



College of Earth and Mineral Sciences
1984-85 REPORT

The Pennsylvania State University

A Message from the Dean

I am happy to report that the health of the College of Earth and Mineral Sciences is excellent. Our faculty continues to be highly productive and successful in teaching and research, and we continue to attract students with SAT scores among the highest of entering students at Penn State. Our research funding increased significantly during the past year, and our academic departments remain among the national leaders in their respective fields of specialization.

As you all know, C.L. Hosler concluded his 20 years as our helmsman a few months ago when he was appointed to the position of Vice President for Research and Dean of the Graduate School here at Penn State. We will, of course, sorely miss Charlie, and I suspect he will miss EMS as well, for this College is unique, not only in terms of its wide spectrum of disciplines but also because of its reputation and spirit, to which Charlie contributed so much.

The search for a new dean is well under way, and as chairman of the search committee I can report to you that the many highly qualified candidates interested in the position augur well for continuation of the strong leadership this College has enjoyed for most of the past 50 years. There also are strong and clear signs of the high esteem in which this College is held by the University's central administration. In all, I believe we have good reason to be extremely optimistic about the future of this College.

I should like to take this opportunity to mention briefly some of the recent developments within the University and the College which are likely to have impact on our operation and on the interface with our alumni and friends.

First among these was the arrival in August 1984 of William C. Richardson to the key position of Provost and Executive Vice President of the University. During his short time here he has clearly taken charge of the academic programs and established a direct reporting/communication link with the college deans. Together with President Jordan, Dr. Richardson has contributed immensely to the focus on excellence at this institution.

The pursuit of academic excellence is also reflected in the new strategic planning process which was launched in earnest during the past academic year. The planning exercises and the associated dialogue have been very valuable in shaping future academic priorities. A draft plan for EMS was submitted to the central administration in March, 1985, and the final report, which outlines goals and implementation plans for the next five years, is almost complete.

Another University-wide event of consequence for all units of the University is the greatly expanded effort in the area of fund raising. Development officers are being assigned to each college, and a major Campaign for Penn State is scheduled to be launched officially in the near future. This fund-raising drive will be headed by a very prominent executive committee and will have nationwide visibility. The campaign is one of the cornerstones in President Jordan's dedication to the task of significantly increasing funding for Penn State both from the state and from private sources.

Within the College, this year saw the long-awaited transfer of Fuel Science's Combustion Laboratory and Mineral Engineering's Mine Electrical Laboratory to the newly constructed Academic Activities Building on Bigler Road. These are superb facilities and the departments involved are justly proud of them.

I should also like to make brief mention of our ambitious plans for a new program in Earth System Science (ESS). Funds to launch this new initiative were made available by the central administration, and we expect to augment them substantially from outside sources. The program was born from the increasing realization that most problems in the earth sciences are truly global in scope, and require for their solution the cooperation and interaction among scientists from many disciplines. In our Earth System Science thrust we intend to build mainly on the combined strengths of the Departments of Geosciences, Geography, and Meteorology, augmented as needed by new appointments and cooperation with other institutions. We believe that this program will be very important in the future and that we have the potential for being a true leader in this field. Further details of the Earth System Science program will be announced in the fall issue of *Earth and Mineral Sciences*.

At a glance

	1984-85
Gifts from Alumni & Friends	\$ 521,823
Corporate Matching of Gifts	\$ 109,648
Gifts from Corporations & Business	\$1,105,911
Gifts from Foundations & Organizations	\$ 310,518
Total Gifts	\$2,047,963
Number of Gifts Received	2,741
Honorary Dean's List Givers	72

Sponsored Research	\$16.9 million
Student Enrollment: Undergraduates	1199
Graduate Students	501
Student Aid:	
Scholarships & Awards to Students	\$ 251,751
Wilson Loans to Students	\$ 195,330

As acting Dean, I consider it my job to provide an interface between the old and the new administrative teams of the College, and help facilitate as smooth a transition as possible. This obviously involves a lot of hard work, considering that some of us wear two or three hats during this transition period. It would certainly be presumptuous and ill-advised on my part to try to stake out the future course of the College. Clearly, this should and will be done by the next Dean in concert with the faculty. However, the time seems right for a pause to reflect on the College, the University, and higher education in general, for we are indeed at a crossroads: The change in administration of the College comes at a time of major changes at the University and of major issues in higher education being debated nationally and internationally.

What are the main characteristics of this College within the context of Penn State as whole? We are a relatively small college with an unusually high ratio of graduate students to undergraduates. Inasmuch as graduate programs in our disciplines are very much dependent on outside funding for research, it is not surprising that our research funding from outside sponsors is also unusually high. Our academic programs, both graduate and undergraduate, rank among the very best in their fields on a national scale. Through the loyalty and generosity of our alumni, friends, and other supporters, and prudent internal fiscal man-

agement, we have achieved a reasonable level of discretionary funds so important for flexibility and the ability to pursue new initiatives and opportunities. Add to these qualities the cadre of highly competent and enthusiastic faculty and staff, and we have indeed a strong base on which to build an even stronger College.

I would like to use the remainder of this message to touch upon some of the ideological and practical issues facing the College as it looks into the future. The framework for such musing is available in the form of the University's strategic planning process which is just unfolding and which, beginning late this fall, will be closely integrated with the annual budget reviews and subsequent budget presentations to Harrisburg.

There is clear evidence that these planning exercises and the associated dialogues between the College Dean and the University Provost and his staff will play a major role in shaping future academic priorities for Penn State. There is also clear evidence that the new central administration is strongly committed to improving academic quality at Penn State by selectively supporting programs where we are or can be very good. We in the College of Earth and Mineral Sciences welcome and applaud this educational philosophy and operating strategy which so clearly have guided our own efforts in building our College to its present position of international reputation.

