Research Contributions Total Over $2 Million

Donor organizations that are supporting academic research through the foundation's grants programs chalked up a new record this spring as total contributions for the purpose exceeded the $2 million mark. Also notable were the first donations of equipment—computers and peripherals—for use in selected research projects.

Under a program headed by Research Corporation Vice President David G. Black, Jr., contributions are sought from industry, other foundations and individuals interested in supporting scientifically significant projects proposed by college and university faculty members. Launched several years ago, the program has made possible hundreds of additional research grants that could not have been supported with available foundation resources.

A new donor to fundamental academic inquiry through Research Corporation, The Apple Education Foundation has made four cooperative grants of microprocessors, disk storage units, printers and other equipment to facilitate projects in biology, chemistry and astrophysics.

Other contributors are as follows: Atlantic Richfield Foundation; Conoco Inc.; Crown Zellerbach Corporation; Joseph H. DeFrees; Dow Chemical U.S.A.; Foremost-McKesson Foundation, Inc.; The Greenwall Foundation; Hercules Incorporated; The William and Flora Hewlett Foundation; Hooker Chemical Corporation; Celine Karraker; The Lubrizol Corporation; M. J. Murdock Charitable Trust; Northwest Area Foundation; Pennwalt Corporation; Pioneer Hi-Bred International, Inc.; Schering-Plough Foundation, Inc.; Stauffer Chemical Company; The Thrasher Research Fund; United States Steel Foundation, Inc., and Westinghouse Educational Foundation.

Engineer Retires: Saw 33 Years of Inventions

A man who was one of the first to see the practical potential of the maser-laser concept; who has evaluated inventions from university "A" almost to "Z" (the University of Alaska to Youngstown State), who has monitored technology change over 33 years? He is Robert H. Ritchings, Senior Associate in Research Corporation's Invention Administration Program who retired March 31.

In completing a span of service that encompassed nearly half the history of the foundation, Bob Ritchings witnessed great changes in mechanical and electrical inventions, his specialties as an engineer. These ranged from harvesting machines and an adjustable electric light in the 1950s to computer inventions and energy-saving car engines in the 1980s.

Graduating from Cornell University with an M.E. degree in 1935, Ritchings did advanced work under an M.I.T. award for graduate study and later received an M.S. from the Stevens Institute of Technology. He was one of only several invention administration staff members in 1949 when he joined the foundation following stints as a research assistant and development engineer for Goodyear and U.S. Plywood Corp.

Although the Invention Administration Program staff grew eight-fold in the years after he joined it, Ritchings personally evaluated some 3,000 of the thousands of invention disclosures received by the foundation, finding them endlessly fascinating. In addition to reviewing many impractical ideas, he found a number of opportunities to advance important new discoveries.

In recognition of Mr. Ritchings dedication to the foundation the Research Corporation Board of Directors unanimously voted at its May meeting to recognize "his outstanding service and his many contributions to this foundation and the institutions and individuals whose lives he has touched." Ritchings, long a contributor to charitable causes, also was cited for his volunteer work for the blind and terminally ill, and for his service to civic and religious organizations.

Invention Program Gains Two New Staff Members

Two new professional members have been added to the foundation's Invention Administration Program staff. Joseph G. Stumpf and Robert W. Piwonka, specializing in mechanical and pharmaceutical inventions respectively, will help extend the program's evaluation, patenting and licensing services for nonprofit scientific and educational institutions.

A research biologist with long experience in the pharmaceutical field, Dr. Piwonka comes to Research Corporation from the Sterling-Winthrop Research Institute. A native of Cleveland, Ohio, he graduated from DePauw and earned his M.A. and Ph.D. degrees at Indiana University. Dr. Piwonka is a member of the Society for Neuroscience and the American Physiological Society.

An inventor and holder of eight U.S. and numerous foreign patents relating to medical and optical equipment, Joseph G. Stumpf is a graduate of Bridgeport Engineering Institute and was formerly chief engineer for Frigitronics, Inc. He is a member of the American College of Cryosurgery; the Association for the Advancement of Medical Instrumentation; Society of Manufacturing Engineers, the Biological Photographic Association and other professional organizations.

As members of the evaluations group of the Invention Administration Program, Stumpf and Piwonka will bear responsibility for gauging the technical merit and marketability of disclosures received by the foundation, and will help maintain communications with university faculty members and administrators.

