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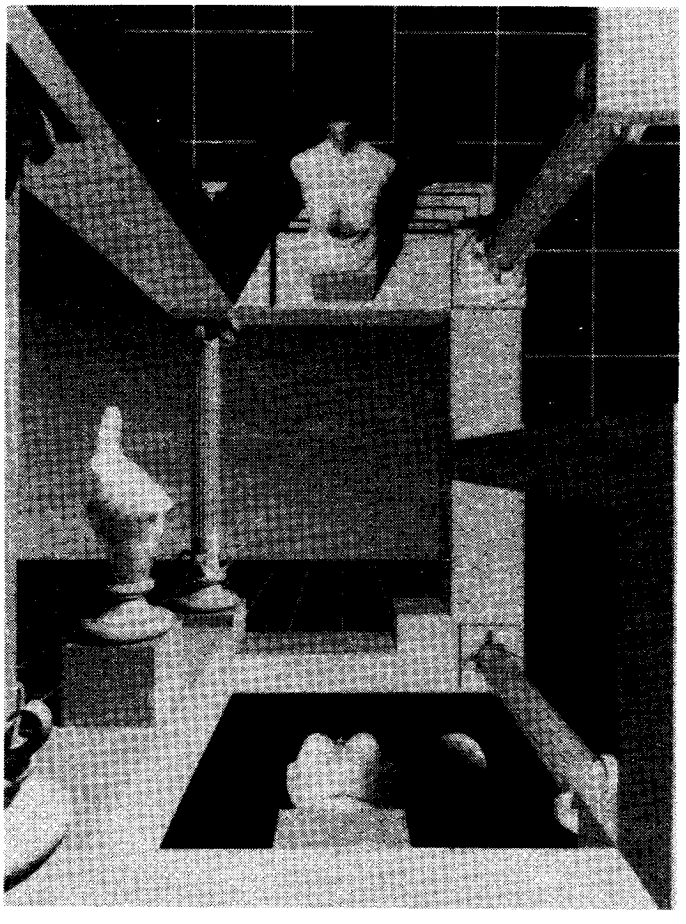

June 18 - 21, 1981

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Washington, DC

organized by: Guy Nouri, Rachel Gellman
Interactive Picture Systems, NY

sponsored by: National Computer Graphics Association

cover by MAGI-Synthavision, NY

COMMERCIAL

Bob Abel	Commercial Reel	1981	Hollywood, CA
	Panasonic 3D	1981	
Acme Cartoon	Commercial Reel	1981	Dallas, TX
California Film	Commercial Reel	1981	Los Angeles, CA
Computer Creations	Commercial Reel	1981	South Bend, IN
Computer Image	Commercial Reel	1981	Denver, CO
Digital Effects	Commercial Reel	1981	NYC, NY
	Video Palette Demo	1981	
Digital Image	Commercial Reel	1980	Berkeley, CA
	"Aura" Demo	1980	
	"I live in the city"	1980	
	"Sci Fi View"	1980	
Dolphin	Commercial Reel	1981	NYC, NY
Gehring Aviation	Commercial Reel	1981	Venice, CA
Image West	Commercial Reel	1981	Hollywood, CA
III	Commercial Reel	1980	Culver City, CA
MAGI-Synthavision	Commercial Reel	1980	Elmsford, NY
Marks & Marks	Commercial Reel	1981	Los Angeles, CA
National Image Maker	Animated slide film	1981	NYC, NY
Rutt Video	Commercial Reel	1980	NYC, NY
	Analog Demo	1980	
Technigraphics	Apple Animation	1981	Brooklyn, NY
Via Video	Cromemco Demo	1981	Sunnyvale, CA

SCIENCE

Argonne National Lab /Bob Schmitt	Fluid Dynamics	1980	Argonne, IL
Jim Blinn/JPL	Voyager Fly Bys	1980	Pasadena, CA
Brigham Young U /Hank Christiansen	"BYU.Movie"	1974	Salt Lake City, UT
Columbia U	"Cartos"	1980	NYC, NY
Bela Jalesz/Bell Labs	"Cyclopean Perception"	1974	Bell Labs, NJ
	"Random Textures"	1975	
Ken Knowlton/Bell Labs	"Nucleation on a Crystal Surface"	1975	Bell Labs, NY
Dr. Livingston /U.C. San Diego	Brain Film	1980	San Diego, CA
Los Alamos	"Infinity's Child"	1978	Los Alamos, NM
	"Animate"		
	"Applied Computer Fluid Dynamics"	1981	
Nelson Max /Lawrence Livermore	DNA Film	1978	Livermore, CA
Singer/Link	"Visulink"	1978	Binghamton, NY
U of Mass, Amherst	"COINS"	1978	Amherst, MA
U of Washington	"Robie House"	1971	Seattle, WA

ART

Loren Carpenter	"Vol Libre"	1980	Boeing Co., Seattle, WA
Harold Cohen	Artist Demo	1981	
Computer Creations /John Halas	"Dilemma"	1981	South Bend, Indiana /London, England
Bruce Cornwell	"Batch Mode Square Dance"	1974	Brooklyn, NY
	"Circle Circus"	1978	
	"Dragon Fold"	1975	
Scott Cornwell	"Bach & Babbage"	1975	Brooklyn, NY
Joanne Culver	"Blot Dance"	1981	Chicago, IL
Tom DeFanti	Z Grass Demo	1980	Chicago, IL
Frank Dietrich	"Circle Twist"	1978	Chicago, IL
	"Digital Reflections"	1978	
Ed Emschwiller	"Sunstone"	1979	Cal Arts, New Hall, CA
Peter Foldes	"Hunger"	1974	NRC, Canada
Copper Giloth	ZGrass pieces	1980	Chicago, IL
Ken Knowlton /Lillian Schwartz	"Metamorphasis"	1974	Bell Labs, NJ
Nancy Nashke /Susan Casey	"Sheherazade"	1978	NYC, NY
Lillian Schwartz	"Artist and Computer"	1978	Bell Labs, NJ
Fred Stern	"Lovers"		Bethesda, MD
Christos Tountas /Ceevah Sobel /Hart Perry	"Birth of Venus"	1975	Channel 13 TV Lab, NYC
Stan Van der Beek	"Curious Phenomenon"	1980	U of Maryland
	"Poem Field Two"	1978	
Woody & Steina Vasulka	"Cantalope"	1980	Santa Fe, NM
	"Artifacts"	1980	
John Whitney	"Catalog"	1961	Pacific Palisades, CA
	"Permutations"	1968	
James Whitney	"Lapis"	1967	Los Angeles, CA
Turner Whitted	"Compleat Angler"	1980	Bell Labs, NJ

COMPUTER SLIDES

Ampex	Art	Redwood City, CA
Chromatics	Commercial	Georgia
Lawrence Gartel	Art, Digital Effects	Queens, NY
Genigraphics	Business graphics, AV	NYC, NY
U of Mass, Amherst /Allen Hansen	3D modelling, image processing	Amherst, MA
Aaron Marcus /Lawrence Livermore	Art	Livermore, CA
National Image Maker	Business graphics, AV	NYC, NY
Precision Visuals	Commercial	Boulder, CO
Ron Resch /Boston U	3D modelling	Boston, MA
SIGGRAPH	assorted, 1979 conference	
Tektronix	commercial	Beaverton, OR
Los Alamos Scientific Lab	scientific	Los Alamos, NM

COMPUTER PRINTS

Polaroid

Dunn
Chromatics

Turner Whitted
Loren Carpenter

Ikonas

PROJECTIONISTS

Steve Devoney
Matt Wilkins, Head projectionist, music coordinator

SPECIAL THANKS TO:

Tom DeFanti, Copper Giloth,
Pat Cole, Peter Black, Peter Block,
Wes Thomas, and the CCM staff

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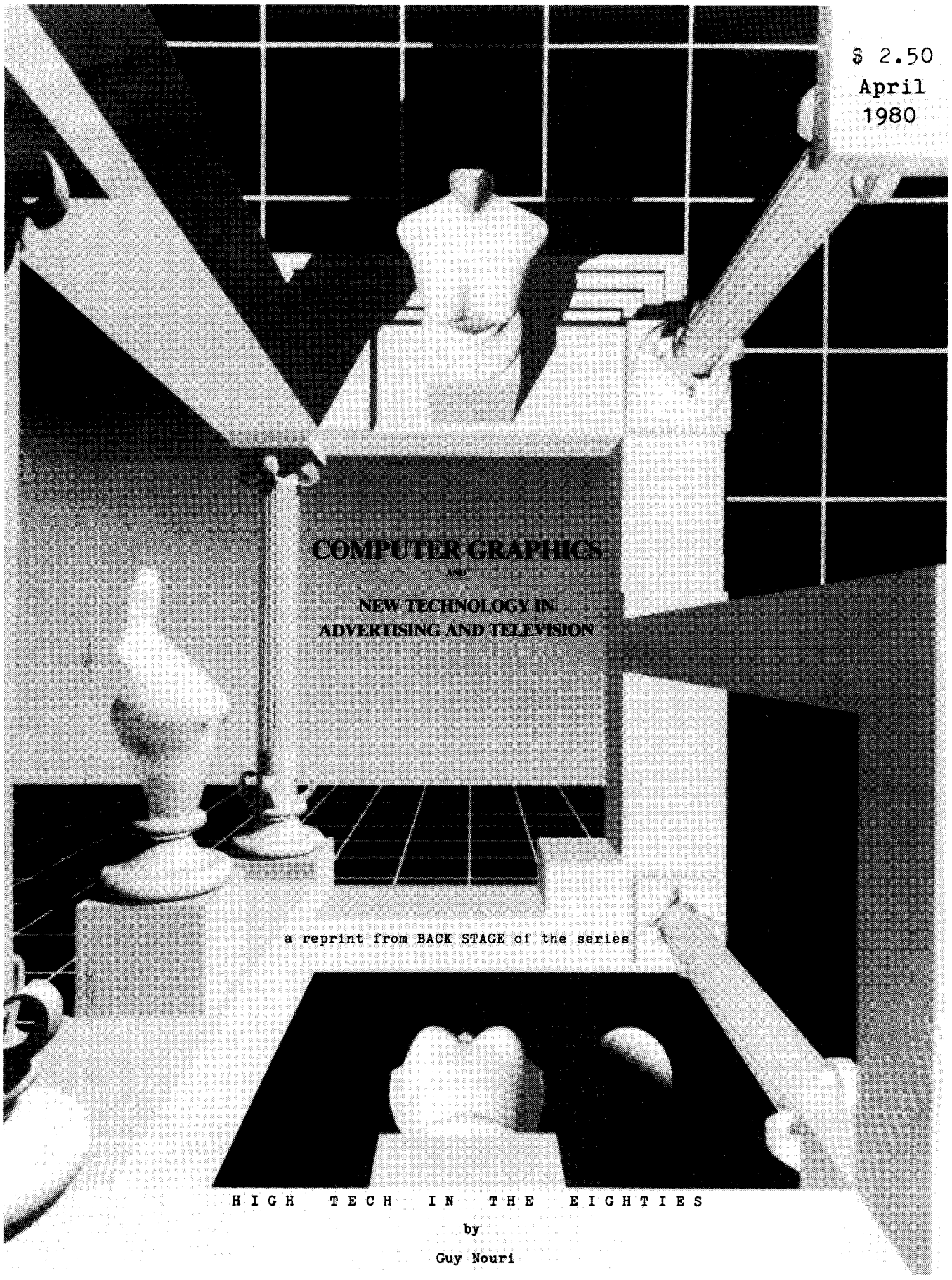

