

PHIPPSCHRIFT: Preface, Vita, Bibliography and Contents

H. PIERRE NOYES<sup>\*</sup>

*Stanford Linear Accelerator Center  
Stanford University, Stanford, California 94309*

Submitted to *Physics Essays*, Vol.8, No. 3, 1995

---

<sup>\*</sup> Work supported by the Department of Energy, contract DE-AC03-76SF00515.

## Guest Editor's Preface

This issue of *Physics Essays* is dedicated to Dr. Thomas E. Phipps, Jr., one of the most original and remarkable physicists whom I know. Among that company, he is singled out as both uncompromising in advocating what he believes to be the truth, yet insistent that people with whom he disagrees be heard. This issue of *Physics Essays*, which I have the honor of editing, illustrates this fact very clearly. Tom chose the authors, well knowing that they disagree with him and with each other on a number of points. Yet, as is the general policy of *Physics Essays*, he wanted them to have their say so long as they could be polite about it, and were not demonstrably and clearly wrong as to facts.

Tom and I had similar backgrounds up to a point in that both of our fathers were professors of Chemistry at the University of Illinois, both of us went to the University of Illinois High School and to Harvard College, Tom following me by a couple of years. We lost touch for a while during and after the war, but renewed our acquaintance when Tom wrote to W.K.H. (Pief) Panofsky (then director of SLAC) asking about a pion lifetime experiment Pief had performed at Berkeley. At that time Tom was interested in Dingle's space-proper time version of relativity. His views at that time are reflected in two letters to *Nature* in 1962, and AFCRL-69-0518 No. 401 (Nov. 1969) with R.G.Newburgh (see Phipps' bibliography). Tom correctly realized that this experiment, if improved in accuracy, could provide an experiment crisis between linear time dilation (as exemplified by cosmic ray mesons and allowed by Dingle) and failure of time dilation (or its demonstration) when the sample of decaying mesons comes back to the same point (i.e. a microscopic realization of the "twin paradox"). By then an early version of the CERN experiment to measure  $g - 2$  for the muon was available. Although the muons do not return to precisely the same point as which they started, the results were sufficient to convince Tom that time dilation is experimentally demonstrated.

You will find that some authors in this issue still do not see the result as

definitive because it deals with accelerated “clocks”, but neither Tom nor I agree with them on this point. However, he and I concur that there is no definitive experiment showing macroscopic “Lorentz contraction” of distance, a point which recurs in several of the papers in this issue. I stress the readiness with which Tom was prepared to abandon a cherished and long held view when the experiment he proposed went against him, yet unwilling to follow the easy course of accepting the conventional (and not directly supported) extension of this result about time to the measurement of spacial dimensions of moving systems.

One we were in touch again, we remained so, and our professional contacts have become more and more significant — at least for me — over the years. I was, then, a pretty conventional high energy physicist. But Tom brought me back into touch with the paradoxes of quantum mechanics as conventionally “interpreted”. I was particularly struck by his analysis of the “correspondence” between classical and quantum physics which allowed him to show that the conventional “derivations” throw away half the degrees of freedom, and that these can be restored in a more general theory which has both classical and quantum mechanics as limiting cases. As Tom remarks [in *Fixed Past and Uncertain Future*, and exchange of correspondence between Pierre Noyes, John Bell and Thomas Phipps, Jr., SLAC-PUB-1351 (December, 1973).] “I’m pretty absent-minded myself, but when it comes to counting parameters, I’ll take on any performing horse (or non-performing physicist).” Tom’s covering theory for quantum and classical mechanics was initially reported in the *Physical Review* in 1960, in *Dialectica* in 1969, and re-examined in a sequence of papers in *Foundations of Physics* (see Phipps’ bibliography).

I still hope that some day, someone will pick up this work and see where it leads. I made use of it in a very minor way to show that it allowed (in the quantum limit) a way to interpret the extra (from the point of view of conventional quantum mechanics) degrees of freedom as the phase of the wave function in an S-Matrix type of scattering theory, and thus to separate (in quantum mechanics) the kinematics which describes scattering from the dynamics of the interactions which explain scattering. [H.P.Noyes, *Foundations of Physics*, 6, 83 (1976).] But even this fairly

minor and reasonably conventional attempt to build on Tom's work fell stillborn from the press. Once when I presented a seminar on related material under the title "Fixed Past, Uncertain Future" a famous physicist warned me in a friendly way "Boy, your future sure will be uncertain if you go on this way." Unfortunately we have no work derivative from Tom's quantum mechanical insights in this issue. Some of my recent work suggests that the "imaginary momentum" states Tom found in the  $2mc^2$  energy gap between the lowest free particle states of a fermion and an anti-fermion predicted by the Dirac equation might be the starting point for a model of "confined" particles such as quarks. The investigation of the free particle Dirac equation I present in this issue might help lead in that direction.

