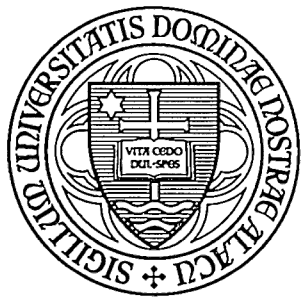

Notre Dame

REPORT

Contents:

January 26, 1990

10

1989-90

Business Administration Complex to Be Constructed

Notre Dame, with $12 million in gifts from a trustee and two alumni, will construct a new complex to house the College of Business Administration. Trustee Donald P. Kelly of Chicago, 1959 alumnus Vincent J. Naimoli of Tampa, Fla., and an anonymous alumnus each will underwrite a component of the business school complex, which will be located on the new DeBartolo quadrangle.

The new complex is expected to provide some 80,000 square feet of floor space for classrooms, offices, and program centers, as well as library, computer, and research facilities. Its anchor building, to be underwritten by a $6-million gift from Kelly, will house the College's faculty and administration. Gifts of $3 million each from Naimoli and the anonymous donor will underwrite two pavilions housing, in one, the College's research center and, in the other, its graduate studies and seminar rooms.

Kelly, a University trustee since 1987, is president and chief executive officer of D.P. Kelly & Associates, L.P. A former chairman of Beatrice Company, he was the central figure in the $6.2-billion purchase of Beatrice in 1986—the nation's largest leveraged buyout to that time. He was a member of the College of Business Administration Advisory Council from 1976 until 1988 and served as chairman of the Sorin Society from 1981 until 1984.

Naimoli is chairman of the board, president, and chief executive officer of Anchor Industries. He is the former chairman and CEO of Anchor Glass Container Corporation and was the leading figure in the $68-million leveraged buyout that separated Anchor Glass from Anchor Hocking Corp, in 1983. Naimoli was graduated from Notre Dame with a bachelor's degree in mechanical engineering. He holds advanced degrees from Farleigh Dickinson University and the New Jersey Institute of Technology and completed the advanced management program at Harvard University. He has been a member of the College of Business Administration Advisory Council since 1987.

With a current enrollment of 2,109 students in its undergraduate, M.B.A., and M.S.A. programs, the College of Business Administration is Notre Dame's second largest academic unit, exceeded in size only by the College of Arts and Letters. Over the past decade, undergraduate enrollment in Business Administration has almost doubled, the College's faculty has grown from 60 to 100 members, and four new centers of scholarship have been established—the Center for Ethics and Religious Values in Business, the Center for Business Research, the Center for Research in Banking, and the Center for International Development.

Reilly Appointed to Advisory Council

William F. Reilly Jr., president and chief operating officer of MacMillan, Inc., has been appointed to the advisory council of the College of Arts and Letters.

Reilly was graduated cum laude from Notre Dame in 1959 and earned an M.B.A. degree from Harvard University in 1964. He has been president of MacMillan, one of the nation's largest textbook publishers, since 1981 after joining the firm as executive vice president in 1980. From 1964-80 he occupied a variety of executive positions with W.R. Grace and Co., including chief executive officer of Bekaert Textile division, president of Herman's World of Sporting Goods, president of the Home Center division and corporate vice president. A native New Yorker, Reilly was granted leave from Grace from 1967-69 to serve as the City of New York's assistant finance administrator.

Financial Aid Administered to Students

Sixty-eight percent of students enrolled during the fall semester at the University received some form of financial aid. Of the 10,035 students enrolled, 6,825 received aid in the form of University-administered and outside scholarships, federal and alternative loans and grants, University student employment, remissions, and ROTC scholarships.

Aid received from all sources totaled $60,348,354. Of undergraduates, 4,955 (65 percent) received financial aid, with total aid provided averaging $7,640. Undergraduate financial aid totaled $37,865,320. Of post-baccalaureate students, including graduate students and those in professional studies, 1,687 (71 percent) received financial aid, with total aid provided averaging $13,333. Post-baccalaureate financial aid totaled $22,492,034.

Scholarships totaled $7,789,130 ($7,760,387 to undergraduates; $28,703 to post-baccalaureate students). Freshmen received $2,231,693 in scholarships. Of the total scholarship dollars, $5,388,103 was University-administered. Aid from non-federal funds, including scholarships, totaled $31,935,909 ($15,357 to undergraduates; $16,578,361 to post-baccalaureate students). Aid from federal assistance programs totaled $21,087,782 ($15,186 to undergraduates; $5,900,961 to post-baccalaureate students). ROTC scholarships totaled $7,324,663 ($7,311,951 to undergraduates; $12,712 to post-baccalaureate students).

Faculty Notes

Honors

Louis J. Berzai, adjunct instructor in computer applications, was elected executive vice president of the Data Processing Management Association for 1990 in Toronto, Canada, Oct. 15. DPMA, an International Data Processing Management Association with approximately 45,000 members, promotes information processing education to its membership.

Hsueh-Chia Chang, chairman and professor of chemical engineering, was elected to the editorial board of the journal *Bifurcation and Chaos in Applied Sciences and Engineering.*

Activities

Jeffrey H. Bergstrand, assistant professor of finance and business economics, presented a paper titled "On Modeling the Impact of Arms Reductions on World Trade: Some Preliminary Considerations" at a joint session of the Peace Science Society International—Economists Against the Arms Race at the Allied Social Science Association annual meeting in Atlanta, Ga., Dec. 28-30. He was chairperson at another joint session of these associations.

Gary H. Bernstein, assistant professor of electrical and computer engineering, was awarded a patent by the U.S. Patent Office in October. This patent, number 4,877,716, is for an improved developer solution for electron beam and x-ray lithographic processing of PMMA resist.

William B. Berry, professor of electrical and computer engineering, presented "Ohmic Contacts on B-SiC" co-authored with M.I. Chauedhry and M.V. Zeller at the fall meeting of the Materials Research Society held in Boston, Mass., Nov. 13-17.

Hsueh-Chia Chang, chairman and professor of chemical engineering, presented "Dynamics of Surge Tank Under Delayed Feedback Control" at the American Control Conference in Pittsburgh, Pa., June 15. He gave the seminar "Nonlinear Dynamics of Systems Under Feedback Control" at the Illinois Institute of Technology in Chicago, Ill., Oct. 18. He gave the presentations "Excitation of Gortler Traveling Wave by Overtone Interaction in Free Connection Over a Heated Plate," "Frequency-Locking and Chaos in a Controlled Liquid Level System," "Nonlinear Wave Instabilities on a Sheared Liquid Layer," and "Waves on Sheared Films at Moderate High Reynolds Numbers" at the 81st AIChE meeting held in San Francisco, Calif., Nov. 7-9. He presented "Evolution of Deep-Water Waves Under Shear" at the 42nd annual meeting of the APS Division of Fluid Dynamics in Palo Alto, Calif., Nov. 19.

William G. Dwyer, professor of mathematics, gave an invited seminar talk "Uniqueness of BS(3)" at Purdue University in West Lafayette, Ind., Dec. 7.

Sylvia Frost, associate librarian, was an invited participant in a Library of Congress national forum on "Multiple Versions of Cataloging Records" held at the Airlie House Conference Center in Warrenton, Va., Dec. 5-8.

Qiu Huang, assistant faculty fellow in electrical and computer engineering, gave "Identification of Finding Patterns of Neuronal Signals" co-authored with Yih-Fang Huang, associate professor of electrical and computer engineering, Ruey-wen Liu, Freimann professor of electrical and computer engineering, and D. Graupe at the 28th IEEE Conference on Decision and Control at the Hyatt Regency in Tampa, Fla., Dec. 13-15.

Ruey-wen Liu, Freimann professor of electrical and computer engineering, presented "Existence of Volterra Series in the Design of Feedback Systems for Nonchaotic Motion" and "Feedback System Design for Systems with Different Input and Output Signal Spaces" both co-authored with V. Raman at the IEEE Conference on Decision and Control at Tampa, Fla., Dec. 12-14.

Gilburt D. Loescher, associate professor of government and international studies, presented the paper "The Single European Act and Refugees" at an international symposium on the European Community and Refugees at The Hague, The Netherlands, Dec. 7.

Anthony N. Michel, McCloskey dean and Freimann professor of electrical and computer engineering, and his students, J.A. Farrell and H.F. Sun, presented the following three papers: "Design Techniques and Neural Networks for Associative Memories," "Synthesis Techniques for Discrete Time Neural Networks Models," and "Digital Implementations of Linear Feedback Controllers: Qualitative Properties and Limitations" at the 1989 IEEE Conference on Decision and Control held in Tampa, Fla., Dec. 13-15. He served as the chairman of a technical session titled "Artificial Intelligence in Control" at that conference.

Leonard J. Morse-Fortier, assistant professor of civil engineering, gave the invited seminar "Structural Intuition, Investigation, and Inference in Artisanship and Architecture" at the School of Architecture and Urban Planning at the Massachusetts Institute of Technology in Cambridge, Mass., Dec. 7.

Faculty Notes

Asokendu Mozumder, faculty fellow in chemistry and in the Radiation Laboratory, presented the paper "Dipole Oscillator Strength and Track Structure" co-authored with **Jay A. LaVerne**, associate professional specialist in the Radiation Laboratory, and **Simon M. Pimblott**, research associate in the Radiation Laboratory, at the 1989 International Chemical Congress of Pacific Basin Societies held in Honolulu, Hawaii, Dec. 17-22.

Leonard E. Munstermann, associate faculty fellow in biological sciences, presented the research paper titled "Differences in the Photoperiodic Control of Diapause Among Three Japanese *Stegomyia*: Relationship to Phylogeny" with **William A. Hawley**, assistant faculty fellow in biological sciences, at the national meeting of the Entomological Society of America held in San Antonio, Tex., Dec. 11. He presented the invited paper titled "Unexpected Genetic Effects of Colonization and Inbreeding: Alozyme Tracking in Culicidae" at the symposium "Can Insect Rearing Change Your Genes?" at that same meeting, Dec. 13.