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1980

COMPUTER GRAPHICS
AND
NEW TECHNOLOGY IN ADVERTISING AND TELEVISION

a reprint from BACK STAGE of the series

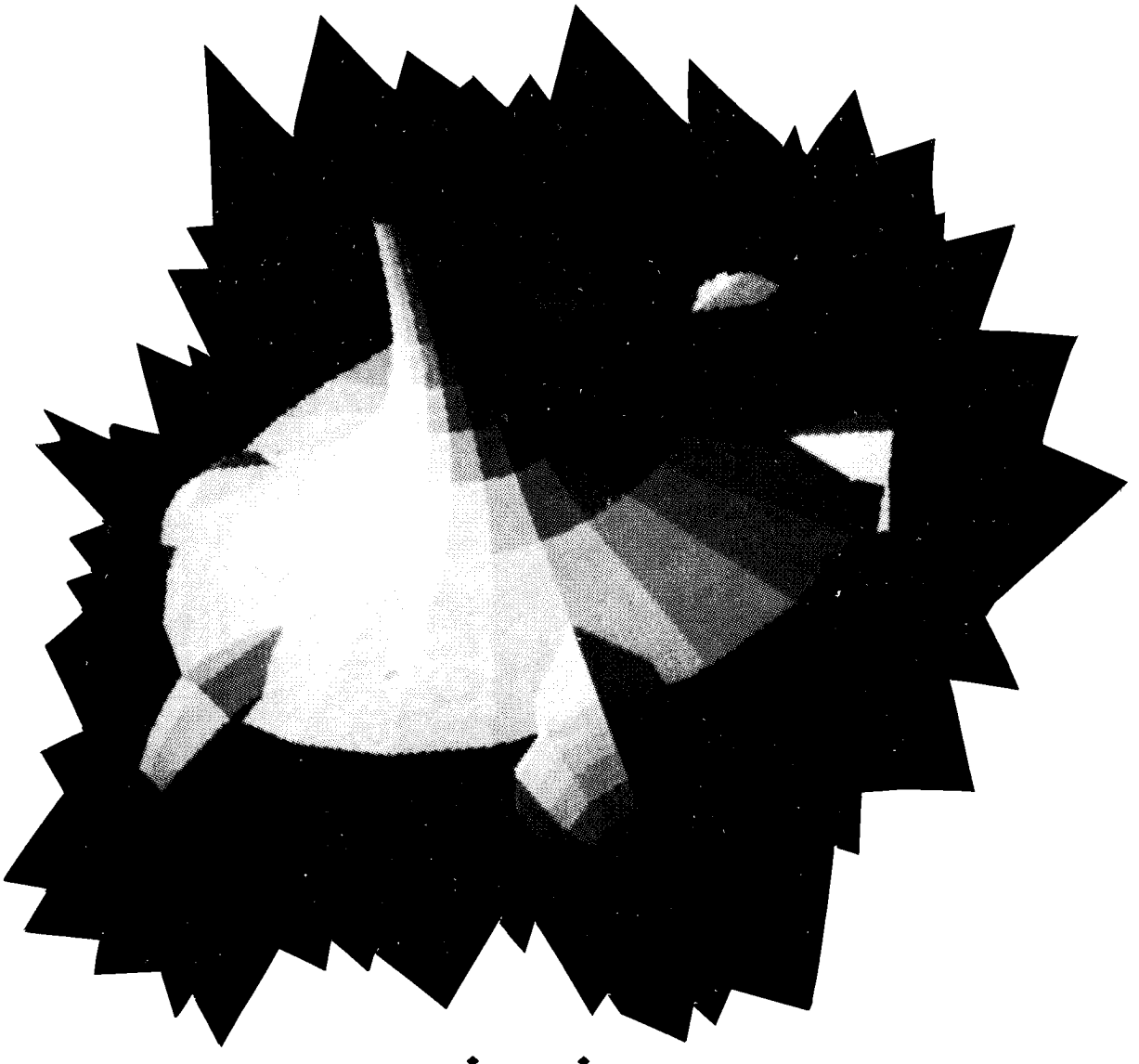
H I G H T E C H I N T H E E I G H T I E S

by

Guy Nouri

cover by MAGI-Synthavision, NY

An Introduction To
The New Science Of Image Making



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HIGH TECH IN THE 80's: The MEDIA

by GUY NOURI

The following is the first of a six-part series written and researched exclusively for Backstage on recent developments in "higher technology." The emphasis while aimed at a general industry audience, is to underscore new methods and machinery and how it will be affecting television advertising in the new decade.

Playing with computer graphics. Credit: Evans & Sutherland, Salt Lake City, Utah.

The profusion and impact of high technology in recent years is best exemplified by the growth and widespread use of video. This trend has been powerfully felt both in the industry and in the homes of the millions who are watching television. As we enter a new decade, most signs point toward an increase in this impact, with more people watching TV, and more watching it longer.

* * *

The role of technology in this picture can hardly be understated. Yet few people understand *what* it is much less *how* it works. While video technology was expanding, so was its electronic cousin, the computer. Now some sort of marriage is taking place. Viewers are being stimulated by a new set of visual phenomena, with their relationship to television being reshaped by access to cable, satellite, two way, and home TV.

While the greater part of television advertising finds its most effective means of persuasion in the live-action approach—an actor piping the benefits of such and such a product—the 5-10% of the industry spending its money on animatics, effects, and animation will soon find a more attractive means of getting the message across through more frugal methods of modern technology.

Computer graphics not long ago could cost producers more than $10,000 a second. An insert of five seconds in a 30-second spot might well cost $30-40,000. The effect was spectacular; but was it worth it? Optical houses began imitating the techniques and computer houses were forced down to earth. The hardware is now cheaper and more powerful; most production houses now have some sort of high-speed digital equipment. Soon such equipment will be commonplace and its sophisticated workings will be no more difficult to operate than drawing with a crayon—an electronic crayon.

To try and understand what is available these days and how it works, one could go dizzy. So a brief simplification of terms is in order. The expression they use along the Ganges "jungle me mungle" is an apt phrase. It translates something like "order out of chaos" and implies as in this case that there are only three or four things going on at any one time. In terms of computer graphics this is certainly true and serves as a model to the approach to the overwhelming complexity of recent technologies.

First, computer graphics can be broken down into two major groups. There are situations in which the computer controls other machinery, and in which the picture or image itself is being controlled. In the first instance you might have an optical bench or an animation stand that is mechanically driven by a computer to do tedious tasks like incrementally moving a camera or artwork to produce effects and animation. In a similar fashion the computer can assist in elaborate editing procedures for film and videotape. Although this sort of equipment has become more flexible, it has been around for some time and requires little explanation.

* * *

At the recent videoshow at NY's Madison Square Garden, computer editing devices for various formats were shown whose operation could be grasped in fifteen minutes by a child. An expert will of course get far better results even on simple machines, but it is the second type of computer control that requires clarification. To generate an image and put it through specific changes seems like magic. This aura of the miraculous and the cost of the necessary machinery ten years ago is what made the price of this material so high. Now the machines are a tenth of what they were, although the price stays about the same.

Our second distinction is again a division in two of computer imagery. Simply, there is analog and there is digital. With analog, the image is treated as a signal, usually as a whole. The signal is bent or distorted in some manner. Then it is colorized. The result is a green man holding his green stomach as it expands and contracts. He needs Alka Seltzer or Pepto Bismal. By the use of standard editing techniques these images can be superimposed and combined to great effect. The technology here is not so current and possibilities are limited. The signal must be treated as a whole. These devices are essentially hard-wired and act as a synthesizer.

* * *

It is best to understand this in comparison with its counterpart—the digital. In the standard television picture there are 525 lines. Each of these lines is made up of the equivalent of approximately 500 parts. Digital technology allows you to address and direct each or any combination of these 250,000 points or "pixels" as they are called. The difference is like that of a sheet of plastic waving in the breeze to the intricate possibilities of a sandbox where each point is independent of the next—the variety of image is practically unlimited! While no slight of analog devices is intended, it must be stressed that digital computers offer the potential of many types of imagery. The particulars of these two technologies will be discussed further in sections on computer systems and techniques.

