ANNUAL REPORT OF THE DEPARTMENT OF PHYSICS
BOSTON UNIVERSITY FOR THE YEAR 1970-71

SUBMITTED TO THE DEAN OF THE COLLEGE OF LIBERAL ARTS
AND THE DEAN OF THE GRADUATE SCHOOL OF BOSTON UNIVERSITY

BY

GEORGE O. ZIMMERMAN - ASSOCIATE CHAIRMAN OF THE DEPT. OF PHYSICS

ROBERT S. COHEN - CHAIRMAN OF THE DEPT. OF PHYSICS

THE FOLLOWING IS A SUMMARY OF THE PROFESSIONAL ACTIVITIES OF THE MEMBERS OF THE DEPARTMENT OF PHYSICS, BOSTON UNIVERSITY, FOR THE 1970-71 SCHOOL YEAR. THE MAIN BODY OF THIS REPORT DOES NOT CONTAIN THE ACTIVITIES OF THE ASTRONOMY DEPARTMENT, ALTHOUGH THOSE ACTIVITIES ARE APPENDED. THAT APPENDIX SHOULD BE CONSIDERED AS THE MAIN BODY FOR THE REPORT SUBMITTED TO THE GRADUATE SCHOOL SINCE THE ASTRONOMY DEPARTMENT IS A PART OF THE DEPARTMENT OF PHYSICS ON THE GRADUATE LEVEL. THE PROFESSIONAL ACTIVITIES OF R.S. COHEN WILL BE GIVEN IN AN ADDITION TO THE REPORT.

TABLE OF CONTENTS

LIST OF FACULTY

Paul Roman, Professor, Ph.D., Eotvos University at Budapest. Joined the Department of Physics in 1960.

William S. Hellman, Associate Professor, Ph.D., Syracuse University. Joined the Department of Physics in 1964.

Ruggero M. Santilli, Assistant Professor, Ph.D., University of Torino, Italy. Joined the Department of Physics in 1968.

J.J. Aghassi, Research Associate, Ph.D.

Ernesto Corinaldesi, Professor, Ph.D., University of Manchester. Joined the Department of Physics in 1966.

John Stachel, Associate Professor, Ph.D., Stevens Institute of Technology. Joined the Department of Physics in 1964.

John Gillespie, Assistant Professor, Ph.D., Stanford University. Joined the Department of Physics in 1969.

Armand Siegel, Professor, Ph.D., Massachusetts Institute of Technology. Joined the Department of Physics in 1950.

Terence Burke, Research Associate, Ph.D.

Charles R. Willis, Professor, Ph.D., Syracuse University. Joined the Department of Physics in 1958.

Robert S. Cohen, Professor (Chairman), Ph.D., Yale University. Joined the Department of Physics in 1957.

Abner Shimony, Associate Professor, Ph.D., (Philosophy) Yale University, (Physics) Princeton University. Joined the Department of Physics in 1968.

Steven P. Heims, Visiting Professor, Ph.D.

William Noble, Visiting Professor, Ph.D.

J. Gordon Stipe, Professor, Ph.D., Princeton University. Joined the Department of Physics in 1958.

Wolfgang Franzen, Professor, Ph.D., University of Pennsylvania. Joined the Department of Physics in 1961.

Dean S. Edmonds, Associate Professor, Ph.D., Massachusetts Institute of Technology. Joined the Department of Physics in 1961.

Edward C. Booth, Professor, Ph.D., Johns Hopkins University. Joined the Department of Physics in 1956.

William J. Alston, III, Assistant Professor, Ph.D., Yale University. Joined the Department of Physics in 1964.

Bernard Chasan, Associate Professor, Ph.D., Cornell University. Joined the Department of Physics in 1962.

Gilbert R. Hoy, Associate Professor, Ph.D., Carnegie Institute of Technology. Joined the Department of Physics in 1965.

George O. Zimmerman, Associate Professor (Associate Chairman), Ph.D., Yale University. Joined the Department of Physics in 1963.

Charles E. Chase, Associate Professor, Ph.D., Cambridge University.

Administrative Organization of the Department of Physics

Robert S. Cohen - Chairman of the Department and ex-officio member of all committees.

M. Papagiannis - Chairman of Astronomy (which is a separate CLA undergraduate department).

E. C. Booth &
G. O. Zimmerman - Served at different times as Associate Chairman of the Department of Physics during the second semester of the 1970-71 school year.

A. Stone - Administrative Assistant to the chairman, in charge of non-academic personnel and physical facilities.

Language Committee -
D.S. Edmonds
P. Roman

Graduate Committee -
E.C. Booth, Chairman
W. S. Hellman
M. Papagiannis
P. Roman
G. O. Zimmerman
R. Arnold - student member
M. Mendillo - student member

Undergraduate Committee -
J. G. Stipe, Chairman
W. J. Alston
B. Chasan (in absentia)
D. S. Edmonds
J. Gillespie

Committee on Graduate Admissions -
G. O. Zimmerman, Chairman
W. S. Hellman
R. Kandel
R. M. Santilli

Library Committee -
J. Gillespie
C. R. Willis

In Charge of Colloquia	-	W. Franzen
In Charge of Astronomy Library	-	R. Berendzen
In Charge of the Observatory	-	W. Straka
In Charge of Graduate Comprehensive Exam.	-	C. R. Willis (Chairman) G. Hoy E. Corinaldesi
In Charge of Financial Aid to Grad Students	-	G. O. Zimmerman

The Courses Offered During the 1970-71 School Year

Semester I

Undergraduate

College	Course #	Course Title	Instructor	# Enrolled
MET	PY101E	Phys. Sciences	Chasan	5
CLA	PY101	Phys. Sciences	Cohen	32
CLA	PY105	Elem. Physics	Booth	146
MET	PY105E	Elem. Physics	Edmonds	22
CLA	PY111	Gen. Physics	Edmonds	70
SAR	PY115	Physics	Edmonds	24
CLA	PY115	Phys-Life Sci.	Edmonds	58
CLA	PY121H	Physics	Stipe	46
MET	PY133E	Phys. and Politics	Stachel	3
MET	PY135E	Science and Religion	Cohen	12
CLA	PY151	Princ. of Phys. 1	Hoy	117
CLA	PY201	Princ. of Phys. 3	Gillespie	53
CLA	SM250 G1	Soph. Sem. Sci.	Stipe	11
CLA	SM250 G2	Soph. Sem. Sci/Hum.	Alston	13
CLA	PY303	Mechanics	Chase	7
CLA	PY305	Electric & Magnet	Willis	7
CLA	PY321	Quantum Phys. II	Franzen	8
CLA	PY375	Phy. Electronics	Edmonds	3
			Total	637

Graduate and Undergraduate

CLA	PY403	Math. Phys.	Hellman	13
CLA	PY405	Class. Mech.	Santilli	7
CLA	PY407	Quantum Mech.	Corinaldesi	13
CLA	PY409	Electromag. Thry.	Chasan	10
CLA	PY411	Thermodynamics	Siegel	8
CLA	PY413	Adv. Lab.	Zimmerman	4
			Total	55

