORANCE ABOUT MOTION IS IGNORANCE OF NATURE
Is the Reciprocal System (RS) of physical science a bad system of scientific theory and practice? We suggest that, as an original theory, it is bad ONLY to those who dismiss it summarily without examination.

Quantum mechanics (QM) and quantum electrodynamics (QED) are not all bad, even though they hardly explain between them everything physical found in our living existence. At least, Quantum Physics (QP) focuses on what not so long ago was complacently denied by generations of physicists and natural philosophers: that most, if not all, the primary and the derived constituents of the physical universe are finitely, rather than infinitely divisible.

Relativity theory (RT) is not at all bad, even when it fails to disclose the why and how of the finite divisibility of the most essential constituents of the physical universe: motion, time and space. Nevertheless, RT endeavors to focus on the evident continuity and difference between relatively slow motions and the relativity fast motions, particularly when and where the speed of light always and ubiquitously occurs.

RS ACCOMPLISHES what neither RT nor QP does. From its definition of motion as the relation between two uniformly progressing reciprocal quantities, space and time, RS discloses that each individual unit of motion is the relation between one unit of space and one unit of time, motion at unit speed. By identifying the speed of light as the absolute magnitude of the unit speed of the uniform three-dimensional progression of both space and time, RS at once accounts for three mathematically but not physically resolved dilemmas of modern physics: 1. why and how the photon of light is both a particle and a wave of motion; 2. why and how the velocity of light is absolutely independent of the rates of motion of source, receiver and/or inertial reference systems; and 3. why and how the physical universe is an 'expanding universe', as postulated by the astronomers. As against the RT claim that time, space and motion basically are relative, RS shows why and how clock time and clock space components are absolute, while only coordinate time and coordinate space components may properly be regarded as relative. RS REVEALS another kind of existing motions--scalar motion, just as important as the vectorial motions of our ordinary experience, in which direction is a specific and inherent property of the motion. Scalar motion has no inherent direction, since it is distributed uniformly over all directions. Prominent examples of scalar motion are outward three-dimensional space-time progression and inward three-dimensional gravitational motion.

Similarly, RS answers often asked questions: What is electricity, electric charge, electron, positron? Why and how is the atom, mass, gravitational motion, matter, 'anti-matter'? RS answers YES to the question whether a preferred reference system exists and can be found in the physical universe to distinguish & relate absolute motion and relative motion?

NOT BAO for the Reciprocal System (RS) in comparison with the Relativity Theory (RT), Quantum Mechanics (QM), Quantum Electrodynamics (QED):

IGNORATOT MOTU IGNORATA NATURA

MUCH IS AWESOME BUT NOTHING MORE AWESOME THAN WOMAN

IN THE MAXIM... THAT SPACE AND TIME ARE INFINITELY DIVISIBLE, WE PASS TO AN AXIOM THE TRUTH OF WHICH IS EXTREMELY DOUBTFUL, EVEN IN THE PHYSICAL WORLD.--George Santayana

1.
1989 I. S. U. S. Convention

The 14th Annual Convention of the International Society of Unified Science (ISUS) is scheduled for August 11-12, 1989, in Portland, Oregon. This year marks Mr. Larson's 90th year and the 30th year since his first book on the Reciprocal System was published.

The headquarters will be in the Jade Tree Motel which is close to Mr. Larson's house. The conference will begin at 9:00 a.m. Friday morning, the 11th in the Jade Tree's conference facilities and run Friday and Saturday, with the ISUS business meeting late Saturday afternoon. There will be a social gathering Friday night at the Larson's. And a banquet dinner Saturday night. Thursday night will be an informal get together for those who arrive early enough.

A block of rooms has been set aside for ISUS. Reservations should be made by July 1 and can be held with a $10.00 deposit. The deposit is fully refundable with 48 hours advance notice, so make your reservations early, directly with the Jade Tree, if there is a chance you will be able to attend so you can stay in the headquarters location. For reservations or lodging questions contact Mrs. Wanda Strong, Manager, Jade Tree Motel, 3939 NE Handcock, Portland, Oregon 97206 Phone: (503) 288-6891.

The location of the Jade Tree, one block off a major street, is convenient and quiet. Access is good from the airport by Taxi, rental car or city transit bus. Stores, city services and restaurants are within easy walking distance. Daily room rates are with: two twin beds $37.06, a single queen bed $33.79, a single king bed $40.33, a two queen bed suite $45.78.

Rooms can be shared. Phillip Porter, P.O. Box 999, Englewood, Colorado 80151 will act as a clearing house if you want to find an ISUS room mate. Send in your reservations to the Jade Tree by July 1st and send a stamped, self addressed envelope with your contact phone numbers to Phil by July 5th. Phil will compile a list of all who respond and mail it back in your envelope by July 20th.

This will give you time to make your own roommate contacts and cancel duplicate room reservations. Please note if you might want to arrive early or stay late and site see, share a rental car, have bus information, etc. and we will attempt to get that information for you.
October 29, 1988

Dr. Lawrence R. Sulack
Chairman
Department of Physics
590 Commonwealth Ave.

Dear Professor Sulack:

It has been about a month since we had a brief discussion about the possibility of inviting Dewey Larson to a Physics Seminar at Boston University.

While I haven't had the opportunity to study Larson's theory in enough detail to be a strong advocate, I have studied it enough and have read and talked to enough others to believe that Larson may well have an approach worthy of the attention of the physics community. I enclose several reviews of Larson's books by scientific journals.

As I understand it, Larson developed his framework of physical theory, which he calls the Reciprocal System, out of extensive analysis relationships between properties of matter, much of it in the study of crystalline material. After decades of work, he began to see that the relationships could be understood only on the basis of a new view of space-time, and that all could be derived from two fundamental postulates, stated in the enclosed review by David Halprin. Over more decades, Larson found that, without the aid of any supplementary or subsidiary assumptions, and without bringing in anything from experience, he could produce a complete qualitative and quantitative description of the basic features of the physical universe from the depths of the atom to quasars and black holes.

The fact that, while much has been written by and about Larson and his Reciprocal System, it has not yet become generally accepted by the physics community, is not necessarily surprising. From what I have read thus far, thorough study of his work requires at least three attributes in one very intelligent person: a willingness to expend a great deal of intellectual energy with no guarantee of success, the humility to set aside what one "knows" long enough to follow through on the new ideas, and the emotional strength and self confidence needed to resist possible admonishments of colleagues who would dismiss the new ideas based on cursory analysis.
While not a physicist myself, I spent most of my time as a doctoral student at M. I. T. studying physics, particularly relativity theory and quantum mechanics, out of interest in understanding how the physical world works, and I have been most interested in following developments in physics through the years thereafter. I am aware that a number of top physicists have commented that fundamentally new ideas are needed and that, while modern physics can calculate a remarkably wide range of phenomena, a unifying theory is still a mystery. Dewey Larson, as an uncommitted investigator outside the cultural domain of physics seems quite possibly to have developed such a theory. If he is correct, and there is a whole organization of people called the International Society of Unified Science that believe he is, he must go down in history as perhaps the greatest scientist of all time. I urge you to give him a hearing.

Sincerely yours,

J. Edward Anderson
Professor

encl.
November 2, 1988
Dr. Arthur G. B. Metcalf
Electronic Corporation of America
265 Winter St.
Waltham, MA 02154

Dear Arthur:

I heard from Professor Sulack today. He gave the material on Larson's theory to Professor Abner Shimony with the enclosed response. Sulack has invited me to lunch with the two of them with the purpose, I assume from the letter, to tell me why Larson is wrong, based on Salz's book.

Having studied relativity theory a good bit, I am surprised by his remark that "if one frame is accelerated relative to an inertial frame ..." There is absolutely nothing in special relativity about accelerated frames—it is pure kinematics. That has been one of the troubles with it. One can introduce acceleration in general relativity, and, in a special course at M. I. T., I was able to solve the clock paradox in general relativity. Also, Shimony's treatment of relativistic mass skirts around the concern Larson had, i.e., that in looking at $F = ma$ with $a$ approaching zero as velocity goes to the speed of light, Einstein assumed that in the ratio $F/m$, $m$ increases relativistically and $F$ is invariant. I noted in my copy of Einstein's paper that I had noted in the margin that he did not discuss why his choice. Larson has argued that from his basic postulates that he has shown that $F$ goes to zero rather than $m$ going to infinity.

This is all very interesting, but I haven't the time to try to argue with the physics department, and really acted in the role of an intermediary rather than an advocate of Larson's ideas. I don't think Shimony has given Larson's theory a good shot, arguing from a different treatment, but I also think that Larson should have found a way to lead people a bit more gradually to his ideas. The burden is on the promoters, and I have no time to be one.

With best regards,

S.
I am an Editor of a 17-year-young journal, RECIPROCITY and also an occasional newsletter, ISUS NEWS. They are news organs of our non-profit science education corporation, ISUS, INC. We are a group of uncommitted investigators, engaged in the mighty adventure of physics research. A main objective of our venture has been and is, working with or/and against my physics profession, to revalue and unify the science of physics.

In this connection I wish to request your assent, your permission, to reprint your Letter of October 31, 1988 to the Chairman of your Physics Department, Professor Larry Sulak, expressing your incipient, honest insight into this venture of ours.

Everyone sees according to his or her light. Everybody knows more than anybody. We think that a very promising, if not the most promising program, for accomplishing the desired comprehensive unification of physics, is the Reciprocal System of physical science, originated by the now 90-year-young engineer-author, Dewey B. Larson. We disagree with some opinions you have expressed against innovations in physics proposed by Larson. We wish, nevertheless, to share your Letter of October 31 information with our members and readers for further exploration of their possible relevance to our adventure.

I have been a practising Research Physicist in industry and medicine for better than a half-century, becoming a Professor of Physics and Philosophy after I turned 60 until I retired in 1981, not from work, but to do my own work. I studied 'scientific method' with Morris R. Cohen, Ernest Nagel, Herbert Feigl, etc. I studied relativity physics with Peter Bergmann as well as crystal physics with I. Fankuchen, Rudolf Brill, P.P. Ewald, David Harker, etc. at Polytechnic University, when it still modestly referred to itself as the Polytechnic Institute of Brooklyn, where I was born in 1915.

We value you, Professor Abner Shimony, not only as a man and fellow physicist, but also as a valued friend and/or a brave enemy, that is, a friend who helps to keep us of ISUS, INC. ON OUR TOES.

Sincerely,

Emeritus member, American Physical Society, American Association of University Professor, American Crystallographic Association, Federation of American Scientists, Emeritus Physics Professor, University of Wisconsin System.

PROF FRANK MEYER, President
DR RONALD BLACKBURN, Vice-President
RONALD W. SATZ, Secretary
DR RAINER HÜCK, Treasurer
PROF FRANK MEYER, Editor, RECIPROCITY
Mr. Frank H. Meyer  
1103 15th Ave., S.E.  
Minneapolis, MN 55414  

Dear Mr. Meyer,  

It is creditable to you and to your journal that you are willing to print the letter that I wrote to Larry Sulak criticizing Ronald Satz's book. (Please correct my unfortunate misspelling of his name when you reprint the letter.) It certainly shows open-mindedness on your part. I give you permission to print the letter, provided that you add a note to it saying, "Professor Shimony requests that no one attempts to initiate a correspondence with him concerning the content of this letter, though he has no objection to being sent reprints and preprints of articles." My reason for insisting on this addition is simply self-protection. I do not have time to engage in correspondence, for I am carrying a heavier burden of work now than I ought to be doing; and I do not like to be discourteous and not even give a brief answer to a letter. When I published my article in Scientific American in Jan. 1988, entitled "The Reality of the Quantum World," I received at least fifty letters, some criticizing my argument, some agreeing with it but enclosing articles and requesting comments on them. I answered many of these, but finally gave up, and I still have a bad conscience about not acknowledging some of the letters. In short, my attitude is: here is my comment on Satz's book for people to consider, and if it helps clarify their thinking some good has been done.

Sincerely yours,  

Abner Shimony  
Prof. of Philosophy and Physics

P.S. It occurs to me that you might simply print this letter along with the letter to Sulak. That would serve the purpose of warding off correspondence by giving the reason for my unwillingness to correspond, and it would also present my compliment about your open-mindedness to your readers.
Dear Larry,

I have examined the material on the Reciprocal System which you gave me and found the reading to be a painful experience. I am frankly baffled that this material was forwarded to you by some one with academic credentials, and I am also baffled that it could have any appeal to people who are acquainted with the natural sciences. I shall mainly refer to Salz's The Unmysterious Universe, since it is the only sustained exposition among the papers you showed me. The arguments which it gives to dismiss the procedures and results of standard modern physics are misrepresentations, and the proposals for a constructive substitute (due to Dewey Larson) seem to me vague and incoherent. I shall give a few illustrations, but I can point out many more examples of these failures if there is need for more examples.

In the second column of p.8 there is a quotation from Larson, giving an argument that mass cannot increase with velocity. It is clear that he has confused two concepts. One is rest mass, which is a property of a particle independent of its velocity, and the same in every frame of reference. The other is sometimes called "relativistic mass" and it is the ratio of the momentum of a particle to its velocity. Since the relativistic expression for momentum is

\[ p = \frac{m_0 v}{(1 - v^2/c^2)^{\frac{1}{2}}} \]

where \( m_0 \) is the rest mass, it is clear that the "relativistic mass" does depend upon the velocity. But it is incorrect to present an argument which conflates these two concepts. Furthermore, Salz's later argument on this page, immediately after the quotation, is based upon the assumption that the Newtonian force law \( F = ma \) is valid relativistically, which is not the case, since the relativistic law is

\[ F = dp/dt, \]

and this reduces approximately to the Newtonian law only for \( v \) much smaller than \( c \).

On p. 9 it is argued that the relativistic treatment of the pair of clocks \( A \) and \( B \) is inconsistent. One statement in the argument is that relativity theory "states that the motion of clock B relative to clock A is indistinguishable from the motion of clock A relative to clock B." But special relativity only asserts the equivalence of all inertial frames, and if one frame is accelerated relative to an inertial frame, then it is not itself inertial. Since the argument supposes that \( B \) is accelerated and \( A \) is not, then presumably it is the latter that is at rest in an inertial frame and the former is at rest in a non-inertial frame. Hence the supposed indistinguishability breaks down according to special relativity theory.

On p. 11, first column, it is asserted that there is no adequate reason for the reaction to proceed from \( \text{H}_2 \) to \( \text{He} \). Since Salz accepts \( E = mc^2 \) on p. 8, even though he rejects other aspects of special relativity theory, he has the reason at hand: the mass of four hydrogen atoms is less than the mass of a helium atom, and hence
an exothermic reaction is possible in which hydrogen is burnt to produce helium.
As to the claim that there is no experimental evidence for this process, one doesn't
have to examine the stars; it occurs in the fusion reaction of a hydrogen bomb!
(Of course, the fusion reaction uses heavy hydrogen rather than ordinary hydrogen,
but the argument which I just gave is unchanged by this fact.)

On p. 12, first column, the author cannot understand how a current can be maintained
without the accumulation of negative charge. He need only consider water pumped steadily
through a circular pipe, giving a current of water without a build-up of density.
(When lapses of logic of this kind occur and recur, it is hard to see why one should
take the work at all seriously.)

Let me turn now to the crucial constructive proposal of the Reciprocal Theory.,
in the second column of p. 20, culminating in the argument for three dimensions of
time. I could paraphrase the argument perfectly well by considering the purchase of
land with dollars, at the cost of c dollars per square foot. Here area and money are
reciprocal. Since area has two dimensions, it would follow --- exactly paraphrasing
the author's argument --- that there are two dimensions of money! (Again, why should
one take seriously a work in which the texture of the reasoning has this character?)

I could not follow the discussion in chapter 3, which seemed to me qualitative,
impressionistic, and loose. What really is meant by "When moving, the electron, a one-
dimensional motion, generates a two-dimensional motion"? This type of discussion
should be compared with the discussion of interactions between moving charges in an
elementary undergraduate book on electromagnetism, in which a rich body of phenomena
is explained quantitatively with fairly simple arguments -- simple, that is, to any
one who takes the pains to acquaint himself with the requisite tools of calculus and
vector analysis, and to proceed in a step by step fashion.

I think that I have said enough to indicate my assessment of Salz's book. If
further analysis is needed, I am willing to give it.

With best regards,

Abner Shimony
Professor of Physics
and Philosophy
November 15, 1988

J. Edward Anderson  
Boston University  
110 Cummington Street  
Boston, MA 02215

Dear Prof. Anderson:

Thank you for having the courage to bring the Reciprocal System to the attention of the physics faculty. My response to Prof. Shizony's review of the Unmysterious Universe is as follows:

1. My name is Satz, not Salz. I am listed in American Men and Women of Science and have a B.Sc. and M.Eng. from RPI. I completed the course work for my doctorate in engineering at MIT before choosing to leave to retain patent rights to my invention (U.S. patent 4,009,573).

2. The mathematics of Special Relativity is correct, but the physical interpretation is wrong. The relativistic correction factor belongs with the force or time, not with the mass; as speed increases, the force goes to zero, rather than the mass going to infinity. The mass of a particle results from the spin of its photon(s); it is not affected in the least by translational motion. (Would the relativists like to tell us where this supposed increase in mass comes from?) See p. 119 of Resnick's Introduction to Special Relativity (1968) for another critique of relativistic mass.

3. The clock paradox applies to the case of two inertial frames in relative motion, whether accelerated or not. Because Special Relativity admits of no preferred coordinate system, the clocks both register more and less than the other even with no acceleration! (See p. 88 of Larson's Nothing But Motion.) In the Reciprocal System, motion is the fundamental component of the universe and is thus self-contained and absolute (i.e., not purely relative).
4. The two most likely candidates to explain stellar energy generation are the fusion of light elements and the fission of heavy elements (both of which have been achieved on earth). Direct observation of the sun and stars cannot give us the answer, so we must rely on collateral evidence. Normally material aggregates stratify by mass; the heavier elements sink to the center, while the lighter elements remain near the surface. It is likely that the heat of the sun and stars is generated from their centers, where the heavy elements are concentrated—hence the greater likelihood that fission, not fusion, is the source of the energy, as the Reciprocal System contends. The hot blue stars are thus old, not young, as their mass indicates—their fuel is not hydrogen. (The more massive entities should be older than the less massive ones).

5. It is the difference in potential, not density, that causes the flow of water or electric charges. Electrostatic potential is directly proportional to the amount of charge. In the Reciprocal System the electrons involved in current flow are neutral and thus there is no charge buildup at one end of a wire.

6. Area of land and amount of money are not reciprocal, but proportional. The analogy does not hold. In the Reciprocal System, space-time (or motion) is three-dimensional; except for convenience, it is incorrect to think of space apart from time or time apart from space.

7. A one-dimensional entity (an electron) translating perpendicular to itself generates a two-dimensional motion (a magnetic effect). Much more on electromagnetism can be found in Larson's Basic Properties of Matter, pp. 230-240.

8. I am perfectly familiar with the "requisite tools of calculus and vector analysis". (See my engineering book, with 800 equations, or my numerous papers, or my commercial software packages). I stated in the preface of the Unmysteries of Matter that "mathematical detail has been kept to a minimum so as to enable the reader to grasp the qualitative essentials first."

9. The basic postulate of the Reciprocal System is that the physical universe is composed entirely of units of motion, the basic speed being \(4.55886 \times 10^{-8} \text{ cm} / 1.520655 \times 10^{-16} \text{ sec}\), or the speed of light. This is quantitative, non-impressionistic, and tight. In contrast, contemporary physics lacks theoretical definitions of space-time, photons, subatoms, and charges. It cannot provide useful calculations for the properties of matter. It is thus qualitative (the mathematics of quantum mechanics is too difficult to apply in practice), impressionistic, and loose. Engineers generally prefer classical physics.
I am willing to continue to respond to any comments made.

By the way, my latest commercial software package, Expert Thinker, is the first microcomputer package able to prove theorems and solve declarative problems in logic, math, and science. It features depth first search, the occurs check, true negation, and the capability to use non-Horn clauses. It includes a predicate calculus to clause form converter. See the November, 1988 issue of Byte magazine, p. 88, for a brief write-up.

Sincerely,

Ronald W. Satz
Systems Engineer

The St. Paul Companies Inc.
385 Washington Street, St. Paul, Minnesota 55102
Telephone (612) 221-7911

DATE: MARCH 27, 1989

To: INT. SOC OF UNIFIED SCIEN
   1103 - 15TH AVE. SE.
   MINNEAPOLIS, MN 55414
   Check No. 00007500
   Check Amt. 400.00
   Org. ID# 2430436

From: Mary E. Pickard
       Community Affairs Officer

Re: The St. Paul Companies Partners in Giving Program

I am pleased to write that our records indicate that your organization qualifies for a matching gift through the Partners in Giving program. Funding for this program is from the St. Paul Fire and Marine Insurance Company Charitable Contributions Trust.

Please note that double matches are granted when 50 hours or more of volunteer time is donated by the participant to the organization in addition to a minimum financial gift of $25. This amount, if any, is reflected in the "Match" column.

If you have any questions about this program, please contact Kim Pohlen at 612-221-7757.

Participant

MEYER, FRANK V

Participant Gift

400

Match

400

12.
My Dear Frank,

Thank you very much for your letter addressed to the ISUS Board Members, which I received on December 1, 1988.

On going through the correspondence you sent, I gather that Mr. Larson has not yet personally presented the introduction of the Reciprocal System at the Boston University and that some literature had been sent instead, including Satz's primer.

I have gone through the criticism made by Prof. Abner Shimony on the unmyysterious universe. I can well understand his dismay in reading it: I myself went through such frustrating experience. I would not recommend Satz's primer to beginners: it could be used as a lecture notes by a speaker on R.S. I would like to touch upon briefly on Prof. Shimony's comments in the past two or three paragraphs of his letter dated October 31, 1988 addressed to Prof. Sulak.

On P.2 of his letter, in para 2, Prof. Shimony remarks about the 'lapses of logic' in Satz's book, aducing the counter-example of water being pumped steadily through a circular pipe, giving a current of water without a build-up of density. Unfortunately, this example proves the point Satz is trying to make (at the place cited) rather than confuting it, provided Prof. Shimony realizes that he should choose pressure and not density in his example so as to make his analogy legitimate.

Concerning the argument for three dimensions of time, Prof. Shimony presents the example of cost of land in dollars per square foot to show that Satz's reasoning applied here would lead to the conclusion that money is two-dimensional. He then expresses: "Why should one take seriously a work in which the texture of the reasoning has this character?"

May I humbly suggest that the implausible conclusion about the two-dimensionality of money that Prof. Shimony presents is not due to defective texture of Satz's reasoning but due to Prof. Shimony's misapplication.
In the Reciprocal System space and time are the two components of motion, reciprocally related to it, by postulate. Larson amply makes it clear that in the universe of motion, space or time per se does not have a separate existence. Each exists only in conjunction with the other, since motion is the primary entity of the physical universe. Hence the characteristics of space and time as these occur in the definition of speed or motion \( v = s/t \) ought to be identical, as explained by Satz.

However, in the conventional theory (the universe of matter) space and time are regarded as having independent existence. In this case, therefore, the occurrence of space and time in the quotient \( s/t \) does not logically entail the identity of their characteristics. A notion (to the Reciprocal System) is quite liable to carry over his conceptual frame (of mind) nurtured by the theory of universe of matter into his study of the theory of universe of motion (the Reciprocal System) un-consciously. This leads to absurd results. In the example cited by Prof. Shimony, the cost and area are independent concepts. Nor the land rate is a fundamental quantity underlying the structure of the universe like motion in the Reciprocal System is. Consequently, the instance of a ratio like \( x \) dollars/\( y \) square feet, where \( x \) and \( y \) are conceptually independent, does not imply any identify of their properties.

The inability to relinquish the setting concept of space and time that the theory of universe of matter engendered and to note that motion is logically prior to all physical phenomena in the theory of universe of motion would be the subtlest and most fatal difficulty a critic has to get over before he can meaningfully evaluate the Reciprocal System.

Prof. Shimony's comments in the last paragraph of his letter, about the electron generating two-dimensional motion and the quantitative explanations in the undergraduate text
books reflect the above cited difficulty in addition to the predilection to mathematical treatment. In this case, there seems to be a confusion between two types of issue. In the first instance, in chapter 3 referred to by Prof. Shimony, Satz is concerned with the discussion showing how the primary entities of the physical universe emerge logically from the fundamental postulates of the Reciprocal System. In the second instance, in which Shimony alludes to the interactions between moving charged in undergraduate books, the discussion is concerned with the quantitative relations between these primary entities. This type of discussion might well be mathematical, but the former type of bound to be qualitative!

What then Prof. Shimony or others who want to see where the 'real stuff' is are looking for is this latter type of treatment where it is not necessarily applicable. What one should be looking for is whether the Reciprocal System explains quantitative facts as well, but not whether it does it preponderantly by mathematics.

With warm regards

(K.V.K. NEHRU)
Dear Frank,

Thanks for including me in the request for input about the Boston Univ. invitation. Dr. Anderson seems to be sufficiently open-minded toward new ideas in general and astute enough to recognize the prerequisites necessary to consider anything really new. His delineation of three attributes that any person must have to really delve into this Reciprocal System is very much on the right track.

Abner Shimony is very obviously not such a person. He seems to have too much vested interest in maintaining his own position to be able to risk even an open mind. His arguments are those of one who cares not admit that any possibility of error exists in his own thinking, let alone that of his idols. His lapses of logic are even more profound than those he accuses Ron Satz of, especially in his comparison of dollars and area. Shimony would miss the whole point of the Reciprocal System even if it were the only theory available and therefore I think his so-called analysis can be summarily dismissed as being from one who himself dares not to risk self-examination. Ignore Shimony and continue communication with Ed even though he admits he doesn't have time to be a promoter.

Every potential audience will have its dissenters and likely its hecklers. Hopefully, DBL has learned how to deal with them in the many years he has been presenting the Reciprocal System of theory. Speaking very frankly to you, Frank, those who are unwilling to look at a new way of considering this world and its phenomena are reacting as though their approach to science is their religion and most people feel very threatened when their religion is being questioned. Don't let the "Shimony's" bug you!

Admittedly, when I first read Larson's book 'The Structure of the Physical
universe", I had considerable difficulty because of where I was coming from, but at least I didn't dismiss it as having no value. Then after plowing through "New Light on Space and Time", my response changed to a need to present the basic ideas through example and discussion rather than what seemed to be too much argumentation about frustrations with the present establishment. I admit that some argumentation was necessary and probably was appropriate for some readers. Now I feel that there is a need for a clear, straightforward presentation of the basic concepts on a level understandable to the average high school chemistry or physics student. That level is where most of us really started our own scientific training and therefore most of us need to be taken back to that level and restarted even though we may resist at being treated like children. That is "ego" preventing us from being teachable and thereby blocking any receptivity we may have. I guess that's the teacher in me talking, but I really feel that high school level is the best place to start.

By high school level I do not imply in any sense that I would be talking down to a college level or even graduate level seminar. What I mean is in sentence structure and complexity of words and ideas and the way they are presented. I have found that even in graduate level courses, the professor had to present new material, and especially involved correlations, in many short statements. Then tie a few together and go around again, tie a few more ideas in and go around yet again. Eventually the full implication could be made in a single statement which initially would have left nothing but confusion.

This is the approach I am taking in preparing my introductory presentation for the video on which I am working. The script for what I expect to say has a lot of repetition in it, but the accompanying book is very concise with very little repetition since the reader can always go back and re-read whatever was not clear initially. What I am having difficulty with is coming up with visuals.
to assist the viewer into coming to grips with scalar motion without the absolute requirement of vectorial direction; maybe that's one of those things that the individual must do in his own mind. The most difficult thing I have had to work out in my mind is the idea that there is no inherent relation between the scalar value of a harmonic motion in one scalar dimension and the normal progression in a perpendicular dimension. If you have any ideas on either of these topics, I could sure use the help.

Wishing all the best for you and yours. Have a Merry Christmas and a very Happy New Year.

Sincerely,

[Signature]

Lawrence E. Venelow

REQUEST ABOUT FUTURE PUBLICATION OF ISUS, INC. MEMBERSHIP LIST

Dear Member,

From time to time we get requests from members of ISUS to obtain a copy of our current membership list. These members feel as I do that it would be very helpful to the organization and for the advancement of the Reciprocal Theory for members to be able to contact other members in their vicinity in order to discuss and share ideas. In fact I feel that it would be helpful to send the membership list to all current members on an annual basis.

We have also received requests though from some individuals to not have their names distributed with such a list. We do not however have an up-to-date list of who these individuals are. We plan to distribute the list in the near future. Only current dues-paying members will be included on the list and will be sent the list.

If you do not want your name included on the distributed list, fill out the form below and return it to me within 30 days and your name will not be included on any future distributed lists.

Edwin Navarro
113 Chinkapin Lane
Williamsburg, VA 23185

Name______________________________________________

Address______________________________________________

City________________________ State_______ Zip__________

E I:3.1-18
ISUS News

The Newsletter of the International Society of Unified Science, Inc.

February, 1990

1990 Conference Announcement 1
Letter from the President 2
Research Interests at ISUS 4
Report on Cold Fusion Experiments 5
Videotapes of Past Conferences 6
1989 Conference Review 6
Minutes of 1989 Conference 7
ISUS News

A publication of the International Society of Unified Science, an organization devoted to advancing the Reciprocal System of theory.

President: Edwin Navarro
21 Steven Drive, Petaluma, CA 94952

Vice President: Frank H. Meyer
1103 15th Avenue S.E., Minneapolis, MN 55414

Secretary: Ronald W. Satz
1 Oak Drive, Parkerford, PA 19457

Treasurer: Rainer F. Huck
1680 East Atkin Avenue, Salt Lake City, UT 84105

ISUS BOARD OF TRUSTEES

Dr. Frank Anderson
Dr. Ronald Blackburn
Lawrence Denslow
David Halprin
Chris Halvorson
Dr. Rainer Huck
Prof. Frank Meyer
Wiliam Mitchell
Dr. K.V.K. Nehru
Edwin Navarro
Phillip Porter
Jan Sammer
Ronald Satz
RobinSims
Hoyt Stearns
Oxford, Mississippi
Fremont, California
Highland City, Florida
North Balwyn, Australia
Boulder, Colorado
Salt Lake City, Utah
Minneapolis, Minnesota
Detroit, Michigan
Hyderabad, India
Petaluma, California
Denver, Colorado
New York, New York
Parkerford, Pennsylvania
Vancouver, British Columbia
Phoenix, Arizona
1990 ISUS Annual Summer Conference
at Reed College in Portland, OR on August 3-5, 1990

ISUS is pleased to announce that the 1990 Annual Conference will be held on the campus of Reed College in Portland, OR, on August 3-5 1990. In following our usual format, the conference will start at 9:00 on Friday, August 3rd. Presentations of papers and discussions will take place all day Friday and Saturday morning. The ISUS business meeting will be held on Saturday afternoon. Sunday morning we plan to have a conference review and discussion group.

ISUS has reserved a number of dormitory rooms for members to stay in on Thursday, Friday, and Saturday night. We currently have not received all the details from the Reed College administration, so we are not sure of the exact number and cost of the rooms. There are single, double, and triple rooms available. If you would like to be assured of having a dormitory room, please contact Rainer Huck, 1680 East Atkin Avenue, Salt Lake City, UT 84106 to make a reservation. Once all the rooms have been reserved, anyone else desiring a room for the conference will have to stay in one of the nearby motels. We will be sending a more complete announcement out about the conference in the next couple of months. In that announcement we will indicate exact costs of the dormitory rooms, and suggest alternative motel accommodations.

We urge all ISUS members to consider making a presentation at the conference. Keep in mind that presentations do not have to be formal papers. They can be reports on work in progress, or merely ideas to present for discussion. This year ISUS plans to initiate a new policy regarding presentations at the conference. If you would like to make a presentation, we are requiring this year that by July 15th you submit an abstract of your presentation along with an indication of approximately how long the presentation will take. This will allow us for the first time in several years to have an agenda ready for the conference prior to the beginning of the conference. If you wish to have your presentation considered for publication in Reciprocity, you should have a typed-written copy of the paper available at the conference.

This year ISUS plans to offer a workshop on Thursday, August 2, to be taught by Lawrence Denslow. The cost of the workshop will be $25 for the whole day. Dormitory rooms will not be available on Wednesday night, so those attending the workshop will have to make motel reservations for that night. The tentative schedule is as follows:

9:30 - 12:00  Introduction to the Reciprocal Theory
2:00 - 5:00   A choice 3 topics - Physical Properties of Matter,
              Principles of Atomic Orientation and Bonding,
              Applications of the Reciprocal Theory to Astronomy

We will provide an application for the workshop in the forthcoming announcement about the conference and the dormitory rooms.
Letter from the President

Edwin Navarro

I wanted to take the opportunity of this ISUS News issue to let the members know about some of the current activities at ISUS. This organization has the potential to be of great influence in the scientific world. In order to realize that potential, we must have your active support and participation in these activities.

New Reciprocity Format

We hope that you have noticed the new format that we began using for the Autumn, 1989 issue of Reciprocity. Jan Sammer has begun producing the journal using desktop publishing programs on a Macintosh. Though the Autumn issue was late due to the transition, we are hoping that future issues can be produced much more quickly due to the use of optical scanning equipment which eliminates much of the typing required. We believe that the quality look of the journal will help the image of ISUS as a professional organization.

Articles for Reciprocity

The editors of Reciprocity have to walk a fine line in choosing articles for Reciprocity. The Society wants to make every effort to encourage members to submit articles. At the same time the focus of the magazine must be maintained. The fundamental requirement for articles to be published in Reciprocity is that the ideas in the article must purport to be derived from the fundamental postulates of the Reciprocal Theory, or from previously published conclusions reached on that basis. We realize that the number of people doing highly original research with the Reciprocal Theory is very limited. Many members, though, have spent time studying the theory and may have a particular area of interest. Articles of an introductory nature that elucidate some particular aspect of the theory are very much appropriate for Reciprocity. Letters questioning or challenging ideas in previous articles are also an important source of material for Reciprocity.

If you have thought of producing an article for Reciprocity, but have been unsure of whether it was appropriate, go ahead and write it and send it to one of the editors. The article will be reviewed by two referees chosen from ISUS' referee committee. In most cases, as long as the article is based on the Reciprocal Theory, the referee will either accept the article as is or may ask for a few revisions before publishing.
Membership and New Brochures

The ISUS membership has remained essentially constant for the last six months at about 80 paid members. We have received the names of only a few new prospects since last summer's conference. There was a discussion at last summer's conference about ways to generate more interest in the Reciprocal Theory and to increase the membership of ISUS. One thing that we are seriously lacking right now is a good introductory brochure. We feel that Dewey Larson's books and the Reciprocity journal issues are the cornerstone of information about the Reciprocal Theory. What is missing is some way to sufficiently stimulate the interest of individuals who are completely unfamiliar with the Reciprocal Theory, so that they will want to further pursue study of the theory in the books and journals.

Towards this purpose, we are initiating a project to develop new introductory brochures for ISUS. It has been suggested that we produce two brochures, one for individuals with an interest in science, but a limited physics background, and one for physics professionals. Dave Chance showed some of the past ISUS brochures to a number of individuals and recorded their reactions to what they read. The reactions were primarily negative, not so much as to what was said in the brochures, but in the way it was said. Based on this we are looking at completely new designs and content for the brochures.

Anyone who would like to participate in this project in any way should drop me a line and let me know how you can help. If you would like to write some sample copy or design a sample outline of a brochure, such assistance would be very much appreciated. Our goal is to have the brochure design and copy completed before this summer's conference.

If you would like to help, my address is:

21 Steven Drive
Petaluma, CA 94952
Research Interests at ISUS

Last fall I sent a letter to all ISUS members. As part of that letter I asked for any members of ISUS who were interested in any aspect of research with the Reciprocal Theory to contact me. My purpose in soliciting this information was to encourage research collaborations among ISUS members. I have received several replies from individuals involved in both experimental and theoretical research. If you find that you have the same research interests as some of the members listed below, feel free to contact them.

My goal is to increase the communication among members, with the hope that new ideas will be generated by greater communication. The degree to which these individuals are involved in research varies greatly, since practically all of them are working only part-time with the Reciprocal Theory. This means that some of these projects may be sufficiently far along to be about ready for publication, while others may be only at a preliminary idea stage. It is my goal to encourage all levels of interest, and all new ideas. It is only through examination and careful evaluation of these ideas that significant new discoveries can be made with the Reciprocal Theory. The individuals are listed in alphabetical order.

David Halprin
PO Box 460
North Balwyn 3104
Victoria, Australia

Einstein, Podolsky, Rosen Paradox and Contiguity in Reciprocal Theory.

George Hanson
PO Box 113
Taconite, MN 55786

Connections between Relativity and the Reciprocal Theory.

Tom Kirk
20267 E. Edgemont Pl.
Walnut, CA 91789

Nature of the Photon, High-Speed Motion, and Translational Motion

Paul Little
2334 Monroe Blvd. #502
Ogden, UT 84401

Carbon Fiber experiments, and Electro-Stimulation of Biological Processes.

Edwin Navarro
21 Steven Drive
Petaluma, CA 94952

Mathematical Formulation of the Reciprocal Theory

K.V.K. Nehru
P.G. School, J.N.T. University
Hyderabad 500028
India

Theoretical Basis for Cold Fusion Experimental Results

Hoyt Stearns
4131 E. Cannon Dr.
Phoenix, AZ 85028

Cold Fusion Experiments
Report on Cold Fusion Experiment

Letter from Hoyt Stearns to Frank Meyer

My fusion experiments are still active, and I plan to continue to run them, using new information as it becomes available. The only positive results I have obtained so far (on the 4th restart with modifications) are somewhat tentative, and did not involve palladium at all. I set up a capacitor discharge power supply to discharge 200 volts every 20 seconds into platinum wire immersed in D2O. I believe I got extra heat on the order of 5 watts. Interestingly enough, when I increased the voltage to 1000, the heat went down. It is very difficult to measure the actual electrical power supplied to the soup when it is delivered in pulses, with a constant D.C. bias. The discharges yielded bright pink flashes, a rather large shock wave that I feared would break the thick glass vessel, but no damage occurred. The solution became black in color, which turned out to be particulate suspension. I don’t know what it is, but the two possibilities are carbon from the LiCO3 which forms if carbon dioxide is in contact with LiOH. I have a sealed cell, so I doubt this happened unless there is a leak. The other possibility is platinum powder ablated away from the wire tip. I have a dry sample, but no equipment to analyze it here.

Positive results continue to occur by other researchers, but the press seems largely to ignore them. Still, no one has been able to correlate heat production with anything in particular. One researcher jocularly reported the common denominator was that Tchaikovsky’s 5th symphony must be playing in order for it to work.

I will do a formal report. I prefer to wait until a little more information becomes available and I get substantial heat production, or I terminate the project. How is K.V.K. Nehru coming on his fusion research?

I just applied for a “Small Business Innovation Research” grant for a reactionless thruster, based on my flywheel idea which I derived from Dewey’s theory that mass must reduce when an electric current flows through a conductor. If accepted, this provides $50,000 for six months work, the result of which is a report on the research. It looks like an excellent program. More ISUS people should apply. One friend here has gotten 30 of them already (in cryogenics and Stirling engines). A phase II grant is $500,000.

I heard on the radio that Japanese researchers were able to demonstrate that a counter-clockwise rotating, (but not clockwise) gyroscope shows reduced mass. K.V.K. Nehru predicted that a rotating object loses mass along its spin axis, but did not indicate that direction was important. I have not been able to find out who or where this happened, but it is an astounding finding and a great boost to the R.S.

Editor’s Note: Contact Hoyt Stearns at 4131 E. Cannon Dr., Phoenix, AZ 85028 if you would like more information about his research or the SBIR program. The Japanese research was mentioned in the Jan. 6, 1990 issue of Science News and was originally published in the Dec. 18, 1989 Physical Review Letters. The two researchers, Hideo Hayasaka and Sakae Takeuchi of Tohoku University in Sendai were quoted as saying, “The experimental result cannot be explained by the usual theories.”
Videotapes of Past Conferences

David Chance has for the last two years made videotapes of the ISUS annual conferences. He has completed editing the 1988 conference tape, and ISUS now has these tapes on sale for $27.00 plus $3.00 shipping and handling. The tape is 2 hours long and contains selected highlights of presentations of conference papers, as well as a question and answer session with Dewey Larson. Questions were from the audience, which included members of the general public as well as long-time members of ISUS. The questions range from Larson's opinions of black holes to his ideas on future developments of the theory.

If you would like to obtain a copy of the tape, send a check for $30 to ISUS, 1680 East Atkin Avenue, Salt Lake City, UT 84106. Please allow 4-6 weeks for delivery.

The tape for the 1989 conference is expected to be ready within the next couple of months. When the tape is available, we will include it on the list of items for sale on the back of each issue of Reciprocity.

1989 ISUS Conference Review

The 1989 ISUS Conference was held at the Jade Tree Motel in Portland, OR on August 11-12, 1989. Approximately 25 ISUS members attended. Papers were presented to the conference all day Friday and Saturday morning. Informal discussions were taking place during breaks and in the evenings. It seems that the nature of the photon was a hotly debated topic.

Though Dewey Larson was unable to attend the conference due to his health, individuals were able to have half-hour visits with Mr. Larson during the conference days. On Saturday night, the Larsons hosted a get-together at their house. Discussions among members and with Mr. Larson went on until late in the evening. We wish to thank the Larsons for their wonderful hospitality throughout the conference.

The following is a list of the presentations at the conference:


Henry Meyer  A Reciprocal System of Higher Dimensions

Lawrence Denslow  The Motions of Atoms

Frank Meyer  The Concept of Mass

Thomas Kirk  High-Speed Motion
MINUTES OF THE BUSINESS MEETING OF THE 14TH ANNUAL CONVENTION OF
THE INTERNATIONAL SOCIETY OF UNIFIED SCIENCE

Saturday, August 12, 1989 at the Jade Tree Motel, Portland, Oregon. The business meeting of the International Society of Unified Science was called to order at 1:10 pm by Frank Meyer, president. Nine members were present: Frank Meyer, Phil Porter, Rainer Huck, Robin Sims, Ed Navarro, Hoyt Stearns, K.V.K. Nehru, Larry Denslow, and Jan Sammer. Others present were W. McCraw, H. Myers, David Chance, C. Halvarson, T. Kirk, M. Witter, Bob Hewitt, and Sara Estby.

1. President Meyer read the minutes of the last meeting and then asked if there were any errors or omissions. Member Porter moved and member Huck seconded that the minutes be accepted as read. Carried. Member Sims agreed to be acting secretary, because of secretary Satz's absence.

2. Treasurer Rainer Huck then read his report. As of July 29, 1988 the balance was $3914.80. The income for the year was $4074.33, and the expenses were $3881.48. So the balance as of August 9, 1989 was $4107.65. There are now 54 paid memberships and 13 paid subscriptions. The president asked for discussion of the report. Member Sammer questioned the money paid ($300) to member Stearns for cold fusion investigations. Treasurer Huck replied that member Stearns would be reporting back to ISUS very soon. Member Navarro said that in the future any such grants should be properly approved. Then member Porter moved and member Denslow seconded to accept the report. Carried.

3. The president then asked for Old Business. The following topics were discussed:

   a. membership activity: member Navarro stated that he mailed out solicitation cards to attract new members. In response to president Meyer, member Navarro said that members not wanting their names listed publicly would have their wishes respected. Member Huck moved and member Porter seconded that member Navarro's report be approved. Carried.

   b. editor's report: managing editor Meyer stated that 2 issues of Reciprocity (Vol. 18, nos. 1 & 2) and 1 issue of ISUS News were printed. Each page cost 2.5 cents, and 200 copies of each issue were printed (so as to keep 3rd class mailing status). He reiterated that he would like the number of copies to be increased to 1000. Member Porter moved and member Navarro seconded that the editor's report be approved. Carried.

   c. back issues of Reciprocity: managing editor Meyer said that back issues were still available and that he was sending 6 copies of each to ISUS headquarters in Utah. As agreed last year, an order form with index is to be put in Reciprocity annually.
d. cosmic proton mass: Satz wrote a paper presenting his analysis in the Autumn, 1988 issue of Reciprocity.

e. Boston University meeting: president Meyer said that Prof. Shimony of the Physics Dept. recommended that the dept. not invite Larson or ISUS. Perhaps Prof. Anderson's Engineering Dept., however, might.

f. reprint: treasurer Huck stated that 485 copies of Larson's *Case Against the Nuclear Atom* were printed and are now on sale for $6.00 each.

g. liquid state papers: they are still not ready for publication.

h. conference video taping: Chance asked that his agreement with ISUS be extended for another year, and include highlights of the 1989 conference as well as that of 1988. Member Porter so moved and member Navarro seconded. Carried.

i. rebinding: member Porter said that all stock copies of Larson's *Basic Properties of Matter* have been rebound.