As we look toward the future, we must follow a course of disciplined growth and adjustments. We cannot be all things to all people; we must make intelligent choices. We must find a proper balance between education and research — i.e., between acquiring and transmitting knowledge on the one hand and developing new knowledge on the other hand. Strictly intellectual challenges must be weighed against the challenges of technological developments. What constitutes the proper balances between undergraduate and graduate programs? How specialized or broad should the education be? How much effort can we afford to devote toward broadening the students' horizons beyond their own fields and our culture? We must learn to live within the constraints imposed by space and time. How far can we go toward integration of our scientific and engineering skills with social and aesthetic wisdom? What changes in our operation will be necessary in order to maintain our College as a leading educational and research center in earth and mineral sciences, in view of changing technologies and societal needs? These are but a few of the many issues that must be debated and resolved during the coming years.

We are well prepared to meet these challenges. Our College has a unique accumulation of talent and expertise for tackling problems of earth sciences. We cover the whole spectrum from pure science (e.g. geophysics) to applied science (e.g. materials science) to engineering (e.g. mining engineering), as well as elements of social sciences (e.g. geography). Our faculty come from a variety of disciplines, again covering the range from theoretical physics to engineering to economics.

We have the expertise and the flexibility to adapt to changing societal trends and new technological developments. We have, by and large, excellent physical facilities, a central administration sympathetic and supportive of our cause, and a stimulating internal atmosphere in the College. We are in the right field, in the right place, at the right time. In our College we can truly say that the whole earth is our laboratory and the sky is the limit.

We are privileged indeed to work in a field where we can contribute so much to a better understanding of planet Earth and better utilization of its resources. Within this framework, we are dedicated to providing the best possible education for the young men and women who will be the leaders in earth sciences and engineering in the future.

Arnulf Muan, Acting Dean



Photograph Ronald A. Matason

The highly successful 50th Anniversary celebration and reunion of the Penn State Department of Meteorology attracted many prominent visitors and more than 200 alumni. The gathering brought together every former department head of the past fifty years; they are seen above with some of the distinguished visitors: Left to right: Alfred K. Blackadar, professor emeritus of meteorology, Department Head 1967-1981; Clifford J. Murino, president University Corporation for Atmospheric Research (UCAR) and president, American Meteorology Society (AMS); Hans Neuberger, Department Head 1941-1961, acting head 1965-67; Kenneth C. Spengler, executive director, American Meteorological Society; Helmut E. Landsberg, Department Head 1934-1941; John A. Dutton, professor and Department Head 1981-present; Hans A. Panofsky, professor emeritus of atmospheric sciences; Richard E. Hallgren '53, '60 Ph.D., director National Weather Service and assistant administrator for Weather Services of the National Oceanographic and Atmospheric Administration (NOAA); Charles L. Hosler, vice president for research and dean of the Graduate School, dean of the college 1965-1985, Department Head 1961-1965.

Research Report

Research and graduate programs in the College continued to show great strength, both qualitatively and quantitatively, during the academic year which came to an end on June 30, 1985. Total research support from outside sponsors was \$16.9 million, an increase of 25 percent from the preceding year. It is gratifying to note that the support increased from all main sources of funding, federal, state, and industry. This is a testimony to our versatility and ability to compete successfully in all three sectors at a time of general fiscal stringencies.

Our graduate enrollment is relatively constant at approximately 500, which is close to the practical upper limit we can accommodate. Indeed, limitations of space and equipment and number of faculty are the main obstacles to any expansion of our research/graduate programs. This is not considered a serious problem however because in most program areas we are at or above the "critical mass" for doing first-rate research, and we insist on maintaining quality and selectivity as our trademarks.

It should be understood that we are not a research institute, and that the Associate Dean for Research does not direct the research in the College. Instead, we are an agglomeration of individual faculty researchers, free to select the research topics of our choice. In most cases this results in individual research projects involving one faculty member and, typically, one or two graduate students. In other cases, team research involving several faculty and a number of graduate students may be the best arrangement. Occasionally, interdisciplinary research teams cutting across departmental or college borders are formed.

All these modes of operation are encouraged, and the principal investigators usually decide how and with whom they wish to organize their research. The size, productivity, and reputation of our research programs bear testimony to the virtues of this approach.

We are all aware that research in science and engineering requires large sums of money, and that federal fiscal policies and depressed economic conditions in some of the basic industries have severely decreased funding opportunities from some of our traditional sources. However, through the initiative and expertise of our faculty and program chairmen, we have successfully made the adjustments necessary to sustain funding for our research and graduate programs, in part by taking advantage of the nationwide trend toward closer industry/university interaction in research. Indeed, Penn State is at the forefront in this regard, having the third largest industrially-sponsored research program among universities in the country.

We are working hard at developing new mechanisms for carrying out such joint research while protecting the vested interests of all parties involved. Universities are bastions of freedom of inquiry and free dissemination of knowledge. On the other hand, industrial sponsors have legitimate proprietary interests to protect. We must, therefore, find ways to form true partnerships between industry and universities in which these various factors and objectives are effectively balanced. We have done this successfully, for instance, in the cooperative program in the Coal Research Section.

We have also had success in joint research ventures with other universities. Our research program in respirable dust, for example, is sponsored by a major grant from the U.S. Bureau of Mines and is carried out in a consortium consisting of Penn State, West Virginia, MIT, and the University of Minnesota.

Typical Research Projects

The following is a sampling of some of the more than 200 research projects under way in the College to illustrate the diversity and broad range of current research:

Dr. David H. Eggler (Geochemistry) and his students are continuing geochemical studies of igneous rocks in southern Montana which contain nodules of subcontinental lithosphere that have been transported upward in magma.