* * *

Digital/Analog—these are words you will be hearing again and again in the 80's. From the little home computers like Warner's Atari and the popular Apple to the enormous mainframes like Amdahl and IBM, our daily information is being processed in a digital mode. Your bills and the countless records of companies are crunched down into vast arrays of ones and zeroes. So too with digital imagery. Each point on your screen is broken down into eight or more yeses and nos, ones and zeroes. The function of a program (or a hardwired circuit design) is to tell all these numbers what to do. Because programming software is flexible, the treatment of an image is wonderfully variable.

Analog devices measure and respond in a continuous fashion. Instead of on or off or yes and no, it is always on like a video camera. The fluctuations of light and dark, red/blue/green are in constant direct relation to the scene or input they are receiving. A microphone or the paddles on your home video game are other good examples of analog devices. What should be becoming apparent is that an effective digital device must have a high degree of resolution to imitate the quality of analog. It must sample and replicate at a sufficient rate, say yes and no fast enough, to display a convincing result. This degree of power is not to be found in the micro or home variety system, but only in the mini and mainframe realm. Analog input and powerful digital processing is the solution.

Thirdly the digital domain is broken down in two approaches—vector graphics and raster graphics. You are more aware of the first in the form of rotating car frames in the Subaru and Toyota commercials. Here the picture is formed by the drawing lines one point to the next. The picture can be in two or three dimensions, can be made to spin, zoom in and out, explode, or change into another shape. In most cases it is the linear quality of vector graphics that gives them away and lends them a computer flavor.

A PICTURE IS BUT A MILLION BITS

Now that we know that the CPU is the overseer and the buffer is the means to get a picture up on the screen, the only thing remaining is where all the information comes from and where it is kept. The information can come from a video camera or tape, from a computer program, or from artwork that has been turned into numbers by means of a digitized tablet. Where is this information kept? In memory. Magnetic spinning memory devices are called disks. They come in increasingly larger formats, from what are called floppies, which are now commonly used with the typical office word processor, to the high speed, high density rotating disks which can store more than 30 seconds of continuous video. That means disks are capable of randomly accessing 900 frames (30 seconds times 30 frames a second) each consisting of 525 lines (or more, horizontal) at approximately 500 pixels per line and 8-16 bits per pixel (for red, blue, green, and brightness). Thus a single picture is formed from a million bits of information, and 30 seconds of video nearly a billion. The memory is a passive yet substantial part of imaging. Prices vary from $600 to $100,000. It is important to know just what you need in designing a system.

The disk spins or is rotated while an armature reads the recorded binary code or NTSC signal. The CPU determines what is to be read and in what order, if it will be changed before being displayed or left as is. This is where programming comes in. The program is the thought that actively influences the flow of visual data to the screen.

It is just how the memory is read and written to and from the buffer and memory that forms the algorithm or open ended program. Each algorithm is designed for a specific purpose such as highlighting a three dimensional object or establishing the parameters of its rotation and movement through space. A collection of several algorithms related to a single batch of data and working in conjunction with the system's operating procedure make up the program. The algorithm is like a recipe and the program the main course. What is important is that programs are flexible. They can be written and rewritten for any imaginable purpose, stored and reused in various combinations.

The hardwired machine has a set number of functions that it can perform and that's it. A library of programs and special purpose algorithms builds up in the case of programmable devices and provides a much deeper creative resource. This is why production facilities will eventually have both types of machinery. As software sophistication increases it will become easier for people without programming experience to use these computers. This will be discussed later (Part IV).

Most computer frame buffers display on a video monitor or CRT (Cathode Ray Tube) similar to your television set. Your broadcast signal is in NTSC standard and your TV translates this to activate the red, green, blue guns to light up the screen. Color video monitors for computers operate on one of the numerous other standards. The video standard is referred to as an RGB signal. This signal has to be encoded before it can be recorded or broadcast but in its native state is well suited to the digital format of computers.

For input a video signal is decoded, allowing video cameras and tape as source material. Artwork can be scanned in this manner or by means of a digitizing tablet and pen-traced into the computer's memory and colorized. Once material has been digitized, it can be manipulated in an unlimlited variety of ways. Software is now developed to the point where photographic quality images can be made and animated in color and three dimensions. As the design concept and creative input is still the most important element, basic skills and techniques will not go out of fashion but only greatly enhanced by the availability of these powerful new tools.

Solid 3-D synthetic object glowing around for Shick. Computer animation done by Digital Effects, Inc. Miguel Bronstein was producer, Special Services, NYC.

By GUY NOURI

HIGH TECH IN THE '80S:

Part III in the six part series on high technology in the media. This section will focus on the variety of uses and special effects the new technology offers the television and advertising industries.

USES AND SPECIAL EFFECTS

IMAGING

Technique is no replacement for creative design, but when certain techniques like rotoscoping fetch a 59% viewer response (20% higher than any previous rating) for a Levi's commercial, it becomes evident that these methods are not without a certain power to reach the mass audience. People love to be amazed. This is what the new tools will allow you to do! Just what are these techniques and what is their potential?

Most people, when they think of computer graphics, are inclined to remember starburst, glowing products, and the spectacular spinning logos they see so often on TV these days. These are just the beginnings of what is to be seen in the next decade. Optical houses are already mimicking these tricks through the more conventional means. The prices the mystique of technology has provided will no longer hold as this sort of imaging comes into common use. $10,000 a second is a high price to pay to catch the viewer's attention. Most often it can be done for considerably less.

In the last two articles on High Tech in the '80s, the basic nature and types of machinery were explained. An introduction to what they can do is outlined below.

What is most alluring about computer technology is the subtle way it responds to time. The machine has no feeling about the notion of work, indeed that is all a machine knows how to do. It does not put a premium on the sort of work that has to be done. Many techniques that are done by traditional means with optics and video technology can be done more cheaply and faster on computer. It is the complexity of the image itself which is the determining cost factor. How many lines is your artwork made up of? How much detail does your Datsun, Toyota, Chrysler, or exploding bottle of shampoo require to be represented effectively? The machine will then manipulate that image with no regard to manual problems in rendering. What would take forever manually happens instantaneously, while other simple operations may take longer. One's time sense is constantly surprised by the output of the computer. Fast and slow are mixed and swapped almost at random. This can be seen especially when you are interacting with the machine itself. This element of time has been little exploited to date. Instead of duplicating older effects, art directors and producers are well advised to visit these facilities and toy with the possibilities. The tech people who inhabit these places are surely living in another realm but are open to creative input.

The variety of imagery that can be created is almost unlimited. Just about anything you can think of can be translated and executed in computer*ese* with exceptional resolution and quality. As mentioned before the standard television is capable of displaying about 500 lines of picture information. Many systems can produce results in excess of twice that, giving a virtually photographic effect. There is no clear delineation between the various categories of image processing, as it is called. They all blend in and out of each other. But there is two and three dimensional animation and a world of possibilities with video synthesis/image enhancement.

In the first area pictures can be entered into the computer by one of three distinct methods. A piece of artwork or design rendering can be entered by digitizing the material. There have been numerous cases where the skeleton of a building, automobile or logo has been set on top of a digitizing tablet and the many points and sides of the object or lettering are read into computer memory with an electronic pen. What is happening here is that points are acknowledged by placing the pen on the artwork. A message is sent to the tablet below, which is acting something like a large, flat, gridded microphone. The precise position is noted and recorded. This is done again and

HIGH TECH IN THE '80S:

page five

The hardwired machines, like the quantel and the SqueeZoom, discussed briefly last time, are also important tools especially when combined with a soft or programmable device. Their attribute is speed. They work in real time and instantly give you zooms, pans, wipes, dissolves and flips. This is accomplished by taking the picture, digitizing it and reforming it on the screen. In the case of a flip, the picture is sampled digitally. Then the numbers are compressed top and bottom for a vertical flip, left and right for a horizontal flip. The image therefore shrinks or appears to flip. This happens on all four sides for a zoom effect. When the numbers are compressed the image appears to recede, when expanded it appears to zoom up. Various analogue devices, such as those at Dolphin, Image West and Computer Image, process or treat the video signal as a whole. A man's stomach expanding and contracting is a global function worked on the entire image. Through the use of chroma keying and standard editing techniques these simple transformations to a picture get great results.

The value of the new technology is in its ability for precise control and repeatability. Any point or pixel on the screen can be manipulated to give an animation or special effect. The process can be repeated with complete accuracy. Various techniques can be combined or improvised. It sets up a responsive environment to the process of picture making. . . be it a still image or, as in the case of flight simulators (the high end of this technology), an airplane ride through a thoroughly convincing three dimensional landscape. The image making process becomes more flexible and the possibilities more exciting.

SYSTEMS

In this the fourth of a six part series on the effects and uses of new technology for the advertising and television media, systems will be outlined and discussed. It is in and through systems that the technology is made available to us.

THE SYSTEM

All the technology in the world would be completely useless without the means to access it. The system is that configuration of components which renders the wonders of sophisticated machines useful to us. Whatever the purpose, an interface is required. Right now the major effort of all the leading computer companies is the design of simple and human models that give control to those without much computer or technical experience.

