ART EX MACHINA

BY

A. M. NOLL

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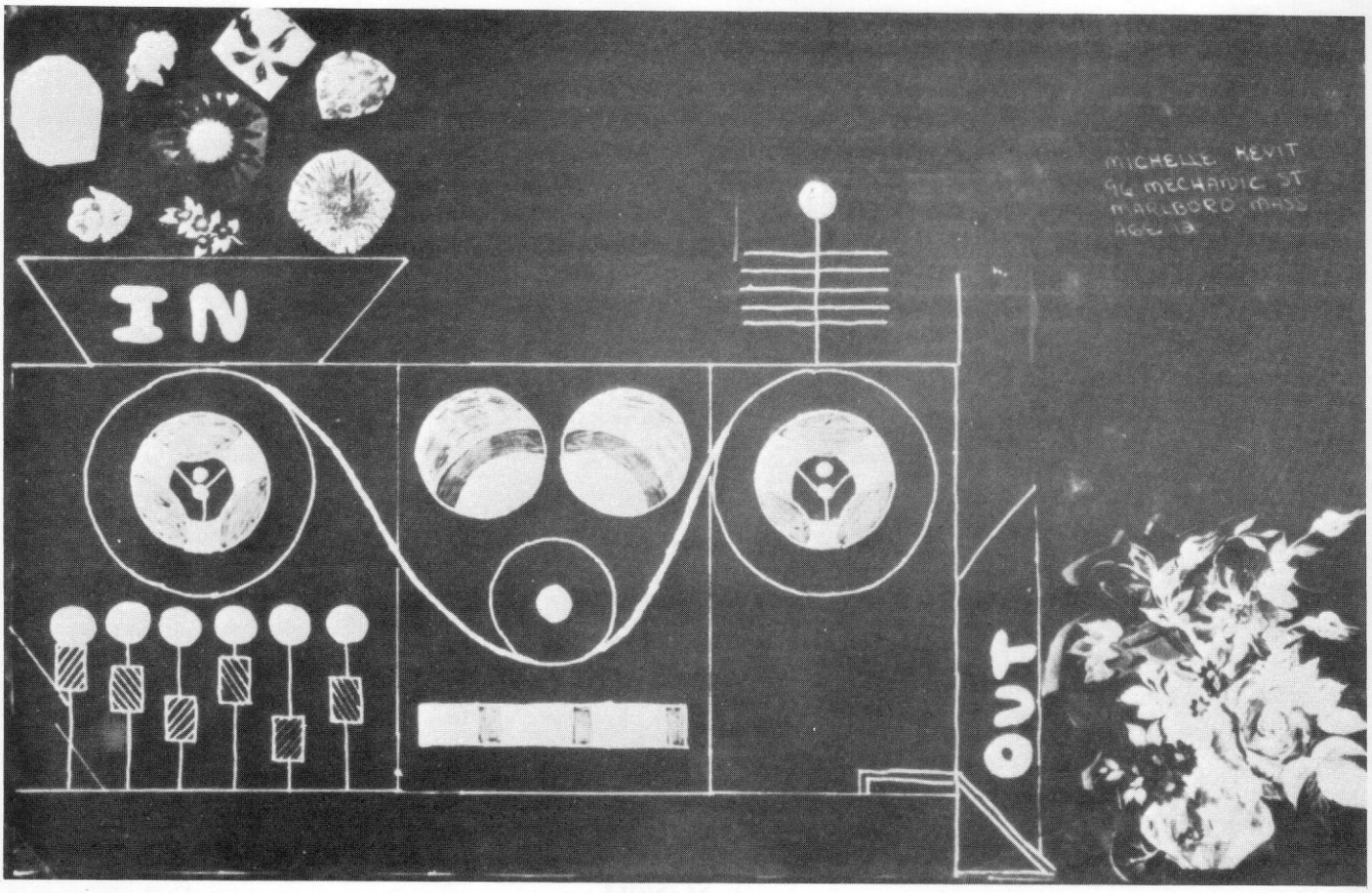