Dr. Kevin P. Furlong (Geophysics) and his students are modeling the thermo-mechanical evolution of the San Andreas fault system, which forms the boundary between the North American and Pacific Ocean plates.

Dr. Barry Voight (Geology) and his students are continuing long term studies of the structures and processes of plate tectonics along the mid-ocean ridge exposed in Iceland.



Gifts from alumni and friends initiate and support various lecture series that bring world renowned scientists to the College. The Nelson W. Taylor Lectures, for example, supported by an annual gift from Mrs. Miriam Taylor, attract outstanding materials scientists such as P.G. de Gennes (center) shown here with Michael M. Coleman, head of the Department of Materials Science and Engineering, and Michelle Hutnik, an undergraduate in polymer science. In the 1984 lectures Professor de Gennes, a French physicist, discussed polymer melts and the differences in flow characteristics between polymers and simple fluids.



Industry provides important scholarship support for undergraduates in EMS majors. In the 1984-85 academic year, 123 scholarships totaling \$95,000 were provided by 42 separate companies, with individual scholarships ranging in value from \$250 to \$2,500. A typical example is Transco Energy Company, Houston, which in 1981 established scholarships to encourage excellence in mineral economics. Three seniors in mineral economics received the awards in 1984-85; they are shown, seated above l. to r., Rosemary Ward (Amble, Pa.); Keith Bailey (Glenshaw, Pa.); and Wayne Brinton (Mechanicsburg, Pa.) with Dr. William A. Vogely, head of the Department of Mineral Economics, right, and Transco representatives Glenna G. Pierpoint and Deborah L. McLain, standing l. to r.

Dr. Dennis W. Thompson, Dr. Christopher W. Fairall, Dr. Gregory S. Forbes, and Dr. Rosa G. de Pena (Meteorology) and their students are applying data from the Department of Meteorology's new wind profiling radar system to a variety of problems associated with winds in the troposphere and stratosphere, the evolution of severe storms, and the transport of polluting particles and gases.

Dr. Robert G. Crane (Geography) is using microwave radiometric data from the Nimbus-7 satellite to study ice changes in Arctica and Antarctica during the spring and early summer melt period to see whether ice cover changes can be used as an indicator of climatic variability.

Dr. T. DebRoy (Metallurgy) and his students are modeling fluid flow and heat transfer in the molten weld pool during laser welding of alloys to gain fundamental understanding of this process, which is currently subject to several technical problems.

Dr. B. Gordon III, Dr. Paul C. Painter, and Dr. James P. Runt (Polymers) are investigating critical problems in conducting polymers: the intractability of known conducting polymers and many of their precursors, the susceptibility to oxidation, their poor mechanical properties, and the toxicity of the dopants.

Dr. Gary L. Messing and Dr. Carlo G. Pantano (Ceramics) and their students are continuing their investigations into sol gel processing for composites which offer new possibilities for tough, fracture resistant glasses and ceramics.

Dr. Alan W. Scaroni (Fuel Science) is carrying out investigations related to the combustion of coal-water slurry fuels.

Dr. L. Barry Phelps (Mining Engineering) is developing a numerical methods computer model related to dustpan dredging equipment to be used for clearing channels on the Mississippi.

Dr. Mark A. Klins (Petroleum and Natural Gas Engineering) is continuing experimental and numerical modeling efforts to understand the mechanisms involved in maximizing oil recovery through immiscible and miscible carbon dioxide injection.

Dr. Leonard G. Austin and Dr. Richard Hogg (Mineral Processing) are investigating the role of slurry rheology in size reduction and material transport in tumbling ball mills.

Arnulf Muan, Acting Dean and Associate Dean for Research

1984-85 Honor Roll of Donors to the College

We should like to express our gratitude to all those listed in the following pages for their generous support of the work of the College. Many of you have achieved considerable success in your careers and we are grateful that in your success you turn to assist new students who are striving to follow you. We are especially happy to acknowledge the generosity of recent graduates whose contributions, however small, demonstrate appreciation for the education they have received. We have high ambitions for the College of Earth and Mineral Sciences, and with your continued support we intend to achieve them.

[This list includes all alumni of the College whose gifts were received between July 1, 1984 and June 30, 1985. Alumni are listed according to the year their first degree was received from the College of Earth and Mineral Sciences.]

E&MS Alumni

1917

J. S. Robison

1922

Norton H. Reichenbach

1923

C. R. Eisler

1925

Edward G. Fox
Carl A. Peterson
Rufus W. Snyder

1926

William R. Beardsley
Robert M. Hess
H. Herbert Hughes
Sylvester J. Koon's

1927

George J. Bair
Norman W. Hosler
Monroe L. Wexler

1928

George H. Todd

1929

Charles F. Haberen
Max W. Lightner
Samuel B. Maximon
William G. Smith

1930

Melvin R. Chapman
Joseph W. Hunt
A. W. MacLaren
Ralph L. Wilcox

1931

J. Richard Benner
John W. Greagor
Milton E. Holmberg

1932

Thomas A. Anderson
J. Robert Jones
William H. Rushworth
George A. Weaver
Andrew J. Zyliz

1933

Frank G. Benford
David A. Carter
Mark S. Childs
Charles H. Feldmiller
Melvin A. Forsyth
Samuel K. Hostetter, Jr.
John E. Miller
William M. Robert
John J. Rotherford, Jr.
Roy W. Stahl

1934

Stanley J. Brocky
Anthony J. Chernoske
John A. Comet
Robert W. Fatzinger
Ralph L. Gibson

Charles L. Labeka
William Reynolds
George J. Schad
C. Thompson Stott

1936

William Bellano
Martin Brezin
Richard P. Stemmler
Edmond A. Watters, Jr.

