Record Amount Approved for Research Grants in the Natural Sciences

More grants than any previous session in recent years resulted from the February meeting of Research Corporation's Cottrell Program Advisory Committee. Also a record was the total dollar amount recommended for basic research in the natural and physical sciences: $1.25 million.

The committee acted favorably on 61 applications submitted under the foundation's Cottrell Research Program. This program, one of two grants subdivisions, is devoted to fundamental investigation in the physical sciences at graduate universities and public undergraduate institutions. The 61 awards totaled $752,964, and will support research projects at 51 different campuses.

An additional 45 grants received favorable review under the Cottrell College Science Program. This second grants effort assists projects in the natural sciences at private undergraduate institutions. The dollar amount of the awards, distributed to investigators at 39 different institutions, was $495,865.

The advisory committee schedules two additional sessions for May and October of each year to consider pending and new applications for research support. Listed below are the grants approved following the February meeting.

Cottrell Research Program

CHARLES R. ALCOCK, Massachusetts Institute of Technology: A theoretical study of the statistics of gravitational lenses—$4,005

PETER B. ARMENTROUT, University of California, Berkeley: Gas phase chemistry of transition metal ion cluster—$21,575

EDWARD J. BEITING and ROBERT STICKEL, JR., Mississippi State University: Studies of molecules in single Rydberg states in a collisionally isolated environment—$15,000

THOMAS E. BITTERWOLF, U.S. Naval Academy: Synthesis of dimetal organometallic compounds for the evolution of hydrogen from water and dilute aqueous acids—$11,000

DAVID F. BOCIAN, University of California, Riverside: Resonance Raman studies of excitonic and exchange interactions in multimeric and multiple metal-containing systems—$5,500

JOHN F. CANNON, Brigham Young University: Crystal structure determination of boron-sulfur compounds prepared at high pressures—$3,000

SYLVIA T. CEYER, Massachusetts Institute of Technology: The effect of translational energy upon dissociative adsorption—$25,000

JOSEPH CHAIKEN, Syracuse University: State-bond specific laser induced chemistry in organometallic supersonic nozzle beams—$20,000

TAI-CHANG CHIANG, University of Illinois: Studies of surface atomic structures using EXAFS with high energy electron excitation—$15,000

ROBERT D. COOMBE, University of Denver: Nucleation phenomena in photochemical deposition of thin films—$15,000

STEPHEN R. COOPER, Harvard University: Transition metal crown thiaether chemistry—$6,000

LENNOX L. COWIE, Massachusetts Institute of Technology: A search for optical filamentation around central galaxies in rich X-ray clusters—$9,000

PAUL L. DeVRIES, University of Missouri—St. Louis: A detailed quantum mechanical investigation of atom-atom collisions in the presence of a non-resonant laser—$6,000

PULAK DUTTA, Northwestern University: X-ray diffraction and external reflection studies of structures and phase transitions in monolayers and surfaces—$20,600

PATRICIA DWYER-HALLQUIST, University of Wisconsin—Oshkosh: Interactions of the Hpa I endonuclease with nucleotides external to the recognition sequence—$9,000

JOHN W. FARLEY, University of Oregon: Spectroscopic and collisional studies of Rydberg states of ^4He and ^3He—$25,000

DONALD G. FARNUM, Michigan State University: Synthesis of dodecahedrane and dodecahedrane encapsulated metal cations—$5,000

JACK FEINBERG, University of Southern California: The nonlinear mixing of optical beams by the photorefractive effect—$16,800

RONALD FISCH, Washington University: Statistical mechanics of noncrystalline magnets—$4,500

JOSEPH L. FOWLER, University of Tennessee: Experiment to extract free quarks from niobium—$10,000

W. RON GENTRY and DONALD G. TRUHLAR, University of Minnesota: Financing for the conference on the dynamics of molecular collisions—$10,000

BERNARD GORDON III, Pennsylvania State University: New carbanion chemistry for polymer synthesis—$10,200

MARK F. GRANVILLE, University of Connecticut: Cis-trans photoisomerization at cryogenic temperatures—$12,700

JAMES M. HAILE, Clemson University: Intermolecular potentials in fluid mixtures from neutron diffraction—$12,500

MICHAEL D. HAMPTON, University of Central Florida: The development, construction, and characterization of a new apparatus for the observation of CIDNP in electrochemically initiated reactions—$5,000

PAUL J. HARRIS, Virginia Polytechnic Institute and State University: The reactions of enolate anions with halophosphazenes—$9,000