ART EX MACHINA

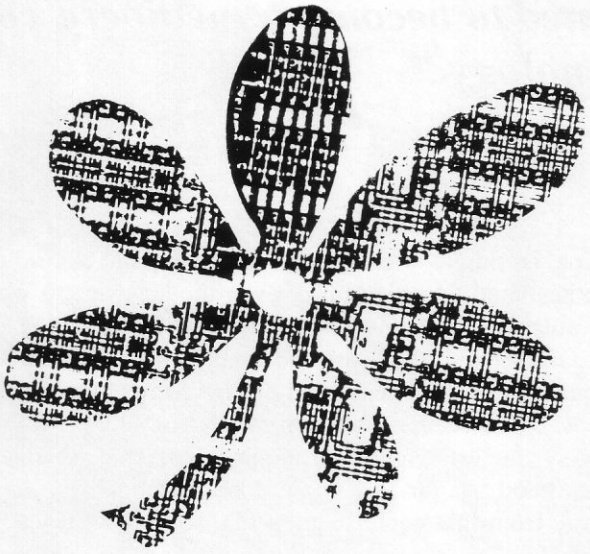
Computer art, is it any good? Or is it just a gimmick—a collection of flashy effects easily obtained with conventional media? Here are one computer artist's candid—and perhaps controversial—answers.

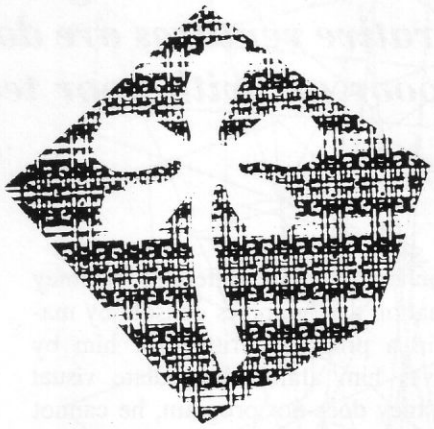
A. Michael Noll

IN THE EARLY 1960's, the digital computer offered great promise as a new tool and medium for the arts. In the past ten years, however, little has actually been accomplished in computer art. As a research engineer who has dabbled in computer-generated movies and choreography, I've come to the conclusion that most computer art done by engineers and scientists, my own work included, would benefit from an artist's touch. But the artist seeking to use the computer as a creative tool has just the opposite problem—he not only lacks a knowledge of computer technology, he doesn't even have access to a computer!

Computers and the arts

Computers have already been used in music, poetry, pictures, movies, ballet, and sculpture primarily by computer scientists turned amateur artists and on very rare occasions by professional artists. The computer is a unique device for the arts since it can function solely as an obedient tool with vast capabilities for controlling complicated and involved processes, but then again, full exploitation of its unique talents for controlled randomness and detailed algorithms could result in an entirely new medium—a creative artistic medium. Someday this might even involve





subconscious communication, perhaps through electroencephalography between the artist and the computer in which aesthetic experiences are created on a psychic level. Unfortunately, most of the work in the arts thus far has involved using the computer as only a simple tool. The computer has only been used to copy aesthetic effects easily obtained with the use of conventional media, although the computer does its work with phenomenal speed and eliminates considerable drudgery. The use of computers in the arts has yet to produce anything approaching entirely new aesthetic experiences, although I must admit that it is virtually impossible to describe what these entirely new aesthetic experiences might be like.

In the field of music, for example, computers have done little more than copy effects that can be obtained through the use of a few audio oscillators, noise generators, and tape recorders. Computers for composing have failed either because of a lack of musical creativity on the part of the programmer or a recurring problem of exactly how best to use the unique talents of the machine. These negative comments about music are equally appropriate to all attempts to use computers in any of the arts.