Alven M. Neiman, assistant professional specialist and assistant dean in the Arts and Letters Core Course, presented a paper titled "Ethics and the Practice of Teaching" at the meeting of the Center for the Study of Ethics in Society at Western Michigan University in Kalamazoo, Mich., Dec. 8.

Walter Nugent, Tackes professor of history, chaired a session on international migration and industrialization 1850-1914 at the annual meeting of the Social Science History Association held in Washington, D.C., Nov. 17. He served as commentator for the session on the economic and cultural development of the American West in the 20th century at the annual meeting of the American Historical Association, San Francisco, Calif., Dec. 29.

Kevin M. Passino, visiting assistant professor of electrical and computer engineering, presented "On the Optimal Control of Discrete Event Systems" at the 1989 IEEE Conference on Decision and Control held in Tampa, Fla., Dec. 15.

Kenneth F. Ripple, professor of law, delivered a lecture on the constitutional role of the federal judiciary at the ABA Constitutional Fellowship Program in Chicago, Ill., Oct. 6.

Charles M. Rosenberg, chairman and associate professor of art, art history and design, delivered the paper titled "Virtu, Pieta e Devozione Alcuni Ritratti Di Domenico Ghirlandaio" in the conference "Il Ritratto e La Memoria" at the French Academy, Villa Medici, in Rome, Italy, Dec. 13.

James H. Seckinger, director of the National Institute for Trial Advocacy and professor of law, served as faculty member for the NITA Rocky Mountain Deposition Program at the University of Denver College of Law, Denver, Colo., Dec. 7-9. He gave a lecture to the faculty on Effective Teaching Techniques.

Robert M. Slabey, associate professor of English, organized and chaired the session "Faces of the Enemy in Vietnam War Films" at the national convention of the Modern Language Association of America held in Washington, D.C., Dec. 28.

Donald E. Sporleder, professor of architecture, met with the National Council of Architectural Registration Boards/ Administration and Methodology Committee in Seattle, Wash., Aug. 24-26, and in Savannah, Ga., Nov. 10-11. The committee is developing computer simulations testing procedures for the Architects Registration Examination.

Albin A. Szewczyk, professor of aerospace and mechanical engineering, presented an invited lecture titled "Effects of Temperature on Turbulent Wakes—A Review" and was a discussion panel member on the topic "Roads to Turbulence—Instability and Transition" at the XIXth biennial symposium on Advanced Problems and Methods in Fluid Mechanics held in Kozubnik, Poland, Sept. 3-8. He also presented invited seminars on "Turbulent Wakes—Large Temperature Effects—New Results" at the Institute for Mechanics and Mining, Polish Academy of Sciences in Krakow, Poland, Sept. 9, and at the Technical University of Czestochowa, Czestochowa, Poland, Sept. 18. He presented an invited seminar titled "Effects of Strong Temperature Gradients on Turbulent Wakes" at the Department of Aeronautics at Imperial College of Science and Technology in London, England, Dec. 6.

Kwang-Tzu Yang, Hank professor of aerospace and mechanical engineering, chaired all Heat Transfer Division activities and chaired a session on "An Open Forum with the Heat Transfer Division Executive Committee" at the ASME winter annual meeting in San Francisco, Calif., Dec. 9-17. He presented a paper titled "Numerical Study of Natural Convection Between Two Vertical Parallel Places with One Oscillating Surface Temperature" at that meeting.

Academic Council Minutes
December 6, 1989

Members in attendance: Rev. Edward A. Malloy, C.S.C., Prof. Timothy O'Meara, Prof. Roger Schmitz, Rev. David Tyson, C.S.C., Prof. Nathan Hatch, Deans Francis Castellino, Emil Hofman, John Keane, David Link, Michael Loux, and Anthony Michel; Mr. Robert Miller, Dr. Paul Conway, Rev. James Burtchaell, C.S.C.; Professors Kathleen Biddick, John Borkowski, Leo Despres, Fernand Dutile, Morton Fuchs, Mark Herro, Barry Keating, Jerry Marley, Suzanne Marilley, William McGlinn, Dian Murray, William Nichols, Daniel Pasto, and Philip Quinn; Mr. J. Douglas Archer, Dr. James Powell, Dr. Kathleen Maas Weigert; Students Martin Chiaverini, Frank Ciraci, and Audrey George (Rev. Ernan McMullin was a guest attendee.)

Observers in attendance: Mr. Richard Conklin and Col. Howard Hanson

Professor O'Meara opened the meeting at 3:00 p.m. with a prayer which he attributed to St. Patrick.

1. **Approval of Minutes.** The minutes of the meeting of October 10, distributed earlier and amended in a memorandum from Prof. Schmitz dated November 20, were approved.

2. **A two-part proposal by the College of Engineering: (a) to disestablish the Department of Materials Science and Engineering and to discontinue the undergraduate program leading to the bachelor of science degree in Materials Science and Engineering, and (b) to establish a Department of Computer Science and Engineering within the College with programs leading to the bachelor of science degrees in Computer Engineering and Computer Science.** Dean Michel reviewed the material in Attachments A, B, and C. These attachments, distributed to council members in advance, are proposals considered and approved by the Engineering College Council at its meeting of November 30, 1989. Dean Michel described the proposed changes in terms of a reorganization which would use faculty positions in the Department of Electrical and Computer Engineering and in the Department of Materials Science and Engineering to form two departments: Electrical Engineering and Computer Science and Engineering. [For the sake of brevity in these minutes, these four departments hereafter will be referred to as ECE, MSE, EE, and CSE, respectively.] The present MSE would cease to exist, and its undergraduate program leading to the bachelor of science degree in Materials Science and Engineering would be discontinued by September 30, 1994. The new CSE would administer degree programs leading to the bachelor of science degree in Computer Engineering and in Computer Science. The proposed effective date for the new departments EE and CSE and the new degree programs is July 1, 1990.

Referring to the proposal to disestablish MSE, Dean Michel cited the department's small faculty size and enrollment statistics which have been regarded for some time as less than critical. These and related problems have been cited in accreditation reviews by the Accreditation Board for Engineering and Technology (ABET) and by the University's graduate program review committees. Most stand-alone departments in the materials area at other institutions have at least 15 faculty positions — compared to six at Notre Dame. He added that the College may soon want to establish an interdisciplinary center in the field of materials to broaden and coordinate teaching and research activities in this subject area.

Regarding the proposed CSE, Dean Michel stated that Notre Dame is far behind nearly all other major universities in not having an identifiable entity in this area and in not offering a degree program in computer science or computer engineering. The interest and demand has been made evident by prospective students and industry. The PACE study recommended that the University re-examine the need for an academic unit dedicated to the general area of computer science. Dean Michel stated that course offerings from the proposed department would benefit other departments, both outside and within the College of Engineering, including those programs involving computer studies in the Department of Mathematics, the College of Arts and Letters (CAPP) and in the College of Business Administration (MIS). He added that offering the courses required for the two new degree programs would amount only to minor changes in offerings already available in the present ECE.

Dean Castellino stated that the additional course offerings in the computer area are welcome. Agreeing with the need for an identifiable entity in this area and expressing support for the proposal, he stated that while such a department and degree program could be placed in the College of Science, offering that alternative at this time is neither feasible nor desirable from the College's viewpoint.

The following statements summarize responses by Dean Michel to questions and comments from the council.

- The new CSE will have 12 faculty positions, including seven shifted from ECE, two from elsewhere in the College of Engineering, and three new positions to be added over a five-year period. Of the total required resources for establishing the new department, about 85 percent would come from present College allocations.

- MSE has established a strong research reputation in certain areas, even excelling in some respects over periods of time. However, instabilities owing to its small size when faculty turnover occurs, have made the sustenance of strength difficult. Further, research activities will continue, and the likely establishment of an interdisciplinary center will coordinate and foster such.
- The reorganization process will entail changes in faculty office locations but not in research space assignments for the most part.
- The principal subspecialty in materials research at Notre Dame presently is microelectronic materials. Research related to polymers has not been a major thrust.
- Establishing CSE will have no direct effect on the support for existing computer-related programs elsewhere on the campus.
- Two members of the faculty of MSE are untenured. Their research agendas, one in semiconductor materials, the other in superconducting materials, should be only minimally interrupted. The closer association with related research activities in EE has good potential for enhancing their programs.
- The disciplines of Computer Engineering and Computer Science have many commonalities in their curricula. The former has greater emphasis on systems, circuits, networks and design; the latter on software and algorithms. The former has greater structure and a larger number of required credits, typical of programs which seek accreditation by ABET. The latter, accredited by the Computer Science Accreditation Board (CSAB), has greater flexibility and a smaller credit requirement.
- In the reorganization some faculty will retain positions in more than one department. For example, some faculty presently in ECE will continue to hold the title *Professor of Electrical Engineering,* even though their positions may be in CSE, for various reasons including their own professional purposes. Their involvement in department activities and committee memberships will be resolved internally.

The following three-part motion was made and seconded: that (a) the Department of Materials Science and Engineering be disestablished effective June 30, 1990, and that the undergraduate program leading to the bachelor of science degree in Materials Science and Engineering be discontinued effective not later than September 30, 1994, (b) a Department of Computer Science and Engineering be established in the College of Engineering effective July 1, 1990, and that this department develop and administer degree programs leading to the bachelor of science degrees in Computer Science and in Computer Engineering, and (c) the present Department of Electrical and Computer Engineering be renamed the Department of Electrical Engineering effective July 1, 1990.

The motion was approved without dissent.

3. A proposal to establish a Ph.D. program in History and Philosophy of Science. Fr. McMullin summarized this proposal, referring for greater detail to Attachment D which was distributed to council members in advance. He stated that Ph.D. programs in History and Philosophy of Science (HPS), or the like, have become relatively common among peer universities through recent years. Most of the students entering such programs have undergraduate degrees in a science field and would not likely go into straight History or Philosophy graduate programs. A Master of Arts program already exists at Notre Dame in HPS.

A total of 15 faculty would be involved in the proposed program. No new faculty positions would be required, nor would there be a necessity to introduce a significant number of new courses.