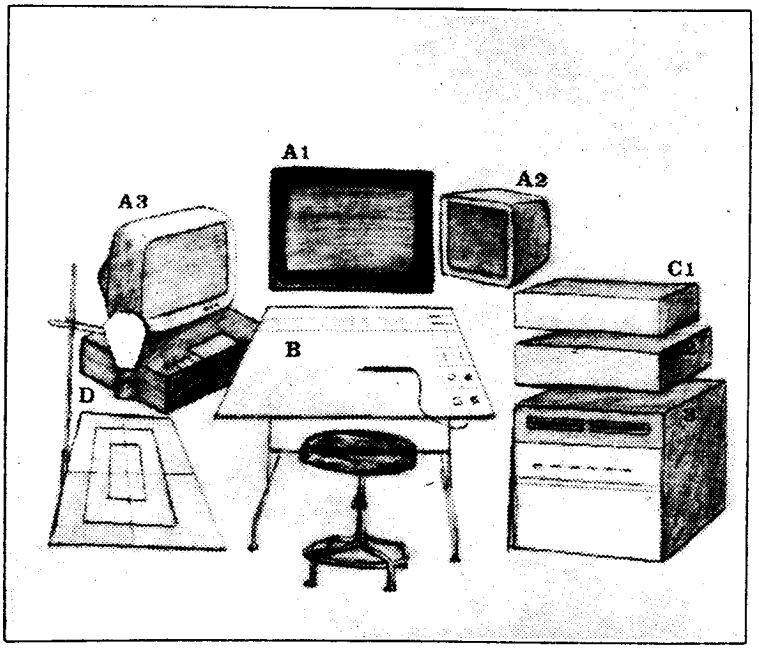
Here perhaps more than anywhere else in the series do the serious time and money saving aspects become most apparent. They may be the most powerful forces bringing the new technology closer to us and our daily work. But as these systems find themselves in general use within the next three years, it is their creative potential that will really make them useful and so much fun to play with. The function of the machine is only to reduce drudgery and heighten the effectiveness of output. Try and remember this in the first initially awkward moments with these new tools.

The user interface is nothing more than a console designed to put the producer or creative director in charge of the machine. The machine can be considered to consist of essentially three parts: the video monitor (s), the (electronic) drawing tablet and the computer. That's it! The "user" sits at the console and implements commands via the tablet through the computer and out onto the screen. What can be done largely depends on the flexibility and power of the system design. That, of course, is determined by the buyer.

Custom systems for animatics, automated animation, and full animation will be in most production facilities within two or three years. They will be as common as titlers are today. Although several companies have the potential of mass producing these systems, they are as yet unaware of the production requirements such systems must fulfill. But it won't be long. It is rumored that the little Apple computer is being developed for just these purposes; however, something with more power is called for.

The three basic types of systems are for animatics, animation, and transfer from one format to another. Today there is sufficient quality from and to virtually any format. Even the transfer of video to film, the most awkward and most apt to produce headaches, has reached a satisfactory level of color and resolution. We will concentrate on the systems for animatics and animation. Below is an illustration of an ideal system.

Systems like this only exist in a few locations. It is an optimal, digital video system, a film output could be added easily. The variations are endless to this sort of system, and some subset of this is.... what you might find at any given facility.



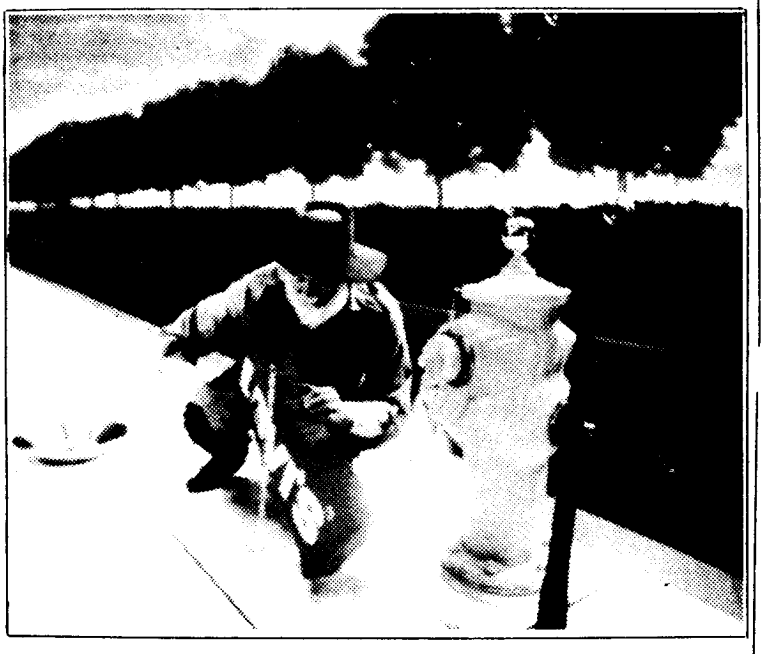
The Ideal System

The experience of sitting at such a console is not unlike that of sitting at a drafting table except the sensation might be more like being behind the wheel of a Porsche. In front of you is an RGB monitor. RGB (Red/Green/Blue) is the format that computers deal with in a color signal. These monitors tend to be more precise than your standard TV set and have resolutions two and four times to what you are accustomed. To your left is the standard TV (NTSC format) for getting a glimpse of what the viewer will be seeing. To the right is either a color or green video display like the kind at the bank. This is used as a menu selection. Instead of writing programs in some alien dialect such as FORTRAN or APL, one can simply select a routine from the menu, say for sketching in color, and begin to draw on the tablet. The monitor in front of you will display your sketch simultaneously.

The menu may also contain editing functions for saving, correcting, or sequencing a picture. These are the functions of the monitors. They keep you in touch in simple terms and pictures with what is going on. The tablet is an electronic drafting surface. Previously it has been described as a wide, gridded microphone. Indeed that is exactly what it is. It listens to the pen, which is connected to the computer, while it emits tiny beeps that tell of its location. The tablet which consists of thousands of horizontal and vertical wires indicates an x, y coordinate to the computer. The tablet can thus be used to digitize precise renderings, to trace artwork, or to do freehand drawing and painting. In the case of a purely vector system, such as that which models three dimensional linear material and rotates it, the pen gives the endpoints of these linear elements and feeds them to the computer for further play.

The most complicated aspect of the system is the computer and its related hardware. Most of this was discussed in part II. Briefly the computer consists of a CPU (Central Processing Unit) and some memory. The procedures of the system are determined by the program and controlled by the CPU. The tablet and pen read into the computer as are commands indicated on the menu display. The computer acts on this information and shoots the results up onto the screen via the frame buffer. A continuous interlaced video image is the result. The resolution and color choice is a major price factor. A minimum of 256 lines and 16 colors (simultaneously displayed) is recommended. 500 lines and 256 colors is more than adequate for television purposes.

If you have kept up with the series, you know that there are essentially three types of computer graphics and it follows that there are essentially three types of computer graphic facilities. First and most prevalent are those who have computers controlling their cameras and artstands. In this case, artwork and cameras are positioned and incremented along a given set of axes. This set-up produces animation and effects such as slitscan where the shutter is also being controlled. This first group is called machine control.



Levi's commercial done by Bob Abel Associates.

The second group contains the remaining types and is called image control. Here are those who exploit the potential of analog technology (where a continuous signal is manipulated). The results nowadays using analog techniques are truly outstanding, and are becoming more flexible every day. The advantage here is most production takes place in real time—a spot can be completed in a day if need be. Once the design has been ironed out, few jobs would take more than a week. Typically these houses are geared for videotape. Finally there are the houses exploring the unlimited potential of digital computers and highly sophisticated programming software. An image is broken down into bits of information and each point of the screen is subject to discrete control. There are combinations and hybrids of these types, so it is best to see their reels. The following brief descriptions serve to act more as a guide than anything else. Their growth has been fantastic and their achievements remarkable. Get to know them!

IMAGE CONTROL

Acme Cartoon Company (Sundance Productions, Dallas) A digital video system. By coincidence the system at Acme is almost precisely that which was outlined in last week's section as the ideal system. It has been under development for almost a year and a half and will be ready for production for the first time in May of this year.

Under the direction of Rush Beesley, Acme has benefited from careful selection as to the most efficient and flexible creative tool. It is equipped with a paint system for animation that allows a variety of brushes including airbrush to electronically create artwork. The images and pictures are stored on a disk and sequenced onto videotape. There is a program for rotoscoping on the system, which when done conventionally on film is very expensive. Here it will be accomplished with minimal difficulty.

All sorts of digital video techniques can be accomplished on the system—video synthesis, mapping, even 3D modeling of scenes, which at a high resolution are almost indistinguishable from real scenes. The work to come out of Acme promises to be among the most modern and exciting. Combining this potential with Sundance's strong video skills will yield exciting results.

Bob Abel (Los Angeles) Digital vector system for film, also machine control. At this point, Bob Abel has the only house to have both a fully automated system for camera control and a digital computer for creating imagery. Their Evans and Sutherland Picture System II is used to create objects and environments in 3D, animate them with an extremely powerful computer, and map out the motions of their camera and artwork for more traditional effects.

Bill Kovacs is the technical director and responsible for the foresight in combining the two approaches. Among their credits are people like AT&T, Citicorp, Amtrak, TRW, 7 UP, Levi's (59% response), and the trailer for "The Black Hole." Abel has a staff of 35 artists, producers and technicians. While his work is fairly well known in the industry, the use of computer graphics—a recent addition to the company—is less understood. Abel started his company in 1971.

The commercial done for Canon Calculators is a good example. Several layers of 3D computer generated imagery are animated and combined with stop action to show the insides of the calculator come together with the keyboard and a real hand—all matched and colored on film by computer control.