Be that as it may, there is no doubt that twentieth century physics has not lived up to its initial promise of producing a coherent view of the physical universe. For example, a distinguished physicist and historian of science (Schweber), in his recent volume *QED and the Men Who Made It* asserts unequivocally that

"How to synthesize the quantum theory with the theory of special relativity was — *and has remained* — the basic problem confronting 'elementary' particle theorists since 1925-27."

The conventional wisdom holds that the basic problem is lurking at the interface between quantum mechanics and *general* relativity, which is sometimes called "quantum gravity". But research along those lines usually assumes that there is nothing wrong with special relativity, and that problems set in only for space-time intervals comparable to the Planck length. The careful reader of the papers in this issue which deal with *special* relativity — often inspired by Tom's critical attention to these problems — will find that the experimental and conceptual conundrums posed by the almost universally accepted analysis given by Einstein are by no means settled. It could be that the missing key is not under the glaring "lamp-post" of high technology particle physics and physical cosmology, but in the murky corners where more mundane issues have been swept aside. As Tom remarks in the letter already cited, "I never was happy with E- and H-fields as *mathematical*

*vectors* propagating precociously straight out of our brains and into the physical world.” As I compose these lines, I am pondering some beautiful results that Tom is achieving and refining in his basement laboratory to see whether the Ampere or the Grassman-Lorentz force law correctly describes the motion of movable elements in closed electric circuits. Good luck, Tom!

It has been a great pleasure for me to have had the opportunity to edit this issue of *Physics Essays* and to contribute in this modest way to honoring one of the most remarkable physicists of our times.

Pierre Noyes  
Stanford Linear Accelerator Center  
March, 1995

## VITA (T. E. Phipps, Jr.)

Dr. Phipps was born in Champaign, Illinois on January 26, 1925, the son of an experimental physical chemist employed at the Noyes Laboratory of the University of Illinois. In 1930-31 his father received a Guggenheim fellowship for study in the Hamburg laboratory of Otto Stern and his parents took him with them to Germany. The family returned to Urbana, Illinois, where he attended the Leal grade school and the University High School. He obtained a National Scholarship from Harvard, where he earned AB (1945), MS (1948), and PhD (1951) degrees.

In 1945-46, having been disqualified for military service by poor eyesight, he joined the wartime Operations Research Group of the Navy Department in Washington, D.C., then under the direction of Professor P. M. Morse of MIT and located in WWI temporary buildings on Constitution Avenue. There he worked under the supervision of Professor B. O. Koopman of Columbia University, mainly in probability analysis of radar applications to anti-submarine warfare. On completing graduate studies and doctoral thesis experimental work on molecular beam magnetic resonance of hydrogen isotopes at Harvard, under the direction of Professor Norman Ramsey, he returned in late 1950 to operations research (nowadays called systems analysis) for the same MIT-sponsored Navy organization, renamed in its post-war version Operations Evaluation Group (OEG). It was directed by Professor J. J. Steinhardt and located in the newly-constructed Pentagon. In 1955-56 he was granted a year of academic leave to study elementary particle physics at MIT under the sponsorship of Professor Morse. On his return to Washington (1956) he was assigned to the Naval Warfare Analysis Group in the Office of the Chief of Naval Operations, an offshoot of OEG. During his employment by these Pentagon organizations he carried out a number of field assignments with United States naval forces in Pearl Harbor, Japan (during the Korean war), and the Mediterranean, and also wrote about 40 classified studies and memoranda.