4. Next the elections were held.

a. board elections: members Curtin, Navarro, Halprin, and Blackburn were up for election (and there was one additional opening). The following were nominated: members Halvorsen, Navarro, Blackburn, and Halprin. President Meyer explained the duties of board members, and member Sammer read from the ISUS constitution the objectives of the society. Member Porter moved and member Denalow seconded that the four nominees be elected by acclamation. Carried. So, the 1989-1990 board consists of the following individuals: Anderson, Meyer, Huck, Satz, Stearns, Denalow, and Mitchell (with one year to go at the end of next year); Nehru, Porter, Sammer, and Sims (up for reelection next year); and Halvorsen, Navarro, Blackburn, and Halprin (with two years to go at the end of next year).

b. elections of officers: president Meyer asked for nominations for secretary of ISUS. Member Huck nominated Ron Satz, the current secretary. Member Porter moved and member Navarro seconded that the nominations be closed and that Satz be reelected by acclamation. Carried. Then member Denalow nominated Rainer Huck, the current treasurer, to continue to be treasurer. Member Porter moved and member Navarro seconded that nominations be closed and that Huck be reelected by acclamation. Carried. Next, president Meyer reported that member Navarro had expressed interest in becoming president of the society. Meyer said he was happy to encourage a new person in the job and thanked all present for allowing him to be president for so many years; he added that he was willing to continue to be a board member and managing editor. Halvorsen nominated Ed Navarro to be the next president. Member Denalow moved and member Huck seconded that the nominations be closed and that Navarro be
elected by acclamation. Carried. The new president then took over the proceedings and opened the nominations for vice president. Member Huck nominated member Meyer to be vice president. Member Meyer nominated member Halprin. Member Porter moved and member Halvorsen moved to close nominations. Carried. The vote was by a show of hands; former president Meyer was elected vice president.

5. New Business

a. North Pacific Publishers: member Porter said that he would like to have NPP and ISUS share literature. William McCraw, vice president of NPP and in attendance, said that NPP is very open to this proposal. Member Meyer so moved and member Porter seconded. Carried. McCraw said that Larson desires a division of function between NPP and ISUS; he wishes ISUS to remain an intellectual group, not a publishing house--NPP should handle the publications. Dorothy Larson said that she now refers interested persons to ISUS.

b. editors: member Porter stated that editors are recommended by the president and approved by the board. President Navarro said that in that case the editorial staff would remain unchanged for now.

c. promotional literature: president Navarro asked about production of introductory literature. Member Huck responded that only old promotional material is available and needs to be updated. The president stated that what we need is a new introductory brochure. Chance then stated that he was working on a revised brochure and handed out to board members a questionnaire to help in the design. He volunteered to coordinate the writing of the new brochure. Member Porter moved and member Meyer seconded to thank Chance for his efforts.

d. grant policy: president Navarro stated that he would like to establish a grant policy and asked member Huck once again to elaborate on the grant made to Stearns. Member Huck said the grant was justified and that he and Meyer had authorized it. Member Porter moved and member Denislow seconded to have the ISUS board endorse the action of Huck and Meyer. Carried. Then member Denislow moved and member Huck seconded that the executive board of ISUS have power to accept and make grants. Porter moved to amend the motion to the effect that the board should develop a grant policy. No second. Both the amendment and the motion failed. Then member Porter moved and member Denislow seconded that the executive board propose a policy of grants to be presented to the entire board within three months time. Carried.
e. other promotional ideas: Hewitt asked if any popular scientists (other than I. Asimov) were familiar with the Reciprocal System. No response. President Navarro suggested sending literature to physics departments. Member Stearns said he writes letters to magazines, such as Scientific American, but most often gets no response. Witter asked about the feasibility of donating a full set of Larson's books to university libraries. Member Denslow responded that he attempted this with his own college and got rejected. But Halvorsen noted that in his area, Colorado, many of the colleges had the older books. President Navarro asked what ISUS should do now to spread the ideas. Chance suggested that two brochures should be developed, one for lay people and one for physicists.

6. Next Year's Convention

Member Porter moved and member Meyer seconded that the next convention be held on August 3rd and 4th, 1990 on the campus of Reed College, Portland, Oregon; if Reed College is not available, then attempts to locate a suitable college campus in Portland would be made, with the Jade Tree Motel being the last resort. The location is to be fixed and approved by the president by November 15th, 1989. Member Porter stated that he would look after all arrangements. The motion carried. Member Porter moved and member Meyer seconded that the president have authority to commit up to $300 to secure Reed College accommodations. Carried. Member Halvorsen asked if there were any standards for convention programs. Member Porter moved and Halvorsen seconded that Halvorsen head a committee to formulate program standards. Carried. President Navarro appointed Estby and Meyer to work with Halvorsen in the committee.

7. Acclamations

Member Meyer thanked member Sims for recording the minutes and thanked member Porter for making the convention arrangements.

The meeting was adjourned.

Ronald W. Satz
Secretary, ISUS

Note: I edited and typed these minutes on the basis of member Sims' handwritten notes. Any errors should be corrected at the next meeting.
In order to make science possible some preliminary assumptions of a philosophical nature must be made. We assume that the universe is rational, that the same physical laws apply throughout the physical universe, that the results of experiment are reproducible. These assumptions are accepted by scientists as a condition of becoming scientists, and are not usually mentioned in purely scientific discourse.

Dewey B. Larson and ISUS

I have not found a better expression than ‘religious’ for the trust in the rational nature of reality that is, at least to a certain extent, accessible to human reason.

Albert Einstein.

**CONTENTS:**

| Letter of Dorothy Larson to 16th Annual ISUS Convention at Drexel University. | page 1 |
| Invitation of II International Holistic Congress to Dewey Larson | page 4 |
| Letter of L.M. Reilly, NPB, to Executive Secretariat: Congress LTDA | page 5 |
| Letter of Dr. Bill McCraw to Members of ISUS, Inc | page 6 |
| Letter of Congress organizer, Dr. Jose M. Martins to F.H. Meyer | page 9 |
| Letter of F. H. Meyer, June 14, 1991 to Congress Organizer | page 10 |
| Letter of Dr. Martins, June 27, 1991 to Frank Meyer | page 11 |
| Letter of Frank Meyer, July 3, 1991 to Dr. Martins | page 12 |
| Opening Remarks for 16th Annual ISUS Convention | page 13 |
| Schedule of 16th Annual Convention, August 9-10 | page 14 |
| Minutes of 16th Annual Convention in Philadelphia | page 15 |
| Letter of Philip M. Heggen, Energy General and Energy General Press, about a couple of publication ideas | page 18 |
Dear Members of the International Society of Unified Science,

This letter is a result of an invitation from ISUS via Ron Satz to attend the conference and give an after dinner talk on my memories of Dewey. I regret that I have had to decline both invitations. However, with the possibility there might be some interest in a letter, I will share with you a few memories of my 58 years with my husband and his interest in ISUS. This will not be a speech, it will be an informal chat with you about a remarkable man, Dewey B. Larson.

My husband had a combination of characteristics which made him easy to live with. While he had a reserved personality, he was also warm and approachable. He was ever patient, disciplined, tidy, gentle but firm, not gregarious, but not anti-social. While he was unusually intelligent and informed on a wide range of subjects, he still displayed, as a friend once stated, "a remarkable tolerance for fools". He did not give praise often, stating one should not expect praise for doing that which he should be doing. He was quiet and had amazing concentration powers which one tried not to disturb. His dry wit and humor was enjoyed by all, and his fantastic memory so frequently produced the humorous story that was appropriate for the occasion.

You may feel that all these favorable qualities may not have belonged to one person, but I assure you there has been no exaggeration. Of course you will be relieved to learn that Dewey did have a few faults, as do we all. But those are probably best left in his wife's memory bank. To climax this personality saga, he was the most ethical person that ever touched my life.

All of you, I'm sure, would be pleased to know that ISUS members played an important part in his life. Some of you were a part in his life over twenty to twenty-five years. I remember well when Rainer Huck parked his motorcycle in front of our house before he rang the doorbell. There was Paul de Lespanessee who came calling many years ago and continued to come every few years thereafter. And there were others who corresponded with Dewey: Frank Meyer, from those early beginning years, and Ron Satz, who was a young high school student when he first wrote to Dewey. All of you provided him with encouragement and inspiration with your interest in his theory.

He was generous with his family but he expected his children to learn to be practical in their expectations. It was necessary for us to save for some special needs. I remember well when we saved and saved for new garage doors. Our policy was to avoid buying things on time, so again and again some need arose for which we needed to use the garage door fund. The last emergency the garage fund paid for was the repair of Linda's left forearm after she fractured both its bones. This was before health insurance was available. We finally were able to have the new door for the garage which is still serving us well.

Dewey planned surprise trips for us again and again to give the children the educational advantages and to provide adventure and pleasure for all of us. Those trips included motor and ferry trips to Victoria, B.C., to Yellowstone National Park, and Craters of the Moon in Idaho. Dewey was fond of train travel in the days of good trains with good sleeping accommodations and excellent service. On one of those trips, we boarded the Southern Pacific Cascade in Portland, taking the curtain sleeping bunks to San Francisco. Both our ten year old daughter and fourteen year old son enjoyed climbing up and down the ladders.
From San Francisco, we rode a new S.P. train, the Lark, with a compartment for the four of us. It was wonderful! The children were ecstatic! They learned more about ordering the food they wanted and we all enjoyed the excellent cuisine the railroad chefs prepared for us in those years of long ago. The white table linens, the silver accessories, and other table appointments were not wasted on the children. They loved it all. Nor was it wasted on Dewey and me.

This generosity by Dewey was not because it was easy. It was necessary to work and plan and save for this kind of expenditure. Dewey enjoyed seeing the self-assurance develop in our offspring as they were exposed to these experiences and so did I. We both felt the priority was well chosen. The occasional trip and/or outing was a treat and a benefit to all of us because we were a closer unit with Dewey able to be with us mentally as well as physically. Well, actually, never quite one hundred percent mentally.

These long and short family trips took place before Dewey discovered he had found something significant in his years of research. The children grew up accustomed to seeing their father sitting in an easy chair with a clipboard, using a long slide rule, working for hours at a time. There were twenty loose-leaf note books filled with calculations attesting to his findings.

When Dewey and I walked on the beach alone, we seldom talked. We thought. On the Oregon coast with its boulders and huge rocks, the blue Pacific Ocean supplies us with large waves we call breakers. Walking at the edge of this powerful body of water and surrounded by all the other coastal beauty of sand, sea grasses, open skies, and clean air, how could one not fall into a philosophical, searching mood? I could just feel him thinking.

Dewey was proud of his son and daughter, each of them having achieved and maintained high academic records. It gave us pleasure that both children loved Gilbert and Sullivan light opera, grand opera, and symphony music as much as Dewey and I. Both of them studied classical piano for eight years.

After we lost our son in 1960, just 2 1/2 months after *The Structure of the Physical Universe* was published, Dewey plunged into his research and writing deeper than ever. This was pushing hard, very hard, since he did not retire until 1963. We both plunged into work in our bereavement. This pattern of work continued, never abated, as the publication dates of the books testify: 1963, '64, '65, '71, '76, '79, '82, '84, '88.

I believe you all know that I am not a scientist. My introduction to the subject was elementary Chemistry followed by aspects of medical science required by the nursing profession. Being very aware of this shallow science foundation, it is with a measure of trepidation that I now venture on two matters of concern to me.

Last March, Dewey received an invitation from Brazil through North Pacific Publishers to speak at the second International Holistic Congress in Belo Horizonte, July 9-13, 1991. Dr. Martins, a geologist who wrote the invitation, suggested Dewey could have twelve hours of lecture time during the Congress and more time with the local scientific community after the Congress was over. It was obvious this wonderful invitation could not be ignored. If the Holistic Congress were willing to accept a substitute speaker, it would be a marvelous opportunity.
for ISUS. Dr. William McCraw wrote to several ISUS members advocating sending a representative by raising travel funds through contributions. You probably know that Dr. Martins' reply was favorable to ISUS, and that Frank Meyer would have gone had he not encountered difficulties clearing his birth certificate in time for passport and visa.

This experience reveals the possibility of ISUS receiving other invitations for speakers and I hope another invitation from Brazil to speak on Larson's Reciprocal Theory. It could be a logical development for ISUS to prepare itself for that eventuality. May I suggest it as a partial answer to your question, "What Do We Do Now?" North Pacific Publishers will continue to refer such inquiries, if they occur, to ISUS.

My second concern is to encourage you to continue your study of the Larson Theory until you feel comprehension of it gives you satisfaction. Dewey knew that much more detail remained to be explained, and that someone else would have to study to understand what he had found.

The members of the International Society of Unified Science have the opportunity to become a significant influence in bringing the Larson Reciprocal Theory to the surface. In twenty-five countries this interest lies quietly waiting to be exposed, waiting for the science world to take a close look at Dewey B. Larson's phenomenal picture of the Universe of Motion.

Sincerely,

Dorothy Larson
August 5, 1991
Executive Secretariat:
CONGRESS LTDA
Av. Francisco Sales, 555 - 10 andar
30150 - BELO HORIZONTE - MG - BRASIL
Telefone: (031) 273 - 1121 / 273 - 1128
Telefax : (031) 273 - 4770

Dr. Dewey B. Larson
C/O The Editor North Pacific Publishers
P.O. BOX 13255
PORTLAND - OREGON - 97213

Dear Sir

As a long time reader of your book on the Reciprocal System Theory I have pleasure in writing to announce the II INTERNATIONAL HOLISTIC CONGRESS which will take place in Belo Horizonte from July 9 to 13, 1991.

The ideas expressed in the books which I have read seem very convincing and better balanced than the current theory in physical sciences, and we should be very honored if you are able to present them at the Congress.

As you can see from the attached general program, there are various ways of participating. As a suggestion, a short Course of 12 hours during the week of the Congress would be suitable.

We would also suggest that you may like to present a more complete course to the local scientific community after the Congress.

Looking forward to a positive reply,

Yours Sincerely,

Paulo Pereira Martins Junior
Dr. Sc. T.
for the Organizing Committee
March 22, 1991

Executive Secretariat:
CONGRESS LTDA
Paulo Pereira Martins Junior, Dr. Sc. T.
Av. Francisco Sales, 555-10 andar
30150 - BELO HORIZONTE - MG - BRASIL

Dear Sir,

In response to your letter dated November 28, 1990, and received March 6, 1991, we thank you for your kind invitation to Dewey B. Larson to speak at the International Holistic Congress in July 1991.

We regret to inform you that Mr. Larson is deceased as of May 25, 1990. He would have been pleased to receive your invitation, and although he was ninety-one years old, would have been mentally able to fulfill it.

You may be interested to know that a group called the International Society of Unified Science is organized to promote the Larson Reciprocal Theory. The organization has members who conduct courses to present and explain aspects of the Theory at their annual conferences.

We have sent a copy of your letter to Mr. Larson and a copy of your literature to the International Society of Unified Science. Should you wish to communicate with them the address follows:

International Society of Unified Science
C/O Dr. Rainer F. Huck
1680 East Atkin Avenue
Salt Lake City, UT 84106 USA

Thank you for the introduction to your organization.

Sincerely,

L. M. Reilly
Dear Ed, Rainer, Frank, Nehru, Jan, Tom, and Bob

I'm writing to you collectively because I have some thoughts that could lead to a kind of group effort, and believe that this is the best way to go about it. By now you've probably received word from Mrs. Larson re the invitation she received that was sent to Mr. Larson from the City of Peace Foundation in Brazil. My impression is that this may present a very good opportunity for the presentation of the Reciprocal System to a new, educated, and receptive audience, and I have a proposal to suggest for your ideas, consideration -- and action.

But first let me summarize the invitation, if by chance it hasn't yet come to your attention. The City of Peace Foundation operates the International Holistic University in Belo Horizonte, Brazil. According to their literature, their inauguration in 1987 was presided over by the President of the Executive Council of UNESCO, and they sponsored their first International Holistic Conference in Brasilia in that year, attended by 1300 people. The invitation is remarkable because the member of the organizing committee who wrote it, Dr. Paulo Pereira Martins Junior, is a reader of Mr. Larson's work -- indeed, he speaks of the Reciprocal System with the highest praise, writing that "[T]he ideas expressed in the books I have read seem very convincing and better balanced than the current theory in physical sciences." You almost certainly may know more of him than I, but it's the first time I ever heard his name mentioned, and Mr. Larson never spoke of him to my knowledge. If you also aren't familiar with him, it's further confirmation of that fact that there are many more students of the Reciprocal System who aren't in touch with us than we know about (not every individual, after all, is motivated to try to get directly in touch with the author of a book, even one that has greatly affected that person's way of thinking).

The conference would be held in Belo Horizonte from July 9 to 13 of this year, and Dr. Martins proposed that a "short course" on the Reciprocal System of 12 hours during the conference "would be suitable." It strikes me that an invitation of this kind -- especially since it comes from one of the organizers who is familiar with and strongly supportive of the Reciprocal System -- is one that deserves a response. To be sure, this is not an orthodox or conventional scientific meeting; it would attract individuals who are searching for new ideas and who are particularly interested in comprehensive, integrative thinking on fundamental questions.

This is, after all, the first time that an international conference has asked for a presentation on the Reciprocal System. I think we should send someone to give that presentation.

Here is my proposal: I don't believe that ISUS has the resources to sponsor such a venture -- nor should it be asked to invest most of its assets in this project. ISUS should keep its funds for its ongoing projects and purposes, and needs a cash reserve. But I think that interested supporters could form an ad hoc committee and raise the needed amount from our own contributions. Mrs. Larson has looked into airfares, and an advance purchase round-trip ticket would be somewhere in
the neighborhood of $1300. Other expenses would probably raise the total required to somewhere around $2500 -- and we'd have to allow a margin for an increase in airfares (which seem to be unpredictable), so I would think $3000 might be a reasonable calculation. If \( x \) number of individuals were willing to pledge \( y \) amount of dollars, we could raise the necessary amount in 24 hours. And of course, if the person who was to go were willing to contribute even more out of pocket (there are great opportunities for touring in Brazil both before and after the conference, and the trip could well be tax-deductible for those of us in occupations where this is allowed by the tax laws), that would reduce the amount we'd need to raise even more -- i.e., if the presenter would pay his expenses while there (or his airfare), we could do the rest. Twenty people pledging $150 would give us $3000 right there. I'm willing to start out by pledging $150 now.

If you think this is a good idea, we'd need to act fast (I'm assuming, by the way, that the conference organizers would be satisfied with a presenter from the ranks -- clearly they did not know of Mr. Larson's passing). If we do it, getting the money together wouldn't take more than a couple of days. And getting a plane ticket wouldn't be difficult. The harder part would be to select a representative to give the presentation. I can't offer any ideas here -- nor should I, since I am not a scientist -- on this, but I do know that there is no shortage of articulate and knowledgeable people in the ranks.

I got off to such a fast start that I didn't say at the beginning what I certainly hope, and that is that you are all well. I was in Portland in March and have the pleasure of some fine visits with Mrs. Larson. I'm very happy to tell you that she's well, and also that she is very supportive of this idea.

If it strikes you as much as it does me that this is a rare and excellent opportunity to reach a new audience and gain wider recognition for the Reciprocal theory, then I hope that you will join in this venture and that we can move quickly. If we do it, maybe Rainer would consider being the banker, in that he is already an experienced treasurer? Time is of the essence, and if we take advantage of the invitation extended, I do believe there is much more potential for furthering our common goal of disseminating Mr. Larson's work.

Sincerely,

Bill McCraw
Dear Bill,

Thank you for including me in your proposal that we seize the opportunity offered by the invitation to Dewey Larson of the 2nd International Holistic Congress to address it and/or alternatively, to present a 12-hour Course about the Reciprocal System of physical science.

I am in complete accord with the proposal and have communicated my support of it to our ISUS, INC. Director, Rainer.

Although the difficulties in the way of implementing your proposal are formidable, it is worthwhile to try to surmount them, since the opportunity is capable of giving us 10x the return of circulating one issue of RECIPROCITY at a minimum cost of $400.

I understand that Rainer is willing to act as banker for the project. Please send your donation made to ISUS, Inc. for this specific purpose to him.

My first choice for this assignment is Dr. K.V.K. Nehru; my next choice is Dr. Ronald Satz, third choice is Dr. Ronald Blackburn, etc. We have others who can perform the assignment; none can replace Dewey Larson. We must do the best we can.

I have sent a Letter of Inquiry to Dr. Paulo Martins whether an ISUS, Inc replacement for Dewey Larson is acceptable and welcome. I ask that, as an ISUS member, you consider whether a similar Letter by you may hasten contact with the organization of the Congress in the remaining time.

If not preoccupied with issuing a Spring, 1991 issue of RECIPROCITY and an issue of ISUS NEWS to publicize our own August 8-10, 1991 16th Annual ISUS Convention on the campus of Drexel University, Philadelphia, I would volunteer. Enclosed is a preliminary notice. I hope to see you there.

Winnie and I send you and yours our best wishes for good health, well-being and the true joy of life.

Sincerely,

Frank

P.S. Another opportunity for ISUS, Inc to grow will present itself when BEYOND SPACE AND TIME is published and in the public domain. The three most interesting topics of human conversation are not physics, engineering and technology, but remain rather the more difficult subjects of politics, sex and religion.
Dear Dr. Meyer,

Thank you for your letter of May 11. Yes, we are glad to extend our invitation to a representative of Larsonian Physics, designated by ISUS, INC. The enclosed program will furnish you with more detailed information.

Please, send us an abstract of your contribution at your earliest convenience. Of course, the deadline is postponed. Otherwise, we ask you to adhere to the guidelines.

We suggest a short presentation (either a mini-course or a lecture) and a post-congress 12 hour course.

We will cover your representative's stay expenses and there might be honorarium for the post-congress course, depending on the number of participants. We hope this is OK with you. We are on a very tight budget.

Looking forward to hearing from you soon, we remain,

Yours sincerely,

Jose M. Martins
for the organizing committee
Dear Dr. Martins,

I trust that you have received brochure about the Reciprocal System of Theory created by Dewey B. Larson. I sent it last week in response to your request for an Abstract of my proposed contribution to the Second Congress. Herein is a one-page Abstract copy of the brochure on page 5 of the enclosed Vol. XX, No. 1, Spring, 1991 issue of our ISUS, Inc. journal, RECIPROCITY. It may serve your purpose better.

While obstacles have appeared and presently remain, I hope to arrive the morning of July 9 in Belo Horizonte to participate in the Second International Holistic Congress Proceedings, July 9 - 13.

Obstacle 1: I'm on waiting list for ticket from Minneapolis to San Francisco to Rio de Janeiro to Belo Horizonte.

Obstacle 2: My passport has been applied for, but I have it not yet.

I trust that the Congress Meeting Place is not too far from the Belo Horizonte Airport, so that I can arrive at Meeting the morning of July 9.

I shall send Registration so soon as I have evidence that I can come.

Sincerely yours,

Frank H. Meyer
Vice-President, ISUS, Inc.
Belo Horizonte    June 27, 1991
CHI/139/91

DR. FRANK MEYER
1103 - 15th Avenue S.E.
Minneapolis, MN 55414
U. S. A.

Dear Dr. Meyer,

I hope you have succeeded in overcoming the obstacles you mentioned in your letter. If you did, please inform us about your travel plans. There will be someone to meet you at the airport.

Your lecture is scheduled for July 9, 2 to 3 P.M. We also have space for a short course on July 12 and 13, three hours each day. We do not know, though, how many persons will be interested, since registration starts on July 8. If you want us to keep this offer in the program, let us know at your earliest convenience.

Looking forward to seeing you soon,

Yours sincerely,

Jose M. Martins
for the organizing committee
Dr. Jose M. Martins  CONGRESS LTDA
Ave. Francisco Sales, 555 - Ander
30150 - Belo Horizonte = M
BRAZIL

July 3, 1991

Dear Dr. Martins,

We appreciate and thank you for extending every courtesy to us of THE INTERNATIONAL SOCIETY OF UNIFIED SCIENCE by and while inviting us to participate in the SECOND HOLISTIC INTERNATIONAL CONGRESS, as exemplified in your latest Letter of June 27, 1991.

I fervently wish that I could still accept your invitation, since with my coming I would have tasted and shared with you the true joy of life, “the being part of a purpose you yourself recognize to be a mighty one.”

In reply to your Letter of June 27, 1911, however, I deeply regret that I must inform you that I have not succeeded and now will not succeed in overcoming ALL the obstacles to my arriving in Belo Horizonte the morning of July 9, 1991.

It is all the more regrettable, since the day before yesterday, July 1, 1991, I finally was taken off the waiting list and guaranteed the $899 discount round trip from San Francisco to Rio de Janeiro that reduced the total cost of the round trip from Minneapolis to Belo Horizonte to $1,637, which with the help of ISUS, Inc., I could afford.

Best wishes to you and yours for good health, well-being and true joy of life and also for THE SECOND HOLISTIC INTERNATIONAL CONGRESS.

Yours sincerely,

Frank H. Meyer
ISUS BOARD MEMBER

You can't turn matter into spirit by making it think.
Joseph Needham

In all my lectures I have taught one doctrine, namely, the infinitude of the private man.
Ralph Waldo Emerson, in his Diary during 1840

Our minds are finite, and yet even in these circumstances we are surrounded by possibilities that are infinite and the purpose of human life is to grasp as much as we can out of that infinitude.
Alfred Whitehead

12
OPENING REMARKS
for the
16th Annual Convention
of the
International Society of Unified Science

Good morning, ladies and gentlemen, and welcome to the 16th annual convention of the International Society of Unified Science. Before beginning with the presentation of scientific papers, let me first provide some background for our group.

On December 30, 1970 three individuals met for a day in Cambridge, Massachusetts, in what may be considered the first Larsonian Convention. Present were Dr. Douglas S. Cramer of General Electric (in Schenectady, NY), George W. Hancock of Marietta College (in Ohio), and Dr. Paul F. deLeSpinasse of Adrian College (in Michigan), who was then at Harvard Law School. One result of the meeting was the decision to start a new scientific publication, called Reciprocity. I was an engineering student at RPI (in Troy, NY) at the time, and was able to link up with Dr. Cramer. The first issue of Reciprocity came out in August, 1971, and carried a review of my newly published book, The Unmysterious Universe, which is still the most succinct statement of the essentials of D.B. Larson's Reciprocal System of physical theory. In those early days, our group was called The New Science Advocates; this name had two distinct interpretations: we were advocates of a new physical science and we were new advocates of science, real science, as we understood it. The society by-laws were approved and adopted at the first official annual Convention of the society, held at the University of Minnesota, August 20, 1976. The by-laws were revised at the sixth annual Convention, held at the North American Rockwell Plant in Downey, California, August 16, 1981. One of the revisions was the change in the society's name to International Society of Unified Science, in recognition of the increasingly international character of the group. The society was chartered as a nonprofit corporation with headquarters in Salt Lake City, Utah. After Dr. Cramer's resignation as editor some years back, Prof. Frank Meyer took over the job and has been at it since, and was the president of the society for many years. Dr. Rainer Huck, a resident of Salt Lake City and a long-standing member and treasurer of the society, became the executive director two years ago. That brings us up, quickly, to the present time. The papers to be presented today will range from elementary to advanced treatments of the theory. If you do not understand something, please ask us. We have a few of Dewey Larson's books available for purchase, as well as my Unmysterious Universe, and back issues of the journal Reciprocity, which you are invited to examine.

I will now begin the presentation of scientific papers. My paper is entitled "Reference Systems and Speed Limits in the Reciprocal System: A Review."

Every boy in the streets of Gottingen understands more about four-dimensional geometry than Einstein. Yet despite that, Einstein did the work and not the mathematicians.

David Hilbert

13
FRIDAY, August 9, 1991

9:30 am-Opening Remarks
9:45 am-"Reference Systems and Speed Limits in the Reciprocal System" by Ronald W. Satz
10:45 am-"Space-Time Progression or Big Bang?" by Frank H. Meyer
11:45 am-"The Large-Scale Structure of the Physical Universe, Part I" by K.V.K. Nehru
12:45 am-"The Large Scale Structure of the Physical Universe, Part II" by K.V.K. Nehru

2:00-4:00 pm- Lunch Break

4:00 pm-"The Essence and Fabric of Mathematics" by David Halprin
5:00 pm-"The Photon as Birotation", by K.V.K. Nehru

7:00 pm-Dinner Banquet at the Sheraton

SATURDAY, August 10, 1991

9:30 pm-12:30 pm- QUESTIONS AND ANSWERS on the Reciprocal System

12:30 pm- 1:30 pm-Lunch

1:30 pm-6:00 pm-ISUS Business Meeting

7:00 pm-10:00 pm-Party at Ron Satz's home.
Minutes of the Business Meeting of the 16th Annual Convention of the International Society of Unified Science

Saturday, August 10, 1991, at Drexel University, Philadelphia, PA. The business meeting of the International Society of Unified Science was called to order at 1:30 pm by vice president (and acting president) Frank Meyer. Two members were present: Prof. Frank Meyer and Dr. Ronald W. Satz. Acting president Meyer held the proxies of board members Frank Anderson, Robin Sims, Ronald Blackburn, Ed Navarro, Larry Denslow, William Mitchell, K.V.K. Nehru, and David Halprin. Secretary Satz held the proxy of executive director/treasurer Rainer Huck. Board member Phil Porter assigned his proxy to Rainer Huck, but gave specific directions on how to vote, so there was no ambiguity during the meeting. In all, there were 12 proxies, two more than 2/3 of the 15 member board during the meeting. According to the By-Laws of ISUS, Section 8 of Article V, “In no event shall the number of Trustees physically present at a Board meeting where a quorum is partially achieved by means of written proxies be less than five (5).” Because of this, the members present used Article VIII, Amendment of Bylaws, to suspend Section 8 of Article V for the purpose of conducting the business of the convention. (Article VIII states that “These By-laws may be amended by a two-thirds majority vote of the Board of Trustees).

1. Secretary Satz read the minutes of the 15th Annual Convention. Acting president Meyer requested a correction on p. 2 of the minutes; Tucek and Denslow are associate editors, not assistant editors. There were no other corrections, and the minutes were approved as modified.

2. At the request of the executive director/treasurer Rainer Huck, secretary Satz read the treasurer’s report. The prior year’s balance was $3907.66; the income for the year was $2718.98; the expenses for the year were $2050.69; so the net income for the year was $668.29, and the current balance (as of July 31, 1991) is $4575.95. The report was approved as read.

3. Next, Secretary Satz read the membership report, also submitted by Rainer Huck. There are 49 paid members (to date), 3 paid subscribers, 5 contributing members, and 2 sustaining members. The report was approved as read.

4. The acting president then asked for Old Business. The following topics were discussed:

a. Reciprocity: Editor Meyer affirmed that each issue can be printed and mailed for under $400. Meyer reported that member Denslow has resigned from his position as associate editor. In the past year, 250 copies were printed for each of 4 issues. Secretary Satz moved and Meyer seconded that back issues of Reciprocity be mailed from the ISUS headquarters. Carried. The Reciprocity report was approved as read.

b. grant policy: Secretary Satz moved and Meyer seconded that there be no changes in grant policy and no grants made for the coming year. Carried.

c. new brochure for ISUS: Acting president Meyer commended members Blackburn, Navarro, and Satz for their good work in designing and producing the new ISUS brochure.
d. Back page of Reciprocity: Editor Meyer stated that the back page now does state the increased prices for foreign subscriptions.

e. Membership goal: Last year’s goal of 200 members by August, 1991 was obviously not met. So something new must be tried.

f. Denslow’s first draft of his introduction to the Reciprocal System has been received by the Editor and Board.

5. The acting president then asked for New Business. The following topics were discussed:

A. Secretary Satz moved and Meyer seconded that a classified ad be placed in Popular Science every other month over the next year. Popular Science has a circulation of 4.4 million readers and is read by technicians, scientists, and engineers. The proposed ad is

RATIONAL UNIFIED GENERAL THEORY. Free info. ISUS, 1680 East Atkin Ave., Salt Lake City, UT 84106. (801) 467-3795.

The cost for the new year would be $1171.50. Satz also moved that ISUS purchase (for Rainer Huck) a new telephone answering machine with the feature of voice activation without time limit. All callers should receive the ISUS brochure, and at least one follow-up call should be made a week or two later. Both Meyer and Satz (and all their proxies) approved the ad proposal and expenditure for the new answering machine.

b. Secretary Satz moved and Meyer seconded that Meyer research the subject of marketing science over the coming year. This is with the view of meeting our membership goals for the future. Carried.

6. Next the elections were held.

a. Executive director Huck (on the proxy) and acting president Meyer nominated Satz to be president of ISUS. Satz accepted the nomination and was elected by 11 in favor and 1 against (counting all proxies).

b. Satz and Meyer nominated Rainer Huck to remain executive director and treasurer. Huck was elected unanimously.

c. No nominations were made for secretary. Satz agreed to remain on as secretary until the Board could elect a qualified individual for the position.

d. Satz nominated Meyer to be vice president, who accepted the nomination. Meyer was elected unanimously.

e. Board elections: In a letter Frank Anderson stated that he has officially retired from the Board (but plans to remain active as a member). This left Meyer, Huck, Satz, Stearn, Denslow, and Mitchell up to reelection this year. All were nominated, all accepted nomination, and all were unanimously reelected. So the 1991-92 Board consists of Meyer, Huck, Satz, Stearn, Denslow, and Mitchell with 2 years to go at the end of next year’s meeting; Nehru, Porter, Sammer, and Simms
with 1 year to go at the end of next year's meeting; and Halverson, Navarro, Blackburn and Halprin up for reelection next year.

7. The acting president then asked for nominations for location of next year's convention. President-elect Satz said that he had a letter from executive director Rainer Huck stating that Huck would be willing to host next year's convention in Salt Lake City. Member Phil Porter's proxy statement also stated Porter's willingness to hold next year's convention in Ft. Collins, Colorado. After deliberation, Meyer and Satz (and their proxies) voted to hold next year's convention in Salt Lake City. The dates in August will be at the discretion of Rainer Huck.

Acting president Meyer commended Satz for his find selection of Drexel University (currently celebrating its 100th year of operation) for this year's convention. The classroom used had excellent acoustics and a very large blackboard. Meyer also commended Satz's hospitality in hosting the Saturday night party.

Satz then moved to adjourn. Carried. The business meeting was adjourned at 4:15pm.

Ronald W. Satz
Secretary, ISUS

Proposed Ad for ISUS in Popular Science:

RATIONAL UNIFIED GENERAL THEORY. Free info. ISUS, 1680 East Atkin Ave., Salt Lake City, UT 84106 (801) 467-3795.

The ad will be placed in the "Science and Chemistry" section. The cost is $11.25/word plus $1.00 extra for each bold word. (There is a ten word minimum). The ad has 17 words and 4 bold words and thus the cost will be $195.25. I propose that we put the ad in every other month, so the annual advertising budget will amount to 1171.50. Popular Science has a circulation of 4.4 million readers; I know of no better way to reach potential supporters of the theory. We should try this for at least 1 year and then assess the results.

As an alternative, we could take out the address to save money:

RATIONAL UNIFIED GENERAL THEORY, the Reciprocal System. Free info. ISUS, (801) 467-3795.

This would cost $127.75 per issue or $742.50 for 6 issues.

Whichever ad we go with, I think it essential that there be a good taped message (not limited to 30 seconds!) to handle calls when Rainer is away.

All callers should receive the ISUS brochure. At least one follow-up call should be made a week or two later.

Truth comes out of error more easily than out of confusion.
Francis Bacon
August 18, 1991

Frank H. Meyer, Editor and Vice President
International Society of Unified Science
1103 15th Avenue, S. E.
Minneapolis, MN 55414

Dear Frank:

Today I called you with a couple of publication ideas which I will detail and add to below:

1) In your list of available literature on the back page of RECIPROCITY, add offprint articles of lasting value from back issues. Such articles could be gathered at a later time into a collection or anthology, edited and published as a valuable addition to the literature available from ISUS. This could easily be done as an ongoing process, with a new volume issued every few years. A selection process should be formally agreed upon and authors of selected articles given the opportunity to update and revise the articles after some kind of review process (analogous to what most good authors do prior to publishing a book, i.e. solicit suggestions with the aim of improving the book).

I feel such an effort would be valuable even if it resulted in the selection of only a few articles over a period of years.

2) Include contact information for authors of articles printed in RECIPROCITY, including address and phone number. This would greatly facilitate valuable feedback.

3) Begin to collect the Letters of Dewey B. Larson, for future publication- that is, ISUS, as an organization, make a commitment to do this, and as a first step obtain photocopies of all available letters of Mr. Larson in present possession of members or others. At a later date difficulties in doing this will be compounded. Furthermore, this would not be an expensive undertaking now, and could result in preserving invaluable materials now held by individuals part or all of which could easily be lost or destroyed. All good physicists are conversant with Murphy's Law, which pertains here! Actual work on a book, The Letters of Dewey B. Larson, could then be safely undertaken at any time in the future and published by ISUS.

4) The Winter 90-91 issue of RECIPROCITY, in its cover title dropped the word, International, which I think should be retained, not only because the acronym, ISUS, continues to be used, but also because RECIPROCITY properly addresses a worldwide audience.

In our phone conversation today you told me that Ronald Satz is the new president of ISUS and needs secretarial assistance. I made an offer to help as I am seriously interested in ISUS, have relevant background and experience, and available time. Let me know what further information you need from me and how I can be of assistance.

Sincerely,
Philip M. Heggen
The Reciprocal System

Two Postulates as to the nature of space and time are the basis from which all of the conclusions of this new theory are derived. A development of the consequences of these postulates, without any supplementary assumptions and without calling upon any information from observation, accounts for the existence of the major physical entities, defines their properties, establishes the relationships among them, and provides the information from which numerical magnitudes applying to these properties and relationships can be calculated. For the first time in the history of science, a general physical theory is derived from a single set of postulates.

The Reciprocal System, Developed by Dewey B. Larson over a 40 year time period, is at once revolutionary and conservative. It is the first unified theory and the first general theory, but its central ideas have been expressed by philosophers through the ages. From just two general postulates, Larson has derived an all-embracing theoretical universe, from sub-atomic particles to supergalaxies, answering simply and reasonably such questions as:

What is the fundamental component of the Universe?
Why is the Universe expanding?
Why does Light behave sometimes as a particle and sometimes as a wave?
What holds the parts of an Atom together?
Why do Electrons and Positrons annihilate one another to produce photons?
What is the origin and nature of Gravitation?
What is the origin of Supernovas, Pulsars, and Solar Systems?
What is the connection between Galaxies and Quasars?
What is the origin of Cosmic Rays?
Is the Universe finite or infinite?
Is the Universe in a steady state, or is it evolving?

Motion is the Fundamental Entity

The thesis of the Reciprocal System is that the universe in which we live is not a universe of matter, but a UNIVERSE OF MOTION, one in which the basic reality is motion, and all physical entities and phenomena, including matter, are merely manifestations of motion. The atom, on this basis, is simply a combination of motions. Radiation is motion, gravitation is motion, an electric charge is motion, and so on.

The physical universe is not a universe of matter existing in a framework provided by space and time, as seen by conventional science, but a universe of motion, in which space and time are simply the two reciprocal aspects of motion and have no other significance. Mr. Larson determined the properties that space and time must necessarily possess in a universe composed entirely of motion, and expressed them in the form of a set of postulates. He then showed that development of the consequences of these postulates by logical and mathematical processes, without making any further assumptions or introducing anything from experience, defines, in detail, a complete theoretical universe that coincides in all respects with the observed physical universe.

According to the Scientific Australian, the Reciprocal System is "The True Theory of the Physical Universe - from Microcosmos to Macrocosmos."

We Can Tell You About It

The International Society of Unified Science, Inc. is a group of scientists, engineers, and others who are trying to call attention to Dewey B. Larson's theory of a universe of motion. The objective of the Society is the advancement of the Reciprocal System which makes use of two fundamental postulates, together with everything that can be derived from these postulates by logical or mathematical processes. The editors of Reciprocity, Journal of the International Society of Unified Science, welcome papters, ideas, and experiments, especially from new contributors.

Membership is open to all persons interested in the advancement of scientific knowledge.
The more complete understanding of physical existence opens the door to an exploration of existence as a whole, including those non-physical areas that have hitherto had to be left to religion and related branches of thought. It is now evident that our familiar material world is not the whole of existence, as modern science would have us believe. It is only a part—perhaps only a small part—of a greater whole.

Dewey B. Larson, in *The Universe of Motion*

In all my lectures I have taught one doctrine, namely, the infinitude of the private man.

Ralph Waldo Emerson, in his *diary*, 1840

A man is a great thing upon the earth, and through eternity—but every jot of the greatness of man is unfolded out of woman,
First the man is shaped in the woman, he can then be shaped in himself.

Walt Whitman in his *Leaves of Grass*, 1856

---

**Table of Contents**

<table>
<thead>
<tr>
<th>Title</th>
<th>Author</th>
<th>Page #</th>
</tr>
</thead>
<tbody>
<tr>
<td>EIGHTEENTH ANNUAL CONFERENCE of ISUS Inc. August 1993, University of</td>
<td>Dewey B. Larson</td>
<td>1</td>
</tr>
<tr>
<td>Denver, Colorado</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Whole Human World Greater Than The Whole Material World, Excerpt</td>
<td>K.V.K. Nehru</td>
<td>5</td>
</tr>
<tr>
<td>from <em>The Universe of Motion</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Some Observations OnThe ‘Executive Orders...’</td>
<td>Thomas Kirk</td>
<td>9</td>
</tr>
<tr>
<td>Recent ISUS Executive Orders</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SEVENTEENTH ANNUAL CONVENTION of ISUS,Inc. Minutes of the BUSINESS</td>
<td>Hoyt A. Stearns</td>
<td>13</td>
</tr>
<tr>
<td>MEETING, August 1992, University of Utah, Salt Lake City</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Updating Electronic Networking and ISUS</td>
<td>Frank H. Meyer</td>
<td>15</td>
</tr>
<tr>
<td>Future Progress of Human Rights on Earth</td>
<td></td>
<td>17</td>
</tr>
</tbody>
</table>
EIGHTEENTH ANNUAL CONFERENCE
INTERNATIONAL SOCIETY OF UNIFIED SCIENCE

University of Denver Campus, Colorado  August 6 & 7, 1993

Dates: August 6 & 7, 1993, Friday & Saturday

Location: University of Denver Campus, Denver, Colorado
Located South of Interstate 25 (Exit 205) and West of University Blvd

Program Sessions: will be held 8:30 am to 5:00 pm in:
Room 103, Boettcher East Building
2050 East Iliff Avenue, Denver, Colorado
Refer Program questions to Ronald Satz: (215) 495 6362.

On Campus Housing: will be at: Centennial Halls
1870 South High Street, Denver, Colorado 80210
Front Desk Phone: (303) 871 2565, 24 hours for Messages.

Refer Housing questions: Conference and Event Services,(303) 871 4333
Receive fax (303) 871 4243 ( $1.00/page, guest use)

Dorm beds, with linen, cost at two per room $21.24 the first night and $16.24 for additional nights. A single room costs $29.08 the first night and $24.08 for additional nights. Advance reservations are not required. There will be a $5.00 facilities fee for conference participants who do not stay in the dorms. Cafeteria meals may be purchased individually or $14.50 for a 3 meal per day ticket. Parking is free at the dorms.

The University of Denver (DU) is a private university located 7 miles Southeast of downtown Denver and 15 miles from Stapleton International Airport. Shuttle service to the dorms is provided by Airport Blvd Co. Call 1 800 288 0688 or (303) 696 9559, $7.00 one way. RTD bus service is also available from the Airport to within four short blocks of the dorms on the DU campus. The Local Host will pick up at the Airport when schedules allow.

Local Conference Host: Phillip H. Porter (or María) Phone (303) 782 5070
3080 South Glencoe Street or (303) 757 4589
Denver, CO 80222

Our Local Host has proposed a mountain retreat for those interested, before the Conference. Some interest has also been expressed in a short trip just before the Conference to Colorado Springs, with such attractions as the Air Force Academy, Pikes Peak, Olympic Training Center, Garden of the Gods, et. al.

Pre Conference Mountain Retreat

Phillip Porter, our Local Host, would like an idea of who might be interested in attending such a retreat. It will be free form with time to do whatever we want.

The topics of discussion will be mountains, sky and the Reciprocal System. It is intended to be a vacation time as well as an idea stimulation and discussion time. People can come whenever they choose. Some may start July 26. Ideally, we could have a workable discussion group for at least the week before.

It would be held in Estes Park, Colorado, a two hour drive out of Denver, at the H-Bar-G Ranch Hostel facility. Estes Park is at the gateway to the Rocky Mountain National Park. The H-Bar-G is an old guest ranch situated in a scenic location on the east side of the valley looking across the town and up into the National Park.
The costs at the H-Bar-G are very reasonable. About $10 per night with a $25 AYH membership. It is a basic bunk bed dorm accommodations in the lodge and cabins with kitchen facilities available. We take care of our own meals. Participants will need a sleeping bag or sheets. Blankets are available. Bring a coat. It gets cold in the mountains. Sturdy footwear is recommended.

Spouses and families can also come as there is lots to see and do in the area. Advance arrangements must be made for families to be housed together. Activities range from cloud watching on the lodge deck for the couch potatoes, through motor trips and day hikes, to high altitude, back country campouts for the hardy. Estes Park is full of shops, if that suits anyone.