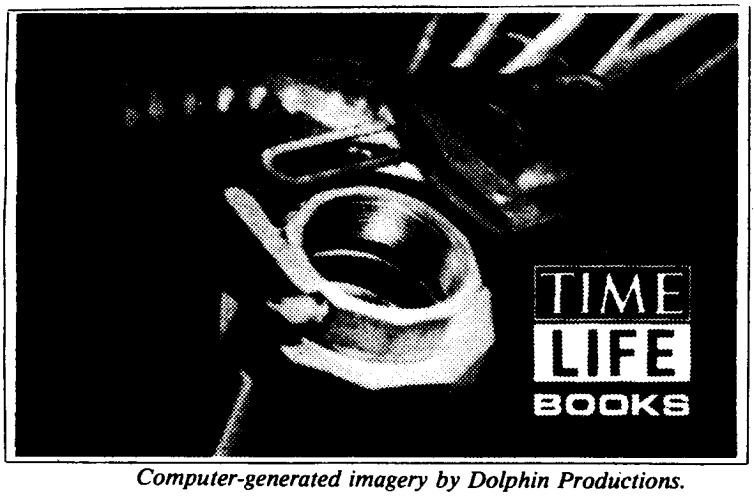
Computer Creation (Indiana) Digital rasterscan system—videotape. Formed in 1975, Computer Creation developed a method which they call videoCel. The final full color result which comes out on two inch videotape begins with simple black and white line art. These drawings are digitized into the computer by means of a data tablet, an electronic drafting surface. From there on the process becomes quite elaborate. Colors are matched or added with much precision and movements of intended animation tested.

When the general nature of the animation is determined, the various aspects of the videoCel process are brought to bear. What is known as anamorphic animation has been termed object blending. One object, shape or form is transformed by computer into another, hence an apple turns into a pear or the shape of a bus in motion alters to show its movement. Mixtures of live action and animation can be achieved as well as techniques like lipsync, rotoscoping, 3D, multiple plane zooming, metallic surfaces, and coloring effects. This is accomplished through the use of a high resolution color display and a controlled slow motion videodisk.

Computer Image Corp. (Denver) Hybrid Analog/Digital System, videotape. At present the people at Computer Image, under the guidance of Lee Harrison, are developing something called System Four. It will represent the state of the art in analog picture manipulation. Three previous systems of which the CAESR and Scanimate still operate, demonstrate Harrison's desire to combine a fine art sensibility with engineering feats. Precise digital control added to real time analog animation provide a wonderfully interactive tool for the creative person.

It is possible just to sit down and play with the system and get a feel for the kind of animation it will give. Most effects have their analog equivalent on this system, popular tricks like 3D rotations, metallic surfaces, and solid objects (hidden surface removal).

The three questions asked are which?, what?, and how much?, i.e. which elements would you like to animate, what would you like to do to them, and what are the parameters of the action or effect you wish to work on your animation. The systems at Computer Image provide for animatic, logos, or the illustration of processes as elaborate as the weather. All this in real time, it feels simple and flexible.



Computer-generated imagery by Dolphin Productions.

MAGI/Synthavision (Elmsford, N.Y.)—digital animation system on film. Each of these production facilities have developed their own unique approach. The equipment may be similar, but in almost every case the programming language is distinct and aimed at specific applications. At MAGI three-dimensional models and architectural scenes are constructed out of geometric primitives which are combined and built up to produce batteries (for J.C. Penney),tablets (for Bufferin), and other constructions for industrial, instructional, and advertising purposes. These may be rotated, opened up and seen through. They've been in business since 1972. They also have a director's language which makes it easier for the non-computer person to interact in the production process. One can choose from a variety of camera angles and lens types. Contact Larry Elin.

New York Tech (New York Institute of Technology,Old Westbury, New York)—digital animation on film, research, video production. New York Tech is the "hands-down" winner of the "who has got the most resources award." Created by Alexander Schure and directed by his son Louis, New York Tech stands out as the most lavish production facility available. Their computing power is almost unlimited, their variety of equipment complete. Their staff represents the leading people in the field snatched up from institutions all over the country. They are capable of producing a full-length animated feature in one third the time and have pioneered the realm of automated animation. You could almost get lost with what is possible to do here. Conventional 2D animation is accomplished by the most sophisticated and flexible painting system. One can create scenes of many layers for the background, draw frames for figures which will be interpolated for in-betweening, and fill these figures with color almost instantly aided by the computer. 3D graphics and animation are also possible, complete with highlighting, shading, shadows and motion. They are oriented toward research and will undoubtedly be providing the systems and software for others who choose to benefit from computer assisted animation as witnessed by the Electronic Pallette once in operation at CBS.

Rutt Video Corp. (New York City)—analog computer animation, effects, and video production. Visiting Steve Rutt is a little like watching Mr. Wizard on television and having the screen evaporate before your eyes. You become immediately part of the process. Production is on two-inch video. Most spots and logos can be turned out for a very reasonable sum in a day or two. He built his own R/E IV synthesizer and the video repositioner (a standard device at most analog houses). He also supervises production. In a matter of hours, a client can test a number of possibilities and select the one most appropriate to the need. Artwork is scanned in and manipulated in the most exciting ways. It is strongly recommended you visit Rutt and get a clear idea of what can be done there.

Spectacolor (New York City)—outdoor digital animation. Perhaps you have passed the huge animated color sign on Times Square and wondered what it was. It is a unique brand of computer animation. Because it is sold more like radio, by the length and frequency of display to the public, its reach is limited, if effective, and not fully understood. One other system like it exists in Kuwait. Other than that you may not see it. Its full potential has yet to be exploited.Staffed by some very imaginitive artists, the Spectacolor board has come to life over the last few years. There is hardly anyone who passes that way and is not surprised by its lively display. It can, of course, be used for television advertising and makes a wonderfully graphic addition to live-action spots on which its message and cartoonlike animation is overlaid.

NETWORKS

At this time, there is only one network exploring computer graphics in its fuller sense. In the ABC News Graphics division, Max Berry has assembled a staff of technicians, programmers, and artists to spice up the news. Where ordinarily a simple titling device writes in pertinent information, a Dubner machine now adds color, 3D effects, and even animation. Elaine Schwartz and others of the staff produced the first animation ever to come out of a titling device.For the Olympics, an animated torch was designed with compelling results—an arm holds a torch from which multicolored flames emerge. This is just the beginning. It is not far off when the weather report will abandon its static format and become the most exciting aspect

An example of analog video animation from Rutt Video Corp.

of the news report. This will require the kind of insight that Berry has shown. In contrast CBS had an "electronic pallette" which was used only once or twice, its potential effectiveness unseen. Soon computer graphics will play a major role in news programs and a rush will be made to acquire the machines and talent to produce such attention-getting results. Keep your eye on the news, especially at ABC!

MACHINE CONTROL

There are a dozen institutions like M.I.T. and Cornell that are exploring and creating new areas in the use of computer graphics. It is a new field and most university departments do not really know what to do with it. Should it be a new department under the auspices of architecture, computer sciences, or art? Whatever the case, it is expanding at a phenomenal rate. Last year. enrollment in most courses had increased 1000% or more. This is where the television and advertising industries will be getting the qualified personnel they will be seeking. Computer graphics spans the range of interests from the scientific through the artistic into the commerical. It is a necessity for visual communication in the future.

The production houses presently using computers to control their cameras and art stands are now innumerable, especially when editing is also taken into account. Cel Art, Cinetron, IF Studios, Image Factory, Midocean, and Zeplin are among the best known. At Midocean, for example, a process they term Photofusion is employed. Here a series of still pictures are combined with staggered dissolves by computer for an unusual animation effect. The computer also plots the camera moves along any or all of five axes (Cinetron makes a system that performs along 11 axes). The camera traverses a 40-foot stage with complete and repeatable precision. Man hours are reduced drastically allowing time for creative emphasis—not drudgery. This is what machines are made for. That and providing the kind of interactive environment that sets the creative impulse free.

The last part of the series on HIGH TECH in the 80's will focus and speculate on the future of computer graphics and technology in the television and advertising industries. A brief glossary of important terms will also be included to familiarize you with the vernacular you will be using in the future.

Creative Forces (New York City) Digital, analog, and traditional animation. Recently formed is Creative Forces specializing in all varieties of animation especially those using the new technology—be it for film or videotape. This is a group of energetic people who work very closely along with clients from the conceptual stages of a campaign, the development of a storyboard through final production.

An entire design concept can be worked out including all aspects of a campaign including print. Creative Forces is a collection of designers, producers, and technical consultants with backgrounds in animation, videotape production, and computer generated imagery. Their work has a strong graphic quality where technical means support their innovative design orientation.

Digital Effects Inc. (New York City) Digital film and video systems. Digital is perhaps the fastest growing of any computer graphics house. This may be due to their location in Manhattan. It may also be because they are staying on the front edge of what technology is needed for commercial production. In only two years they have acquired an impressive list of clients including Marlboro, Subaru, ABC and CBS Sports, and Annie. They have recently acquired a Dicomed film printer, several new staff, and a large space located in the center of production activity.

They can provide all the stock computer techniques such as video synthesis, image enhancement, edge detection, 3D modeling and animation, as well as the ability to write software to meet specific needs. They produce on either 35mm film or videotape. They are also in the business of building systems for other people in the production industry. One such project is the development of an animatics system for advertising. This device will allow an agency to create and modify all its animatic material in house with considerable savings in time and money. It is designed for use by persons without computer experience. Judson Rosebush is president.

Dolphin Productions (New York City) Analog production system on tape or film. Dolphin is the best known computer production house with 70 awards to its credit. Clients include Pepsi, Ford, GM, Pepto Bismal, and program work for PBS and TV movies like the Scarlet Letter.

While digital technology enjoys the limelight these days, Dolphin has held its position proving itself equal to the challenge. This is best demonstrated by the revolving globe done for the "CBS Evening News," a job which ordinarily would be considered possible only by digital means. With several thousand jobs under their belt, they simply know how to get what is needed. Various techniques are combined and edited together to achieve the desired effect. Rather than stress the techniques employed, both Allan Stanley, president, and Bruce Davis, production manager, call attention to developing the possible only by digital means. With several thousand jobs under their belt, they simply know how to get what is needed. Various techniques are combined and edited together to acheive the desired effect. Rather than stress the techniques employed, both Allan Stanley, president, and Bruce Davis, production manager, call attention to developing the possibilities as indicated by the storyboard.