1937

Paul F. Berg
Charles D. Borland, Jr.
Joseph M. Bray
John C. Calhoun, Jr.
Erwin H. Leemann
Samuel J. MacMullan
George F. McHale
Edward P. McNamara
Joseph B. Merritt
Bertrand S. Norris
Charles W. Stickler, Jr.
Robert W. Stohr
Jack Turner

1938

John C. Cosgrove, Jr.
Joseph S. Levine
Marvin O. Lewis
W. Julian Parton
J. M. Steltzer
Max K. Wiant, Sr.
Richard A. Wilde

1939

Charles F. Bowden
William P. Bramlett, Jr.
Sidney O. Fisher
John M. Kelso
Otto C. Klein
T. M. Ocheltree
Donald F. Russell
E. Kenneth Schluntz
August C. Siefert
Glenn F. Whiteley
Theodore B. Winkler

1940

John A. Babcock
William D. Beach
Joseph R. Carter
William E. Gardner
Harry N. Ghenn
James M. Harrison
Walter A. Jones, Jr.
Lois Limber Kok
Edward J. Lichy
Maurice M. Lipnick
Jack M. MacLachlan
John W. Murray, Jr.
John W. Myers
Roger F. Scott
Joseph Sloop
John C. Wagner
Arthur F. Whitehill
Arthur E. Williams
J. Albert Wunderlich

1941

Ronald Barracough
Charles E. Carter

Ronald F. Crawford
Joseph D. D'Amico
Edward Forst, Jr.
Joseph J. Lelevich
Oliver G. Morgan
Jack R. Polley
William S. Wiley

1942

Robert A. Barracough
John F. Beck
Warren R. Beck
Howard B. Bomberger, Jr.
Robert P. Brooks
Herbert B. Charnbury
Sylvester V. Chek
John D. Clarke
Harry A. Dennis II
R. Tracy Eddinger
Michael P. Fedock
Jack M. Fillman
Robert M. Gontz
Robert L. Hess
Edward A. Kachik
Daniel J. Kerley
Nicholas M. Mittica
James E. Morgan, Jr.
Samuel O. Patterson
Thomas A. Prater
Jack D. Ramaley
Edward J. Rippling
George H. Smith
Robert L. Sproat
Henry W. Stoner
Louis E. Sylvester
Charles O. Tarr
George E. Trimble
Herbert F. Turnbull
Frank C. Wagner
Joseph T. Weber
Warren H. Williams

1943

Paul T. Bail
John O. Brittain
Alan I. Brunstein
Frederick L. Conyers
Harold B. Federman
Andrew J. Gaber
John T. Gary
Lawrence D. Gent, Jr.
Edwin W. Hoover
David J. Kachik
David E. Landers
Joseph A. Manfre
James J. Manganello
Alfred G. Metzger
Paul E. Moore
James J. Scarr, Jr.
Edward Steidle, Jr.

1944

C. E. Blakeslee
John F. Crum, Jr.
John D. Kalasky
Malcolm F. Lebowitz
Michael M. Marchich
Charles A. McFadden
George H. Rowe III
Marion J. Slivka

1945

Frank Marold
Paul L. Terwilliger

1946

David E. Adams
Joseph A. Cerroni
John C. Fern
Howard L. Hartman
John H. Hoke
Louis K. Keay, Jr.
Marjorie Provost Nelson
Richard R. Newton

Allison R. Palmer
Guy E. Rindone
Joseph P. Shaw
James L. Tenley

1947

William L. Batten
Wen L. Chen
David J. Crawford
William L. Frankhouser
James P. Freeman
Allan L. Habelson
Herbert J. Hartson
Charles L. Hosler, Jr.
John G. Howis
Hugo R. Larson
Edward I. Lorenzi
C. Drew Stahl
Richard F. Wesner
Horace J. Weymer

1948

Howard O. Beaver, Jr.
Wilford B. Beisel, Jr.
George M. Bretz
George W. Cleveland
Charles W. Daiker
Anthony J. Decillis, Jr.
John C. Devine
Dorothy R. Enright
John W. Foreman
Harold D. Frith
Donald F. Harris
Ralph W. Harris
Clifford F. Hocker
John W. Hosterman
Floyd A. Hummel
C. Donald Jamison, Jr.
Robert G. Jones
Richard H. Juve
George B. Kaiser
Adolph J. Lena
Richard E. Leshar
Warren T. Paynter
John W. Putman
Richard B. Robb
Ned W. Roudabush
Rustum Roy
John J. Schanz, Jr.
Paul J. Shanor
Carl W. Sherman
John Sherrod
M. Byron Shumaker
Donald B. Tait
Quentin E. Wood
Clifton C. Woodward, Jr.

1949

Bruce E. Adams
Robert H. Auman
Robert D. Barron
Charles E. Brackbill
Raymond Brooks
Joseph A. Brown
Robert E. Caffrey
Harry C. Dunegan
Frank E. Eckert, Jr.
Byron M. Emery
Doris Bye Fern
Richard K. Fisher
Russell C. Flegal
Paul W. Graff
John W. Harrison
Edmund D. Haube
William H. Hymes
Abraham Kleiner
Thomas M. Krebs
James C. Laughrey
Jack L. Marshall
Glenn W. Oyler
Edward P. Quick
Thompson Reid
Della Roy
Russell C. Ruhf

William H. Sampsel, Jr.
William H. Smith
Donald F. Stock
Judson D. Sweet
Donald B. Tuttle
Richard F. Urban
John P. Weir
Earl Youtz