In 1960 he changed to Civil Service employment and joined the U. S. Naval Ordnance Test Station in the Mojave desert (China Lake, California) as a research consultant to the Technical Director, Dr. W. B. McLean. Here he had leisure to write an anti-Air-Force book, *Ethics of Power*, for which he was unsuccessful in finding a publisher. In 1962 he was appointed Associate Technical Director for Research and Head, Research Department. Finding that he lacked talent for administration, he returned in 1964-66 to the Pentagon, where he joined the Office of the Director, Defense Research and Engineering as Assistant Deputy Director, Research, under Dr. C. W. Sherwin. These, too, were comparatively unproductive years, in that the work involved bureaucratic supervising of organizations such as ONR, AFOSR, etc., that had no felt need for supervision. He was therefore pleased to conclude his gainful employment, during 1966-80, in the more research-oriented atmosphere of the Naval Ordnance Laboratory, White Oak, Maryland (as it was then, under the directorship of Dr. G. R. Hartmann), where he served for the most part as Scientific Advisor to Dr. C. M. Schoman, Head, Advanced Planning and Analysis

Staff. This afforded a few unstructured opportunities for small-scale physics experimentation.

Upon retirement at minimum age 55 from Civil Service, he returned to Urbana, Illinois and set up a small physics laboratory in his father's basement, where they conducted joint experiments until his father's death in 1990. These experiments are described in Chapter 7 of *Heretical Verities*, a self-published book he produced in 1987.

Dr. Phipps has been married twice, first to Mabel Lee Maier Borden and, following her death, to Frances Motz Boldyreff. He has no children. His professional memberships include Phi Beta Kappa, Sigma Xi, and, at various times, the Operations Research Society of America and the American Physical Society.

## PUBLICATIONS (T. E. Phipps, Jr.)

### PHYSICS:

- Phys. Rev. **87**, 395 (1952), "Nuclear Radiofrequency Spectra of  $H_2$  and  $D_2$  in High and Low Magnetic Fields," co-authored with N. F. Ramsay, H. C. Kolsky, and H. B. Silsbee.

Letters to the Editor on similar subjects, co-authored as above:

- Phys. Rev. **79**, 883 (1950).
- Phys. Rev. **80**, 483 (1950).
- Phys. Rev. **81**, 1061 (1951).
  
- Phys. Rev. **118**, 1653 (1960), "Generalization of Quantum Mechanics."
- Nature **195**, 67 (1962), "Re-entrant Motion in Special Relativity" (letter).
- Nature **195**, 1088 (1962), "Interpretation of Quantum Physics" (letter).
- Nature **196**, 886 (1962), "Re-entrant Motion in Special Relativity" (letter).
  
- Dialectica, **23**, 189 (1969), "The Relativity of Physical Size."
  
- AFCRL-69-0518, *Physical Sciences Research Papers, No. 401* (Air Force Cambridge Research Laboratories, Nov. 1969), "A Space-Proper Time Formulation of Relativistic Geometry," co-authored with R. G. Newburgh.
  
- Nuovo Cimento **67B**, 84 (1970), "Relativistic Time and the Principle of Carathèodory," co-authored with R. G. Newburgh.
  
- AFCRL-71-0027, *Physical Sciences Research Papers, No. 441* (Air Force Cambridge Research Laboratories, 8 January, 1971), "A Novel Rotation Sensor Based on Measurement of the Brewster Angle in a Moving Medium," co-authored with R. G. Newburgh (principal author).
  
- Am. J. Phys. **39**, 1079 (1971), "Brewster Angle and the Einstein Velocity Addition Theorem," co-authored with R. G. Newburgh (principal author).
  
- Air Force Research Review, No. 1 (Jan.-Feb. 1971), p. 8, "A Novel Electro-optical Rotation Sensor," co-authored with R. G. Newburgh (principal author).
  
- Found. Phys. **3**, 435 (1973), "Time Asymmetry and Quantum Equations of Motion."
  
- Lettere al Nuovo Cimento **9**, 467 (1974), "Kinematics of a 'Rigid' Rotor."
  
- Found. Phys. **5**, 45 (1975), "Toward a Fundamental Mechanics, Part I."