Prof. Hatch advised the council that the proposal had been approved by the Graduate Council.

The following statements summarize Fr. McMullin's responses to questions and comments from the council.

- No stipulation is made regarding the composition of dissertation committees.
- Students in the program would fulfill degree requirements in one of the Departments of History or Philosophy, and they would be under the joint jurisdiction of that department and the HPS program.
- Research advisors would direct students to appropriate courses. Individual cases would vary, but the appropriate courses in science would not necessarily be in *modern* science.
- Two assistantships would be available to the program each year for new students.
- No conflict exists between the proposed program and the Departments of History and Philosophy, both of which approved the proposal. Students would be accepted into the HPS program only if they were accepted into one of the two departments.
- While the history and philosophy of *technology* would be of interest, the program presently is not strong in technology at the graduate level.

Questions were raised about the long-range commitment of the Departments of History and Philosophy to support the program. Comments were made also that additional faculty appointments should be considered to support and

broaden the program, perhaps to develop the area of gender studies at the graduate level. Fr. McMullin stated that it was in the interests of the departments to support the program because it will attract good students, and that appointment questions need to be revisited as the program develops. He noted that such questions and concerns are probably inherent in interdisciplinary endeavors of this type.

A motion to establish the proposed Ph.D. program in History and Philosophy of Science was approved without dissent.

4. A proposal to change the name of the Office of Advanced Studies to *The Graduate School* and to change the title of the Vice President for Advanced Studies to *Vice President for Graduate Studies and Research and Dean of the Graduate School.* In presenting this proposal, Prof. Hatch pointed out that the words *advanced studies* in his title and in the name of his office had unclear meaning and are not used at other institutions. He felt that it was important for the University to give emphasis to the words *graduate school* and *graduate studies and research.* Further, instead of the titles of *Assistant* and *Associate Vice President* for others in his office, he would use *Assistant* and *Associate Dean of the Graduate School.* He added that this matter had been discussed among, and received favorably by, the officers of the University and the Provost's Advisory Committee. He explained that advanced study programs offered by the Law School and the College of Business Administration are not administered through his office.

The proposal was approved without dissent.

Fr. Malloy noted that the changes will require approval by the Board of Trustees, and Prof. O'Meara pointed out that, pending such approval, appropriate changes must be made in the Academic Articles.

There being no further business, the meeting adjourned at 4:10 p.m.

Respectfully submitted,

Roger A. Schmitz
secretary of the Academic Council

Attachment A

Disestablish the Department of Materials Science and Engineering

Proposal

The first proposal is to disestablish the Department of Materials Science and Engineering, and to discontinue the degree program leading to the Bachelor of Science in Materials Science and Engineering.

> "The Engineering College Council recommends that the Department of Materials Science and Engineering be disestablished effective June 30, 1990. The College Council further recommends that the undergraduate program leading to the Bachelor of Science in Materials Science and Engineering be discontinued."

Implementation

If approved, it is anticipated that the following actions would be taken to implement this proposal:

a) The undergraduate program (BS in MSE) would be discontinued as of September 30, 1993. This would permit all students who entered Notre Dame as freshmen in August 1989 to complete degree requirements.

b) Faculty in the present Materials Science and Engineering Department would be assigned to a Department of Electrical Engineering at their then current rank and status. The resulting Department of Electrical Engineering would be expected to have two principal thrusts: 1) circuits, systems, and signal processing, and 2) solid state electronics and materials science and engineering. It is anticipated that this department would have approximately 22 faculty positions.

c) A proposal to establish a Center for Materials Science and Engineering Education and Research would be made. The function of such a center would be to coordinate education and degree program efforts in Materials Science and Engineering at the Masters' and Doctoral levels across the units of the College of Engineering and the units of the University. The center would provide research focus and visibility and advertising for graduate student recruiting and research efforts.

d) Undergraduate instruction in materials science and engineering will be maintained as required by other engineering degree programs. That is, faculty of the Department of Electrical Engineering will continue to offer "service" courses in materials science and engineering for students in all engineering disciplines.

Background

The determination to make this proposal to the Engineering College Council has come after a great deal of study and deliberation extending over several years.

The College and the (then) Department of Metallurgical Engineering and Material Science made rather detailed comparative studies and recommendations in the summer of 1985. In a memorandum to the faculty of the department in September 1985, (then) Dean Schmitz wrote that [discussions] "...have led me to conclude that there should be no merger of departments at this time." He also wrote in a parenthetical statement, "...I feel that a merger to form a Division of Materials Science in the Department of Electrical Engineering would be a good and timely move...."

Subsequent to 1985, Dr. Miller was appointed chairman of the department, Dr. Alcock was named Freimann Professor of Materials Science and Engineering, and three assistant professors were appointed (Drs. Choudhary, McGinn, and Pelton). Also, Dr. Allen became emeritus and Dr. Ricker resigned as chairman, and Dr. Pelton resigned his faculty position. At this time, the chairmanship and one faculty position (of six) are vacant.

The Graduate Council recently received and discussed a Review of the Graduate Program in the Department of Materials Science and Engineering, but has taken no action nor made any recommendations regarding the report.

An issue discussed in each of the reviews of the Materials Science and Engineering Department (the 1985 internal review and the 1988/89 external review of the graduate program) is that of faculty size. There seems to be little disagreement that a faculty of six persons has small probability of attaining a top quality research and graduate program.

Understandably, the faculty of the department would have the College of Engineering and the University commit sufficient additional faculty resources to the department to enable it to achieve the lofty goals to which the department, college, and university aspire.

The College of Engineering and the University must assess the best distribution of limited resources. Significant resources for equipment replacement, repair, operation, and maintenance are required to sustain and improve materials science research. We do not believe that a major infusion of faculty and equipment resources into the Department of Materials Science and Engineering should be the top priority of the College of Engineering at this time. Rather, we propose to consolidate our assets in materials science and engineering within the Department of Electrical Engineering and seek excellence in research and education in solid state electronics and materials science and engineering.

Attachment B

Establish a Department of Computer Science and Engineering

Proposal

The second proposal is to establish a Department of Computer Science and Engineering and to develop two undergraduate degree programs, one a Bachelor of Science in Computer Engineering, and the second a Bachelor of Science in Computer Science.

The proposed motion to be placed before the Engineering College Council is:

> "The Engineering College Council recommends that a Department of Computer Science and Engineering be established within the College of Engineering. The College Council further recommends that the University establish the following degrees: 1) Bachelor of Science in Computer Engineering, and 2) Bachelor of Science in Computer Science."

Implementation

If approved, it is anticipated that the following actions would be taken to implement this proposal:

a) The Department of Computer Science and Engineering would be established as of July 1, 1990. Initially, faculty positions would come from the present Department of Electrical and Computer Engineering. Faculty who would join the newly-established department would be permitted to retain their faculty appointment in the present Department of Electrical and Computer Engineering. It is anticipated that the newly-established Department of Computer Science an Engineering would have about 12 faculty positions which come from the present Department of Electrical and Computer Engineering, as well as from other College of Engineering and University resources.

b) The degree programs in Computer Science and in Computer Engineering would be established immediately with the first degrees being awarded in May 1993. Requests for accreditation visits would be made to have visits scheduled for the fall of 1993, which coincides

with the next general review of our engineering programs by the Accreditation Board of Engineering and Technology (ABET). The Bachelor of Science in Computer Science would be submitted to the Computer Science Accreditation Board (CSAB).

c) If the Department of Computer Science and Engineering is established in July 1990, it is anticipated that an acting chairman would be appointed to serve for the academic year 1990/91. A search for a chairman would be conducted during that academic year with a goal of having a chairman appointed at the beginning of the academic year 1991/92.

d) The faculty of the proposed Department of Computer Science and Engineering would have the opportunity to develop graduate programs and, at the appropriate time, petition the College Council, Graduate Council, and Academic Council for authority to offer graduate degrees.

RATIONALE

In the 1982 Priorities and Commitments for Excellence (PACE) report, it is stated that "...it is essential that we examine anew the role of computing in the curriculum and in the University, and the possible need for an academic unit or program dedicated to computing, computer science, information systems, and related disciplines."

National Science Foundation studies report that the average annual employment growth rates of doctoral scientists and engineers has been greater than 10 percent in the computer field, higher than any other science or engineering discipline reported.

The present situation at Notre Dame is that some computer studies are found in the Mathematics Department, in the Computer Applications (CAPP) program in the College of Arts and Letters, in the Department of Management (Management Information Systems) in the College of Business Administration, and in the Computer Engineering sequence of our Electrical Engineering degree program in the Department of Electrical and Computer Engineering. None of these programs offer a degree in Computer Science or in Computer Engineering and, based on the number of inquiries we receive, our public external to the University and prospective students have difficulty interpreting these different programs and, in some cases, have difficulty finding where computer studies are offered in the University based on the Undergraduate Bulletin of Information.

Our programs in the Department of Electrical and Computer Engineering have developed to the point where with only minor adjustments (perhaps one or two courses), the Computer Engineering sequence of our Bachelor of Science in Electrical Engineering degree program can meet requirements for accreditation by ABET as a Bachelor of Science in Computer Engineering degree program. The requirements for accreditation by CSAB of Computer Science programs are essentially a subset of the ABET Computer Engineering requirements.

In summary, Notre Dame has no current focus for a discipline area that has undergone the most significant technological growth of any discipline in recent years. The College of Engineering has programs and resources that, with some reorganization, adjustment, and minor augmentation of assigned resources, can offer top quality programs in Computer Science and Computer Engineering to all interested Notre Dame students.

Conditional Proposal

If the proposal to establish a Department of Computer Science and Engineering is approved (ultimately by the president of the University), a request will be made to change the name of the present Department of Electrical and Computer Engineering to the Department of Electrical Engineering.

The College Council will be requested to approve such a name change, conditioned as noted.