1950

Philip C. Barr, Jr.
Harry H. Bauer
Frank P. Bence
John A. Bonk
Marvin D. Burkhardt
Allan A. Coburn
John H. Dickson
Robert L. Frantz
John Frassinelli
Donald Gasper
Richard S. Good
Robert K. Hansen
Robert A. Harris
Alvin Kaufman
Robert W. Lawrence
Charles J. Lindstrom
A. William McKnight III
Robert L. Mentch
Robert J. Menzie
Vance E. Moyer
James W. Peters
Joseph Pinto, Jr.
Alexander J. Simpson
David C. Skelly
Lewis Stein
Frederick A. Stephens
James W. Taylor
Paul F. Wallace
Russell J. Williams

1951

Dale L. Bartlebaugh
James H. Black
Charles R. Campbell
William H. Davitt
Edwin F. Eiswerth
Charles R. Enoch
Harry P. Ferris
Louis D. Friedman
Robert D. Geisenderfer
Robert L. Halvorsen
Harold K. Heberling
Howard C. Karr
Paul M. Kerschner
Harry Klemic
John C. Kraft
Joseph E. Michalski
Jesse A. Miller
John C. Parry
Richard J. Plunkett
Andrew Pocalyko
Harry W. Rauch, Sr.
Edwin J. Richard
Maurice J. Romanell
Thomas H. Sadler
Robert M. Schultz
William R. Sittig
Ralph P. Vollmer
James R. Williams, Jr.
Lloyd G. Young
Bruce E. Ziegler

1952

Geoffrey E. Brock
Edward A. Bush
Robert A. Cadigan
Myron K. Cox
William J. Englert
Robert H. Goodman
Don E. Harrison
Frederick L. Horning
Robert H. Insley
Eric V. Loder
George R. Macaulay

Harold P. Meabon
Kenneth W. Miller
Karl F. Ockert
Robert E. Olson
Richard C. Patterson
Wallace E. Riffelmacher
Frank Rusinko, Jr.
Regis E. Rusnock
Leonard B. Sand
George Simkovich
Henry J. Swartz
Philip L. Walker, Jr.
John B. Whitney
Arthur C. Woodard

1953

Ralph J. Alois
Alfred J. Babecki
Robert W. Cameron
Robert E. Cobb
Robert C. Devries
Peter G. Fairchok
Steward S. Flaschen
David V. Haines
Richard E. Hallgren
Frank D. Huttlinger
David L. Jones
Albert J. Kaehn, Jr.
Richard F. Knauss
Franklin W. Kone
Eugene A. Laumann
Joseph W. Leonard III
Francis P. Markulin
Edward Martinez
John E. Megles
James H. Meyer
N. Arthur Pore
John M. Ruffner
Walter P. Shaunessy
Donald C. Shirey
Norman R. Thielke
Robert M. Williams
Miles H. Woodward
William R. Young
Frank R. Yurkoski, Jr.
Richard A. Zimmerman

1954

James H. Brannigan
Clark P. Breeding
W. Barry Collins
Richard E. Crosby
Joseph C. Culp
P. James Diefenbach
Herbert D. Duey
Thomas N. Elston
Edward S. Epstein
Charles E. Felker
Robert H. Fendick
Franklin A. Gifford, Jr.
John W. Goehring
Arthur M. Hussey II
Robert S. Jack
Kenneth L. Keller
Charles H. Kreischer, Jr.
Harry R. Mansfield
Bruce W. Nelson
Howard R. Peiffer
Robert H. Read
Norman J. Rubash
George G. Schneider
Jan D. Steber
Richard J. Voigtsberger
John H. Weltz
John E. Werner
John H. Wernick
Ward M. Wheatall

1955

David E. Albert, Jr.
James A. Anderson, Jr.
Glenn W. Bush
Leonard R. Chase
John Dash
Reed J. Dunn, Jr.

Kenneth H. Gee
Jacob E. Gerhard
Lowell S. Gonano
Richard M. Hamer
James H. Hartsock, Jr.
Charles T. Illsley, Jr.
Frederick C. Langenberg
Richard H. Lufey, Jr.
S. James Mann
Robert J. Matanick
Charles O. McHugh
John E. Moser, Jr.
Amulf Muan
Robert C. Newman
Kenneth E. Pinnow
Franklin F. Ross
Wayne D. Rupert
Robert J. Ryder
Herbert A. Schueltz
William M. Schumacher
Alexander Simkovich
George R. Spalding
Richard Vidanoff
James E. Walczak
Thomas J. Whalen

1956

David K. Baumann
Victor G. Beghini
John Belak
Thomas V. Falkie
Hal L. Harman
Joseph E. Henry
Charles F. Hickey, Jr.
Ronald H. Hicks
Robert A. Hoyt
Solomon Jarmell
Delos C. Jensen
L. Grant Lesoine
George A. Reimann
Donald F. Rieco
Frederick A. Sotok
Marlin H. Snyder
Edwin Tocker

1957

Frederick E. Arant
Herbert L. Black, Jr.
Charles H. Bowman
Clark D. Brillhart
Gerard A. Demarrais
George A. Gerber
Carl P. Giardini
Eugene S. Harsh
Richard H. Johnston
Glenn F. Jones
Irwin Kaplan
Ralph D. Kauffman
Sidney J. Lestz
Robert A. Miscik
Catherine D. Mowrer
Harry R. Neff
Jack L. Pensyl
Robert S. Pocreva
George H. Pudlo
Hilda J. Snelling
Donald J. Vinkovich
Donald L. Woodrow

1958

Aldo T. Angelo
Alvin L. Barth, Jr.
Robert E. Beamer
James M. Caldwell
Ronald V. Caporali
Joseph A. Chivinsky
James V. Cotton
Robert C. Curtis
Gordon K. Dunsmore
George L. Gedeon
Stephen Gogniat
Arthur H. Graham
Walter R. Gruber
Walter C. Hahn, Jr.
John G. Harhai
George Jubinsky
James A. Kelley
John J. Kelley
John C. Kosco
James F. Lander
Charles R. Latta
Roger L. Levin
Alvin I. Opolinsky
Edward P. Scott
Frederick C. Spott
Harold S. Springer
Paul A. Stoerker
P. Stuart Tholan

