

## Editorial: Memorable papers from the *American Journal of Physics*, 1933–1990

In an earlier editorial, "Vote for your favorite AJP papers" [57 (12), 1067 (1989)], I invited readers to nominate their favorite papers from past issues of this Journal, from the first issue in Volume 1 (1933) to the present. I wanted to be able to encourage all readers to seek out stimulating articles they might have missed or that they might have read a long time ago but forgotten in the intervening years.

The "AJP All-Star Team" is listed below. The chosen papers are simply arranged chronologically and grouped by year, except for cases in which several papers obviously belong together. Citations are given in the form recently adopted for this Journal, with both final and initial page numbers and—in particular—*titles* of the published articles. We have made one *addition* to the usual format for printing journal references, by including the *issue number*, in the hopes of making it easier for readers who may have unbound sets of AJP conveniently at hand. In all cases in which I happened to know about subsequent errata or sequels, I have added appropriate references but no systematic search has been made.

I decided not to try to group these papers by subject category for two reasons. First, because of the nature of this particular Journal, it would have been an impossible task. There was, however, a second and more important reason. To segregate the papers by subject matter would have run contrary to the spirit of this effort. For there was an implicit assumption behind my decision to print such a list, the assumption that AJP readers are a peculiar lot, with broad interests and eclectic tastes. (Does that really make us "peculiar"? I hope that all physicists fall into that category, but I sometimes worry that during the past few decades the percentage of physicists who fit that description may have been decreasing.) In my own case, for instance, though electromagnetic theory is still my own first love, I would not think of scanning a list like this looking only for papers on that topic. Rather, to quote from the one sentence in our current "Statement of Editorial Policy" that I think best summarizes the purpose of AJP, I would look for papers that meet my "needs and intellectual interests," in a broad interpretation of those words.

It is clear that nominations were made for a variety of reasons. Some may have been chosen in part because of the names of the authors. (Look, for instance, at the papers near the beginning of the list written by Condon, Bridgman, Morrison, Compton, Weisskopf, Wigner, Sommerfeld, Fermi, and Purcell.) Some were perhaps chosen because of the quaintness of their approach or a sense of "déjà vu all over again" in Yogi Berra's immortal words. (See, for instance, Daffin, 1937 or Pake, 1961.) Some were chosen because of the important role that the particular papers played in an individual's own education. As any reader of my August, 1988 editorial, "Wanted—Tutorial articles for the *American Journal of Physics*" [56 (8), 681 (1988)] might have predicted, I myself nominated Pake's 1950 papers on nuclear magnetic resonance, papers that can still serve as a useful introduction to that subject. Some papers were nominated that are not yet venerable enough to be "classics" but are obviously meeting the *current* needs and intellectual interests of readers: look, for instance, at Purcell, Mills, Janot *et al.*, and Washburn (1989); Dehmelt (our "Nobel Prize paper"), Dyson, Mermin, and Green-

berger *et al.* (1990). (Careful readers of published dates of receipt and acceptance will realize that Dehmelt's paper was received in this office a few days prior to the announcement of his Nobel Prize award, hurried with unusual speed through the review process after the prize was reported, and published much more quickly than is normally possible, so that it appeared in print almost simultaneously with the ceremony in Stockholm.)

Here is one small statistical note for those interested in the sociology of science. The great majority (about 84%) of the listed papers were written by a single author, with an average of approximately 1.2 authors per paper. In the physics community at large, these numbers may seem bizarre, but they are not absurdly anomalous in the *American Journal of Physics* context. Of all new manuscripts submitted to AJP during the last three years, 65% were written by a single author, with an average of approximately 1.5 authors per paper. Think what the corresponding numbers are for other physics journals!

I want to thank everyone who nominated papers for this list; perhaps I owe a special word of thanks to those anonymous voters who were kind enough to nominate a few of my own old contributions to these pages! Happy reading.

Robert H. Romer, *Editor*

### 1934

E. U. Condon, "Where Do We Live? Reflections on Physical Units and the Universal Constants," 2 (2), 63–69 (1934).

### 1937

W. V. Houston, "The Physical Content of Quantum Mechanics," 5 (2), 49–55 (1937).

John B. Daffin, "Why the Woman Student Does Not Elect Physics," 5 (2), 82–85 (1937).