TERRY L. HELSER, State University of New York College at Oneonta: Composite gel electrophoretic analysis of subunit, ribosome, and polyribosome structures—$12,835

KEITH A. HORN, Tufts University: Spectroscopic studies of carbene-carbene rearrangements—$17,700

JOHN M. HUGHES, Miami University: An investigation of fumarolic vanadates and mixed valence (IV, V) vanadium oxides—$7,205

CYNTHIA E. IRVINE et al, Monterey Institute for Research in Astronomy: N-type carbon star variables—$39,420

DOUGLAS E. JOHNSON, North Dakota State University: Homogeneous models of hydrodesulfurization—$10,000

TAPPEY H. JONES, U.S. Naval Academy: A gas chromatograph for the investigation of ant venom alkaloids—$9,100

DAVID F. KARNOSKY, New York Botanical Garden, Cary Arboretum: Techniques for culturing elm protoplasts (two-year program)—$15,400

JANE V. Z. KREVOR, San Francisco University: Activation of alkane C-C and C-H bonds using organotransition metal complexes—$5,457

HAI-WOONG LEE, Oakland University: Study of X-ray emission from charge-exchange transitions —$2,700

TIMOTHY M. LOHMAN, Texas A & M University: The thermodynamics and kinetics of protein-DNA interactions involved in DNA replication—$6,000

JOHN M. LoSECCO, California Institute of Technology: A search for extraterrestrial neutrino bursts—$13,555

WILHELM F. MAIER, University of California, Berkeley: The synthesis and chemistry of hyperstable bridgehead olefins—$15,000

JACK M. MILLER, Brock University: Fast atom bombardment mass spectrometry: application to bioinorganic chemistry—$10,200

CARLA W. MONTGOMERY, Northern Illinois University: Early Precambrian evolution of northern Wisconsin and Michigan (two-year program)—$6,500

NICHOLAS R. NATALE, University of Idaho: Asymmetric reductions via chiral N-heterocyclic amine-borane complexes (two-year program)—$13,900

REBECCA M. O'MALLEY, University of South Florida: An experimental determination of the kinetic shift—$17,145

EDWARD J. PARISH, Auburn University: A new approach to the synthesis of C_{18}-functionalized steroids—$9,600

DAVID H. PARKER, University of California, Santa Cruz: Orientation dependence of chemical reactions—$12,100

HOWARD R. PETTY, Wayne State University: Applications of magnetophoretic laser light scattering—$15,000

P. S. RAMANUJAM, University of Toledo: Experimental study of doubly excited states of atoms produced in electron-atom collisions—$22,000

DONALD M. SCHLEICH, Polytechnic Institute of New York: Photo-electrointercalation of layered semiconductors—$12,000

SURESH C. SHARMA, University of Texas at Arlington: Investigations of the formation and annihilation of positronium in molecular gases—$10,000

ANNE P. SHERBLOM, University of Maine: Sialic acid in glycoprotein biosynthesis—$10,000

MARY J. SHULTZ, Tufts University: Vibrational energy transfer in vibrationally highly excited species: methylisocyanide and acetonitrile—$19,000

TAMARAPU SRIDHAR, State University of New York at Buffalo: Application of fluidity model to non-Newtonian liquids—$8,200

DAVID M. STANBURY, Rice University: Electron transfer reactions of chlorine dioxide—$10,500

GEORGE G. STANLEY, Washington University: Synthesis of all-metal sandwich-type clusters—$12,800

M. L. W. THEWALT, Simon Fraser University: Study of multi-exciton systems in semiconductors using the extremely weak photoluminescence at twice the band gap—$17,820

RUTHANNE D. THOMAS, North Texas State University: Higher aggregation states of organolithium compounds—$6,162

DAVID R. WALT, Tufts University: Polyketide biosynthesis: mechanistic studies and application to natural products synthesis—$14,088

DEBORAH K. WATSON, University of Oklahoma: Study of the interaction of electrons with highly-stripped ions—$9,311

ROBERT M. WESTERVELT, Harvard University: Nonlinear oscillations and chaos in electrical conduction in Ge—$20,000

DABNEY K. WHITE, Washington University: σ and π amide radicals—$10,986

STEPHEN A. WINKLE, Rutgers University: Binding of carcinogens to DNAs—site selectivity and effects on DNA structure and function—$12,000

