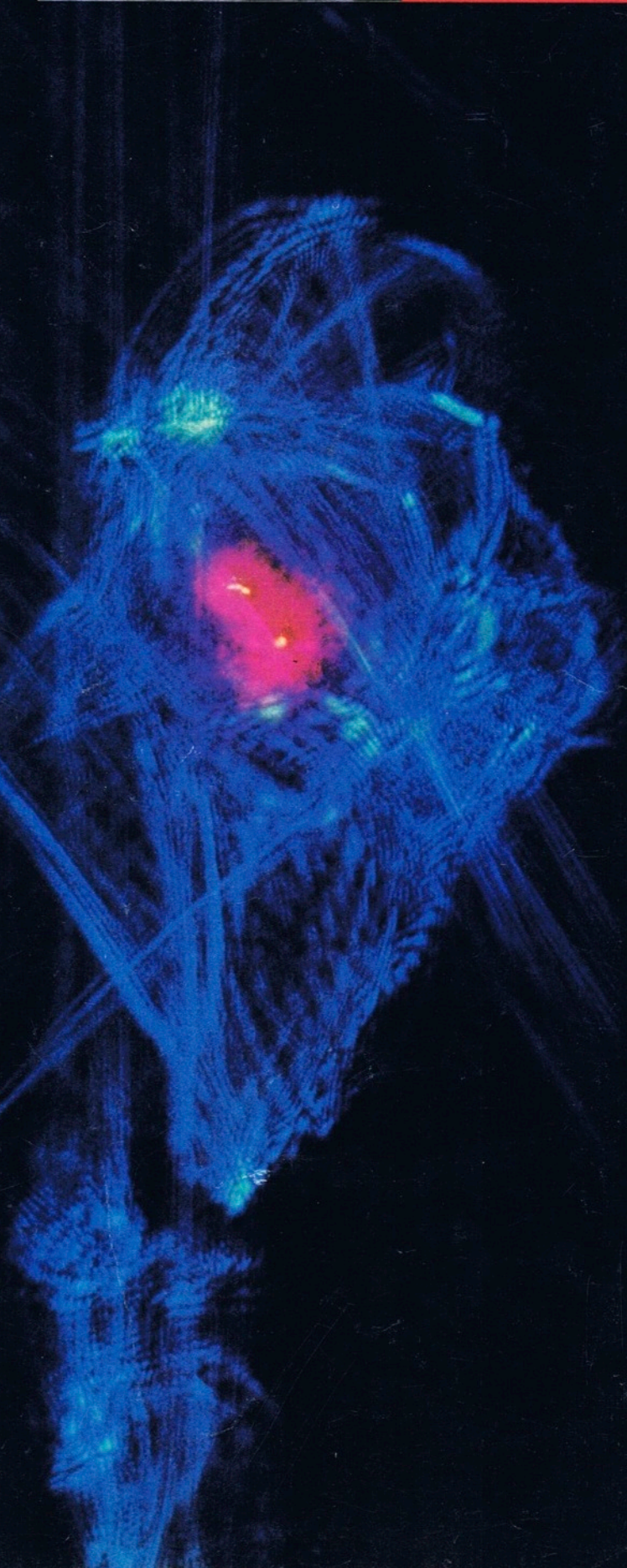


**Chemical &  
Engineering**

**NEWS**

August 1, 1977

An abstract, glowing blue and red fiber-like structure, possibly representing a molecular or biological model, is centered on the cover. It consists of numerous thin, intersecting lines that form a complex, tangled mass. A bright red, glowing core is visible in the center of the structure. The background is dark, with some faint, diagonal lines suggesting a grid or coordinate system.