Exclusively Graduate

GRS	PY703	Adv. Math. Phys.	Roman	11
GRS	PY711	Adv. Quant. Thry.	Hellman	3
GRS	PY777	Sym.Sol.St. Phys.	Hoy	7
GRS	PY815	S. Thry. Physics	Roman	2
GRS	PY903	Res. in Physics	Booth	1
GRS	PY909	Res. in Physics	Roman	2
GRS	PY911	Res. in Physics	Hellman	1
GRS	PY923	Res. in Physics	Hoy	1
GRS	PY925	Res. in Physics	Corinaldesi	1
GRS	PY929	Res. in Physics	Zimmerman	2
			Total	31

Grand Total 723

Semester II

Undergraduate

College	Course #	Course Title	Instructor	# Enrolled
CLA	PY106	Elem. Physics	Booth	121
MET	PY106E	Elem. Physics	Edmonds	28
CLA	PY112	Gen. Physics	Alston	50
CLA	PY116	Physics II	Edmonds	75
CLA	PY122	Physics	Stipe	46
MET	PY132E	How Things Work	Edmonds	18
MET	PY134E	Phy. in Lit.	Gillespie	12
MET	PY136E	Science in History	Cohen	15
CLA	SM150	Fr. Sem. SS Sci.	Siegel	12
CLA	PY152	Prin. of Phys. II	Hoy	88
CLA	PY202	Princ. of Phys. 4	Willis	11
CLA	SM251	Soph.Sem. Hum/Sci.	Alston	8
CLA	PY306	Rad. & Optics	Chase	4
CLA	PY320	Quantum Phys. I	Franzen	8
			Total	496

Graduate and Undergraduate

CLA	PY404	Math. Phys. II	Santilli	9
CLA	PY408	Quantum Mech.	Corinaldesi	12
CLA	PY410	Electro. Theory	Shimony	9
CLA	PY412	Stat. Phys.	Zimmerman	12
CLA	PY414	Adv. Lab.	Zimmerman	5
			Total	47

Exclusively Graduate

GRS	PY704	Adv. Math. Physics	Roman	8
GRS	PY712	Adv. Quant. Thry.	Hellman	4
GRS	PY714	Nuclear Phys.	Gillespie	2
GRS	PY778	Many Body Top.Sol.St.	Willis	3
GRS	PY816	Adv.S.Thry.Physics	Roman	2
GRS	PY904	Res. in Physics	Booth	1
GRS	PY910	Res. in Physics	Roman	2
GRS	PY912	Res. in Physics	Hellman	1
GRS	PY916	Res. in Physics	Siegel	2
GRS	PY920	Res. in Physics	Franzen	1
GRS	PY924	Res. in Physics	Hoy	1
GRS	PY926	Res. in Physics	Corinaldesi	1
GRS	PY930	Res. in Physics	Zimmerman	3
			Total	31
			Grand Total	547

Innovative and Interdisciplinary Courses

During the 1970-71 year we have introduced, through the Metropolitan College on an experimental basis, seminars which we will continue as full CLA courses during the 1971-72 school year. Those are:

PY101E - Physics for Poets - Chasan
PY132E - How Things Work - Edmonds
PY133E - Physics and Politics - Stachel
PY134E - Science in Literature - Gillespie
PY135E - Science and Religion - Cohen
PY136E - Science in History - Cohen

Freshman-Sophomore Seminars were given and well received* by three of our faculty members. They were:

Exploration of the Earth and Moon - Stipe
The Physics in Music - Alston
Freshman Seminar in Social Science - Siegel

Of the above "The Physics in Music" will be given as a CLA course during the 1971-72 year.

Booth also initiated a course, given during the second semester on an experimental basis which will be offered in CLA during the 1971-72 year. That course is:

Problems in Environmental Pollution Analysis

Next year the Physics Department will thus offer the following innovative courses through CLA in addition to a full complement of courses in Physics.

PY101. THE PHYSICAL SCIENCES. Introduction to the nature of the physical world and to concepts and methods of the physical sciences.

*See 1971 Course Evaluation Book.

For students not concentrating in the natural sciences. Logical and creative aspects of scientific ideas as well as observation and experiment. Physical themes (atomism, motion, forces and fields, the nature of time) treated historically with appreciation of their social, economic, religious and cultural influences. Mathematics not a prerequisite. Not recommended for freshmen.

First semester.

PY231. THE PHYSICS IN MUSIC. Prerequisite: musical performance experience or consent of instructor. Physical description of and measurements on resonant systems; analysis of natural harmonics of simple systems; tuning, temperament and intervals explored; string, woodwind and brass families discussed and demonstrated; topics in: electronic music, room acoustics, psycho-physical phenomena in the human ear.

First semester.

PY232. HOW THINGS WORK. Understanding physical principles through everyday technology. Concepts of mechanics, heat, and energy transformations illustrated by skiing, the automobile, and the electric motor; the study of electrical circuits and basic concepts of electro-magnetism with electric appliances; wave motion studied at lower frequencies with examples: the telephone, sound equipment, AM and FM radio and television; investigation of optical wave lengths through the behavior of eyeglasses and telescopes. Throughout the course extensive demonstrations will be relied on to show how the various examples chosen from technology actually work.

Second semester.

PY234. MODERN PHYSICS AND POLITICAL PROBLEMS. Mutual impact of physics upon social and political life. Particular emphasis upon case studies of this interrelationship in the post-World War II

period. The atomic bomb, hydrogen bomb and the Oppenheimer case. The dispute over civilian control of atomic energy development. Problems of military support of basic research in physics. The test-ban treaty and nuclear disarmament. The fall-out shelter debate. ABM and MIRV. Cases from civilian life.

Second semester.

PY236. SCIENCE IN HISTORY. Reciprocal relations of science and society from pre-history to the atomic and genetic age of 1971. Science for progress and for misery; how social factors influence science: political, economic, artistic, religious, and playful. Science and war.

Second semester.

PY237. SCIENCE IN LITERATURE. Interaction of science and culture through literature: fantasy through the scientific imagination, science and the poetic vision, utopia and anti-utopia, technology and social consciousness, the counter-culture, science fiction. Lewis Carroll, Swift, Orwell, Vonnegut, Poe, Twain, Blake, Dickens, selected science fiction.

First semester.

PY238. SCIENCE AND RELIGION. How religion sees science; how science understands religion. The power and limits of the scientific method, the social functions of religion and science. Religious hostility to and religious support of science. What may a rational man believe?

Second semester.

PY431. PROBLEMS IN ENVIRONMENTAL POLLUTION ANALYSIS. Open to natural science, mathematics and engineering majors in the junior year. An interdisciplinary course in techniques for the analysis of problems of environmental pollution, using methods of mass-spectrometry, nuclear spectroscopy, and observational astronomy. A background in the disciplines necessary for understanding the experimental techniques will be supplied. Invited lectures by specialists in the fields of air and water pollution,

meteorology, geology, chemistry, and biology. Demonstration laboratories and individual projects.

First semester.

The following will be offered through the Metropolitan College.