GEOFFREY B. WONG, University of Southern California: Coordination chemistry of thallium—$12,900

Cottrell College Science Program

PAULETTE BIERZYCHUDEK, Pomona College: An experimental study of the significance of sexual reproduction in *Antennaria* (two-year program)—$13,525

LYNN A. BUFFINGTON, Carleton College: Glycoprotein glycosylation site conformation (two-year program)—$13,300

SCOTT A. CHAMBERS, George Fox College: Angle-resolved auger electron emission from LaB_6 single crystal surfaces—$4,350

JOHN G. COBLEY, University of San Francisco: The role of plasmids in the chromatic adaptation of cyanobacteria—$11,800

DONALD B. DAHLBERG, Lebanon Valley College: The effect of electron withdrawing substituents on the mechanism of elimination reactions (two-year program)—$13,000

GUIDO W. DAUB, Harvey Mudd College: Synthetic applications of the ketal Claisen rearrangement —$4,800

DONALD R. DEARDORFF, Occidental College: Enantiospecific synthesis of festucine—a novel pyrrolizidine alkaloid—$11,610

(Continued on page 8)

RESEARCH CORPORATION
405 LEXINGTON AVENUE, NEW YORK, NEW YORK 10174-0370

Address Correction Requested
Return Postage Guaranteed

Nonprofit Org.
U. S. POSTAGE
PAID
NEW YORK, N. Y.
Permit No. 4125

College Science Grants

(Continued from page 7)

RICHARD R. DOYLE, Denison University: Synthesis, isolation and characterization of artificial substrates for the enzyme, α-N-acetylglucosaminyl phosphodiesterase (two-year program)—$10,000

JAMES A. DUNCAN, Lewis and Clark College: A study of the thermal rearrangement of 7-(1,2-butadienyl) bicyclo [2.2.1] hept-2-ene and related hydrocarbons (two-year program)—$23,300

JAMES C. ECKERT, Harvey Mudd College: I. High resolution heat capacity measurements of the transition metal trichalcogenides; II. Detailed growth study of the transition metal trichalcogenides (two-year program)—$15,100

LUTHER E. ERICKSON, Grinnell College: Structural and kinetic studies of platinum(II) complexes of amino acids and π-donor ligands (two-year program)—$12,800

C. ROBERT FELDMETH, The Claremont Colleges: Thermal niche width in pupfish *(Cyprinodon):* evolutionary adaptations to cool and warm temperature habitats—$8,265

PAUL E. FELL, Connecticut College: A study of reproduction and population dynamics of the marine sponges, *Microciona prolifera* and *Lissodendoryx isodictyalis* (two-year program)—$7,600

ROBERT B. FULTON, St. John's University, Minn.: Development of a model system for the application of the sample ion increment method for determining ionic Mg^{++} and Ca^{++} in biological fluids (two-year program)—$10,000

JAMES H. HAMMONS, Swarthmore College: Electronic spin resonance studies of trimethylenemethane radical anions: effects of substituents and Jahn-Teller distortions on orbital ordering—$20,000

FRANCIS X. HART, University of the South: Time domain dielectric spectroscopy of plant stems and leaves—$7,300

LILIAN M. HSU, Mount Holyoke College: Studies of the regulation of *E. coli* tRNA gene expression *in vivo* and *in vitro*—$14,000

WALTER H. JONES, University of West Florida: Proton transfer between hydronium ion and π-electron donors—$2,400

YOGI N. JOSHI, St. Francis Xavier University: Laboratory investigation of the atomic structure of four times and five times ionized zinc and the identification of Zn V and Zn VI forbidden lines in the STELLAR SPECTRA—$8,000

DONALD G. KUBLER, Furman University: Does the energy of activation change with temperature for the hydrolysis of sucrose?—$7,600

THOMAS F. LEE, Saint Anselm College: Culture studies with macroscopic brown algae: seaweed tissue and organ culture (two-year program)—$15,375

GEORGE LISENSKY, Beloit College: Synthesis of linked macrocyclic ligands (two-year program)—$14,800

NICHOLAS C. MARAVOLO, Lawrence University: Radioimmunoassay and GLC analysis of endogenous growth regulators during sexual induction in the hepatic, *Marchantia polymorpha* (two-year program)—$12,750

SLAVICA SMIT MATACIC, Haverford College: Phosphorylation of actin and high molecular weight proteins in developing cardiac tissue (two-year program)—$13,100