If there are enough of us to indicate advanced interest we will have a cabin to ourselves. Stores and restaurants facilities are available in town, a short drive away. The H-Bar-G has a rental car available when not scheduled. Limited arrangements can be made to get from Denver or Boulder to Estes Park.

As soon as possible our Local Host would like some idea of those who might be interested in such an event to make the appropriate arrangements. A commitment is not required, simply a statement of interest and possible time span.

If you think you might be interested in attending the retreat, please send a Letter or Postcard with your name, address and phone number to Philip H. Porter, 3080 South Glencoe Street, Denver, CO 60222. Please indicate possible dates and degree of interest. Include a legal-sized, stamped, self addressed envelope if possible. You will be sent maps, information about the H-Bar-G and travel connection information.

We may include a trip to Colorado Springs for one to three days, just before the Conference, if there is enough interest. The Denver Mint where coins are stamped may be of interest to some as we return to Denver. The Catholic World Youth Day Conference will be starting in Denver on August 9th. The Pope is scheduled to visit that conference on the 13 and 14th, which will explain the incoming airport activity as we are leaving.

* * * *

Our Minds are finite, and yet even in these circumstances of finitude we are surrounded by possibilities that are infinite, and the purpose of human life is to grasp as much as we can of that infinitude.

Alfred Whitehead

The solution of the difficulties which formerly surrounded the mathematically infinite is probably the greatest achievement of which our age has to boast.

Bertrand Russell

* * *
WHOLE HUMAN WORLD GREATER THAN THE WHOLE MATERIAL WORLD

Excerpt from THE UNIVERSE OF MOTION , pages 436 - 438

Dewey B.Larson

10.) Is there anything outside (that is, independent of) the universe of motion?

This is probably the most important question that can be asked by members of the human race. Many persons, particularly those with strong religious ties, will be inclined to contest this assertion, having in mind issues that are more directly connected with their specific beliefs. But we can safely predict that if these alternative questions are carefully examined it will be found that they have no meaning unless this question number 10 can be answered affirmatively.

Conventional science gives us a negative answer. It regards space and time as constituting a background, or setting, in which physical entities exist, and in which physical activity takes place. All existence, according to this view, is in space and in time. It then follows that there cannot be any existence outside of space and time. The prevailing scientific opinion is that this is an incontrovertible conclusion. Furthermore, it is claimed that every fact to which we have access can reasonably be explained in terms of the physical universe alone, as would be expected on the basis of the foregoing assertions.

Although it is generally conceded that this is the verdict of science at the present stage of knowledge, it is, to most scientists, an unwelcome conclusion. The great majority of these individuals have some kind of religious or philosophical convictions about non-physical existence that they are not willing to give up, regardless how strong a case against the reality of such an existence science may present. For some this has created a very difficult situation. As expressed by du Nouy, P.L. (Between Knowing and Believing. David McKay Co.,N.Y., 1966, page 239):

It cannot be contested that the heart of many men is the stage of a conflict between the strictly intellectual activity of the brain, based on the progress of science, and the intuitive, religious, self. The greater the sincerity of the man, the more violent the conflict.

The fact that the clarification of the physical relationships in our study of the universe of motion has opened the door to an extension of this study into the realm of the non-physical thus has a profound significance. The physical findings clearly demolish what previously seemed to be an unassailable case against the reality of outside existence. Even the most casual consideration of the claim that every known fact has a reasonable explanation in physical terms is sufficient to show that the validity of this claim rests entirely on a subjective assessment of what constitutes a reasonable explanation in each individual case. The prevailing scientific position with respect to evidence of non-physical existence thus amounts to nothing more than a refusal to recognize any evidence that is offered in favor of such existence. It follows that the scientific rejection of the possibility of existence outside the physical universe has no basis other than the premise that all existence is in space and in time.

In the universe of motion, this is not true. Space and time do not constitute a container for the entities and phenomena of that universe; they are contents of the universe. Once this is understood, the obstacle in the way of non-physical existence disappears. The results of the investigation here being reported show that the physical universe consists entirely of a specific finite quantity of a particular kind of motion. The question at issue now becomes: Can anything exist other than this quantity of this kind of motion?

This is an issue that can be investigated by standard scientific methods and procedures. We cannot apply the purely deductive method by which we have derived the answers to similar
questions within the boundaries of the physical universe after establishing the validity of the fundamental postulates of the Reciprocal System of theory, as we have no assurance that the laws and principles of the physical universe are applicable to the outside region. We can, however, postulate the applicability of those of the previously established principles that are not subject to any obvious regional limitations, and test the validity of that postulate in the regular manner. In so doing, we are using one of the versatile tools of inductive reasoning: the extrapolation process. We are making the kind of an “inference from experience” upon which scientific theory was based before the “inventive” school of Einstein and his successors gained control of the scientific Establishment.

First, we assume the validity of the Principle of Uniformity, identified as Principle (b) in the list given at the beginning of this chapter. This Principle then carries with it the validity of the other items in the list that are relevant to the point at issue, particularly the rationality of the outside existence, principle (a), and the assertion that what can exist does exist, principle (g). We know from observation that motion can exist. Our observations tell us only that it exists in a certain form and in a certain finite quantity, but there is no indication of any kind of limiting factor that would restrict it to this form and this quantity. Principle (g) therefore tells us that motion can exist in other forms and in other quantities if our hypothesis as to the applicability of the Principle of Uniformity to the outside existence is valid.

Having formulated the hypothesis by extrapolating the principles and relations that we have established in the physical universe, we are ready to verify it in the standard manner by developing the consequences of the hypothesis and comparing them with observation. Notwithstanding the scientific contention that all observed phenomena can be explained on a purely physical basis, it quickly becomes evident, when the verification process is undertaken, that many of the effects of non-physical existence required by the uniformity hypothesis are, in fact, observable. Their true status as unexplained non-physical phenomena has not heretofore been recognized because they coexist with many unexplained physical phenomena, and have not been distinguished from these obscure features of physical existence.

The findings of this extension of the investigation of the physical universe into the non-physical region are much too voluminous to be included with the physical results, and will be described in a separate publication, but it would not be appropriate to conclude the discussion in this volume without calling attention to the manner in which the clarification of the properties of the physical universe sets the stage for a confirmation of the reality of existence outside that universe. The more complete understanding of physical existence opens the door to an exploration of existence as a whole, including those non-physical areas that have hitherto had to be left to religion and related branches of thought. It is now evident that our familiar material world is not the whole of existence, as modern science would have us believe. It is only a part—perhaps a very small part—of the whole.

Dewey Larson about Infinity

Infinity is excluded from the physical universe, since we are defining motion as a relation between a time magnitude and a space magnitude, and we deduce that the quantity of motion is finite. Since all physical entities and phenomena are manifestations of motion, they are all measured in terms of 1/n and n/1, where n is finite. No infinities are possible. This is one of the many places where the Reciprocal System of physics has the advantage over conventional theory, in which infinities are a considerable source of embarrassment. As Richard Feynmann put it: “If we get infinity, how can we ever say that this agrees with nature?”
We must appreciate Satz's motive underlying the 'Executive Orders,' though the method adopted will prove to be fatal to the ISUS objectives. Since mine was one of the papers affected by these 'orders' I do not want to raise issues over them, but before passing a sentence, even criminals are given a chance to establish their innocence. May I point out that what we are all primarily interested in is truth, and our concern for the RS is only because we believe it is leading to the truth. Surely no one of us is in a position, at the present moment, to state that no further development or change in the RS is possible in a direction not previously thought of. Indeed, it seems that some new, previously unexplored ground has to be broken before the properties of elements like the lanthanides, or the vast wealth of the spectroscopic data, could be explained in the context of the RS.

I may be permitted to present the following observations on Satz's 'Executive Orders,' first para:-

1) Quoting Satz, "In our system there are four basic scalar motions: uniform linear motion, linear vibratory motion, uniform rotational motion, and rotational vibratory motion."

This is an incorrect statement because the latter are not 'four basic scalar motions'; they are four possible types of representations, in the conventional reference system, of the one possible scalar motion that exists. There are no four basic scalar motions at all. The one scalar motion may take on any of the four forms depending on the conditions obtained in the reference system.

2) "We identify units with linear vibratory motion as photons." This is true. Larson, further, identifies the linear simple harmonic motion (SHM) as the photon. Since this is in print no one can deny this. Now the point we are making is that Larson does not show how the linear SHM—which is an accelerated motion -- can arise out of the basic scalar motion, which is uniform. He (Larson) glosses over this. Clearly there is a hiatus in his explanation (Fig. 1).

I am only endeavoring to supply the missing link in the explanation. If not myself, someone else has to attend to this to make Larson's reasoning complete, if we accept his view that the photon is a linear SHM. In spite of my repeatedly pointing this out no one seems to recognize this. Different people seem to be having different reasons for not being willing to consider the biorotation concept. I could trace out at least five:

(i) 'There can't be rotation without some thing to rotate.' (Satz)
(ii) Disbelief in the possibility of the intrinsic existence of the components of a vector on their own right. (Halprin)
(iii) There is no necessity of SHM at all. (Kirk, Halprin)
(iv) How is biorotation identical to SHM? (Meyer)
(v) Larson has never talked about it! (perhaps some)

3) Satz contends that the biorotation "presents a completely different theory of the photon, not an extension or revision of the RS concept." This is wrong.

In the universe of motion, an entity, force, or effect could only be either the primary motion(s), or a combination of them. Rotational motion is one such allowed form. A combination of
rotational motions is also possible. I am only pointing out that the linear SHM is a combination of two rotational motions. It is, therefore, not a 'completely different theory' as Satz complains. Fig. 2 is self explanatory.

![Diagram](image)

**Fig. 2 Larson's explanation completed**

What is new, however, is only the name 'birotation' I coined in this context. Probably it was sufficient to cause a misunderstanding that I am introducing a foreign element into the RS!

4) "...and this can in no way be caused to rotate." While this statement does not depict the truth it very well demonstrates the fact how even well-informed persons could fall prey to the fallacy of misreading what in reality is only a grammatical necessity as a logical necessity. Let me explain.

In the universe of motion the question 'how there could be motion without anything moving' does not arise, since motion is logically prior to 'things.' The primary motions are motions per se--not motions of something. Rotation is a subset of motion, and there can be primary rotational motion without having to require the existence of something to be rotated.

In English language we have the two grammatical categories, nouns and verbs, which make us divide Reality into 'actors' and their 'actions.' Our sentence structure, when not imperative, requires a substantive to take the place of an 'actor' whenever there occurs a verb typifying action. We sometimes, therefore, read fictitious acting entities into Nature. "It rains" is such an example. There are languages--like Hopi--in which there can occur sentences with verbs only. The picture of Reality carried in the minds of the speakers of such a language is notably different from that of the speakers of English-like languages.

Understandably, the grammatical structure and the structure of Reality at the everyday level of experience are homologous, and therefore we are justified in deducing the latter from the former. But when we are dealing with the fundamental motions, in a universe of motion, the application of reasoning based on the logic of the language proves disastrous. The question, how motion can exist without the existence of any thing to be moved, is an example of this linguistic prompting. Language is a bad guide here. Satz's statement that space-time cannot be 'caused to rotate' is a mistake of this nature; space-time is not a 'thing' in the sense of being representable by the linguistic category of nouns. Both the linear space-time progression and the rotation that is the component of photon are representations of scalar motion in our conventional reference frame. There is nothing to prevent the scalar motion to take either form, depending on the environment.

Even Larson's earlier thinking was not free from this linguistic conditioning. As late as when writing Nothing but Motion, he was still subscribing unconsciously to the view that 'while motion can exist without the existence of any thing moving, rotation is not possible without the existence of something to be rotated.' Not until his writing of The Basic Properties of Matter did he begin to realize the primary nature of rotation. In the latter work he goes at length to explain the existence of rotational space--the space aspect of rotational motion--in the context of the electron. He states there that people are unfamiliar with this idea of rotational space and might find it difficult to accept. An atom of matter, for example, can exist in the space of the electron rotation as much as it could in the translational space of the conventional reference system, he emphasizes.

(I may add, that to say that even Larson was not exempt, till late, from the linguistic trap does not mean to imply that our thinking is in any way superior to his, since anyone who has chanced to study the works of Sapir, Whorf, Wittgenstein, Ogden or Kirshnamurti would not have difficulty in recognizing what we have been endeavoring to point out.)
Also, it will be instructive to consider the question of the origin of gravitation. Larson remarks that the motion (rotation) that makes an atom an atom also causes it to gravitate. He proffers the example of a ball rolling, to show how it rotates and travels too. While it is clear in the case of the ball why it travels forward while rotating—namely, that it is in contact with the stationary surface—I would ask the student of the RS, whether it is equally clear in the case of an atom, how the rotation that is the atom results in the linear inward motion? Scientists of the Establishment would not be so ready to swallow Larson’s explanation of the origin of gravitation merely on the strength of an analogy; especially since the conditions in the analogy and the original are not identical.

Does the same scalar motion manifest as rotation within the time region and linear inward motion in the time-space region simultaneously? Further, in the case of gravitation inside the time region, as in cohesion, does the scalar motion (constituting the atom) get represented both as rotation and outward linear translation, at the same time? I think that the explanation of the translatory spatial effect (gravitation) of the atomic rotation is by no means evident from Larson’s account. If one has comprehended this thoroughly, I am sure, then we would not have to ask—as Satz does—how space time ‘could be caused’ to rotate.

There might be another fear lurking in Satz’s mind. Larson takes the existence of photons (linear vibratory units) as the pre-requisite for the formation of the atoms since he takes atoms as rotations of the photons. Now if it could be shown that rotation can emerge from the scalar space-time directly on its own right, without the intermediary of the photons, the whole scheme of Larson’s seems superfluous.

However, our study indicates that this does not happen, in view of the requirement to conserve angular momentum: only a birotation—with zero net angular momentum—can emerge as the primary entity (the photon, of course). The rotation that is an atom can come out only as the rotation of the pre-existing entity (namely, the photon) in view of the necessity to create net angular momentum. So the birotation does in no way upset the existing RS scheme.

5) In closing we may point out that the realization that linear SHM is birotation not only completes Larson’s account of the photon explanation but also makes the explanation of the origin of the angular momentum of the photon possible. It further paves the way for the understanding of how photons can emerge from atoms or why there is a change in the angular momentum of the emitting atom.

In a Paper entitled ‘The Photon as Birotation’ which I originally submitted in July 1991, and which is being withheld from publishing by the ‘orders,’ I demonstrated how the concept leads naturally to the explanation of a host of the phenomena, like the Doppler effect, birefringence, the Zeeman effect etc. Let us remember that we are like the soldiers in the midst of a fight: we might not be able to see in which direction the battle is progressing. But let us at least get our work available in print to our progeny who, having the inestimable advantage of historical perspective, may have a true evaluation and a chance to build on it.

6) ‘Executive Orders...’, para 2. Here Satz tries to prove that Kirk is breaking the rules of logic. Satz’s syllogism goes like this:
   (a) In the RS space-time is unit motion. (Satz & Kirk)
   (b) In the RS ‘nothing’ is zero motion. (Satz)
   (c) Therefore space-time is nothing. (Satz)

Putting symbolically

   \[ (a) \land (b) \Rightarrow (c) \]  \hspace{1cm} (1)

If one understands Kirk aright, his syllogism is:
   (a) In the RS space-time is unit motion. (Satz & Kirk)
   (b') In the RS ‘nothing’ is unit motion. (Kirk)
   (c') Therefore space-time is nothing. (Kirk)

   \[ (a) \land (b') \Rightarrow (c') \]  \hspace{1cm} (2)
So far either one's logic is faultless.
Now Satz takes (c) and (c') as new premises, along with the rule
(d) For any A, since A and not-A are mutually exclusive, anyone
Assuming to the contrary is illogical.

He therefore reaches the conclusion
(e) Kirk is illogical. (Satz)

\[(c) \land (c') \land (d) \Rightarrow (e)\]  

(e) Kirk is illogical. (Satz)

Now we note that (b') is a subset of not-(b) because unit motion is not-zero motion. Therefore, we see that it is Satz—and not Kirk—who adopts two mutually exclusive propositions, (b) and not-(b), as his premises for drawing the conclusion (e) in (4). In view of rule (d) the correct conclusion is

\[(e') \text{Satz is illogical. (KVK)}\]

\[(a) \land (b) \land (b') \land (d) \Rightarrow (a) \land (b) \land \text{not-(b)} \land (d) \Rightarrow (e')\]  

***

From the very beginning there has always been present the attempt to find a
unifying theoretical basis for all these single sciences, consisting of a minimum of
concepts and fundamental relationships, from which all the concepts and
relationships of the single disciplines might be derived by logical process. This is
what we mean by the search for a fondation of the whole of physics..... Some
physicists, among them myself, can not believe that we must abandon, actually
and forever, the idea of direct representation of physical reality in space and time;
or that we must accept the view that events in nature are analogous to a game of
chance.

Albert Einstein,

OUT OF MY LATER YEARS

In its entirety, the universe is indeed complex, extremely so, but......from a
qualitative standpoint, it is actually a complex aggregate of interrelated simple
elements.

......the Reciprocal System makes relatively few changes in the
mathematical aspects of current physical theory. The changes that it calls for are
primarily conceptual.. They require different interpretations of the mathematics,
changes in the text, as Bridgeman would say.

Dewey B. Larson,

NOTHING BUT MOTION

The essential fact is that all the pictures which science now draws of
nature, and which alone seem capable of according with observational facts are
mathematical pictures.

James Jeans

Everything should be made as simple as possible—but no simpler.

Albert Einstein

E I: 5.1-8
Recent ISUS Executive Orders
February 23, 1993
Thomas Kirk

President Satz's rulings in the last issue of Reciprocity stem from some well founded concerns. We do not want to be embarrassed by a published paper and we do not want the journal to become a writer's club. I submit that we must establish rather definitive guidelines for publication. All of the present controversy extends from there being no such definition.

There are other perhaps more important reasons why such guidelines are required.

1) Readers who are not fully versed in Larson's theory may read a contradictory article and believe it is "commonly accepted Reciprocal Theory" (to be referred to as CART herein).

2) A plethora of ad hoc theories arise with no semblance of order in relation to commonly accepted RS principles.

AN UNBROKEN CONNECTION

The following guidelines are my draft submittal to provide a free exchange of ideas without the confusion and other unpleasantness that otherwise result:

1) Any submittal must firmly establish a beginning point within CART which is in agreement with CART from which the new development presented extends.

2) The extended development must have no gaps.

3) All contradictions of CART must be identified and thoroughly explained.

4) No self-contradictory developments will be allowed.

Application of these rules will eliminate most of the problems formerly encountered, and at once raise the quality of our journal greatly. These rules simply provide for conformance to the existing requirement that all papers directly pertain to Reciprocal System theory. Also, whether we like it or not the President and other referees each are working under their own set of rules now.

A QUESTION OF LOGIC

There is one difficult circumstance that will inevitably arise when one or another original development is submitted under the aforementioned guidelines.

If we keep the publication strictly academic, and someone insists on publishing an idea such as, "it requires all of the energy derivable from all the matter in the universe, plush a lot more, to accelerate a hydrogen atom to the speed of light" (Relativity theory), we must be able to deal with it. Completely banning an idea like, "unit motion is the equivalent of nothing at all", (Larson quotation), because it may appear illogical to some people, is not good.

A fair hearing must be open to ideas that at first seem absurd; after all, this is a scientific journal and an open mind is paramount. However, a fair hearing must be reciprocated by a quality presentation. When after careful screening under the previous guidelines, a referee (or president) can not be satisfied by the submitter about a particular point of logic in a submitted development, the following rules shall apply:

1) The article shall be scaled down to include only one such questionable point.

2) The author shall present and discuss both sides of that issue.
3) A disclaimer will be installed at the head of the article by the Editor referencing the paragraph with questionable logic, clarifying that ISUS finds the referenced point to be questionable as to its logic.

We will be dealing with heretofore unforeseen concepts and no concept should be offhandedly discarded without a fair hearing. Truth is not always self-evident and indeed seems bizarre from some perspectives. For example, the article pertaining to the nature of unit motion ruled by the President recently to be not acceptable boils down to one question: Is the void something as the President maintains, or is it nothing as Larson maintained? Both Larson and the President agree that the void is unit motion.

To most people the idea that the void is nothing seems quite natural. The President's fear seems to be that a conventional scientist with other preconceived ideas might find the concept illogical and this would embarrass ISUS. I do not believe hiding this concept in the closet and censuring all discussion of it is the proper approach.

Many crucial concepts must be derived from the nature of unit motion:

1) “Location” in time
2) 3 scalar “dimensions”
3) 128 “orientations”
4) 8 units of “progression”

This is just to name a few. Only after we fully understand these concepts will we understand cosmic gravity, the inter-atomic distance relation and speed beyond unit speed, for example. If we are denied freedom of expression on this subject, then we have accepted perpetual failure in our pursuit of scientific truth.

If the background unit motion is nothing then how do time and space extend from it? If unit motion is something, how does that something maintain its all pervasive, procreative infinite qualities, and how is its existence accounted for. Taking unit motion as nothing seems to provide many answers. Taking it as something creates more questions.

I believe the rules presented above will maintain Reciprocity as a shining example of academic and scientific excellence by presenting only presentations firmly based in CART with at most one potentially illogical aspect. That aspect would be highlighted for the general scientific community to judge, without being sanctioned in any way by ISUS.

Any article submitted under the rules of submission, even with a point of logic question, could be followed by subsequent articles extending that development. Each submittal must meet all of the usual criteria, and thereby the path of development including each potential inconsistency will be well documented, each such consistency being well flagged for future reference. A buried incongruity will not be left behind as is so often the case in conventional theories. Such points of logic can be easily referenced and discussed between members outside Reciprocity and at annual conferences.

RULES OF ENGAGEMENT

Another set of rules will be needed for challenge and response type submittals pertaining to the original developments submitted under the rules outlined above. These type of articles are of a different nature and require rules of engagement.

I believe that a heated exchange of ideas is very interesting to the readership. It can only be productive however, if it is carried out in a scholarly manner without evasive responses that take the argument off on hopeless tangents, as has been the case with the birotational photon. A draft set of rules are as follows:

1) Questions must be definitive and include explanation of what the concern is, specifically mentioning the CART principle or general principle of logic that is potentially being violated.
2) Responses must be direct and forthright and non-evasive providing an answer at least as definitive as the question, and clearing up all of the concerns explained by the questioner.

3) Where the response or the questioner desires to bring in new or modified concepts outside of the CART or the original article in question, such new material shall be subject to the rules for new submittals.

WRITER'S CLUB

There is another type of article that is occasionally submitted. This is the ad hoc foraging of concepts done in such a way that there is no pretense of a firm connection to the CART. David Halprin seems to enjoy such writing and I am not sure it should be strictly banned. Such a piece could be acceptable if it were presented for what it is, just foraging for new ideas that might be valid revisions to the CART if and when a solid development could be determined.

Such a submittal would be considered only as space allowed without much priority and the decision to publish would be purely a subjective one made by the editors and referee. Required revisions would likewise be decided on a subjective basis.

BACK TO EVOLUTION

The above discussion should not go by without a very important consideration. Will Larson's theory, if clearly proven to be in error in some point, remain the enduring and unchanging CART, or is there a way that a modification can be added to the CART. The rules presented above are a major first step to allow for advancement in the latter direction:

1) Modifications are subjected to rigorous tests both in their connection to CART and their development of modified principles extending therefrom.

2) Logic questions are allowed a full peer review.

3) A system of challenge and response is provided forthwith that has the same rigorous requirements as the original development and provides for clear scholarly discourse.

I believe that we are negligent if we do not recognize that Larson's theory may need some modifications. Yet at this time the method to establish such change does not exist.

I do not want to conclude without mentioning the remaining specific controversial ruling by our President, the birotational photon exclusion. I think every one will agree that Dr. Nehru has had a fair hearing on this subject, and without having to adhere to any guidelines on presentation. No further submittals should be allowed until such guidelines are set and further submittals are required to conform. In fact, all future papers from any author should start from first base and conform to all of the guidelines. This means making the original CART connection and extending the development from that point.

Responding to an idea, forwarded by Mr. Maurice Gilroy, of having Reciprocity divided into two sections, one conforming to the CART and one not, will just lead to an additional arena of argumentation about whether an idea is connected with the CART or not. This will likely multiply arguments about publishing Reciprocity. I believe the resulting publication will appear somewhat strange to new readers also.

I have enclosed a draft set of rules for acceptance and would suggest that the Board vote by mail on them to be used tentatively until the next ISUS conference. This will allow some testing time after which needed refinements will be more obvious. I would imagine that even after the conference, more evolution will occur to refine the guidelines.
SUGGESTED RULES OF SUBMITTAL
Reciprocity
Thomas Kirk

ORIGINAL DEVELOPMENTS

1) Any submittal must firmly establish a beginning point within CART which is in agreement with CART from which the new development presented extends.

2) The extended development must have no gaps.

3) All contradictions of CART must be identified and thoroughly explained.

4) Self-contradictory developments shall not be allowed.

5) Where a questions of logic is deemed by a referee to be questionable:
   a) The article shall be scaled down to include only one such questionable point.
   b) The author shall present and discuss both sides of that issue.
   c) A disclaimer will be installed at the head of the article by the Editor referencing the paragraph with questionable logic, clarifying that ISUS finds the referenced point to be questionable as to its logic.

QUESTION AND RESPONSE SUBMITTALS

1) Questions must be definitive and include explanation of what the concern is, specifically mentioning the CART principle or general logic principle that is potentially being violated.

2) Responses must be direct and forthright and non-evasive providing an answer at least as definitive as the question, and clearing up all of the concerns explained by questioner.

3) Where the responder or the questioner desires to bring in new or modified concepts outside of the CART of the original article in question, such new material shall be subject to the rules for new submittals.
SEVENTEENTH ANNUAL CONVENTION OF ISUS, Inc.
Minutes of the BUSINESS MEETING, at the University of Utah, Salt Lake City, August 6, 1992

The business meeting of the International Society of Unified Science was called to order at 2:01 pm by President Ron Satz. Eleven members were present:

Ronald W. Satz
Jim Schmidt
Frank H. Meyer
Ronald Blackburn
Robert Staehling
Laura Jean Frenouw

Rainer F. Huck
Hoyt Stearns
Lawrence Denslow
Thomas Kirk
Phillip H. Porter

Rainer Huck held proxies from Ed Navarro and Robin Sims. Frank Meyer held proxies from K.V.K. Nehru and David Halprin.

1. Phil Porter mentioned that proxy votes are not allowed in the business meeting.

2. Ron Satz read the minutes of the Sixteenth ISUS 1991 Convention in Philadelphia. Phil Porter moved that last year’s Meeting be declared invalid. Motion died for lack of a second. The Minutes were approved as read.

3. Rainer Huck read the Treasurer’s report: Prior year’s balance: $4575.95. Income of the year: $2,816; Expenses of the year: $3,482.14; Net income of the year: -$666.13. Balance as of August 6, 1992: $3,909.82.

4. Frank Meyer gave a report about Reciprocity: Associate Editor, Robert Tucek submitted his resignation. Frank Meyer suggested that Daeron Meyer be promoted to Associate Editor. Ron Satz suggested that Frank Meyer talk to Robert Tucek about staying on as Associate Editor. Frank Meyer is to look into buying a Macintosh computer for Robert Tucek to use, as he no longer has access to one. Phil Porter moved to approve the Reciprocity Report with praise for the effort. Motion passed.

5. Ron Satz asked for OLD BUSINESS:
   a. Larry Denslow moved to retain current grant policy. The motion carried.
   b. Although the ISUS Brochure is acceptable, Ron Blackburn volunteered to look at revising the brochure, assisted by Ron Satz. Rainer Huck moved to approve and the motion passed.
   c. Rainer Huck discussed putting “Quasars & Pulsars” and Arnold Studtmann’s dissertation on the price list.
   d. Rainer Huck moved to put the Studtmann dissertation and “New Light on Space and Time” on the price list.
   e. Frank Meyer will put “New Light on Space and Time” and the Studtmann dissertation on the price list.
   f. The membership goal was not reached. Even though the ad in “Popular Science” ran 3 times, it generated very little response. Laura Fremouw mentioned that we should not use a Salt Lake City address, because of certain negative associations.
   g. Ron Satz wants to think about a new ad, but will take no action.
   h. Robert Staehling suggested that we purchase mailing list targeted to specific markets.
   i. Rainer Huck asked Frank Meyer where 150 issues of Reciprocity go, as that many extras are printed. He replied that they go to physics educators of his selection, often members of the American Association of Physics Teachers.
   j. Phil Porter suggested looking into locating other people to send issues of Reciprocity to, and using the list of the “Popular Science” respondents to send the extras to.
   k. Frank Meyer mentioned that Dewey’s last book, “Beyond Space and Time”, should be published to bring new members and build ISUS. Ron Satz reiterated that metaphysics and paranormal studies are not in the purview of ISUS. Ron Blackburn said we should put a strong statement in the brochure disavowing metaphysics. Phil Porter mentioned that many “new agers” are engineers.
   l. Robert Staehling suggested that an ISUS member should attempt to be a guest on radio talk shows, in particular, “For the People”, and “Radio Free America”, both in the short wave band. Rainer Huck moved to designate Larry Denslow to look into getting the radio shows, Motion passed.
   m. Phil Porter moved that ISUS should not publish Dewey’s last book. Ron Satz moved to amend Phil’s motion to include “ISUS in its official capacity as a scientific organ not support any work not specified in the Charter.” Ron’s amendment failed 6-4. Phil’s motion passed.

6. Ron Satz asked for NEW BUSINESS
a. Rainer Huck mentioned that Dewey's daughter, Linda, asked ISUS to take over North Pacific Publishing Administration. The issue was not resolved.
b. Ron Blackburn asked if Reciprocity should be available by magnetic tape. Ron Satz asked Frank Meyer to have Daeron Meyer look into it.
c. Frank Meyer suggested to promote more young people to enter college physics who are already pro Reciprocal System
d. Frank Meyer also mentioned that he likes earlier discussions about creating computer models of the Reciprocal System, but Laura Frenouw said that an instructional design must precede a computer program.
e. Ron Satz moved and discussed a new policy on paper publication: The Editor staff does first screening of articles. Editor sends accepted papers to President or his designee, with appeal to three member Reciprocity Review Committee of Board members.

Ron Satz accepted a friendly amendment from Phil Porter: Authors with papers that get rejected can appeal to all Board members, and if five Board members support publishing the paper, it shall be published as a minority position. Motion seconded and passed.

Ron Satz nominated the three person Committee and Phil Porter seconded: K.V.K. Nehru, Ed Navarro and Robin Sims. Motion passed with one opposed.

f. Phil Porter moved to change Article II, Section 1 of the Bylaws to add the information to add the information on "Basic Properties of Matter" to it. Motion, seconded by Larry Denslow, passed.

g. Phil Porter moved to add a sentence to Article III, Section 3, paragraph 1, which states "All membership categories, except student member, shall have equal membership privileges and voting rights, irrespective of the amount of dues paid." Seconded by Frank Meyer. Motion to table.

h. Phil Porter moved to change Article V of ISUS Bylaws: 1. Add a sentence to Section 7: "The business of the Board of Trustees may be transacted by written ballot, as specified in Section 8." 2. Add a new Section 8 heading which states: "Section 8: Business of the Board of Trustees may be transacted in meetings or by written ballot. 3. Change the present Section 8 to become paragraph a of Section 8 with it prefaced with: "a. Votes at meetings......A majority of..." 4. Add a paragraph b. to Section 8 which states: "b. Votes by written ballot - Business may be decided by the Board of Trustees by using signed, written ballots collected by the Secretary. Such written ballots shall be retained for inspection by any Board member for at least one year after the outcome has been decided and communicated to the Board by mail. Issues decided by written ballots must have votable options of "Abstain", and "None of the above". All Board members who do not return ballots shall be counted as Abstain. The Board shall establish the procedures forballoting by mail. 5. Add Paragraph (d) to Section 9 which states: (d) Nominations for positions on the Board of Trustees may also be made from the floor during the Meeting where trustees are to be elected.

7. The ELECTIONS were held:
   a. Chris Halvorson, Ron Blackburn and Ed Navarro were up for re-election.
   b. Jim Schmidt was nominated for the Board by Ron Satz.
   c. Ron Blackburn, David Halprin, Ed Navarro and Thomas Kirk were nominated by Phil Porter.
   d. The nominations were carried unanimously.
   e. Phil Porter nominated Robin Sims for Secretary. Nomination passed unanimously.
   f. Phil Porter nominated Rainer Huck for Executive Director/Treasurer. Motion unanimous.
   g. Phil Porter nominated Ron Satz for President. Motion adopted unanimously.
   h. Phil Porter nominated Frank Meyer for Vice-President. Motion unanimous

8. Frank Meyer moved a vote: express thanks to Rainer Huck for hosting the 17th Convention. Phil Porter seconded motion. The vote was unanimous.
   Larry Denslow moved to print the updated Bylaws. Hoyt Stearns seconded. Unanimous.

9. Board meeting closes and General meeting opens again.
   Phil Porter volunteers to host the 1993 ISUS Conference in Boulder, Colorado. Frank Meyer moved approval. Rainer seconded and motion was adopted.
   Ron Satz moves to adjourn. Carried. General Meeting was adjourned at 5.00 pm.
UPDATING ELECTRONIC NETWORKING AND ISUS

Hoyt A. Stearns JR.

1.) Overview

There are many electronic text communications networks in the world, and most of them are interconnected. A few examples are shown in Table 1.

Table 1

- Compuserve
- ARPANET
- INTERNET
- MCI Mail
- TYMNET
- ERNET(India)

2.) The UUCP network

The UUCP network is unusual in that it is anarchic. It is a collection of many thousands of computers connected to neighboring sites, usually by normal voice phone lines, using modems and usually using local calls. There are over a million users on the UUCPnet --- some computers have more than one user who can log in. The network reaches around the world, and most educational institutions are connected.

The software used to access the network is formally called "BNU", or "Basic Networking Utilities ", but it is commonly referred to as UUCP software. The software is included with virtually all UNIX software packages, and is available free for most other operating systems. For MS-DOS, one package is called"UUCP".

The UUCP software automates the process of accessing the network, forwarding messages, and correcting errors. Once installed, the user need not bother with the details.

The network access is usually accomplished in the background by the software without intervention, often during the wee hours. For example, to send a mail message to the author, one would type:

"mail hoyt@isus.tnet.com"

followed by the text of the message. The system will queue up the message and send it out to the neighboring site according to a preset schedule(which could be immediately). When the connection is established, (by either end) the system will also collect any mail destined for this system, or any that is to be forwarded from this system to another neighboring site.

If the mail is found undeliverable, a mail message will be sent to the sender explaining the reason, e.g. "addressee unknown".

2.1) The USENET

There is a way to broadcast messages to all network users who choose to receive broadcast messages. This facility has been developed into the "USENET". The "USENET" has its own protocol, etiquette, and software, which uses the UUCP software for transmission. The software is called "NETNEWS".

The data on USENET is divided into 934 special interest groups, so a user can browse the articles of interest, and post articles to specific news groups. Between 4 and 60 megabytes of data ripples through the USENET every day.
Some examples of news groups are: “sci.physics.fusion, alt.music, alt.alien.visitors, comp.binaries.ibm.pc”.

Often scientific papers appear on the USENET before they are published, for example, the Pons-Fleischmann cold fusion paper appeared on the net soon after it was written.

2.2) UUNET Communications Services

There is a non-profit organization called UUNET Communication Services that maintains archives and high speed communications links for the UUCP network. The networking software is available for downloading from them. (They had 46,000 files on line last week.) They maintain a 900 number for direct access to their archives: 900-468-7727. This will cost you 40 cents per minute. You can also subscribe to their service, whereby a connection is available through a local call to Tymnet or Compuserv, at $5.00 per hour + $35.00 per month.

2.2.2) UUNET Directories

The main directory of the UUNET archives is a file called:

```
uunet!usr/spool/ftp/is-1R.Z
```

which you can download using the UUCP software. They also maintain the network maps, which show every node on the network. These are useful to find your nearest neighbor on the net. e.g.

```
uunet!usr/spool/ftp/uumap/u.aus.vic.1
```

is the map for the Victoria, Australia area.

3.) New node for ISUS

A new computer system has been established which is connected to the UUCP network. Its node name is “isus”, and it is located in Phoenix, Arizona. It is the author’s intention that this be the official node for ISUS. Other people on the network may correspond with ISUS using the mail address

“postmaster@isus.tnet.com”

or they may direct mail to any specific member who has a login account on the isus computer.

3.1) Compuserve access

Compuserve has access to the UUNET, for example, to send mail to the author from Compuserve, the address is:

```
>internet:hoyt@isus.tnet.com
```

3.2) Technical Details

The hardware consists of a 33MHz 80486 PC, with 16 MB RAM, 670 MB hard disc, an uninterruptable power supply, and a Telebit T2500 19,200 baud modem. (UUCP users have standardized on Telebit modems.)

The system may soon have an ISDN phone line, which supports 56,000 baud without any modem. The system is running the UHC Unix System 5 Release 4.036 operating system.

4.) Conclusion

Communication with the world wide electronic community should provide an enormous boost to knowledge of the Reciprocal System, and stimulate much discussion and research. The author hopes that all other members of ISUS will plug in and join the community.
PROBABLE FUTURE OF HUMAN RIGHTS ON EARTH
Frank H. Meyer

(This contribution to the claim of the Reciprocal System of Unified Science about the non-
physical sector of human existence is scheduled to be published in an anthology, Voices on the
Threshold of Tomorrow, in Summer, 1993 by Quest.)

For many generations humankind with numerous other living creatures has inhabited
Earth, third planet of our Sun.

Generations from now, humankind, a most unusual whole, as I see us, will outlast Earth.
The long longevity of our planet apparently is finite. Who knows when, if ever, humankind
must or will end? Who knows when, where, how this most ornery living species now on Earth
began?

The human species has become too ornery to be put off the Earth, as the dinosaurs are reputed
to have been. Rather we shall stay and advance and prevail by becoming ethically better united
among ourselves, toward the living world and with the physical world.

In the summer of 1992 I became seventy seven years young. For over half a century I have
been a theorizing and practising physicist in industry, medicine and education.

When beginning, I was taught and postulated that humankind, as a whole, is a small,
incidental, even accidental and unessential component of the physical universe. I took the
finite physical world to be the whole of Nature and/or natural
existence. This now is questionable science.

When ending, I infer from abundantly accumulating evidence that the opposite is more
probably true: that the physical world, the universe of motion or space-time, enormous in size
and dimensions though it be, is just a small but essential component of the human universe,
a whole of ultimate infinite human worth.

What makes the human universe an infinite whole is a nonphysical sector of natural
existence, believably inhabited by humankind exclusive of most, if not all, other living
organisms of Earth. This nonphysical sector is not simply or readily visible, audible or
tangible. It includes numbers and the meanings of words, but not numerals or words
themselves. Humankind as a whole can and does learn about the nonphysical sector of
existence by virtue of our native ability to create and produce adequate physical entities to
represent nonphysical entities essential to our well-being: numbers by numerals and
meanings by words.

Humankind as a whole and as S(he)'s proper parts, the private woman and the private man,
can and do participate in the infinitude of ultimate human worth only by way of our
inhabiting the nonphysical sector or realm of the human universe. This is the realm of
meanings, including dicursive meanings, number, arithmetic, human values, truth,
beauty, humor, science, music, art, philosophy and ethics of the human spirit.

The total quantity of money around our planet is finite (like all the grains of sand on all the
beaches of the Earth) and countable (if you have nothing better to do). Money is a commodity
whose use value is to estimate and measure only finite exchange values. Once when a famous
American capitalist was asked: "How much money income is enough?", he replied: "A little
more".

Ultimate human worth is not finite. Hence ultimate human worth cannot be counted with
money and finite arithmetic. Finite arithmetic is governed by the postulate that any and every
part of a finite whole is less than the whole. Finite arithmetic, adequate for counting the
exchange values of commodities of the global market, is quite unsuitable for counting the
ultimate human worth of the whole of humankind. Ultimate human worth is not finite.
Ultimate human worth is an infinite whole.

17
Not many years ago none of the professional mathematicians among humankind appeared to know how to estimate and count infinite wholes. Today infinite wholes can be and are counted with a method much like, while different from, the more familiar method of counting finite wholes.

Mathematicians refer to the method for counting both finite and infinite or transfinite wholes as “one to one correspondence”. The difference is that when counting an infinite whole, not any part will do. In order to identify and count any infinite whole, a proper part of it must first be found. The fundamental postulate of infinite wholes differs from that of finite wholes: “The proper part of an infinite whole is equal to the whole. A simple example: The set of counting numbers is an infinite whole (since there is no greatest counting number). In this infinite whole the even counting number total can be demonstrated to equal the total of even and odd counting numbers.

The proper parts of the infinite whole of humankind are ourselves, all women and all men. PERSONS ARE THE MOST PRECIOUS OF ALL HUMAN WEALTH ON EARTH. The proper parts of the whole of humankind are not any of the physical parts of the human organism, not human hands, not legs, not hearts, not brains, neither human bodies, nor even the biological control units that are designed to govern survival of human bodies: human minds. The proper parts of the infinite whole of humankind are our spaceless and timeless nonphysical selves: our human spirits, if you like.

By virtue of the nonphysical self, provided only that in each particular case it continues integrating and growing instead of disintegrating to non-existence, herself and/or himself is equal to the whole of humankind in ultimate human worth. Since entities equal to the same entity are equal to each other, all women and men are by nature infinite, independent and equal in respect to worth or human value. In no other presently known respect, particularly including human longevity and human biological or physical performance, are persons infinite or equal.

American civilization was first introduced, so far as I can tell, to the human equality proposition through Jesus Josephson. Jesus never said that He is the only Son of God, but taught rather that all Women are the Daughters of Nature’s God and all Men are the Sons of S/he. The proposition was reaffirmed eighteen centuries later by Thomas Paine, author of “A Declaration by the representatives of the United States of America in general Congress assembled”.

From our equal creation we derive rights, nowadays called “human rights”, inherent and unalienable, among which are the Preservation of Life, Liberty and Democracy.

The future of human rights on Earth relates to how humankind practices the human rights we profess. A primary attitudinal change among all humankind on Earth now is required for the future of human rights to be brighter. The change has to be composed of a rational rejection of the hoary bromide that all men are by nature finite and unequal in all respects, while women are less equal together with the voluntary informed acknowledgement and positive affirmation that the human equality proposition is, after all, accurately true.

Frank H. Meyer is a research physicist and emeritus physics professor, University of Wisconsin System, Superior, Wisconsin. He is a Board member of ISUS, Inc. and Editor of its journal, Reciprocity.
Practice Without Theory is Blind.

We all had better be concerned about the future, because that’s where we’re going to spend the rest of our lives.

Will Rogers

Every child owes its existence to God.

Thomas Paine

All women, children and men are by Nature and Nature’s God (S[he]) infinite, independent and equal in ultimate human worth.

Frank H. Meyer, Henry A. Myers, George B. Shaw, Joseph Lewis, Thomas Paine

[The Declaration] acknowledges that man has a soul and for that reason is equal to every other man, and that is the corner stone of what we call the American System. Dwight D. Eisenhower

Since it is now available, having been invented nine years ago in Minneapolis by a staunch supporter of the reciprocal system of natural science, Dr. J. Edward Anderson, and UM, PRT (Personal Rapid Transit) is an inherent and unalienable right of all women, children and men.

Table of Contents

<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>What is the use of a New Born Baby?</td>
<td>1</td>
</tr>
<tr>
<td>EIGHTEENTH ANNUAL CONFERENCE of ISUS Inc.</td>
<td>2</td>
</tr>
<tr>
<td>Minutes of the BUSINESS MEETING</td>
<td></td>
</tr>
<tr>
<td>Correspondence between two former ISUS, Inc. Presidents</td>
<td>8</td>
</tr>
<tr>
<td>Letters of J. Edward Anderson to Frank Meyer</td>
<td>11</td>
</tr>
<tr>
<td>Correspondence Between Maurice Gilroy and Robert Tucek</td>
<td>13</td>
</tr>
<tr>
<td>How to meet the new age ushered by the Reciprocal System ?</td>
<td>19</td>
</tr>
<tr>
<td>PRT: Excerpt from University of Minnesota Research Review</td>
<td>23</td>
</tr>
</tbody>
</table>
WHAT IS THE USE OF A NEW-BORN BABY?
Editorial

The lives of new-born human babies, to be useful, must be preserved, properly cared for and cultivated after leaving their mothers' wombs. Americans and all the rest of humankind should participate in this gainful public enterprise as well as or even better than the Manhattan Project preserved, cared for and nurtured the atom bomb babies and their technological descendants.

New-born babies around the Earth can be the best available source of new and better thoughts and actions for the survival and a better, less warlike and less criminal, more peaceful and brighter future of all who can be human.