# **Science & Art**

Approaches to  
an interface Page 24

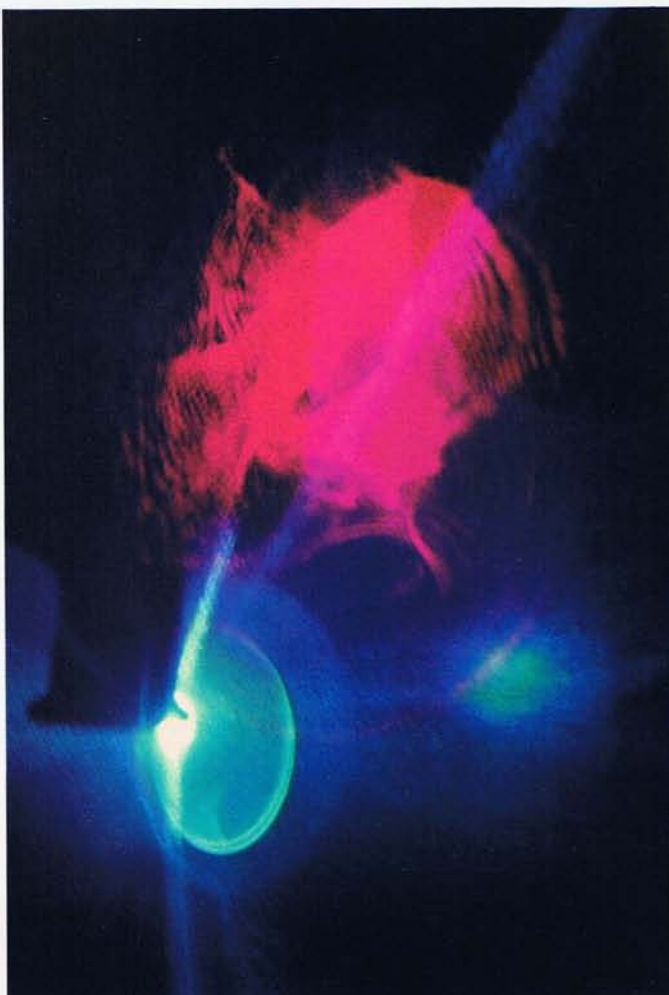


# Science & Art

Gradually, some artists are teaming with scientists and engineers in hopes of extending the dimensions of both worlds into new levels of awareness

Will Lepkowski  
C&EN, Washington

Artist Reginald Pollack created this composition by shooting helium-neon and cobalt lasers through glass



extending the dimensions of both worlds into new levels of awareness and thus new expressions of productivity.

In 1975 Massachusetts Institute of Technology played host to a conference on the use of new technologies by the arts. Last year the American Association for the Advancement of Science held a symposium called "Art, Science, and Technology in Shaping the Environment of the Future." So there are definite bubbles rising in the pot. But what deeper intellectual ferment emerges from such a brew is still anyone's guess.

This C&EN special report shows some of the artistic results of a science and art collaboration in the materials research laboratory at Pennsylvania State University. The laboratory, directed by Dr. Rustum Roy, already has a tiny museum consisting of commissioned art works and purchase prizes that are awarded to the laboratory by Carborundum Corp. as products of its annual science in art competition.

For the past several years, Roy has collaborated with artists from within and outside the laboratory in a program of exposing faculty and students in the lab to the artistic enterprise. Although up to now there has been no major financial commitment to the effort, Roy says the venture does represent a small 10-year nucleus of experience in bringing the two worlds together.

This year's artist, Reginald Pollack of Great Falls, Va., comes

The connection between science and art forms a rich and varied tapestry of scholarship and speculation. Some have linked the artistic vision to the core of scientific creativity; some to relief, through art, from the dehumanizing threat of technology; some to survival itself. The acknowledged relationship of the arts to harmonizing mind, body, and soul goes back to the healing schools of ancient Greece, when dance, music, color, and poetry were systematically applied to the prevention and cure of illness. Now, some are prescribing art to the healing of an entire culture.

But the search for a contemporary bridge, for a common vocabulary—indeed, for a resynthesis of the two worlds—continues. C. P. Snow's "Two Cultures and the Scientific Revolution" is the most popular contemporary effort to articulate the problem. Jacob Bronowski's televised "Ascent of Man" series attempted to put into lyrical form the history of Man the Maker. And the journal *Leonardo* tries to give artists a chance to describe their research on new materials and techniques, and to scientists a forum for expressing their deeper speculations on the humanistic meaning of their work.

