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ART & TECHNOLOGY- THE NEW COMBINE

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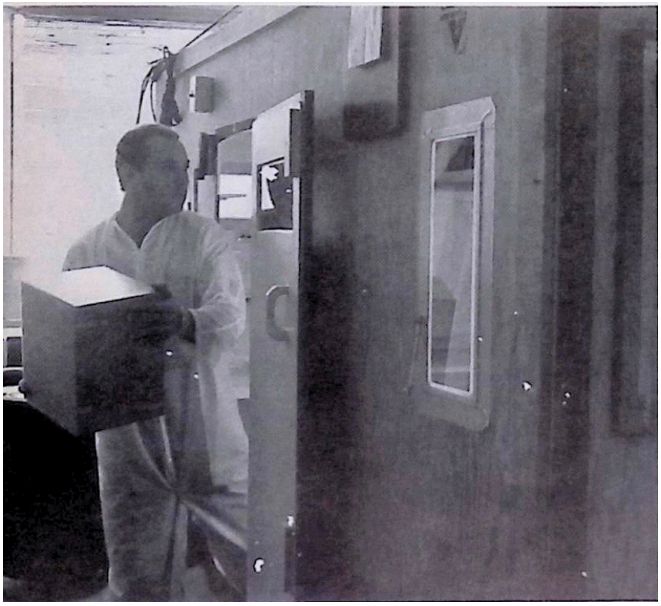

Norman Zammitt emerges from his “clean room,” a dust-free chamber where he presses together thin plates of acrylic plastic which have been sprayed with a pigment of his own invention. It took much investigation in- the face of the pessimistic warnings from technicians- before Zammitt perfected a pigment that could withstand the glue used in his laminating process. Zammitt’s plastic blocks (see page 32) give the illusion, as the artists puts it, of “color suspended in space.”

Living as they do, in a supertechnological society, American artists have quite naturally turned to the products, processes and imagery of science and industry. Some approach technology with traditional attitudes, others are using it to alter the very definition of art, but all who succumb to its fascination have responded with a new sense of exhilaration and discovery.

technology is stealing into art in so many ways, some seen, others unseen, that its progress literally escapes us. We know technology is there in art; we feel its presence every time we stand before a sculptural object that buzzes or dances or lights up, much as we sense the influence of drugs in the rock music, the dancing and the “be-ins” around us. Yet we lack a handle, a vocabulary to domesticate these phenomena. The new combine, art and technology, falling as it does between academic departments and between “isms,” particularly daunts us. Perhaps we can see it best as a force of unparalleled strength, a force at once profound, comic, joyous and mysterious.

We do not normally associate technology with comedy and joy, almost never with mystery. We associate it with the dry, the rational, the inhuman. When, in 1951, Lewis Mumford compared technology to the walls of a prison in “Art and Technics,” he spoke for a wide segment of sophisticated opinion. But investigation of even so humble a chore as definition ought to reveal that man and technology are one, not two.

“Technology” on the dictionary level is the servant of “science,” meaning an application of theory, as it is embodied in science, to practical problems, a distinction that shall be kept throughout this article. On the simplest level, that application can mean, for the artist, nothing more or less than a new product like epoxy paint, or a new process, say the vacuum-forming used by Craig Kauffman to shape the plexiglas in his bold sculptural objects. On a slightly higher level, “technology” can and should mean, as Donald Schon points out in his brilliant book “Technology and Change,” “any tool or technique, any product or process, any physical equipment or method of doing or making, by which human capability is extended” [my italics]. Technology, in other words, is man’s way of working, no less a part of him than his own brain or hands: Marshall McLuhan is therefore surely right when he calls technology an extension of the central nervous system. There is more than making and extending in this new art, of course: there is “science” broadly considered, the kind of science that is charting a new metaphysic as well as a new, computer-based society. We need to keep both the specific and the general in mind, then, both the new tools provided by technology for the hand, and the new knowledge provided by science for the mind.

The artist has always employed new tools and knowledge, though never so readily as now, when he haunts the factory as often as the museum. In the past the gap in time between the new product and its use in art was far wider. The Bauhaus, that influential school of design, was founded in Germany in 1919 partially to close that gap-and from it came such architects as Ludwig Mies van der Rohe, such painters as Josef Albers. The futurists and the constructivists, whose adherents numbered Russians as well as Western Europeans, were also consciously deter- mined to make art out of the materials around them. It is because of their achievements that a contemporary artist like Larry Rivers can take the stand-in conversation and in his work-that it is as noble to make sculpture out of a light bulb as marble. “Michelangelo saw marble around him and worked with it,” Rivers says. “I use electricity. What’s the difference?”

The difference is that of degree, and not only because artists moved more slowly in the past: so did technology. Leonardo da Vinci actively sought new knowledge. He collaborated with the anatomist Marcantonio della Torre to learn what he needed to complete his great figure studies and drawings. His interest in pure technology was, of course, complete: he designed and in part constructed everything from field guns to flying machines. A good argument can be made, in fact, that the Renaissance far antedated the new tendency to mix art and science. The men of the Renaissance seemed to lack both the Greek penchant for elevating pure thought (or art) above mere craft (or technology) and our own for glorifying specialized knowledge.