Attachment C

Proposed Degree Programs
General Subject Matter Outlines

Computer Engineering	Approx. Cr. Hrs.	Computer Science	Approx. Cr. Hrs.
University requirements in Humanities and Social Science	27	University requirements in Humanities and Social Science	27
Mathematics through differential equations	17	Mathematics through differential equations	17
Discrete mathematics and probability	6	Discrete mathematics and probability	6
General Chemistry	7	General Chemistry	7
General Physics through Modern Physics	14	General Physics	7
Engineering Science Electrical Networks and Systems, Electro-magnetism, Electrophysics, Thermodynamics, etc.	30		
Computer Science Programming, algorithms, modeling, data structures, digital systems, software engineering, etc.	12	Computer Science Programming algorythms, modeling, data structures, design, computer architecture	21
Computer Engineering Computer organization and architecture, computer hardware, computer systems design, micro-computers	15		
Computer Science and Computer Engineeringing electives	6	Computer Science electives (e.g., adv. topics, artificial intelligence, neural networks)	21
		Humanities/Social Science electives	6
TOTAL	134		127

Attachment D

Proposal: Ph.D. Program in History and Philosophy of Science

1. Background

With the recent addition of four new faculty whose research lies mainly in the area of history and philosophy of science, the extension of the already-existing M.A. program in History and Philosophy of Science to the doctoral level has become a more and more attractive possibility. The M.A. program has been in existence in its present form for just over 10 years, and in that time has awarded 13 M.A. degrees. Two tuition scholarships have been awarded each year. The degree was originally conceived a self-contained M.A., though HPS students were required to take four of their courses in one of the regular doctoral departments (Philosophy, History, or Theology).

In recent years, students admitted to the Ph.D. program in Philosophy have occasionally registered in HPS also, in order to obtain an additional qualification. They take an M.A. in HPS as well as the Ph.D., which turns out to be rather cumbersome to organize. Five of those recently completing a Ph.D. (three in philosophy and two in theology) took an additional M.A. degree in HPS. Of the 12 students presently completing work toward an M.A. in HPS, six are enrolled also in the Ph.D. program in philosophy.

The system has worked reasonably well, but there have been several problems. Foremost is the difficulty of recruiting really good students. Because the program is an M.S. one only, and because it offers at most only tuition support, strong candidates will usually go elsewhere, to one of the established centers for doctoral work in HPS, like Chicago or Princeton. Each year we get letters of inquiry from promising students who in the end do not apply because they want to enroll directly in a doctoral program. And we frequently lose one or both of those we admit on tuition scholarship, when they are awarded an assistantship in a Ph.D. program elsewhere; we then have to move down the list to weaker candidates.

What has, in fact, sustained the program and allowed it to grow to its present size (an average of eight to 10 enrolled for the HPS degree at any one time) has been the increase in the numbers of those already admitted in one of the University's Ph.D. programs who have elected to take an M.A. in HPS as well as their primary Ph.D. degree.

But this has created a problem. Students admitted to the M.A. program alone have been on the whole distinctly weaker in quality than those who qualified for entry in the Ph.D. program. The consequent disparities in talent and in background have been troubling to student and teacher alike. Some of this is inevitable, given that most of those entering HPS directly come from a science background, and usually have had little in the way of philosophy or of history at the undergraduate level. A greater degree of selectivity could help to even out these disparities.

For some time past, the possibility of extending the HPS program to the Ph.D. level has commended itself as a way to attract better students and to provide a better-rounded training in history and philosophy of science. The transformation required would not be a large one; the new Ph.D. degree would not differ markedly from the combination of an M.A. in HPS and a Ph.D. in Philosophy or History that some students have already managed to put together. But restructuring it as a Ph.D. program in History and Philosophy of Science will make a very large difference.

Several other factors have led to the formulation of this proposal. Our Department of History has recently added two historians of science (Christopher Hamlin and Francesca Rochberg-Halton), and another (Lynn Joy) has been given a joint appointment with Philosophy. This has encouraged the Department of History to treat History of Science as one of its areas of concentration for the Ph.D., and to propose an M.A. which takes History of Science as its focus. Philosophy of Science had already been an area of concentration for the Department of Philosophy, so that this makes for a closer approach to symmetry between the two departments in regard to HPS.

One other significant addition is that of Michael Buckley, S.J., to the Department of Theology. Fr. Buckley comes from the Graduate Theological Union at Berkeley where his research and teaching focussed largely on the historical interaction of science and religion. This is an area where we already have some strength, one which has proved effective in attracting good graduate students. Two of these have been admitted to the Ph.D. program in theology, taking theology concurrently with HPS. But it has been difficult for them to find course work in theology that would relate to science-religion issues; though the department has been sympathetic to research proposals in the area of science and religion, none of the present graduate faculty is active in this area. This will be changed with Fr. Buckley's arrival. His most recent book (*At the Origins of Modern Atheism*, 1987) is receiving wide notice.

Another consideration is that a number of universities have recently announced new Ph.D. programs in the joint field of History and Philosophy of Science. Stanford, the University of California at San Diego, and Northwestern University have initiated such programs in the last year or two. Maryland is in the process of revamping its program, which has been in existence for some years. In all four cases, the Ph.D. degree in History and Philosophy of Science will be granted in the departments either of Philosophy or of History; it will not be a separate degree, nor will there be a separate Department of History and Philosophy of Science, as there is at Indiana and Pittsburgh, the two oldest HPS centers.

The reason for this is widespread conviction that it is preferable to award degrees that will qualify graduates for teaching in mainline departments, either of History or of Philosophy. A doctorate in HPS alone might be seen as not equipping graduates to teach elementary courses in Philosophy or in History, and hence as not fitting students for employment in one of the two mainline departments. Since graduate placement is such an important consideration in the humanities generally, this potential disadvantage has to be taken seriously.

But even more important is the belief that a strong general background either in Philosophy or in History is essential for proper graduate preparation in HPS. Restriction of study to the science-connected fields alone could be distortive. And if students are going to be required to take a substantial amount of work in one of the regular doctoral fields, Philosophy or History, it might just as well be within the normal Ph.D. structure of those departments.

In recent years, we have on several occasions received encouragement to consider the possibility of a Ph.D. in the joint HPS field. The time now appears to be ripe for making this move.

2. Proposal

The proposed Ph.D. in History and Philosophy of Science would be awarded in the already-existing Ph.D. programs of Philosophy or of History. But it would be administered (as is the current M.A. in HPS) by a special interdepartmental Program Committee elected from the faculty of the program. Graduates would be awarded a Ph.D. in History and Philosophy of Science in Philosophy or in History. They would take a modified version of the regular Ph.D. program of one of the two departments, with the addition of four courses on the "other" side. Thus, those taking a Ph.D. in HPS in the Department of Philosophy would take four courses in History of Science, and those electing a Ph.D. in HPS in the Department of History would take four courses in the general area of Philosophy of Science. This would lengthen the average period of course work by one semester. A tentative lay-out of courses will be found in Appendix A.

It would not be necessary to add significantly to the graduate courses already being offered. In Appendix B, the courses actually given in 1986-89 are listed. (The average is three-four a semester). Of the courses offered over the six semesters (leaving aside the Proseminar, which is a joint project), 10 were offered by faculty in the Department of Philosophy, four in History, five in the Program of Liberal Studies, and two in the Medieval Institute. With the addition of Lynn Joy and Michael Buckley, we may anticipate an additional two HPS graduate courses a year in the normal way. If each of the HPS faculty offered one graduate course in the HPS area each year, there would be more than enough for a full-scale Ph.D. program. Several of the HPS faculty are also active in research areas other than History and Philosophy of Science, and so have not been offering regular yearly HPS courses.

By next fall there will, however, be 10 faculty, all of whose graduate teaching is likely to be in HPS. This of itself is more than sufficient for a thriving Ph.D. program. With five others who offer occasional graduate courses in HPS, this gives us a doctoral faculty numbering 15, much larger than any one of the three other new Ph.D. programs in HPS mentioned above. (See Appendix C for a listing of faculty, with some representative publications in HPS in each case. This list does not include two replacements that are currently being sought, one for a historian of science in the Program of Liberal Studies and the other for a philosopher of science in the Department of Philosophy.)

The qualifying examinations would require only slight modification of the present models in the two departments. In Philosophy, there is a written comprehensive examination in the History of Philosophy. Students in the HPS doctoral program will take a second written examination in History of Science. A comprehensive oral examination is also required in the general area the candidate has chosen for his or her dissertation research. This latter requirement would remain unchanged.

In History, students choose one major area, and either one or two minor areas for their qualifying examination. They take written examinations in each of the chosen areas, and an oral covering all the chosen areas together. Students in the HPS doctoral program would take History of Science as their major area, and would take Philosophy of Science as one of their two minor areas.

HPS students would be under the joint jurisdiction of the HPS Program and the relevant doctoral department. The department would have to certify the satisfaction of departmental requirements. The program would be responsible for making sure that the distribution of courses satisfies HPS requirements, and would also take care of faculty advising.

An M.A. in History and Philosophy of Science would be retained, and the requirements for it would remain as they are at present.

3. Financial Aid and Admissions

The program will be a small and selective one, admitting only perhaps two to four applicants to Ph.D. student status each year (or fewer, if applicants are not up to expected standards). Two assistantships ought be available each year for new students, and these would be renewable if satisfactory progress were to be maintained. Assuming a four-year period of support, this would require eight assistantships when the program is fully under way. Two additional tuition scholarships a year are requested; since most applicants are likely to be coming from undergraduate work in a science, the first year in graduate work in HPS will be probationary to an extent that would be less necessary in a more conventional graduate program. Students on assistantship would be asked to help with large courses in the undergraduate Science, Technology and Values concentration, for example, or in large courses in History of Science in the Program of Liberal Studies. There is plenty of work available, of the kind that could serve as a useful apprenticeship for future HPS teachers.

Admission would be decided by an admissions committee of the HPS program, working with the program director. The assistantships would go to the strongest applicants, but some consideration would be given to distribution over the different specialties within the program. Applications would go in the first instance to the program, but copies of the application material would be given to the relevant Ph.D. department for evaluation. The Admissions Committee of the department would have to certify the applicant as admissible before the HPS Program could act to admit.