Meanwhile, the technological revolution rockets ahead. Some artists have seized the new electronic and chemical technologies in attempts to create new expressive forms. Gradually, some artists are teaming with scientists and engineers in hopes of



The photograph below is an enlargement of the spectra resulting from directing sunlight on a diffraction grating embossed on Mylar

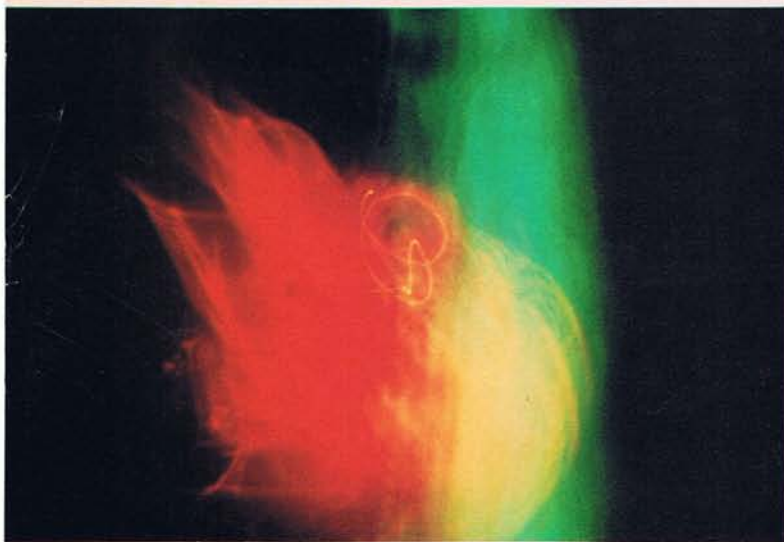


with a special set of credentials—and understanding of new electronic technologies and an instinct about their potential as tools for the artist. A Pollack exhibition of paintings opened in July at Penn State, and during the university's annual arts festival last month he produced a light show using eight neon-helium lasers to project abstract images on a screen. Computer-generated images were also made to interact with the laser images to music by Bach and Stravinsky.

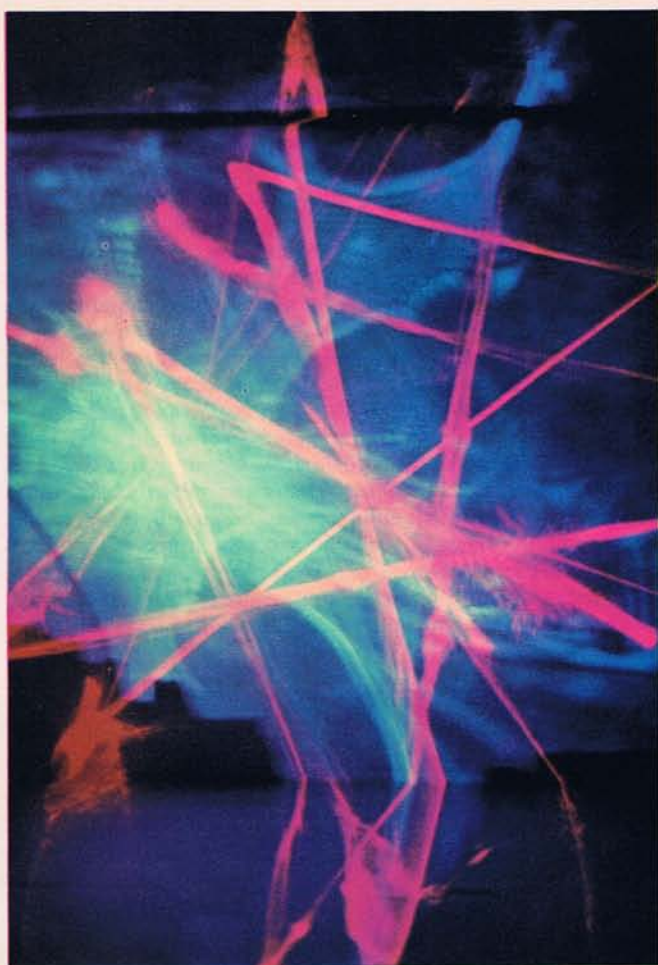
It goes without saying that considerable controversy swirls around the art/technology scene. Traditionalists see it as gimmicky and rootless. But to Pollack the new technologies are simply new tools, in the same way oils, pigments, and canvases were technologies of the past, all used for the expression of the interior world, which is the artist's domain.