- Found. Phys. **6**, 71 (1976), "Toward a Fundamental Mechanics, Part II."
- Found. Phys. **6**, 263 (1976), "Toward a Fundamental Mechanics, Part III."
- Speculations in Science and Technology **1**, 499 (1978), "Should Mach's Principle be Taken Seriously?"
- IEEE publication 79CH1424-1 SMC, *Proceedings of the International Conference on Cybernetics and Society* (October, 1979), p. 630, "Do Quantum 'Events' Occur?"
- Found. Phys. **10**, 289 (1980), "Do Metric Standards Contract?"
- Found. Phys. **10**, 811 (1980), "Do Metric Standards Contract? -- A Reply to Cantoni."
- Found. Phys. **11**, 633 (1981), "Light on Light: A Response to Grön."
- The Toth-Maatian Review **1**, 265 (1982), "Covariance vs. Invariance."
- The Journal of Classical Physics **2**, 1 (1983), "First-order Modification of Maxwell's Equations."
- The Journal of Classical Physics **2**, 23 (1983), "Astronomical Counter-evidence to Relativity," co-authored with H. W. Milnes (principal author).
- The Toth-Maatian Review **2**, **3** (1983-84), Chapters 1 & 2 from *Mathematical Themes in Physical Description* previewed pp. 509, 801, 924, 1008.
- Annales de la Fondation Louis de Broglie **8**, 325 (1983), "Neo-Hertzian Electromagnetism (I)."
- Annales de la Fondation Louis de Broglie **9**, 41 (1984), "Neo-Hertzian Electromagnetism (II)."
- Am. J. Phys. **54**, 245 (1986), "Mercury's precession according to special relativity."
- *Quantum Uncertainties -- Recent and Future Experiments and Interpretations*, W. M. Honig, D. W. Kraft, and E. Panarella, eds. (Plenum, New York, 1986), p. 223, "Neo-Hertzian Electromagnetism."
- Am. J. Phys. **55**, 758 (1987), "Response to "Comment on 'Mercury's precession according to special relativity'"[Am. J. Phys. **55**, 757 (1987)]."
- The Toth-Maatian Review **6**, 3207 (1987), "Reassessment of Neo-Hertzian Electromagnetism."

- Phys. Essays **1**, 20 (1988), "Measurement Theory via Hidden Variables Not Subject to Bell's Theorem."
- Phys. Essays **1**, 150 (1988), "Getting Wind of the Ether."
- Am. J. Phys. **57**, 549 (1989), "Relativity and aberration."
- Phys. Essays **2**, 180 (1989), "Superluminal Velocities: Evidence for a New Kinematics?"
- Phys. Essays **2**, 301 (1989), "Steady-state Cosmology: Once More Unto the Breach?"
- Phys. Essays **2**, 380 (1989), "Consistency Test of an Alternative Kinematics."
- Phys. Letters A **146**, 6 (1990), "Observation of Ampère Forces in Mercury" (co-authored with T. E. Phipps).
- Phys. Essays **3**, 198 (1990), "New Evidence for Ampère Longitudinal Forces."
- *Revue Roumaine des Sciences Techniques, Série Électrotechnique et Énergétique* **35**, 135 (1990), "Hertz's contribution to electromagnetic theory."
- Apeiron **8**, 8 (1990), "Weber-type Laws of Action-at-a-Distance in Modern Physics."
- Phys. Essays **3**, 414 (1990), "Toward Modernization of Weber's Force Law."
- *Physical Interpretations of Relativity Theory Proceedings* (British Society for the Philosophy of Science International Conference, London, 1990), M. C. Duffy, ed., p. 435, "Do Noncovariant Forces Exist in Nature?"
- Phys. Essays **4**, 368 (1991), "Stellar Aberration from the Standpoint of the Radiation Convection Hypothesis."
- Found. Phys. **21**, 1071 (1991), "Proper Time Synchronization."
- Galilean Electrodynamics **2**, 78 (1991), "An Ant's Challenge to the Grace-Hoppers of Special Relativity."
- *What physics for the next century? Prospects for renewal, open problems, "heretical" truths* (Proceedings of the International Conference, Ischia, Italy, 1991), G. Arcidiacono, U. Bartocci, M. M. Capria, eds., p. 151, "Letter to Science on 'Testing Special Relativity,'" and p. 153, "On Up-dating Weber's Instant-action Force-Law."
- Apeiron **14**, 5 (1992), "Lorentz Contraction of the Coulomb Field: An Experimental Proposal."

