RESEARCH CORPORATION
A FOUNDATION FOR THE ADVANCEMENT OF SCIENCE AND TECHNOLOGY

Notes on... grants and grantees

The use of "sound chemistry" to catalyze certain reactions, widely reported in recent months, began as an outgrowth of a 1978 Research Corporation grant to *Kenneth S. Suslick* of the University of Illinois. The availability of graduate students in appropriate fields led Dr. Suslick to switch his grant funds, originally for a physical chemistry project, to work on sonochemistry and sonocatalysis of organometallic complexes. Discovered by researchers was that intense sound, which causes local heating of up to 10,000° K, produces some unusual chemical reactions and can function as a versatile, selective catalyst for research purposes. Practical applications are foreseen in the chemical, petroleum and pharmaceutical industries. Ongoing support for the research is being provided by NSF and the ACS Petroleum Research Fund.

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Do close binary stars eventually swallow each other? Former grantee Bernard W. Bopp *of the University of Toledo thinks that may be the case. His observations of an unusual star known as FK Comae, last studied in the 1940s, support the theory. FK Comae is about ten times larger than the sun and rotating 50 times faster—a rate characteristic of binary or twin star systems. Failure to find another star very close to, or touching, FK Comae leads Bopp to conclude that absorption may be the final phase in the development of contact binary stars.*

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Two disparate research projects, one in a chemistry department and the other in physics, have furnished new data on the nature of matter—both with the help of lasers. At the University of Illinois, Chicago, *Timothy A. Keiderling,* a chemist and 1978 grantee, reports measurement of two-photon excitation spectra of transition metal complexes. The two-photon technique reveals highly excited molecular states and sheds new light on electronic structure. Heavy transition metal complexes have been the focus of much recent research due to their novel chemical, magnetic and

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Using Science to Support Research: Foundation Marks 70 Years as Middleman

As universities turn to industry to supplement diminished government funding for science, it is rewarding to trace Research Corporation's 70-year record as one of the nation's first foundations and the only one designed to make academic research self-sustaining. There was little support for scientific inquiry and only the bare beginnings of cooperation between industry and the academic community in 1912 when a young Berkeley professor of physical chemistry, Frederick Gardner Cottrell, established Research Corporation. The foundation was given the task of making available and effective the useful inventions from university research. In exchange it would collect patent royalties from industry to be devoted to scholarly work in the sciences. Research Corporation would not only promote industrial interest and protect the public by establishing patent rights to inventions, Cottrell reasoned, but would return any royalties to generate new knowledge. It would encourage industry to capitalize on academic technology in the name of progress while minimizing any intrusion of commercial interests into academic laboratories. A man of modest means, Cottrell proposed to launch Research Corporation by donating to it patent rights to his own invention, a device described by a popular journal as "a means for turning smoke into money."

That invention, the electrostatic precipitator for controlling the smoke and soot that belched from turn-of-the-century smelters, chemical, cement and power plants, ultimately created a spectacularly useful endowment. Because of it funds have been available for the research of thousands of scientists, in-

Top photos: Cottrell's first laboratory precipitator was made with an inverted bell jar. It cleared sulfuric acid mists when electricity was applied (right photo) between the acid-wetted jar walls and center discharge electrode. Bottom: Rare informal photo of Cottrell was made at the site of an early precipitator installation. Figure at left is Walter A. Schmidt, a Cottrell pupil and inventor of many precipitator improvements.

Cottrell concept: a part of research rewards for further advancement

cluding 17 who later won Nobel Prizes; because of it some 15,000 inventions have been evaluated over the years, among them many that are now basic to medicine, nutrition, chemistry, electronics and agriculture.

Cottrell, just 34 years old when he organized Research Corporation, had been drawn into pollution control seven years earlier. He first attacked the problem of collecting sulfuric acid mists at the E. I. Du Pont de Nemours powder works on San Francisco Bay with a centrifuge, a technique which worked in the laboratory but not on a larger scale. Then, some time early in 1906, Cottrell applied electricity to the acid vapor and the electrostatic precipitator became a practical reality.

The basic idea behind precipitation, the charging of particles in a stream of gas so that they can be attracted to a collector, had been suggested as early as 1824. An attempt was made in 1885 by Sir Oliver Lodge to build and operate a primitive precipitator powered by Wimshurst machines. Cottrell's later success rested on the high-voltage direct current power supply he devised, and negative-polarity electrodes incorporating mica or asbestos to promote the discharge of current from a myriad of small points. Temperamental as his early precipitators were, they worked, solving previously intractable air pollution problems and sometimes collecting useful chemicals in the process.

The first Cottrell backer, San Francisco consulting chemist Harry East Miller, was later joined by Professor Edmund O'Neill and attorney E. S. Heller. All invested money in the work and became partners when the electrostatic method for collecting smoke and fumes proved practical. By 1909 working units had been installed at the Du Pont powder plant and the nearby Selby Smelting and Lead Company, and precipitation was a rapidly growing business as industry sought an answer to air pollution.

At that point Cottrell's altruism, noted by his biographer Frank Cameron in "Cottrell: Samaritan of Science," asserted itself. He suggested turning the precipitator into an endowment for scientific work, an idea presaged by his earlier actions directed toward improving

First Research Corporation president was Elon H. Hooker (1915-1922). A friend of Theodore Roosevelt, he helped establish U.S. chemical industry.

Arthur A. Hamerschlag, formerly of Carnegie Institute, first paid president (1922-1927).

Many of the foundation's vital 1930s grants were by president Howard A. Poillon (1927-1945).

Former Columbia dean of engineering Joseph A. Barker was president from 1946 to 1957.

J. William Hinkley, engineer, W.W. II defense consultant, headed foundation until 1967.

James S. Coles, president from 1968 to mid-1982 formerly guided Bowdoin College.

John P. Schaefer, past University of Arizona head, became president of Research Corporation July 1, 1982.

To support academic research, Frederick G. Cottrell (1877-1948) advocated dedication of rights to useful discoveries, beginning with his own.

Joseph A. Holmes of the Bureau of Mines suggested Smithsonian as patent repository.

Charles D. Walcott, Smithsonian Secretary, agreed to help form an organization to administer patents to help science.

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