Richard L. Twiddy IV

1959

John W. Andrews
Roger G. Brooks
Louis D. Camino
Robert L. Caton
Dael E. Copeland
Duane A. Crawford
Michael S. Crowley
Dorothy Demos Daye
Richard L. Daye
Charles N. Freed
Joseph W. Glass
Charles A. Giotfelty
Gerardo W. Gross
David D. Houghton
Harrison E. Hunsicker
E. Bruce Jones
Robert J. Kopicke
Ronald F. Lay
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The significant increase in the number of gifts from friends of the College was due to the establishment of a fund to honor Charles L. Hosler, who left us to assume the role of Penn State's Vice President for Research and Dean of the Graduate School after spending the past twenty years as Dean of the College. As a result of the high esteem in which he is held by the faculty and staff, virtually all College personnel made gifts to the Hosler Fund, which swelled dramatically to around \$12,000 within a matter of weeks.

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We are grateful to the following companies and foundations

- for matching the gifts of our alumni and friends
- for giving support through scholarships
- for assistance in our research programs
- for the donation of equipment
- and for participating in the ongoing dialogue between industry and academia that brings such strength to our educational system.

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Gifts of new or used equipment were made by several companies, in some cases through the initiative of individual alumni. We should like to thank Instron Corp. Research & Applications Lab, United Technologies, Shell Development Company, and U.S. Steel Corp. for their gifts. The Materials Testing System being demonstrated here by Michael Foley, a graduate student in the Ceramic Science and Engineering program, was donated by Instron in support of the College's research program into the reliability of ceramics and ceramic composites, and is being used for research into high temperature fracture strengths of such materials as silicon nitride and silicon carbide ceramics.

Resident Instruction

The College of Earth and Mineral Sciences continued last year to attract and produce high quality students. At Commencement in May, conducted for the first time in memory by the College itself, 272 undergraduates were presented with diplomas, four receiving honors degrees for completing the demanding University Scholars program. In a separate Graduate School ceremony, 25 masters and 11 doctorates were conferred.

Undergraduate enrollment peaked in 1982 at about 1500 at University Park and nearly 2000 system-wide. In fall 1985, enrollment has now backed down to 1100 at University Park and 1400 overall. The decline has been exclusively in the energy-related majors, with for example Petroleum and Natural Gas Engineering dropping from over 500 majors to less than 200 in just three years. In many respects this development is very welcome, as we have only seven faculty members in PNGE (ably augmented by two generous and heroic retirees) who have had to cope with excessively large classes. Other areas, notably materials science and engineering, meteorology, and geography, have seen increasing numbers of majors in recent years. These changes reflect placement trends to some extent.

Graduate enrollments continue very strong, with 532 graduate students on board in fall 1985, which is very close to the all-time peak of 556 reached in 1983. An interesting index of the quality of the EMS graduate programs turned up this year when the Graduate School reported that for three years it has been asking the "outside" member of all doctoral committees to rate the dissertations they review. EMS theses scored much the best among the Penn State colleges, with 89 percent of EMS theses receiving "excellent" or "very good" ratings, against a 62 percent University average, and 74 percent for the next best group.

The College's Strategic Plan recognizes the major role the College plays for graduate education in our fields. With only four percent of the University's faculty, EMS professors supervise about 12 percent of the full-time graduate students and Ph.D. dissertations. With respect to the instructional program, the aims stated in the Strategic Plan are to maintain and improve quality at both undergraduate and graduate levels, rather than strive for mindless growth. The goals emphasize sound fundamentals, increased emphasis on speaking and writing skills, and greater sophistication toward the use of computers. The years to come will be a good time to be a student in our College, and we hope alumni and friends will make that known to qualified students.

As has become the norm, EMS students received national recognition for their achievements. Of only 31 National Science Foundation Graduate Fellows nationally who plan to study in the earth, ocean, or space sciences, the College was represented once again when Michael Ham, who earned his B.S. in meteorology, here, won one of those prized fellowships and elected to continue his studies in the College. Jeffrey Tilley (meteorology) won a national award in the Father James B. Macelwane student paper competition sponsored by the American Meteorological Society. V. Mohan Karyampudi (meteorology) won the Max A. Eaton prize award for the best student paper presented at the 16th Conference on Hurricanes and Tropical Meteorology. Ragula Bhaskar (mining engineering) received the SME-AIME outstanding graduate student paper award for 1984. Gary M. Carinci (metallurgy) received a scholarship from the American Society for Metals to support his undergraduate studies, and Mark A. Ridgley (geography) was awarded a Fulbright Fellowship to carry out research in Colombia for his dissertation on "Water in the Latin American City."

In addition, we are proud to announce that Michal Ellen Ruder (geophysics) has been selected to serve on the Education and Human Resources Committee of the American Geophysical Union.

John J. Cahir,
Associate Dean for Resident Instruction



Shelley Corman, the College's student marshal for Summer Commencement 1985, receives a commemorative pen from Acting Dean Arnulf Muan, right, and Associate Dean John Cahir. Shelley, who graduated with distinction as a mineral economics major, held a John and Elizabeth Holmes Teas Scholarship, was secretary of the EMS Student Council and editor of its newsletter. She participated in the Department of Mineral Economics Cooperative Study Program, through which she held an internship with the Federal Energy Regulatory Commission in Washington D.C., working with the natural gas industry. In fall 1984, she was selected to attend the Washington Seminar in Economic Policy of the American University, and held an internship in the Congressional Budget Office. She is now beginning her career as a rate analyst for the natural gas industry.

