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Nancy J. Oyos

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ROCHESTER INSTITUTE OF TECHNOLOGY

A Thesis Submitted to the Faculty of
The College of Fine and Applied Arts
in Candidacy for the Degree of

MASTER OF FINE ARTS

Computer Generated Graphics
vs.
Traditionally Rendered Illustration
a contrast and comparsion

by

Nancy J. Oyos

November 15, 1985

Advisor: Mr. James Ver Hague

James C. Ver Hague

Date: 2/4/86

Associate

Advisor: Mr. Jack Slutzky

Jack Slutzky

Date: 2/6/86

Associate

Advisor: Mr. Robert Keough

Robert Keough

Date: 2/7/86

Special Assistant
to the Dean for

Graduate Affairs: Mr. Philip Bornarth

Philip W. Bornarth

Date: 2/24/86

Dean, College of

Fine and Applied Arts: Mr. Robert Johnston

Dr. Robert H. Johnston Ph.D.

Date: 2/26/86

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Date: 1-23-86

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Advisor: Pro. James Ver Hague

Assistant

Advisor: Pro. Jack Slutzky

Assistant

Advisor: Pro. Robert Keough

Before I begin, I want to give my love and special thanks to my fiance, Joe, to whom, I will be married in August 2, 1986, for all his support, and strong encouragement, and most of all, his deep patience.

To Mr. James Ver Hague, my thesis chairperson, since he was my long time teacher at the College Fine and Applied Arts, I would like to give my special thanks for his ideas and suggestions. I also very much want to say thank you for his understanding and his patience, and most of all, his kindness.

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To this special woman, Dr. Bonnie Meath-Lang, who helped me put together my thesis work, I want to give her my special thanks for her time working with me. I am very pleased with all the hard work I have done with this thesis and how hard I tried through the graduate program.

The purpose of this thesis is to explore the relationships between the traditional way of developing illustrations, and the way, I feel strongly, illustration and graphic design will be produced in the future, utilizing computer graphics equipment. Through careful research and study on this thesis, I created sixteen illustrations divided into two groups: eight manual illustrations, and eight computer generated illustrations. I chose eight types of illustration that are important, and most common in the design field. I will compare and contrast traditionally rendered vs. computer generated illustration for the purpose of analyzing the strengths and weaknesses of each.

1. Type: Special Effects
Title: Carnival Cruise

To experiment with the "metallic look". Most popular for audio-visual, media, and other commercial uses.

2. Type: Flat Graphics
Title: The Runner

To use a limited number of colors to achieve a more "graphic" look, with no airbrushing techniques. Most popular in posters and, is often used in "silhouettes".

3. Type: Collage-Combination
Title: Horton Plaza

Mixed media with a collection of images overlapping each other on one format. Popular uses for editorial illustrations.

4. Type: High Technology
Title: The Digitizing Pen

Using special effects to simulate a "today" image. Most popular for use in communicating to a young audience (8-25 years old).

5. Type: Charts and Graphs
Title: Snacks are Important

To investigate how convenient charts and graphs are to develop, adjust, and how fast and powerful the computer is in generating this kind of illustration. Charts do not necessarily always need adjustments in the composition, except for numbers and ratios that change with time.

6. Type: Fashion Illustration
Title: Fashion Illustration

To experiment with colors and textures that are extremely important to this style.

7. Type: Humor
Title: Dolly Parton

To show humor in characters. Usually done in line for the casual look. It does not need to be serious.

8. Type: Editorial Illustration
Title: The Three French Women

To experiment with the techniques that the computer has in its software, using different brushstrokes, colors, and textures similar to those used in a traditional illustration.

All eight categories are represented by two illustrations.

The analysis will include the following areas of investigation:

1. Time
2. Materials
3. Cost
4. Flexibility
5. Color
6. Dependability
7. Author's alterations
8. Updates
9. Reproducibility
10. Storage and Retrieval

It is through comparison and contrast that I will show the strengths and weaknesses of the two ways illustration is being done today. This thesis will help to provide guidelines to a corporation by pointing out why they should invest in both computer hardware/software.