A once new-born baby, now Dr. J. Edward Anderson, is a strong investigator of the reciprocal system of revalued and unified science, created by another once new-born baby, Mr. Dewey B. Larson. Dr. Anderson and the UM-Twin Cities within the past decade also have created one of the greatest, if not the greatest, technological inventions of this century—PRT. **Personal Rapid Transit** now will be available, if wanted, to make possible for all women, children and men, to move about doing their daily work and play more readily, conveniently, comfortably and joyfully on the surface of a healthier Earth.

PRT is comparable to the greatest invention of the last century, MED. The **Magnetical Electric Dynamo** is the wonderful discovery during 1831 in London of the principal way electric power is now commercially generated throughout the world of humankind on Earth. Another once new-born baby, the discoverer, Michael Faraday, began as early as 1822, using only his common sense, to think about, observe and try how to convert magnetism to electricity. He was inspired by the observation of his contemporary, Hans Christian Oersted, that an electric current causes magnetism to circulate about the current. This observation, made in 1820, led Faraday to wonder whether magnetism somehow can be made to produce electricity. After some years of trial and error, he found his doable.

Around 1831 Michael Faraday's electric generator was regarded as an interesting scientific toy, helping to disclose a symmetrical, reciprocal relation between electricity and magnetism. The toy evoked some public interest, so that Prime Minister William Gladstone came to Faraday's Laboratory to be shown the toy. Mr. Gladstone at the end of his visit politely inquired of Mr. Faraday: "But what is the use of it"? Michael Faraday offered two answers. The first was another question: "What is the use of a new-born baby?" Michael Faraday's second answer probably was more to the Minister's liking: "Some day, Mr. Prime Minister, you may be able to tax it."

J. Edward Anderson is a man much like Michael Faraday," being part of a purpose he himself recognizes to be a mighty one." At Boston University, with which he has been associated after departing from the University of Minnesota-Twin Cities, our friend and colleague took valuable time out from his work for PRT to try to obtain a hearing on the Boston campus for Dewey B. Larson and his reciprocal system of revalued and unified science. This has been a valuable learning experience for ISUS,Inc members and supporters and subscribers to our journal, Reciprocity. The RS is both a theory and a practice to change for the better both the physical sectors and the non-physical sector of human existence. PRT can and will change our material sector for the better in practice.
Eighteenth Annual Conference of the
International Society of Unified Science, Inc.

Business meeting held August 7, 1993 at
the University of Denver Campus, Colorado.

The business meeting of the International Society of Unified Science, Inc. was called to
order on August 7, 1993 at 1:50 pm by President Ron Satz. Six members were present in
person:

Ronald Satz
Frank Meyer
Phillip Porter
Larry Denslow
Hoyt Stearns
Laura Jean Fremouw

Board of Trustee members were present by written proxy:

Jim Schmidt assigned his proxy to Ronald Satz.
David Halprin assigned his proxy to Ronald Satz.
Ed Navarro assigned his proxy to Phillip Porter.
Rainer Huck assigned his proxy to Phillip Porter.
William Michell assigned his proxy to Frank Meyer.
Thomas Kirk assigned his proxy to Ronald Blackburn.
Ronald Blackburn assigned his proxy to Hoyt Stearns.

The President ruled that because Ronald Blackburn was not present the proxy of Thomas
Kirk could be exercised by Hoyt Stearns.

1. Hoyt Stearns started to read the minutes of last years meeting. Phillip Porter moved
and Hoyt Stearns seconded that the minutes as just published in the latest issue of ISUS
News, not be read, and stand for consideration as published. The motion not to read the
published version passed.

President Satz asked for corrections.
Frank Meyer proposed that item 6.a. be changed to read:

"Rainer Huck mentioned that Dewey Larson's daughter, Linda, asked ISUS if we would
be willing to take over the administration of North Pacific Publishers, in the event that
Dorothy Larson becomes unable to carry on. The item was discussed, but no action was
necessary or taken."

Phillip Porter noted that item 3. should have ended with,
'The reports were approved as read.'

Phillip Porter noted that in item 5.m. the words, "last book" be changed to, "book Beyond
Space and Time", with the words "Beyond Space and Time" underlined.

Phillip Porter noted that at the end of item 6.h. should be added the line: "The motion for
these changes was seconded by Denslow and passed."

Phillip Porter moved acceptance of the minutes as amended. Larry Denslow seconded the
motion. The motion passed.

2
2. Treasurer's report:

Given by Phillip Porter in the absence of Rainer Huck. From last year's meeting minutes last year's balance was $3,909.82 on Aug 6, 1992. The current checking account balance as of 7-19-93 was $4,492.29. Ronald Satz will get detail of income and expenses from Rainer Huck and send it out. Frank Meyer moved acceptance of the report. Larry Denslow seconded the motion. The motion passed.

3. Reciprocity Editor's report:

Frank Meyer reported that only one issue of Reciprocity was published this past year, with an issue of ISUS News included. The total cost was under $400 as directed. 250 copies were printed.

Discussion was held on Reciprocity editorial staffing. Phillip Porter moved acceptance of the report. Larry Denslow seconded the motion. The motion passed.

4. Old Business:

a. Last year's tabled item 6.g, was brought off the table by Phillip Porter. A short discussion followed. The vote for acceptance was ruled as failed because 8 votes were cast in favor and 4 votes were cast against, including proxies. The president ruled that it took a two thirds majority of all board members, whether present or not, to pass an amendment to the Bylaws.

b. Discussion was held on getting all the back issues of Reciprocity from Frank Meyer's house to ISUS headquarters in Salt Lake City. Frank Meyer moved that ISUS reimburse anybody who will move the back issues from Minneapolis to SLC. Larry Denslow seconded the motion. The motion passed. Discussion followed on how to obtain back issues. Discussion followed on whether the back issues should be in SLC.

c. Phillip Porter brought up a problem with item 6.h. of last year's minutes concerning mail ballots and counting non returned ballots as being "Abstain". No motion was made.

d. The new ISUS brochure was discussed. Hoyt Stearns moved to accept the new brochure except the video tape information will be removed and the dues amount will be removed. Frank Meyer seconded the motion. The motion passed.

5. New Business:

a. Discussion of sending ISUS News to members only as first class mail. ISUS News is going to two libraries, at the current time. Phillip Porter moved that ISUS News no longer be sent out with Reciprocity and that it be printed in limited amounts and sent to ISUS members only as first class mail. Larry Denslow seconded the motion. The motion passed.

b. Discussion of Reciprocity peer review process and requirements to have articles published in Reciprocity and having papers rejected. Phillip Porter moved that we table this issue until later. Larry Denslow seconded the motion. The motion passed.

c. Discussion of marketing the Reciprocal System. Targeted marketing of an ISUS book catalogue to a specific mailing list was suggested, although it is expensive. Space ads don't seem to work for us. No motion given.
d. Frank Meyer moved that Hoyt Stearns replace Edwin Navarro on the Reciprocity Review Committee of the Board of Trustees. Larry Denslow seconded the motion. The motion passed. Now the Reciprocity Review Committee consists of K.V.K. Nehru, Robin Sims, and Hoyt Stearns.

e. Discussion of the Reciprocity paper on bi-rotation that has been rejected. No motion given.

f. Discussion of establishing a procedure for the Board of Trustee to hold votes by written ballots. Phillip Porter moved that we table this issue until later. Larry Denslow seconded the motion. The motion to table passed.

g. Discussion was held on having each member bring one additional person to the meeting each year. No motion given.

h. Discussion was held on finding additional critical experiments. No motion given.

6. Election of Board of Trustees:

The acting secretary announced:


It was pointed out that the Bylaws designate that 1/3 of the board should be elected each year, so five should be elected this year, if possible, and five next year.

Meyer resigned as a Board of Trustee member. Phillip Porter moved we accept the resignation of Frank Meyer. Larry Denslow seconded the motion. The motion passed.

Larry Denslow nominated Nehru, Porter, Sammer, Simms and Meyer for the five positions on the Board of Trustees to have a term of three years. Phillip Porter seconded the motion. There was discussion.

Larry Denslow moved that nominations be closed and a unanimous ballot be cast for the five nominees. Phillip Porter seconded the motion. The motion passed.

Therefore the 1993-1994 Board of Trustees consists of Huck, Satz, Stearns, Denslow and Mitchell with one year to go, Schmidt, Blackburn, Halprin, Navarro, and Kirk with two years to go, and Nehru, Porter, Sammer, Simms and Meyer with three years to go.

7. The president closed the general membership meeting and opened the Board of Trustee meeting for election of officers.

Executive Director/Treasurer: Larry Denslow nominated Rainer Huck for Executive Director/Treasurer. Phillip Porter seconded the nomination. Nominations were closed with a unanimous ballot cast for Rainer Huck as Executive Director/Treasurer.

Secretary: Phillip Porter nominated Larry Denslow for secretary. Frank Meyer seconded the nomination. Nominations were closed with a unanimous ballot cast for Larry Denslow for secretary.

Vice President: Larry Denslow nominated Frank Meyer for Vice President and moved that nominations be closed and a unanimous ballot be cast for Frank Meyer for Vice
President. Phillip Porter seconded the nomination and motion. Motion passed unanimously.

President: Larry Denslow nominated Ronald Satz for President and moved that nominations be closed and a unanimous ballot be cast for Ronald Satz for President. Frank Meyer seconded the nomination and motion. A unanimous ballot was cast for Ronald Satz for President.

8. President Ronald Satz closed Board meeting and reopened the general membership meeting.

9. Frank Meyer moved that the Board review and reappoint the editorial staff of Reciprocity. Phillip Porter seconded the motion. The motion passed.

10. Frank Meyer moved that appreciation be expressed to this years meeting host, Phillip Porter. Larry Denslow seconded the motion. The motion passed.

11. Ronald Satz nominated that the 19th Annual meeting be held in Arizona with Hoyt Stearns as host. Hoyt Stearns will determine where. Phoenix or Flagstaff were mentioned as possibilities. Larry Denslow seconded the motion. The motion passed.

12. Phillip Porter moved that the meeting be adjourned for now to be continued tonight at 9:00 pm. Frank Meyer seconded the motion. The meeting was adjourned at 4:10 pm, August 7, 1993, by President Ronald Satz.

13. The business meeting of the ISUS, Inc. was again called to order on August 8, 1993 at 9:33 am by President Ron Satz. Seven members were present in person with the same 7 proxies as yesterday:

   Ronald Satz
   Frank Meyer
   Phillip Porter
   Larry Denslow
   Hoyt Stearns
   Laura Jean Fremouw
   Robert Straehling

14. Regarding item 5.f. from these minutes yesterday that was tabled, Phillip Porter moved and Frank Meyer seconded that the following Mail Ballot Procedure be accepted as the policy of the Board of Trustees. The following Mail Ballot Procedure passed with a unanimous ballot.

   Mail Ballot Procedure

   This is the procedure for balloting by mail of the ISUS Board of Trustees as established under the provisions of Article V, Section 8, Paragraph b, of the Bylaws of the International Society of Unified Science. There are three possible ways that a ballot by mail may be taken.

   1. Informal path: Any member of the Board of Trustees who wishes to have a matter brought before the board by mail ballot shall contact the President by telephone, mail, fax or any other means and communicate his concerns and request a mail ballot be taken. The President may discuss the issues with anyone he sees fit and create an appropriate mail ballot if he chooses.
2. Formal written motion: Any two members of the board may submit, singly or jointly, a written motion and request for a mail ballot vote to the President. The written motion and request shall be signed by at least two members of the board and shall include the specific wording of the motion to be voted on. They shall also include any supporting written material which they wish to be considered by the board in deciding upon the motion. The President shall have 15 days after receipt of the formal motion to prepare an appropriate mail ballot and mail it to the Secretary.

3. Fast track: A written motion, whether in one or more copies, signed by a majority of the board shall be certified as approved when it is received by the Secretary, even if it is not sent to the President. This could result in certified votes as quickly as one day by faxing ballots to Board members with return to the Secretary by overnight mail.

An appropriate mail ballot shall contain the specific language of the motion under consideration, who submitted the motion and shall have boxes to vote "Yes", "No", "Abstain" and "None of the Above". "None of the Above" shall be counted as a "No" vote, but shall indicate that the issue needs more consideration. "Yes" and "No" may be replaced by other choices, if appropriate to the motion under consideration. The mail ballot shall contain the name of the board member to whom it was sent, the Secretary's address to which the completed ballot is to be sent, and a place for the board member to sign and date the ballot to validate it.

When the Secretary receives a mail ballot from the President he shall send it out to all the board members within seven days with the supporting material and any comments he wishes to make. He shall also include a list of all the board members, their mail addresses and phone numbers to allow board members to easily discuss the motion among themselves, as they see fit.

All written requests and ballots shall have an original signature of the board member involved, in order to be considered valid. Copies and faxes of signatures shall not be allowed as valid by the Secretary when tabulating a vote. Proxy voting will not be allowed in mail balloting. A board member may withdraw a signed ballot and submit another one anytime before the vote is certified by the Secretary.

When the Secretary tabulates the ballots and a majority of the board, not Abstaining, have voted one way to decide the issue, then the Secretary shall certified the vote to the board by sending each board member a copy of the results of the vote. The results of all mail ballots shall be printed in the next issue of ISUS News.

If enough ballots are not returned to the Secretary to allow him to certify the vote then the motion shall be open and decided under old business at the next valid meeting of the board. At such a meeting of the board, written ballots shall take precedence over proxy votes and the outcome shall be determined by a majority of the written ballots, proxy and live votes cast and not abstaining.

If either the President or Secretary is unable or unwilling to carry out their timely duties under this procedure, then any board member may carry out the steps for them with duplicate ballots so that marked ballots can be returned to the Secretary's last known address as well as to the board member who is acting as Secretary.
15. Regarding item 5.b. from these minutes yesterday that was tabled, Phillip Porter moved and Frank Meyer seconded that the following Editorial Policy for Reciprocity be accepted as the policy of the Board of Trustees. The following Editorial Policy for Reciprocity passed with a unanimous ballot.

**Editorial Policy for Reciprocity**

The editorial staff of Reciprocity shall do the first screening of articles. The Editor will send acceptable papers to the President, or his designee, for peer review.

If the Editor or President rejects the article it will not be published in Reciprocity, unless it is reviewed and approved by the three man Reciprocity Review Committee of the Board of Trustees. The Review Committee can over rule a rejection by a majority vote.

Rejected articles can be referred to the Review Committee by the author, the Editor or any member of the Board of Trustees.

If the Review Committee supports the rejection then the author, the Editor or any member of the Board of Trustees can submit the article for consideration to members of the Board of Trustees.

If eight or more board members indicate their support to the Editor for publishing the paper, that shall over ride all previous rejections and the paper shall be published. If five to seven board members support to the Editor publishing the paper, it shall be published as a minority position paper, and so noted.

< End of Editorial Policy for Reciprocity >

16. There was more discussion of Reciprocity paper policy questions.

17. Phillip Porter moved that the business and Board of Trustees meeting be adjourned. Frank Meyer seconded the motion. The meeting was adjourned at 9:43 am, August 8, 1993, by President Ronald Satz.

Respectfully submitted,
Phillip H. Porter
Acting Secretary
Correspondence between two former ISUS, Inc Presidents

Editor Frank H. Meyer: About Future Progress of Human Rights on Earth:

In response to the request of your Letter of February 9, 1993, I have learned that you can obtain a copy of the map you seek.

Carol Urness, Librarian of the James Ford Collection of the University of Minnesota, will communicate directly with you about your interest, provided I give your address to her, which I have done...........

Frank, I wish to invite you, as time permits, to help us to evaluate a theorem of the reciprocal system of natural science, originated by Dewey B. Larson. The theorem does not directly have to do with physics. It relates rather to Dewey's conclusion that the human universe involves a non-physical sector as well as the material sector and the cosmic sector of the physical universe. Dewey Larson maintains that such a non-physical sector not only is, but just as naturally exists as do the two sectors of the physical universe.

In an effort to develop the theory of the non-physical sector, characteristic of the human universe, I have composed the enclosed paper, "Probable Future of Human Rights on Earth," which is to be published in an anthology, VOICES ON THE THRESHOLD OF TOMORROW, this summer, 1993. [Editor's note: This book now has been published by Quest, as of September, 1993. In the book, the essay, Number 89, is published under the title, "Ultimate Human Worth." ]

Please, as your time permits, comment and criticize the essay, as to its relevance and compatibility with Dewey Larson's philosophy of science.

Dr. Frank A. Anderson, former President, ISUS, Inc: About Human Equality:

Thank you very much for your Letter of February 16 and for the copy of your paper, "Probable Future of Human Rights on Earth". In the same mail that brought your letter I also received a letter from Librarian Carol Urness in which she let me know how I can get a copy of the 15th century map in which I am interested............

The paper you sent me is very interesting and has already been read twice. I plan to study it more carefully as time permits. However, I thought you might be interested in some of my reactions to your work. It seems to me that we can look at man in two ways, as a physical being with spiritual overtones or as a spiritual being temporarily living in the physical world. The latter view is the one I hold. Thus I agree with you that the universe has three sectors: the material, the cosmic and the (non-physical-FHM) spiritual. The proper relationship between the three sectors is still something I am working on............

........In your article you state: "In this infinite whole the even counting number total can be demonstrated to equal the total of odd and even counting numbers." This may be demonstrated but it is difficult for me to accept something which appears to be so illogical in terms of the everyday world with which I have to come to grips.

I agree with your statement that all human beings are equal with respect to worth. I have often stated in simple terms that all people are equal in the sight of God, that all people should be equal in the sight of the law, but otherwise people are not equal. I certainly recognize my "un-equality" when I consider my limited mathematical ability. My math ability may be greater than average but I consider it to be very limited in comparison to mathematicians as a class. But, thank God, it makes no difference in God's sight what our mathematical abilities are.
Thank you for your thoughtfulness in sending me a copy of your paper. I am looking forward to spending more time with it.

Frank Meyer's response to Frank Anderson:

Thanks to the distinguished nineteenth century mathematician, Dr. Georg Cantor, counting some infinite wholes can be done with the same one-to-one correspondence method we employ when counting finite sets.... Thus, he counted all the counting numbers, odd and even, with the even, putting each of all in one-to-one correspondence with each of only the even:

\[
\begin{array}{cccccccc}
1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 & 9 & 10 & \ldots & 100 & \ldots & 1000 & \ldots & 10^{12} & \ldots & 10^{12} + 1 \\
2 & 4 & 6 & 8 & 10 & 12 & 14 & 16 & 18 & 20 & \ldots & 200 & \ldots & 2000 & \ldots & 2 \times 10^{12} & \ldots & 2 \times 10^{12} + 2 \\
\end{array}
\]

All the counting numbers are countable with a proper part of the set, the even counting numbers. No finite set can be counted in this way. The fundamental postulate of finite arithmetic is that every part of a finite whole is less than the whole; therefore, no part of a finite whole can be equal to the whole. The even counting numbers constitute a proper part of the set of counting numbers. Since the members of this proper part count all the members of the whole set, because the members of the part can be put into a one-to-one correspondence with the members of the whole, this confirms that the set of counting numbers is not a finite set, but an infinite whole. Such wholes cannot be counted with finite arithmetic; but, if at all, with infinite or transfinite arithmetic, whose fundamental postulate is that a proper part of an infinite whole equals the whole. That no greatest counting number exists is more evidence that the set is infinite. If there were a greatest counting number, then the set would be, of course, finite; but no such number ever will turn up, because whatever number is alleged the greatest, you always can add one to it.

The whole of humankind's ultimate human worth is a more complicated infinite whole than the set of counting numbers. We and our human worth are more like the infinite set of real numbers. Although the latter set is not, like the set of the counting numbers, countable, it is the more interesting to use for showing what all infinite wholes, as distinguished from all finite wholes, have in common: namely, an equality between a proper part and the whole. Thus, the real number set can be put into a one-to-one correspondence with the points of a line of any length. Let Diagram 1 show how every point on base(AB) of triangle can be put in one-to-one correspondence with the parallel line of shorter length(DE).

![Diagram 1.](image)

The proper part of the humankind whole is not our physical equipment: brain, heart, eye, mind, body, but the human person, the private woman and/or the private man. Since in ultimate human worth each person is infinite, independent and equal to that of the whole of humankind, and since, as in finite arithmetic, entities equal to the same entity are equal to each other, all women and men are by nature equal in worth.
Frank Anderson: further questioning about the infinite and the finite:

In your letter you ask if I would consent to having our letters printed in an in-house issue of ISUS News. If you feel that my letters, or parts of them, might be of interest to others, you have my permission to use them. I don't feel that I have any special insights. All that I am doing is scratching the surface of things in the hope that I might peel away a layer or two - like peeling a layer or two of an onion of infinite size. It's a fascinating venture for one with a curious mind. It is also humbling when you realize how little you know. The tears in my eyes from peeling the onion are tears of joy even though you know the search is endless.

Let me comment on some of the issues and questions you raised in your letter. At one point you state: "Some 23 centuries ago the mathematician, Euclid, was able to prove that whatever counting number is alleged to be the greatest, I can always be added to it." I know of this statement, but must admit that it bothers me for I think that there is a flaw in Euclid's reasoning. To my way of thinking, if a number is the greatest, then nothing can be added to it. Once a climber reaches the top of Mt. Everest, that is IT! You can't add anything else to it. In the same fashion, if a counting number is the greatest, then nothing can be added to it. I admit that Euclid has an "out", if he says that a counting number is ALLEGED to be the greatest. I'd be happy if you pointed out the flaw in my thinking.............

Changing the subject once again- in the last paragraph of your letter you say, "Since each human person in ultimate human worth is equal to that of the whole of humankind,........" The concept that has been advanced that in some cases the part may equal the whole is difficult for me to comprehend. In the case of the human being I can reason as follows: If the value of a human is priceless or infinite, then nothing can exceed it, even the value of the whole of humankind. Here again, as in the case of Euclid, we are talking about a concept expressed in a word, infinite in one case and greatest in another case. Any further thoughts along this line that you can re to share with me, Frank, will be appreciated.

Frank Meyer's response to Frank Anderson's inquiry:

Frank, you are quite right, "once a climber reaches the top of Mt. Everest, that is IT! You can't add anything to it." This peak has a maximum height, measured to be 29,028 feet (8,848 meters). This is because the height of this highest mountain on Earth is finite. If you met a man 30 feet, 2 inches height, he probably would be the tallest man you ever did see or will see; but he would still be finite in height! If the set of counting numbers included a greatest number, then this set would be finite. The fact, as disclosed by Euclid, that it is and forever will be impossible to find any greatest counting number among the whole set of counting numbers excludes the possibility of this whole being finite. Infinite whole and greatest member are mutually exclusive. Similarly, if human beings are an infinite whole of ultimate human worth, then this excludes anyone human being greatest in worth. Furthermore, if persons are priceless, then men may not be sold nor women bought for a price by their superiors in worldly goods.
November 12, 1993

Dr. Frank H. Meyer
1103 - 15th Avenue S. E.
Minneapolis, MN 55414

Dear Frank,

Thank you very much for your letter of October 29th. I am most happy to learn that you have gotten involved in the cause of PRT as a solution to many pressing problems of urban society everywhere. I have thought many times that PRT will be seen as one of the crowning technologies of the declining years of the 20th century, and thus that I could devote myself to no better cause than to help the process by which it will be fully developed for the betterment of humankind. Documents such as those enclosed give me great satisfaction, but there is much to be done yet to make sure the most cost-effective PRT system is implemented. Now finally we can look forward to the first operating system in a few years. Raytheon now has over forty very good engineers developing plans and specifications in exhaustive detail in preparation for detailed design, construction, and test of our new system.

I am thrilled by your proposition to have ISUS promote PRT, and will be happy to cooperate to the extent that I can. I discuss Dewey Larson and the reciprocal system whenever I can and look forward to the time when I could dig into it more deeply than possible with my present duties. You have my permission to print my letter of July 18th and I am honored that you wish to do so.

I enclose my check for a copy of * Voices on the Threshold of Tomorrow* and look forward to seeing you and Winnie at the breakfast on 23 November. I would like to hear more about Senior Citizens for PRT, as I have long seen that the service offered by PRT will be of great utility to Seniors.

With warmest personal regards to you and Winnie,
J. Edward Anderson, PhD, P.E.

474 Revere Beach Blvd. #802
Revere, Massachusetts 02151
phone & fax (617) 289-6965

July 18, 1993

Dr. Frank H. Meyer
1103 - 15th Avenue S. E.
Minneapolis, MN 55414

Dear Frank,

Thanks very much for your note re the article that appeared on our progress with Taxi 2000. I am very sorry I had not answered your letter of January 12, but in the flurry of activity, it got buried after I tried to give you a good response. Your essay "Probable Future of Human Rights on Earth" is a very thoughtful piece.

Several years ago, I would have scoffed at the proposition that the known physical world was not the whole of existence. Through a variety of seemingly chance events, I have, during the past year and a half been exposed to enough different views, some from famous physicists like David Bohm, that have caused me to realize that there is much more to it than I thought. I read The Morphological Universe, by Michael Talbot, The Looking Glass Universe, by two physicists, a book about Edgar Cayce, material from Earl Nightingale, Hose Silva, Napoleon Hill and others, each of which came from a different source, but together have converted me in a direction I, as a hard-headed practical scientist-engineer, would have thought not possible. Add to that the ideas of Dewey Larson, and you have a whole new way of thinking about the universe and our place in it. In thinking back about my work on PRT, there have been an uncanny string of "coincidences" that have made it possible.

With warmest personal regards to you and Winnie,

\[ Signature \]
Correspondence Between Maurice Gilroy and Robert Tucek

Robert Tucek on Editing and Censorship:

As to censorship, I feel you may be somewhat too sensitive to the selective process involved in publishing a journal. I doubt you could find a major journal (scientific or otherwise) that publishes everything that crosses its editor's desk. In fact, rejection slips are more common than not. Why do you think Larson had to publish his own works? There was an obvious lack of acceptance of his ideas on the part of "orthodox" editors.

I, myself, have written several letters to Science News commenting on such things as the absurdities of astronomical theories propounded by leading cosmologists, to no avail. Not one of them has been published. I am not surprised.

Censorship is a fact of life. For example, your short list of "questions" to be asked about articles submitted to Reciprocity rejects non-RS papers, philosophical papers and papers consisting of regurgitated Larson. Censorship! It all depends on your particular point of view.

As a former associate editor for Reciprocity, I must also take exception to your assertion that format is unnecessary. Certainly it is superfluous in a conference mailing such as the one you have been sending around, since its primary purpose is for getting the word out. As a publication that purportedly, would be seen by the scientific community at large, Reciprocity should look at least competent. There is nothing more odious than having a science paper replete with typos and spelling/grammar errors. My original purpose was to improve the visual appearance of the journal, I wanted it to look respectable. Great ideas ought not be hindered by poor presentation. Unfortunately the content of late does not rate the format.

Nevertheless, I agree with your short list. Rather than censorhip, the term is Quality Control. Reciprocity should represent the ongoing research that is being done by those involved in RS investigations. Its articles ought to be academic discourses on the particulars of RS research. Papers should attempt to enhance the knowledge base of science from an RS point of view. They should not be argumentative or solicitous—they should be statements of empirical findings or theory development (to be judged on their own merit). A simple disclaimer by the editorial board as to the contents being those of the authors alone, and not necessarily those of ISUS, would suffice.

In keeping with the above, however, all opinion papers, gossip items, and philosophical/political pieces should be kept in a revamped ISUS News. Your vision of a collection between covers is just what ISUS News should be—a circular for members only. Perhaps it should survive as an extension of your conference mailings.

The journal, however, should be for academic purposes alone. Unfortunately, there probably are not enough submissions that qualify to call for a quarterly journal. Perhaps Reciprocity should be published annually, and ISUS News can become a bi-monthly newsletter ("uncensored").
Response of Maurice Gilroy to Robert Tucek:

I am in general agreement with Robert's comments about editing and censorship. However, my concern, for which I see no easy answer, is how can unorthodox ideas receive a fair hearing in the scientific press, which is supposed to promote the human search for truth?

Our human search for truth seems to be mislead continually by our human desire for certainty, while standing in the middle of a profound mystery. When our main stream scientific leadership agrees that some view is most likely, then "the herd" follows their leaders in the unlikely belief that their leaders know the way to the green pastures of truth. The main stream journal editors then reject alternative views as being of limited interest to their readership--and they are RIGHT! Their readership isn't interested in unorthodox views..........................

I believe that the censored main stream journals are the essential tool in the creation of the herd mentality of main stream science. Consequently, I believe that prestigious main stream journals are the worst possible model for the publications of a society that is supposedly trying to study, clarify, and promote Dewey's RS. I believe that ISUS should abandon any attempt at publishing a censored journal, and get on with an open debate of all the RS issues that arise.

Robert Tucek on the fundamental motions:

Your problem with fundamental motion is also puzzling. The reason Larson kept to a translational motion was that it squared with observations of the physical universe. What observations correspond to a basic rotation of natural units?

Of course Larson's ideas were colored by his preconceived notions (as are all of ours), but logical derivation is not based on starting with a blank slate or empty head. If an outcome is logical, it is logical whether or not its discovery was anticipated or not.

I have a feeling that the problem rests on an inadequate understanding of scalar motion. The idea of motion with magnitude but without direction requires a certain leap of reason because we exist in a world of directions. It is hard enough to comprehend motion without an object, let alone motion without direction.

The misunderstanding is compounded by confusing the distinction between circular and rotational motion. And here is the crux of the problem. Rotational motion, by definition, requires an object! This is what Larson claimed, and this is the stumbling-block for ISUS members. Rotational motion involves movement around an axis --an axis that constitutes a "part" of the object in motion. In circular motion the axis is "outside the object" and is simply an imaginary line joining an object (or motion) undergoing acceleration and the center of the curve. The moon does not rotate about the earth; it moves with a circular motion. It does, however, rotate about its own axis.

A photon is an object, and therefore could (and does) rotate about its own axis. But prior to the formation of photons, there is no object to rotate. There does not have to be an object to translate simply because translational motion is a relationship between until there is an object with an axis to rotate about.

Admittedly, there can be no distinction made between scalar translational motion and scalar circular motion. Since direction is inconsequential, one is
indistinguishable from the other, especially when “direction” can change at unit boundary. So who can say what the basic motion really is? We couldn’t distinguish it anyway. Since circular motion is more complex, translational motion was considered (by Larson) as fundamental.

Thus, add another opinion on RS basics. I, however, will not be submitting a paper to Reciprocity. I prefer to expend my energies on studying RS theory in whole, highlighting the shortcomings of modern science, and introducing RS to potential "converts".

Response of Maurice Gilroy to Robert Tucek:

I am in general DISagreement with Robert’s view of the fundamental motion because I REALLY disagree with Dewey's translation-rotation vision as restated by Robert.................

Science = knowledge = to know = to cognize = to see or measure. If you can’t see something, or in some way measure it, it’s not the subject of science or physics. Therefore, studies of some measurable property or action of an unseen entity is physics.

If you can agree with the definition of science (check your dictionary) then you can agree that much of what is claimed to be modern theoretical physics and cosmology is a modern metaphysics—whether it is mainstream or RS.

However, I hope you will be honest enough to quit claiming that “translation prior to rotation” is a logical deduction from anything. It is simply required by Dewey’s belief in a finite universe, which is one of two possible irrational answers to a profound metaphysical question.

More by Robert Tucek on fundamental motion:

Now regarding fundamental motions: It seems quite obvious that there is a “fundamental” disagreement at the very foundation of RS theory, with you on one side and Larson on the other. I don’t know how the lines are drawn within the current membership, but I for one would have to cast my lot in Larson’s camp if it came down to that.

If we are to make axiomatic assumptions about the inherent nature of the uni-verse, we cannot but come to the dichotomy you have described. Either it is finite or it is infinite. (Though perhaps some future “Larson” will appear with an alternative no one ever thought possible.). It is also either eternal or non-eternal. As we now understand it, it cannot be both.

While you prefer to “believe” (your words) that it is eternal and infinite, I prefer to “believe” it is non-eternal and finite (as did Larson). We cannot prove one “faith” is more correct than the other. Larson did try in his latest book but I know what you think of that.

In original RS theory, however, the relationship of space to time is one of motion. There is a natural reference frame from which all deviations arise. Whether you view it from a stationary reference frame or the natural one, there is still motion. And whether it is translational or rotational, motion must be present. The absence of motion would preclude the existence of space and time (as we know it). Therefore “eternity” is simply a manifestation of the existence of motion. It is circular
reasoning that claims a universe of motion can be eternal. How can you define the existence of something by one of its subsets? How can motion exist “for all time” when time itself is only an aspect of motion? In short, the universe will last as long as time lasts. Does that make it eternal?

I must disagree with you about your assertion that “translation prior to rotation” indicates a particular worldview. I cannot see that it has any bearing on whether the universe is finite or infinite. Neither can I see rotational motion as a necessary precursor of the infinite viewpoint. If I wanted to (and I don’t) embrace the belief of an infinite universe, I wouldn’t need rotation to support me. Just what advantages rotational motion has over translational motion I have not figured out.

A careful reading of Larson’s works will show that translation is not an outcome of his metaphysical ideas, it is simply an outcome of using Occam’s razor to describe motion. Translation is less complicated than rotational motion, period. As Larson puts it, it’s a “matter of geometry.” This seems logical to me. And its validity is documented in the ensuing development.

I also fail to see how a rotation of space/time units would entail a scalar expansion or progression. More likely it would produce a scalar “black hole.” In that case, the universe could fit inside the period at the end of this sentence.

As far as I am concerned, your claim (per your letter) of fundamental precedence for rotation over translation has just as many hang-ups.

“An eternal, unchanging rotation needs no other cause.” -- Gilroy

If you can claim that for rotation, one could just as well claim that for translation. As long as you disregard cause, you are home free on either point. In your eternal/infinite universe, motion is presumed—without the need to assess cause. This is akin to Einstein’s assertion that “space has the physical property of transmitting electromagnetic waves, and not to bother too much about the meaning of this statement.” It takes just as much faith to hold to your premise as any that includes an outside agent.

Larson himself did not speculate on the origin of motion within the confines of his works on physical science. He accepted its existence as the starting point of his theoretical development, claiming that explanations for the “creation” of motion (if any) was beyond science per se. This is not waffling; it is recognizing the limitations of science.

Causation itself is a manifestation of time. Without time, there is no temporal cause or effect. Without space, there is no spatial cause or effect. Without motion, causation does not apply. If there were a precursor to the universe of motion, we would not understand it as a cause.

If, as you claim, a “vibration implies a change in direction” and “a change in direction requires a cause,” likewise a rotation would imply a change in angle, and a change in angle would require a cause! You cannot relieve rotational motion from the same constraints without being duplicitous. What is the unexplained attribute of Gilroy’s rotating photon that is the primal space/time limits to the existence of matter. Galaxies must explode once they reach the age limit, and this limit necessarily determines the spatial perimeter of the material universe. The only way the universe of motion could be cyclical (material-cosmic) is to have limitations on the age of the components of each sector.
This has no bearing, however, on the duration of the cycle as a whole. It could have been here “forever” and may never end. Or it may have had a beginning in creation and is destined for eventual demise. Who knows?

By holding to an infinite and eternal universe, you are in effect regressing to the idea that the universe is a container for all phenomena, an idea Larson overturned as the most limiting paradigm of modern science.

It comes down to this, either you believe that something (or someone) initiated the motion we have in our universe along with the start of space and time, or you believe that this motion has been present for all eternity,” a position that simply ignores the “cause” by assuming perpetuity.

If one cannot accept the “infinite” premise, one is necessarily stuck with some perhaps unanswerable questions. If motion was “started,” how did it start? and what was before motion(time,space)? And if something (or someone) started it,, in what type of “universe” did (or does) that something (or someone) exist? But I would rather have those kinds of questions hanging around than adopt the idea that our present state of motion is the sum total of reality.

The existence of religion is one human response to that set of questions. And religion is often the sticking point for so-called scientists. Larson’s own attempt in Beyond Space and Time demonstrates the possibility of “beings” outside of time and space—without a need for the trappings of religion.

As with many of the controversial scientific theories, there is usually a vocal “anti-religious/anti-metaphysical” contingent that is quite adamant about their position because the opposing viewpoint entails the possibility that there might be something (or someone) “out there” to which (or whom) we may be held accountable. [The other side often is adamant about knowing that particular something (or someone)).

Those who question the validity of religion often tend to prefer views that minimize the “need” for an outside explanation. After all, it is much more comfortable to convince oneself that our present science is all there is——is all there ever was, and all that there ever will be——for then one can ignore any demands on our persons for ethical conduct, social responsibility, etc.- at least those that become inconvenient.

It really irks me that some people show such contempt for anything that smacks of the spiritual. Of course there have been (and still are) excesses by some in the name of God, but that does not prohibit the actual existence of something beyond space and time. It may not be “science,” but it certainly falls within the realm of “the search for truth.”

“My disagreement with Dewey.....rises from a metaphysics that I cannot accept.” (Gilroy—-8/19/93)

Your quote says it all. The problem is with metaphysics. There is no way that any theory of the physical universe will ever be able to answer the primal metaphysical questions. That is why they are called metaphysical. It is only in the realm of “revelation”—from God or Sector 3——that one can know anything of existence outside motion.

If you prefer to limit your search for knowledge to that obtainable by human senses (and those of the technology we invent), that is your perogative. But disavowing
ventures into an understanding of metaphysical things is the epitome of censorship. And by lambasting Larson’s theories because of his supposed vision of a finite universe you are proscribing the free exercise of inquiry. Larson has done admirably in developing his theory of the universe of motion. What have the “rotationalists” done?

This all is of vital concern for the continued existence of ISUS. It was originally founded as a society to perpetuate the work of Dewey B. Larson and propagate his ideas throughout the scientific world. It now has a sizable (at least vociferous contingent that seems to be bent on “generalizing” this purpose. While I find no fault in the free expression of ideas, I do despise the subversion of private institutions founded on specific ideals. There is nothing stopping you and your cohorts from founding a “sister” organization to promote RS with an infinite predilection. After all, Luther did as much for Christianity once. Perhaps you could call it ICARUS---International Collegium of Amended and Reformed Unified Science.

Well, enough said. You can see that nerves can be touched on both sides. I'm sure we will never see eye-to-eye, but perhaps by “spouting off,” we both can learn. We can at least sharpen our own outlooks on reality.

I wish you all the best in your forthcoming endeavors."Forever" yours, Robt Tucek.

Maurice Gilroy’s response to Robert Tucek:

Robert - Each time I reread your letter I am pleased by your last few sentences. We may not agree; “spouting off” may help us learn; we can sharpen our views of reality; and wish each other the best. Very well put. Thank you. ........

A light-hearted comment on your (I assume) light-hearted ‘perhaps some future “Larson” will appear....’ Words like finite and infinite, eternal and non-eternal (pregnant and non-pregnant) that are the logical negation of the each other don’t leave much room for a “future Larson.” They are binary (0,1) choices that leave no “middle ground” for argument. I believe your “As we now understand it,” is eternal

Editor’s note: As Dewey Larson and Robert Tucek affirm, the physical universe is finite, as a whole and in all its parts, including all human performance and longevity. Hence the universe of motion is not infinite. However, humankind, by virtue of its non-physical sector of existence, does appear to be an infinite whole of ultimate human worth. The global market of commodities together with its commodity, money, for estimating the finite exchange value or worth of all commodities, is, unlike the humankind whole, a finite whole, part of the finite universe of motion. Including the global market, the whole material world, in which humankind presently lives, is limited and smaller than the humankind whole of ultimate human worth, which is boundless.
HOW TO MEET THE NEW AGE USHERED BY THE RECIPROCAL SYSTEM?

Dr. K.V.K. Nehru

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 8/19/93), 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, 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 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 pre-occupation with the Cartesian (rectangular) co-ordinate frame has some biasing influence. Turning, instead, to the polar co-ordinates, 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 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 pre-occupation 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 righthand 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 $\theta$!

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/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 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 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 viewpoint.

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 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. Tediuous repetitions of long expressions may have to be resorted to avoid misleading, or evoking semantic responses incongruous to the new viewpoint.

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, 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 viewpoint. 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 Group 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 viewpoint of the universe of matter. 'Illogical,' 'absurd,' 'non-sensical' 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 cocksureness and finality is the second impediment. The tendency to take the unfamiliar for the admissible 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 viewpoint of the universe of motion that needs to be adopted and the viewpoint 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. 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 viewpoint, either in his 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 AB₁ in x (natural) units of time, such that BB₁ = 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 BB₁ is added to the end of the original length AB at B, but additional 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 M₁ such that it is still the midpoint of AB₁. 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 \( \text{cm/sec} \) has an intrinsic direction that may be oriented in any direction of the conventional reference frame. The scalar speed \( \text{radians/sec} \) 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 \( /POQ \) be an angle \( \phi \), such that \( O \) is the origin, \( OQ \) the reference direction and \( OP \) another direction. In \( y \) units of time let \( \phi \) 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 \( /POQ \). That is, it is not the case that an angle \( y \) is added to the end of the original angle \( /POQ \) at \( OP \), but additional angular space emerges between every two adjacent directions in \( /POQ \).

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 the \( 2\pi \) radians of angle (or \( 4\pi \) 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 0) rotation. On the other hand, since no such limitation exists for accommodating linear space we observe an unlimited outward progression in the linear case.
Raytheon and Illinois to Invest $38 Million in Taxi 2000 PRT

Perseverance pays off for former U of M Professor

The Illinois Regional Transportation Authority (RTA) chose a team of contractors June 3 to develop an automated personal rapid transit system based on technology invented at and owned by the University of Minnesota. The RTA voted to award an $18 million contract to a team comprised of the Taxi 2000 Corporation and Raytheon Company, which will invest an additional $20 million to build a half-mile prototype system to test the safety and reliability of the technology. Based on those results, the RTA will vote on whether to build a three-mile track in the Chicago suburb of Rosemont.

Raytheon’s backing and the RTA’s decision vindicate 25 years of research, teaching and public education by a former University of Minnesota professor of mechanical engineering, J. Edward Anderson. He co-founded Automated Transportation Systems, Inc., the predecessor of Taxi 2000 Corp., in 1984 with four other individuals and with help from the University’s Office of Patents and Licensing.

The University granted Anderson’s company an exclusive worldwide license to commercialize the personal rapid transit (PRT) technology, which is protected by U.S. and foreign patents financed by and issued to the University. The University received equity in Taxi 2000 Corp. and a royalty for each vehicle and mile of guideway built by the company or sub-licenses.

Anderson’s PRT system, originally called Alpha but now called Taxi 2000, has small, computer-controlled vehicles traveling on a network of lightweight, elevated guideways. Carrying from one to four passengers, the electric vehicles

(Continued On Page 10)
Taxi 2000 (Continued From Page 1)

enter and exit the main guideway via ramps to off-line stations. This design enables passengers to purchase a ticket for any station in the network and then travel to that station without stopping. The vehicles' small size lets passengers travel in privacy or in small groups, while making the system efficient to run and less costly to build than transit systems based on large train-like vehicles.

What most confuses people about the Taxi 2000 system is the vehicles’ small size. Anderson explains that vehicle and passenger weight must be kept low in order for the guideway and support posts to be less imposing and less costly, and for the system to use energy most efficiently. Conventional thinking is that to have enough capacity to make a system worthwhile, each vehicle must accommodate at least 15 passengers. “That’s intuitive, and what I’ve found in this kind of design is that raw intuition is worthless; you really have to go through careful analysis of the optimal features for the system,” Anderson says.

Anderson calls automated systems with larger vehicles group rapid transit, not PRT. He has been proven right about their lack of efficiency; they must travel slowly because passengers are standing, and they usually travel mostly empty. Unfortunately, the high cost and low efficiency of the two existing group rapid transit systems, one at the University of West Virginia in Morgantown (20 passengers per vehicle), and one at Duke University Hospital in Durham, North Carolina (22 passengers per vehicle), has been used by critics to argue against investments in PRT.

Years of analysis have brought Anderson to these arguments explaining how the Taxi 2000 system meets fundamental urban transit needs:

- An optimal transit system must compare favorably to the convenience of the automobile before enough people will leave their cars at home in favor of public transit. The Taxi 2000 guideway system with off-line stations has many car-like features; it lets a person travel in private or with one to three others if desired, in a comfortable vehicle that is either waiting at the station or arrives in less than three minutes, and that takes people directly from where they buy a ticket to their destination without stopping to let others on or off. As a totally automated and safety-maximized system, it could actually improve on the automobile in congested areas where traffic gridlock is common and parking is at a premium.

- An optimal transit system must be inexpensive to build, operate and maintain so that municipalities can afford to provide access to enough people. The Taxi 2000 guideway system can be installed without tearing up streets, provides stations as close as every four blocks, and can be expanded in connecting loops as desired. Including 40 vehicles and four stations per mile, Taxi 2000 could be built for an estimated $10 million to $15 million per mile, compared to $40 million for light-rail transit systems, over $100 million for heavy rail trains, and about $300 million for subways. Operation and maintenance costs per passenger mile will be about 12 cents, compared to 30 cents for subways, 35 cents for busses, and 45 cents for light-rail streetcars.