PY232E. HOW THINGS WORK. Understanding the great variety of things we live with in the city, the environment, the home, the factory, and the office. Clarity through demonstration in the classroom. An approach to the principles of technology and science by concrete example.

Second semester.

PY234E. SCIENCE AND POLITICS. Mutual impact of physics upon social and political life. Particular emphasis upon case studies of this interrelationship in the post-World War II period. The atomic bomb, hydrogen bomb and the Oppenheimer case. The dispute over civilian control of atomic energy development. Problems of military support of basic research in physics. The test-ban treaty and nuclear disarmament. The fall-out shelter debate. ABM and MIRV. Cases from civilian life.

Second semester.

PY236E. SCIENCE AND RELIGION. How religion sees science; how science understands religion. The power and limits of scientific method, the social functions of religion and science. Religious hostility to and religious support of science. What may a rational man believe?

Second semester.

SEMINARS:

SM261B. COLOR AND LIGHT. (Science). A non-mathematical discussion of the nature of light, photography and the formation of photographic images, the eye and color vision, optical illusions, perspective and stereoscopic vision, sun light and star light, and related subjects. No prerequisites and no previous background in science required. There will be some demonstrations.

First semester.

SM271(272)A. PHYSICS IN MUSIC. (Science/Humanities). Physical description of and measurements upon resonant system; analysis of natural harmonics of simple systems (e.g., vibrating strings, drumheads); tuning, temperament and intervals explored with recorded examples; string, woodwind and brass families discussed and demonstrated. Topics in: electronic/computer music, room acoustics, psycho-physical phenomena in the human ear. Prerequisite: experience in musical performance or consent of instructor. Listening assignments at Mugar Library included.

Full-year.

As a result of these course offerings the number of people taking courses offered by the Physics Department during the first semester of 1971-72 has already exceeded the number of those taking courses during the first semester of 1970-71 by about 400, according to the preregistration figures. If this trend continues, this might necessitate an increase in the number of our faculty members and teaching fellows.

Two other courses taught innovatively deserve some mention here.

One is PY202 - Statistical Physics, taught by Willis; the other is PY703 - 704, taught by Roman. The following are the instructors' comments:

Willis: Statistical Physics - PY202 for sophomores. In this course I presented what I feel was a conceptually simple but surprisingly advanced introduction to statistical physics with very little mathematics. The only result I know for sure is that the good students enjoyed and benefited from the course a great deal. Marginal students had difficulty but I think they gained something. I now feel an undergraduate physics problem is that though it is possible to take the good students very far into conceptual physics the poorer students lose confidence in themselves when they see the progress of the good students and consequently they try less.

Roman: PY703 - 704 (Advanced Math. Physics). I completely changed both the approach and the syllabus. Essentially, I gave an introduction to basic modern mathematical thinking, fundamental structures of mathematics (algebra, topology, measure theory), and to the application of these structures in physics (essentially functional analysis). To my best knowledge, no such course is given anywhere. I arranged matters so that, apart from basic calculus, no prerequisites were needed; I started really from scratch, but managed to go on up to the most contemporary and very involved topics, such as spectral theory. Surprisingly enough, for the most part I could even achieve mathematical rigor, without detriment to ease of perception and without endangering the "service-course" nature of the lectures. Because of the style as well as the broad variety of topics covered, the course was suitable for almost anyone. I actually had, besides the usual contingent of physics graduate students, some physics undergraduates and even some mathematics undergraduates. The course also formed the basis of a new book which I am now completing.

Publications of the Physics Department 1970-1971

Roman & Santilli

1) "Derivation of Poincare Covariance from Causality Requirements in Field Theory". Int'l. Jour. of Theoret. Physics, 3, 233 (1970).

2) "Inhomogeneous U(3,1) Invariant Extension of Vacuum Expectation Values". Nuovo Cim. 2A, 965 (1971).

3) "New Dynamical Group for the Relativistic Quantum Theory of Elementary Particles". Phys. Rev. D, 1, 2753 (1970). (With J.J. Aghassi)

4) "Relation of the Inhomogeneous de Sitter Group to the Quantum Mechanics of Elementary Particles". Jour. Math. Phys. 15, 536 (1970). (With J.J. Aghassi)

5) "Representation Theory of a New Relativistic Dynamical Group". Nuovo Cimento, in press. (With J.J. Aghassi)

6) "Relativistic Quantum Mechanical Galilei Group". Contributed paper to the A.P.S. meeting, Chicago (1970). Bull. Am. Phy. Soc. 15, 49 (1970). (With J.J. Aghassi).

7) "IU(3.1) - Invariant N-point Functions". Contributed paper to Annual Meeting of the A.P.S., Chicago (1970). Bull. Am. Phys. Soc. 15, 92 (1970).

8) "Further Studies of the Relativistic Quantum Mechanical Galilei Group". Contributed paper to the A.P.S. meeting, Washington (1970). Bull. Am. Phys. Soc., 15, 536 (1970). (With J.J. Aghassi).

Roman

Several book reviews in "Mathematical Reviews, U.S.A."

Oral publications:

"Methods of Functional Analysis in Theoretical Physics", Lectures and discussions given for students and everyone interested.

Santilli

"A New Relativistic Dynamical Group for Elementary Particles". Particles & Nuclei, 1, 81, (1970).

Hellman

1) AN-2 "Gauge Field Model Calculation of the Hadron Production from Leptons". Bull. Am. Phys. Soc. 16, 504, (1971). (With R.B. Singh).

2) AN-3 "On the Quantization of a Class of Nonlinear Systems". Bull. Am. Phys. Soc. 16, 504 (1971). (With C.G. Hood).

3) "Neutrino Induced Production of Hadrons from Leptons and the Weinberg Sum Rules", submitted for publication. (With R. B. Singh).

Gillespie

1) "Effect of Jastrow Correlation Factor on Nuclear Charge Distributions". Phys. Rev. Letters 25, 1624 (1970). (With G. Ripka).

2) "Jastrow Correlations". (to be published). (With M. Gauden & G. Ripka).

3) "High Energy Scattering of Hadrons from Nuclei". Invited lectures at 1971 Nuclear Theory Course, International Centre for Theoretical Physics, Trieste. (To be published, International Atomic Energy Commission).

Siegel

1) "The Cameron-Martin-Wiener Method in Turbulence and in Burger's Model: General Formulae, and Application to Late Decay." J. Fluid Mech. 41, part 3, 593 (1970). (With W.-H. Kahng.).

2) "Distinguishable Equivalent Particles with Symmetrized Wave Functions". Foundations of Physics 1, 57 (1970).

3) "On the Classical Approximation in the Quantum Statistics of Equivalent Particles". Foundations of Physics 1, 145 (1970).

Willis

1) "Kinetic Equations for Optical Pumping". Phys. Rev. 1, 467 (1970).

2) "Coherent Modulation of a Coherent Beam". J. Optc. Soc. Am. 60, 921 (1970).

3) "Matter Field Correlations in Optical Pulse Propagation". Phys. Letters 31A, 217 (1970). (With D.B. Ostrowsky).