Artronics/3M PC 2000 Studio Computer

Artronics/3M Techart 2000

Special effects are significant in creating something that looks powerful, and is different from the usual. The availability of thousands of colors, instant posterization, pixel enhancement, image grabbing and manipulation, and repetition, provides the opportunity to create high-quality form and structures, almost instantaneously. In this research, I experimented with the "metallic look" on a special effects logo.

A. Type: Special Effects
Computer Graphics Generated

Figure 1.1 shown on pg. 13

Title: Carnival Cruise

1. Time: 38 hours and 10 minutes
2. Materials: 1 roll of 20 exposures, ASA 100
Ektachrome daylight 35mm Kodak film

150mm zoom lens, tripod

one 5 1/4 inches double sided, double density
soft sector disk
3. Cost: \$25 ten 5 1/4 inches disks
\$30 color prints (c prints), 8x10 inches
\$10 slides development
4. Flexibility:

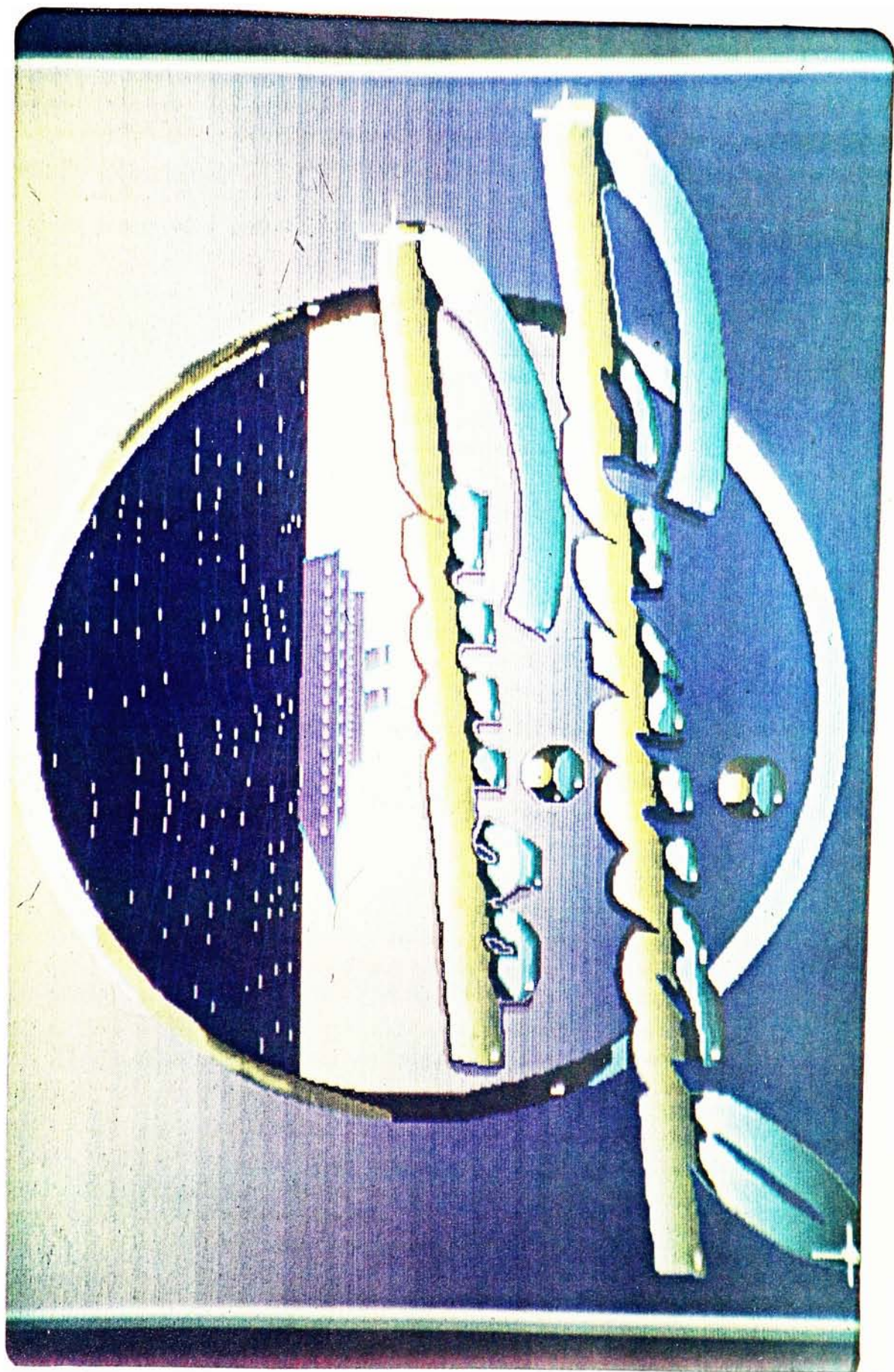
It was quick making the pattern for the logo, by using the shading option and color editing. The code numbers for specific colors help to save time when making gradated colors for the background. Texture push average in paint mode helped blend the colors together for the logo and ring. The solid push average paint was excellent for touch-ups.
5. Color: The system provides a solution to luminosity for gradated colors. In that case, it helps soften the colors. The highlights are the focus of the logo that give reflections. Coloring the pattern for the logo gives that "metallic look". The colors are more effective for the special effects logo. They are flexible in the making of sharp and realistic looking images. Compared to the traditional illustration, the hand drawn colors are loose and too weak to use in developing a metallic look. A lot of additional support (like airbrush) is needed to make an effective special effects image by hand.