LARRY F. MEHNE, Calvin College: Control of the oxidation potential for the formation of nickel(III) di-R-glyoximes and their electron spin distributions through variation of the R-group and weak axial ligation (two-year program)—$11,310

DAVID NITZ and JAMES CEDERBERG, St. Olaf College: Molecular beam electric resonance spectroscopy (two-year program)—$15,600

JUDITH A. OWEN, Haverford College: A comparative study of the B and cytotoxic T lymphocyte responses to fluorescein (two-year program)—$13,910

BARRY W. POTVIN, Yeshiva University: Selection of cells which synthesize inappropriate products (two-year program)—$20,500

PATTLE P. T. PUN, Wheaton College, Ill.: Cloning of the conditional asporogenous and rifampin resistant (Spo^c Rif^r) gene of *Bacillus subtilis* and its genetic and biochemical analyses (two-year program)—$15,700

RICHARD W. RAMETTE, Carleton College: A solubility probe for studying metal-ligand complex equilibria (two-year program)—$8,650

BRIAN G. RAMSEY, Rollins College: Investigations in the photochemistry of arylated metalloids and nonmetals—$6,500

PEGGY A. REDSHAW, Austin College: Genetic mapping in *Streptomyces alboniger*—$6,000

JOHN D. REINHEIMER, College of Wooster: Ring cleavage reactions in the pyridine system (two-year program)—$10,800

ALEX T. ROWLAND, Gettysburg College: Configuration change at the β carbon during decarbalkoxylation—$6,720

WILLIAM H. SCOUTEN, Bucknell University: Affinity chromatography on immobilized borates and arsene oxides (two-year program)—$13,800

DALE F. SHELLHAMER, Point Loma College: Reactions of xenon difluoride with alkenes and dienes (two-year program)—$11,500

PETER S. SHERIDAN, Colgate University: Nonlabilized ligand influence in transition metal photochemistry (two-year program)—$15,800

JOHN A. SODERQUIST, University of San Francisco: New applications of α-lithiated vinyl ethers to organic synthesis—$1,000

JAMES N. SPENCER, Franklin and Marshall College: Calorimetric and spectroscopic studies of solvation effects (two-year program)—$12,000

RICHARD D. STOREY, Colorado College: Nitrogen metabolism in jojoba *(Simondsia chinensis):* investigations of seed proteins and their metabolism during germination (two-year program)—$13,500

LAURENCE E. STRONG, Earlham College: Conductance and thermodynamics of ionization of substituted benzoic acids in water from 0° to 100°C (two-year program)—$5,800

JEFF TASSIN, University of the South: The photochemistry of tryptophan in proteins and model peptides—$3,000

JOHN H. WILLIAMSON, Davidson College: The genetic bases of aging—$10,100

MARY L. WRIGHT, College of Our Lady of the Elms: Investigation of the effect of varying the light/dark regime on rhythms of cell proliferation in tadpole epidermis (two-year program)—$9,100

CLAUDE H. YODER, Franklin and Marshall College: Transmission of substituent effects through the carbon-carbon, silicon-silicon and germanium-germanium bonds (two-year program)—$9,800

QUARTERLY BULLETIN
SPRING 1982

Research Corporation, 405 Lexington Ave., New York, N.Y. 10174-0370

A foundation for the advancement of science and technology, Research Corporation serves educational and scientific institutions through grants-in-aid for basic research in the natural sciences, and by furthering the application of scientific discoveries.

Grants Program

Cottrell Research Grants support basic investigations in the physical sciences at graduate universities and public undergraduate institutions.

Cottrell College Science Grants support academic research projects in the natural sciences at private undergraduate institutions.

In addition to these regular programs, Research Corporation occasionally supports other important scientific endeavors within its general fields of interest.

Invention Administration Program

Services contributed to educational and scientific institutions include evaluating faculty and staff inventions, accepting assignment of those which appear to be useful and marketable, applying for patents through qualified counsel, licensing issued patents to industry, and defending against infringement when necessary.

Royalties received from patents assigned to the foundation are apportioned among the inventor, his institution and Research Corporation, with the institution's patent policy determining the inventor's share. The foundation's share is used to help support its Grants and Invention Administration Programs.

The *Quarterly Bulletin* is published three times yearly, with the Annual Report constituting a fourth issue. Articles may be quoted in whole or in part with credit to Research Corporation. Invention administration projects are reported in *Research and Invention,* an occasional newsletter. Address correspondence to W. Stevenson Bacon, Director of Communications.