4) "Quantum Boltzmann Equation for a Laser". Article in the book "Cornell Symposium on Kinetic Equations", which is in press.

Shimony

1) "Scientific Inference", in The Nature and Function of Scientific Theories, ed. R.G. Colodny (U. of Pittsburgh Press, Pittsburgh, 1971), pp. 79-172.

2) "Resolution of the Paradox: A Philosophical Puppet Play", in Zeno's Paradoxes, ed. Wesley Salmon (Bobbs-Merrill, Indianapolis, 1970), pp. 1-3.

3) "Filters with Infinitely Many Components", accepted for publication in Foundations of Physics.

4) "Jaynes' Maximum-Entropy Prescription and Probability Theory" (in collaboration with K. Friedman), accepted for publication in Journal of Statistical Physics.

5) "Experimental Consequences of Local Hidden-Variable Theories", to appear in Foundations of Quantum Mechanics. (Proceedings of the International School of Physics "Enrico Fermi"), ed. B. d'Espagnat.

6) "Philosophical Comments on Quantum Mechanics", to appear ibid.

7) "Limitations on Measurement" (in collaboration with Howard Stein), to appear ibid.

8) "Babar et les Variables Cachees", to appear ibid.

Franzen

1) "Polarization Vectors and Electric Dipole Radiation",

Am. Jour. of Physics (in press).

2) "Space-Charge Limited Emission from Cylinders and Spheres: A New Approach", Jour. of Applied Physics (in press). (With J.H. Porter and R.S. Wenstrup).

Edmonds

"A Simple Velocity of Light Measurement for the Undergraduate Laboratory", Am. Jour. of Phys. 38, 12, 1481 (1970). (With R.V. Smith).

Booth & Alston

1) "Comparison of Level Widths Using Bremsstrahlung Resonance Fluorescence", Bull. Am. Phys. Soc. II, 16, 563 (1971). (With R. Arnold).

2) "Resonance Fluorescence Studies in Iodine and Antimony", Bull. Am. Phys. Soc. II, 16, 563 (1971). (With R. Arnold).

3) "Resonance Fluorescence Studies in Sc^{45}", Bull. Am. Phys. Soc. II, 16, 563 (1971). (With R. Arnold).

Alston

1) "Inelastic Electron Scattering from Fe^{56}", Bull. Am. Phys. Soc. II, 15, No. 4, 501 (1970). (With R.J. Peterson & H. THeissen).

2) "Inelastic Scattering of 60 MeV Electrons from K^{39}", Nuclear Physics, A143, 337 (1970). (With R.J. Peterson & H. Theissen).

3) "Inelastic Electron Scattering from Fe^{56}", Nuclear Physics A153, 610 (1970). (With R.J. Peterson & H. Theissen).

Chasan

"Nuclear Spectroscopy of 205 PB", Bull. Am. Phys. Soc. Series II, 16, 492 (1971). (With B. Ahluwalia).

Hoy

1) "Coincidence Mössbauer Spectroscopy" in Mössbauer Effect Methodology Vol. 6 ed. I.J. Gruverman (Plenum Press, New York 1970). (With D.W. Hamill).

2) "Thickness Effects in Mössbauer Spectroscopy" Bull. Am. Phys. Soc. Series II 16, 640 (1971) KD4. (With P. Van den Beemt).

3) "Multilined Coincidence Mössbauer Spectroscopy" Bull. Am. Phys. Soc. Series II 16, 641 (1971) KD5. (With P.P. Wintersteiner).

4) "Iron Mössbauer Scattering Studies", Bull. Am. Phys. Soc. Series II 16, 641 (1971) KD6. (With B. Balko).

Zimmerman

1) "Ultrasonic Investigation of a Phase Transition in CrK $(SO_4)_2 \cdot 12\ H_2O$". Bull. Am. Phys. Soc. 15, 880, (1970). (With P. R. Younger).

2) "The Magnetic Susceptibility and Specific Heat of Constantan at Low Temperatures", Rev. of Sci. Instr. 42, 233, (1971). (With R. Yee).

3) "A Note on the Phase Transition in Cerium Magnesium Nitrate", Physica 51, 623, (1971). (With D.J. Abeshouse, E. Maxwell and D.R. Kelland).

4) "Ultrasonic Heating of BCC Solid He^3", Bull. Am. Phys. Soc. 16, 638 (1971). (With F.E. Kearly).

Selected List of Publications by the Members Of The B.U. Physics Department 1969-1970

Roman

1) "Low Energy Theorem from Pair Suppression and Some Applications". Phys. Rev. 177, 2371 (1969). (With S. Ishida).

2) "Causality Restriction on Relativistic Extensions of Particle Symmetries". International Jour. of Theor. Phys., 2, 201 (1969). (With R. Santilli).

3) "Derivation of Poincare Covariance from Causilty Requirements in Field Theories". International Jour. of Theor. Phys., Vol. 3, (1970). (With R. Santilli).

4) "Lie Admissible Model for Dissipative Plasmas". Lett. Nuovo Cim. 2, 449 (1969). (With R. Santilli).

5) "New Dynamical Group for the Relativistic Quantum Theory of Elementary Particles". Phys. Rev., D1, 2753 (1970).

6) "Relation of the Inhomogeneous de Sitter Group to the Quantum Mechanics of Elementary Particles". Jour. Math. Phys., (1970). (With J. Aghassi & R. Santilli).

Santilli

1) "Haag Theorem and Lie-Admissible Algebras", contributed paper in the book "Analytic Methods in Mathematical Physics", Gilbert-Newton Editors, Gordon & Breach Pub. (1970).

2) "Dissipativity and Lie-Admissible Algebras" - Meccanica 4, 3 (1969).

Stachel

1) "Invariance of Approximately Relativistic Lagrangians and the Center-of-Mass Theorem I", Phys. Rev. 185, 1636-47 (1969).

2) Comments on "Causality Requirements and the Theory of

Relativity", in R.S. Cohen and M. Wartofsky (eds.), Boston Studies in the Philosophy of Science, Vol. V, p. 96 (Reidel, 1969).

3) "Covariant Formulation of the Cauchy Problem in Generalized Electrodynamics and General Relativity", Acta Physica Polonica, 35, 689 (1969).

Siegel

1) "Distinguishable Equivalent Particles with Symmetrized Wave Functions", Foundations of Physics 1, 57 (1970).

2) "On the Classical Approximation in the Quantum Statistics of Equivalent Particles", Foundations of Physics 1, 145 (1970).

3) "Symmetry Properties of Cameron-Martin-Wiener Kernels", Physics of Fluids 12, 1778 (1969). (With W. H. Kahng).

4) "Intensity Fluctuations in Forward Scattering and Temporal Coherence", Applied Optics 8, 1849 (1969). (With O.A. Germogenova).

Willis

1) C.R. Willis and D.R. Ostrowsky, Physics Letters 29A, 707 (1969).

2) C.R. Willis and D.R. Ostrowsky, Physics Letters 31A, 217 (1970).

3) C.R. Willis "Kinetic Equations for Optical Pumping", Phys. Rev. 1, 467 (1970).