6. Dependability:

For creating a powerful image using colors, the special effects from a computer, with special techniques, provides a higher quality image. The dependability comes from the constant, readily available colors, and because light is being used and not pigment. There is no fading or loss of intensity. There are more immediate ways of developing creative options than by using a computer, but I cannot create the same effects as I can from using the computer.

7. Author's Alterations:

It was much faster using the computer when I was told to adjust the colors to add brightness. Other changes were just as easy. Results are immediate and choices are many.



B. Type: Special Effect
Traditionally-Rendered

Figure 1.2 shown on pg. 16

Title: Carnival Cruise II

1. Time: 20 hours and 19 minutes

2. Materials: 1 hot press illustration board
1 box of seven Liquids acrylic paints
3 red sable brushes
1 roll of frisket film
razor blades
masking tape
plastic jar
old rag
ruling pen
t-square, triangle, and ruler
palette
slide projector

3. Cost: \$1.50 illustration board
\$17 box of Liquids acrylic paints
\$9.50 slide projector rental
\$3 masking tape
\$8 roll of frisket film

4. Flexibility:

Painting areas of gradated colors is a time-consuming, tiring job to do, with no room for error.

5. Color: Mixing colors is a very complicated process to achieve the look of gradated colors. This is not an efficient way to achieve the "metallic look".