His credentials as a painter are established, with more than 35 one-man exhibitions in the U.S. and Europe to his credit. But for years he also has been seeking full access to the electronic technologies. Now, thanks to Roy, he has the chance to experiment with them: lasers, holographic devices, graphical and digital computers, scanning electron microscopes, color Xerox machines, television studios, diffraction gratings, and any others that come to his attention. Ceramics, casting techniques, and phosphors more recently have come to his attention as materials he intends to explore.

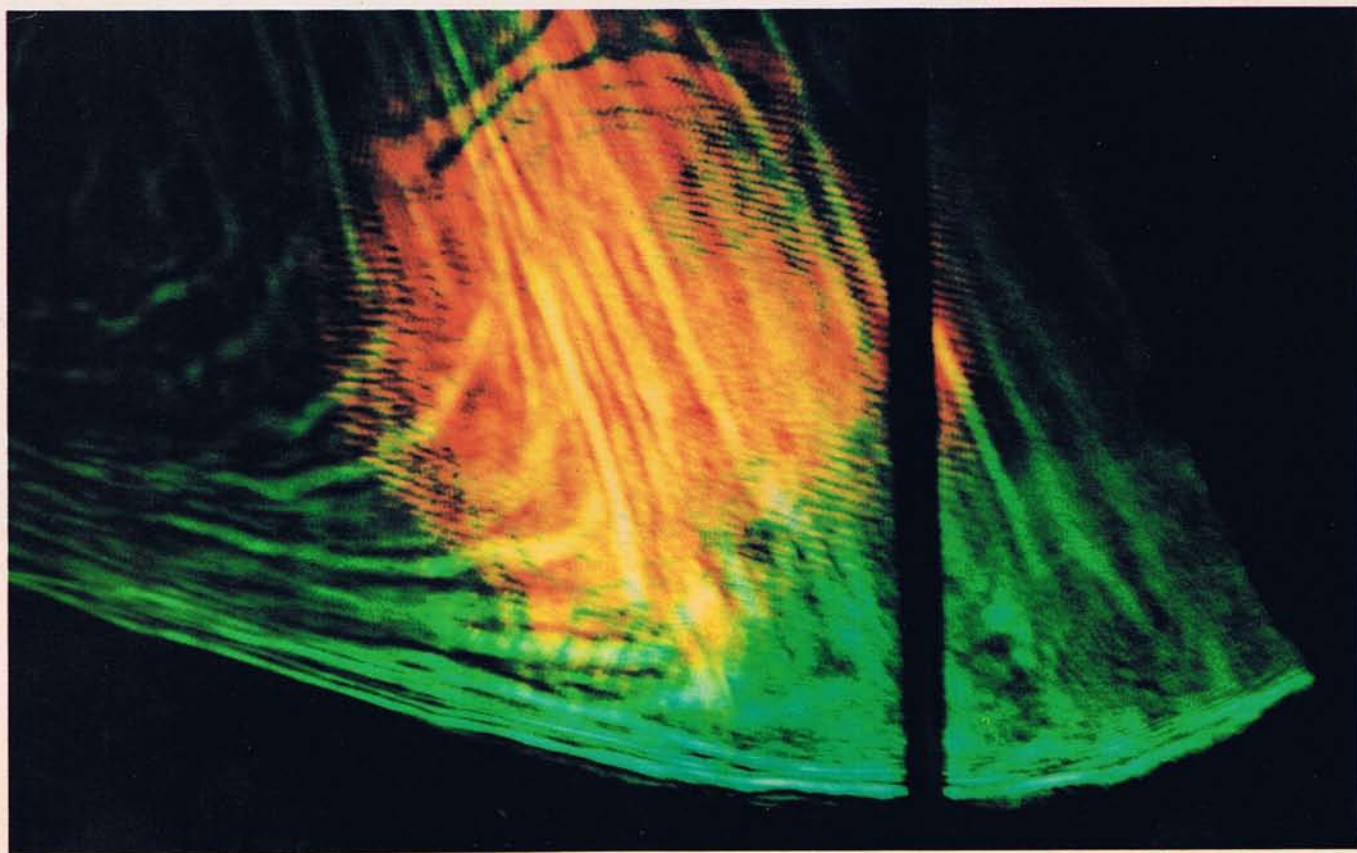
Artist Pollack created this combination of red, yellow, and aquamarine with helium-neon and cobalt lasers in the materials research laboratory at Penn State