4) "Coherent Modulation of a Thermal Beam," J. Opt. Soc. Am. 60, 921 (1970).

Cohen

"Causation in History", reprinted from: Physics, Logic and History, (Plenum Press) (1970).

Shimony

"Proposed Experiment to Test Local Hidden Variable Theories",

Phys. Rev. Lett. 23, 880 (1969). (With J.F. Clauson, M.A. Horne and R.A. Holt).

Edmonds

Introduction to Electronics for Scientists (Reinhold Publishing Corp, to be published, 1969).

Alston

1) "Inelastic Scattering of 60 MeV Electrons from K^{39}, Nuclear Physics A 143, 337 (1970). (With R.J. Peterson and H. Theissen).

2) "Resonance Fluorescence Measurements of In^{115} Transition Strengths Below 3 MeV", Phys. Rev. 188, No. 4, 1837 (1969).

3) "Elastic and Inelastic Electron Scattering from Mn^{55}", Phys. Rev. 186, No. 4, 1119 (1969). (With H. Theissen, R.J. Peterson and J.P. Stewart).

Hoy

1) "Computational Techniques in Single Crystal Mössbauer Spectroscopy", Air Force Cambridge Research Laboratories Technical Report AFCRL-70-0010 (1969). (With K.P. Singh).

2) "Coincidence Mössbauer Spectroscopy" to be published in Mössbauer Effect Methodology, Vol. 6 Ed. I.J. Gruverman (Plenum Press, New York 1970). (With D.W. Hamill & P.P. Wintersteiner).

3) "Magnetically Induced Quadrupole Interactions in Mössbauer Spectroscopy", Proceedings of the Magnetism Conference, Chania, Crete, Greece, 1969. (To be published by I.C.A.S. Press 1970). (With K.P. Singh).

4) "Coincidence Mössbauer Spectroscopy", Proceedings of the Magnetism Conference, Chania, Crete, Greece, June 1969. (To be published by I.C.A.S. Press 1970). (With D.W. Hamill & P.P. Wintersteiner).

Zimmerman

1) "Search for Anomalies in the Temperature Dependence of Ultrasonic Velocity in Water", Jour. of Chem. Phys. 51, 2543-2545, (1969). (With Senghaphan & C.E. Chase).

2) "Low Temperature Phase Transition in Cerium Magnesium Nitrate", Phys. Rev. Letters 23, 308, (1969). (With D. J. Abeshouse, D.R. Kelland & E. Maxwell).

3) "Search for a Third Order Phase Transition in Water", OAR Research Review, (Jan. 1970) Vol. IX No. 1 p. 26, 1970.

4) "The T-T* Relation in Ferric Ammonium Sulfate Below 0.1 K", Cryogenics, 10, 136 (1970). (With R. Yee).

CLA and University-Wide Committee Membership

A number of faculty members of the Physics Department also belonged to CLA, University-wide, and Physics Department Committees not listed above.

Corinaldesi

Comprehensive Exam Committee (Physics).

Gillespie

Physics Department Recruiting Committee (Physics).

Siegel

CLA Tenure Advisory Committee.

Willis

Committee on Physics in the University (Physics).
Physics Department Recruiting Committee (Physics).
Graduate Academic Program Committee - Graduate School.

Stipe

Committee on Physics in the University (Physics), Chairman.

Franzen

Member, Academic Policy Committee, CLA.

Chairman of Science Course Approval Subcommittee of the Academic Policy Committee.

Member, Physics Department Faculty Recruiting Committee, (Physics).

Edmonds

Shop Committee (Physics).

CLA-GRS: Premedical Advisory Committee
Teacher Preparation Committee

University: Patent Committee

Booth

CLA Assmebly Chairman

Alston

Teaching Fellow Coordinator

Chasan

Academic Policy Committee (Chairman) CLA
Academic Innovation Committee, CLA

Hoy

Scholarship Committee for CLA
Nomination Committee for Sigma Xi
Comprehensive Exam Committee (Physics)

Zimmerman

Committee on Physics in the University (Physics)

RECOGNITION FOR ACADEMIC ACTIVITIES

(Honors, Invitations, Lectures, Conference Participation, Research Grants Received or Held from Other than Boston University Sources)

Roman

Received "Faculty Publication Merit Award" (BU-Shell) for Academic Year 1969-70.

Roman was officially authorized by the Institute for Fundamental Studies Association to organize an International Postgraduate School of Theoretical Physics, with the implication to become Director of the School when it becomes established.

He had several invitations (including one to the Rutherford Conference in Christ Church, New Zealand) which he turned down, partly because of lack of time (was under unusually hard work pressure, both research and teaching) and partly because of lack of funds.

Roman quoted:

The High Energy Group had several distinguished visitors this year:

Prof. B. Gruber, University of St. Louis, (Missouri), in December 1970. He gave a colloquium and a seminar, and spent 2 days with us in consultation on matters of group theoretical methods.

Prof. B.B. Deo, University of Utkar (India), in March 1971. He gave a seminar and discussed with me some aspects of graduate teaching.

Prof. G. Sudarshan, University of Texas, Austin, in April 1971. He gave a colloquium and a seminar, and consulted with us for 3 days on tachyons and dynamical groups.

Prof. A. Ramakrishnan, MATSCIENCE, Madras (India) will come in June 1971, and will give a seminar.

NOTE: Two of the visitors were supported by the Departmental fund for special visitors.

Santilli

Gave a seminar at the Brandeis Summer Institute 1970 at the invitation of Prof. S. Deser.

Stachel

NSF Research Grant

Director of the Boston University-Brandeis Relativity Seminar.

Gillespie

Invited Lectures:

"Recent Developments in Glauber Theory" at the Max Planck Institute, Heidelberg, July 1970.

"High Energy Hadron-Nucleus Scattering" at the International Center for Theoretical Physics, Trieste, February 1971.

Siegel

Invited lecture "The Scientist's Personality - As Perceived, and As Perceiving", Center for the Study of Democratic Institutions, Santa Barbara, April 1, 1971.

Represented the Boston Colloquium for the Philosophy of Science in organizing, in cooperation with the Society for Social Responsibility in Science, a small but sugnificant world-wide organization, a conference, "Human Values in a Technological Society", held at the George Sherman Union, October 16-18, 1970. This Conference was the SSRS's annual meeting. Also gave a paper at the Conference, "The Youth Culture and the Socially Responsible Scientist".

Professional Activities Outside the University:

Paper refereed for "Foundations of Physics".

Paper refereed for "Journal of Mathematical Physics".

Paper refereed for "Physics of Fluids".

Grant proposal reviewed for NSF.

Willis

Honors received - Chairman of Section at Rochester Radiation-Matter Conference.

Cohen

Invited talks given at: Mt. Holyoke College - Oct. 8, 1970
Indiana University - Nov. 20, 1970
U. of Calif., Davis - Nov. 28, 1970
U. of Calif., San Diego - Nov. 30, 1970

Shimony

Invited lecturer at International School of Physics "Enrico Fermi" at Varenna, Italy, summer 1970.