Applications will be encouraged from students with a strong background in science. Such students will not usually have taken much work in either philosophy or history. It is in part because of this that special admission and financial aid arrangements are needed, since those without an undergraduate major in philosophy or history are unlikely to be competitive for financial support in a strong Ph.D. program in philosophy or history.

Submitted October 1, 1989

Appendix A

Ph.D. in the History and Philosophy of Science
(Tentative)

Philosophy Curriculum	History Curriculum
Fall (1)	
Introduction to HPS	Introduction to HPS
Philosophy of Science I	Philosophy of Science I
History of Science I	History of Science I
History of Ancient Philosophy	Area History I
Philosophy Proseminar	History Proseminar
Spring (2)	
History of Science II	History of Science I
Philosophy of Science II	History of Science II
History of Medieval Philosophy	Area History II
Logic	Area History III
Fall (3)	
Philosophy of Science III	History of Science III
History of Modern Philosophy	Philosophy of Science
Epistemology	Area History IV
	History Seminar I
Spring (4)	
Philosophy of Science IV	History of Science III or IV
History of Science III	Philosophy of Science II or III
Ethics	Area History V
	Area History VI
Fall (5)	
History of Science IV	History of Science IV
Metaphysics	Philosophy of Science III or IV
Teaching Seminar	History Seminar II
	Research Seminar
Spring (6)	
Qualifying Examinations	Qualifying Examinations

Appendix B

HPS Program
Courses given, 1986-1989

Fall 1986:
- 580 Proseminar: Introduction to History and Philosophy of Science
- 583 History of Philosophy of Science - McMullin
- 584 Medicine & Natural Philosophy in Medieval Science - Jordan

Spring 1987:
- 589 Philosophy of Biology - Manier
- 590 Origins of Early Modern Science - Goddu
- 638 Science, Medicine, & Social Reform, 1750-1950 -Hamlin

Fall 1987:
- 580 Proseminar: Introduction to History of Science - Hamlin
- 581 Philosophy of Science - McMullin
- 588 19th Century Biology: The Age of Transformism - Sloan
- 626 Myth & Science in Antiquity - F. Rochberg-Halton
- 685 Contemporary French Philosophy of Science - Gutting
- 688 Sociology of Science - Manier

Spring 1988:
- 585 History of Modern Astronomy - Crowe
- 624 Cosmology: Ancient, Patristic, Medieval - Gersh
- 650 Problems in History of Technology - Hamlin
- 682 Explanation Causation/Law in Science - McKim

Fall 1988:
- 560 Proseminar: Introduction to History of Science - Sloan
- 568 Topics/History/Modern Physical Science - Crowe
- 581 Philosophy of Science - McMullin
- 603 Readings in the Philosophy of Quantum Mechanics - Cushing
- 661 Ancient Cosmologies - F. Rochberg-Halton
- 683 Philosophy/Cognitive Science - Manier

Spring 1989:
- 584 Philosophy of Social Science - McKim
- 587 History of Philosophy of Science - McMullin
- 664 Science, Probability and Probable Knowledge in the Middle Ages - Goddu

Appendix C

Program Faculty

Ernan McMullin (Director): Ph.D., Philosophy, Louvain.
Contemporary Philosophy of Science; History of the Philosophy of Science; Science and Religion.
Galileo, Man of Science (ed., 1967); *Newton on Matter and Activity* (1978); *Evolution and Creation* (ed., 1985); *Construction and Constraint* (ed., 1988); *Philosophical Consequences of Quantum Theory* (ed. with J. Cushing, 1989).

Michael Buckley: Ph.D., Ideas and Methods, Chicago.
Historical Interactions of Religion and Science.
Motion and Motion's God (1971); *At the Origins of Modern Atheism* (1987); "The Newtonian settlement and the origins of atheism" (1988).

Michael Crowe: Ph.D., History of Science, Wisconsin.
History of Astronomy, Physics, and Mathematics 1700-1900.
A History of Vector Analysis (1967); *The Extraterrestrial Life Debate 1750-1900: The Idea of Plurality of Worlds from Kant to Lowell* (1986); "Ten misconceptions about mathematics and its history" (1988).

James Cushing: Ph.D., Physics, Iowa.
History and Philosophy of Modern Physics; Foundational Problems in Quantum Mechanics.
Science and Reality (ed., 1984); *Philosophical Consequences of Quantum Theory* (ed. with E. McMullin, 1989); *Theory Construction and Selection in Modern Physics: The S. Matrix* (1990); "Is there just one possible world? Contingency vs. the bootstrap" (1985); "Causality as an overarching principle in physics" (1986).

Gary Gutting: Ph.D., Philosophy, St. Louis.
Contemporary Philosophy of Science; Continental Philosophy of Science.
Paradigms and Revolutions (ed., 1980); *Michel Foucault's Archaeology of Scientific Reason* (1989); "Gaston Bachelard's philosophy of science" (1987); "Continental approaches to history and philosophy of science" (1989).

Christopher Hamlin: Ph.D., History of Science, Wisconsin.
History of Technology; History of Medicine.
What Becomes of Pollution? Adversary Science and the Controversy on the Self-Purification of Rivers in Britain, 1850-1900 (1987); "Edward Frankland's early career as London's official water analyst, 1865-1876" (1982); "The metaphysics of putrefaction: Victorian sanitarians and the natural theology of health and disease" (1985).

Mark Jordan: Ph.D., Philosophy, Texas.
Medieval Science and Medicine.
Ordering Wisdom: The Hierarchy of Philosophical Discourses in Aquinas (1986): "Medicine as science in the early commentaries on Johannitius" (1987); "Medicine and natural philosophy in Aquinas" (1987); "The order of science and the order of pedagogy in Aquinas' Summa Theologiae" (1988).

Lynn Joy: Ph.D., History of Science, Harvard.
Renaissance Science and Philosophy; Scientific Revolution; Philosophy of Science.
Gassendi the Atomist, Advocate of History in an Age of Science (1987); "The conflict of mechanisms and its empiricist outcome" (1988); "Rival Renaissance atomisms and the making of an Epicurean tradition" (1990).

Edward Manier: Ph.D., Philosophy, St. Louis.
Philosophy of Biology; Sociology of Science.
The Young Darwin and His Cultural Circle (1978); "Social dimensions of the mind-body problem" (1986); "External factors and ideology in the earliest drafts of Darwin's theory" (1987); "Reductionist rhetoric" (1989).

Vaughn McKim: Ph.D., Philosophy, Yale.
Philosophy of Social Science; Science; Technology, and Values.
"Social and environmental values in the regulation of nuclear power" (1977); "The role of singular causal explanations in the social sciences" (1988).

Philip Quinn: Ph.D., Philosophy, Pittsburgh.
Philosophy of Space and Time; Science and Values.
"Metaphysical necessity and modal logics" (1982); "Grunbaum on determinism and the moral life" (1983); "The philosopher of science as expert witness" (1984); "Creationism, methodology and politics" (1988).

Francesca Rochberg-Halton: Ph.D., Near Eastern Languages and Civilization, Chicago.
Ancient Science.
Language, Literature and History (ed., 1987); *Aspects of Babylonian Celestial Divination* (1987); "Canonicity in cuneiform texts" (1984); "Benefic and malefic planets in Babylonian astrology" (1987); "Seasonal hours in Babylonian astronomy" (1988).

Phillip Sloan: Ph.D., Philosophy, U.C. San Diego.
History of Biology 1700-1950; Modern Intellectual History.
From Natural History to the History of Nature: Readings from Buffon and his Critics (ed. and transl. with John Lyon, 1981); "Darwin's invertebrate program 1826-36" (1985); "The question of natural purpose" (1985); "Darwin, vital matter, and the transformism of species: (1986); "From logical universals to historical individuals" (1987); "Organic molecules revisited" (1990).

Appendix D

Some Recent Graduates of the HPS Program

Several students have recently taken an M.A. in the History and Philosophy of Science co-ordinately with a Ph.D. in one of the regular doctoral programs of the University.

Daniel Beck wrote a dissertation on "Miracle and the Mechanical Philosophy: The theology of Robert Boyle in its historical context" (1986), in the Department of Theology and now teaches at Messiah College (Pa.).

Rose Mary Sargent, now teaching at the University of New Mexico, wrote her Ph.D. dissertation in philosophy on: "Robert Boyle and the experimental ideal" (1987). She has published several papers in *Studies in the History and Philosophy of Science,* and has been awarded an NSF research grant to work in the Boyle Archives in London next summer.

Timothy Shanahan wrote on "The units of selection controversy" for his Ph.D. in philosophy in 1988, and is now teaching at Loyola-Marymount University in Los Angeles. He has articles in *Philosophy of Science,* the *Journal of the History of Philosophy,* and *Transactions of the Pierce Society.*

Patrick Wilson completed his Ph.D. in philosophy with a dissertation on: "The anthropic principle" and is teaching this year in the Program of Liberal Studies at Notre Dame.

Several students entered Ph.D. degree programs elsewhere, after completing their M.A. in HPS work at Notre Dame.

Job Kozhamthadam, S.J., went on to write a dissertation on Kepler's *Harmonia Nova* for a Ph.D. in HPS at the University of Maryland (1986).

Orville Butler went on to work for a Ph.D. in History of Science at Iowa State University, and is completing a dissertation on the history of the U.S. Weather Service in the 19th century.

Craig Stillwell was accepted in the Ph.D. program in History at Notre Dame, and is writing a Ph.D dissertation on the Russian biologist, Elie Metchnikoff.

Appendix E

Library Resources

In the area of philosophy of science, Notre Dame already possesses strong library holdings and currently allots adequate funding for new purchases. The situation for history of science, however, needs attention, especially because research in history of science is heavily dependent on the quality of library resources.

In general, the Notre Dame Library posses good, if somewhat uneven, holdings relevant to research in the history of science. Because Notre Dame was founded nearly a century and half ago, its library contains long runs of the main scientific and engineering journals as well as good holdings in technical books published since the University's establishment. In addition, there are a few exceptionally good collections, e.g., the Greene collection in botany, the microtext *Landmarks of Science* series, and various holdings in the Medieval Institute. Moreover, systematic purchasing in the history of science area has been carried out since the early 1960s. Strong holdings in Chicago, e.g., at the John Crerar Library of the University of Chicago and the Center for Research Libraries, also enhance the availability of materials. Thus a solid core is already present.