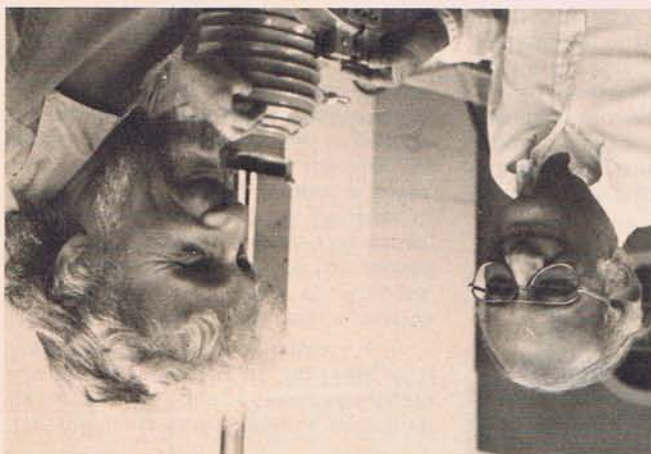


The images on these two pages were all composed with helium-neon and cobalt lasers, using different shapes of transparent glass





Artist Reginald Pollack (right) with Penn State chemistry professor Rustum Roy



He says he is especially committed to the creation of software that will realize the full potential of the audio-video cassette and disk systems. "When those systems came out in 1970," he says, "something clicked and I realized what a perfect educational and art production tool they could be." His hope is that teams of artists, writers, engineers, musicians, dancers, educators and philosophers will work together in the future to define and create new educational forms available to the public—not merely to produce performances but to teach the traditional techniques of art.

For Roy, there's no reason art and science should not complement each other. He believes the split was unnatural and that today's forces converging to bring them back together is simply history playing one of its inevitable pendular themes. "For scientists, art simply complements the rational side of the human being," he says. "It helps one be a whole person. Scientists are always in danger of overemphasizing the rational and missing the real goals of the masses of human beings." What is needed, he adds, is true research agenda. And science, together with art, can help fashion it. "At the very least," he says, "we can widen the bandwidth of the dialogue."

The artist Paul Klee said in 1928 that there is "plenty of room left for exact experiment in art. . . . What had been accomplished in music by the end of the 18th century has only begun in the fine arts. Mathematics and physics have given us a clue in the form of rules to be strictly observed or departed from, as the case may be . . . to look beyond the surface and get to the root of things."

And the root? Obviously a richer and more creative human interior, firing the "intellectual passions" that form the creative experiment, whether in science or art. "Science," said Michael Polanyi, "can no longer hope to survive on an island of positive facts, around which the rest of man's intellectual heritage sinks to the status of subjective emotionalism. It must claim that certain emotions are right; and if it can make good such a claim, it will not only save itself but sustain by its example the whole system of cultural life of which it forms a part."

Heavy stuff, and highly debatable. What isn't debatable is the convergence of disciplines, whether in the arts or in the sciences, that are creating new forms of intellectual endeavor. Both Roy and Pollack believe that scientists and engineers, working with artists, could design basic and applied research agenda that would help establish the base for a more humanistic civilization.

At any rate, the series pictures shown here can be enjoyed or argued over as to their meaning to art or science, as well as to their impact on the psyche, where human activity begins any way.

□