- Federal and state governments cannot afford to construct and subsidize the operation of all the public’s transit needs, so innovative ways must be found to make transit systems more affordable. The Taxi 2000 guideway design provides an incentive to private developers to pay for access ramps to and from their office or housing development, hotel, shopping center, restaurant, or entertainment facility, as a way of attracting customers and improving real estate value, while reducing the need for parking. And during off-peak hours, the Taxi 2000 guideway could generate revenue by carrying freight in special vehicles with the same carrying capacity (750 pounds) as the passenger vehicles.

- An optimal transit system must be environmentally friendly in terms of air emissions, noise, visual impact, and land usage. Taxi 2000 vehicles are powered by electric linear induction motors controlled by variable-frequency, solid-state drives that receive their power from 600 volt d.c. power mills mounted inside the guideway. The electromagnetic force generated between the guideway and motors is used to accelerate and deceler-
ate the vehicles. Kinetic energy released during braking is pumped back into the line. Energy efficiency is comparable to cars that get 70 miles per gallon with no emissions. Initial systems will draw electricity from local utilities, but eventually the system batteries could be charged by wind or solar power.

Taxi 2000 passenger compartments are attached over a mechanical cart, or “bogey,” that carries two linear induction motors, two solid state variable frequency drives, two digital control processors, two on-board switches, and front and back hydraulic bumpers. The bogey rides inside the guideway on high-pressure tires that roll on smooth, adjustable, steel rails, producing very little noise.

The Taxi 2000 guideway is about 42 inches wide by 42 inches deep, and is held about 16 feet in the air by two-foot diameter steel posts spaced every 60 feet, or hung by brackets from buildings. To keep out snow and ice, the guideway will be covered by a thin sheet of steel or plastic, with a slot in the center where the vehicle connects to the bogey. Stations would have from one to twelve vehicle berths, with stairs and an elevator to take riders to the second-story automatic ticketing machine and the vehicles. Such a station would be 16 feet wide and 33 feet long, and would have a capacity of about 650 vehicles per hour. Larger stations with capacities of 2,000 vehicles per hour would be placed in downtown areas, airports, and shopping and entertainment centers. By providing easy access 24 hours a day to any site within a downtown or other densely built area, the Taxi 2000 system could drastically reduce the need for parking ramps and streets in these areas.

"Ed Anderson deserves a great deal of credit for carrying this technology forward. He has survived much skepticism and many highs and lows when we thought we had a deal with a company or developer," says Tony Potami, the University's associate vice president for research and technology transfer. Potami served on the Taxi 2000 Corp. board of directors until 1989, when he was replaced by Tony Strauss, assistant director of the University's Office of Patents and Licensing. Both men have assisted Anderson in discussing license terms with corporations and construction contracts with public and private developers. "Most groups were deterred by the need to spend about $10 million to build a prototype and test the technology thoroughly before a public system could be built.

"We would have preferred to have a Minnesota company build the prototype and demonstration system here in the Twin Cities, perhaps connecting the University's St. Paul and Minneapolis campus or at a high-visibility site such as the airport—494-Mall of America area in Bloomington. Strauss says. "But we did all we could to make that happen and it didn't work out, so we're pleased for Ed and everyone else involved that Raytheon and the Illinois RTA are going ahead. We'll continue to work with Ed and Raytheon to provide information to Twin Cities developers and the public about potential uses of the technology here."

On the Space-Age Fast-Track

Anderson's training and first career were far removed from the down-to-earth concerns of urban transportation. After earning a bachelor of science degree in mechanical engineering from Iowa State University in 1949, he became an aeronautical research scientist at the National Advisory Committee for Aeronautics, which later became NASA. In 1951 he moved to Honeywell's Aeronautical Division in the Twin Cities. Working for three years as a development engineer, he invented a fuel-gauge sensor that was retrofitted into Boeing 720 B-47 aircraft and which gave Honeywell a dominant position in the market. He also moonlighted as a graduate student in the University's Department of Mechanical Engineering, receiving his master's in 1955.

Anderson's work at Honeywell then turned to navigation systems, first coordinating work on autopilot systems and then inventing and leading development of the gimballess inertial navigation system, which became the standard guidance system for intercontinental ballistic missiles. In 1957, he was promoted to one of only 12 positions as principal research engineer at Honeywell.

From 1959 to 1962, Anderson studied as an MIT fellow in aeronautics and astronautics at the Massachusetts Institute of Technology. He received his Ph.D. in 1962 for research on magnetohydrodynamics, the study of electrically conducting fluids in electric and magnetic fields. His thesis, "Magnetohydrodynamic Shock Waves," was published by MIT Press and in an international edition by University of Tokyo Press, and was translated into Russian and published by Atomizdat, Moscow, in 1968.

Returning to Honeywell in 1962, Anderson managed the company's studies on laser effects, high-powered laser, laser gyro, and magnetohydrodynamics. His final Honeywell project involved directing 25 engineers in preliminary de-

Research Review
sign of solar probe spacecraft, which earned the company its first space-system contract. During 1962-63, Anderson also served at the University as a lecturer on magnetohydrodynamics. In 1963, he made the leap to academia, joining the University's Institute of Technology, Department of Mechanical Engineering, as an associate professor.

Applying his expertise to teaching, research, and industry consulting, Anderson remained for four years with the fields he had explored in his industrial career. Then, in 1967-68, he went to the Soviet Union as a National Academy of Sciences exchange professor in the Institute of Heat and Heat Transfer, in Minsk.

"I had a lot of time to read and think about my career," Anderson says. "I went through it objectively and concluded that what I was doing wasn't what I wanted for my career. My real love was systems engineering, working on large interdisciplinary problems. But I wanted to get involved in something where the social need was strong, not something with a concocted need." Anderson explained that his last job at Honeywell was to manage a team designing a solar probe spacecraft to orbit Mercury and gather data on particle fields around the sun. "I wrote the report in some vague way saying that the mission would provide data for studies of the origin of the solar system. The hardest part of the job was to justify the mission."

One of the books Anderson read and thought deeply about while in Minsk was an 800-page volume of the writings of Thomas Jefferson. "The most overriding impression I got was that Jefferson was always talking about first-rank problems, not about trivial, second-rank issues. I thought, why not figure out how to get into something really important?"

With these misgivings in mind, Anderson wrote a letter to his department chairman, Richard C. Jordan (now retired), saying that he wasn't sure if he could find what he wanted at a university, that he might look for a problem involving systems engineering in industry or at NASA. "He wrote me back a letter saying: 'Don't quit. I think we've got some-thing here that could be just what you're looking for.' When I got back he showed me a copy of a federal request for proposals to study the application of new technologies for urban transportation through interdisciplinary projects at universities. That looked like just what I was looking for."

The timing of that request for proposals was perfect in terms of laying out the course of Anderson's second career. If it had come a year earlier or later, he points out, he probably would not have gotten involved in transportation research.

In 1968 Anderson launched into a program of teaching and research in new concepts in urban transportation. He chaired a multidisciplinary task force on new concepts in urban transportation, with representatives from the University's engineering, architecture, sociology, urban and regional affairs, and psychology programs, as well as members from the League of Women Voters, Citizens League and Metropolitan Transit Commission. He also became interested in environmental issues, helping to organize and chairing the "Radioactive Daisies Symposium," a three-day conference about nuclear waste, nuclear war, and various environmental problems. He then was invited by the University Honors Program to lead a CLA honors seminar titled "Technology, Man and the Future" in the fall of 1969.

"As a result, I spent the summer of 1969 studying environmental issues, because I was going to be facing some of the University's brightest students and I wanted to be sure I knew what I was talking about," Anderson says. That seminar led him to collaborate with history Professor Hyman Berman to develop an interdisciplinary course called "Ecology, Technology, and Society," which Anderson first coordinated in 1970 and was taken by over 3,600 students.

Anderson's environmental interests fit perfectly with the concept of personal rapid transit. "I saw that PRT was a way to answer urban environmental problems; everything kind of just fell together," he remembers. "I decided in the spring of 1970 that I was going to take on the problem of figuring out how to implement PRT; that was my long-range objective."

Anderson says he made a deliberate decision at that time not to try to invent his own concept of PRT. "First of all, I didn't know enough, and second, I saw some of the [weird] systems some people have designed when they're starting without enough background. I decided that I wanted to try to figure out how to optimize PRT."

Stimulated by research funding included in the 1965 Urban Mass Transportation Act (UMTA), nine PRT systems were in various stages of design or development in the early 1970s. Unfortunately, because UMTA provided multimillion dollar subsidies for the installation of heavy rail...

(Next Page)
systems like San Francisco’s Bay Area Rapid Transit system, there was little interest among politicians or conventional transit planners in implementing PRT.

Therefore, Anderson set out to study the basics of transportation systems engineering, and to analyze existing PRT systems to see which offered the most efficient and affordable solutions to the problems of urban traffic congestion. He started by organizing, with the help of Gordon Amundson in the University’s Department of Professional Development and Conference Services, the first International Conference on Personal Rapid Transit, held in 1971 and repeated in 1973 and 1975. “These conferences put me in a premier position to know everyone in the world who was doing PRT,” Anderson says. They also led to extensive travel: from 1973 to 1981 he traveled throughout the United States and gave lectures and inspected transit projects in Singapore, Switzerland, England, Sweden, France, Germany, Japan and Romania. He also wrote a textbook, *Transit Systems Theory*, (Lexington Books, 1978) which established his expertise among transportation planners and engineers.

In 1976 Raytheon estimated the potential worldwide PRT market at $100 billion.

Anderson took two leaves of absence during the 1970s to consult on U.S. transit analyses. In 1974-75 he served for eight months as technical advisor to the Colorado Regional Transportation District during a large-scale analysis of transit alternatives for the Denver Metropolitan Area. And in 1975-76 he served as a consultant to Raytheon Company Transportation Systems Group, which was evaluating the feasibility of bringing a German-designed PRT system to the United States. Raytheon had determined that PRT was one of very few technologies that could occupy its Missile Systems Division if defense contracts decreased significantly. The company estimated the potential worldwide PRT market at $100 billion.

It was the German PRT system, called Cabintaxi, which Anderson analyzed most closely and which eventually convinced him that a new approach was necessary. A Cabintaxi prototype was built and implementation planned for Hamburg in 1980. But because of severe economic problems, the project fell to the budget axe of Chancellor Helmut Schmidt. In 1981, Indianapolis city planners became convinced that a PRT system would improve that city’s transit, and they hired Anderson and Raymond MacDonald, a transportation planning engineer, to analyze the cost and feasibility of building a Cabintaxi system in downtown Indianapolis.

When Anderson and MacDonald crunched the numbers, costs came out much higher than they had expected, leading them to advise the Indianapolis developers to wait until a better PRT system was available. “We found that the [Cabintaxi] guideway switch was shockingly expensive. We always knew that it was a structural monstrosity, but it really hit us how expensive that switch was. We always thought that given a chance, we could improve on Cabintaxi, but that was the final straw that got us, in the spring of 1981, to say let’s start a new design.”

By April of 1982, Anderson had made so much design progress that he decided to form a corporation to develop, design, manufacture and market his new PRT system. In a memo to then-IT Dean Roger W. Staehle and Professor Richard J. Goldstein, head of the Department of Mechanical Engineering, Anderson reported his decision to incorporate and the progress he had made at the University: “We have a design that is substantially simpler, lighter weight and easier to produce than the best of other systems.” Besides the planned PRT system in Indianapolis, Anderson had also received a request from a group in Los Angeles asking him to supply a system for the 1984 Summer Olympics, which he noted in the memo “unfortunately is a bit soon.”

In the mid-1980s, the University received five U.S. patents for components of Anderson’s PRT design: two for the guideway design and method of construction; two for the on-board switching device that allows vehicles to be quickly and automatically switched to connecting guideways and ramps; and one for the method and apparatus for controlling the vehicles; similar patent coverage is pending internationally.

By Michael P. Moore

*Next month: The struggle to keep Taxi 2000 on track.*
International Society of Unified Science

Membership

Membership is open to all persons interested in the advancement of scientific knowledge. Dues, including a subscription to *Reciprocity* are $25.00 per year. Contributing membership is $50.00, supporting $150.00 and sustaining $300.00. The Society's by-laws may be requested from the Secretary.

Available Literature:

*Reciprocity*, a quarterly publication of the ISUS. Annual subscription $15.00

Books:

Dewey B. Larson, *Nothing But Motion* (1979) 308 pages
The first of three volumes of a revised and enlarged edition of *The Structure of the Physical Universe* (1959). Basic laws and principles applicable to physical phenomena $18.00

The second volume of a revised and enlarged edition of the 1959 publication. Properties of solids, including temperature, electricity, magnetism and radioactivity. $35.00

The third volume of a revised and enlarged edition of the 1959 publication, extending the physical relations and principles to a description of the large-scale features of the universe of motion. $28.00

A derivation of many of the theoretical conclusions from factual premises, notably the study of scalar motion and its properties. $12.00

Dewey B. Larson, *Beyond Newton* (1964) 160 pages
A study of gravitation. $15.00

Dewey B. Larson, *The Case Against the Nuclear Atom* (1963) 139 pages (softcover)
A critique of the accepted theory of atomic structure. $10.00

Ronald W. Satz, *The Unmysterious Universe* (1971) 80 pages
$6.50

Offprints:

Dewey B. Larson, "Just How Much do We Really Know?"
A critique of scientific methodology, written in 1961, 15 pages $3.00

Dewey B. Larson, "The Mythical Universe of Modern Astronomy"
Larson's address at the VIIth ISUS Convention, Philadelphia, 1982, 10 pages $2.00

Ronald W. Satz, "The Interaction of Alpha Particles and Gold Atoms: A New Explanation of Rutherford Scattering."
reprinted from the Summer 1981 issue of *Reciprocity*, 10 pages $2.00

Videotape:

Videotape of 1988 ISUS Summer Conference - Discussions with Dewey Larson, et. al. $30.00

All prices, within USA, include shipping and handling. Outside USA, add $4.00 for surface mail, or $10.00 for air mail for each book, videotape, subscription, or membership. Send Checks to:

ISUS, Inc., 1680 East Atkin Avenue, Salt Lake City, Utah 84106
In Dewey B. Larson's previous publications he began the presentation of a new theory of the structure of the physical universe which has emerged as a result of a careful and critical reexamination of basic physical processes on which he was engaged for more than a quarter of a century. In all essential respects this new theory is just the kind of a product that the scientific world would like to have. It is a unified theory: all of the principles governing all sub-divisions of physical activity are deduced from the same premises: two fundamental postulates as to the nature of space and time. It is a self-consistent theory; there are no internal contradictions or inconsistencies. It is an accurate theory; all of the deductions from the postulates are in full agreement with the results of observation and measurement, within the margin of accuracy of the latter or, at least, are not inconsistent with any of these results. It is an unequivocal theory; the consequences of the postulates are specific and definite and at no point is there any recourse to a "postulate of impotence" or other evasive device to avoid admitting a discrepancy. It is a rational theory; it provides definite and specific explanations for everything that happens, without calling upon ad hoc forces or transcendental agencies. It is a complete theory; the logical and unavoidable consequences of the postulates describe, both qualitatively and quantitatively, a complete theoretical universe, and it is not necessary to utilize any supplementary or auxiliary assumptions, nor is it necessary to introduce the results of observation as a foundation for the theoretical structure, because the theoretical deductions from the postulates provide for the existence of the various physical phenomena—matter, radiation, electrical and magnetic phenomena, gravitation, etc.—as well as establishing the relations between these entities.
THE RECIPROCAL THEORY OF THE PHYSICAL UNIVERSE

Two postulates as to the nature of space and time—45 words in all—are the basis from which all of the conclusions of this new theory are derived. A development of the consequences of these postulates, without any supplementary assumptions and without calling upon any information from observation, accounts for the existence of the major physical entities, defines their properties, establishes the relations between them, and provides the information from which numerical magnitudes applying to these properties and relations can be calculated. For the first time in the history of science, a general physical theory is derived from a single set of postulates.

The Reciprocal System, developed by Dewey B. Larson over a 40 year time period, is at once revolutionary and conservative. It is the first unified theory and the first general theory, but its central ideas have been expressed by philosophers through the ages. From just two general postulates, Larson has derived an all-embracing theoretical universe, answering simply and reasonably such questions as:

What is the fundamental component of the Universe?
Why is the Universe expanding?
Why does Light behave sometimes as a particle and sometimes as a wave?
What holds the parts of an Atom together?

Why do Electrons and Positrons annihilate one another to produce photons?
What is the origin and nature of Gravitation?
What is the origin of Supernovas, Pulsars, and Solar Systems?
What is the connection between exploding Galaxies and Quasars?
What is the origin of the Cosmic Rays?
Is the Universe finite or infinite?
Is the Universe in a steady-state, or is it evolving?

MOTION IS THE FUNDAMENTAL ENTITY

The thesis of this present work is that the universe in which we live is not a universe of matter, but a UNIVERSE OF MOTION, one in which the basic reality is motion, and all physical entities and phenomena, including matter, are merely manifestations of motion. The atom, on this basis, is simply a combination of motions. Radiation is motion, gravitation is motion, an electric charge is motion, and so on.

The physical universe is not a universe of matter existing in a framework provided by space and time, as seen by conventional science, but a universe of motion, in which space and time are simply the two reciprocal aspects of motion, and have no other significance. Mr. Larson determined the properties that space and time must necessarily possess in a universe composed entirely of motion, and expressed them in the form of a set of postulates. He then showed that development of the consequences of these postulates by logical and mathematical processes, without making any further assumptions or introducing anything from experience, defines, in detail, a complete theoretical universe that coincides in all respects with the observed physical universe.

According to the SCIENTIFIC AUSTRALIAN, the Reciprocal System is "The True Theory of the Physical Universe—from Microcosmos to Macrocosmos."

WE CAN TELL YOU ABOUT IT

The International Society of Unified Science, Inc. is a group of scientists, engineers, and others who are trying to call attention to Dewey B. Larson's theory of a universe of motion. The objective of the Society is the advancement of the Reciprocal System which makes use of two fundamental postulates, together with everything that can be derived from these postulates by logical or mathematical processes. The editors of Reciprocity, Journal of the International Society of Unified Science, welcome papers, ideas, and experiments, especially from new contributors.

Membership is open to all persons interested in the advancement of scientific knowledge.
To try to stop all attempts to pass beyond the present viewpoint of quantum physics could be very dangerous for the progress of science and would furthermore be contrary to the lessons we may learn from the history of science. This teaches us, in effect, that the actual state of our knowledge is always provisional and that there must be, beyond what is actually known, immense new regions to discover. —--- Louis de Broglie,

Forward to David Bohm's *Causality and Chance in Modern Physics*.

How we got to where we are today has involved enough uncanny, seemingly lucky coincidences to fill a book, which we hope to write once PRT is in operation, and have convinced us that we must have been blessed with Divine Guidance. It was right for PRT to be brought through an incredible labyrinth of challenges and pitfalls over two decades to the point it is today, a few years from operational reality.

Dr. John Edward Anderson, inventor of *Taxi 2000 Personal Rapid Transit*

The expansion of the universe is not the motion of the galaxies *through* space .... but is the steady expansion of space. —--- Paul Davies *Edge of Infinity*.

### Table of Contents

<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>NINETEENTH ANNUAL CONFERENCE of ISUS, Inc. Scottsdale, Phoenix Metro Area, Arizona, July, 8-9, 1994.</td>
<td>1</td>
</tr>
<tr>
<td>Beyond Mechanistic Metaphysics: Reform Future Now.</td>
<td>3</td>
</tr>
<tr>
<td><strong>The Birth of a Breakthrough in Urban Transportation</strong></td>
<td>4</td>
</tr>
<tr>
<td>J. Edward Anderson, North Park College Chapel Lecture.</td>
<td></td>
</tr>
<tr>
<td>Report by ISUS Sec’y, Lawrence E, Denslow on W.A.F. Motion,</td>
<td>9</td>
</tr>
<tr>
<td>Letter of Keith Burgess, England, to Editor</td>
<td>10</td>
</tr>
<tr>
<td>Letter of David Halprin, Australia, to Editor</td>
<td>12</td>
</tr>
<tr>
<td>Letter of Editor to Dave Halprin</td>
<td>13</td>
</tr>
<tr>
<td><strong>ULTIMATE HUMAN WORTH</strong> from &quot;Voices on the Threshold of Tomorrow&quot;</td>
<td>14</td>
</tr>
</tbody>
</table>

Frank H. Meyer
ANNOUNCING
(Corrects posting of 3 Apr 1994)

The Nineteenth Annual Conference
of the
International Society of Unified Science

All members and interested persons are invited to attend the Nineteenth Annual Conference of the International Society of Unified Science, to be held at the

Courtyard Marriott Hotel
13444 E. Shea Blvd.
Scottsdale, AZ 85260 USA
1+602 860 4000
Hotel contact: Michelle Daniels

July 8-9, 1994.

Rooms will be available to conference participants for $42/double room+tax. Rooms will be available Jul. 7-9 for all participants. Those planning to arrive earlier or stay later should so indicate.

Rides locally will be provided by one or more ISUS members with cars.

The hotel is located ~20 miles N.E. of Phoenix Sky Harbor Airport, and the SuperShuttle and other transportation is available.

It is very close to Taliesin West (Frank Lloyd Wright's compound), and the Mayo Clinic, Scottsdale.

We request that you make your plans to attend known to the conference facilitator as soon as possible. Please indicate if you wish to share a room or prefer a private room.

Call for Papers

Quality papers are an essential element of a successful conference. In the past we have witnessed substantial advances in the development of the Reciprocal System presented through conference papers. We invite everyone to submit papers for presentation to the conference. We request that all papers be received no later than June 1, 1994.

ISUS is a non-profit scientific Utah corporation advancing Dewey B. Larson's Reciprocal System of Physics.

Papers and Questions about ISUS may be addressed to:

Prof. Frank H. Meyer
1103 15th Ave. S.E.
Minneapolis, MN 55414
612 331 6086

Please address all conference related correspondence to:

Hoyt A. Stearns jr. | isus:hoyt@ | International Society of Unified Science
4131 E. Cannon Dr. | stat.com OR | Advancing Dewey B. Larson's Reciprocal
Phoenix, AZ, 85028 | asuvax:ennews: | System - a unified physical theory.
voice 602 996-1717 | stat.com:wierius:isus:hoyt | ________________________________
fax: 602 996 9088
Cellular Phone during conference: 602 540 1195.
The Birth of a Breakthrough in Urban Transportation

J. Edward Anderson
North Park College Chapel Lecture
Chicago, Illinois
March 1, 1994

Abstract

The author was invited to speak at North Park College as the 1994 Distinguished Alumnus Lecturer on his role in the development of Personal Rapid Transit (PRT), the first genuinely new urban transportation system to appear in a century. This Chapel Lecture describes his relevant technical experience, his search for meaning, his need for interdisciplinary project work, and the extraordinary circumstances and timing that led him to PRT as a new career, and that carried this work to the point where it has been taken over by a major corporation and a major urban transportation authority. The lecture ends with a challenge to young people to aim high and seek a noble cause of fundamental importance to mankind.

An Aerospace Career

I am a mechanical engineer. There were no adults in our early lives that influenced my brother Ray and me into the field of engineering, but both of us knew by about the age of 12 that we were going to be engineers. There were warnings in books on careers that after the war was over (WWII in this case), there would be few opportunities in engineering. Yet, we never thought in terms of any other vocation.

I have now practiced and taught mechanical engineering for almost 45 years. I have known engineers who wished they had taken up a different profession. This has not been so in my case. I can’t say I have enjoyed every minute of it, there have been difficult times, but on the whole my career has been exciting for me and varied—never, or hardly ever, a dull moment.

I spent the first third of my career in aerospace engineering. Green, with a Bachelor’s Degree in Mechanical Engineering from Iowa State University, I was hired by the Structures Research Laboratory at NACA, the National Advisory Committee for Aeronautics, predecessor to NASA, at Langley Field, Virginia. There I developed methods for calculating stresses and deflections in supersonic-aircraft wings and received the equivalent of a Master’s Degree on the job.

After a few years, I moved to the Honeywell Aeronautical Division in Minneapolis, where, a course at a time with no time off and no reimbursement for tuition. I earned a real MSME from the University of Minnesota. My mother had urged me many times to get all the education I could, and I wanted to take her advice.

At the Aero Division at the age of 25 I was given a budget of $35,000 a month and singlehandedly designed an aircraft fuel gage sensor that left Honeywell with no competitors. I was then asked to do the mechanical design of the first transistorized amplifier that flew in a U. S. military aircraft and in so doing was the first at Honeywell to introduce printed circuits, nylon gearing, and adhesive bonding. The design won the Aviation Age Product of the Month Award.

Looking for new worlds to conquer, I transferred to engineering research on autopilots for fighter aircraft and missiles as a research engineer and manager of the work of about 15 engineers during some of the peak years of the post-Korean-War military buildup.

After a couple of years, I was invited to move to the field of inertial navigation, where I invented and led the development of a new type of inertial navigation. I had the recent satisfaction of learning that my work on so-called "gimballess inertial navigation" has been incorporated into
A New Challenge

On October 4, 1957 the Soviet Union launched its first Sputnik spacecraft. It was a tiny device by the standards of the next decade, but it was a wake-up call, a challenge to American scientific and engineering prowess. It brought on the new math that tormented many children, but for me it created a challenge.

Right after Sputnik, the Aero Division Director of Planning proclaimed that there should be more PhDs in the Honeywell Aeronautical Research Department, where I worked. I had wanted to get a PhD but by then had just about given up on the idea. I thought about it until the Summer of 1958 when I decided to go for it. That was the best decision of my professional life! It opened up avenues essential to my later work in directions I could not have dreamed possible.

By June 1959 I was at work in a PhD program in the Department of Aeronautics and Astronautics at M. I. T., the greatest engineering school in the world, starting one of the most enjoyable phases of an enjoyable career. I wanted to broaden my understanding of physics and mathematics and generally wanted to broaden my knowledge base. thinking at the time in purely technical terms.

I wanted to explore exciting new fields, I spent most of the first year studying the Special and General Theories of Relativity, and even solved the clock paradox problem in General Relativity. But, as time went on, I realized that I had to be practical, and my search for the right field of study led me to magnetohydrodynamics, which is the study of the interaction between conducting gases and magnetic fields. It promised the hope of substantially more efficient electric power, and required the learning of a lot of physics and math that interested me. I finished in late 1961 with a thesis entitled “Magnetohydrodynamic Shock Waves” that was the only one of 200 M. I. T. PhD theses published that year by The M. I. T. Press. It was later republished by the University of Tokyo Press and in Russian by a Moscow publisher Atomizdat.

At that stage of my life. I didn’t think there was anything I couldn’t master if I set my mind to it. But, I had to go back to work at Honeywell to earn a living.

A Search for Meaning

With my new background, I was assigned to manage a 25-man team to do the advanced design of an unmanned Solar Probe, a spacecraft that was to go within the orbit of Mercury to gather data on fields and particles around the sun.

The project led to Honeywell’s first spacecraft contract. an infra-red probe that flew around the earth. I found that the hardest part of the Solar Probe project, which I took on personally, was to justify the mission. NASA even called later to ask permission to use my report in their Congressional testimony to justify their missions. Rather than being flattered, I was troubled. I wanted to be relevant.

I also had a burning desire to be an educator. so in 1963. I left a promising career in military and space engineering for a professorship in Mechanical Engineering at the University of Minnesota. I soon realized, however, that there was a cost in uprooting one’s self from an environment in which one’s capabilities were understood and appreciated. Now I was “low man on the totem pole.” I had to work my way up all over again, although in an exciting field made possible for me by my research at M. I. T.

During the 1960s the United States and the Soviet Union had a scientific-exchange program involving 30 professors each year. I was offered an opportunity to participate. It was a good time for me personally. so I accepted and spent the
period from November 1967 through August 1968 as a guest of the Soviet Academy of Sciences mostly in Minsk, but for periods in Moscow, Leningrad, and ten other Soviet cities.

I had interesting adventures, but most importantly I had time to read broadly and to contemplate the direction of my career. I was very concerned that my work be enjoyable, meaningful, and worth the expenditure of my time. I was in a hurry and I felt time slipping by. Frankly, I was undergoing a serious mid-life crisis.

I read many books while in Minsk, the most influential of which was a volume of writings of Thomas Jefferson. My most important realization from reading Jefferson was that he was always talking about the first rank problems of his time. Why couldn’t I also work on a first-rank problem of my time? Was it possible for an engineer to work on first-rank problems?

Some time during that period of quiet a most meaningful statement of Jesus came to me: "He who shall lose his life for my sake shall find it and find it in abundance." I interpreted that to mean, "He who shall become deeply involved in a cause of fundamental need for mankind shall find his life in abundance."

That was it! The purpose of life is service in the best way each individual can provide that service.

New Directions

Being aware of my successes at Honeywell and M.I.T., I had the confidence to aim high. I concluded that the most enjoyable, meaningful, worthwhile work that I, as an engineer, could do could not involve becoming more and more highly specialized in a narrow field such as I was in, but it would be interdisciplinary, it would involve systems engineering in the broadest sense. Unfortunately for me, Universities were organized around highly specialized individuals, each encouraged to deepen his or her specialized knowledge.

I read an article by a University of Michigan professor who commented that the important problems of the day were interdisciplinary. They were falling neglected in the cracks between the disciplines. A rank ordering of problems of importance began with trying to prevent nuclear war, then doing something about the burgeoning environmental problems, problems of civil rights and of poverty, and so on. He concluded that the vast majority of university faculty were working on problems of about the tenth to the twelfth order in importance, almost the equivalent of Nero fiddling while Rome burned.

By the established system of recognition, faculty members were discouraged from the kind of interdisciplinary work that would raise the rank order of importance of the problems they worked on to something close the Jeffersonian ideal.

I sent a 16-page handwritten letter to my Department Head explaining all of my reasons for my belief that I couldn’t find what I needed at a University. I offered my resignation, not realizing what a terrible time it was for an aerospace engineer to find any job, much less a meaningful one. The Apollo Moon Program was ending, and Aerospace engineers were being laid off by the thousands. My Department Head, Dr. Richard Jordan, wrote back and said “Don’t resign. I think I have something here that would appeal to you.”

Upon returning, he handed me a solicitation from the newly formed Urban Mass Transportation Administration inviting Universities to submit interdisciplinary proposals to study the application of new technologies to problems of urban transportation. I had not thought a microsecond about the possibility of working in urban transportation, but the descriptions I read of the possibilities of new personal transit systems sounded appealing and would enable me to apply knowledge and skills I had acquired in every phase of my career.
Urban Transportation

I had experienced the worsening problems of transportation during the 1950s and 1960s. The whole urban environment was becoming more and more profoundly and negatively influenced by automobiles. Autos were so convenient that virtually everyone wanted one. Credit had become so easy that virtually everyone could afford one. Street congestion was becoming a major concern as more and more people abandoned the bus, streetcar and train for the auto. In Wintertime, while tediously making my way in my car through Minneapolis in a foot of snow, sliding around, stopping and starting, waiting for traffic. I had wondered if there wasn't a better way. Now, with a possible solution presented to me, a better way was no longer a fantasy. The federal government was backing research!

I had watched beautiful green lawns, bushes, flower gardens and trees give way to asphalt parking lots. I saw that the increasing rush of autos made street parking hopelessly inadequate, leading to huge, expensive multi-story parking structures.

One particular street in Minneapolis had beautiful 100-year-old elm trees on its boulevards for many miles. Well before Dutch-elm decease was a problem, these trees were all cut down to widen the street by one lane. and in the process the beautiful character of that community was destroyed. Although I didn't live near that street, I had a feeling of great loss. Could this, I thought, be progress?

More and more roads and streets were being designed just for the automobile, with no thought for sidewalks or bicycle paths. As downtown streets widened at the expense of narrower sidewalks, the attractiveness of downtowns gradually declined. With more and more ground covered by asphalt and concrete, there was less room for grass, trees and flower gardens. Asphalt and concrete absorb and reradiate the sun's energy and significantly warm the city in Summertime. Living plants also absorb the sun's energy; but, in the process of photosynthesis, they hold much of that energy and release it as heat only in Autumn as the leaves decay. The result is a significant reduction in Summertime temperatures. Is there any wonder that people moved farther and farther out in the suburbs to find comfort. solitude, green grass and trees?

I had witnessed terrible battles over the introduction of urban freeways. which of course went through the poorer communities where the political resistance was the least. Once built these freeways divided neighborhoods and destroyed community spirit. The noise was so intense that 20-foot walls had to be built next to them. and property values declined drastically for the unfortunate people whose houses were next to the freeway rights of way but were not taken.

We learned about lead poisoning from auto exhausts. We saw the levels of carbon monoxide and hydrocarbons rise and affect our health. We saw mothers spending too much time as chauffeur while the children were young. and then watched our children reach driving age and work too many hours in menial jobs earning money to buy a car. barely having time to enjoy it because of the time required to earn the payments. We saw our city bus companies go broke and we saw them replaced by inefficient bureaucracies.

I read a broad-based interdisciplinary study by General Research Corporation of Santa Barbara, California, that examined the future of cities if only conventional transit systems were deployed. and compared that future with the future if the new personal transit systems were deployed. The conclusion, reported in the July 1969 issue of Scientific American, was that congestion would continually worsen if only conventional transit systems were deployed, but that congestion could be arrested if personal transit systems were widely deployed.

A New Career

In the Fall of 1968, with colleagues from several departments at the University of Minnesota, I
plunged enthusiastically into work on a grant proposal on Research and Training in new forms of urban transportation. We won a grant, and that enabled us to get a serious start in this new venture.

While engaged in learning all I could about personal transit, later called "personal rapid transit" or PRT, I began studying and lecturing about environmental issues generally. In the Spring Term of 1970, the Spring of the first Earth Day, my colleagues and I inaugurated an interdisciplinary course we called "Ecology, Technology and Society." During preparation to moderate this course, I converted from a person concerned about environmental problems but from the sidelines, to an activist. I saw the consequences of too many automobiles as the major deterrent to an acceptable urban environment, and PRT to be the only reasonable way to turn a deteriorating situation around.

I had been looking for a hard problem—a meaningful, relevant, hard problem. I decided to devote my career to the problem of implementation of PRT, how to make it actually happen.

That was an unusual type of problem for a University Professor to take on. I realized the risks, but had tenure, and decided that I had to ignore the reward system if I was to "lose my life" in a cause worth pursuing.

Enter the RTA

I had no idea that it would take two decades of hard, persistent work before a major transit agency would become interested. In Spring 1989, the leadership of the Northern Illinois Regional Transportation Authority (the RTA) concluded that they could not solve their transportation problems in the Chicago Area with only more roads and more conventional rail systems. One of them commented that "there must be a rocket scientist out there with an idea that can help us."

We met them a month later, and that meeting has now, five years later, grown into a contract between the RTA and Raytheon Company involving a commitment of almost $40 million to design and test a PRT system along the lines we had, since 1982, been developing. This has taken great courage on the part of the RTA Board. If they succeed, they will have realized one of the greatest technologies of the declining years of the Twentieth Century. With only century-old transit concepts deployed, congestion has since 1969, as predicted, worsened substantially.

Divine Guidance

How we got to where we are today has involved enough uncanny, seemingly lucky coincidences to fill a book, which we hope to write once PRT is in operation, and have convinced us that we must have been blessed with Divine Guidance. It was right for PRT to be brought through an incredible labyrinth of challenges and pitfalls over two decades to the point it is today, a few years from operational reality.

I mentioned early in this lecture my background in engineering to comment here that my sequence of experiences was crucial to giving me the engineering knowhow, discipline, and confidence that I could succeed, notwithstanding all of the naysayers that have appeared along the way. There was no way for me to know in the 1950s and 1960s where my work would lead, but in looking back, every phase contributed something I would need in the design of a new PRT system. There was no way for me to know then that PRT could not have been developed by governments because they require too much consensus too soon, and it could not have been developed by industries because they require too early a return on investment. PRT could only be developed in a Research University.

The Human Mind

Technical education and experience alone were not enough! Equally, and perhaps more importantly, were the lessons learned from books and hard knocks about dealing with people. Everything we do, whether it be in dealing with the
physical world or not, involves interaction of people, individually or in various types of organizations. Those who say that engineers deal only with things while others deal with people cannot have had much experience in real engineering. I give lectures every year on the psychology of engineering and creativity in engineering, and I regard these topics as essential as all of the technical topics. They involve the relationship between the right brain and the left brain—how to take advantage of the capabilities of both sides of your brain.

From the last century to the present, there has been a profound advance in understanding of the workings of the human mind, and of its affect on the physical body, its own and others. Having said this, I must hasten to add that my observations and reading have convinced me that we are on the threshold of a quantum leap in further practical understanding of the power of the mind over events.

If everyone could be trained in this knowledge, how much greater would be our prosperity and our tranquility. Many minds of a century ago carried resentments, anger, hatred, anguish over past events, and bitterness to the point of destroying effectiveness and ruining lives. Even outstanding scientists let the acid of hatred lead to tragic lives and early death. Of course this happens all too frequently today. Not everyone reads the psychological literature.

Destructive behavior has been countered by wise counsel of religious leaders to love one’s enemies, to forgive, and to forget. But, all too often we resolve, after a Sunday morning sermon, to improve, but by Monday morning fall back into our old habits. Today more and more leaders of mind-body research add hardheaded scientific evidence that love, forgiveness and prayer really work. One must harbor no resentments. One must cleanse one’s mind of all negative thoughts, which are destructive not only of one’s relations to others, but affect, often disastrously, one’s own health.

New Challenges

Are there new challenges for young people today?

We live in an age of mounting problems. The world faces practically unconstrained population growth, with an additional billion people expected in only six or seven years: with the prospect of one hundred million more people in the United States in two decades. We have waste disposal problems that now force states to ship wastes thousands of miles to dump sites at heretofore unimaginable costs.

We have a burden of debt with interest that now consumes 57% of our income taxes. And with the need to borrow more money just to pay the interest. And this is not static. With present policies, in a decade that 57% could, if we lack determination, be ruinously higher, leaving our children and grandchildren with staggering reminders of our fiscal irresponsibility.

We all know that problems of crime are increasing. We are reminded continuously that our educational system is not adequate, and that we are falling behind. We know that we have too many people caught, with apparent permanence, in structural poverty. We know that our healthcare system cannot continue as it is, but there is not enough consensus as to appropriate remedies. We are faced with the prospect of potentially disastrous climate change due to relentless increases in dumping of carbon dioxide and other substances into the atmosphere. We fear the loss of the rain forests and the further effect that will have on our climate.

With respect to urban transportation, urban settlements everywhere are crying for solutions. PRT is an essential element, but most planners and opinion leaders will do nothing until it is demonstrated. PRT has been referred to as an essential technology of a sustainable world. But, we are not out of the woods yet. There are many pitfalls and there is too little understanding. Your help, your positive thoughts, and your prayers
are much needed.

Every one of these problems requires for its solution, interdisciplinary, systematic thinking. Yet far too many brilliant scientists still concentrate on narrow specialties and leave interdisciplinary work to others. We do need specialists, but we need a balance between specialists and interdisciplinarians. Fortunately, more and more colleges and universities are recognizing the importance of interdisciplinary research as a respected academic discipline, and the National Science Foundation is now funding such research.

Are there new challenges for young people today?

You bet there are! Are you preparing for a significant role in the solutions? Do you think you can contribute in a significant way? Don’t underestimate what you, as one individual, can do. With dedication, concentration, careful study, carefully prepared papers, thoughtful speeches, and a burning desire to make a difference, you can and will make a difference.

The world is full of cynics and naysayers who will put logs in your path, who will discourage you at every step. Be ready to understand them and to answer them calmly, kindly, factually, with respect, and with love in your heart. Your challenge, with tact and perseverance, is to prevail.

Remember the advice of Jesus: "He who shall lose his life for my sake shall find it and find it in abundance."

Acknowledgements

Because of limitations on time, I have mentioned only one person in this lecture, yet the current state of development of PRT has been reached only because of the dedicated work of many dozens of individuals who preceded us, who joined us and who worked in parallel with us. Their essential work must be acknowledged in a history of development of PRT. Without them, this story could not have been written.

Secretary’s Report

Early in December of 1993 members of the Board of Trustees for Isus, Inc received a ballot by mail to vote on the question of establishing an ISUS Writer’s Assistance Fund. As explained in the cover Letter for the Ballot, only funds donated directly to that fund will be available for grants to writers, no other ISUS funds can be diverted to that fund without specific Board approval. The ISUS Executive Director will act only as the receiver and disburser of W.A.F. monies, the individual writer seeking the assistance from that fund must solicit the contributions for the fund. It is not intended that solicitations of funds for the ISUS W.A.F. be an official function of ISUS nor of any member of ISUS.

As of April 1, 1994 there have been of the fifteen Board members, eleven (11) “Yes” responses, one abstention and three not responding. There thus is no doubt about the desire of the Board to approve this motion. No other official business has been requested of the Secretary.

Respectfully submitted, Lawrence E. Denslow, Secretary, ISUS, Inc.
Frank H Meyer
1103 - 15th Avenue S.E.
Minneapolis
MN 55414

Dear Frank,

A happy new year to you both. Let us hope that it will be a year of progress in all our endeavours.

I read the article on the Anderson PRT system in the Autumn 1993 copy of the ISUS NEWS with some interest. I am enclosing some extracts from a book that I own, about such a system. This in itself is not earth shattering news, until you hear that the book was written between 1883 and 1886 and first copyrighted in 1894. The book has been in my possession for over twenty years. There are two companion volumes: 'A Dweller on Two Planets' and 'An Earth Dweller's Return' (442 & 509 pages respectively) by Phyllos. Both volumes are out of print in my versions, but I have seen copies of the first volume in bookshops in paperback form. The second volume is the better of the two volumes for technical information.

The book was channelled through a Frederick Spencer Oliver in Yreka and Santa Barbara, California between 1883 and 1886 and purports to be a record of life in Caipul on the island of Poseid, better known to us as Atlantis.

Much of what was written and prophesied about inventions has come about since the late 1890s and Anderson's PRT system is very similar to the one outlined in the enclosed excerpts. I am sure that Anderson will be intrigued by the description and especially considering the date that it was written. There is nothing new under the sun etc....etc.

The book correctly prophesied that air transport would go through the following phases: lighter than air (balloon), gliders, mechanically driven (propellers), gas driven (jet) and that we would eventually rediscover that levitation from what they called the 'Night Side Forces' would obsolete the use of propellers, jets and even wings and bring about the use of what they called needle ships, or the Vailx. (****)

Would you kindly pass a copy of this letter and the extracts to Mr. Anderson please?

After reading Stephen W Hawking's book 'A Brief History of Time', I thought that I would send him details of Larson's Reciprocal System. Hawking holds the Chair of Applied Mathematics & Theoretical Physics at Cambridge University, but you may have seen television pictures of his disabled state, which necessitates the use of a wheelchair and a computer to communicate. I do not expect much will come of it, but you never know. I got a brief card acknowledgement from his secretary noting "He hopes that you will appreciate that he is unable to write to you personally." I offered to lend him any books that he might require.

In love and light,

Keith Burgess

E I: 6.1-10
Frank H. Meyer  
1103 15th Avenue S.E.  
Minneapolis, MN 55414  
United States of America  
25 April, 1994

Dear Frank,

I received your letter and concomitant request to review it (How Light Speed is Constant paper for submission to Editors of a journal of the American Physical Society, of which I am a member-FHM insert). This has been a surprise, albeit flattery. I acknowledge that it is not for ISUS members, so the extra responsibility engendered by such external readers and/or listeners, means that it must be even more scrupulously edited than an internal paper for ISUS. I have read it twice and find it so flawed, that it needs to be almost completely scrapped, notwithstanding that it is far removed from my opinions and beliefs in several areas. If I were to work on it, it would take at least 3 months of all my spare time, and I would have to scrap most of it. This would have to become a combined effort, as previously, when we co-authored a paper. But it seems that you must have it sooner, and also you may not agree to my severe critical comments and intended excisions. However, if you can see my way to postpone the presentation, then I will undertake the combined effort, provided you give me complete control of what will be.

Now to much more important matters, the resolution of which may make me decide to continue with membership of ISUS.

1) I have never received any acknowledgement of my two papers and audiotape, sent for presentation at the last conference. Both Ronald and you received copies. Why have I been completely ignored? It seems that they were neither presented nor considered for printing in Reciprocity, and not even the courtesy of an acknowledgement from either of you. BOURFAKS 5.DOC and HAMILTON 2 . WPF were their titles, and the audio-tape was of a radio broadcast, that came from 2 weekly programs on 3RRR, (a community station), with a science program, and whose presenters I met at a Science Exhibition, where I broached Larson's paradigm.

2) I had sent an earlier version of HAMILTON 2.WPF to you, which, also, had not been acknowledged.

3) Also in a letter to you in March 1993, MEYER932 .WPF, I had a lot of worthwhile material, and I questioned you about printing it too, when I wrote to you in July with the other papers just before the conference. Once again I was completely ignored. What is the point of me taking both the time and the trouble to prepare these papers and letters if you do not bring them before the readership? I am really very cheesed off !!!!! I even took the trouble to include the march letter at the bottom of the July letter, in case you had misplaced it, but it was still ignored.