### 1939

P. W. Bridgman, "Society and the Intelligent Physicist," 7 (2), 109–116 (1939).

### 1941

P. Morrison, "Introduction to the Theory of Nuclear Reactions," 9 (3), 135–162 (1941).

Donald R. Hamilton, "Molecular Beams and Nuclear Moments," 9 (6), 319–337 (1941).

### 1942

Arthur H. Compton, "War Problems of the Physics Teacher," 10 (2), 92–96 (1942).

E. U. Condon, "A Physicist's Peace," 10 (2), 96–97 (1942).

### 1943

V. F. Weisskopf, "On the Theory of the Electric Resistance of Metals," 11 (1), 1–12 (1943).

## 1946

- Sherwood K. Haynes and Wilfrid J. Jackson, "The Physics of Radar," **14** (3), 143–164 (1946); "The Physics of Radar (Continued)," **14** (6), 403–431 (1946).  
 Arthur H. Compton, "The Social Implications of Atomic Energy," **14** (3), 173–178 (1946).

## 1947

- Philipp Frank, "The Place of the Philosophy of Science in the Curriculum of the Physics Student," **15** (3), 202–218 (1947).  
 E. U. Condon, "The Franck–Condon Principle and Related Topics," **15** (5), 365–374 (1947).  
 E. C. Watson, "Joule's Only *General* Exposition of the Principle of Conservation of Energy," (including a reprint of James Prescott Joule's lecture at Manchester, April 28, 1847: "On Matter, Living Force, and Heat"), **15** (5), 383–390 (1947).  
 E. C. Watson, "Jubilee of the Electron," (a reprint of J. J. Thomson's Royal Institution Lecture of April 30, 1897: "Cathode Rays"), **15** (6), 458–464 (1947).

## 1948

- E. U. Condon and P. E. Condon, "Effect of Oscillations of the Case on the Rate of a Watch," **16** (1), 14–16 (1948).  
 G. P. Harnwell, "Submarine Physics," **16** (3), 127–139 (1948).  
 James S. Allen, "The Search for the Neutrino through Nuclear Recoil Experiments," **16** (9), 451–461 (1948).

## 1949

- E. P. Wigner, "Nuclear Reactions and Level Widths," **17** (3), 99–109 (1949).  
 C. Kikuchi and R. D. Spence, "Microwave Methods in Physics. I. Microwave Spectroscopy," **17** (5), 288–297 (1949); "Microwave Methods in Physics. II. Microwave Absorption in Paramagnetic Substances," **18** (4), 167–182 (1950).  
 A. Sommerfeld, "Some Reminiscences of My Teaching Career," **17** (5), 315–316 (1949).

## 1950

- Coulomb's Law Committee of the A.A.P.T. (W. F. Brown, Jr.; N. H. Frank; E. C. Kemble, Chair; W. H. Michener; C. C. Murdock and D. L. Webster), "The Teaching of Electricity and Magnetism at the College Level. I. Logical Standards and Critical Issues," **18** (1), 1–25 (1950); "II. Two Outlines for Teachers," **18** (2), 69–88 (1950).  
 Karl Menger, "The Mathematics of Elementary Thermodynamics," **18** (2), 89–103 (1950). See also John S. Thomsen, **19** (8), 476 (1951), and Karl Menger **19** (8), 476–477 (1951).  
 Geoffrey F. Chew and Burton J. Moyer, "High Energy Accelerators at the University of California Radiation Laboratory," **18** (3), 125–136 (1950).  
 G. E. Pake, "Fundamentals of Nuclear Magnetic Resonance Absorption I," **18** (7), 438–452 (1950); "Fundamentals of Nuclear Magnetic Resonance Absorption II," **18** (8), 473–486 (1950).  
 J. H. Van Vleck, "Landmarks in the Theory of Magnetism," **18** (8), 495–509 (1950).

## 1951

- Herbert Goldstein, "The Classical Motion of a Rigid Charged Body in a Magnetic Field," **19** (2), 100–109 (1951).

- J. C. Slater, "The Electron Theory of Solids," **19** (6), 368–374 (1951).