Invited lecturer at International Congress of Logic, Scientific Method, and Philosophy of Science, Bucharest, summer 1971 (topic: Hidden Variables).

Invited lecturer to conference on Philosophy of Science, Pennsylvania State U., Sept. 1971 (topic: Experiments in Quantum Mechanics).

Invited lecturer at meeting of Eastern Division of American Philosophical Association, Dec. 1971 (topic: Perception).

Colloquia:

Harvard Physics Department - October 1970
Brown Physics Department - January 1971
U. of Maryland Physics Department - December 1970

Invited participant in conference on Foundations of Quantum Mechanics, U. of Western Ontario, March 1971.

Refereeing many papers for Physical Review, American Journal of Physics, & Philosophical Forum.

Stipe

Has just completed six years (being six of the past eight) as the Secretary-Treasurer of the New England Section, American Association of Physics Teachers. This office is limited to six years. He is a Director of this organization, and has been re-elected to another three year term as Director.

He attended meetings of the NES-AAPT in October, at the University of Maine, where he chaired one session. Attended another meeting in April, at Worcester Polytechnic Institute, where he led a small discussion group.

Franzen

Holder of a Research Grant.

NATO Senior Foreign Fellow in Science at the University of Toulouse, France, through June 30, 1970.

Continued service as associate editor, Zeitschrift für Angewandte Physik und Mathematik (Swiss Journal of Applied Physics and Mathematics), Zürich, Switzerland.

Referee for the Physical Review and Physical Review Letters 1970-71.

Referee for several National Science Foundation research grant proposals in atomic physics.

Editorial consultant to G.K. Hall & Co. and to the M.I.T. Press.

Member, Board of Reviewers, Physics Today.

Member, Evaluation Panel for N.S.F. Post-Doctoral Fellowships, National Academy of Sciences, Washington, D.C.

Edmonds

Special merit award for velocity of light apparatus at New York AAPT meeting, January 31, 1971.

Attended the meeting of the New England Section of the American Association of Physics Teachers held at Worcester Polytechnic Institute on May 1, 1971, and presented a paper on the velocity of light apparatus mentioned above.

He also served as a judge at the Massachusetts Science Fair held at M.I.T., April 17, 1971.

Hoy

Holder of a Research Grant.

Northeastern Univ.: "Magnetically Induced Quadrupole Interactions".

Univ. of Cincinnati: "Magnetically Induced Quadrupole Interactions".

Zimmerman

Holder of a Research Grant.

Was invited to attend the 12th International Conference on Low Temperature Physics, September 1970 (declined) at Kyoto, Japan.

Was invited to speak at Stanford University, October 30, 1970, "The Phase Transition in CMN".

Refereed papers for the Physical Review Letters.

Chase

Was invited to attend the 12th International Conference on Low Temperature Physics, September 1970 (declined) at Kyoto, Japan.

Refereed papers for the Physical Review Letters.

Holder of a Research Grant.

COMMITTEE REPORTS

Graduate Committee Proceedings: September 1970-June 1971 - Booth

Members: Ed Booth, Chairman
Paul Roman
Mike Papagiannis
George Zimmerman
Bill Hellman
Ray Arnold (Graduate Student)
Mike Mendillo (Graduate Student)

The Committee met early in the fall and proposed two changes in the Departmental requirements. The first was that the language requirement be relaxed to permit the use of a dictionary with only one language required. If a student fails the language exam twice, he is required to take two terms of a languaga for a B- or better. The second change was the establishment of a M.A. thesis defense with an examining committee composed of three faculty members. This measure was taken with a view of establishing recognized standards in our department for M.A. level work. Both measures were adopted by the faculty.

The Committee recommended changes in the structure of the Written Comprehensive Examination. Only six instead of eight topics are to be covered, and the examination is to be spread over three days instead of two days. This was accepted, and so handled at the Writtens in May 1971. A substantial increase was observed in the examination grades.

The Committee met after the winter recess to attack two substantial problems. One was the difficult problem of graduate course content as it relates to the present crises in physics job opportunities and the other was concerned with teaching opportunities and duties for graduate students. In connection with these problems, three meetings were held with our graduate students by Profs. Cohen and Booth, and considerable discussion occurred. It was agreed that Teaching Fellow assignments be made early in the summer and that new graduate students were to be contacted and advised by volunteer graduate students. The various proposals

involving the teaching experience did not get beyond the speculative stages.

A Graduate Committee proposal that we give an auxilliary degree or certification for Junior College teaching in cooperation with the School of Education foundered on the requirement that such students spend a term in practice teaching, which required outside funds. The Committee was divided in its views on the subject of changing the course structure to meet the possible market demand and the matter was dropped.

Our June graduation list (Ph.D.) consisted of David Abeshouse, Gregory Hood and Laurence Rothman. R. B. Singh and Malcolm Skerry made good their thesis defenses just after the June deadline and are entitled to the usual certification of completion. Skerry will complete his NSF supported summer by working up his thesis for publication. Michael Mendillo received his Ph.D. in Physics and Astronomy in June. There were no June awards of the M.A. degree.

Boston University Physics Graduate Students and Advisors

Students	Advisor
Huddleston, P. Ktorides, C.	Roman
Erdmann, R. Hood, G. Ko, C. Meadors, E. Singh, R.	Hellman
Casianu Corones, J. Lacour, E. Rothman, L. Schaefer, R.	Corinaldesi
Nwankwo, C. Pascoe, T.	Stachel
Gershon, M. Skerry, M.	Gillespie
Chu Kellen, P. St. Amand Ward, J.	Siegel
Wolfson, S.	Willis
Kinnier, J. Sarill, W. Stith, T.	Cohen
Hall, B. Hultgren, B.	Shimony
Hosford, P.	Stipe
Bernstein, K. Porter, J. Wenstrup. B.	Franzen
Plimpton, G.	Edmonds
Arnold, R. Goldman Pauliukonis, E.	Booth
Seng, H.	Alston
Ahluwalia, B.	Chasan

Students	Advisor
Balko, B.	Hoy
Branch, J.	
Van den Beemt, P.	
Wintersteiner, P.	
Abeshouse	Zimmerman
Corson, M.	
Emerson, D.	
Holmes, B.	
Kearly, F.	
Reinstein, L.	
Younger, P.	
Simon, G.	Chase

Undergraduate Committee, Physics Department

Chasan - Chairman, First Term.

The curriculum needs to be re-examined. In particular it is completely possible that the switch from four to three semesters in the introductory sequence for concentrators and engineers should be reversed. The comparatively leisurely first year which characterized the old system apparently allowed many students to make up mathematical deficiencies, adjust to college, and apply their (slowly acquired) calculus to the physics.

The junior-senior sequence needs re-examination as well. One issue concerns the teaching of quantum physics, which starts in the second semester of the junior year, and ends in the first semester of the senior year. Does it come too early relative to students' mathematics preparation? Does the early start really help students on their graduate record examinations? And, most important, have we cut back too far in presenting Modern Physics? The old style "Richtmyer-Kennard" course has vanished from our department as it has from many others. Is this progress?