Once an idea is agreed upon, artwork is scanned in by video and manipulated. Computer generated elements can be added, or originial artwork colorized and transformed. One of the best known examples of this is the Pepto Bismal spot where a live shot of a man is frozen, his stomach distorted and made green.

EMI (London) Digital animation on film. When in Europe, go see EMI. Design is the overriding concern no matter what the method is for its representation. At the computer graphics conference in Chicago, much emphasis was laid on technique and raw computing power. It is not wrong to single out this facility as perhaps the most imaginative. Being in England it will not steal much business away. The commercials shown at the conference were not overwhelming feats of computer graphic acrobatics. What they were was clever. Several months later they were on TV in America—remade by another house for another product.

The emphasis in this European company is not on its machinery, but what it can get out of it. The commercials are simple, elegant and powerful. This must, of course, have to do with a slower schedule and closer collaboration with the designers. Tony Dimert is the one to contact.

Three dimensional computer animation by Digital Effects: Times Square, 1932. For Paramount Pictures, Randel Kleiser, director.

Harold Friedman Consortium (New York City)–traditional and computerized animation. Harold Friedman Consortium is a unique situation—it is a group of top designer/director/artists. Rather than being restricted to hardware, a match is made to best suit the client's ad with just the right talent. They recognize technology is here to stay, a greater part of their business employs computer techniques of one sort or another, and it is their strength to find the experts for a particular application. A mix of live-action, animation, and computer techniques is an elaborate process in which the numbers and the look must be accurate. They have been doing it for ten years and their reel is one of the most varied and good looking.

Image West (Los Angeles)—analog computer animation. It is an oversimplification to describe Image West as the Dolphin of the West Coast, but it is accurate in as much as their systems and procedures are quite similar. Their production is of the analog variety—feeding in a video image, distorting it, processing it, and mixing it with computer-generated imagery on two-inch videotape. To properly understand the difference, it is recommended you view their reel.

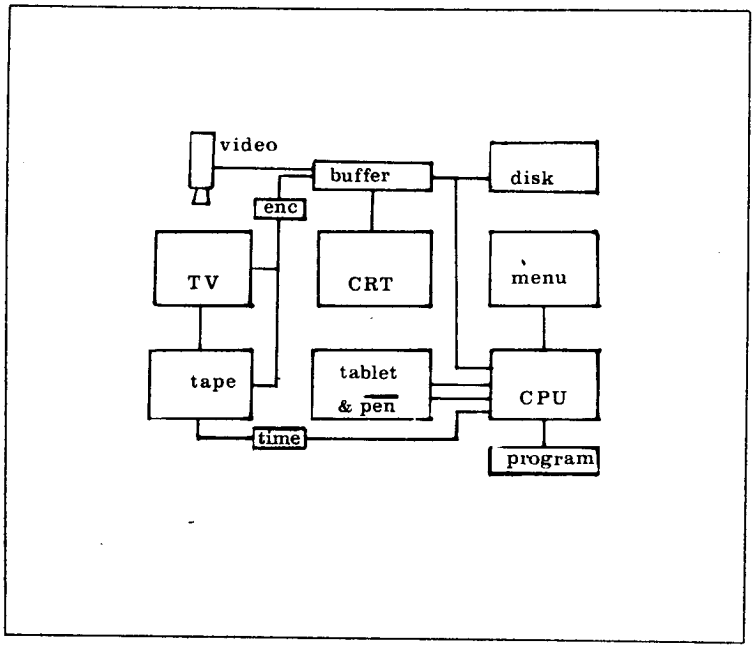
Information International Inc. (Culver City, Cal.)—digital animation for film. Known as "Triple I" by most, the Entertainment Technology Group at III produces the finest quality film anywhere. Their equipment is of such resolution as to surpass the requirements of 35mm color negative. This considerable accomplishment is a result of their own in-house research under advanced technology director Gary Demos who is recognized as one of the top people in the field. His expertise with color conversion from computer to film is coveted. The process at III is called "Digital Scene Simulation." Here there are no models, only magic. An entire environment is created by the computer, be it a still life or landscape, real or imagined. The information is fed into the computer via a data tablet and directed by means of a director's language on a keyboard. Realistic three-dimensional objects and scenes are thus created without matte lines or jagged edges. The results which may involve transparencies, highlighting, and textures are suitable for film (motion pictures like "Westworld" or "Futureworld"), television, or advertising (the Datsun generic) and, of course, spectacular logos. The director of marketing and creative services at III's Entertainment Technology Group is John Whitney Jr., sone of the man who virtually invented computer graphics thirty years ago.

NEW TECHNOLOGY

THE DISK

The disk is your very active and accessible memory. It stores not only the myriads of programming you will eventually want, but also store the 9 to 900 frames of full screen data you will want to create and edit sequences for animatics and animation. In either case, the menu will provide a simple means of recording the frames you have created or digitized (by trading or using a video camera) onto the disk.

The menu will also allow you to access these images in any desired sequence from the disk. There is no need to be intimidated. A well designed system will make this all seem invisible and magic. A system for animation and animatics includes little else and its operation is picked up in a day!



Legend for the ideal system: A1, color CRT (video monitor); A2, menu selection (video display); A3, color television; B, electronic drafting tablet and pen; C1, frame buffer; C2, videodisk (revolving magnetic storage); C3, CPU (program and program control); D, videotape recorder, video camera and artstand.

HOW YOU DO IT

The system configured above is designed primarily for the production of quality animatics...the kind that make a client's eyes pop out! The artwork can be entered via a color video camera or created on the system itself. An artist sits at the console and draws away. The images would be displayed on the CRT directly in front of the drawing surface. When a given image had been completed, the artist would select a store function from the right hand menu selection display. Additional pictures would be created, various types of brushes could be used and colors swapped to achieve the desired effect.

An image could be reworked again, and if an error is made, it would be possible to correct a section without having to dump the original and begin all over again. Once a series of pictures had been stored onto the disk, the artist or operator would go to the menu and, by indicating the appropriate function with the pen, have the material transferred to whatever format videotape. Dissolves, wipes, zooms and pans could be added for additional enhancement—this being implemented simply with the pen's selection from the menu. The edited sequence would then be viewed on the standard color televison set for approval. If the results were not satisfactory, the original material could be called up again from the computer and reassembled. The six to twelve images in an animatic are thus transformed into a very nifty and continuous program. A quality animatic could be produced in a matter of hours in-house, under close supervision.

Animation would be created in much the same fashion. The difference here being the increased number of images needed to create a continuous and smooth result. Programs could be added to the system to do inbetweening. You draw frames A and C, the computer will draw B. Shapes are automatically filled with a selected color. There is no need to hand color each part of each frame. A 30-second animated spot would be made up of 450 frames (done in two's). The time involved is less than half that of conventional means.

There are few ready-made systems. One worth noting is the Evans and Sutherland Picture System II. This is a color vector system on which one can easily create objects in a three dimensional environment. It is useless for animatics, however. But for scaling, sliding, and rotating 3D material, it is a remarkable tool.

It would be wise to note here that there are two types of pictures with which the computer deals in separate ways. Those images which exist in an environment of three dimensions and the flat variety. They are not easily interchanged. For most purposes flat imagery (it may look very dimensional) is best suited to television and advertising. The system above is a "flat" system. Three dimensions could be added making a truly remarkable machine, but programming for this would get somewhat complicated and the user would have too many choices.

Most production requirements could be met by a system of 500 line resolution output onto 1" or Quad. Film, if needed, can be added. In this case, the imagery is output to a high resolution monitor and shot frame by frame, three passes—one for each primary color. While systems vary, keep in mind that the major types include systems for 3D modeling and manipulation, automated animation, animatics, and analog/digital hybrids. Hardcopy can be had by the hookup of a color copy device. This can be very handy for showing concrete material. Phone transmission of colored pictures is possible but slow, six pictures might take an hour to transmit—it is still cheaper and faster than sending a storyboard across country by mail.

The state-of-the-art in this technology is exemplified by the flight simulators. These systems cost about $1.5 million. They are able to save multiples of that in fuel costs for training air personnel. The kind of system needed for production would cost a tenth of that. The flight simulator, however, is capable of real time, 3D color animation. Some systems even allow you to interact with other pilots in a mutual synthetic environment.

You sit at the controls and have a dogfight with three or four other aircraft. The landscape below you zips by. You cruise through fog banks, fire rockets at moving targets, go into a rolling dive and get shot at by the enemy ... and it's all just a bunch of numbers. The home cable version that lets you play with your neighbor is ten years off.

PROD HOUSES

AUTHOR'S NOTE: Here in the fifth of a six part series on the uses of new technology in the TV and advertising industries, an outline of the various facilities is provided as a guide to the art director and producer. It is the purpose of this series to encourage the use of recent developments by creative people, by dispelling some of the misconceptions and revealing strengths inherent to these places. They vary in size and age. Some have not as yet even been advertised. But all are capable of quality production for television.

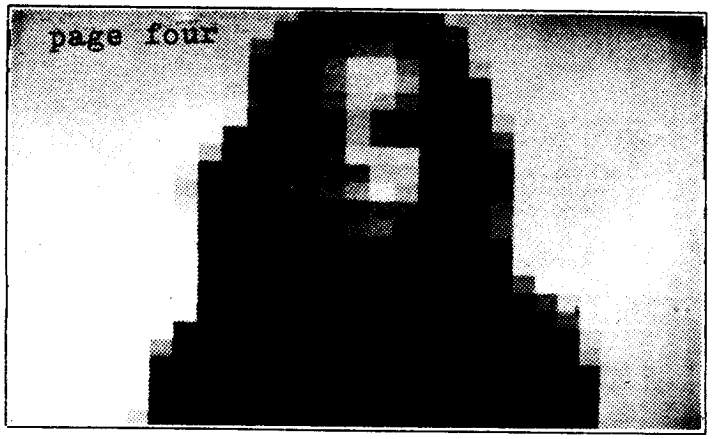
JUST THE BEGINNING

There was literally no such thing as computer graphics prior to 1950. Before 1965 there was no such thing as computer graphics in TV. Now in 1980 computerized graphics prove to be the most exciting trend in effective advertising methods. Art directors and producers should no longer be intimidated by either the price or vocabulary of these new techniques. Instead, one can feel at ease by knowing the meaning of a few key terms like analog and digital, and by visiting one of the facilities described below.