Obelisk Society

Membership in the Obelisk Society is the highest honor the College bestows on its alumni and friends. It is a group made up of those who have made truly significant gifts to the College of Earth and Mineral Sciences.

This year we give special recognition to three new members of the society:

Victor G. Beghini '56
Howard L. Hartman '46
Donald E. Kline '51

Victor G. Beghini is vice president of Marathon Oil Company's U.S. exploration and production and heads the College's fund drive to establish a new center for enhanced oil recovery. Dr. Howard L. Hartman is professor emeritus of mineral engineering at the University of Alabama and a former faculty member of the College's Department of Mineral Engineering. Dr. Donald Kline is professor emeritus of materials science of the College's Department of Materials Science and Engineering.

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Members — In Memoriam

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Helen R. and Van H. Leichter
'30 Metal
Livingston P. Teas '16 Mining
Anne C. Wilson
Matthew J. Wilson Jr. '18 Mining

Faculty Milestones

Promotions

The following faculty members were promoted in academic rank on July 1, 1985: Craig F. Bohren to professor of meteorology; David H. Eggler to professor of petrology; John J. Olivero to professor of meteorology; Paul C. Painter to professor of polymer science; Christopher J. Bise to associate professor of mining engineering; Christopher W. Fairall to associate professor of meteorology; Gregory S. Forbes to associate professor of meteorology; Thomas W. Gardner to associate professor of geology; Gary L. Messing to associate professor of ceramic science and engineering; James P. Runt to associate professor of polymer science.

Retirements

Several prominent and distinguished members of the faculty retired during the past academic year:

Dr. Alfred K. Blackadar retired with the rank of professor emeritus of meteorology following 29 years of service to the University. Dr. Blackadar was head of the Department of Meteorology from 1967 to 1981.

Dr. John H. Hoke retired with the rank of professor emeritus of metallurgy. Dr. Hoke was chairman of the Metallurgy Section of the Department of Materials Science and Engineering from 1980 to 1985. He joined the Penn State faculty in 1960.

Dr. Donald E. Kline retired with the rank of professor emeritus of materials science following 25 years of service to the University.

Dr. Robert Scholten retired with the rank of professor emeritus of geology following 34 years of service to Penn State. He was acting head of the Department of Geology and Geophysics during part of the years from 1957 to 1973, and served as chairman of the geology graduate program from 1974 to 1978, and again from 1982 to 1985.

Carl W. Sherman has retired from the faculty after serving as lecturer in Petroleum and Natural Gas Engineering since 1975.

Dr. Eugene G. Williams retired with the rank of professor emeritus of geology following 27 years of service to the University.

Dr. Lauren A. Wright has retired with the rank of professor emeritus of geology following 24 years on the faculty. Dr. Wright was head of the Department of Geology and Geophysics from 1961-1971.

Departures

These faculty left us at the end of the academic year to assume new positions: **Dr. John Tilton** has been appointed Coulter Professor of Mineral Economics at Colorado School of Mines.

Dr. Lloyd 'Pete' Morley has been appointed head of the Department of Mineral Engineering at the University of Alabama-Tuscaloosa.

1985 Wilson Teaching Awards

The 1985 Matthew J. and Anne C. Wilson Awards for Outstanding Teaching were presented at the Dean's Award Banquet, held at the Nittany Lion Inn on April 21st. This year, the awards went to Dr. Christopher J. Bise, associate professor of mining engineering, and Dr. Paul R. Howell, associate professor of metallurgy.

Christopher Bise, who was named assistant professor in 1980 and associate professor in 1985, has developed two new courses in the mining engineering program — Mine Maintenance Engineering, for undergraduates, and Advanced Mining Systems, a graduate level course. He also teaches Mining Engineering Analysis and Management in the Mineral Industries and a graduate seminar. Since 1976, he has been an active participant in mining continuing education short courses, and organized the first and second Symposia on the Applications of Microcomputers in the Mining Industry, held at Penn State in 1983 and 1984.

His research interests include design and planning of innovative mining systems, mine maintenance engineering, and the relationship between productivity and safety. His text *Mining Engineering Analysis*, will be published later this year by SME-AIME.

Dr. Bise holds B.S. and M.S. degrees in mining engineering from Virginia Polytechnic Institute and State University, and a doctorate in mining engineering from Penn State.

Dr. Ronald Eyton is now with the Department of Geography, University of Alberta.

Dr. Mauricio Eggenschwiler is now research engineer with Mobil Oil Corporation in Dallas, Texas.

We wish them well and hope they will maintain their ties with the College of Earth and Mineral Sciences.

EMS Student Awards

The following students received special honors within the College in the 1984-85 academic year:

The **Jerome N. Behrman Award** for students with an excellent academic record who plan to carry out graduate studies in the Department of Meteorology went to Bradford S. Kelly and Louis Y. Zuccarello. The **George W. Brindley Award** for superior work in a nonmetallic crystal chemistry course was awarded to Susan Trolier. The **Dupont Polymer Science Award** for the outstanding junior in the polymer science program was received by Michelle Hutnik.



Dr. Charles L. Hosler, former dean of the College, presents the 1985 Wilson Awards for Outstanding Teaching to **Dr. Christopher J. Bise** (center), associate professor of mining engineering, and **Dr. Paul R. Howell**, associate professor of metallurgy.

Paul Howell received his education from Cambridge University, U.K., and was a research fellow in the Department of Metallurgy and Materials Science at Cambridge before joining the Penn State faculty in 1981.

While at Penn State, he has developed a core course, Microscopy of Materials, for all undergraduates in the Department of Materials Science and Engineering, and a graduate level course in electron microscopy. He has also participated in major revisions to three existing courses: Physical Metallurgy, Solid-Phase Reactions, and Transmission Electron Microscopy in Materials Science.