Finally, a general examination of the aims of the physics curriculum needs to be made. The main thrust of this curriculum has been to prepare students for graduate work in atomic, nuclear solid state, and particle physics. In a sense everything is aimed at supplying the prerequisites for quantum theory, which is given much earlier in the curriculum than formerly. (I believe that the more or less standard undergraduate quantum course offered to juniors and seniors today is at least as sophisticated as the standard second year graduate quantum course of fifteen years ago.) Yet an increasing number of physics majors will not enter the microphysics research fields. They will, in many cases go into medical, geological, space and oceanographic work instead. Partly as a response to this situation, and partly to correct a serious imbalance which has developed independently of this, I suggest that we design a junior-senior level course in the physics of continua hydrodynamics, plasmas, etc. Properly designed, such a course might be of interest to some students of engineering,

applied mathematics and geology as well as to our own concentrators.

Stipe - Chairman

I agree that the undergraduate program is in need of re-examination, and agree fully with the attitude behind Professor Chasan's comments. However, I would like to explore a change in the program that goes much deeper. Our undergraduate physics majors, and the majors with combination of physics and another field, have a variety of interests, with an interest in the core material of basic physics as a common denominator. There are physics majors who plan to concentrate in physics in graduate school, physics majors who will seek employment in applied physics at the B.A. level, and majors who will enter graduate school in another field related to physics. There are also the "hyphenated majors" such as physics-astronomy, physics-chemistry, physics-mathematics and physics-philosophy. Present trends suggest that we might also have physics-geology and physics-oceanography.

We think of physics as the basic physical science - basic for astronomy, chemistry, geophysics, and for the various branches of engineering. The combination programs and hyphenated-majors described above are in response to student demand and indicate that our students recognize the basic nature of physics in its relation to other fields. We should recognize this in the design of an undergraduate program. I propose that we consider a physics "core program", to which other programs may be added for majors in physics and astronomy, physics and chemistry, physics and mathematics, physics and philosophy, and even physics and physics.

There have been some informal discussions along these lines. Material describing a seminar core-and-branch program at Cornell is being studied. I intend to propose a thorough consideration of such a program as an important item of business for the undergraduate committee at the first meeting in September.

The Undergraduate Physics Society, "PHOTON", was started by M. Witten this year. On March 29, 1971 the featured speaker was Cathy Olmer and on April 16 Prof. R. Kandel delivered a colloquium on PULSARS. The following is a report of the March 29 meeting:

At a meeting of PHOTON, the undergraduate physics group, there was a talk by Cathy Olmer, a recent physics major who is now doing graduate work at Yale. Present were Alston, Booth, Edmonds, Hoy and Stipe and about 18 undergraduates. Several interesting points concerning our undergraduate program were discussed. Some of these should be of interest to the entire department.

1. Our undergraduate program provides a good preparation for graduate study at Yale, but we should not encourage undergraduates to take our graduate level courses because they will just have to repeat them in graduate school.

2. We should have students do independent projects, even if this means eliminating some courses from the present program. If there is a staffing problem, perhaps these projects could be in a regular "project course".

3. Students should learn about statistical analysis of data. This could be a course, or it could be taught as an important part of a lab course or independent projects course. This is analysis of data, not mathematical statistics.

4. Students should learn some lab and shop techniques. Drilling, soldering, etc., instead of using snap-together kits.

5. When asked about more math courses, she said that B.U. math courses did not do much good, and she gave a strong recommendation for what she called "Hellman Physics" (PY403-404).

6. Students should learn to use computers. This means Fortran, not computer language.

Graduate Admissions in Physics and Astronomy - Zimmerman

Number of Applications Received - 106
Number Accepted with Financial Aid - 19
Financial Aid Alternates - 27
No aid - 16
Number Refused Admission - 22
Estimated Incoming Class - 12

Of the 19 admitted with financial aid, 8 decided to attend Boston University.

Comments:

Although the number of applications for Graduate Study to the Physics and Astronomy Departments increased from 85 last year to 106 this year, the Graduate Admissions Committee worked under several handicaps, the most serious of wbich was the scarcity of financial support to incoming graduate students.

Since at present the only form of financial aid for incoming graduate students available to us is the Teaching Fellowship, which also has to support many of our more advanced students, we were severely constricted in the number of Teaching Fellowships we could offer in the first round of acceptances. This problem was further aggravated by the fact that a number of our faculty lost their research grants, thus making it necessary to support a greater number than usual of advanced graduate students on Teaching Fellowships. As a result, some of the people whom we offered financial aid on the second round of acceptances were lost because they had already accepted a firm financial aid offer from another university.

On the first round of acceptances we competed with universities such as M.I.T., Yale and Cal.Tech. Nevertheless, the number of acceptances was above average. There were, however, some refusals of our financial aid offer which gave the fact that a teaching fellowship pays for only 5 courses as a reason for choosing another university.

Thus, the Physics and Astronomy Departments need more financial aid for their incoming graduate students, aid which would pay tuition for a full complement of courses.

Colloquium and Distinguished Visitors: Franzen

Prof. Franzen organized these two activities during the academic year. Below is a list of speakers and Distinguished Visitors, with the title of their talks:

Oct. 28, 1970	Prof. Manuel Cardona, Brown University "Synchrotron Radiation in Solid State Spectroscopy".
Nov. 4, 1970	Prof. Michael Tinkham, Harvard University "Fluctuations in Superconductors".
Nov.18, 1970	Dr. Stephen Moran, Goddard Space Flight Center "Pulsars and the Crab Nebula".
Dec. 9, 1970	Prof. Bruno Gruber, St. Louis University (a) "Applications of Group Theory to Physics"; (b) "Computational Methods in Lie Algebra Representations".
Jan. 20, 1971	Prof. V. L. Telegdi, University of Chicago "Experiments on Interference Between Short-Lived and Long-Lived Neutral K-Mesons".
Feb. 10, 1971	Mr. Richard Holt, Harvard University "Polarization Correlations and Hidden Variables".
Feb. 24, 1971	Prof. W. P. Wolf, Yale University "Paramagnetic Resonance of Weakly-Coupled Ion Pairs".
March 17, 1971	Prof. George Sudarshan, University of Texas "Action at a Distance".
March 31, 1971	Prof. John Strong, Univ. of Massachusetts "Infrared Balloon Astronomy".
April 7, 1971	Prof. Paul C. Martin, Harvard University "Dynamics of Liquid Crystals".
April 14, 1971	Prof. W. C. Straka, Boston University "Supernovae and Their Effects on the Interstellar Medium".
April 21, 1971	Dr. Martin Blume, Brookhaven National Lab. "Phase Separation of He^3-He^4 Mixtures".

Physics Machine Shop - Edmonds

Attention should be called to the excellence of the staff with which the Physics Department is currently blessed. Mr. R. Allan O'Neill continues to run the department shop most effectively. A year ago we attempted to hire a second machinist to assist him and went to considerable effort to bring in a highly recommended Canadian. A series of immigration problems delayed his arrival and made his position difficult thereafter, so that Mr. O'Neill has been working alone since last July. Nevertheless, between May 13, 1970 and Feb. 18, 1971 the shop has worked 1,137 chargeable hours for six different departments resulting in a total billing of $5,778.20. Mr. O'Neill is to be complimented for his continued high level of performance in the face of the declining support of experimental science.