Although I have very strong negative feelings towards the results of virtually all attempts at using computers in the arts, in all fairness I must admit that the creative use of computers in the arts is a very difficult task indeed. I am strongly pleading for new aesthetic experiences and media which I am unable even to define. Quite obviously, experimentation in the form of copying conventional work is a part of learning a new artistic tool or medium, and the computer is no exception. However, we are so strongly limited by our programming and technological facilities that it is extremely difficult for new and imaginative artistic uses of the computer to flourish.

Computers and experimental aesthetics

There is a major area of use for digital computers as a tool in the analysis and study of the arts. The computer has already been used in a very small, but excitingly and philosophically important, number of experiments in analyzing the essential properties of trumpets and violins and in determining artistic preferences for different visual patterns. Here one is using the computer either as an analysis tool or as a stimulus generation tool. However, when one begins to study the acoustic patterns of conventional music or the visual patterns of conventional paintings, then the presently insurmountable problems of pattern recognition and artificial intelligence appear and block all efforts. With the most advanced technology and programming techniques, it is still difficult for a computer to recognize a simple three-dimensional block! Nevertheless, the work that can be done in the study of musical sounds, aesthetics, and pattern preference would be most fruitful and would add immeasurably to our scientific knowledge of the arts and the aesthetic experience.

Computer animation—two different approaches

Two outstanding animators, John Whitney and Stan VanDerBeek, have used computers in their work although

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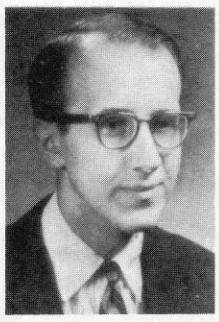
their individual approaches are quite different. Whitney does his computer animation at a graphics console by manipulating parameters in a program written for him by someone else. This gives him almost immediate visual feedback, but since Whitney does not program, he cannot obtain a completely different repertoire of visual images without his programmer's help. VanDerBeek, on the other hand, does his computer animation at the programming level, but the resulting programs are so time consuming and the amount of data to be displayed is so large that immediate visual feedback is virtually impossible. Thus both VanDerBeek and Whitney are handicapped by the deficiencies of their computer environment although their work is nevertheless quite exciting.

Would it be any different if VanDerBeek had immediate access to visual feedback in addition to his programming knowledge? Or if Whitney knew how to program for his real-time visual display? It would help somewhat but not in terms of completely new image producing capabilities. Knowledge of both the hardware and the software problems might well make the task of taming and using the computer for artistic purposes seem even more formidable. But the real problem is of a very fundamental nature: artists think visually and communicate visually in a very intuitive manner. Computer programming, on the other hand, requires logical rigor in a well-formulated manner and can easily appear to be far removed from the artistic end product.

All of this is really a problem of man–machine communication, but even the most competent computer scientist lacks the solution to how best to communicate with the computer. Computer graphics and programming languages seem to be obvious solutions for scientific applications, but not for the arts where a mathematical or algorithmic solution is simply nonexistent. The computer *artist,* on the other hand, is uncertain of even the language in which he wants to communicate his ideas, if even known, to the computer. For the artist, the computer would have to show qualities of intelligence and pattern recognition as part of a solution. Because of the visual and intuitive nature of his work, the artist above all requires a machine that can read his mind. As far as I know, we are technologically a long way from that goal, except in the minds of science fictionists.

A. Michael Noll (M) is a member of the technical staff in the Speech and Communications department at Bell Labs. He received the BSEE from Newark College of Engineering, the MEE from New York University, and in June 1971 will receive his PhD from the Polytechnical Institute of Brooklyn. In 1968 his work was shown in the first major exhibition of digital computer art in the USA. Mr. Noll is a member of Eta Kappa Nu, Tau Beta Pi, the Acoustical Society of America, ACM and AES.