Nonetheless, various factors point to the need for increased funding for history of science purchasing, the current figure for which is only about $3,200. This figure allows for the purchase of perhaps 120 new books each year, this number being supplemented by the volumes (ca. 100) received under the library's Approval Plan. Over the last three years, substantial help (ca. $8,000 total) came from the NEH grant that permitted the creation of the undergraduate Science, Technology, and Values Program at Notre Dame and the hiring of a historian of technology. The great majority of this special fund, which is now exhausted, went for the purchase of publications in history of technology, where our holdings have been weak. One result of the present shortage of funds for history of science is that it has been impossible for a number of years to do any retrospective purchasing, which purchases are essential to a strong library. Moreover, at a time when over a thousand books are appearing each year in the history of science area, it is clear that the acquisitions of only about 20 percent of these new publications is not satisfactory for the maintenance of good library holdings in the history of science area.

Consequently, the building of an adequate library base for the history of science component of the present proposal will require additional funding for library purchases. Our recommendation is that $8,000 be approved. This would allow very selective retrospective purchasing and the acquisition of a substantially higher percentage of new materials.

Faculty Senate Journal
November 8, 1989

The chair, Prof. Paul Conway, gavelled the meeting to order at 7:34 p.m. in Room 202 of the Center for Continuing Education, and called upon Prof. F. Clark Power to offer a prayer. The journal for the meeting of October 16, 1989, having been distributed, the chair asked for a motion of conditional approval; if there were to be changes, the members would call the secretary to do so. Power so moved, Prof. Mark Pilkinton seconded and the members agreed.

Standing Committee Reports

a. **Administrative Affairs** - the chair Prof. Frank Connolly reported that his committee will have a proposal on the "tenure clock" issue at the next meeting, asking for a stoppage for one year for both men and women. He asked other senators to give their views to his committee.

b. **Academic Affairs** - Prof. Ellen Weaver reported for the chair, Prof. Robert Hayes (who was excused), on their work consulting with library faculty about expanding academic needs and the resulting requirement for library materials to meet those needs. The committee may come to the senate with a resolution soon.

c. **Student Affairs** - Power reported that their work on the relationship of athletics and academic is proceeding; a survey is being formulated. Some particular issues in this: class absences and grades.

d. **Benefits** - chair Prof. Frank Bonello brought a resolution on TIAA/CREF to the senate (printed as Appendix A); Weaver seconded. Prof. Joseph Blenkinsopp asked about the current status of cashability; Bonello explained the new position that TIAA/CREF is taking to expand options for faculty members and urged the University to approve the options for its faculty. He felt it was important for the senate's Benefits Committee to be consulted in the process, and commended the Department of Human Resources for its efforts to expand their educational programs. Prof. Morton Fuchs asked who spoke for the University on this issue, and Bonello responded that he was unsure. The resolution was passed unanimously.

Next the chair asked Weaver to report on the recent meeting of the Academic and Faculty Affairs Committee of the Board of Trustees. The senate report and resolution on the status of women committee was well received; another resolution was to have an advocate for women appointed, and it too was well received. The resolutions are now before the president and provost of the University. A third point, to charge the committee to work at the "grass-roots" levels of the campus to improve the status of women, was also incorporated in the proposals to the administration. An agenda was suggested too, including staff compensation, scholarship, support for gender studies, affirmation action, and evaluation of counseling services. Others will come up, but the administration needs to take action.

Conway remarked on another issue brought up at the meeting: faculty governance. In addressing this, he pointed out to the trustees that the senate was indeed representative of the entire faculty, and that it does represent the broad spectrum of the faculty.

The provost in correspondence with the chair has asked the senate to recommend three faculty members (of whom he will choose one) for the Parking Committee. The sense seemed to be that the Executive Committee should review this and recommend someone.

The secretary, Peter J. Lombardo Jr., reported that members of the Junior Parents Weekend Committee have contacted him to ask the senate to be aware that the juniors will be approaching faculty members for their active participation in the academic workshops of the weekend. It is a chance for the faculty to meet and talk informally with parents, and share some sense of the academic side of the University with them. He hoped faculty members will respond positively to this opportunity. Junior Parents Weekend is February 16-18, 1990. The chair also invited the senate to the Senior Class Block Party for the Northeast Neighborhood.

The senate's guests for the evening having arrived, the chair turned the meeting over to: Roger Mullins, director of human resources, and his assistant for compensation, Rita Gautier. He began with the bad news on health insurance: claims to Blue Cross/Blue Shield (BC/BS) are exceeding premiums paid in 1989. But there is no cheaper insurance than Blue Cross/Blue Shield, and self-insurance is not the answer. Blue Cross/Blue Shield adds approximately 6 percent for administrative costs and a small amount for retention and reserve adjustments. Conway asked about the sharp drop in members in Blue Cross/Blue Shield; Mullins said much of the drop can be attributed to people choosing health maintenance organizations (HMOs), and that is a problem for the University. Prof.

Panos Antsaklis asked if the rising cost of Blue Cross/Blue Shield is due to an aging population or to a general rise in health costs. Mullins replied that the "trending factor"—the 22 percent usual increase—was due to rising medical costs in the system. But one part of the problem is this: The average age of an HMO enrollee is 38, while in Blue Cross/Blue Shield it is 45; the older population, the higher expenses will be. For 1990, the University will prepare some incentive plans to move people back into Blue Cross/Blue Shield from the HMOs.

How much will rates increase on January 1, 1990? As an example, Mullins pointed out that claims exceeded premiums for those who chose the $100 plan in Blue Cross/Blue Shield by two times, and this discrepancy is driving the increase for 1990. Overall Blue Cross/Blue Shield paid out $140,000 more in Notre Dame claims than we paid in premiums. This plus the 22 percent trending factor will give us a 30 percent increase for 1990 in Blue Cross/Blue Shield rates. HMO information is more difficult to get because of their own financial arrangements with hospitals and doctors. Prof. Stephen Bell pointed out that HMOs have an entirely different structure, which would make comparisons difficult if not unfair, and Mullins agreed. But if we compare HMOs with the Blue Cross/Blue Shield $100 plan, the comparison indicated comparable value for both. Fuchs and Antsaklis asked about the "short window" of five months' experience (April-August) to determine such a huge increase for 1990; Mullins said Blue Cross/Blue Shield will refund whatever future experience indicates, but this refund (if it comes) will not reduce the 1990 rates. Conway asked about the University's contribution to the benefit package, and Mullins said the University was paying part of the increase; it was not being totally passed on to the employee.

Mullins announced several design changes in Blue Cross/Blue Shield: organ transplants (except for kidneys) will be covered, there will be no need for second opinions anymore, and "well-baby" care will be added (for children up to age 5). A "start-smart" program for high-risk pregnancies will be instituted also. The last two are being added in part as incentive for HMO members to move back to Blue Cross/Blue Shield. Prof. Barry Keating pointed out that in any insurance program, some people subsidize others, usually based on unforeseeable factors; but in the University plan the subsidy is based on the fact that the design of the grades in the plan indicate that some (paying higher deductions monthly) subsidize others. Mullins responded that other subsidies are involved based on, for instance, family size or for retirees. The plan's levels seem fair to most. Connolly agreed with Keating that the enormous disparity should be changed. Fuchs thought that by December some of the disparity will even out.

The University, according to Mullins, will continue to shoulder the bulk of health insurance costs, and the increase to faculty and staff will be modest for Blue Cross/Blue Shield. The percentage of the total paid by the University will remain roughly the same. We do not know what the future will hold. Costs will rise, and the $100 plan will be very expensive later on. At this time, it was considered fair not to raise this plan too substantially, but Mullins urged people to consider moving to another level. On HMOs, where 41 percent of Notre Dame employees are, the University is consciously trying to encourage people to switch back to Blue Cross/Blue Shield. The percentage of the University contribution is decreasing to HMO plans. Prof. Steven Fallon asked why the University was seeking to switch people from HMOs (where their contribution is less) to Blue Cross/Blue Shield (where their contribution is more). Mullins said it revolves around freedom of choice which HMOs do not have; the base plan should, and that's Blue Cross/Blue Shield. Power said if people want freedom of choice for physicians, they should pay for it. Prof. Mario Borelli asked about the policy decision of discouraging HMO membership. Mullins said Notre Dame wants to distribute costs in the fairest way. Bonello supported the rationale behind the decision described by Mullins. The subsidy for retirees will be a bit higher than for current faculty. Antsaklis asked what the incentive was for Blue Cross/Blue Shield to hold down costs? Indiana's colleges and universities have formed a coalition to battle the costs of Blue Cross/Blue Shield; this coalition may be a step toward a kind of self-insurance strategy.

The spending accounts seemed to be well-received by faculty and staff, and they have some tax savings involved. Power asked if contraceptives were included in the plans or contraceptive drugs to regulate the cycle. Mullins responded no, but the issue has not been raised. If such an issue as this or others like it, Fr. Beauchamp would be the person to deal with it.

On TIAA/CREF the University is increasing its percentage contribution to 10 percent by July 1993. Two other issues are yet to be decided: transferability and the cash-out option. Mullins was informed of the senate's earlier action in approving the resolutions on these issues. Prof. Alan Krieger brought up the job-sharing issue, a proposal which was presented by a library staff person to Human Resources some time ago. Mullins said the topic needs further study, especially in terms of benefits and the possibility of one party to job-sharing leaving. Human Resources is investigating flex-hours and job-sharing; model pilot projects are in the works.

The presentation having concluded, Conway thanked Mullins and Gautier for their efforts, and the senate concurred with hearty applause.