Whatever the shape of esthetic theory, technology has always left its imprint

upon art. It has altered, quite radically, the nature of pigment, that last reserve of the traditionalist. Before 1700- and the maturation of chemistry as a science-few synthetics were in use, most pigments being “natural,” like carbon black, colored earth and certain natural metallic compounds. Since then, a number of colors-titanium white, Prussian blue, cobalt blue and a wide variety of yellows based on zinc, chromium and cadmium- have been added by chemistry to the painter’s palette. The development of synthetic, quick-drying acrylic paints since World War II has literally transformed the application of color to canvas. They permit, to mention but one method, the wholesale “staining” of the canvas, characteristic of the work of the Washington color painters-Morris Louis, Kenneth Noland, Howard Mehring, among others. This staining sinks the color deep into the fibers, a process not possible with destructive oil-based pigments, which can only be applied over a primer. Acrylic paints are also among the most durable paints known. In 1959 the Artists Technical Re- search Institute was founded solely to collect and disseminate such information in an era of increasing chemical expertise.

Pop art and op art, as well as color painting, could not exist without modern technology-a truth so obvious it often escapes attention. The very meaning of pop art is based on how it is done -by methods normally associated with commercial art and the machine, not the brush, that instrument of the lone, gifted genius. As for op art, it is completely the child of optical science. Sculpture betrays an even closer relationship with technology; if we are indeed seeing the beginnings of a renaissance in sculpture, it is entirely due to technology. For centuries sculpture has been dominated by heavy materials like marble and bronze, both of which take considerable time to master and considerable expense to carve and cast. Today we live in a world of synthetic materials that are cheap, pliable and exciting: the sculptor can work directly with these materials in a way long denied him. “I can make anything now,” says Chicago sculptor Mel Johnson. “I can make my pieces float, fly, suspend in the air or radiate odors.” The presence of styrofoam, a soft, synthetic material developed by Dow Chemical, is proof in point. Styrofoam can be shaped or carved into the most complicated forms; then, as sculptor Calvin Albert recently discovered, a stream of molten metal magically turns the substance into metal. “The styrofoam melts, I think, upon contact with the heat of the molten metal,” says Albert. “Foam casting” of this kind is widely employed and promises to increase as new foams are developed, along with the expertise needed to use them.

Young sculptors in California seem particularly open to the use of new materials and methods, surely because of the presence there of what are sometimes called “esoteric” industries, especially those involved with space technology. In 1965 Piotr Kowalski joined with North American Aviation to “form” a piece of sculptural metal by underwater explosion. Norman Zammitt’s trans- parent plastic blocks, in which thin sheets of color seem to be suspended indefinitely, grew out of wartime needs plus the artist’s own ingenuity: during World War II American industry developed a clear, durable acrylic plastic to protect the fighter pilot in his plane; years later, after much research, Zammitt invented a pigment that survives contact with the glue needed to fasten acrylic sheets together. In this case the time gap between product and art neared twenty years. De Wain Valentine’s use of forms drawn from new technology (plastic objects made in the image of the rocket’s nose cone) appears

to have followed roughly the same time pattern, as does Larry Bell's "High Vacuum Optical Coating Machine." Originally commissioned by the U.S. Air Force, this machine lays an exquisitely thin coat of color onto glass, so thin and precise it can be measured in the millionths of an inch. Bell's glass "boxes," which both mirror and reflect the subtlest patterns of light and color, grew out of a direct, practical need for precision in optics.

The connection between technology and kinetic sculpture is clear, too. Jean Tinguely, the most famous of the kinetic sculptors, is anti-machine in a wry, antic way, but certain of his colleagues evince an almost mystical positivism about the machine. The German Nicholas Schöffer has said that he wants to "humanize" the machine, that he sees in technology a chance to "liberate" man- kind. The San Francisco sculptor Fletcher Benton puts it more succinctly: "I think kinetic art is involved in moving time in the same way that society is. It's more applicable to social change, say, than static culture." The sculpture of Charles Frazier, which dances, swims and flies, literally leaves the static world of the gallery behind. Late in 1966, James Seawright exhibited at New York's Stable Gallery eight "electronic sculptures," some fixed, some moving, all purely devoted to the forms of circuitry-amplifiers, oscillators, digital computers, wires-all making a kind of beauty entirely proper to more static materials. On every level, these sculptors display a fascination with parts, wheels, sounds and movements peculiar to our time.

The use of artificial light as a sculptural medium, pioneered in this country by Gyorgy Kepes of M.I.T. and now a full-blown art form, is yet another obvious instance of the meeting of technology and art. The same could be said of "factory sculpture"-the tendency, particularly strong among the minimal artists, Donald Judd, Robert Morris, Craig Kauffman, John McCracken and others, to have their pieces cut, shaped and sheened on order rather than in the studio. As for the computer, the most sophisticated of the new tools now at our disposal, it has just begun to be the subject of artistic exploration. At the Bell Telephone Laboratories in Murray Hill, New Jersey, it is being played like an instrument by such men as James Tenney, the composer, film-maker Stan Vanderbeek and engineer Michael Noll. Tenney, using the inherently mathematical nature of music and the computer's ability to create combinations of sounds, random or ordered, with tremendous speed, has produced compositions by and for the computer. Noll has translated probability theory into art by producing pictures on a graphic display unit attached to the computer. With this same unit he has created man/machine choreography and movies. Stan Vanderbeek's film "Studies in Computer-generated Graphics" moves letters and patterns derived from the machine backward and forward. It is surely no accident that Tenney's informal classes in computer methodology, begun last winter in New York, were attended by a wide range of artists, from playwrights and poets to dancers and composers. "I'm interested in the computer in the same way that a geologist would be interested in flying over an area in an airplane," says Tenney. "He can see from a great height formations that would otherwise take him years to study. With the computer I can experiment freely with large formal terms, like the symphony."

Avant-garde music was intimately involved with technology (continued on page 34)