Dr. Howell's primary research interests are in phase transformations and high-temperature deformation of metals, and he has published more than 85 papers and articles.

The **William Grundy Haven Memorial Awards**, given to the three best papers entered in an annual student technical paper contest open to all EMS students, were won by Kreg T. Ettenger for his paper, "The Formation and Development of Limestone Caves"; Robert W. Mahood for his paper, "Shedding Some Light on Optical Phenomena"; and Frank J. Pazzaglia, who wrote on "The Current Hydrogeologic Situation of the Northern Anthracite Coal Field, Northeastern Pa."

The **Arthur P. Honess Memorial Award**, which recognizes outstanding geosciences students, was received by Dagmar I. Kohl, who was also nominated for a summer field scholarship with the U.S. Geological Survey by the National Association of Geology Teachers.

The **B. F. Howell, Jr. Award** that recognizes outstanding professional contributions by a geosciences undergraduate or graduate student, was awarded to Michal Ellen Ruder.

The **Robert W. Lindsay Award**, presented to students who demonstrate outstanding capabilities in physical metallurgy, was given to Gary M. Carinci, a graduating senior in metallurgy who represented the

student body as Engineering Honor Graduate at the Spring 1985 Commencement. E. Willard Miller Awards recognize geography graduate and undergraduate students who have demonstrated academic excellence and have submitted papers on topics of their choice. This year the Miller Award was presented to Marc R. Hess, who graduated in spring with simultaneous bachelor's degrees in geography and general arts and sciences; to Catherine P. Harding, a master's degree candidate; and Anne M. Sheridan, a doctoral candidate.

The Ellen Steidle Achievement Awards are made to junior and senior students of the College who have been particularly active in advancing the welfare the College and its student body. This year's awards went to Daniel P. Black, a geosciences student, and to Keith F. Bailey, a mineral economics major.

The Old Timers Club Watch Award recognizes a mining engineering student with high academic record, leadership qualities, and involvement in student organizations, who is committed to a career in the coal industry. The 1985 award was given to Ronald Hetzer, a senior in mining engineering, at the Old Timers Banquet in April. The Old Timers Club, which was founded in 1938, has a membership limited to 30, currently made up of 18 coal company executives and 12 mining equipment manufacturers.

The C.C. Wright Award for the best graduate seminar in Fuel Science was awarded to Madhukar Rao, a doctoral candidate.

Alumni Achieve High Distinction

National Academy of Engineering

During the past year, several alumni of the College have received national recognition for their outstanding professional achievements. Three of our alumni were elected to the National Academy of Engineering, the highest professional distinction that can be conferred on an engineer. It is awarded only to those who have made significant contributions to engineering theory or practice.

John C. Calhoun, '37 PNGE, '41 M.S., '46 Ph.D., deputy chancellor emeritus for engineering, Texas A&M, and formerly head of Petroleum and Natural Gas Engineering at Penn State, was cited for "outstanding contributions to the art and science of petroleum recovery, to the development of engineering education, and to the use and understanding of engineering in the public arena."

Ronald M. Latanision, '64 Metallurgy, Shell Distinguished Professor of Materials Science, and director of the H.H. Uhlig Corrosion Laboratory, Massachusetts Institute of Technology, was honored for "public service and interdisciplinary research related to environmental effects on the chemical and mechanical properties of engineering materials."

John B. MacChesney, '59 Ph.D. Geochemistry, technical staff member AT&T Bell Laboratories, was honored for "leadership in the invention of processes to make glasses for optical fiber and for transfer of these processes to manufacturing."

Alumnus gets Top MSA Award

During the past academic year, **Paul B. Barton Jr.**, '52 Geosciences, research scientist, U.S. Geological Survey, was awarded the Roebling Medal, the highest honor of the Mineralogical Society of America. Dr. Barton was cited as "the father of modern ore petrology" in recognition of his pioneering studies of ore deposits, which have made a major contribution to our understanding of the movement and concentration of metals within Earth's crust.



Victor G. Beghini



James J. Tietjen

Penn State Distinguished Alumni

Two alumni of the College were named Distinguished Alumni of the University during the past year in recognition of their outstanding professional achievements and social service: Victor G. Beghini '56 PNGE, and James J. Tietjen '58 M.S., '63 Ph.D. Fuel Science.

Victor G. Beghini has had a dynamic and highly successful career with Marathon Oil, moving through nineteen promotions and job relocations to his present position as a director and senior vice president for Marathon's U.S. exploration and production activities. He is noted for his superior executive management skills and sound knowledge of the petroleum industry. Mr. Beghini has maintained close ties with the Petroleum and Natural Gas Engineering Section and has been generous in his support of College programs. He is currently serving as chairman of the C. Drew Stahl Fund Campaign to establish and support an Enhanced Oil Recovery Laboratory in the College.

Through his innovative work at RCA Laboratories, **James J. Tietjen** has pioneered advances in electronics that have had a significant impact on the world of communications. He is now vice president in charge of RCA Laboratories. Dr. Tietjen is a trustee of the Medical Center at Princeton, a member of NASA's terrestrial applications advisory committee, a member of the solid state sciences advisory board of the National Academy of Sciences, and a telecommunications adviser to the U.S. Information Agency.

54th Year of Publication

ISSN 0026-4539

EARTH AND MINERAL SCIENCES

Arnulf Muan, *Editorial Director*
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The Pennsylvania State University
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MINERAL SCIENCES

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Published quarterly, fall, winter, spring, and summer, as a continuing education service of the College of Earth and Mineral Sciences, 116 Deike Building, University Park, Pennsylvania 16802. Third-class postage paid at State College, Pennsylvania 16801. Subscriptions available without cost upon request to: Editor, *Earth and Mineral Sciences*, 116 Deike Building, University Park, Pennsylvania 16802. U.Ed. 86-373

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