The next item of business was a discussion of the faculty survey on governance. A draft had been distributed to all senators, and Prof. Mohamed Gad-el-Hak reported for the ad hoc committee on governance that "draft 3" was ready for discussion. Conway pointed to question 3 and asked if it was sufficiently clear in wording; Gad-el-Hak thought that after changes it was clear. Borelli moved that the survey be mailed out and Weaver seconded. Prof. Philip Quinn remarked that all questions should have provision for an "I do not know" answer. Conway saw no question on the tenure/promotion process, but Gad-el-Hak thought 5B covered that. Prof. Peter Moody believed on that point that college and university levels ought to be separate questions and provide for separate responses. Weaver agreed, saying an additional section (5C) would clarify it. Quinn and Fuchs thought perhaps "and/or" might suffice. Weaver understood the purpose of the survey was to show some kind of consensus among the faculty, and wanted, as did Borelli, to have it mailed out as soon as possible but in a clear form. Borelli preferred a slightly imperfect instrument to a perfect one further delayed; the survey must be mailed out soon before the matter is forgotten and the senate's credibility is lost. Fallon wanted discreet sections on the University and college levels for involvement in tenure/promotion decisions. Gad-el-Hak did not want to draw up a blueprint, only a survey. Connolly supported Fallon and others who wanted two distinct questions, asking for two distinct answers. The general feeling was to have two sections to clarify the situation. The motion then was to authorize the ad hoc committee to send out the survey as amended as soon as possible. It was passed unanimously.

The chair proposed that the motion earlier passed on TIAA/CREF would be brought by Bonello to the Budget Priorities Committee, and Conway would inform the provost.

Borelli moved to adjourn, Weaver seconded, and the senate adjourned at 9:30 p.m.

Members present:
Antsaklis, Attridge, Bell, Bender, Bentley, Blenkinsopp, Bonello, Borelli, Collins, Connolly, Conway, Costigan, Esch, Fallon, Fuchs, Gad-el-Hak, Halloran, Hanson, Harmatuik, Hurtt, Jerez-Ferran, Keating, Krieger, Lombardo, MacKenzie, Moody, Parnell, Pilkinton, Powell, Power, Pratt, Quinn, Rai, Sheehan, Weaver

Members excused:
Biddick, Despres, Falkenberg, Hayes, Porter, Sporleder

Members absent:
Anderson, Bandyopadhyay, Bunker, Goddu, Herro, Johnson, C., Johnson, P., Slaughter

Appendix A

Whereas the December 1988 agreement between TIAA-CREF and the Securities and Exchange Commission creates new options regarding the transfer of CREF accumulations to alternative funding vehicles and cashability, up to 100 percent, of CREF accumulations on termination of employment, and

Whereas these options must be approved by the employer,

Be it resolved that the Faculty Senate recommends that the University of Notre Dame approve and provide both options: 1) the transfer of CREF accumulations to alternative funding vehicles and 2) cashability, up to 100 percent, of CREF accumulations on termination of employment to the TIAA-CREF participants in its employ.

Be it further resolved that the Faculty Senate recognizes the increased planning required of TIAA-CREF participants as these options become available and, therefore, strongly endorses the efforts of the Department of Human Resources to expand its educational programs in the areas of financial planning and pre-retirement planning.

University Committee on Libraries Minutes
November 16, 1989

The meeting was called to order at noon in the office of the director of libraries by the chairman, John Lucey. Also in attendance were Harvey Bender, Maureen Boulton, Maureen Gleason, Bill McDonald, Robert Miller, James Robinson, Robert Scheidt, and the secretary, Melodie Eiteljorge.

The minutes of October 12 were approved as written. Maureen Boulton raised a question of what plans were being implemented to increase staffing to the levels referred to in the October minutes. Robert Miller replied that he hopes to reach the levels indicated within five years.

Robert Miller reported that he would like to increase membership in and awareness of the Friends of the Library at Notre Dame, particularly within the Notre Dame community. Faculty participation within the Friends is unusually low.

Miller also reported that the budget process for the 1990-91 fiscal year has begun. Priorities have been set, and requests for budget items from various units are being obtained.

The Library Advisory Council meeting seemed to be very productive. It was held in conjunction with a major dedication of library endowments. The week following the council meeting, John T. and Irene Ryan were honored by the library and by the Friends of the Library for their many contributions, including funds for the automated system.

Last week Miller traveled to California to meet with several donors and potential donors. He felt the trip was very worthwhile. He intends to meet soon with Joe Sandman regarding library development and several fund raising possibilities. While in California, he also initiated a program to incorporate Anastos holdings into UNLOC and expedite delivery of materials here when requested.

The next meeting will be held at noon, December 7, in the director's office. The meeting adjourned at 1:00 p.m.

Respectfully submitted,

Melodie Eiteljorge
secretary

Current Publications and Other Scholarly Works

Current Publications should be mailed to the Division of Sponsored Programs, Room 314, Main Building

COLLEGE OF ARTS AND LETTERS

Anthropology

O'Nell, Carl W.
C.W. O'Nell. 1989. The Nonviolent Zapotec. Pages 117-132 *in*, S. Howell and R. Willis, eds., Societies at Peace: Anthropological Perspectives. Routledge, London, United Kingdom.

English

Jemielity, Thomas J.
T.J. Jemielity. 1989. Prophetic Voices and Satiric Echoes. *Cithara: Essays in the Judaeo-Christian Tradition* 29(1):30-47.
T.J. Jemielity. 1989. Gibbon Among the Aeolists: Islamic Credulity and Pagan Fanaticism in *The Decline and Fall*. Pages 165-183 *in*, L.E. Brown and P. Craddock, eds., Studies in Eighteenth-Century Culture, 19. Colleagues Press, East Lansing, Michigan.

Vanden Bossche, Chris R.
C.R. Vanden Bossche. 1989. Carlyle's Fareyinga Saga Translation. *Carlyle Annual* 10:64-79.

German and Russian Languages and Literatures

Schaum, Konrad J.
See under ACCOUNTANCY; Rueschhoff, Norlin G. Editors. 1989. Duncker and Humblot, Berlin, Germany. 188 pages.
K.J. Schaum and N.G. Rueschhoff. 1989. Perspectives for Further Research. Pages 182-188 *in*, N.G. Rueschhoff and K.J. Schaum, eds., Christian Business Values in an Intercultural Environment. Duncker and Humblot, Berlin, Germany.

Philosophy

McMullin, Ernan
E. McMullin. 1990. The Development of Philosophy of Science, 1600-1900. Pages 816-837 *in*, R.C. Olby, et al., eds., Companion to the History of Modern Science. Routledge, London, United Kingdom.

Psychology

Anderson, D. Chris
M.A. McDaniel, D.C. Anderson, G.O. Einstein and C.M. O'Halloran. 1989. Modulation of Environmental Reinstatement Effects Through Encoding Strategies. *American Journal of Psychology* 102(4): 523-548.

Sociology

Rochberg-Halton, Eugene W.
E.W. Rochberg-Halton. 1989. An American Epiphany in Nashville. *New Observations* 72:14-19.
E.W. Rochberg-Halton. 1989. Photograph, Maxwell Street Blues. New Observations, New York, New York.
E.W. Rochberg-Halton. 1989. Photograph, Maxwell Street Ventriloquist. New Observations, New York, New York.

Theology

Cunningham, Lawrence S.
L.S. Cunningham and J. Reich. 1990. Culture and Values: A Survey of Western Humanities, Volume II. Holt Rinehart Winston, New York, New York. XI + 421 pp.
L.S. Cunningham and J. Reich. 1990. Culture and Values: A Survey of Western Humanities, Volume I. Holt Rinehart Winston, New York, New York. XI + 418 pp.
L.S. Cunningham and J. Reich. 1990. Culture and Values: A Survey of Western Humanities, Alternate Edition. Holt Rinehart Winston, New York, New York. 410 pp.

COLLEGE OF SCIENCE

Chemistry

Castellino, Francis J.
See under Chibber, Bakshy A. 1989. *The Journal of Antibiotics* 42(10):1506-1512.

Chibber, Bakshy A.
C.-W. Chi, H.-Z. Liu, C.-Y. Liu, B.A. Chibber and F.J. Castellino. 1989. The Inhibition of the Enzymic Activity of Blood Coagulation and Fibrinolytic Serine Proteases by a New Leupeptin-Like Inhibitor, and Its Structural Analogues, Isolated from Streptomyces griseus. *The Journal of Antibiotics* 42(10):1506-1512.

Miller, Marvin J.
M.J. Miller. 1989. Syntheses and Therapeutic Potential of Hydroxamic Acid Based Siderophores and Analogues. *Chemical Reviews* 89:1563-1579.

Mathematics

Pillay, Anand
A. Pillay. 1989. A Note on Subgroups of the Automorphism Group of a Saturated Model, and Regular Types. *The Journal of Symbolic Logic* 54(3):858-864.
A. Pillay. 1989. On Fields Definable in Qp. *Archive for Mathematical Logic* 29:1-7.
A. Pillay. 1989. An Application of Model Theory to Real and p-adic Algebraic Groups. *Journal of Algebra* 126(1):139-146.
A. Pillay. 1989. Stable Theories, Pseudoplanes and the Number of Countable Models. *Annals of Pure and Applied Logic* 43:147-160.

Sommese, Andrew J.
A. Lanteri and A.J. Sommese. 1989. A Vector Bundle Characterization of p^n. *Abhandlungen aus dem Mathematischen Seminar der Universitat Hamburg* 58:89-94.
A.P. Morgan, A.J. Sommese and L.T. Watson. 1989. Mathematical Reduction of a Heart Dipole Model. *Journal of Computational and Applied Mathematics* 27:407-410.

COLLEGE OF ENGINEERING

Aerospace and Mechanical Engineering

Gad-el-Hak, Mohamed
S.P. Wilkinson, M. Gaster, T. Tritz, M. Gad-el-Hak and G.V. Selby. 1989. Experimental Study of a Wave-Packet on a Rotating Disk. *Bulletin of the American Physical Society* 34:2260.
M. Gad-el-Hak. 1989. Some Unanswered Questions in Fluid Mechanics. ASME (L.M. Trefethen and R.L. Panton, eds.), New York, New York. 12 pages.