Grants and Grantees

(Continued from page 1)

electronic properties, and possible technological applications . . . To the south of Illinois, physicist *Keith B. MacAdam* of the University of Kentucky used a laser to drive atoms of sodium to highly excited (Rydberg) states. The excited atoms were bombarded with ion beams of helium or sodium to study near-resonant charge transfer. The collisions of ions with highly excited atoms duplicate processes at work in interstellar gas clouds, and may have implications for x-ray laser design or precision spectroscopy.

•

Silicon atoms never form multiple bonds —except under conditions recently discovered by researchers of the Universities of Utah and Wisconsin. Helping create a bright orange-yellow crystalline solid with multiply-bonded atoms is 1972 grantee Josef Michl *of the University of Utah, who was codirector of research done by Mark J. Fink. The silicon starting material used in the compound, known as tetramesityldisilene, was cooled to absolute zero and irradiated with ultraviolet. Created was a stable, solid residual which contains silicon-silicon double bonds resembling those formed by carbon. This compound and others made with the same techniques could lead to breakthroughs in solid state electronics, in which silicon plays a central role.*

•

Physicists in the news: *Lee A. DuBridge,* Caltech president emeritus and early foundation grantee, received the third Vannevar Bush Award of the National Science Board on May 19 . . . *Albert A. Bartlett* of the University of Colorado and a former grantee has received the 1981 Robert A. Millikan Award of the American Association of Physics Teachers . . . That organization's new executive is 1973 grantee *Jack M. Wilson* of Sam Houston State.

•

Chemists in the news: Herbert C. Brown, *1979 Nobel Prize winner and 1948 Research Corporation grantee, added the Perkin Medal to his honors last February . . .* Gilbert Stork *of Columbia University and six-time grantee was awarded the Gibbs Medal in mid-May.*

70 Years Marked

(Continued from page 4)

Currently Research Corporation has invention administration agreements with nearly 300 scientific and educational institutions, and evaluates between 300 and 400 disclosures a year. Roughly ten percent are accepted for administration, including patenting and licensing in the U.S. and other countries as warranted. Those inventions that are developed under patent licenses with industrial companies produce significant income for education and science: in 1981 over $6.5 million in royalties was collected. Some $4.5 million was distributed to the universities and other institutions that originated the inventions, and $2 million was retained for foundation programs.

A kind of technology storehouse, the foundation has evaluated about 15,000 inventions over the years, electing to administer some 1,300. There are about 500 active projects at any one time, 200 of which have been licensed to industry, government or both (government receives a pro forma, royalty-free license where it has funded the original research). Some 400 inventions are available at any time for licensing to industry. There is a constant turnover as old patents expire—the life of a U.S. patent is 17 years—and new ones come on stream.

Funds for research

Resources for Research Corporation to feed back into scholarly research were some time in coming, but by 1917 the infant foundation was able to offer a fellowship in applied science. The first gift for a specific project was made in 1920. Funds became more plentiful by the early 1930s and awards were made to the University of California for the work of E. O. Lawrence of cyclotron fame; to the University of Chicago for chemistry and physics equipment and to assist chemist Morris S. Kharasch; to Columbia University to help I. I. Rabi, Harold Urey and other researchers; to M.I.T. to fund R. J. Van de Graaff, inventor of the generator that bears his name, and to Johns Hopkins, Princeton, Stanford and a host of lesser known institutions and investigators.

Grants were largely suspended during the early 1940s as college and university faculty members joined the war effort. By 1945 it was evident that both research support and modern instrumentation would be required to restore academic science. The reservoir of funds accumulated by the foundation during the wartime hiatus on grants provided one of the few means of accomplishing this in an era before the National Science Foundation was created and peacetime support for science became firmly established national policy.

"Research Corporation Offers $2,500,000 in Grants-In-Aid of Postwar Scientific Research," read a news release dated Oct. 9, 1945. With that announcement the foundation laid the groundwork for systematic support of promising research projects, a pioneering effort that has tested procedures widely adopted by other funding agencies.

Grants-in-aid have been provided through a competition designed to assist young faculty members and those with particularly speculative research projects. Peer review procedures are utilized, and grant proposals are scrutinized by referees selected by the applicant and the foundation staff, and by an advisory committee drawn largely from the academic research community. Another feature of the Research Corporation Grants Program has been the use of scientifically trained regional directors to maintain direct contact with college and university scientists and administrators, and help gauge proposed research, the investigator and his institution.