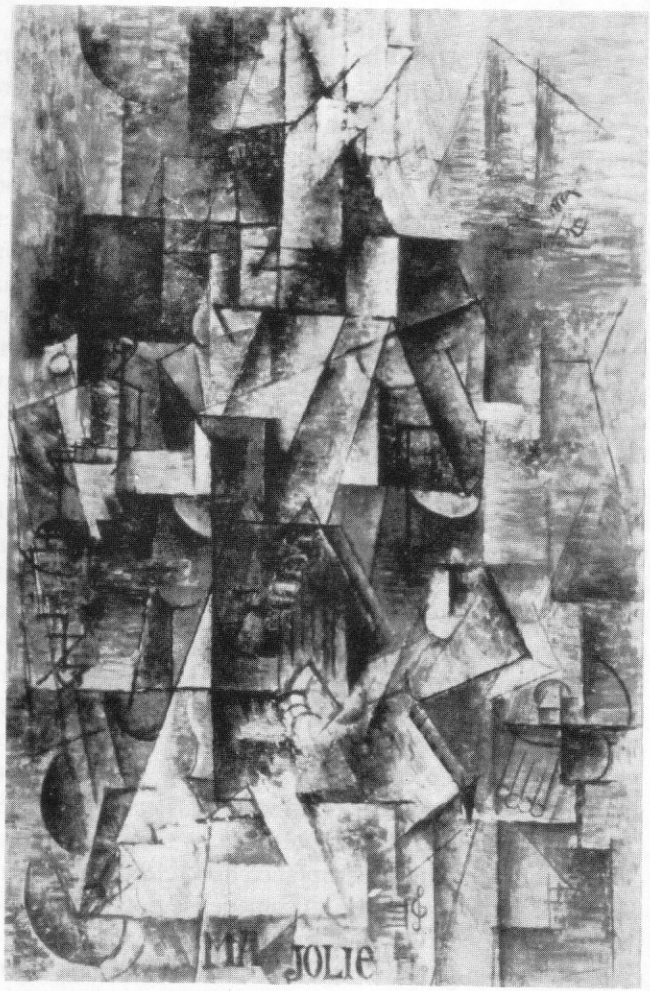


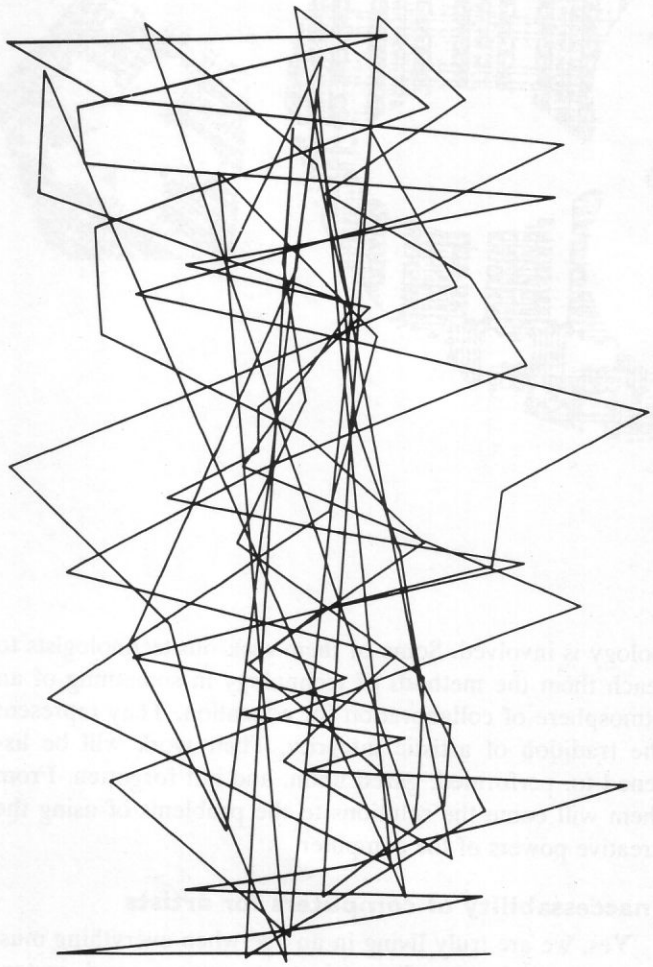
Academic breeding grounds

Most programmers, scientists, and technologists are not artists and lack artistic sensitivity and judgment. Hence they are ill-equipped to discover new and imaginative uses for computers in the arts. The solution is simple—artists should be using and programming computers for artistic purposes. What we really need is a new breed of artist–computer scientist. And the proper environment for the hatching of this second generation of computer artists is the university, which already has departments of art and computer science, and the ever important computing facilities. If the art department and the computer science department would only talk to each other without suspicion and distrust, perhaps some formal program of interdisciplinary study might be possible. Presently, very few of even the most enlightened engineering schools will accept art courses as credit toward a degree. This leaves the responsibility to the student, who must chart his own course of interdisciplinary study by searching out sympathetic professors from both sides of the cultural fence.

Misalliance

Some of the problems encountered in using computers creatively in the arts might suggest a form of collaboration between the artist and the computer scientist as a solution. This brings up the whole topic of collaboration between artists and scientists or engineers—a field of endeavor which presently happens to be very