## 1952

- Martin J. Klein, "On a Degeneracy Theorem of Kramers," **20** (2), 65–71 (1952).  
 Alvin M. Weinberg, "Current Status of Nuclear Reactor Theory," **20** (7), 401–412 (1952).  
 L. I. Schiff, "Quantum Effects in the Radiation from Accelerated Relativistic Electrons," **20** (8), 474–478 (1952).  
 Kerson Huang, "On the Zitterbewegung of the Dirac Electron," **20** (8), 479–484 (1952).  
 Enrico Fermi, "Experimental Production of a Divergent Chain Reaction," **20** (9), 536–558 (1952).

## 1953

- G. Breit and M. H. Hull, Jr., "Advances in Knowledge of Nuclear Forces," **21** (3), 184–220 (1953).  
 Allen L. King, "Note in Memory of Blind John Gough," **21** (3), 231–232 (1953).  
 F. Keffer, H. Kaplan, and Y. Yafet, "Spin Waves in Ferromagnetic and Antiferromagnetic Materials," **21** (4), 250–257 (1953).

## 1954

- E. M. Purcell, "Nuclear Magnetism," **22** (1), 1–8 (1954).  
 Victor K. La Mer, "Some Current Misinterpretations of N. L. Sadi Carnot's Memoir and Cycle I," **22** (1), 20–27 (1954); "Some Current Misinterpretations of N. L. Sadi Carnot's Memoir and Cycle II," **23** (2), 95–102 (1955).  
 E. U. Condon, "Physics of the Glassy State. I. Constitution and Structure," **22** (2), 43–53 (1954); "Physics of the Glassy State. II. The Transformation Range," **22** (3), 132–142 (1954); "Physics of the Glassy State. III. Strength of Glass," **22** (4), 224–232 (1954); "Physics of the Glassy State. IV. Radiation-Sensitive Glasses," **22** (5), 310–317 (1955).  
 H. G. Dehmelt, "Nuclear Quadrupole Resonance," **22** (3), 110–120 (1954).  
 Eric Mendoza, "Storm Location at Sea—An Illustration of Group Velocity," **22** (4), 208–211 (1954).  
 C. Kittel, "The Effective Mass of Electrons in Crystals," **22** (5), 250–252 (1954).

## 1955

- Thomas S. Kuhn, "Carnot's Version of 'Carnot's Cycle,'" **23** (2), 91–95 (1955).  
 Martin A. Hirshfeld, "On 'Some Current Misinterpretations of Carnot's Memoir,'" **23** (2), 103–105 (1955).  
 E. J. Zimmerman, "Numerical Coincidences in Microphysics and Cosmology," **23** (3), 136–141 (1955).  
 Eugene P. Wigner, "On the Development of the Compound Nucleus Model," **23** (6), 371–380 (1955).  
 Harald C. Jensen, "Production of Chladni Figures on Vibrating Plates Using Continuous Excitation," **23** (8), 503–505 (1955).  
 W. H. Furry, "Lorentz Transformation and the Thomas Precession," **23** (8), 517–525 (1955).

## 1956

- C. E. Chase, "Ultrasonic Propagation in Liquid Helium," **24** (3), 136–155 (1956).  
 Mario Bunge, "Survey of the Interpretations of Quantum Mechanics," **24** (4), 272–286 (1956).

- Gerald Holton, "Johannes Kepler's Universe: Its Physics and Metaphysics," **24** (5), 340–351 (1956).  
 Walter H. Brattain, "Development of Concepts in Semiconductor Research," **24** (6), 421–425 (1956).  
 G. E. Uhlenbeck, "Reminiscences of Professor Paul Ehrenfest," **24** (6), 431–433 (1956).  
 H. R. Crane, "Maintaining the Geometrical Alignment of a Large Accelerator," **24** (8), 549–554 (1956).

### 1957

- Mary D. Waller, "Interpreting Chladni Figures," **25** (3), 157–158 (1957).  
 Harald C. Jensen, "Production of Chladni Figures," **25** (3), 203 (1957).  
 E. C. Watson, "On the Relations Between Light and Electricity" (a translation of Heinrich Hertz's Heidelberg lecture of 1889), **25** (6), 335–343 (1957).  
 Mark W. Zemansky, "Fashions in Thermodynamics," **25** (6), 349–351 (1957).  
 E. Segrè, "Antinucleons," **25** (6), 363–369 (1957).  
 E. M. Purcell, "Gravitation Torsion Balance," **25** (6), 393–394 (1957).  
 Jerome Rothstein, "Nuclear Spin Echo Experiments and the Foundations of Statistical Mechanics," **25** (8), 510–518 (1957).  
 Allan Sandage, "The Birth and Death of a Star," **25** (8), 525–531 (1957).  
 Aage Bohr, "On the Structure of Atomic Nuclei," **25** (8), 547–553 (1957).