Sen, Mihir
N. Acharya and M. Sen. 1989. Frequency Measurements in Capillary Tube Boiling. Pages 13-19 *in*, M.J. Braun, ed., Second International Multiphase Fluid Transient Symposium. ASME, New York, New York.
P. Vasseur, C.H. Wang and M. Sen. 1989. Thermal Instability and Natural Convection in a Fluid Layer Over a Porous Substrate. *Warme-Und Stoffubertragung* 24:337-347.

Chemical Engineering

Chang, Hsueh-Chia
J. Ratulowski and H.-C. Chang. 1989. Transport of Gas Bubbles in Capillaries. *The Physics of Fluids* 1:1642.

Electrical and Computer Engineering

Michel, Anthony N.
A.N. Michel and J.A. Farrell. 1989. Digital Implementations of Linear Feedback Controllers: Qualitative Properties and Limitations. Pages 2233-2238 *in*, Proceedings of the 28th IEEE Conference on Decision and Control. Tampa, Florida.
A.N. Michel and J.A. Farrell. 1989. Design Techniques of Neural Networks for Associative Memories. Pages 252-259 *in*, Proceedings of the 28th IEEE Conference on Decision and Control. Tampa, Florida.
A.N. Michel, J.A. Farrell and H.F. Sun. 1989. Synthesis Techniques for Discrete Time Neural Networks Models. Pages 773-778 *in*, Proceedings of the 28th IEEE Conference on Decision and Control. Tampa, Florida.

COLLEGE OF BUSINESS ADMINISTRATION

Accountancy

Rueschhoff, Norlin G.
N.G. Rueschhoff and K.J. Schaum. Editors. 1989. Christian Business Values in an Intercultural Environment. Duncker and Humblot, Berlin, Germany. 188 pages.
See under GERMAN AND RUSSIAN LANGUAGES AND LITERATURES; Schaum, Konrad J. 1989. Pages 182-188 *in*, N.G. Rueschhoff and K.J. Schaum, eds., Christian Business Values in an Intercultural Environment. Duncker and Humblot, Berlin, Germany.

Finance and Business Economics

Affleck-Graves, John F.
J.F. Affleck-Graves and B.D. McDonald. 1989. Nonnormalities and Tests of Asset Pricing Theories. *The Journal of Finance* 44 (September 4):889-908.
Bundt, Thomas P.
A. Solocha and T.P. Bundt. 1990. International Crowding Out: The U.S. Debt and Foreign Interest Rates. *Quarterly Journal of Business and Economics* 29(1):28-45.
McDonald, Bill D.
See under Affleck-Graves, John F. 1989. *The Journal of Finance* 44(September 4):889-908.

RADIATION LABORATORY

Green, Nicholas J.B.
N.J.B. Green, M.J. Pilling, S.M. Pimblott and P. Clifford. 1989. Stochastic Models of Diffusion-Controlled Ionic Reactions in Radiation-Induced Spurs. 2. Low-Permittivity Solvents. *The Journal of Physical Chemistry* 93(24):8025-8031.
Mozumder, Asokendu
A. Mozumder. 1989. Radiation Chemistry and Radiation Chemists: Some Recollections. Pages 291-319 *in*, J. Kroh, ed., Early Developments in Radiation Chemistry. Royal Society of Chemistry, Cambridge, England.
Pimblott, Simon M.
See under Green, Nicholas J.B. 1989. *The Journal of Physical Chemistry* 93(24):8025-8031.

Summary of Awards Received and Proposals Submitted

In the period December 1, 1989, through December 31, 1989

Awards Received

Category	Renewal		New		Total	
	No.	Amount	No.	Amount	No.	Amount
Research	2	95,109	3	120,165	5	223,874
Facilities and Equipment	0	0	0	0	0	0
Instructional Programs	0	0	0	0	0	0
Service Programs	0	0	8	29,152	8	29,152
Other Programs	0	0	0	0	0	0
Total	2	95,109	11	149,317	13	253,026

Proposals Submitted

Category	Renewal		New		Total	
	No.	Amount	No.	Amount	No.	Amount
Research	4	644,959	18	4,653,525	22	5,298,484
Facilities and Equipment	0	0	3	411,632	3	411,632
Instructional Programs	0	0	1	346,272	1	346,272
Service Programs	1	35,046	0	0	1	35,046
Other Programs	0	0	0	0	0	0
Total	5	680,005	22	5,411,429	27	6,091,434

Awards Received

In the period December 1, 1989, through December 31, 1989

Department or Office	Principal	Short Title	Sponsor	Dollars / Months
		AWARDS FOR RESEARCH		
Aerospace Mech.Eng.	Batill	Preliminary Design of Flight Vehicle Structures	Dept. Air Force	51,404 12
Earth Sciences	Halfman	Sedimentation in Lake Turkana, Kenya	Natl. Sci. Fdtn.	49,861 12
Romance Lang./Lit.	Delgado-Gomez	The Conquistador as Historian	Natl. Endow. Humanities	27,500 12
Physics	Ruggiero	Perpendicular Transport in Multilayer Thin-Film Systems	Nat. Sci. Fdtn.	40,000 12
Physics	Newman	Studies of Ordering in Semi-conducting and Other Alloys	Dept. Navy	55,109 12
		AWARDS FOR SERVICE PROGRAMS		
Cent. Social Concerns	McNeill	Center for Social Concerns	Various Others	2,916 1
ND Cent. Past. Liturgy	Bernstein	Notre Dame Center for Pastoral Liturgy - Publications	Various Others	2,308 1
ND Cent. Past. Liturgy	Bernstein	Notre Dame Center for Pastoral Liturgy	Various Others	5,621 1
Cent. Cont. Form. Min.	Pelton	Notre Dame Center For Continuing Formation in Ministry	Various Others	12,046 1
Cent. Cont. Form. Min.	Pelton	Notre Dame Center for Continuing Formation in Ministry	Various Others	5,000 1
Inst. Past. Soc. Min.	Pelton	Institute for Pastoral and Social Ministry	Various Others	200 1
Inst. Past. Soc. Min.	Pelton	IPSM Dynamic Parish	Various Others	711 1
Prog. Church Leaders	Kelly	Programs for Church Leaders	Various Others	350 1

Proposals Submitted

In the period December 1, 1989, through December 31, 1989

Department or Office	Principal	Short Title	Sponsor	Dollars Months
		PROPOSALS FOR RESEARCH		
Aerospace Mech. Eng.	Jumper	Improved Performance of High Energy Laser Exhaust System	Scientific Research Assoc.	27,245 6
Aerospace Mech. Eng.	Atassi	Noise Radiation from Blades	NASA - Lewis Research Ctr.	52,666 10
Aerospace Mech. Eng.	Mueller, Jumper	Sustained and Controlled Lift	Dept. Air Force	302,869 38
Civil Eng.	Spencer, Sain	Robust Feedback Control of Structures	Natl. Sci. Fdtn.	143,312 24
Chemical Eng.	McCready, Chang	Evolution of Interfacila Disturbances/Sheared Liquid Layers	Natl. Cent. Supercomputing	0[a] 12
Chemical Eng.	Varma, Miller	Synthesis of Silicon Nitride	Nat. Sci. Fdtn.	226,924 24
Chemical Eng.	Brennecke	Presidential Young Investigator Award	Nat. Sci. Fdtn.	500,000 60
Chemistry and Biochemistry	Miller	Drugs & Delivery Systems for Opportunistic Infections	Natl. Inst. Health	265,835 12
Chemistry and Biochemistry	Fehlner	Main Group-Transition Element Clusters	Natl. Sci. Fdtn.	396,363 36
Economics	Kim, Creamer	Adjustment Policies, Growth & Income Distribution in Ecuador	Natl. Sci. Fdtn.	93,482 24
Mathematics	Smyth, Xavier	Analytic Techniques in Surface Theory and Spectral Theory	Natl. Sci. Fdtn.	195,930 36
Mathematics	Stoll, Wong	Theory of Several Complex Variables	Natl. Sci. Fdtn.	452,820 48
Mathematics	Pillay	Topics in Model Theory	Nat. Sci. Fdtn.	67,895 24
Mathematics	Corredor	Groups of Finite Morley-rank	Natl. Sci. Fdtn.	31,486 24
Materials Sci. Eng.	McGinn	Zone Melt Texturing of High Temperature Superconductors	Natl. Sci. Fdtn.	307,439 36

Physics	Aprahamian	Nuclear Structure Research	Dept. Energy	641,061 36
Physics	Livingston	Spectroscopy of Highly-Ionized Atoms	Natl. Sci. Fdtn.	568,588 36
Physics	Furdyna	Growth and Ordering of Semi-conductors	Dept. Navy	339,508 19
Physics	Aprahamian	Nuclear Structure Research	Natl. Sci. Fdtn.	641,061 36
Theology	Burtchaell	A Study of Moral Consistency	Amer. Philo. Society	3,000 14
Theology	Burtchaell	A Study of Moral Consistency/ Element in Conflict Resolution	U.S. Institute of Peace	41,000 9
Advanced Stud.	Hilliard	Biomedical Support Grant for 1990-91	Natl. Inst. Health	0[b] 12
		PROPOSALS FOR FACILITIES AND EQUIPMENT		
Aerospace Mech. Eng.	Atassi, et al.	Computer Graphic Laboratory	Natl. Sci. Fdtn.	158,432 24
Aerospace Mech. Eng.	Gad-el-Hak	Water Tunnel's Instrumentation	Natl. Sci. Fdtn.	99,700 12
Aerospace Mech. Eng.	Dunn	Two-Component Phase Doppler Particle Analyzer	Natl. Sci. Fdtn.	153,500 12
		PROPOSALS FOR INSTRUCTIONAL PROGRAMS		
Cent. Educ. Oppor.	Harris, Smith Blake-Smith	Upward Bound	Dept. Education	346,272 12
		PROPOSALS FOR SERVICE PROGRAMS		
Biological Sciences	Grimstad	Arbovirus Surveillance Laboratory Service	Ind. St. Bd. Health	35,046 12

[a] Computing Time
[b] Dollar amount to be determined by Sponsor

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