popular and particularly rewarding, both financially and publicitywise, to those omniscient souls who purport to match artists with scientists or engineers—for example, Experiments in Art and Technology, Inc. (E.A.T.). Unfortunately, science and technology have become exploitable commodities used as artistic gimmicks in many of these alliances. The most cre-





Art, machine and man-made. Picasso's "Ma Jolie" (Woman with a Guitar) and the author's computer-generated "Guassian-Quadratic." Author Noll feels that the straight-edged, transparent planes of the Picasso bear some resemblance to the randomly zigzagging lines of his computer art. In Guassian-Quadratic, the horizontal lines are Guassian, the vertical lines increase quadratically. The standard deviation of the Guassian density is 150. The exact proportions of the computer art were arrived at by trial and error. The computer very rapidly produced a series of pictures in which the different factors were uniformly changed. Thus, the author was able to intuitively alter the pictorial effects until he achieved a desired balance.

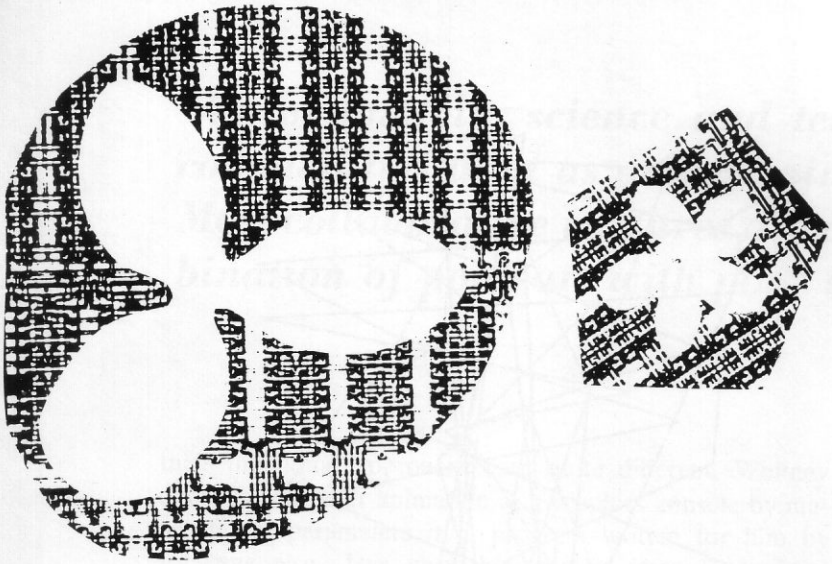
("Ma Jolie" Collection The Museum of Modern Art, New York. "Gaussian-Quadratic" © A. Michael Noll 1965.)

ative engineers and scientists have their own artistic ideas and aesthetic sensitivities which match those of a particular artist with probability zero. The net result is that most collaborative ventures are doomed to a mediocre combination of poor art with poor technology.