4) In the extreme case of a reviewer or two rejecting a paper as unsuitable, the author received such a rejection, but in my case no acknowledgement in any form. What's going on?

5) Also the paper on the Granat satellite, sent to you, more than once?

6) Also I asked you a direct question about Dewey's writing on the non-physical sector, which you did not answer or acknowledge in any way.

Yours sincerely,

David Halprin

E I:6.1-12
Thank you for your Letter of April 25, 1994.

I quite understand how you are cheesed off with me. Since freedom means responsibility, I plead guilty to being the cause of part, if not all, of your frustration with our ISUS ADMINISTRATION.

You report that I have ignored and failed to acknowledge communications you mailed to me before August, 1993. I did receive copy of your audiotape, but to the best of my search of your file and my recollection, I did not receive copies of your updated version of BOURBAK15.DOC and the HAMILTON2.WPF that you mention in your Letter to me of July 11, 1993 sending to President Satz. I believe your tape was played Saturday evening, August 7, 1993 in Phil Porter’s daughter’s house. Your tape was played and approved along with several others with little extended critical comment, as well as I remember.

As nearly as I can remember, one of the above two papers of yours was read at the regular session, probably the BOURBAK15.DOC. You should know that as of our Seventeenth Annual ISUS Conference President Satz has the final say as to what passes muster in Reciprocity. I have not heard President Satz say that he disapproves or approves of either of the above papers of yours, but perhaps mistakenly assumed that, if he approved of either or both for publication in our journal, Reciprocity, he would call my attention to his decision in either case. If he did not acknowledge receiving your papers and reporting his decision about publication in Reciprocity, I am surprised. Did you tell Ronald, as you have told me in your Letter of April 25 that you sent me copies of the two papers? If so. an explanation I suggest may be that Ronald assumed that I should acknowledge to you his receiving your copies and reporting his decision to you.

As for the paper, How Light Speed Is Constant. I plan to delay submitting it for publication in a journal of the American Physical Society and publishing it in the current issue of Reciprocity. If an experienced ISUS member, like yourself, can find flaws in a paper, it is not ready to submit for publication in an APS journal. Not every member, however, sees the paper as badly flawed. However, if you are willing to volunteer to undertake a joint or combined effort, I am willing to give you complete control of what will be the account of How Light Speed Is Constant. Whatever you turn out, I shall argue for its publication in Reciprocity, as it stands, in your name and with or without my name in an Autumn, 1994 issue of Reciprocity. If any move is made to overrule this understanding, I shall submit my resignation as an Editor of Reciprocity.

I do not believe after searching your file and to the best of my recollection that I have received a copy of a Granat satellite paper once and/or more than once.

Let me now attend to much more important matters: my concern to make you decide to continue with your belonging to ISUS.

I wish to attend to your direct question about Dewey’s writing on the non-physical sector of the human universe. You say that I did not answer or acknowledge your question in any way...I thought I did in V,1, Spring,1993 issue of ISUS News, page 3-4. Here I have printed an excerpt from Dewey B. Larson’s THE UNIVERSE OF MOTION, in which Dewey affirms that “the most important question that can be asked by a member of the human race” concerns the existence or non-existence of the “realm of the non-physical”.

Sometime before I ever met Dewey B. Larson, an inquiry of my own became involved with the non-physical sector of the human universe, which I find, contrary to what I was taught as a physicist, is infinitely larger than the whole finite physical universe, enormous though the latter is. More than a quarter century ago, I began trying to learn whether the human equality proposition, which my country, the U.S.A., began professing, can be reasonably shown to be true, as affirmed by our Declaration? The arithmetical question is how to count the worth of a woman and/or a man? Is the worth of the whole of humankind infinite or finite? Is the worth of each private woman or man equal to or less than that of the whole of humankind? If the whole is finite, then all women and men are by nature finite, dependent and unequal in worth.
FRANK H. MEYER

Frank H. Meyer is a research physicist and emeritus professor of physics. University of Wisconsin System, Superior. He is a board member of the International Society of Unified Science (ISUS, Inc.) and editor of its journal, Reciprocity.

ULTIMATE HUMAN WORTH

For many generations humankind, with numerous other living creatures, has inhabited Earth, third planet of our Sun.

Generations from now, humankind, a most unusual whole, as I see us, will outlast Earth. The great longevity of our Earth apparently is finite. Who knows when, if ever, humankind must or will end? Who knows when, where, how this most ornery living species now on Earth began? The human species will not be put off the Earth, as the dinosaurs are reputed to have been. Rather we shall stay and advance by becoming ethically better united among ourselves, toward the living world and with the physical world.

In the summer of 1992 I became seventy-seven years young. For over half a century I have been a theorizing and practicing physicist in industry, medicine, and education. When beginning my education, I was taught and postulated that humankind is a small, incidental and unessential component of the physical universe. I took the finite physical world to be the whole of Nature and/or natural existence. This now is questionable science.

Now approaching the end of my life, I infer from abundantly accumulating evidence that the opposite is more likely to be true: that the finite physical world, the universe of motion or space-time, enormous in size and dimensions though it be, is just a small but essential component of the human universe, a whole of ultimate infinite human worth.

What makes the human universe an infinite whole is a non-physical sector of natural existence, believably inhabited by humankind exclusive of most, if not all, other living organisms of Earth. This non-physical sector is not simply or readily visible, audible, or tangible. It includes numbers and the meanings of words, but not numerals or words themselves. Humankind as a whole can and does learn about the being of our nonphysical sector of existence by virtue of our native ability to create and reproduce adequate physical entities to represent nonphysical entities essential to our well-being: numbers by numerals, meanings by words.

Humankind as a whole and as its proper parts, the private woman and the private man, can and do participate in the infinitude of ultimate human worth only by way of our inhabiting the non-physical sector or realm of the human universe. This is the realm of meanings, including discourse, number, arithmetic, human values, truth, beauty, humor, science, art, philosophy, and ethics of the human spirit.

The total quantity of money around our planet is finite (like all the grains of sand on all the beaches of Earth) and countable (if you have nothing better to do). Money is a commodity whose use value is to estimate and measure only finite exchange values. Once a famous American capitalist was asked, "How much money income is enough?" He replied, "A little more."

Ultimate human worth is not finite. Hence ultimate human worth cannot be counted with money and finite arithmetic. Finite arithmetic is governed by the postulate that any and every part of a finite whole is less than the whole. Finite arithmetic, adequate for counting the exchange values of commodities of the global market, is quite unsuitable for counting the ultimate worth of the whole of Humankind. Ultimate human worth is not finite. Ultimate human worth is an infinite whole.

Not many years ago none of the professed mathematicians among humankind appeared to know how to estimate and count infinite wholes. To-day infinite wholes can be and are
counted with a method much like, while different from, the more familiar method of counting finite wholes.

Mathematicians refer to the method of counting both finite or transfinite wholes as "one-to-one correspondence." The difference is that when counting an infinite whole, not any part will do. In order to find an infinite whole, a proper part of it must first be found. The fundamental postulate of infinite wholes differs from that of finite wholes: "The proper part of an infinite whole is equal to the whole." A simple example: The set of counting numbers is an infinite whole (since there is no greatest counting number). In this infinite whole, the even counting number total can be demonstrated to equal the total of even and odd counting numbers.

The proper parts of the infinite whole of humankind are ourselves, all women and all men. Persons are the most precious of all human wealth on earth. The proper parts of the whole of humankind are not any of the physical parts of the human organism, not human hands, not legs, not hearts, nor brains, neither human bodies, nor even the biological control units that are designed to govern survival of human bodies: human minds. The proper parts of the infinite whole of humankind are our spaceless and timeless nonphysical selves, our human spirits, if you like.

By virtue of the nonphysical self, provided only that in each particular case it continues integrating and growing instead of disintegrating to nonexistence, each individual self is equal to the whole of humankind in ultimate human wealth. Since entities equal to the same entity are equal to each other, all women and men are by nature infinite, independent, and equal in respect to worth or human value. In no other presently known respect, particularly including human longevity and human biological or physical performance, are persons infinite or equal.

American civilization was first introduced to the human equality proposition, so far as I can tell, through Jesus Josephson. Jesus never said that He is the only Son of God, but He taught rather that all Women are the Daughters of Nature's God and all Men are the Sons of S[he]. The proposition was reaffirmed eighteen centuries later by Thomas Paine, author of the original draft of "A Declaration by the representatives of the United States of America in general Congress assembled."

From our equal creation we derive rights inherent and unalienable, nowadays called human rights, among which are the preservation of life, liberty and democracy.

The future of human rights on Earth relates to how humankind practises the human rights we profess. A primary attitudinal change among all humankind on Earth now is required for the future of human rights on Earth to be brighter. The change has to be composed of a rational rejection of the hoary bromide that all men are by nature unequal in all respects, while women are less equal together with the voluntary informed acknowledgement and positive affirmation that the human equality proposition is, after all, accurately true.
REFORM THE FUTURE NOW
Start Today!

Personal Rapid Transit:
Making Cities Livable Again

Major changes are needed in public transportation if our large cities are going to survive as livable environments that serve the needs of all citizens. Fortunately, a technology is being developed that promises to re-humanize cities plagued by congestion, pollution, crime, racism, classism, and ageism.

The technology is called Taxi 2000 Personal Rapid Transit (PRT). Invented at the University of Minnesota, it offers the convenience and privacy of the automobile without causing air or noise pollution. PRT offers service to all: seniors, disabled persons, tourists, those who choose not to drive and cannot afford taxicabs, and those who are not served by existing mass transit systems.

The TAXI 2000 PRT system recalls the saying "Small is Beautiful." It is similar to a monorail, but with electrically powered vehicles the size of small cars rather than long trains like those at the Minnesota Zoo or Disney World. PRT vehicles seat no more than four people, or one person in a wheelchair with an attendant. There is no driver, because the vehicles are controlled automatically.

To ride PRT, you will purchase a ticket from a machine like an automatic bank teller. Inserting the ticket into a scanning device will summon a vehicle, if one is not already waiting. Information recorded on the ticket when you selected your destination will program the vehicle to go to that station. You and your fellow passengers (if you choose to travel with others) just sit back and enjoy the ride. Travel is nonstop because stations are connected to the guideway with entrance and exit ramps, allowing vehicles to bypass all intervening stations as they travel at a moderate, constant speed. Yet riders can always talk with a human operator if a problem arises, and constant voice and video monitoring assures safety and security.

The PRT system connects a city in stages, as neighborhood guideway loops and stations are built and then interconnected to form a network. Unlike subways, elevated trains, or light-rail transit streetcars, PRT guideways can be installed without tearing up streets or disrupting neighborhoods. Because the guideway and vehicles are small, they also cost much less to build and operate. Yet PRT systems can carry more riders than buses, streetcars, or trains, because they don't make frequent stops and starts to pick up or drop off passengers. And during off-peak hours, the guideway can also carry small freight vehicles, earning revenue to help pay for the system. Tickets would cost about what city bus tickets cost today.

PRT guideways would not be placed on every street. They would be built in loops to serve congested areas of cities. In the Twin Cities, PRT lines have been proposed to:
- connect the airport and the Mall of America with the entire freeway 494 office, shopping, and residential area;
- link the skyway system of downtown Minneapolis with remote parking garages, with the Metrodome, and with the Riverplace and St. Anthony Main district;
- shuttle students between the University of Minnesota's St. Paul and Minneapolis campuses; and,
- connect the two downtowns, and then link those loops to others built by
public and private developers to serve heavily traveled routes throughout the metropolitan area.

An experimental PRT system is now being built near Boston by the Raytheon Company. In 1997 the first public system is scheduled to be built in the Chicago suburb of Rosemont, near O'Hare airport. Many other cities are planning systems, including Seattle-Tacoma, Washington; Atlanta, Georgia; and Amsterdam, The Netherlands. Some Minnesota legislators are interested in studying PRT as an alternative to the light-rail streetcar lines proposed for the Twin Cities. The testing now underway in Boston will show whether PRT can indeed provide better service for less cost to the people struggling to make their cities and neighborhoods more liveable.

For more information:

Citizens for PRT
P.O. Box 39692
Edina, MN 55439
612/335-1025
Who would understand nature must learn to know how to see motion.
- Leonardo da Vinci

The results of the investigation (by the reciprocal system of natural rational science of D.B. Larson) here being reported, show that the physical universe consists entirely of a specific finite quantity of a particular kind of motion. The question at issue now becomes: Can anything exist other than this quantity of this kind of motion?
- D.B. Larson.

This is becoming the richest and the poorest country in the world. Why? Why. on account of an unequal distribution of money.
- Will Rogers

To help celebrate Kay Graham's 70th birthday, June 30, 1987, Malcolm Forbes came via helicopter bearing a bottle of Chateau Lafite-Rothchild from 1916," I chose one that was laid down the same year she was," he commented. "Like Kay Graham, it's beyond price."
- News Report

Ms Candace Gingrich, as a person, is equal in worth to the infinite whole of humankind. Her brother, Dr. Newton Gingrich, current Speaker of the House, as a person, is equal in worth to the whole of humankind. First Lady Hillary Rodham Clinton, as a person, is equal in worth to the whole of humankind. The Declaration of the United States of America teaches that all women and men, as persons, are by nature, infinite (priceless), independent and inherently equal in human worth.
- Frank H. Meyer

Table of Contents

TWENTIETH ANNUAL CONFERENCE of ISUS, Inc. -Phillip Porter, The Regency Hotel, Denver, Colorado, August 9 & 10th, 1995. 1

Special Meeting to Consider Contract Proposed by Dorothy Larson. 3
Secretary's Reports of 1994 Annual ISUS Business Conference. 5
Messages from President R.W. Satz and Dewey B. Larson. 8

Letter of Arch Busby, January 25, 1995. Victoria, Australia. 9

Information Products about Reciprocal System Theory & Practice. 12
International Society of Unified Science
20th Annual Conference
Dates: August 9 & 10, 1995, Wednesday & Thursday
Location: The Regency Hotel, 3900 Elati Street, Denver, Colorado 80216
Located just West of Interstate 25 at exit 213 for W 38th Ave.

The special hotel room rate is $50.00 per room per night for a double or single room. If made before July 4th and you mention you are with the "Global Sciences Congress". (The hotel will not know who ISUS is, so be sure and mention "Global Sciences Congress".)

To get the special room rates make your room reservations by calling Monday-Friday 9:00 am to 5:00 pm Mountain Time, 800-525-8748 (in Colorado call 303-458-0808). After July 4th the block of rooms that is reserved for us will be released. The Regency Hotel is the closest hotel to the Colorado Rockies baseball field. If the strike gets settled, they will fill up fast.

Persons wishing to share a room and who do not have someone to share with may contact Dr. Ronald Satz, One Oak Drive, Parker Ford, PA 19457, phone: 610-495-6362. email: transpower@aol.com who will coordinate requests.

There are two ways, at this time, to get the 23 miles from the new Denver International Airport (DIA) to The Regency Hotel. The Airporter Shuttle makes the trip for $15 one way, call 800-355-5833 for reservations. Or the Regional Transportation District (RTD) runs a direct RTD bus from DIA to the downtown bus station for $6 one way. The Regency Hotel car service shuttle serves the downtown bus depot. Note: The DIA is new and different arrangements may be in place by the date of the conference.

Those wishing to fly into the Colorado Springs Airport may contact Dr. Ron Blackburn, 303-683-0420, FAX: 303-683-0428. P.O. Box 260852, Littleton, CO 80126 to make shuttle arrangements.

During the conference, emergency contact may be made with participants through Phillip Porter at 800-873-7074. Anyone desiring to spend some time in the Colorado mountains after the conference is invited to contact Mr. Porter.

The ISUS Conference this year is being held just before the Global Sciences Congress (GSC). We are getting good room rates based upon the power of the much larger GSC. ISUS wishes to thank Mr. Dean Stonier, head of the Global Sciences Institute, for making this possible.

On the opposite page is some information on the GSC. Those wishing more detailed information or who wish to enroll in the GSC are encouraged to contact Mr. Stonier. There is no connection between the International Society of Unified Science and the GSC.

The Global Sciences Congress (GSC) will immediately follow the ISUS 20th Annual Conference. These functions are separate and those wishing to attend the GSC will need to register separately. There are substantial discounts for early GSC registration.

The Global Sciences Institute will present the Global Sciences Congress from 1:30 pm on August 10 through August 14, 1995, at The Regency Hotel, 3900 Elati St., Denver, Colorado. Confirmed speakers, in alphabetical order are:

Brain David Anderson, San Diego, CA, "The Multi-Tranz"
Ken Anderson, Evans, WA, "Survival Herbs & Supplements"
P M H Atwater, Charlottesville, VA, "What Isn't Being Said About the Near Death Experience"
Dr. Bob Beck, Santa Ana, CA, "First Time Released Plans of New Frequency Device"
Alex Christopher, Spokane, WA, "The Hidden Link"
Emahn, Santa Fe, NM, "The Healing Power of Mandalas"
Alleut Francesca, White City, OR, "Contactees vs Abductions, The Critical Difference"
John Judge, Washington, DC. "T B A"
Harry King, Oracle, AZ. "The Results of 27 Years of Investigating the Unknown"
Jordan Maxwell, Burbank, CA. "Lucifer 2000--The New World Order"
R. E. McMaster Jr., "Money"
Dr. Dietrich Luedtke, Santa Fe, NM. "Earth Frequency Changes from Place to Place"
Tom Rael, Brighton, CO. "Ancient Hope Prophecies"
Ed Skilling, Phoenix, AZ. "T B A"
Jeffrey Thayer, Austin, TX. "Who Owns the Land?"
Bob Westbrook, Northridge, CA. "A Survivor's Guide to Armageddon"
Randall Winters, Atwood, CA. "The Pleadian Mission"
Plus some speakers to be announced at ONLY the Congress!

Full Congress registration is $115.00 before June 1, 1995. $130.00 before July 15, 1995 or $150.00 thereafter and at the door. Daily and session registrations are also available. The first 200 reservations. called "Early Birds" get front seating privileges. Exhibit rates are: $40.00 per table plus registration of personnel and 10% of the Congress sales.

For further details call 303-452-9300, FAX: 303-457-8269 or write:
Global Sciences. c/o 3273 East 119th Place, Thornton, Colorado state.

The special hotel room rate is $50.00 per room per night for a double or single room. if made before July 4th and you mention you are with the "Global Sciences Congress". To get the special room rates make room reservations by calling Monday-Friday 9:00 am to 5:00 pm Mountain Time, 800-525-8748 (in Colorado call 303-458-0808). After July 4th the block of rooms that is reserved for us will be released.

Mr. Stonier replies to the questions. "What is Global Sciences all about?" and "What describes what you do?"

"These are typical questions and not really that easy to answer when you consider the scope of the fields of interest that we research and investigate.

"One answer could be that we are interested in anything that will improve the physical or spiritual health of soils, animals, plants, people. or the planet, realizing that energy and/or frequency energy is the basis of most of the research. It could be said that we are involved in the re-examination of human understanding in the light of the most recent advances in science, especially physics, mathematics and astronomy. Our speakers/presenters are usually those researchers who are very close to the edge of present knowledge and considerably ahead of the conventional pack. Many of their findings may not be adopted as general practice for many years. They include physicists, MD's, DC's, HMD's, PhD's, DD's, agronomists, and backyard/basement inventors, among others, who are willing to share freely their many gifts, abilities, accomplishments, and research results.

"A partial list of topics of interest includes: color, crystals, music, sound, Tesla research, energy efficient devices (motors, generators, etc.). ELF (extra low frequency) and EHF (extra high frequency) research, nutrition, homeopathy, radionics, Kirlian photography, electronic healing, anti-gravity propulsion (UFO) devices. dowsing, pagan magic, paranormal research, food energy, pyramid energy, and psychic phenomena.

"Past practice has been to meet annually for a comprehensive conference (registrations come from approximately 40 states. Canada, and a few foreign countries) in Denver in mid-August, and a monthly meeting for Colorado area members. Public attendance and participation is encouraged at all meetings. Local meeting attendance averages over 100 and the annual Congress registration is approximately 500. Objectives are to keep registration fees modest to encourage the broadest possible attendance. Local membership fee is $15.00 per year."

E I: 7.1-2
A special business meeting of the International Society of Unified Science (ISUS) was called to order at 9:50 am, Saturday, July 9, 1994 in the Marriott Courtyard Hotel, Scottsdale, Arizona by ISUS President Ron Satz. There were seven ISUS members present. The purpose of this meeting was to consider the proposed contract which Dorothy Larson had sent to ISUS.

The contract was between Dorothy Larson and ISUS regarding the books of Dewey B. Larson currently in stock at North Pacific Publishers (NPP) and the copyrights to Mr. Larson's books. The contract contained the terms and conditions to allow ISUS to take over the day to day affairs of NPP.

The president appointed Philip Porter as the acting secretary for this special business meeting.

Robin Sims moved to amend the agenda to adjourn at 11:45 for lunch. Hoyt Stearns seconded. Passed on voice vote.

Rainer Huck gave a history of the reasons for the book distribution contract with Dorothy Larson. Mrs. Larson is preparing to sell the house where the books are stored and she wishes to retire from running NPP. She therefore desires to have ISUS take over the work NPP has been doing. Her lawyer had prepared the contract which was before us.

Robin Sims gave a summary of the contract's terms and conditions. Approximately 4000 books remain in stock, which is about 6000 lbs of books. The proposal is to move the books to ISUS headquarters in Salt Lake City, approximately 800 miles. ISUS would then take over the book sales, distribution and printing. The books offered are listed in the contract.

It was moved by Philip Porter and seconded by Frank Meyer that the contract be copied for all to have to look at as its terms are reviewed. Motion failed, 3 aye 4 no.

The meeting proceeded with Robin Sims reading each paragraph of the contract and the paragraphs being discussed, as appropriate. Each paragraph was revised as necessary to allow a majority of the members present to support the wording.

The opening "WHEREAS" of the contract was revised to add additional books to the list of books so that all of Mr. Larson's books are included. A motion was made and seconded and it passed unanimously.

"WHEREAS, Larson owns multiple copies of and the copyright to Nothing But Motion, the Universe of Motion, The Neglected Facts of Science, New Light of Space and Time, The Road to Full Employment, Beyond Newton, The Structure of the Physical Universe, Quasars and Pulsars, The Case Against the Nuclear Atom, Basic Properties of Matter (collectively, "the Books"); and . . ."

Discussion on length and amount of reimbursement was held. A motion to change the 60% to 70% in paragraph 1.4 and add the word "existing".
Kainer Huck moved and Phillip Porter seconded that we strike paragraphs 1.5 and 1.6. Much discussion followed. The total retail value of the books was calculated at $85,468.00. Thirty percent was $25,640.40. Forty percent is $34,187.20. The motion passed unanimously.

Motion to modify paragraph 2.1 and 2.2. passed unanimously.

Motion to strike paragraph 2.3. passed unanimously.

Motion to reduce the 30% to 15% in paragraph 2.4 passed unanimously.

Motion to amend 30 days to 75 days in paragraph 2.7. passed unanimously.

Kainer Huck moved and Frank Meyer seconded that in paragraph 4.1, the "quarterly" be changed to "yearly" and the "statement" be changed to "report". It passed unanimously.

The motion to delete "... about fees..." in paragraph 4.3, passed unanimously.

The motion to change the wording in paragraph 5.6 to "appropriate addresses", passed unanimously.

The motion to delete paragraph 5.7, passed unanimously.

The motion to delete paragraph 5.9, passed unanimously.

The motion by Kainer Huck, seconded by Frank Meyer to add a paragraph 5.11 passed unanimously.

"5.11 Larson will transfer to ISUS the title of post office boxes that North Pacific Publishers has printed in Larson's books, so that orders can be forwarded to ISUS. Larson will forward mail from the box to ISUS at least every two weeks at ISUS expense. ISUS will pay to maintain and continue the boxes as long as it deems necessary."

It was moved and seconded to replace the second WHEREAS clause with:

"WHEREAS, ISUS is a non-profit, scientific organization operated by unpaid volunteers for the purpose of promoting, supporting and continuing the works of Dewey B. Larson. ISUS is entering into this contract to maintain the availability of Larson's works for the benefit of future generations."

The motion passed unanimously.

That concluded discussion of the contract terms and conditions. A motion was made and seconded to adjourn the special business meeting at 11:35 am. Motion passed unanimously.

E I:7.1-4
SECRETARY'S REPORT

1994 ANNUAL CONFERENCE
BUSINESS MEETING July 9, 1994
COURTYARD MARRIOTT HOTEL
SCOTTSDALE, AZ

Call to Order by President,
Ronald Satz 1:37 P.M.

Reading of minutes suspended,
approved as published

Treasurer's Report approved as read [copy available on written request to Secretary]

Report of Editor of Reciprocity;
[copy of financial report available on written request to Secretary]
discussion concerning appropriateness of sending ISUS News with Reciprocity, motion carried to NOT send ISUS News to non-members. ISUS News to be sent to members ONLY.

OLD BUSINESS

Back issues of Reciprocity;
motion to authorize sending all excess and back issues to Executive Director's office in S.L.C. carried unanimously.
Back issues of ISUS News also to be sent to Exec. Dir.
Motion to restrict mailing of Reciprocity to members only; discussion; question failed to meet majority requirement, tabled.
Peer Review process questioned due to insufficient submissions. No conclusion.

Counting of mail-in ballots; discussion, no motion, no change.

Brochure; discussion, no recommendations regarding changes.

NEW BUSINESS

Motion to request all appropriate ISUS materials be copied to disk. Carried Unanimously. Authorization to obtain software to convert MAC data to PC data and PC to MAC, carried unanimously.

Motion to authorize reprinting "Basic Properties of Matter"; 112 copies (12 to D. Larson); carried unanimously.

Motion of Thanks: to Maurice Gilroy for "underground" publishing activities; carried unanimously.

Motion to publish compilation of back issues of Reciprocity; died.
Request for resolution: regarding J. Edward Anderson's material on Personal Rapid Transit; no action other than note of tribute.
question of publication policy related to D.B. Larson's "Beyond Space and Time"; discussion of metaphysics vs. ISUS by-laws; motion to amend by-laws failed.

other letters; no action.

INTERNAL BUSINESS

Motion to re-elect existing Board of Trustees; carried unanimously.

Motion of Thanks to Host of conference: Hoyt Stearns; carried unanimously.

Future Meetings and possible locations; discussion; final decision: Phil Porter will Host the 1995 ISUS Annual Conference in Denver, CO. meeting time to be announced later.
MEETING: BOARD OF TRUSTEES

Nominations sequentially to re-elect present slate of Officers; each carried unanimously.

Motion to authorize Executive Director to hire assistance as required for bookkeeping; carried unanimously.

Proposal for transference of Writer's Assistance Fund monies to appropriate recipient with restrictions regarding publication deadline; carried unanimously.

PRESENT
MEMBERS

Ronald Blackburn
Rainer Huck
D. Maurice Gilroy
Frank H. Meyer
Philip H. Porter
Ronald W. Satz
Robin Simms
Hoyt Stearns

and Non-Members

Brian Frazer
Emil Hahn
Michael Riley

Respectfully submitted,
Lawrence E. Denslow, Secretary.

Publication Policy

The editors of Reciprocity welcome papers, especially from new contributors. The requirements that a contributed paper must meet in order to qualify for publication are clarified below. Editorial assistance is available in those cases where a limited amount of revision will enable a paper to meet the requirements.

As stated in the by-laws of the International Society of Unified Science, the objective of the Society is the advancement of the Reciprocal System of physical science. This theory, as it is defined, consists of two fundamental postulates, together with everything that can be derived from those postulates by logical and mathematical processes, without introduction from any other source.

The unitary character of the theory, resulting from the derivation of all its conclusions from the same set of premises, is its most essential feature. It is this status of this theory as a general physical theory - the only thing of its kind - that enables extension of the theory into areas inaccessible to observation.

The purpose of Reciprocity is to contribute toward the accomplishment of the objective of the organization. Acceptance of items for publication shall therefore be determined by the following criteria:

1. All items must have relevance to the stated objective of the International Society of Unified Science.
2. Original technical articles must deal with the Reciprocal system of theory, as defined above, or aspects thereof; that is, the propositions supported must purport to be derived from the postulates of the Reciprocal System, or from previously published reached on that basis, without introducing further assumptions.
3. Arguments advanced against previously published material must be similarly based.

Papers should be sent to one of the editors. All published papers become property of ISUS, INC.

Alternatively, you may now, if you wish, submit your papers on 3.5 inch disks for the Macintosh computer, in Word 4.0 or MacWrite (version 2, 4.5, and 5.0) formats. This helps to eliminate the errors that may occur in transcription and reduces the amount of time it takes us to put the journal together.
Due to an error in page numbering, there is no page 7.
From My Corner of the Universe,
A Message from ISUS President R.W. Satz

Our By-Laws state that the objective of ISUS is "to advance in all ways deemed feasible the Reciprocal System of physical theory as proposed by Dewey B. Larson and as set forth in [his] books....A corollary purpose of this organization shall be to reexamine and revalue existing and generally accepted theories of physics, chemistry, and biology and the Reciprocal System of physical theory in the light of sound experimental data, it being assumed that when any theory is in disagreement with valid experimental data, the theory is wrong."

Over the years a few individuals within ISUS have tried to modify the objective to include taking particular stand in philosophy, religion, politics, and economics. At the recent conference, an attempt was made, again, to change the mission of ISUS. I am very happy to report that this attempt failed utterly, and the vast majority of members present voted to keep this mission exactly as it is in our legal charter.

Therefore all articles not directly related to the Reciprocal System of physical theory will not be accepted for publication in Reciprocity or ISUS News. Articles on human nature, new transportation systems, metaphysics, etc. are inappropriate, There are many other organizations devoted to causes in these areas. We have a specific, unique mission: the promotion and advancement of D.B. Larson's Reciprocal System of physical theory; there is enough work here for ISUS members to last hundreds of years.

From My corner of the Non-physical Universe Beyond Space and Time,
A Message from D.B. Larson

......the scientific rejection of the possibility of existence outside the physical universe has no basis other than the premise that all existence is in space and in time.

In the universe of motion this is not true. Space and time do not constitute a container for the entities and phenomena of that universe; they are contents of the universe......

Notwithstanding the scientific contention that all observed phenomena can be explained on a purely physical basis, it quickly became evident, when the verification process is undertaken, that many of the effects of non-physical existence required by the uniformity hypothesis are, in fact, observable.

The findings of this extension of the investigation of the physical universe into the non-physical region are much too voluminous to be included with the physical results, and will be described in a separate publication, but it would not be appropriate to conclude the discussion of this volume without calling attention to the manner in which the clarification of the properties of the physical universe sets the stage for a confirmation of the reality of existence outside that universe. The more complete understanding of physical existence opens the door to an exploration of existence as a whole, including those non-physical areas that have hitherto had to be left to religion and related branches of thought. It is now evident that our familiar material world is not the whole of existence, as modern science would have us believe. It is only a part - perhaps a very small part - of a greater whole.
Dear Dr. Meyer,

Thank you for the copy of Reciprocity containing your interesting article exploring some of the implications of Space and Time quanta and your correspondence, the article with Dr. Romer, editor of the A.J.P.

I too am interested in the possible quantum nature of space. The idea of quantum time is implicit in much modern physics, however I believe Dr. Romer is not declining the concept of quantisation but the nature of the particular Space/Time which you have presented. To publish your paper on the quantum nature of space and time would, for many of his learned readers, imply his approval of the Reciprocal Theory and all its assertions regarding scalar motion. This would include the linear expansion of space everywhere at the speed of light and the claim that everything not gravitationally bound, eg. photons, are being carried along with it.

That is what Dr Romer is declining.
In the issue of Reciprocity Vol XX No 2 in an article by K.V.K.Nehru entitled "The Large-scale Structure of the universe. Part 1. The Cosmic Bubbles." the author, while speaking from a R/S standpoint, offers an explanation of this recently "discovered" phenomenon. He appears to be unconcerned that the distances measured depend in large part on the current conventional interpretation of red-shift measurements on quasars since these bright objects in distant galaxies provide the best targets for red-shift measurements.

Why should Nehru attempt to conjure up R/S explanations for phenomena based on what he and other R/S proponents agree to regard as misinterpreted red-shifts.

In the Spring 1991 issue of Reciprocity, page 16, is an article by Tom Kirk titled "Derivation of the Hydrogen Spectra Equations". On page 18 he launches into an extraordinary series of assertions concerning atomic numbers and the nature of the Hydrogen atom. The H atom has a atomic weight of 1 only when expressed in the system which defines the atomic weight of H to be 1. Its atomic Number is always 1 because the atom contains 1 proton with a positive charge of 1. The same
goes for Deuterium a\textfone and Tritium a\textftwo. Both these isotopes of Hydrogen have 1 as their Atomic number.

Why is Kirk messing about with atomic number when he does not recognise protons. Atomic numbers are purely statements about the number of protons in the nuclei of atoms. The elements generally do not have atomic weights twice their atomic number as Kirk states and there is no reason why they should, either in standard physics or in the Reciprocal system. He continues by asserting that, for reasons I find obscure, this "unique" hydrogen atom contains two mass elements, only one of which is real during any one time interval. This is all sheer nonsense, probably the result of a man trying too hard to justify the object of his faith.

I believe R/S contributors should abandon their attempts to encompass the exotica of physics and concentrate on the nature of Larsen space and it's role in photo-emission, reflection, diffraction, laser action and a host of other phenomena that standard physics had to cut it's teeth on. It is vital that any attempt to write new foundations for a Universe must develop not just believable theories, but quantitative, verifiable mechanisms based solely on the new principles without recourse to analogy or uncritical borrowing from convention physics.

For example, Newton's gravitation involved action at a distance. Such action and also electric charge are regarded as being mediated by Fields each with it's special characteristic parameters including the inverse square law. The origins of these fields are, as yet not understood, modern physics is a top down science and the present theories work very well at all scales. The effects of gravitation and the electric field are real. Unified Science starting at the bottom, must come up with a mechanisms which provide the fields that massive bodies and charged particles carry about with them. Is there in Larsen's Universe a consistent, clear-cut process which can provide all the observed effects physicists now ascribe to gravitational fields?. Incidentally a gravitation-like force does not account for the strength of solid bodies, that's basically an electrical effect. Gravitation as it is understood by physicists is not available for R/S use. Space and Matter must be provided with more parameters than Larsen has done in his theories. While Quantised space is undergoing scalar expansion it is impossible for it's passive photon burden to play any part in reflection, refraction, diffraction or Laser emission.

The path of a photon is vectorial. Forget about distant receding galaxies; you could not read this page if photons submitted to scalar spatial expansion.

Furthermore since R/S does not allow electrical fields within atoms and molecules, Larsen type photons cannot undergo reflection.
Whatever the foundations of the Universe ultimately prove to be, photons are reflected by interaction with electric fields within the surface molecules of reflectors. This is not theory!

These are not matters of my choosing, they are the nuts and bolts of observational science. Tom Kirk should not scold Nehru for attempting to come to terms with Reality. Of course R/S should explain physical phenomena using only its own parameters, with no appeal to conventional processes and all this should lead to hard practical equations. The correspondents to Reciprocity are not doing this. As you know, modern physics is a top down science, having no fundamental foundations. People just started wherever the fancy took them. Theoretical physics exists to provide a framework for observational and experimental discoveries. As a consequence science is a bit lay-back about theories concerned with the ultimate fundamentals of the Universe, only taking seriously those theories for which experimental or observational confirmation of some sort can be envisaged. Theoretical development is then devoted to discovering ways to make these experiments capable of discriminating in the face of other possible theories.

On the other hand Larsen's theories constitute a Bottom Up approach where the fundamentals are postulated first off. The path upward to the realities must be deliberate with each step firmly based on R/S principles but there must be a path. It's mundane of course to work over classical physics, and I mean work in detail, using only the defined properties of Larsonian particles in a Larsonian space/time without borrowing or the use of empirical constants. Any problems arising on the way must be solved by going back to the foundations. Reality cannot be modified. Theories are only as good as the results of the experiments they give rise to. At present, what with black holes, cosmic strings, worm holes etc, theories are thick on the ground and that's where most of them will stay. It is not helpful to promote theories that by their nature, cannot be tested.

By now you may realise that I am A.Nonymous. I wrote to Mr Halprin during 1991 and unknown to me he chose to submit some of my letter under the pseudonym. What I said then still bears repeating. I sincerely hope the fragment of aluminium foil Mr Little so coyly referred to in the only published reply to Anon does not constitute the only response to my questions.

I hope my remarks do not sound patronising or deliberately unkind. That was not my intention but I suggest Dr Romer is doing no more than you did with your editorial note on the Little comment.

Sincerely,

[Signature]

11
International Society of Unified Science

Membership

Membership is open to all persons interested in the advancement of scientific knowledge. Dues, including a subscription to Reciprocity are $25.00 per year. Contributing membership is $50.00, supporting $150.00 and sustaining $300.00. The Society’s by-laws may be requested from the Secretary.

Available Literature:

Reciprocity, a quarterly publication of the ISUS. Annual subscription $15.00

Books:

Dewey B. Larson, Nothing But Motion (1979) 308 pages
The first of three volumes of a revised and enlarged edition of The Structure of the Physical Universe (1959). Basic laws and principles applicable to physical phenomena $18.00

Dewey B. Larson, Basic Properties of Matter (1979) 300 pages (softcover)
The second volume of a revised and enlarged edition of the 1939 publication. Properties of solids, including temperature, electricity, magnetism and radioactivity. $35.00

The third volume of a revised and enlarged edition of the 1959 publication, extending the physical relations and principles to a description of the large-scale features of the universe of motion. $28.00

A derivation of many of the theoretical conclusions from factual premises, notably the study of scalar motion and its properties. $12.00

Dewey B. Larson, New Light on Space and Time (1965) $17.00

Dewey B. Larson, Beyond Newton (1964) 160 pages
A study of gravitation. $15.00

Dewey B. Larson, The Case Against the Nuclear Atom (1963) 139 pages (softcover)
A critique of the accepted theory of atomic structure. $10.00

Ronald W. Satz, The Unmysterious Universe (1971) 80 pages $6.50

K.V.K. Nehru, Collected Writings about Larsonian Physics $40.00

Offprints:

Dewey B. Larson, “Just How Much do We Really Know?”
A critique of scientific methodology, written in 1961. 15 pages $3.00

Larson’s address at the VIIth ISUS Convention, Philadelphia, 1982, 10 pages $2.00

Ronald W. Satz, “The Interaction of Alpha Particles and Gold Atoms:
A New Explanation of Rutherford Scattering.”
reprinted from the summer 1981 issue of Reciprocity, 10 pages $2.00

Videotape:

Videotape of 1978 D.B. Larson Address to Salt Lake City NSA Conference $30.00

All prices, within USA, include shipping and handling. Outside USA, add $4.00 for surface mail, or $10.00 for air mail for each book, videotape, subscription, or membership. Send Checks to:

ISUS, Inc., 1680 East Atkin Avenue, Salt Lake City, Utah 84106
BEYOND SPACE AND TIME is a continuation and extension of the subject matter of my previous scientific publications. In those earlier works, I demonstrated that a true and accurate representation of the entire physical universe can be deduced from two simple postulates as to the nature of space and time. With the aid of this complete and correct theoretical system, I was able to organize and systematize the previously existing knowledge derived from physical observation and measurement and to clarify the physical relationships applicable to the far-out regions that are partially or wholly inaccessible to observation. The present volume extends the scope of that work by examining the information about the existences outside (that is, independent) of the physical space-time universe, and the local manifestations of the outside existence that can be derived from the new and more complete knowledge of the space-time universe itself.

Dewey B. Larson

Do those who survive beyond physical death communicate in any way with the living?

Dewey B. Larson

With my assumption .......life need never end. There is no decisive argument for deciding between [certain] assumptions. I prefer the one that allows the possibility of endless life. One may hope that some day the question will be decided by direct observation.

Paul Dirac

When I see nothing annihilated[in the works of God) and not a drop of water wasted, I cannot suspect the annihilation of souls, or believe that He will suffer the daily waste of millions of minds already made that now exist; and with all the inconveniences human life is liable to, I shall not object to a new edition of myself ---- hoping that the errata of the last may be corrected.

Benjamin Franklin

Table of Contents

Larson’s Humankind has a Purposeful Future. F.H. Meyer 1

Minutes of the Twentieth Annual ISUS, INC Conference, 8/95 3
LARSON'S HUMANKIND HAS A PURPOSEFUL FUTURE

Frank H. Meyer

The last master literary work of Dewey B. Larson, *Beyond Space and Time*, teaches about the infinitude of the whole ethical human universe, of which the entire finite space-time physical universe of motion, enormous in size though it be, is an essential part.

The humanist mechanical materialists and logical positivists among the natural scientists assume on the contrary that humankind is an incidental, accidental, unessential, purposeless and meaningless part of Prof. Einstein's presumed finite and unbounded space-time physical universe. They share an unfounded anti-metaphysical belief that a physical explanation someday will be found for the seemingly non-physical aspects of human existence. Meanwhile Larson's revaluation and unification of physics have discovered abundant evidence that both the material sector and the cosmic sector of the physical universe have participated in the origination and evolution of life, including human life, on planet Earth; and have contributed two necessary but not sufficient levels and sectors of human existence, the material sector and the cosmic sector.

What makes the human universe an infinite whole is a non-physical level and sector of natural existence, believably inhabited by ethical humankind, exclusive of most, if not all other living organisms. This non-physical sector is not simply or readily visible, audible or tangible. It includes pure mathematics, numbers, discursive meaning, the meaning of words and much more, but not applied mathematics, numerals, libraries, books and words themselves. Humankind as a whole can and does learn about the being of our non-physical sector of existence, by virtue of our native ability to create and reproduce adequate physical entities to represent the non-physical entities essential to our well-being: numbers by numerals; meanings by words.

To name and distinguish the subject, the human non-physical realm outside space and time, of his last work, just now published, Larson has chosen an appropriate word: 'metaphysics'. Larson calls it 'Third Sector'.

Metaphysics and physics are made for humankind; humankind are not made for metaphysics or physics.

Larson's metaphysics, as has his physics, induces me to question and to seek better answers to numerous current conventional and institutionalized practices of humankind, including particularly practices of the United States of America, my country.

A case in point is how human worth is counted in the U.S.A. The human worth of men and women is their exchange value in the market place. It is taken for granted as proved that persons are all physical, finite
and unequal in human worth. A prevalent assumption of the business community of the U.S.A. and elsewhere is that every man has his price, that it is untrue that there are men who cannot be bought and women who cannot be sold. When human slavery is legally practised in North America, children, women and men have been bought as commodities, paid for in the market at market prices and owned as private property.

However, inherent human worth is a non-physical attribute of the private man or the private woman and cannot be identified with a material property of a person, his market exchange value. While it is evident that persons are finite and unequal in exchange worth, it is actually easy to prove with pure arithmetic that persons are probably not finite in human worth. If you seek to demonstrate that persons are finite in human worth, because you believe you are altogether and entirely a physical entity and know that in every respect that we are physical we are finite, do analogously what you have to do to prove that the set of counting numbers is finite: find a greatest counting number; that is, identify among the human dead, the living and yet to be born your candidate for person of greatest worth and win the unanimous consensus for this candidate from the people.

Meanwhile, until the person of maximum inherent human worth is found, I shall assume unproved that ethical persons are inherently finite in non-physical human worth. I rather would not, when I don’t have to suppose finitude of human worth, since traditionally it has implied the corollary proposition that women and men are unequal in human worth. Furthermore, my long inquiry into the text and meaning of the original draft of A Declaration by the representatives of the United States of America in general Congress assembled has led me to discover that the author had to and did learn how to count infinite wholes before the mathematical profession was prepared to concede it could be done in order to affirm that all women as well as all men are created by nature infinite, independent and inherently equal in human worth.

In all my lectures I have taught one doctrine, namely, the infinitude of the private man.  

----- Ralph Waldo Emerson

[The Declaration] acknowledges that man has a soul, and for that reason is equal to every other man, and that is the cornerstone of what we call the American System.  

----- Dwight D. Eisenhower

If this country cannot be saved without giving up the the principles (of the Declaration of Independence), I would rather be assassinated on this spot than surrender it.  

----- Abraham Lincoln

The foundation on which all our constitutions are built is the natural equality of man.  

----- Thomas Jefferson
MINUTES of the Twentieth
Annual Meeting of the Members of
the INTERNATIONAL SOCIETY OF
UNIFIED SCIENCE :

President Ronald W. Satz formally opened the meeting 9 A.M.
August 11, 1995

MEMBERS PRESENT :

Ron Blackburn
Larry Denslow
Frank Meyer
Phil Porter
Ron Satz
Hoyt Sterns

REPORTS :

Secretary's READING of the
MINUTES of last year's meeting in
Scottsdale, Az., at the Courtyard
Marriott Hotel on July 9, 1994.
Moved, seconded, and approved as
amended below to show terms of
Trustees:

Blackburn, Halprin, Kirk,
Navaro, and Schmidt term ending
in '95.

Meyer, Nehru, Porter, Sammar,
and Simms term ending in '96.

Denslow, Huck, Mitchell, Satz,
and Sterns term ending in '97.