While the Cottrell Program for basic research in the natural and physical sciences continues as the foundation's main grants effort, special programs have been conducted in recognition of the interests of other scientists who have donated inventions to the foundation. Among them have been the Williams-Waterman Program for research in applied nutrition; the Brown-Hazen Fund for biomedical and medical mycological research; the Charles H. Townes Fund for work in advanced physics, and the Donald F. Jones Program for research in plant cytogenetics.

In total, $70 million in grants has been awarded since the inception of the foundation, currently at the rate of over $3 million annually. Nearly 10,000 scientists have been grantees. Eminent in industry and government as well as the academic community, they have been winners of every major award, including 17 Nobel Prizes.

"Considering the modest funds that were available for grants," wrote Dr. Carl Borgmann some years ago in an evaluation of Research Corporation grants for 1945 to 1970, "Research Corporation's behavior has almost been quixotic. Few windmills were so large as to be safe from its lance. It worked in the foothills of American higher education, not on the usual foundation activity of piling more onto the peaks . . . It has taken unusual chances and sought to fill the needs difficult to meet."

Not so well understood but also of seminal value to society has been the foundation's Invention Administration Program. Beginning with a device basic to air pollution control, it has quickly and efficiently helped make available to the public inventions essential to nutrition, medicine, industry and agriculture, distributing the rewards to push forward the frontiers of science.—*W. Stevenson Bacon*

LANDMARK INVENTIONS ADMINISTERED BY RESEARCH CORPORATION

Year	Invention	Inventor
1912	Electrostatic precipitator	F. G. Cottrell
1934	Ergotrate	M. S. Kharasch
1935	Synthesis of vitamin B_1	R. R. Williams, R. E. Waterman
1938	Merthiolate	M. S. Kharasch
1949	Hybrid seed corn	D. F. Jones
1950	Cortisone	E. C. Kendall
1951	Nystatin (anti-fungal antibiotic)	E. L. Hazen, R. F. Brown
1951	Maser-laser concept	C. H. Townes
1954	Computer memory core	J. W. Forrester
1955	Pump oxygenator (heart-lung machine)	J. H. Gibbon, Jr., C. V. A. Malmros, E. A. Barber
1960	Tetrahedral anvil press (for making diamonds)	H. Tracy Hall
1966	Animal food supplements	M. J. Haddadin, C. H. Issidorides
1968	Burn ointment	C. L. Fox, Jr.
1969	Platinum anti-cancer compounds	B. Rosenberg L. Van Camp T. Krigas
1970	Failsafe micro-organisms (for recombinant DNA)	R. Curtiss
1973	Skeletal imaging agents	G. Subramanian, J. G. McAfee
1974	Cardiac pacemakers	R. R. Brownlee, G. F. O. Tyers
1977	Cancer detection test	E. A. Davidson, S. D. Bolmer
1977	Immunological test for prostate cancer	T. M. Chu, M. C. Wang, L. Papsidero

SOME LANDMARK GRANTS AWARDED BY RESEARCH CORPORATION

First Grant	Project	Grantee
1923	Rockets	R. H. Goddard
1931	Cyclotron	E. O. Lawrence
1931	Molecular beam research	I. I. Rabi
1931	Electrostatic generator	R. J. Van de Graaff
1937	Isotopes	H. C. Urey
1939	Nuclear physics	F. Bloch
1941	Carbohydrates	S. Ochoa
1942	Cortical hormones	E. C. Kendall
1942	Action of thiamin	G. Wald
1946	Resonance absorption	E. M. Purcell
1946	Isotopes in study of biosynthesis	E. L. Tatum
1948	Effects of structure on addition compounds	H. C. Brown
1949	Synthesis of cortisone, chlorophyll	R. B. Woodward
1950	Nuclear charge distribution	R. Hofstadter
1951	Radio astronomy	G. Reber
1954	Biosynthesis of fatty acids	F. Lynen
1954	High speed ionic reactions	M. Eigen
1955	Organic anion chemistry	G. Wittig
1958	Intermediates in protein synthesis	R. W. Holley
1958	Characterization of a phage	M. Delbruck
1959	Molecular structure of an enzyme	W. N. Lipscomb, Jr.