In the fall of 1966 an art–technology show called "9 evenings: theatre and engineering" was held in New York's Armory of the 69th Infantry. For me, this show revealed the artists' inability to cope with technology. Equipment was out of order more often than not, which later prompted some of the artists to justify their technological incompetence as a deliberate artistic comment on twentieth century technology. I have always looked on the artist as a master craftsman in complete control of his medium. If the artists at the Armory show were going to use the products and concepts of technology in their work, they themselves should have first learned the skills of the technologists. But why take the time and effort to learn a new medium when a large corporation like E.A.T. is only all too eager to pass judgment upon your project and put you in contact with the appropriate scientist or engineer who will instantly and effortlessly realize your artistic project.

The fallacy of collaboration is clearly evident when the computer is involved as a third party. Here the artist must communicate his ideas to a computer scientist or programmer who must then communicate his interpretation of the artist's ideas to a computer. This is most certainly a noisy process.

Fortunately, there are those artists who shun collaboration and learn and perfect their medium even when tech-



nology is involved. Some of them seek out technologists to teach them the methods of technology in something of an atmosphere of collaboration for education. They represent the tradition of artistic integrity. Their work will be listened to, performed, gazed upon, and not forgotten. From them will come the solutions to the problems of using the creative powers of the computer.

Inaccessability of computers for artists

Yes, we are truly living in an age when everything must be instant—instant fame, instant success, and instant knowledge through collaboration. Digital computers are an important part of the *now* generation. Above all else, computers epitomize this preoccupation with instant speed, instant calculations, and instant results. Their flashing lights, eerie green CRT displays, and cabinets jammed with a maze of multicolored wires have caught the fancy of scientists and technologists to the extent that they use computers whether they're needed or not. The tragedy of this situation is that only scientists and technologists have been granted the blessings of the use of computing machines. Only large corporations and universities have computers, and even then the machines are used almost exclusively for business and scientific applications. Time sharing is available, but inexpensive fast-interactive terminals are not. For most art departments and artists, the required expenditures of tens of thousands of dollars for a reasonable computer facility using a minicomputer for art research are simply unattainable. The net effect with a few rare exceptions is that *the artist does not have access to computers.* However, many artists very strongly and emphatically do want to use and experiment with the artistic capabilities of computers. Surprisingly, the "two culture" syndrome does not seem to exist, and many artists readily accept computers even though the computer is the product of the other culture—the technology culture.

The future

Since artists do not have ready access to computers, some scientists and engineers have assumed the role of artist, thereby becoming something like twentieth-century Da-Vinci's. One could easily conclude that many scientists and technologists are really frustrated artists in disguise, but with virtually complete monopolistic control of computers for artistic experimentation. Their experiments are conducted primarily for fun and the usual selfish reasons that justify art in its purest sense. Most of this artistic fun and games has to be done clandestinely and in their spare time as only the most secure universities and corporations have the courage to allow publication or exhibition of the art of the computer avant-garde.

In the meantime, we are entering a period of experimentation and unearned publicity as the artist tries to learn the unique artistic possibilities of the computer and as the galleries attempt to exploit comp art for their own profit. The glamour of that mystical word *computer* is already attracting artists who wish to use a computer in any fashion or manner whatsoever just as long as they can say that they used a computer. We all know that "computers never make mistakes" so quite obviously a work of art produced with the assistance, no matter how small, of a computer must be likewise near perfect. Individuals emerge both exclaiming and criticizing computer art as the pendulum oscillates between official acceptance and rejection. To some extent this picture of things to come leads to the conclusion that the computer scientist working in his spare time on computer art might remain undiscovered and hence uncorrupted. If so, then the Charles Ives of the future might be found in the computation center of some large corporation or university, busily at work on secret computer art projects while supporting himself with his scientific or technological work with computers.