No two computer facilities are alike! Each has its strengths and specialities. It is recommended that you visit one and ask questions. The knowledge you will gain will be invaluable. You will become familiarized with the fundamentals and potential of a medium which will play a significant role in the future. Take along at least a rough board, this will assure you of getting due attention. There are many options and tradeoffs combining conventional and novel techniques that can both save money and deliver attention-getting results.

Whether it is automobiles, gum, shampoo, jeans or beer, computer graphics is a tool that allows you to do just about anything you could possibly imagine. You have the ability to control and invent visual situations in color, time, multiple dimensions, and often with photographic clarity. Once you appreciate the fact, which may seem abstract at first, that you can shape the appearance of each and every part of a picture, you are on your way to experiencing the freedom your creative impulse has been waiting for. Having read this series you will be in a very good position to talk intelligently and discuss ideas.

HIGH TECH IN THE '80S:

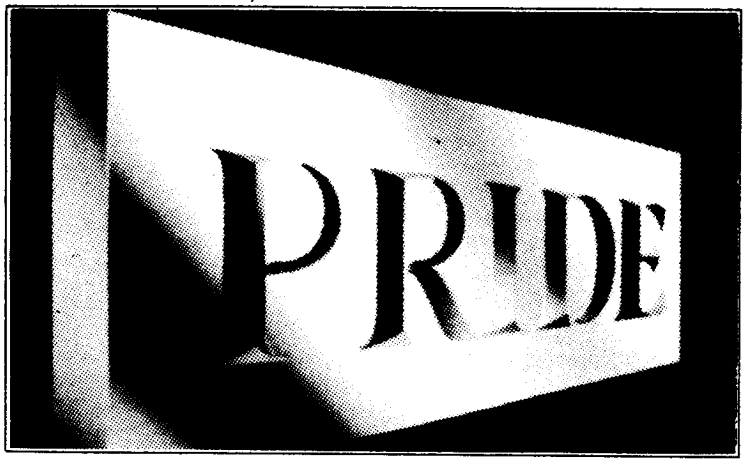


An example of image processing for "Portrait of Andrea D'Amico." Computer animation done by Digital Effects.

again until the entire image has been digitized and turned into numbers (x,y coordinates). Once this has been accomplished the entire picture may be made to rotate, slide or zoom back and forth. A process that would normally take a very long time is completed in seconds by the computer. This information can by played back on the computer monitor for test purposes. If approved, it is output to computer tape and printed onto high resolution film. Pictures can also be entered in the form of mathematical formulae or scanned in by either a black and white or color video camera..

Anamorphic animation can be achieved in a similar fashion. The first and last frames are digitized into the computer (and any number of desired steps in between) and the inbetweens are calculated. Thus a gas station can turn into an automobile, the automobile into an airplane and the airplane into the surrounding landscape. The process is not unlike conventional key frame animation. The time for production is only a fraction, and places like New York Tech have sophisticated fill programs that allow rapid coloring of the individual frames.

The simpler animatics used for testing purposes are created in much the same way. Artwork is scanned in or digitized and then moved around to give a highly graphic portrayal of the commercial to come. More advanced systems allow for shading, highlighting and even shadows, all done automatically. 3D animation of rounded images can also be achieved complete with shading. It will not be long before a live or simulated background is combined with lifelike representations of human beings to produce cheaper and more enticing sales pitch. It is doubtful actors will find themselves out of work, but many production requirements can be fullfilled using these methods. This newer form of animation will become very popular later in the decade as costs of live production skyrocket and computers become considerably cheaper to buy and operate. The mixing of live and computer images will become commonplace. They complement each other and satisfy the broad appetite of viewers.

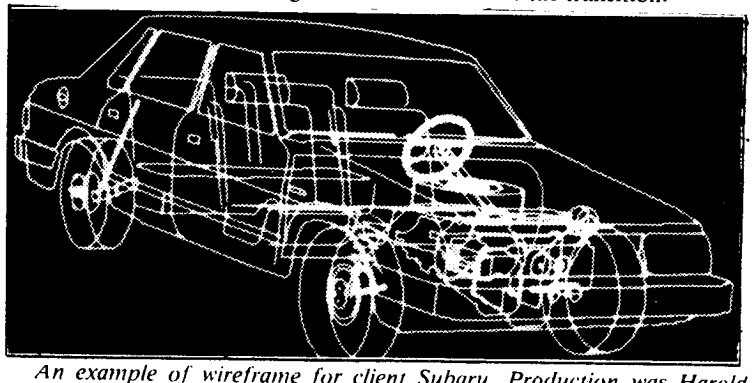


Solid 3-D object with 3-D font; metallic texture/light sources for Lincoln-Mercury. Dick O'Brien, creative director, Cato Johnson; producer, John Kelly, Dana Cairns Associates. Computer animation, Digital Effects.

SYNTHESIS AND ENHANCEMENT

The large domain of video synthesis and image enhancement offer the person—after special effects—the widest variety of options. The image in this case is essentially flat. Think of the picture as a fine grid in which each intersection is an area that can be manipulated by the whims of your imagination. The most popular technique here is Block Pix where a given image is divided into squares of changing sizes. The detail inside the blocks is averaged out and the result is a field of gently colored areas. This has been used with great success in cosmetic commercials and creates a wonderfully softened image. Edge detection is a way of highlighting edges and dropping out less relevant material. It might be used for example to show the beneficial results of a hair formula on the waves and curls of its user. It is important to stress again that the computer is programmable. That is its advantage. The kind of synthesis or enhancement you seek can be programmed into the machine to suit your needs.

Most computer generated material is best used in conjunction with other input. Mixing it with optical techniques proves very effective. One special application is the generation of mattes for pixel wipes. In a recent ad for Marlboro—Japanese television—a three dimensional scene dissolves into a pack of Marlboro's. This is accomplished by means of a pixel wipe. A series of mattes are created in a selected pattern by the computer and used to blend one scene into the next. There must be hundreds of variations on wipes and dissolves but all rather simple and uneventful. The pixel wipe can incorporate any pattern you can dream up as a means of getting from one place to the next. Even the third image can be used to make the transition.



An example of wireframe for client Subaru. Production was Harold Friedman Consortium; producers, Harold Friedman and Susan Rubin; designer/director, George Parker. Huntley Schmidt Plaper & Beaver producer; producer Bob Nelson; art director, Steve Singer. Computer animation by Digital Effects.

MULTIBUFFERED ANIMATION

It is possible to hook up a series of frame buffers each processing a different level of imagery. This way of doing things is presently being researched at a major U.S. university for an animation house in southern California. It will permit real time animation of figures on a dynamic background. This is accomplished by feeding the different planes of activity into different buffers that flow into yet another buffer for viewing. Actions take place in the time it takes to direct them. Trial runs are made and rehearsed, then the final version is output to quad or ¾". Production time: less than a day for what ordinarily might take weeks. In two to three years we will be seeing this sort of animation on Saturday morning cartoons and animated spots.

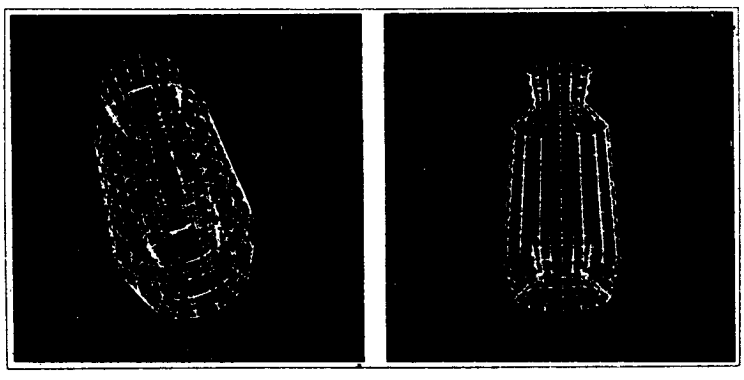
PAINT

The software already exists, and has since 1974, for paint systems. This allows the artist or designer to literally paint directly onto the video monitor. Research for this was begun at Xerox Park, Palo Alto, and reached its fruition several years later at New York Tech. The output can either be film or tape. The artist sits down at a console and chooses from a variety of brushes and an even wider variety of colors and begins to draw or paint-in figures and background. Colors can be swapped, modified and cycled to achieve the desired effect. Brushes can be made out of any image and stamped onto the screen easily. A clump of grass becomes an entire meadow in no time. Images can be scaled or repainted without difficulty. All this happens in direct response to the gestures of the artist so there is no loss in quality. The system takes only a day to learn to use effectively. When combined with live material another new form of animation is created. Mix-time animation allows the simultaneous combination of real and created content. So far this technique has not been used at all.

HIGH TECH IN THE 80's: The MEDIA

Continued from page 68

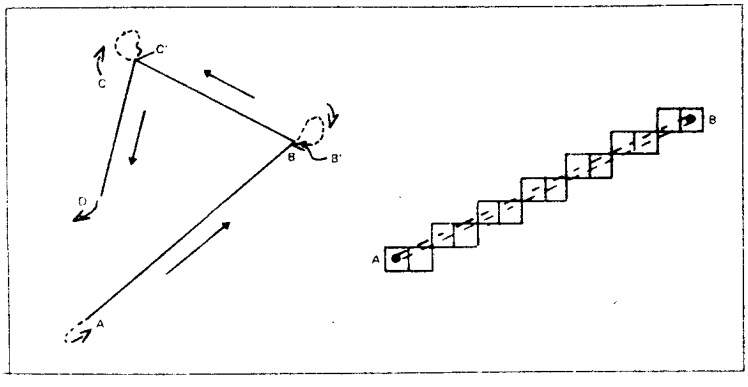
Raster graphics are generated not by drawing lines but by actually controlling the videobeam in a way similar to that in the gun inside the screen to color each point on the line in order, line after line until the entire screen is a seemingly continuous picture. On the high end both approaches have such speed and resolution that they become practically indistinguishible. The image quality approaches the photographic. The latter has the advantage of readily using scanned in artwork and video input where the former is faster and better suited to animation such as the rotation of three dimensional objects.