- *Wave-Particle Duality*, F. Selleri, ed., (Plenum, New York, 1992), Chapter 12, p. 193, "On the 'Completeness' of Quantum Mechanics."
- *Phys. Essays* **5**, 425 (1992), "Derivation of a modernized Weber force law."
- *Galilean Electrodynamics* **3**, 56 (1992), "Potier's Principle: A Trap for Unwary Etherists and Others."
- *Apeiron* **17**, 1 (1993), "Ampère Tension and Newton's Laws."
- *Galilean Electrodynamics* **4**, 105 (1993), "Logical Insufficiency of the 'Two Postulates' of Special Relativity."
- *Courants, Amers Écueils en Microphysique -- Directions in Microphysics* (Fondation Louis de Broglie, 1993), p. 323, "On force laws and alternative pathways to electrodynamics" (special issue of *Annales de la Fondation Louis de Broglie*).
- *Phys. Essays* **6**, 249 (1993), "On Hertz's Invariant Form of Maxwell's Equations."
- *Galilean Electrodynamics* **5**, (1994), "Neo-Hertzian Wave Equation and Aberration."
- *Apeiron* **19**, 11 (1994), "Stellar and Planetary Aberration."
- *Advanced Electromagnetism: Foundations, Theory, Applications* (World Scientific Pub. Co., Inc., Singapore, 1995), T. W. Barrett and D. M. Grimes, eds., Chap. 11, "Hertzian Invariant Forms of Electromagnetism."

#### MATHEMATICS:

- *Operations Research* **4**, 76 (1956), "Machine Repair as a Priority Waiting-Line Problem."
- *SIAM Review* **10**, 223 (1968), "A Continued Fraction Representation of Eigenvalues (Problem 68-6)."
- *Am. Mathematical Monthly* **75**, 881 (1968), "Cauchy-Riemann Relations in  $n$  Dimensions."
- *SIAM Review* **13**, 390 (1971), "A Continued Fraction Representation of Eigenvalues (Problem 68-6): Solution by Proposer."
- *SIAM Review* **13**, 389 (1971), "A Double-sum Identity (Problem 71-16)."
- *Byte* (April, 1986), p. 181, "The Inversion of Large Matrices."
- *Phys. Essays* **6**, 135 (1993), "On Infinite Process Convergence, Part I: Speeding Series Convergence."

- Phys. Essays **6**, 440 (1993), "On Infinite Process Convergence, Part II: Brown's Series  $1 + 1!x + 2!x^2 + \dots$ ."
- Phys. Essays **6**, 588 (1993), "Infinite Process Convergence, Part III: Introduction to Continued Fractions."

#### MISCELLANEOUS:

- Science **129**, 118 (1959), "Scientific Communication" (Letter to the editor).
- Journal of Conflict Resolution **5**, 274 (1961), "Resolving 'Hopeless' Conflicts."
- Current History **42**, 275 (1962), "The Case for Deterrence."
- Journal of Conflict Resolution **7**, 215 (1963) and Journal of Arms Control **1**, 309 (1963), "Strategy of War Limitation."
- Science **139**, 674 (1963), "Civil Defense" (Letter to the Editor).
- *Heretical Verities: Mathematical Themes in Physical Description* (Classic Non-fiction Library, Urbana, IL, 1987).

## PHIPPSCHRIFT CONTENTS

Halton Arp

— Observational Cosmology Impacts Physics

A.K.T. Assis

— Weber's Force Versus Lorentz's Force

Chappell Brown

— A New Perspective on the Foundations of Analysis

H.C. Corben

— The Quantization of Relativistic Classical Mechanics

Peter Graneau

— Mach's Magic Principle: The Unique Inertial System

Reginald I. Gray

— The Transmission-Line Vacuum

Howard C. Hayden

— Special Relativity: Problems and Alternatives

Constantin I. Mocanu

— Hertz's Special Relativity and Physical Reality

Ronald Newburgh

— Newton's Third Law: A Criterion for Particle Behavior of Extended Bodies

H. Pierre Noyes

— A Finite and Discrete Model for Fermion Mass Renormalization:

Vivian Pope

— Instantaneous Gravitational and Inertial Action-at-a-Distance

David F. Roscoe

— Galilean Metric Gravity

Franco Selleri

— Inertial Systems and Absolute Transformations of Space and Time

M. Surdin

— On the Origin of Galaxies

— The Rotating Universe

Mogens Wegener

— The Radar Technique as a Theoretical Device

— A Classical Alternative to Special Relativity

Cynthia K. Whitney

— Aetherial Models, Real Measurables