TREASURER'S REPORT read by Ron
Blackburn: not quantifiable at
this time, but approximately
$4000 balance. Official report
should be sent by Executive Di-
rector to all Board members in
bye of report read at this meet-
ing. Payments to Dorothy Larson
requires official action; Meyer
moved and Sterns seconded that
contractual obligation be kept
regarding dollar amount to be
sent to Dorothy Larson for book
sales, etc. R. Huck to be noti-
tified regarding these decisions.
(Motion made later regarding this
and other matters)

Frank Meyer brought to our
attention that Dorothy Larson
needs a list of membership by
which to contact various members.
Moved and seconded, approved as
requested.

EDITOR'S REPORT by Frank
Meyer:

Report for 1994: due to
changes that we have made it has
become possible to have further
economies in paying for copying
and circulation of Reciprocity.
In 1994 two issues of Reciprocity
and two issues of ISUS News were
sent out, cost came to between
800 and 1000 dollars, but includ-
ed in that are all additional
expenses incurred with these
publications.

Costs during '95 are under
$500. Membership is about 120.
30 copies presently going to R.
Huck, 50 copies presently mailed
back to Editor for information
fillers, P.O. requires a minimum
of 200 copies for bulk rate
mailing.

Motion by P. Porter that two
copies of each mailing be sent to
each director, amended to not
exhaust supply while sending
larger balance of each printing
to Executive Director, current
copy of Reciprocity (but not ISUS
News) to be included with all
book orders as long as they are
available. Seconded; discussion;
motion carried unanimously.

Motion by P. Porter that all
mailings of Reciprocity and ISUS
News be the same to members and
non-members due to the small
number of non-member subscribers
on the mailing list at this time.
Seconded by F. Meyer, amended by
R. Satz to include the stipulation
that discussions of topics not
relevant to ISUS not be included
in the ISUS News publication,
also seconded by F. Meyer. Motion
carried unanimously.
Voting members present: Ron Blackburn, Larry Denslow, Frank Meyer, Phil Porter, Ron Satz, and Hoyt Sterns

Direct proxies being voted: Rainer Huck assigned to Ron Blackburn, Robin Simms assigned to Ron Blackburn, James Schmidt assigned to Ron Blackburn, William Mitchell assigned to Meyer.
Proxie assigned but not required for quorum and not used in vote: Ed Navarro assigned to Rainer Huck.

Board Members and terms of office listed in amendment of previous meeting minutes.
Blackburn, Halprin, Kirk, Navarro, and Schmidt have term ending with this meeting. James Schmidt requested to not be re-considered for Board membership. Porter renominated Blackburn, Halprin, Kirk, and Navarro to serve on the Board for another term. Approved unanimously.

By-Laws indicate a maximum number of Board members, but does not require a minimum number. Motion made by Porter to leave Schmidt's position on the Board unfilled at this time, position to carry the balance of the term when filled. Seconded by Sterns, motion carried unanimously.

ELECTION OF OFFICERS:

L. Denslow renominated for Secretary, seconded, and unanimous ballot cast. Duties of the Secretary include recording and preserving the minutes of the annual meeting of the membership, meetings of the Board of Trustees, and meetings of the Executive Council, and report all minutes as requested by the presiding officer at such meetings: to conduct normal business membership correspondence as related to the preservation and growth of the organization; to conduct special correspondence as requested by the Board of Trustees; to maintain accurate listing of members by classification; and serve as a voting member of the Board of Trustees.

Rainer Huck renominated for Treasurer/Executive Director, motion for casting of unanimous ballot carried.
Nominations for Vice President made and seconded. Discussion of candidate qualifications and other concerns followed by trial vote resulted in tie vote and postponement of V.P. vote until after vote for office of President.

Nominations for President made, seconded, discussed, and voted. Unanimous ballot cast for Hoyt Sterns as President with Ron Satz as Vice President.

Frank Meyer accepted position as Editor of Reciprocity for the year '95 - '96.

After appropriate discussion, the position of Executive Researcher was created. Motion by Blackburn seconded by Meyer to create the position of Executive Researcher to act as chairman of review committee for papers and have other duties as assigned by the President and the Board of Trustees.

Motion made by Porter, seconded by Meyer, that membership of Reciprocity Review committee be President, Vice President/Executive Researcher, and K.V.K. Nehru. Accepted as recommended for committee membership without vote.

Motion made by Porter, seconded by Sterns, for the Editorial staff of Reciprocity to include R. Blackburn as Associate Editor. Editor of Reciprocity is to be responsible for investigating faster and more reliable means of communicating with membership. Committee membership accepted without vote.
OLD BUSINESS:

Discussion of matters related to electronic transmission of current and past publications by Editor to other board members. Most previously published information is on disk, requested that they also be included as part of the

Motion made by H. Sterns to request that D. Meyer, Associate Editor, transmit by E-mail Reciprocity files to H. Sterns for possible uploading to internet. Seconded by Blackburn. After discussion motion carried unanimously.

Discussion regarding request that he obtain quotes for scanning and conversion software introduced by Blackburn: all quotes prohibitively expensive. Presently available software is not always reliable for MAC / MS-DOS. Can files be uploaded as internet hypertext markup language document? Motion that R. Blackburn continue to work in this area of electronic transmission of R.S. information and MAC / MS-DOS conversion systems made, seconded; carried unanimously.

Discussion of listings of and what publications are available. Newly printed copies of Basic Properties of Matter are available with plastic binding. Motion made by R. Blackburn that R. Huck include in his report to Dorothy Larson a statement concerning the status of the books, that they are being kept in proper condition for sale, etc., seconded by H. Sterns. Motion carried unanimously.

NEW BUSINESS:

Discussion regarding Post Script file transmission of information leading to motion by Sterns that ISUS look into creating and placing R.S. information on the internet in hypertext markup language. Seconded by F. Meyer. Hoyt Sterns then accepted responsibility to so do. Amendment by P. Porter, accepted as friendly, to investigate costs, etc., rather than just do it; reporting results to appropriate board members. Motion authorizes Hoyt Sterns to investigate formation of document and determination of the cost of actually putting it into this format and submit the details to the Secretary for dissemination and vote by mail ballot procedure.

Motion by Ron Blackburn to request that the treasurer obtain an E-mail address whereby direct contact can be more immediate and investigate the feasibility of Web-site, possibly through the University of Utah. Seconded by F. Meyer. Discussion concerning types of connections.

Discussion of methods of obtaining new members and/or disseminating information about the Reciprocal System of theory. International Association of New Science suggested as possible avenue for exposure. Motion to investigate possibility of obtaining a table at the IANS conference as well as delivering a paper. Seconded by Meyer. Motion carried unanimously.

ELECTIONS (condensed due to attendance and time constraints):

Proxies assigned to various members present and to others who assigned their proxies to one of those present. Indirect assignment was accepted for purposes of obtaining quorum but not for number of votes cast by member actually present. Quorum was obtained by direct assignment of proxy for this meeting of the Board of Trustees without use of indirect assignment of proxy.
Motion by Porter that a member of the Reciprocity Review committee (President, V.P., or Editor) respond in a timely manner to all submissions, advising of acceptance/rejection and statement of comments and rights of review by the review committee. Seconded by Meyer, carried unanimously.

Motion that Rainer Huck to be notified by formal letter from Secretary to review status of Schmidt's order for back issues of Reciprocity and carry out appropriate action; as well as, other actions the Board requests he take. Seconded, carried unanimously.

Discussion of where to hold the annual meeting in '96. Possibilities ranged from Florida to somewhere in the west. Moved and seconded that President Sterns explore the possibilities of having the '96 convention in Las Vegas, NV, setting appropriate meeting time and place. Carried unanimously.

Motion to adjourn at 1:30 P.M.
8/11/95.

RECAPITULATION:

Officers for '95 - '96:

Hoyt Sterns - President
Ron Satz - Vice President/Executive Researcher
Rainer Huck - Treasurer/Executive Director
Lawrence Denslow - Secretary
Frank Meyer - Editor
BEYOND SPACE AND TIME is a continuation and extension of the subject matter of my previous scientific publications. In those earlier works, I demonstrated that a true and accurate representation of the entire physical universe can be deduced from two simple postulates as to the nature of space and time. With the aid of this complete and correct theoretical system, I was able to organize and systematize the previously existing knowledge derived from physical observation and measurement and to clarify the physical relationships applicable to the far-out regions that are partially or wholly inaccessible to observation. The present volume extends the scope of that work by examining the information about the existences outside (that is, independent) of the physical space-time universe, and the local manifestations of the outside existence that can be derived from the new and more complete knowledge of the space-time universe itself.

Dewey B. Larson

With my assumption .......life need never end. There is no decisive argument for deciding between {certain} assumptions. I prefer the one that allows the possibility of endless life. One may hope that some day the question will be decided by direct observation.

Paul Dirac

When I see nothing annihilated(in the works of God) and not a drop of water wasted, I cannot suspect the annihilation of souls, or believe that He will suffer the daily waste of millions of minds already made that now exist; and with all the inconveniences human life is liable to, I shall not object to a new edition of myself ---- hoping that the errata of the last may be corrected.

Benjamin Franklin

Table of Contents

President Hoyt Stearn's Letter to ISUS, Inc Members & Friends 1

TWENTYFIRST ISUS ANNUAL CONFERENCE, Aug.12-13, Denver, 5

SPACE-TIME AND BEYOND Frank H. Meyer 8
Dear ISUS members,

I am delighted to have been elected to the presidency of ISUS for 1995-1996.

Many thanks to those of you who supported me. I hope I surpass your expectations.

A consulting electrical engineer by profession, I have a BS and MEE from Cornell University, 1967, and specialize in embedded electronic design and software engineering.

I have been interested in the Reciprocal System (RS) since 1984 when I read Dewey Larson's paper "The Dimensions of Motion", in which an explanation of magnetism appeared, the first satisfying explanation I have seen.

In my opinion, ISUS is on the verge of great growth for several reasons:

+ Firstly

Dewey Larson developed the optimum model of physical reality, and conventional physicists are starting to embrace these RS concepts.

There is also a trend to more financial and moral support for alternative research.

+ Secondly

Many more physical anomalies are being detected which conventional physicists find impossible to explain with their sophisticated theories. Still more epicycles must be appended to the point of absurdity. More conceptual dead ends are being reached by the conventional wisdom, opening the door to alternatives.

+ Thirdly

The Internet and World Wide Web have allowed broad dissemination of Reciprocal System material and sometimes heated discussions of it.

I have been very active on the Internet promoting the Reciprocal System for several years now, and I've personally answered many questions by electronic mail. It takes a while for these seeds to sprout, which they are now doing.

I am proud to say that I have made the Internet's "Net Legends" list and mathematical physicist John Baez' "crackpot list". Although these lists are jocular in nature, they do give us exposure, and I believe it is generally positive, even though there are bogus ideas present in the lists also.

Anyone differing in any significant way with the status quo has a good chance of appearing therein.

Those interested in alternate views might do well peruse these lists. I'm sure Einstein would have made the lists if he were active on the Internet during his productive years.

Our new World Wide Web ISUS home page, Created and maintained by Jan Sammer, gives us still more exposure. Jan will be adding more material to it. I have sent some of my
Internet postings to him for inclusion. I thank Ian for his efforts on our behalf.

+ Forthly

There are some fundamental changes occurring in our understanding of "reality" in general (as contrasted with "physical reality").

The study of physical reality has yielded some surprises that require broadening our view into the domain of metaphysics if we're to gain any real understanding. I believe the two domains intersect in the area of probabilities as they are dealt with in the Reciprocal System.

Fortunately, Dewey Larson addresses these types of issues in his recently published book "Beyond Space and Time". Thanks to Bob Tucek for working to get this book published. There are indications it will be quite popular.

+Fifthly:

Larry Denslow has just finished his book: "The Fundamentals of Scalar Motion". As an educator, he is talented in presenting this material in a way that complements Dewey Larson's material, and he has helped many to understand it better. Thank you Larry.

My thanks also to all the authors of technical papers included in "Reciprocity", especially our most prolific authors of hard technical papers, Dr. Ron Satz and Prof. RVK Nehru. They form the backbone of ISUS.

Thanks to Frank Meyer for performing the considerable work of preparing and mailing our publications, and to Daeron Meyer for assisting Frank in electronic publishing tasks.

We have the opportunity to really "show our stuff" by providing explanations for some recent experimental results that are completely devoid of any reasonable conventional explanations, such as the new Patterson power cell cold fusion device; the "sonofusion" cold fusion devices; advances in high temperature superconductivity; a myriad of Hubble Space telescope pictures; rail gun anomalies; and plenty more.

There are certain moments when publicising Reciprocal System theory has particular leverage--when the establishment guard is down, just after an experimental surprise for example. Here's a case in point:

An experiment was done whereby the result was that the sun didn't emit as many neutrinos as the pet theory predicted. "There must be something wrong with the experiment" they all said in unison, "We shall have to run another experiment." A New, very expensive experimental apparatus was built, run, and, alas, a similar result, with a similar commentary.

A third experiment was run, and the results were largely consistent with the first two.

What's a scientist to do? Revise the theory? Not a chance. When I suggested on the Internet facetiously that "When the experiment and theory disagree, the theory wins", it caused outrage in cyberspace.

These are the opportune moments to inject what the Reciprocal System has to say on such matters, and I have done so. I encourage all of you to do the same. You don't have to be 100% accurate, just get the name

"Larson" and "Reciprocal System" out into cyberspace, and mention that we have an
alternate explanation. Beware though, I have observed a pattern when a new idea is presented: The vested interests—

1. Ignore it, and if that doesn't make it go away,
2. Make fun of it, and if that doesn't make it go away,
3. Attack the messenger, and if that doesn't make it go away,
4. They say they've really thought that way all along. then
5. Incorporate it as if it's always been that way.

Some of the Reciprocal System concepts have made it to 5., although the wording is often different. Credit has never been given to my knowledge.

Although credit is certainly nice. I still count it as a success if a correct idea makes it into the mainstream.

I think the best way of all to call attention to the Reciprocal System is to invent, design, and successfully build a product based on it. I have been keeping my mind open to that possibility since 1985.

I submitted a Small Business Innovation Research (SBIR) proposal a few years ago to investigate a reactionless thruster which I invented, based on RS theory.

Ron Satz submitted an SBIR proposal to investigate the scattering of neutral particles from gold atoms. This doesn't strictly lead to a product, but it would certainly make "waves" if performed and the expected results were published.

Both were declined, however, but only a few percent of the proposals are funded each year. I encourage you apply also, because the SBIR program is well tailored to funding unconventional projects by very small entities, and the contracts are very favorable to the principals, if granted. $100,000 to start.

I encourage you to write to the editors of popular publications, radio stations such as NPR, as well as to Usenet newsgroups on Internet, challenging conventional scientists whenever they spout some nonsense, whether about black holes, quarks, singularities, big bang, element 120, or anything else that strikes you as bogus.

You can speak up whenever someone wants to find magnetic monopoles or gravity waves, talks of the beginning of the universe, anti-matter propulsion, or gravitons.

You can explain enigmas such as gamma ray bursts when they are described as completely unexplainable.

ISUS members are a very philosophically diverse group united by the common interest in physics. The diversity is healthy, but does lead to differences of opinion on what ISUS is and does.

Experiments have demonstrated beyond any doubt such effects as backward causation and precognition, not to mention non-locality which make many people very uncomfortable with the current scientific views on reality. I see a new openness and thirst for knowledge from unconventional sources blossoming.

Let us hope that ISUS can rationally help satisfy this thirst. There are plenty of sources that attempt to irrationally satisfy this thirst.
I do not want to see any of us behave similarly to the ways we accuse others of behaving. We must always maintain an open mind no matter how strange a new idea first appears. Always give it a decent hearing. Allow others to express themselves.

The most divisive issue is how much metaphysics is permissible to be incorporated into "Reciprocity". If we had a surplus of highly technical hard science papers, this would not be an issue, as they would be given precedence over the controversial ones. As it is, the number of papers submitted is painfully low.

In that case I have no problem including carefully selected metaphysical papers in "Reciprocity". As I have implied above, it's a fuzzy line separating physics and metaphysics, which line is going out of focus more with each passing day.

These are exciting times we live in, and we have the opportunity to be at the forefront of science!

All the best to you,

Hoyt A. Stearns jr., President, International Society of Unified Science!

---

A man is a great thing upon the earth, and through eternity
but every jot of the greatness of man is unfolded out of woman,
First the man is shaped in the woman, he can then be shaped in himself.
Walt Whitman

In all my lectures I have taught, one doctrine,
namely, the infinitude of the private man.
Ralph Waldo Emerson

assume among the Powers of the Earth, the equal and independent Station
to which the Laws of Nature and of Nature's God entitle them,
We hold these Truths to be Self-evident; that all Men are created equal and independent; that from that equal Creation they derive Rights inherent and unalienable; among which are the Preservation of Life and Liberty and the
Pursuit of Happiness;
A Declaration by the representatives of the United States of America in
genral Congress assembled.

If this country cannot be saved without giving up the principles of the
Declaration, I would rather be assassinated on this spot than surrender it.
Abraham Lincoln

E I: 8.1-4
International Society of Unified Science
21st Annual Conference

Dates: August 12 & 13, 1995. Monday & Tuesday morning

Location: Red Lion Hotel, 3203 Quebec Ave., Denver, Colorado
Across the street from the old Stapleton Airport

The special hotel room rate is $60.00 per room per night for
a room with double bed for one to four occupants. To get the
special room rates make your room reservations by calling
303-321-3333 Ext. 4500 before July 15th. You must mention you are
with the "Global Sciences Congress". (The hotel will not know who
ISUS is, so be sure and mention "Global Sciences Congress").

After July 15th the block of rooms that is reserved for us
will be released. The Red Lion Hotel has free airport pick up from
the Denver International Airport (DIA). During the conference,
emergency contact may be made with participants through Phillip
Porter at 800-873-7074.

Persons wishing to share a room and who do not have someone to
share with may contact Phillip H. Porter, 703 Sheridan Ave.,
Loveland, Colorado 80537-5467, who will coordinate requests.
Reserve a room and then contact Phil. Extra rooms will be released.

Those wishing to fly into the Colorado Springs airport may
contact Dr. Ronald Blackburn, 303-683-0420, FAX: 303-683-0428,
9546 S. Harford Ct., Highlands Ranch, Colorado 80126 to make
shuttle arrangements.

The ISUS Conference this year is being held just after the
Global Sciences Congress (GSC) which runs August 8-12, 1996. We
are getting favorable room rates because of the much larger GSC.
ISUS wishes to thank Mr. Dean Stonier, head of the Global Sciences
Institute, for making this possible. There is no connection
between the International Society of Unified Science and the GSC.

Last year several ISUS members attended the GSC and found it
very interesting. ISUS also had an exhibitors table which allowed
us to share with GSC participants about the Reciprocal System, give
out ISUS flyers and sell some of Dewey's books.

Those wishing to attend the GSC will need to register
separately. The GSC "Early Bird" registration, which must be
sent in soon, is $125.00 and you get front seating privileges.
Registration at the door is $160.00. Daily and session
registrations are also available. For complete information on the
GSC contact Global Sciences Congress, c/o 669 Peoria #345, Aurora,
Colorado 80011, phone 303-343-6461, FAX 303-344-1578.
Dr. K.V.K. Nehru, from Hyderabad, India, is expected to attend the ISUS Conference and Retreat. He also has been invited to present a paper on the Reciprocal System and speak at the International Forum on New Science, October 4, 1996, in Denver. In between, he will be in Salt Lake City reviewing Larson's papers.

ISUS Post Conference Mountain Retreat

We have made tentative arrangements for a mountain retreat after the conference for those interested. Interesting discussions on science and the Reciprocal System are expected. Other expected topics of discussion will be mountains, sky and trees.

It will be free form with time to do whatever we want. It is intended to be a vacation time as well as an idea stimulation and discussion time. People can stay as long as they wish.

It would be held in Estes Park, Colorado, a two hour drive out of Denver, at the H-Bar-G Ranch AYH Hostel facility. Estes Park is the gateway town to Rocky Mountain National Park. The H-Bar-G is an old guest ranch situated in a scenic location on the east side of the valley looking over the town and into the National Park.

The costs at the H-Bar-G are very reasonable. $8.26 per night with a $25 AYH membership. It is basic dorm accommodations in a lodge and cabins with central, shared kitchen facilities. We take care of our own meals. Stores and restaurant facilities are available in town, a short drive away. If enough advance interest is shown, we will have a cabin to ourselves.

Participants will need personal items and a sleeping bag or sheets. Blankets are available. Bring a coat. It gets cold in the mountains. Sturdy footwear is recommended.

Spouses and families can also come as there is lots to see and do in the area. Advance arrangements must be made for families to be housed together. The H-Bar-G has a rental car available when not scheduled. Limited arrangements can be made to get from Denver or Boulder to Estes Park.

In order for this retreat to be held, at least six people must send deposits by June 30, 1996 to Phillip Porter 703 Sheridan Ave., Loveland, Colorado 80537-5467. The required deposit is $8.00 for the first night. Make the check out to "H-Bar-G". Please include your phone number and a stamped, self-addressed envelope. Soon after July 1st, confirmation or cancellation notice will be sent so cheap air fares can be secured.
THE RECIPROCAL THEORY OF THE PHYSICAL UNIVERSE

Two postulates as to the nature of space and time—45 words in all—are the basis from which all of the conclusions of this new theory are derived. A development of the consequences of these postulates, without any supplementary assumptions and without calling upon any information from observation, accounts for the existence of the major physical entities, defines their properties, establishes the relations between them, and provides the information from which numerical magnitudes applying to these properties and relations can be calculated. For the first time in the history of science, a general physical theory is derived from a single set of postulates.

The Reciprocal System, developed by Dewey B. Larson over a 40 year time period, is at once revolutionary and conservative. It is the first unified theory and the first general theory, but its central ideas have been expressed by philosophers through the ages. From just two general postulates, Larson has derived an all-embracing theoretical universe, answering simply and reasonably such questions as:

What is the fundamental component of the Universe?
Why is the Universe expanding?
Why does Light behave sometimes as a particle and sometimes as a wave?
What holds the parts of an Atom together?

Why do Electrons and Positrons annihilate one another to produce photons?
What is the origin and nature of Gravitation?
What is the origin of Supernovas, Pulsars, and Solar Systems?
What is the connection between exploding Galaxies and Quasars?
What is the origin of the Cosmic Rays?
Is the Universe finite or infinite?
Is the Universe in a steady-state, or is it evolving?

MOTION IS THE FUNDAMENTAL ENTITY

The thesis of this present work is that the universe in which we live is not a universe of matter, but a UNIVERSE OF MOTION, one in which the basic reality is motion, and all physical entities and phenomena, including matter, are merely manifestations of motion. The atom, on this basis, is simply a combination of motions. Radiation is motion, gravitation is motion, an electric charge is motion, and so on.

The physical universe is not a universe of matter existing in a framework provided by space and time, as seen by conventional science, but a universe of motion, in which space and time are simply the two reciprocal aspects of motion, and have no other significance. Mr. Larson determined the properties that space and time must necessarily possess in a universe composed entirely of motion, and expressed them in the form of a set of postulates. He then showed that development of the consequences of these postulates by logical and mathematical processes, without making any further assumptions or introducing anything from experience, defines, in detail, a complete theoretical universe that coincides in all respects with the observed physical universe.

According to the SCIENTIFIC AUSTRALIAN, the Reciprocal System is "The True Theory of the Physical Universe—from Microcosmos to Macrocosmos."

WE CAN TELL YOU ABOUT IT

The International Society of Unified Science, Inc. is a group of scientists, engineers, and others who are trying to call attention to Dewey B. Larson’s theory of a universe of motion. The objective of the Society is the advancement of the Reciprocal System which makes use of two fundamental postulates, together with everything that can be derived from these postulates by logical or mathematical processes. The editors of Reciprocity, Journal of the International Society of Unified Science, welcome papers, ideas, and experiments, especially from new contributors.

Membership is open to all persons interested in the advancement of scientific knowledge.
SPACE-TIME and BEYOND

Frank H. Meyer

(This lecture was presented to the U.S. Psychotronics Association's Annual Conference during July, 1985 in Dayton, Ohio.)

Dewey B. Larson\(^{1,2}\) has discovered and elaborated how to unify physics through his Reciprocal System of Physics and Philosophy. This discovery, I think, is the one most important development and achievement of world science since the Copernican Revolution, which began in sixteenth century Poland and Europe. Larson has accomplished his work, I suggest, by following the precept of Frederick Nietzche: "If you seek comfort, believe; if you seek truth, then inquire."

Before Copernicus, religion and science in the West taught that the supreme worth of humankind depended on the presumed fact that the whole physical universe is centered about an immovable earth. The presumed fact was and is, no fact at all. Copernicus's detection of this elementary error of science and religion was a most salutary development. "A truth that disheartens is of far more value than the most stimulating falsehood. Without veracity neither science nor religion can be produced, let alone unified.

More than four centuries after Copernicus, as the twentieth century draws to a close, science is about to take a giant leap toward unification. Thanks to the Reciprocal System, a quiet revolution recently already has occurred in physics. This break in continuity not only will take the Copernican Revolution further forward, turning science from a sun-centered direction to a bio-centered orientation: it also will accelerate the world-wide endeavor to unify physics that has commenced at the beginning of this century. All this will be a welcome change for all people interested in advance in the life of both science and religion, because unification of religion can hardly even begin until substantial unification and understanding of science is produced.

OVERCOMING DISUNITY IN PHYSICS

Physics presently is more disunited by what physicists know that isn't so than by what we don't know. No science can be united on a foundation of error. Physics has not been the truth, the whole truth and nothing but the truth even about the physical world. An even more fundamental error in science is also more widespread in modern times. It is the error of believing that all that exists is in space and time, and specifically in an unmoving, immovable 4-dimensional space-time continuum. It is the error of believing that the human world is only a part of and less than the physical world rather than that humankind is the larger whole, of which the whole physical world is only a part.

The contemporary situation in physics is analogous to that which prevailed in sixteenth and seventeenth century Europe. The general run of natural philosopher then knew that heaven, earth and the rest of the physical universe are centered about an immobile planet. Physicists then were referred to as 'natural philosophers'. To-day's philosophers of Nature "know" that all that exists on earth, in heaven and beyond is centered about moving matter. Nevertheless, the physical universe and the human universe are no more centered about moving matter than all of existence is or ever was centered about an immovable earth.

Larson has shown that the physical universe itself actually is the whole universe of motional speed displacements from unit speed of space-time progression. Thanks to the R.S., we think that the material sector of the physical universe is but one half of the physical universe as a whole. This sector is the half in which everything moves in space and everything moves with a speed less than the unit speed of space-time progression.

In the other half, which Larson calls the 'cosmic sector', everything moves in time. In this sector a condition of stability is that everything moves in time with speed in excess of unit speed.

A model of the physical universe, premised on moving matter, contradicts itself. Because motion is presumed to be a property only of matter, the model implies that motion without matter is impossible. Of course, this rules out any independent progression of space with unit progression. Here is the reason conventional physicists are unable to measure the rate with which time progresses. Space-time progression is an immaterial, quantised physical phenomenon, a nothing-nothing, dependent on the finite divisibility of both space & time and motion.
hat has to be recognized also is that if matter were the exclusive source of motion, that is, if motion were a property of matter, then matter would be self-moving. In consequence, perpetual motion of the first kind and of a second kind not only is not prohibited, but can and does occur. However, no one has yet demonstrated perpetual motion in the physical universe. Until someone does demonstrate it, the hoary hypothesis that motion nothing but an inessential or essential property of matter had better be discarded in favor of the postulate that motion is identical with space-time.

DEFINITY OF SPACE-TIME AND MOTION

An outstanding discovery of the Reciprocal System of physics is that the physical universe is limited to the world of space and time and that physical space-time is identical with physical motion. This is because physical motion always involves a special relation of space and time and nothing else.

Without identifying the nature of space and time, Newton found them to be quite unrelated. Without identifying the nature of the relation of space and time, Einstein did find them to be inseparable in physical fact. Unfortunately, both Einstein and Newton ruled out the possibility that space and/or time have to do with and are related to motion. Both agreed with Isaac Burrow's reply to the question: "But does not time imply motion?" Not at all. Both disagreed with Aristotle, for whom "time is an aspect of motion." Neither Aristotle, Newton, nor Einstein, recognized that space also is an aspect of motion.

n actuality time and space are the two necessary and sufficient conditions or aspects of all physical phenomena of motion. All physical motion, according to Larson, invariably is a reciprocal or multiplicatively inverse relation of time and space. In their turn, space and time together depend for their very existence on the existence of motion. Anyone in the material sector can verify for oneself that slower motion equals less space and more time, while faster motion equals more space and less time. Speed displacement from the unit speed of space-time progression is the natural and adequate measure of all scalar motion, physical in nature. Energy and mass as discrete quantities of diverse compounds of motion can be and are equal or equivalent. Energy and matter (mass) are not identical.

Recognizing the identity of motion and space-time, D. B. Larson has created the Reciprocal System of physics. It essentially consists of two Fundamental Postulates, expressing the postulated properties of space and time in a universe of motion:

1. The physical universe is entirely composed of one component, motion, existing in three dimensions, in discrete units and in two reciprocal forms, space and time.

2. The physical universe conforms to the relations of finite mathematics, its magnitudes are absolute and its geometry is Euclidean.

Through the aid of the Reciprocal System Larson discovers, by implication, that the physical universe, while enormous, is finite in all its parts and is finite, cyclical and unchanging as a whole. It is in no sense itself infinite. Larson says: "Infinity is excluded from it, since we are defining motion as a relation between a time magnitude and a space magnitude, and we deduce that the quantity of motion is finite. Since all physical entities and phenomena are manifestations of motion, they are all measured in terms of 1/n or n/1, where n is finite. No infinities are possible. This is another of the many places where the Reciprocal System of physics has an advantage over conventional theory, in which infinities are a considerable source of embarrassment. As Richard Feynman puts it: "If we get infinity, how can we ever say that this agrees with nature?"

Since the physical universe is a finite whole, it is governed throughout by the basic Euclidean axiom, which pertains to all finite wholes: a part is less than the whole and only the sum of the parts equal the whole.

The finitude of the physical universe implies that each and every part of it is less than the whole and only the sum of the parts can and does equal the whole. Thus, no part of it can be or is equal to or greater than the whole. For example, the mass of an electron cannot be infinite and greater than the total finite mass of the whole physical universe, even when by moving in time it travels with an inverse speed in excess of unit speed.

OVERCOMING THE DISUNITY OF HUMANKIND

What lies beyond Space-Time? Humankind!

While revaluing the nature and structure of the physical world, can the Reciprocal System serve to revalue also the relationship of humankind, particularly the private man and/or woman, to the physical world? I believe so. Unifying the science of physics is an essential and indispensable step of the inquiry into advancing the aim and knowledge of uniting humankind.

While revaluation of the human world and nature is far more difficult than revaluing the physical world and

9
nature, the goal of uniting humankind is just as important and probably more important than even the goal of unifying physics.

Now that the Reciprocal System discloses that the physical world as a whole is a finite and unchanging whole, how about the human world as a whole? Is it too, finite and unchanging, or infinite and evolving?

At first the human world appears to be as finite as the physical world, since in so far as human beings are physical beings we too are not otherwise than finite. To this degree we can be counted, measured and computed by the same finite arithmetic which applies to counting, measuring and computing all the commodities we produce that are bought, sold and owned in the marketplace.

Price is the measure of all finite values expressed in terms of medium of exchange commodity, money. It appears that in all respects in which private human individuals are physical and unequal, we are finite: height, weight, performance, knowledge, ignorance, intelligence, stupidity, longevity, etc. In the light of available evidence further reflection reveals that the case is far from proved that a human being, specifically an ethical human being, is nothing but a finite physical being.

Finite unities are not the only kind of gestalt wholes. Infinite unities also are known to exist. The human realm as well as the realm of numbers are known examples of infinite wholes. Until recently mathematicians themselves maintained that no one could count the infinite and consequently infinite unities went largely unnoticed. However, a little more than a century ago a European mathematician, Georg Cantor, showed that it is not impossible to count the infinite by learning how to count numerous infinite mathematical unities or sets. Infinite unities now can be counted just as well as finite unities, but are characterized by a quite different axiom from the Euclidean axiom which characterizes all finite unities. All infinite unities or wholes are characterized by the Cantorian axiom: A proper part of each infinite whole equals the whole.

It has been known for some time that the whole set of counting numbers is an infinite set. Cantor demonstrated that this whole set can be counted with just the even counting numbers.

In 1846 Ralph Waldo Emerson wrote in his diary: “In all my lectures I have taught one doctrine, namely, the infinitude of the private man.” When Emerson wrote “man,” I think he included “woman” as well in the generic term for humankind. I think further that he intended “infinitude” to refer to the ultimate human worth of the private ethical man and/or private ethical woman - men who cannot be bought, women who cannot be sold. If “man” denotes an ethical human being, who behaves as best as he or she knows how, is the private man infinite or not in ultimate human worth? Probably no question more relevant to the aim of uniting humankind calls for an answer.

A private human individual, being finite in ultimate human worth, would be compatible with his being entirely a physical being. Since finitude implies inequality, private persons of finite worth also would be compatible with the aristocratic doctrine of human inequality, i.e. that all men are created unequal in ultimate human worth as well as in performance and longevity. Here is the doctrine, enforced with deception and violence, that divides and disunities humankind.

A private human individual, being infinite in ultimate human worth would be compatible with his being ultimately a non-physical being, temporarily housed in and governing his physical being (his material body and biological control unit). Since infinitude implies equality, private persons of infinite worth also would be compatible with and enhance the democratic doctrine of human equality, i.e. that all men are created equal in ultimate human worth, however unequal in performance, longevity, etc.

If the doctrine of human equality be true and is voluntarily acknowledged by the people, then humankind can and may take a big step forward to the goal of uniting our potential and ourselves instead of continuing wantonly to waste them.

The doctrine that all men are created equal, namely, the doctrine of human equality, can be demonstrated as follows, only if the private woman and/or man is infinite in ultimate human worth:

The worth of a person is due to her or his membership in an infinite whole, namely, Humankind. Infinitude means that any one member is equal in worth to the whole of Humankind. Since all entities equal to the same entity are equal to each other, all men are created equal.

Until you learn to appreciate that your own ultimate human worth is infinite and to behave and love yourself accordingly, you cannot appreciate adequately the worth of friends and strangers, who behave themselves and love themselves, as they should.

SPACE-TIME AND BEYOND

Humankind is involved with Space-Time (the physical world) and Beyond (the human world, of which the
physical universe is but one part). The human universe is infinitely larger, greater and more remarkable than the entire physical universe. The physical universe as a whole is finite, cyclical and unchanging: the more its parts change, the more the whole stays the same. The human universe is infinite, law-governed, evolving, growing, discovering, creating.

The direct way to explore and examine the human world is to explore and examine its simplest and most accessible sectors, the material and cosmic sectors of the physical region. Physics is easier to unify than religions and unified physics will facilitate the more difficult and important aim of unifying religions.

Let me finally try to dispel the myth that unless you are a physicist yourself, you are hopelessly and forever unable to explore, learn about and understand the physics of the Reciprocal System, the theory of relativity, quantum mechanics, etc.

As a boy, I remember being told that no more than six people, including Einstein, could ever understand the theory of relativity, no matter how hard you tried, because Einstein himself couldn't explain it to you, unless you first studied a whole lot of mathematics for the rest of your life.

Einstein himself made no such claim or pretext. One afternoon on the Princeton campus Einstein took a coffee break in a room of the Institute of Advanced Study. A graduate student in the Woodrow Wilson School of Political Science wandered into the room. Seeing Einstein, the political science student saw an opportunity to learn about the theory of relativity, about which he had heard a lot but never studied. He introduced himself to Einstein, told Einstein where he came from and wondered whether the physicist could brief him about the famous theory. Einstein smiled at him and said:

"Young man, it is like this. If you sit with your girl on a sofa, two hours go by as though they were two minutes. But if you sit on a red hot stove, two minutes seem like two hours. That's the theory of relativity."

Like the theory of relativity, the Reciprocal System of Physics and Philosophy can be learned by anyone who cares enough to know about it.

REFERENCES


The divine likeness of man is an idea known in many religions. It is the contribution of Judaism to have taught the tremendous implications of the idea; the metaphysical dignity of man, the divine preciousness of human life. Man is not valued in physical terms; his value is infinite.

Abraham Heschel: The Insecurity of Freedom

True religion is that relationship in accordance and reason and knowledge, which man establishes with the infinite world around him and which binds his life to that infinity and guides him.

Leo Tolstoy: A Confession and other Religious Writings.

(The Declaration) acknowledges that man has a soul and for that reason is equal to every other man, and that is the cornerstone of what we call the American System.

Dwight Eisenhower

It is wrong to say that God made Rich and Poor; he made only Male and Female and he gave them the earth for their inheritance.

Thomas Paine
ISUS News
The Newsletter of The International Society of Unified Science

Volume VIII, Number 2  Autumn, 1996

The Twenty-First Annual Meeting of the Members of the International Society of Unified Science

And Introducing Papers on

Beyond Space and Time—Larson's Final Work
# Table of Contents

Minutes of the Twenty-First Annual Meeting of the Members of the International Society of Unified Science

*Lawrence E. Densow, Secretary*  
3

The ISUS Retreat at the H Bar G Youth Hostel

*Lawrence E. Denslow*  
6

Monist or Dualist?

*Ronald W. Satz*  
7

Correspondence Between Ronald W., Satz and Dewey B. Larson Regarding Larson's New Book, *Beyond Space and Time*

*Ronald W. Satz and Dewey B. Larson*  
9

Evidence that Woman and Men are Equals is True Infinitude of the Private Person

*Frank H. Meyer, Otto H. Schmitt, and Bruce M. Peret*  
13

The Physical and the Human: Part and Whole

Commentary on the ISUS Retreat

*Bruce M. Peret*  
18

Correspondence Between Frank H. Meyer and The Scientific & Medical Network

*Frank H. Meyer*  
19

---

**ISUS News Staff**

<table>
<thead>
<tr>
<th>Name</th>
<th>Contact Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frank H. Meyer</td>
<td>1103 15th Avenue SE, Minneapolis, MN 55414 <a href="mailto:meyer078@maroon.tc.umn.edu">meyer078@maroon.tc.umn.edu</a></td>
</tr>
<tr>
<td><strong>Editor</strong></td>
<td></td>
</tr>
<tr>
<td>K.V.K. Nehru</td>
<td>P.G. School, J.N.T. University, Hyderabad 500029, India <a href="mailto:nehru@isus.wierius.com">nehru@isus.wierius.com</a></td>
</tr>
<tr>
<td><strong>Associate Editor</strong></td>
<td></td>
</tr>
<tr>
<td>Bruce M. Peret</td>
<td>7201 36th Avenue N, Apt 221, Crystal, MN 55427 <a href="mailto:bruce.peret@dtc.fingerhut.com">bruce.peret@dtc.fingerhut.com</a></td>
</tr>
<tr>
<td><strong>Associate Editor</strong></td>
<td></td>
</tr>
</tbody>
</table>

*ISUS News* was typeset on an Amiga 3000 using PageStream 3 by SoftLogik Publishing Corporation. Please send electronic submissions on an Amiga 880k floppy, an IBM 720k MS/DOS disk, or via E-mail to bruce.peret@dtc.fingerhut.com. MIME and UUEncoded E-mail formats accepted for flat text, ZIP, ARC, and LHARC compression formats. PGF key available upon request. Documents can be in ASCII (ISO-8859-1 Latin-1 character set), Excellence, Final/Writer, ProWrite, RTF, WordPerfect, or WordWorth formats. Flat text preferred. Graphics can be in BMP, EPS, GIF, IFF/ILBM, JPEG, MacPaint, PCX, ProDraw, PICT, or TIFF formats. JPEG preferred. Send hardcopy to the Editor, Frank Meyer. Please send hardcopy as well as electronic media if your submission contains complex graphics or equations.
Minutes of the Twenty-First Annual Meeting of
the Members of the International Society of
Unified Science

President Hoyt A. Stearns formally opened the meeting at 8:00 A.M., August 13, 1996, in room 959, the Director's Suites, at the Red Lion Hotel, Denver, Colorado, U.S.A.

Members Present

| Hoyt Stearns  | Rainer Huck    |
| Larry Denslow | Frank Meyer    |
| K.V.K. Nehru  | Phil Porter    |
| Tom Kirk      | Bruce Peret    |

Reports

Motion by Phil Porter to dispense with the reading of the MINUTES of last year's meeting due to prior publication of minutes, second by Rainer Huck, passed unanimously. No corrections noted.

Treasurer's Report

Sum of accounts, checking, money market, and W.A.F., as of July 8, 1996, $5,100.89. Writer's Assistance Fund payout will reduce this balance by an estimated $1000. Memberships and subsequent book sales to increase the balance. Liability for royalties to Mrs. Larson on D.B.L. books will be due in December. Motion by Phil Porter to accept Treasurer's Report as given, seconded by Frank Meyer, passed unanimously.

Editor's Report

Costs to publish have increased although our costs have decreased due to reduced number of issues and mailings. total slightly under $400. Other editorial expenses have added another $200; exact amounts in Treasurer's written report. Associate Editor Daeron Meyer has submitted his resignation effective immediately. It is requested that Bruce Peret be appointed to that position. The present editor submits his resignation to be effective June 1997. Reasons for taking this action are personal. After discussion the editor agreed to extend his service in that capacity until appropriate staff is available to carry on that function without his input. Reciprocity is the life blood of this organization and without it we would not have survived this long. Motion by Phil Porter to accept the Editor's Report with strong thanks from the Society for the many years of excellent service in that capacity, second by Rainer Huck, passed unanimously.

Election of Board Members


Motion by Larry Denslow that Meyer, K.V.K., Porter, Sammer, and Simms be re-elected to board membership, term ending 1999, second by Tom Kirk. Passed unanimously. Frank Meyer nominated Bruce Peret to fill the remainder of term ending in '98, seconded by Larry Denslow, passed unanimously.

General meeting adjourned at 8:33 A.M.

Meeting of the Board of Trustees for the International Society of Unified Science


Secretary L. Denslow accepted nomination for another year in that position, re-elected unanimously. Rainer Huck was nominated and elected to continue in the position of Executive Director. Rainer Huck requested that the position of Treasurer be separated from that of Executive Director, since they were in fact separate offices.
and submitted his resignation from the position of Treasurer. Resignation from the office of Treasurer was accepted by the Board with a hearty vote of thanks for his twenty years of service in that position. Motion to that effect was made later in the meeting which passed unanimously.

Phil Porter nominated and Frank Meyer seconded nomination of Larry Denslow for Treasurer. Unanimous election to that office combines the jobs of secretary and treasurer, but does not combine the offices; they remain separate offices to be elected individually in subsequent elections of officers.

Nomination of Ronald Satz to the position of Vice President, seconded by Larry Denslow, followed by discussion of the relationship between his position as Executive Researcher and that of V.P. The function of Executive Researcher is an appointed position to chair the review committee for any papers initially rejected for publication. The committee is composed of the President, V.P./Executive Researcher, and K.V.K. Nehru. Ronald Satz was elected unanimously to the position of Vice President.

Nomination by Larry Denslow that Hoyt Stearns be elected for another year as the President of ISUS. Second by Rainer Huck, and others; Hoyt Stearns elected unanimously.

Old Business consisted of: Internet discussion; Motions from 1995 meeting concerning investigation and formation of documents to be placed on Internet required no action by the board prior to or during the 1996 meeting. The motion for the treasurer to obtain E-mail address was passed on to the new treasurer. The motion concerning a table at the IANS conference was taken care of by Phil Porter.

Further comments concerning E-mail showed that it is excessively expensive in foreign countries, while other aspects continue to make it difficult for all members to have access. Several members have separate accounts and make significant use of electronic communication; however, until all members have some kind of access, not much can be accomplished via that media.

New Business discussions concerned several topics:

Bruce Peret was asked to accept appointment to the editorial staff of Reciprocity and ISUS News as Associate Editor. Accepted.

Tom Kirk desired further clarification of criteria for publication specifically with respect to requiring precise points of connection and divergence with previously proposed concepts within the RST. Several members added their comments which confirmed the idea that Reciprocity should have separate sections devoted to different aspects of the theory with different criteria for publication in each section rather than the present "blanket" guidelines. Motion was made that Tom, Bruce, and any others interested, prepare a formal set of rules by which judgments of suitability can be made concerning content, structure, and presentation of ideas in papers submitted for publication by ISUS. This is a motion of encouragement for those interested in this question to become involved in the process by critiquing the previously published paper in ISUS News on this topic. Motion was seconded by Larry Denslow. The motion passed unanimously.

Frank Meyer read a proposal for a resolution which required further study and thereby drew a motion to table the resolution for further study. Rainer Huck seconded the motion to table the resolution as read. Our position with respect to D.B. Larson's Beyond Space and Time was discussed at length. The motion "to table" passed unanimously. Phil Porter made motion to list D.B. Larson's Beyond Space and Time as being available for purchase thru ISUS. Bruce Peret seconded the motion. Choice of how to categorize this and The Road to Full Employment for listing in books available thru ISUS is left to the discretion of the editors was added as a friendly amendment. This motion passed unanimously.