Examples of object rotation. Credit: Megatek of California.

Vector/Rastor are the two words that will become familiar to those who become involved with the new digital video technology. Your TV operates as a raster scanning device, constantly drawing the two fields of odd and even lines once each thirtieth of a second. Resolution is key here. There must be enough of it to yield a pleasing picture. Otherwise (in the case of raster) jaggies appear, those awkward looking stepped edges that identify computer graphics to the eye of the novice.

Vector or vector refresh (as it is called) is linear in characer. The computer is simply instructing the video gun to draw line segments between to endpoints which the computer has in its memory. It is faster because there is less information to be processed; it is less desirable when trying to create full-bodied images. There are ways of cheating and mixing the two methods (especially in conjunction with optical techniques) which will be discussed in more detail in a future article.



Illustrations of vector (l.) versus raster (r.) graphics. Credit: Megatek of California.

Lastly it should be stated that a combination of these techniques is desireable and is the likely direction of computer graphics as a whole for commercial production. Digital technology in both machine design and software flexibility seems to dominate the scene currently. As producers and directors become acquainted with these techniques a new world of imagery will be opened up for the fascination and enjoyment of all. Being riveted to the television set could well become a more enlightening experience.

THE HARDWARE AND SOFTWARE

Part II in the six part series on high technology in the advertising and television industries. This section will focus on the hardware/software now available and a glimpse of how it works.

To simplify matters there are essentially two types of machines or hardware which will become familiar in the next decade. They epitomize what technology has to offer and will not change any time soon; combinations of the two answering specific needs will arise, but based solely on these concepts. First there is the hardwired devices such as special effects generators, titlers. synthesizers, and special purpose production tools like the SqueeZoom and the Quantel.

THE HARDWIRED DEVICES

The hardwired devices are characteristically fast. They perform a unique set of transformations on an image with sufficient speed and resolution for broadcast purposes. Pictures can be zoomed up, panned, wiped, juxtaposed simultaneously with other moving pictures and, as in the case of effects generators and generators and synthesizers, create abstract patterns and overlays. This all takes place in "real time." Their capabilities are aimed toward the various formats of videotape production. "Real time" by the way is a term that along with "Digital" you will be hearing again and again in the '80s. It implies that imagery being generated is output at a rate equal to the rate of a specific medium—for example, 30 frames per second in TV—and that a given command is responded to immediately. Hardwire machines are built to produce this illusion, in fact they can get a full frame picture up in less than 1/30th of a second.

One such device, digital in structure, is the frame store mentioned in *Back Stage* two weeks ago. The frame store is capable of saving the ¼ million bits of information in a video image and throwing them up on the screen in almost no time. Several of these devices can hold seconds of full screen material and access it randomly in a fashion not unlike the new videodisc. Sequences do not occur in real time, but with the editing techniques typical at most video houses this can be simulated. No fear, there are real time storage devices to be mentioned later.

The hardwired machine does not make decisions; this is what distinguishes it from the soft or programmable machine. It is also what makes it faster. A signal or stream of information follows a predetermined path. The results are steered and directed by analogue controls or by specific dictations such as the number(s) of frames to be displayed.

THE SOFT MACHINE

The three types of hardware to be discussed here are the CPU, the disks and the frame buffer. It is the latter which is perhaps the newest and the one with the most far reaching implications.

The CPU is the heart of any soft machine—that is, any machine that is controlled and operated by programming. The CPU is the computer. More precisely it is the part of the computer that directs traffic. In television the CPU is the manager of vast and rapidly moving arrays of information, its memory resides in the disks and buffers. A program is entered, say, to produce a stretching effect or determine the sequencing of a series of frames, and the CPU sees to it that everything happens in the appropriate manner. Unless you are going to become a programmer, this is all you really need to know. The frame buffer is essentially a dynamic frame store, able to grab or output an entire image again and again onto the monitor. The arrays of visual information are kept in memory like so many grains of sand. When the time is right the CPU directs this mass of information to the buffer where it is converted like sand into water and splashed onto the screen. Transformations take place and the altered array in the buffer are splashed up again. It is very fast and can produce all sorts of animation and image manipulation.

This may seem to be esoteric information, but it is not. An understanding of frame buffers will be a commonplace thing in the use of the new technology for television. This will be made clearer in Part IV where various systems will be discussed. For now, think of the frame buffer as a kindly device which plays the role of doorman between computers and television.

COMPUTER GRAPHICS

the fastest growing, most creative tool in visual communications

This course is designed to introduce designers, producers, animators, and those with a serious interest in graphics to the potential uses of this new medium. Viewing state of the art computers at one of New York's top computer production facilities, you will learn about the hardware, terminology, and applications in film, print and video. The overview provides a historical perspective to a rapidly advancing field with strong visual examples from advertising production and communications.

Guy Nouri first studied film and computer graphics at Princeton University where he headed the film workshop. He is currently technical editor to Back Stage Publications, editor of Computer Pictures Magazine, and director of Interactive Picture Systems, a consulting firm in the area of computer graphics production and systems design.

Call 473-3333 for Information

The Ottowa Journal, August 26, 1980

Computers give animators unlimited scope

Old frame-by-frame craftsmanship becomes electronic magic

By Duart Snow
JOURNAL REPORTER

It's difficult to imagine a wider gulf than that between the painstaking, frame-by-frame craftsmanship of traditional animation and the lightning-fast, electronic magic of computerized image-creation.

Yet a handful of animators and computer specialists — mainly in the U. S. — are building bridges across that gulf at a mind-boggling rate, as audiences at the Ottawa '80 International Animation Festival have learned in a series of seminars since the festival opened Saturday.

And rather than eliminating jobs, as it has done in so many fields, those familar with computerized animation — or "imaging" as it is more properly known — say it will open up creative possibilities never hinted at by traditional methods, as well as generating more "bread-and-butter" commercial work for animators.

"Get friendly with a programmer and play," was the message which Guy Nouri — editor of the New York-based *Computer Piotures* magazine and a roving spokesman-salesman for computer imaging — brought Monday to a seminar audience composed largely of animation professionals.

Exciting as the prospects sound, however, Nouri and others readily acknowledge that, like most of us outside the world of computers, many traditional animators don't know much about imaging, and trust the process about equally.

Major obstacle

That apprehension is the major obstacle to bridges between traditional and computerized animation technology.

One of the goals of the seminars, and regular screenings of videotaped samples of the work of computerized animation companies and organizations, is to try to overcome this mistrust, as well as to demonstrate current work, says seminar organizer Frank Taylor.

Nouri is more colorful. He calls himself a "gunslinger" for the cause of computerized animation.

"There has been a contract taken out on your fear of machines. I'm here to terminate that fear," he began his lecture.

Then he continued with a series of what he called "lies".

"In about five years you will all be out of business. Machines can do the job better than you, they can do it faster and cheaper. They can think for themselves. They can do anything."

But there is a certain amount of truth to those "lies", he continued.

Used to control conventional animation equipment, computers save costly time and human labor.

And because U. S. companies are growing at the phenomenal rate of 50 per cent per year, they could soon threaten the health of Canada's small but productive and creative animation establishment by taking away vital commercial contracts if Canada doesn't keep up.

"You have spent years developing styles and techniques and carrying out your work. Some of that work is laborious, it's drudgery. There's no need for that anymore. These machines can do that for you. They're a tool."

In an interview, Nouri continued: "It's not replacing — it's enhancing processes and procedures that already exist and opening up whole new worlds of visual thinking. Instead of wasting their time with drudgery, they can spend time on the images — there's nothing creative about drawing a million images the same."

Allow new styles

Yet it's a waste of time and technology to use computers simply to imitate reality and duplicate current techniques — their major role so far — when they also allow an animator an apparently boundless range of entirely new methods and styles.

"You can program any kind of event you want. You animators are the creative people."

It's been about 20 years since computer images were first created and only 12 or 13 years since more complex and appealing pictures were developed for practical use.

The rapid development of the field, however, means we now face a daily barrage of computer-created or manipulated images without necessarily being aware of it.

Today's uses include special effects in space-fantasy movies like *Star Wars* and sets in other films, logos for television news and sports programs and commercials like the recent series for Levi's jeans.

One of the main attractions of computerized imaging for animators is its selling power, says Nouri.

"It's so precise that what you get is more precise than reality itself — and you can augment reality.

"The images are so convincing that the execution becomes the message itself."

The impact on dazzled viewers is borne out by the success of the Levi's commercials, which drew a response rate of 59 per cent, 20 per cent higher than a conventional spot, Nouri told the seminar.

As a result, says Taylor, advertisers who use little animation now will be encouraged to use more and more of it, their contracts helping to provide the steady income that keeps animation companies in operation and allows them the luxury of more artistic work.

Perhaps because the high cost — competitive with conventional animation but justifiable in commercials if it sells products — computerized animated features are still to come. But there's no reason why they shouldn't be made, Nouri added.

Athough Taylor is convinced the seminars and screenings have helped put to rest many professionals' fears about the quality of computer images and about machines in general, he rightly observes that the field is changing so fast that a single look at it is hardly enough. He speculated that from now on, each biennial festival might include regular looks at computers.