### 1958

- Martin J. Klein, "Note on a Problem Concerning the Gibbs Paradox," **26** (2), 80–81 (1958).  
 Leonard Eisenbud, "On the Classical Laws of Motion," **26** (3), 144–159 (1958).  
 John K. Wood, "Aristotle and the Physics Student," **26** (3), 175–178 (1958).  
 David Park, "Recent Advances in Physics," **26** (4), 210–234 (1958).  
 Raymond J. Seeger, "On Teaching Thermophysics," **26** (4), 248–257 (1958).  
 R. B. Lindsay, "Concept of Energy as the Theme of a General Education Course in Physics," **26** (5), 290–296 (1958).  
 P. Morrison, "Approximate Nature of Physical Symmetries," **26** (6), 358–368 (1958).  
 Willard F. Libby, "Chemistry and the Atomic Nucleus," **26** (8), 524–536 (1958).

### 1959

- Norwood Russell Hanson, "Copenhagen Interpretation of Quantum Theory," **27** (1), 1–15 (1959).  
 David Park, "Recent Advances in Physics," **27** (4), 234–255 (1959).  
 E. R. Harrison, "Epicyclic Orbits of Charged Particles," **27** (5), 314–317 (1959).  
 Bela G. Kolosvay, "Eötvös Balance," **27** (5), 336–343 (1959).  
 M. Stanley Livingston, "Early Development of Particle Accelerators," **27** (9), 626–629 (1959).

### 1960

- Leon N. Cooper, "Theory of Superconductivity," **28** (2), 91–101 (1960).  
 Sir George P. Thomson, "Nature of Physics and Its Relation to Other Disciplines," **28** (3), 187–192 (1960).

- H. A. Buchdahl, "The Concepts of Classical Thermodynamics," **28** (3), 196–201 (1960).  
 L. I. Schiff, "On Experimental Tests of the General Theory of Relativity," **28** (4), 340–343 (1960).  
 R. H. Dicke, "Eötvös Experiment and the Gravitational Red Shift," **28** (4), 344–347 (1960).  
 Richard A. Ferrell, "Electron-Nucleus Hyperfine Interaction in Atoms," **28** (5), 484–486 (1960).  
 Gerald Holton, "On the Origins of the Special Theory of Relativity," **28** (7), 627–636 (1960).  
 F. Rohrlich, "Self-Energy and the Stability of the Classical Electron," **28** (7), 639–643 (1960).  
 Robert L. de Zafra, "Optical Pumping," **28** (7), 646–654 (1960).

### 1961

- Harry Lustig, "The Mössbauer Effect," **29** (1), 1–18 (1961).  
 P. W. Bridgman, "Significance of the Mach Principle," **29** (1), 32–36 (1961).  
 L. Brillouin, "Thermodynamics, Statistics, and Information," **29** (5), 318–328 (1961).  
 William A. Fowler, Jesse L. Greenstein, and Fred Hoyle, "Deuteronomy. Synthesis of Deuterons and the Light Nuclei during the Early History of the Solar System," **29** (7), 393–403 (1961).  
 George E. Pake, "Can Four-Year Colleges Prepare Physics Majors for Graduate Work in Physics?" **29** (10), 678–684 (1961).  
 Robert Weinstock, "Laws of Classical Motion: What's  $F$ ? What's  $m$ ? What's  $a$ ?" **29** (10), 698–702 (1961).  
 A. H. Compton, "The Scattering of X Rays as Particles," **29** (12), 817–820 (1961).  
 Sir George Thomson, "Early Work in Electron Diffraction," **29** (12), 821–825 (1961).  
 C. D. Anderson, "Early Work on the Positron and Muon," **29** (12), 825–830 (1961).

### 1962

- E. Merzbacher, "Single Valuedness of Wave Functions," **30** (4), 237–247 (1962).  
 T. Gold, "The Arrow of Time," **30** (6), 403–410 (1962).  
 Robert W. Brehme, "A Geometric Representation of Galilean and Lorentz Transformations," **30** (7), 489–496 (1962).  
 William T. Scott, "Electron Levels, Electrochemical Effects, and Thermoelectricity," **30** (10), 727–737 (1962).