COMMENTS - G.O. Zimmerman, Associate Chairman

As one can see from the above statistics, the Department of Physics at Boston University is a professionally active department. The professional activity encompasses both teaching as evidenced by the "Course Evaluation 1971" and by the number of innovative courses mentioned previously in this report, and research as evidenced by our publication list and honors received. Many members of the Department of Physics are also active in University affairs, as can be seen from the University Committee membership lists. Nevertheless, the school year started on a glum note.

To begin with, there was the apprehension that campus unrest, which started during the Cambodian Invasion will continue into this school year, and thus disrupt our academic activities. That fear was almost realized at the beginning of the year when frequent bomb threats disrupted the University. That, however, subsided.

There were other factors which contributed to the general unease. The "Kenneth D. Roose & Charles J. Anderson Report" did not list our Department (although allegedly we missed getting in by a very narrow margin) and we all thought that we were much better than some of the physics departments listed. Perhaps, we thought, the reason for that failure was that we have a relatively young department, and although we are fairly well known prefessionally as individuals, the connection made by others between us as individuals and us as members of the B.U. Physics Department is infrequent.

A general malaise was also produced by the current wave of antiscientific attitude on the part of the American society and its side-effects which were particularly severe in physics, (possibly because physics represents closest the Platonic ideal of science). The side-effects of that attitude were that some of us lost research grants, namely Roman, Siegel, Willis, and Booth, and were it not for the research support of the Graduate School some of us would have had to stop research. A consequence of the loss of research grants was the loss of a substantial

source of support for our graduate students which the grants provided.

Partly because of the antiscientific attitude, and partly because of the change to the four course semester, the number of students taking courses offered by the Physics Department dropped from that of a year before. That trend, it seems according to the preregistration figures for 1971-72, has been reversed.

The Physics Department also suffered by the fact that it is located in an old unrennovated building, the physics part of which is commonly known by the janitors as Alcatraz. Although parts of the building have been rennovated, especially the Biology and the School of Education wings for which money was provided by the "SPACE COMMITTEE" which is in charge of developing new space, there seems to be no mechanism by means of which one could provide money to rennovate space for a department which inhabits it rather than is just moving into it. That to me seems like an extremely anomalous situation.

During the last months of the school year the department also suffered somewhat because of the uncertainty which the change in administration brought with it, especially because its Chairman, R.S. Cohen, was asked to become Acting Dean of CLA. Despite the factors mentioned above, there were some favorable developments, and promise of a better future.

The addition of A. Stone as the man in charge of the non-academic business in the department has proven to be a marked improvement in the operation of the department. Other staff members also deserve special praise. Thus our two secretaries, B. McCarthy and B. Sherman have done a very good job of taking care of department needs, although at times they are overloaded with work - since in the past we used to have three secretaries; and the two assistants to A. Stone, G. Caplan and J. Greenly are doing a great job of maintaining, repairing and building experimental and demonstration lab equipment.

Other developments which foreshadow better things to come are that two distinguished members were added to our department

for the 1971-72 year, Pirani and Papapetrou. The projected student enrollment in our courses has risen by more than 50% from last year, and the increase in graduate student applications for the 1971-72 year was over 25% greater than a year ago. The latter fact has improved our choice and thus the quality of our incoming graduate students. Also, work is currently under way on the rennovation of the Physics Library. This should contribute to some degree to more pleasant physical surroundings of the Physics Department.

In addition to the distinguished appointments which we have received, the following distinguished physicists have been named as possible candidates for further consideration:

Breit
Biedenhorn
Caianiello
Cabbibo
Ivanenko
Kemmer
Rosenfeld
Votruba
Schucking
Chase
King
Ingraham
Dicke
Bell
Blume

OTHER COMMENTS

Siegel

We are confronted with twofold crises: A drastic decrease in the number of students interested in traditional physics, and a shift in the needs of those who still are interested. We are already working on the more-or-less obvious solution to the first problem: developing courses within our competence but more or less peripheral to physics. In this endeavor we need the indulgence of the College and the University, and so far we are gratified with the understanding being shown us. In the case of the second problem, I am not aware of any explicit effort of a solution. Perhaps this is because our graduates have (according to my information) done incredibly well in the job market, compared to other, often more prestigious institutions. It should be realized that this may be only a temporary condition, and we may soon join the others in this predicament.

Edmonds

Special mention should be made of the care the department and its equipment have received at the hands of our administrative assistant, Mr. Alfred Stone, and his staff. Instructors can now count on having working equipment in their laboratories, and Mr. John Greenly can be depended on to produce operating demonstrations in time for lectures. In addition, we were fortunate in securing the services of Mr. George Caplan, a graduate engineer, who has done yeoman service in organizing the stock rooms and maintaining our laboratory equipment during the past academic year. We are sorry to be losing him to Wang Laboratories this summer.

Finally I would like to reiterate my often expressed optimism with regard to our department's future. I believe we now have a president, a dean, and a chairman who, in addition to being competent, have the best interests of the university, the college, and even so much-maligned a field as physics at heart. I take the recent appointments in our department not as a manifestation of power

politics but as a remarkably prompt demonstration that we are not only going to survive but that a good share of the distinguished faculty pie will be ours. I suggest that, viewed in this light, the situation calls for us to live up to the confidence thus expressed in us by redoubling our efforts to get grants and attract students. It's a challenge that a group that has worked together so long and successfully as ourselves should have no difficulty in meeting.

Booth

I think we should a) try harder to get more outside money b) run a better organized Teaching Fellow program c) get into applied research in money-rich fields. For part c), I think we can probably afford to have anywhere from two to four of our faculty engaged in this effort. I see a very serious threat to our department in the form of rapidly dwindling numbers of physics majors, which is serious in itself and presages the extinction of our graduate program as well. The only things I can think of are to do what we have done but do it better, and also to try to make physics more exciting at an early stage.

Anonymous

We are exposed to external pressures. Hints of "checking up" on tenured faculty, even "plans" for abolishing tenure, or for "early retirement" float around. "Usefulness" of a faculty member seems to be measured by the number of students he teaches, and by the "relevance" of his courses. So called "narrow professionalism" is talked about, and so on. These things are surely "counter-productive" to the pursuit of truly valuable academic activities - and in fact, are demoralizing, degrading, and extremely dangerous.

1971 - SUMMER PLANS

Although most of the faculty plans to do some research and work on the development of courses during the summer, some of them plan to do so in places other than Boston:

Edmonds plans to spend the summer at the University of Western Ontario working on the Racetrack Microtron Project.

Gillespie will be visiting

1. International Center for Theoretical Physics, Trieste.
2. Seminar für Theoretische Physik, E.T.H., Zürich.

Then he will spend one month at the Institut de Physique Nucleaire Faculte des Sciences (University of Paris, Orsay).