Phil Porter made motion that the audio tape entitled "D.B.L., WSSU 1969" have multiple copies made and become available for sale thru ISUS. Second by Frank Meyer and passed unanimously.

Motion was made by Phil Porter to allow publication of papers reviewing any and all of D.B. Larson's books and papers whether related to his views concerning economic or non-physical concepts in ISUS News until such time that a broader policy of publication becomes available and that papers related to the physical aspects of the Reciprocal System of theory be continued in Reciprocity. Second by Frank Meyer with subsequent unanimous passage. Discussion concerning the nature of the content in each of the publications presently supported by ISUS was part of the deliberations.

Motion by Larry Denslow to have the book, "Fundamentals of Scalar Motion in a Multiple Reference Point Universe of Motion" be made available thru ISUS. Following a second which the
Secretary could not identify and considerable discussion concerning the question of whether contradictions exist between Larson’s concepts and those of Denslow. The question requiring possible modifications in mode of expression of all subsequent authors by imposing sanctions regarding the listing of works available thru ISUS was brought up. Comment was made in this discussion that ISUS is NOT and should never become a “religion, defying Dewey B. Larson”; he is merely the author of a new idea. Unanimous passage of the motion was obtained. Another motion by Larry Denslow that ISUS accept the donation of copyright to the book, Fundamentals of Scalar Motion..., which it is his desire to give to ISUS. Second by Rainer Huck. Unanimous passage of motion to accept the donation. Motion by Phil Porter that the Board of Trustees grant Larry Denslow rights of revision and that all revisions be brought to ISUS to establish continued publication of the work. Second by Larry Denslow signifying acceptance of the conditions in the motion brought unanimous passage.

Motion was made by Rainer Huck that Arnold Studtmann’s dissertation entitled “Toward a Unified Cosmological Physics: The Reciprocal System of D.B. Larson” again be made available thru ISUS. Seconded by Phil Porter. Price to be established by cost of printing. Motion passed unanimously.

Motion was made by Bruce Peret that the previous volumes of Reciprocity be bound together, with updated index, as a single publication to be made available thru ISUS. A friendly amendment by Rainer Huck was added to the effect that Bruce accept the responsibility for the task and, thereby, the Executive Director will supply him with a full set of all back issues of Reciprocity. Format of the compilation to be at the discretion of Bruce Peret. Second to the amendment was not identifiable. Call for the question was made by Tom Kirk, the motion then passed unanimously.

Bruce Peret made motion that business cards be made for board members of ISUS to be able to give as advertisement for ISUS, funds for these cards to come from ISUS. Second by Phil Porter with request for clarification. Discussion resulted in passage of the motion with amendments for the

Secretary/Treasurer to obtain an appropriate number of cards suitable for individual members to add their own name and address and to distribute an appropriate number to board members.

Discussion concerning next years conference was opened with considerable debate as to time and location. A motion was eventually made by Phil Porter that Hoyt Stearns host the 1997 Conference in the Phoenix/Scottsdale, Arizona area, and that we try to have a Retreat in the Sedona area after the conference. Amendment by Larry Denslow that the conference be Friday, Saturday, and/or Sunday, August 1, 2, and 3, 1997 was made before second to the original motion. Second by Rainer Huck to the motion as amended. A friendly amendment was added that if suitable accommodations could not be arranged in that area, the President, the Executive Director, and the Secretary/Treasurer, as a committee, select an alternate location and time. Motion passed unanimously.

Motion was made by Rainer Huck that our sincere thanks be extended in writing from the Secretary to Dean Stonier and the Global Sciences Congress for allowing us to take advantage of the arrangements by him and room for our meeting. Second by Frank Meyer. Motion passed unanimously.

Motion was made that thanks be conveyed by Frank Meyer to his grandson Daeron Meyer for service to ISUS in his capacity as Associate Editor of Reciprocity. Second by Phil Porter. Motion passed unanimously.

Personal thanks from all present were extended to Dr. K.V.K. Nehru for his attendance in spite of the great expense incurred; as well as, for his contributions thru correspondence and papers to our greater understanding of the concepts of the Reciprocal System of Theory.

Motion to adjourn was made by several members with as many seconds; hearing no opposition, the meeting was adjourned at 11:39 A.M., Tuesday, August 13, 1996.

Respectfully submitted:
Lawrence E. Denslow, Secretary

"There will be peace in the world only when there are equality and security everywhere for all human beings. These peace plans upon which men consume their days and brains are useless... to work for peace as though it were a thing in itself with no relation to causes is the crowning folly of our foolish age."

Pearl Buck, 1986
The ISUS Retreat at the H Bar G Youth Hostel

Larry Denslow

The Secretary is taking this opportunity to report to the membership that the Retreat held at the H Bar G Youth Hostel near Estes Park was very much worthwhile. Daytimes were spent hiking and riding in the Rocky Mountains National Park and evenings were spent in discussion in the living room of the main lodge. Several rather important decisions were accomplished during this time which was shared by several people not yet members of ISUS. The importance of simple and consistent nomenclature by which to describe the nature of the motions required to represent phenomena of the physical universe was among those accomplishments. The book written by Larry Denslow, "Fundamentals of Scalar Motion..." has been revised already to incorporate those results.

As a point of interest for those members who may have the impression that D.B.L.'s work should not be revised in any way, comment must be made that no new idea has ever been presented to mankind in its final, absolute form. My work is an outgrowth of the necessity to show "why" the modes of motion used and described by D.B.L. are both logical and required. The new nomenclature is a result of consensus, not a unilateral declaration. Investigation by readers of that work will show complete mathematical consistency for the descriptions used as well as considerable simplification of the concepts involved.

The probability is that next year's Retreat can be more productive. All members should plan to attend.

Announcing the Publication of

Beyond Space and Time

by Dewey B. Larson

At last, 5 years after the passing of the most important writer in the history of science comes the final volume...

_Beyond Space and Time_ is a comprehensive overview of science and its relation to the major philosophies and religions of the world. As the culmination of a lifetime of research on the fundamental structure of the physical universe, the author delves into the metaphysical ramifications of the universe as derived from his Reciprocal System of Theory on quantum space and time. By establishing a logical foundation for existence outside the physical universe, Larson takes one on a journey from biological groundwork, through the meaning of dreams and the moral values inherent in all world beliefs, to the final destiny of humankind—both as individuals and as a species.

While completely accessible to the general reader, the book is targeted especially toward the devout scientist who finds his life frequently torn between logic and faith. In an age when the quickening advance of science and technology is often at odds with humanity's innate longing for spiritual moorings, this timely volume sheds new light on the age-old conflict between science and religion, the personal aspect of ethics, and the consequences of a reality beyond space and time.

Don't miss your chance to own what one critic has called "one of the ten most important books of the 20th century."

Hardcover, 384 pages, $29.95, available from the ISUS Bookstore. or send prepaid orders to:

Tucek and Tucek, Book Publishers
1651 W. San Lucas Drive
Tuscon, AZ 85704
Monist or Dualist?

Ronald W. Satz, Ph.D.

Judging solely by the title of one of D.B. Larson's books, Nothing But Motion', a reader would conclude that he was a monist: one who believes that every existent is a unit of motion or a combination of units of motion (space-time). But just recently, Larson's metaphysical work, Beyond Space and Time², has been published. Judging solely by this title, a reader would conclude that Larson was not a monist, but a dualist (or more).

Of course, we know that as far as the physical world is concerned, Larson was, indeed, a monist. But, contrary to most theoretical physicists, Larson did not equate the physical world with existence as a whole. I will now briefly summarize his entire system here, as laid out in the above two books, and others.

Summary

In the physical universe, there are two sectors—material and cosmic. The cosmic sector is the inverse of our sector, with space and time interchanged. A biological organism (in the material sector) is a material entity controlled by a cosmic entity (in the nuclei of cells and the nervous system—the mind; as Samuel Alexander said in Space, Time, and Deity³, “Time is the mind of Space.”) Biological organisms evolve until preethical human beings are reached. In Larson’s metaphysics there is a third sector of the universe, which is non-physical, non-space-time, made up of metaphysical units. An ethical human being has a metaphysical unit (simple or complex) controlling the biological organism (a higher-level mind controlling the biological mind). Larson thus provides a scientific justification for the traditional belief of the tripartite nature of human beings: body, mind, and soul. Since the metaphysical unit is not physical, it is not destructible and thus survives the death of the body and mind. It may then be reincorporated into a new body (or mind); thus Larson provides support for reincarnation on this or another planet. Communication between or among metaphysical units is by telepathy, or religious revelation, by scientific insight, and by intuition. “Memory” of past lives is by clairvoyance.

Problems

What is a metaphysical unit, if it is not a space-time structure? And: how does it interact with space-time units? Larson does not answer these questions! The metaphysical unit, it seems, is unanalyzable. This is the same “negative” theology that Rand⁴ railed against. Also, ESP still has not been confirmed; in science, we need to replicate experiments. (The April issue of Discover⁵ has an interesting article on CIA’s 20 year research into ESP, which has now been discontinued. The data does seem to indicate results above chance levels, as did my experiments in high school—but I am not really sure!) Also: the various religious revelations disagree with one another; how can we possibly rely on any such mechanism? Besides, no such revelation may violate the rule of reason: contradictions cannot exist in the universe.

Discussion

Larson’s metaphysical system has elements of Buddhism and Judaism in it; many theoreticians seem to come to these conclusions in their old age. It is definitely not Christian or Islamic. Larson has a chapter on Humanism (but none on Objectivism)—mostly attacking it (although, Larson was not a supernaturalist or theist). The recent spate of terrorist suicide bombings in Israel confirms, again, that there is no supernatural beings protecting us. The Islamic belief of a bodily paradise is false; there is no survival of anything physical (biological) after death; these bombers obviously have no metaphysical control units, so they do not survive at all! Thus, the joke is on them.

Evil results from the absence of a metaphysical control unit in a criminal. All metaphysical units are “good,” so there is no dualism of good vs. evil in the system: the dualism is between physical and metaphysical units (and physical/biological units are not had per se). Rehabilitation is not possible simply because a criminal does not have the specific organ necessary to control his impulses properly in the first place. A perusal of the Humanist or Objectivist literature finds many references to the “soul,” so even ostensibly atheistic systems cannot dispense with the concept.

Larson says that our purpose is to build our metaphysical control units (rather like body-building
for the soul). This is reminiscent of Galt's statement that "As man is a being of self-made wealth, so is he a being of self-made soul." To me, this means minimizing entropy and maximizing efficiency on Earth and other hospitable planets in the universe. Over millions or billions of years, our metaphysical control units will continue to grow and differentiate—there is no merging of everything as in Buddhism. Personally I would much prefer to be on a planet millions or billions of years more advanced than Earth. But: the optimal solution is optimal forever (which is why I've written commercial software packages with titles like Optimal Manager®, Optimal Engineer®, and Optimal Scientist®).

Philosophers and readers familiar with Plato will recognize that the system described is very Platonic, with the metaphysical sector substituting for the realm of Forms. But Larson, I believe, would posit that physical and metaphysical entities are equally real.

Larson's metaphysics is not fundamentalist or supernaturalist. It is naturalistic, yet transcendental (meaning that there is an outside sector to our normal everyday world). There is no hook like this anywhere (on Earth).

References


Appendix

I reviewed a draft of Larson's Beyond Space and Time in December of 1981. Enclosed is a copy of my letter to him and his response.

"You will see in this my notion of good works, that I am far from expecting to merit heaven by them. By heaven we understand a state of happiness, infinite in degree, and eternal in duration: I can do nothing to deserve such rewards. He that for giving a draught of water to a thirsty person, would expect to be paid with a good plantation, would be modest in his demands, compar'd with those who think they deserve heaven for the little good they do on earth."

Benjamin Franklin, 1753 CE

"The creation we behold is the real and ever-existing word of God, in which we cannot be deceived. It proclaimeth his power, it demonstrates his wisdom, it manifests his goodness and beneficence...

"I trouble not myself about the manner of future existence. I content myself with believing, even to positive conviction, that the power that gave me existence is able to continue it, in any form and manner he pleases, either with or without this body; and it appears more probable to me that I shall continue to exist hereafter, than that I should have had existence, as I now have, before that existence began."

Thomas Paine, 1794 CE
Correspondence Between Ronald W. Satz and Dewey B. Larson Regarding Larson's New Book, Beyond Space and Time

(The series of questions posed by Ronald W. Satz and Dewey B. Larson's answers have been merged together for readability. --Ed.)

Dec. 12, 1981

Dear Dewey,

I just finished reading *Beyond Space and Time*. It read very smoothly. Certainly it is on a very high ethereal plane. Here are my questions and comments:

Ronald W. Satz

Feb. 13, 1982

Dear Ron:

Your comments on BS&T are interesting, but to a considerable extent they are outside the scope of the subject matter that I have attempted to cover in the book. My intention has been to confine my investigations in this subject area to matters that I can treat by the same scientific methods that I have used in the physical development, and I am reluctant to go beyond the limits to which I can carry this policy. I will therefore have to pass over without comment two categories of items, which I can define as follows:

**Category I**: Subjects that I did not address at all. As I said in the preface, “Subjects that are not covered herein simply represent territory that was not explored... there is no significance in the absence of any particular subject from these pages.” The items in this category really represent an agenda for further study. Since I have not studied them—at least not to the point of treating them scientifically—I do not feel that I am ready to express any opinions on them.

**Category II**: Items that go into the subject matter in greater depth than I have undertaken to reach. Again quoting my preface, “this work... is simply a pioneer expedition into this hitherto scientifically uncharted region.” You are asking me for the topography of the interior where I have only explored the coastline.

On this basis, I will make the following remarks on your numbered items:

Dewey B. Larson

<table>
<thead>
<tr>
<th>Questions and Answers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q 1 (Satz): The cosmic life control units are physical and said to be associated with material units in the cell nucleus and nervous system. Precisely what are they and how can we find them experimentally?</td>
</tr>
<tr>
<td>A (Larson): All negative motions—the electronegative components of the atomic motions, for instance, and most electrical phenomena—are cosmic in character. Thus cosmic motions play a role in the material sector that is minor in magnitude, but often determines the direction that the action takes. My conclusion is that after the normal aggregation processes of the material sector have built up a large and complex molecule on the order of DNA, a cosmic-oriented component joins the molecule, and alters its behavior. Of course, this is only a rather vague idea as yet—I don't have anything in the way of details—but something of the sort is certainly a distinct possibility.</td>
</tr>
</tbody>
</table>
Q 2 (Satz): Precisely what is the Sector 3 control unit? Is it simple or compound? If it is non-space-time how can it interact with a space-time unit?

A (Larson): Category II. Just in case you feel that one cannot legitimately assert the existence of such a thing without being able to answer such questions, let me point out that if you asked Newton questions of this kind about gravitation, he could not answer them either.

Q 3: How can there be a sector completely outside of space-time? Wouldn't it be more likely that our 3-space-time is embedded in a 4-space-time and that all non-physical communications or interactions come from the 4th space-time dimension?

A: No, I can't buy this at all. The universe is definitely three-dimensional. My finding that space and time are constituents of the physical universe, not a container or setting for that universe completely demolishes the idea that all existence must be in space and in time.

Q 4: The most critical problem of our time is not that of the relation of science to religion. It is the ideological battle between individualism and collectivism. Yet nothing is said on this.

A: Category I. Incidentally, I don't agree with your premise.

Q 5: If the purpose of humans is the evolutionary development of ethical personalities, this would appear to imply that there was a creation of the universe, for that purpose.

A: Perhaps, although I don't believe that it necessarily follows.

Q 6: There must be overall conservation of Sector 3 control units. How does this fit in with the scheme?

A: I do not accept this premise either.

Q 7: It is collectivist to assume that there is one purpose for all of humanity.

A: So what? I don't like the collectivist philosophy either, but so far as I can see, the issue of individualism versus collectivism has no ethical dimensions per se. I see no essential difference between an individual's desire to go his own way and his desire to be warm and comfortable. Both contribute to human happiness, but my finding is that happiness is ethically neutral, except for such indirect effects that it may have in one direction or the other.

Q 8: After the universe reaches the stage where every personality is ethical, what then happens?

A: Category I.

Q 9: Isn't the seeking after Truth a very important human purpose too?

A: This is a pertinent question, and it illustrates the point that I am trying to make about the nature of my investigation in this area. Apparently you are raising the issue because you believe that the pursuit of knowledge ought to be one of our purposes. But this is a subjective conclusion. At the present stage of my investigation I see no way of deriving it from factual premises in the manner in which I am trying to make a start toward defining the non-physical aspects of existence. Acquisition of ethical knowledge is, of course, essential for progress toward our goal. We cannot do what is right consistently unless we know what is right. But, as matters now stand, I see no direct ethical significance in the acquisition of physical knowledge.

Q 10: With reincarnation, obviously some individuals will have a vastly greater capacity for ethics, right from birth. Yet we know that all individuals pass through the same stages of ethical development, from the work of psychologist L. Kohlberg. Most get to stage 4 and a few get to stage 6, but no one (so far as we know) skips any of the stages.

A: So far as we have been able to ascertain, we pass through the same physical stages as the monkeys in the zoo, yet we come out with a substantially greater mental capacity--a physical attribute--than our cousins. Similarly, the improvement that is made in the ethical area can also take the form of an ability to move through the earlier stages faster, leaving time for progress toward a higher level. I might say that I don't like the reincarnation idea. In the first draft of this book many years ago I dismissed this concept summarily. But each time I reviewed the subject matter and revised the text of the book, I was forced to give it more credence. Now, still somewhat reluctantly, I believe that it is an inescapable result of several items of what appears to be firm factual knowledge.

Q 11: Aren't the sudden "flashes of light" just multiple neurons firing when some brain circuit loop closes?
A: No one has ever explained how a mechanism of any kind can accomplish anything that is actually new. In order to confer that power on a brain you will have to assert that a brain is more than a mechanism, and then you are right back where you started.

Q 12: Ethics appear to be more about means than ends. Certainly there are ends to a person’s life, too. For example, your purpose was and is to develop the Reciprocal System.

A: As I see the picture, both the ends and the means have to be evaluated in determining the ethical status of an action. Either may be ethically positive, ethically negative, or neutral (that is, having no ethical significance). The right or wrong of the action as a whole is a net resultant of the positive and negative values of all aspects of the action. Such an evaluation is often difficult, which is one of the reasons why improvement in ethical understanding is a requirement for ethical progress.

Q 13: Engineers and entrepreneurs of the past 200 years have done more for humanity than all the priests, ministers, rabbis, etc., have done over the past 3000 years.

A: The validity of your contention depends on the definition of “doing more.” Certainly they have done more to make life more pleasant and more comfortable. I have emphasized that point in the book. But the conclusion from my factual development is that well-being in that physical sense in not relevant to the purpose of our existence. The question then becomes whether the indirect results of better living conditions on progress toward the primary goal have outweighed the accomplishments of those who are trying the direct approach. I think this is at least debatable.

Q 14: Shouldn’t prayer be a self-help device to improve ethical living, rather than the worship of some omnipotent being?

A: The question of worship is in Category I. I have not considered it. In fact, I am not sure that I really understand just what worship is. I have dealt with prayer only as a means of communication.

Q 15: Could the interaction of the Sector 3 control units with each other constitute the Deity? Perhaps, rather than “God is dead,” “God is yet to be born.”

A: Category I, again. I have not encountered anything that would give me a handle on the question as to the existence of a Deity, other than religious revelation. My finding is that revelation is a genuine source of information, but, like information derived from other sources, the information from revelation requires verification, and the purported revelations are so conflicting that their validity cannot be either confirmed or disproved by any of the criteria that I have been able to establish.

Q 16: Verbal transactions are important to ethics. I have been assaulted verbally much more often than physically. What about this subject?

A: Category I.

Q 17: There is no mention of S. Alexander’s metaphysics or that of A. N. Whitehead’s.

A: Category I.

Q 18: I’m happy to see that you raked the existentialists over the coals; I can’t stand them either.

A: No comment needed.

Q 19: Is the selection of a host planet for reincarnation an assignment or a random process?

A: Category II.

Q 20: Might not some individuals move in the opposite direction and become less ethical over several lifespans?

A: Probably. There are eddies in all rivers, but they have no effect on the final outcome.

Q 21: What happens when the individual becomes fully ethical but enjoys being in a body and doesn’t want to be “liberated?”

A: Category I, although I might point out that we have no choice in the matter. We are deprived of a body sooner or later whether we approve of the idea or not.

Q 22: If there is no deciding ego, how is the choice made between the biological control unit and the ethical control unit?

A: I don’t think that this is a serious problem. If we look at the situation objectively, and consider only what we actually know, excluding what we think is happening, we see that the human individual is confronted by two or more possible responses to each of various sets of circumstances. Certain forces
(using the term in a very general sense) exert influences tending to cause one of these responses to take place. Other forces tend to cause some different response. We know that the anticipated material gain or loss is one such force. Public approval or disapproval is another. There are many. My finding is that the individual’s stage of ethical development is one of these, a significant factor, but not necessarily controlling. This conclusion has enough support from experience to justify asserting that it is factual.

In a complex physical situation the observed facts are exactly the same. Some forces tend toward one resultant, some toward another, and the action that finally ensues depends on the relative strength of the various forces. We could credit the physical object that is involved with making a choice between the alternatives—Aristotle did just that—but this assumption is now recognized as superfluous. So far as we know is concerned, it is just as superfluous in the ethical case. B. F. Skinner makes this point quite forcibly. The flaw in his reasoning is that he views the situation as wholly mechanical, and this leaves him without any explanation of ethical behavior.

Q 23: Individuals that process an unusual amount of information during the day seem to require more sleep. How does the theory account for this?

A: There is a zone of tolerance within which we can run a surplus or deficit of sleep for a time, but my conclusion is that the books have to be balanced sooner or later. This seems to conflict with some observations, but recent sleep research has found that there is a “microsleep” that accounts for most of the deviations in one direction, and that the long sleepers are actually awake physiologically during part of their presumed sleep time. There book by Dement that I listed in the references is fascinating reading if you are interested in the sleep question.

Q 24: If the “angels” of the metaphysical realm have all kinds of technical answers for us why can’t they find a better means for giving us all these answers?

A: Category I.

Q 25: What about the value of individual liberty and individual rights? Nothing is said on this.

A: Category I.

I hope you find these questions stimulating, not irritating. Please reply at your convenience.

Ronald W. Sarz

I have been rather brief, for reasons which you no doubt understand, but perhaps we can go into some of these issues in more detail later.

Dewey B. Larson

The International Society of Unified Science

Presents its World-Wide Web Site!

Surfing the Internet? Stop by the ISUS Web Site for a collection of articles, reviews, books, and the latest information regarding Dewey B. Larson’s Reciprocal System of Theory. Browse the North Pacific Publishers Online page for the latest collection of books, reprints, video and audio tapes available for purchase from ISUS. Hosted by ISUS Board of Trustee member Jan Sammer (interpre@login.cz).

Evidence That Women and Men are Equals is True Infinitude of the Private Person
The Physical and the Human: Part and Whole

Frank H. Meyer, Otto H. Schmitt and Bruce M. Peret

This paper gives some discussion of certain essential relations between Dewey Larson’s Reciprocal System of Physics and his scientific discovery of our Level 3 from the existing non-physical Sector 3 of human existence.)

The Human Realm in Relation to the Physical

Physicists teach that the human realm is an accidental and finite part of the material sector of the whole realm of an infinite physical universe. In this setting, working women and men are found by economists to have no inherent human worth, only finite and unequal value use. This physical value is expressed in terms of their exchange price or finite wages. Price is physical value, invented to express the finite worth of all other commodities in the free and slave markets. For a century after the U.S.A. was born, a working married woman had no recognized inherent or market value, even when she worked outside her home. Her wages belonged to her husband.

Larson teaches that humankind itself is a whole continuous universe, composed of three Sectors. Sector 1, the material sector, and Sector 2, the cosmic sector—the two enormous physical sectors—are entirely quantized, finite parts of our universe. Thus, the Larson universe includes not only the quantized world of motion, a reciprocal relation between space and time, but also a continuous, infinite non-physical, distinctively human Sector 3, beyond Space and Time, accessible with human language.

Dewey Larson teaches that equitable treatment of all is undoubtedly part of the Sector 3 code. The human realm is not made for the physical realm. The physical is made for the human. The human right to private property does not include ownership of other persons. No one is free to be a slave. No one is free to be master of slaves. No human being is a commodity of infinitely divisible human worth. A thing to be bought or sold. Since inherent human worth is a continuous, non-physical asset of the whole of humankind, then it is true, as evidently affirmed by our Declaration of Independence, that all women as well as all men are created infinite, independent, and inherently equal in human worth.

Infinitude belongs to the Sector 3 equal creation realm of the human. Larson has discovered that the entire realm of the physical is only a finite part of the human.

Quantum Physics vs Relativity Physics

Quantum physics, rather than relativity physics, is the more promising approach to unifying physics. Finite divisibility of the physical as first proposed to humankind as early as twenty-five centuries ago. Quantum physical theory and practice came into its own as a “new” theory during this century with 1) Planck’s discovery that the structure of light is discrete, 2) followed by Einstein’s confirmation of this finding via the photoelectric effect, 3) also Einstein’s recipe for proving that the structure of matter is atomic by counting Avogadro’s number via Brownian motion in the laboratory and 4) climaxed by Larson’s demonstration that matter, electricity, and light are quantized, because space, time and motion also are.

Aristocratic and academic natural philosophers from 500 BCE to 1905 CE refused to explore the atomic hypothesis of Leucippus, Democritus, Epicurus, Lucretius. Refusal resulted from their assuming without examination that the continuous and the infinite must reside in the physical aspects rather than the non-physical aspects of human existence.

The mistaken guess that the physical universe must constitute an infinite whole appears to have ensued from the unproved assumption that matter and energy, as well as motion, space and time, all must be infinite; in the sense of all being infinitely divisible or continuous. According to Aristotle, motion is supposed to belong to the class of things
which are continuous and the infinite presents itself first in the continuous.

From assuming that motion and time are continuous, Aristotle went on to postulate that matter and the universe of matter are continuous. Incidentally, Aristotle also believed the physical world is finite in the sense of being bounded. Later, Einstein reported the physical world to be finite and unbounded. However, when creating his theory of relativity, Einstein assumed, as did Aristotle, that motion, time and space are continuous or infinitely divisible. This ancient axiom of the infinite divisibility of space and time has become an inseparable part of relativity theory. Modern physicists guess this assumed truth without further examination to be necessarily true. The physics profession currently does not appear to be aware that before Einstein died in 1955, he reexamined his space-time continuum postulate and became disenchanted with it, "One can give good reasons why reality cannot at all be represented by a continuous field. From the quantum phenomenon it appears to follow with certainty that a finite energy can be completely described by a finite set of numbers [quantum theory]. This does not appear to be in accord with a continuum theory and must lead to a purely algebraic theory for the description of reality. But nobody knows how to obtain the theory." Nobody? Larson has known since at least 1959.

Very few physicists have questioned the space-time continuum principle of ancient, classical and relativity physics. Dr. Richard Feynman is one, "On the other hand, I believe that the theory that space is continuous is wrong, because we get these infinities and other difficulties, and we are left with questions on what determines the size of all the particles. I rather suspect that the simple ideas of geometry, extended down into infinitely small space, are wrong. Here, of course, I am only making a hole, and not telling you what to substitute. If I did, I should finish this lecture with a new law."

So far as the universe of motion, that is, the physical aspect of the existence of the whole of humankind, is concerned, the Reciprocal System of Physics supports the quantum (finite divisibility) approach over the continuous (infinite divisibility) approach. Larson put the matter this way, "Infinity is excluded from the physical universe, since we are defining motion as the relation between a time magnitude and a space magnitude, and we deduce that the quantity of motion is finite. Since all physical entities and phenomena are manifestations of motion, they are all measured in terms of 1/n and n/1, where n is finite. No infinities are possible." 18

Estimating the Whole Worth of Humankind

Physical reality is the finite and diverse part of the human whole. Human reality is one, continuous and transfinite. The physical realm, enormous though it be, is a finite whole. The physical total consists of two main physical sectors, the Material Sector (motions in space, Sector 1) and its reciprocal, the Cosmic Sector (motions in time, Sector 2). Sectors 1&2 assets, including our human bodies and minds, are all finite wholes that can be counted with finite arithmetic.

Unlike the physical whole, the human totality is not a finite whole. Besides one's Sector 1 and Sector 2 physical assets, the whole human ethical personality includes infinite non-physical Sector 3 assets beyond time and space. Another name to keep in mind for our human Level 3 access to Sector 3 realm is the non-physically existing infinite "Realm of Truth."

The whole of humankind includes the dead and the yet to be born, as well as the presently living. The inherent human worth of the whole of humankind, a non-physical Sector 3 human asset, is an infinite whole. This infinite whole cannot be counted in the way a finite whole, such as the total value today of the global commodities market, can be counted.

The market counting is performed with a measure of finite worth, money or money capital. The tally is governed by the fundamental postulate of finite arithmetic: every part of a finite whole is worth less than the whole. Only the sum of the parts can be equal to the whole. Finite arithmetic, designed for counting the finite market exchange values of slaves and other commodities in the markets of the earth is quite unsuitable for counting the infinite whole of inherent human worth.

Can the whole inherent human worth of humankind be counted? Before Dewey Larson was born, splendidly to define the non-physical Sector 3 aspect of human existence, the heritage of the United States of America included a suitable hidden arithmetical technology for counting countable infinite wholes. With this country's birth, a person with a Level 3 free spirit from the intelligent Sector 3 of human existence appeared. He understood that the whole of human worth is a non-finite, non-physical whole. Before composing the original draft of the Declaration of Independence, this free spirit, signing himself Common Sense, learned and discovered the art of counting an infinite whole, as distinguished from a finite whole. Fully a century later the mathematician, Georg Cantor taught for his
profession this way of counting countable infinite wholes.

The ethical person who composed the original draft of the 1776 Declaration of Independence did not simply affirm true the human equality proposition that men and women, the proper parts of humankind, are created infinite, independent and inherently equal in human worth. This truth, says he, is self evident.

The original draft in the John Adams' copy reads, “We hold these Truths to be Self-evident: that all Men are created equal and independent; that from that equal Creation they derive Rights, inherent and unalienable, among which are the Preservation of Life and Liberty.”

With equal human worth go equal human rights for man and woman.

The author of the original draft of the Declaration found the supporting evidence for the truth of the human equality proposition in another non-physical Sector 3 asset: pure mathematics. Infinite wholes exist as well as finite wholes. The set of counting numbers, daily and ubiquitously used with finite arithmetic for counting finite wholes, is itself an infinite whole. This is easy to prove. For the set to be finite, you have only to mention its greatest counting number. You cannot, because however large a counting number you name, one can be added to it. For centuries the mathematicians didn’t learn how this simple infinite whole is countable and therefore concluded it can’t be counted. Then Georg Cantor, one of them, did it. Common Sense did it earlier, because otherwise he would have lacked his evidence for his affirming the truth of the human equality proposition.

When you learn how to count the infinite set of counting numbers, you are ready to understand how Common Sense learned how to count human worth as an infinite whole. He did what everyone of us does when we wish to count a finite whole: find another whole with the same cardinality to put in a one-to-one correspondence with the set we wish to count. In the case of an infinite whole the second set has to be found within the set to be counted. To count the infinite counting number set you first find the part of the whole, called the proper part, that can be put in one-to-one correspondence with the whole. This proves to be the set of even counting numbers. Only because the whole is infinite, you can show that the set of odd and even counting numbers can be put in one-to-one correspondence with just the set of even counting numbers.

A mathematician defines any whole collection of terms or values as infinite when the whole contains as parts other collections which have just as many terms or values as the whole collection has. Such part is called a proper part. Equal to the whole, the proper part counts the whole.

Common Sense, composer of the Original Drafts of the Declaration of Independence, performed a prodigious mental feat when learning by himself how to count the infinite whole human worth of the collection of all proper members of ethical humankind. Each private person, whether man or woman, as a member of ethical humankind, is inherently equal to, not less than, the whole of humankind in human worth. Therefore, all women as well as all men are created infinite, independent and inherently equal to each other in human worth, as the author of the original draft of our declaration demonstrated to himself.

Inherent human worth is a non-physical, ethical value of the whole of ethical humankind, like human dignity and/or human honor. This value concerning the whole of humankind is infinite, since it is a non-physical value of Sector 3 human existence. Human worth is quite unlike human height, weight or other value of bodily and/or mental performance, all of which are physical values. In each and every aspect of the physical nature of persons, we are finite and unequal, not infinite and equal. Because inherent human worth is infinite, it cannot be counted with money, the customary counter of market exchange worth. Capital is a commodity; labor is a collection of persons, each of whom, as a proper part of humankind, shares equally in the infinite human worth of the whole.

Who is Common Sense?

Common Sense, we affirm with Joseph Lewis, is one of the names of the man who composed the original draft of A Declaration by the Representatives of the United States of America in general Congress assembled. He did it as the culmination of his organizing and publicizing the victory of the American Revolution around 1776.

The original draft is no longer extant; but before its destruction two copies were made, one in the handwriting of Thomas Jefferson and another in the handwriting of John Adams, two of the five members of the Second Continental Congress Committee, appointed by it to originate and edit a draft for the Congress to adopt. Benjamin Franklin, the man who introduced Common Sense to this continent, Roger Sherman and Robert Livingston
were the other three Committee members.

Upon a first reading of his hand-written copy of the original draft, Thomas Jefferson crossed out the word "self-evident" and wrote in a substitute phrase, "sacred and undeniable." This suggests and appears to mean that the truth of the human equality proposition was not evident to Mr. Jefferson, even though it had a surprising ring of truth to him; he liked the proposition and wished it to be true, even though he could not arithmetically prove it to himself, as he trusted Common Sense had.

From this finding and other similar findings, particularly Mr. Jefferson's careless deletion of the essential world, "inherent," we conclude, contrary to most historians and Jefferson biographers, that Thomas Jefferson did not originate the original draft of A Declaration by the Representatives of the United States of America in general Congress assembled.

Mr. Jefferson was a latecomer to the goal of Independence for the Thirteen Colonies. Furthermore, the ideas of human equality and of equality implying the independence of the private person, found in the original draft and cancelled by the Committee, if not by Jefferson himself, was quite alien to him and his associates. When appointed to the Committee to replace Richard Henry Lee, the delegate from Virginia who introduced the resolution to draw up a Declaration of Independence, Thomas Jefferson was quite unprepared for the assignment. A few days before he was appointed to the Committee, he wrote a letter, dated May 17, 1776, "I suppose they will tell us what to say about independence."

From careful and persistent inquiry we find the evidence certainly probable, if not irrefutable, that Thomas Paine, George Washington's friend and Thomas Jefferson's friend, authored the original draft of the Declaration of Independence. No one knew better than Mr. Paine, not a duly elected delegate of the congress, the necessity and advantage in 1776 for the success of the American Revolution of having his name but not his words left off the Declaration of Independence.

A plain citizen, who is known to have had access to a copy of the original draft and who read it before the official printed Declaration of Independence was published, was Ms. Abigail Adams, wife to Mr. John Adams. He sent his hand-written copy, probably for safe-keeping to his wife in Massachusetts. Ms. Adams evidently carefully read this copy before receiving the official, printed copy.

On July 14th she wrote to her husband, comparing her evaluation of the two copies, "By yesterday's post I received two letters dated 3rd and 4th of July... I cannot but be sorry that some of the most manly sentiments in the Declaration are expunged from the printed copy..."

The importance of the Declaration original Draft to the United States of America and to the Preservation of the Future of the Whole of Humankind Beyond Space and Time cannot be exaggerated. Not the least of its immediate significance is that its author, Mr. Thomas Paine, in the title of the draft gave our country the name, the "United States of America".

Of more ultimate significance is that during 1776 for the second time in human history after Jesus Josephson, as reported in the Bible, affirmed the preciousness and equal worth of Human life, including women as well as men, another private person, Thomas Paine, reaffirmed this non-physical Sector 3 asset of all ethical humankind with a scientific arithmetic reason.

From our equal creation we derive equal human rights, inherent and unalienable, including are the Preservation of Life, Liberty and Democracy.

A President of the United States of America who best mastered the non-physical meaning of the human equality proposition of the Original Draft has given a splendid definition of Democracy that deserves to be better known, "As I would not be a slave, so I would not be a master. This expresses my idea of democracy. Whatever differs from this, to the extent to the difference is no democracy."

The postulate that private men and women, as proper parts of ethical humankind, are finite, expendable and worth less than the whole of humankind coexists with the doing of the institution of human slavery. While Presidents of the United States of America freely owned men and women slaves, Adam Smith reported in 1776 that the possession of money measures the magnitude of human worth. But is human worth finite? If so, what prevents the slave from owning the President by gaining more money than the latter? Each of the Presidents, as private persons, is himself in truth inherently equal in human worth to the whole of humankind and no better standard is available to count his human worth. Yet each chooses finite market exchange worth for his neighbors whom he enslaves. This mystery led a nineteenth century distinguished American writer, Herman Melville, author of Moby Dick, to declare in the spirit of the Declaration of Independence human equality
proposition, "a thief in jail is as honorable personage as General George Washington."

The future of human rights on Earth relates to how humankind practices the human rights we profess. A primary attitudinal change among humankind on Earth now is required for the future of human rights on Earth to be brighter. The change has to be composed of a rational rejection of the hoary lie that all men are by nature finite and unequal in all respects while women are less equal together with the voluntary acknowledgment and positive affirmation that the human equality proposition is accurately true.

References

5. Aristotle, Physics, (Great Books, University of Chicago, 1952), Book III, page 278.
15. Lincoln, Abraham, Springfield, IL, ca 1858
17. Melville, H., Letter to Nathaniel Hawthorne, 1851

† When Mr. Jefferson copied the Original Draft of the Declaration, he copied the word “unalienable” to be “inalienable”. The John Adams copy of the Original reproduces the word “unalienable.” It is interesting that the vulgar word “unalienable” is retained in the official printed version of the Declaration of Independence.

"I long to hear you have declared an independency, and, by the way, in the new code of laws which I suppose it will be necessary for you to make, I desire you would remember the ladies and be more generous and favorable to them than your ancestors. Do not put such unlimited power into the hands of husbands. Remember, all men would be tyrants if they could. If particular care and attention are not paid to the ladies, we are determined to foment a rebellion, and will not hold ourselves bound to obey any laws in which we have no voice or representation."

Abigail Adams

"...our expansion into the universe is not just an expansion of men and machines. It is an expansion of all life, making use of man's brain for her own purposes.

Freeman Dyson
Commentary on the ISUS Retreat

Bruce M. Peret

As Larry Denslow mentioned in his addendum to the Secretary's report, ISUS held a Retreat at the H Bar G Youth Hostel in Estes Park, Colorado. This was my first time at both an ISUS Conference, and a Youth Hostel, and I must admit that I was pleasantly surprised—though things did not start off all too well. I had traveled to Colorado from Georgia by motorcycle, and on the drive from Denver to Estes Park found myself stuck in a traffic jam for 2 hours, then a bee flew into my jacket and stung me, and while crossing a pass over a mountain got caught in a thunderstorm—not a real problem because I had my rain gear with me, but throwing half-inch hail was not kind. I'm glad I was wearing a helmet. Nonetheless, I pressed on and was the first to arrive at the H Bar G Youth Hostel. Phil Porter, Larry Denslow, and K.V.K. Nehru were travelling together, and were expected to arrive a couple hours later, as they had to make some stops along the way.

The hostel itself was a refurbished farm with a number of log cabins nestled on the sides of a hill, with a spectacular view of the Rocky Mountains several miles in the distance. The area was kept natural, with horses wandering the fields, and abundant birds and wildlife exploring the grassy areas around the cabins.

The cabins themselves were very clean, and included 4 beds, furniture, a closet and bathroom. A large picture window looked across the front porch to the mountains beyond. A cook shack provided refrigerators, stoves, and shelves to store food. Pots, pans, and eating utensils were available for a cook-it-yourself environment. The main lodge had a large common room, with couches, tables, and refreshments, as well as an entire wall of glass again giving a splendid view of the tall peaks of the Rockies, and Estes Park surrounding a small lake below.

Being the first to arrive, I nabbed one of the lower berths on the two sets of bunk beds in the cabin, and got settled in. Phil, Larry, and Nehru were expected to arrive around 7pm, so I got myself comfortable on a chair on the porch, and started looking thru the material that I obtained at both the ISUS Conference, and the Global Sciences Congress, which I caught he last day of. Eight o'clock rolled around, and the other ISUS members had not arrived. Apparently, luck was not with them, either, as they had car trouble enroute, and did not arrive until after 10pm.

With such a start, everything had to be uphill from here—and it was, about 15,000 feet uphill! We spent the daylight hours exploring the flora and fauna—as well as the spectacular scenery—of the Rocky Mountain National Park. As sunset approached, we returned to the Hostel for a home-cooked meal in the cook shack, discussing various activities of the day, and sufficient comments about Reciprocity for us to have picked up the nickname “The Mad Scientists” from the other Hostellers.

After dinner, we would retire to the main room of the Lodge, where we were able to obtain a blackboard, and explain our personal understanding of Larson's works. It was surprising to see the different conclusions drawn by four different people from reading the same books. At the same time, the supporting comments and clarifications made for an extraordinary learning experience.

A question to explain the wave-particle duality from a High School student named Josh eventually got to the “teacher” instinct in Larry Denslow, who embarked on an all-night lecture based on his upcoming book, “Fundamentals of Scalar Motion,” with supporting comments (and clarifications) from myself and K.V.K. Nehru. An hour after he started, he had a room full of people, all interested, understanding, and questioning. It was a one-of-a-kind event, and quite a relief to myself to realize that Larsonian Physics doesn't require a degree in physics to understand—just an open mind and a willingness to learn. But I will note that the people we met at the Youth Hostel were unusually intelligent and very curious about life. I suppose this is why they chose a hostel instead of a hotel.

All-in-all, I had a wonderful time with some very interesting people, and plan to attend all future conferences and retreats. Maybe one of these days, we'll even get Nehru on my Harley—or at least Rainer Huck.
Correspondence Between Frank H. Meyer and the Scientific & Medical Network

Frank Meyer
1103 15th Avenue SE
Minneapolis, MN, 55414-2407
4th April 1996
Dear Frank,

Many thanks indeed for arranging to send us a copy of "Beyond Space and Time". I would be very happy for you to write a review of it. The maximum number of words that we normally allow would be 1000, so I hope this would be okay with you. Our next copy date is mid-July. In the meantime I will pass the copy on to some of our physicists here.

With every best wish,

David Lorimer

Scientific & Medical Network
Lesser Halings, Tilehouse Lane
Dehnam, Nr. Uxbridge
Middlesex UB9 5DG England
100114.1637@compuserve.com

Frank Meyer
1103 15th Avenue SE
Minneapolis, MN, 55414-2407
10th July 1996
Dear Frank,

Many thanks indeed for your informative review of Dewey Larson’s book. This will give a good idea of his work to Members who are unaware of it. I will also put a cross referring notice about ISUS in, so that people can make further inquiries.

Following your request, I have pleasure in enclosing five copies of our leaflet and application forms. I am also enclosing a couple of extra council description leaflets.

With every best wish to you and Dr. Schmitt,

David Lorimer

Scientific & Medical Network
Lesser Halings, Tilehouse Lane
Dehnam, Nr. Uxbridge
Middlesex UB9 5DG England
100114.1637@compuserve.com
For the PENNSYLVANIA EVENING POST.

A very moment that I reflect on our affairs, the more am I convinced of the necessity of a formal Declaration of Independence. Reconciliation is thought of now by none but knaves, fools, and meddlemen; and as we cannot offer terms of peace to Great-Britain, until, as other nations have done before us, we agree to call ourselves by some name, I shall rejoice to hear the title of the United States of America, in order that we may be on a proper footing to negotiate a peace.

Besides, the condition of those brave fellows who have fallen into the enemy's hands as prisoners, and the risque which every man runs, who bears arms either by land or sea in the American cause, makes a declaration of independence absolutely necessary, because no proper cartel for an exchange of prisoners can take place while we remain dependants. It is some degree of comfort to a man, taken prisoner, that he belongs to some national power; it is the subject of some flattery that will see after him. Oliver Cromwell would have sent a memorial as powerful as thunder to any King on earth, who dared to have used prisoners in the manner which ours have been.

What is it that we have done in this matter? Nothing. We were subjects of Great-Britain, and must not do these things. Shame on your cowardly souls that do them not! You are not fit to govern.

Were Britain to make a conquest of America, I would, for my own part, choose rather to be conquered as an independent state than as an acknowledged rebel. Some foreign powers might interfere for us in the first case, but they cannot in the latter, because the law of all nations is against us. Besides, the foreign European powers will not be long neutral, and unless we declare an independence, and send embassies to seek their friendship, Britain will be befriended with us; for the moment that she finds that she cannot make a conquest of America by her own strength, she will endeavour to make an European affair of it. Upon the whole, we may be benefited by independence, but we cannot be hurt by it, and every man that is against it is a traitor.

REPUBLICUS.