### 1963

- Eugene P. Wigner, "The Problem of Measurement," **31** (1), 6–15 (1963).  
 R. S. Shankland, "Conversations with Albert Einstein," **31** (1), 47–57 (1963); "Conversations with Albert Einstein, II," **41** (7), 895–901 (1973).  
 H. V. Neher and R. B. Leighton, "Linear Air Trough," **31** (4), 255–262 (1963).  
 David H. Frisch and James H. Smith, "Measurement of Relativistic Time Dilation Using  $\mu$ -Mesons," **31** (5), 342–355 (1963).  
 W. K. H. Panofsky, "Photon and Electron High-Energy Physics: Present and Future," **31** (6), 409–416 (1963).  
 R. H. Dicke, "Cosmology, Mach's Principle and Relativity," **31** (7), 500–509 (1963).  
 Francis W. Sears, "A Simplified Simplification of Carathéodory's Treatment of Thermodynamics," **31** (10), 747–752 (1963).  
 Abner Shimony, "Role of the Observer in Quantum Theory," **31** (10), 755–773 (1963).

- R. S. Shankland, "Michelson-Morley Experiment," **32** (1), 16-35 (1964).  
 Mark Sharnoff, "Validity Conditions for the Kramers-Kronig Relations," **32** (1), 40-44 (1964).  
 Albert Allen Bartlett, "Compton Effect: Historical Background," **32** (2), 120-127 (1964).  
 Philip Morrison, "Less May Be More," **32** (6), 441-457 (1964).  
 C. H. Holbrow and W. C. Davidon, "An Introduction to Dispersion Relations," **32** (10), 762-774 (1964).

## 1965

- Reuben Benumof, "Optical Pumping Theory and Experiments," **33** (2), 151-160 (1965).  
 E. T. Jaynes, "Gibbs vs Boltzmann Entropies," **33** (5), 391-398 (1965).  
 A. L. Schawlow, "Measuring the Wavelength of Light with a Ruler," **33** (11), 922-923 (1965).  
 Arthur Komar, "Foundations of Special Relativity and the Shape of the Big Dipper," **33** (12), 1024-1027 (1965).

## 1966

- Arthur A. Evett, "Permutation Symbol Approach to Elementary Vector Analysis," **34** (6), 503-507 (1966).  
 Vladislav Bevc, "Vector Differential Operations Derived from Physical Definitions," **34** (6), 507-510 (1966).  
 R. H. Romer, "Angular Momentum of Static Electromagnetic Fields," **34** (9), 772-778 (1966); "Electromagnetic Angular Momentum," **35** (5), 445-446 (1967).  
 Mark W. Zemansky, "Kelvin and Caratheodory—A Reconciliation," **34** (10), 914-920 (1966).

## 1967

- A. Gamba, "Physical Quantities in Different Reference Systems According to Relativity," **35** (2), 83-89 (1967).  
 Emerson M. Pugh and George E. Pugh, "Physical Significance of the Poynting Vector in Static Fields," **35** (2), 153-156 (1967).  
 C. Kittel, "The Way of the Chemical Potential," **35** (6), 483-487 (1967).  
 R. H. Dicke, "Gravitation and Cosmic Physics," **35** (7), 559-566 (1967).  
 O. L. Brill and B. Goodman, "Causality in the Coulomb Gauge," **35** (9), 832-837 (1967).  
 R. H. Romer, "Matrix Description of Collisions on an Air Track," **35** (9), 862-868 (1967).

## 1968

- John C. Wheatley, "Dilute Solutions of  $^3\text{He}$  in  $^4\text{He}$  at Low Temperatures," **36** (3), 181-210 (1968).  
 C. Kittel, "X-Ray Diffraction from Helices: Structure of DNA," **36** (7), 610-616 (1968).  
 Stephen G. Kukolich, "Demonstration of the Ramsauer-Townsend Effect in a Xenon Thyatron," **36** (8), 701-703 (1968).  
 Eugen Merzbacher, "Matrix Methods in Quantum Mechanics," **36** (9), 814-821 (1968).  
 Lester M. Clendenning, "A Laboratory Approach to an Eigenvalue Problem," **36** (10), 879-881 (1968).  
 H. R. Crane, "Students Do Not Think Physics is 'Relevant.' What Can We Do About It?" **36** (12), 1137-1143 (1968).

- Martin S. Tiersten, "Force, Momentum Change, and Motion," **37** (1), 82-87 (1969).  
 Richard L. Garwin, "Kinematics of an Ultraelastic Rough Ball," **37** (1), 88-92 (1969).  
 P. J. E. Peebles, "Cosmology for Everyphysicist," **37** (4), 410-422 (1969).  
 S. Chandrasekhar, "Some Historical Notes," **37** (6), 577-584 (1969).  
 W. H. Furry, "Examples of Momentum Distributions in the Electromagnetic Field and in Matter," **37** (6), 621-636 (1969).  
 N. R. Werthamer, "Theory of Quantum Crystals," **37** (8), 763-782 (1969).  
 C. Kittel, "Phase Transition of a Molecular Zipper," **37** (9), 917-920 (1969).  
 Gerald Holton, "Einstein and the 'Crucial' Experiment," **37** (10), 968-982 (1969).  
 Robert Weinstock, "Heat Capacity of an Ideal Free-Electron Gas: A Rigorous Derivation," **37** (12), 1273-1279 (1969).

## 1970

- Herman Erlichson, "Aharonov-Bohm Effect—Quantum Effects on Charged Particles in Field-Free Regions," **38** (2), 162-173 (1970).  
 E. O. Schulz-DuBois, "Foucault Pendulum Experiment by Kamerlingh Onnes and Degenerate Perturbation Theory," **38** (2), 173-188 (1970).  
 Eugene P. Wigner, "On Hidden Variables and Quantum Mechanical Probabilities," **38** (8), 1005-1009 (1970).  
 John Clarke, "The Josephson Effect and  $e/h$ ," **38** (9), 1071-1095 (1970).

## 1971

- G. E. Stedman, "Fermi's Golden Rule—An Exercise in Quantum Field Theory," **39** (2), 205-214 (1971).  
 Timothy H. Boyer, "Energy and Momentum in Electromagnetic Field for Charged Particles Moving with Constant Velocities," **39** (3), 257-270 (1971).  
 Jean-Marc Lévy-Leblond, "Conservation Laws for Gauge-Variant Lagrangians," **39** (5), 502-506 (1971).  
 Frank S. Crawford, "Culvert Whistlers," **39** (6), 610-615 (1971); "Culvert whistlers revisited," **56** (8), 752-754 (1988).

## 1972

- Roger Y. Tsien, "Pictures of Dynamic Electric Fields," **40** (1), 46-56 (1972).  
 S. Chandrasekhar, "On the 'Derivation' of Einstein's Field Equations," **40** (2), 224-234 (1972).  
 Barry R. Holstein and Arthur R. Swift, "The Relativity Twins in Free Fall," **40** (5), 746-750 (1972).  
 Henry Pierce Stapp, "The Copenhagen Interpretation," **40** (8), 1098-1116 (1972).

## 1973

- N. Bloembergen, "The Concept of Temperature in Magnetism," **41** (3), 325-331 (1973).  
 O. Donati, G. F. Missiroli, and G. Pozzi, "An Experiment on Electron Interference," **41** (5), 639-644 (1973); P. G. Merli, G. F. Missiroli, and G. Pozzi, "On the statistical aspect of electron interference phenomena," **44** (3), 306-307 (1976); G. Matteucci and G. Pozzi, "Two further experiments on electron interference," **46** (6), 619-623 (1978).

- Arnold Arons, "Toward Wider Public Understanding of Science," **41** (6), 769–782 (1973); **42** (2), 157–158 (1974).  
 Frank S. Crawford, "Water-Wave Machine for Demonstrating Group Velocity," **41** (10), 1203–1204 (1973).  
 Frank S. Crawford, "Coille Effect: A Manifestation of the Reversibility of Light Rays," **41** (12), 1370–1371 (1973).

#### 1974

- Claus Jönsson, "Electron Diffraction at Multiple Slits," **42** (1), 4–11 (1974).  
 Frank S. Crawford, "Singing Corrugated Pipes," **42** (4), 278–288 (1974).  
 Julian Schwinger, "Precession Tests of General Relativity—Source Theory Derivations," **42** (6), 507–510 (1974).  
 Julian Schwinger, "Spin-Precession—A Dynamical Discussion," **42** (6), 510–513 (1974).

#### 1976

- Leon H. Fisher and Robert N. Varney, "Contact potentials between metals: History, concepts, and persistent misconceptions," **44** (5), 464–475 (1976).  
 Allan Franklin, "Principle of inertia in the Middle Ages," **44** (6), 529–545 (1976).  
 Thomas F. Jordan, "Conditions on wave functions derived from operator domains," **44** (6), 567–570 (1976).  
 R. J. Higgins, "Fast Fourier transform: An introduction with some minicomputer experiments," **44** (8), 766–773 (1976).  
 Luis W. Alvarez, "A physicist examines the Kennedy assassination film," **44** (9), 813–827 (1976).  
 Edward MacKinnon, "De Broglie's thesis: A critical retrospective," **44** (11), 1047–1055 (1976).

#### 1977

- E. M. Purcell, "Life at low Reynolds number," **45** (1), 3–11 (1977).  
 E. R. Harrison, "The dark night sky paradox," **45** (2), 119–124 (1977).  
 E. M. Lifshitz, "L. D. Landau's plain talk to students of physics," **45** (5), 415–422 (1977).  
 J. Als-Nielsen and R. J. Birgeneau, "Mean field theory, the Ginzburg criterion, and marginal dimensionality of phase transitions," **45** (6), 554–560 (1977).  
 Banesh Hoffmann, "Unexpected rewards," **45** (9), 787–794 (1977).  
 Hans C. Ohanian, "What is the principle of equivalence?" **45** (10), 903–909 (1977).

#### 1978

- Michael Nauenberg and Victor F. Weisskopf, "Why does the sun shine?" **46** (1), 23–31 (1978).  
 P. Kittel, W. R. Hackleman, and R. J. Donnelly, "Undergraduate experiment on noise thermometry," **46** (1), 94–100 (1978).  
 Frederik J. Belinfante, "Can individual elementary particles have individual properties?" **46** (4), 329–336 (1978).  
 Timothy H. Boyer, "Electrostatic potential energy leading to an inertial mass change for a system of two point charges," **46** (4), 383–385 (1978).  
 E. J. Konopinski, "What the electromagnetic vector potential describes," **46** (5), 499–502 (1978).  
 Sidney D. Drell, "When is a particle?" **46** (6), 597–606 (1978).  
 Humphrey J. Maris and Leo P. Kadanoff, "Teaching the renormalization group," **46** (6), 652–657 (1978).

- Albert A. Bartlett, "Forgotten fundamentals of the energy crisis," **46** (9), 876–888 (1978).  
 Lorenzo J. Curtis, "Concept of the exponential law prior to 1900," **46** (9), 896–906 (1978).  
 R. A. Powell, "Photoelectric effect: Back to basics," **46** (10), 1046–1051 (1978).

#### 1979

- Fritjof Capra, "Quark physics without quarks: A review of recent developments in S-matrix theory," **47** (1), 11–23 (1979).  
 Timothy H. Boyer, "Electrostatic potential energy leading to a gravitational mass change for a system of two point charges," **47** (2), 129–131 (1979).  
 M. V. Berry and N. L. Balazs, "Nonspreading wave packets," **47** (3), 264–267 (1979).  
 Evelyn Fox Keller, "Cognitive repression in contemporary physics," **47** (8), 718–721 (1979).  
 A. B. Arons, "Basic physics of the semidiurnal lunar tide," **47** (11), 934–937 (1979).  
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### JOHN BELL ON QUANTUM MECHANICS

But is there not something to be said for the approach of Euclid? Even now that we know that Euclidean geometry is (in some sense) not quite true? Is it not good to know what follows from what, even if it is not really necessary FAPP ("For All Practical Purposes")? Suppose for example that quantum mechanics were found to *resist* precise formulation. Suppose that when formulation beyond FAPP is attempted, we find an unmovable finger obstinately pointing outside the subject...to the Mind of the Observer, to the Hindu scriptures, to God, or even only Gravitation? Would not that be *very very interesting*?

John S. Bell, "Against 'Measurement,'" CERN-TH-5611/89 (December 1989).