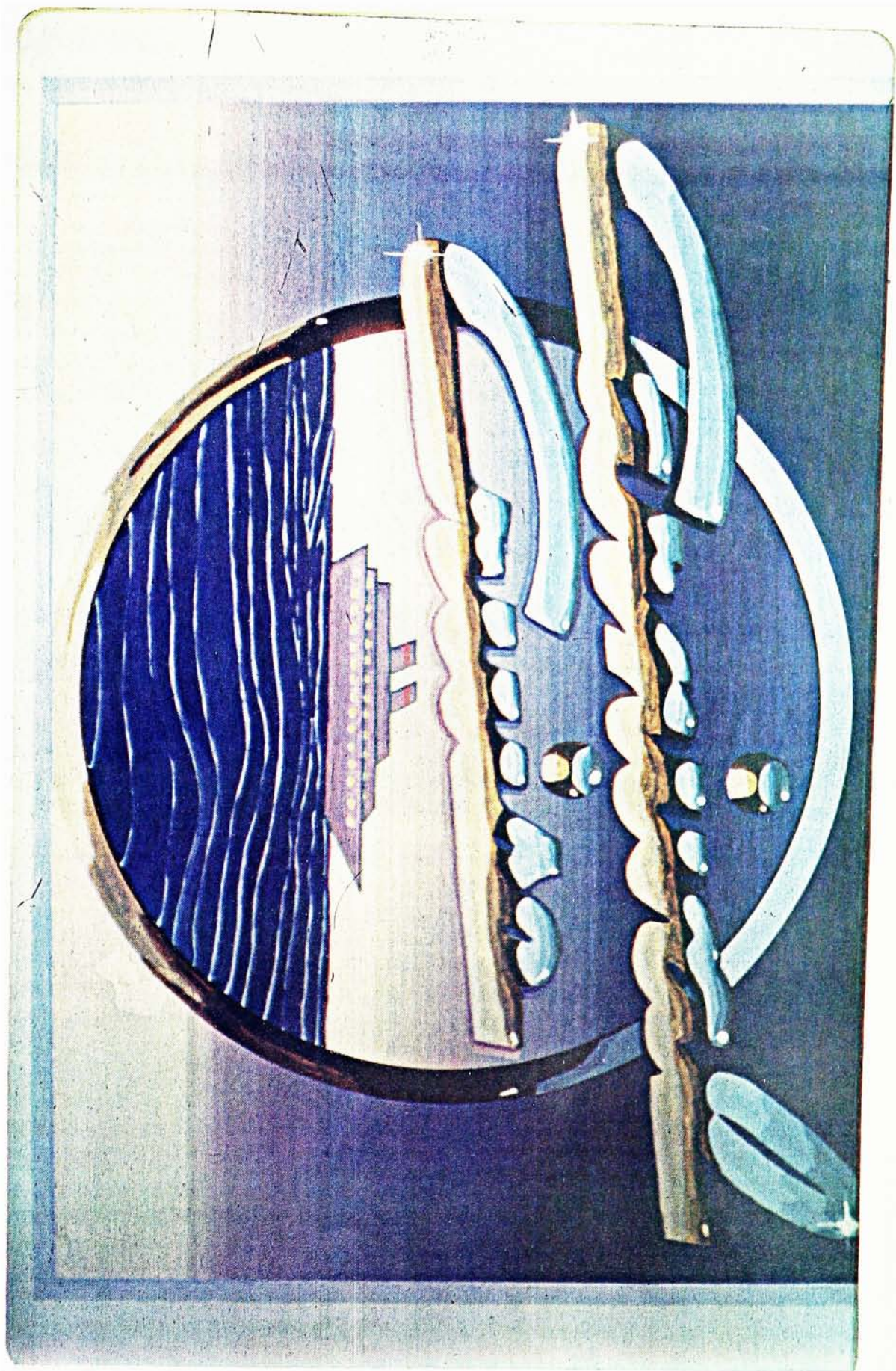
6. Dependability:

Using high quality materials are what made my work more controllable, but mixing color pigments that make the blend just right is dependent upon many factors out of my control. For example, adding abit too much water can

cause a different tone of color, when the paint becomes dry, the textural surface is very obvious. Sometimes when adding a few drops of water, the paint shows another color. The results vary depending, upon the amount of water added to make the correct blend.

7. Author's Alterations:

Changes made by the client would necessitate almost a total re-do of the illustration because the media used was a water-base media.



Comparison/Contrast

Computer Graphics Generated	Traditionally Rendered Illustration
Colors are easy to select by adding luminosity or saturation to add brightness for "metallic look".	Mixing colors is a very slow process and time-consuming. You do more work on the mixing color pigments than working on the image.
Colors are more effective and powerful.	Colors are weak because they are reflective to a "metallic look", and more difficult to achieve.
Making a pattern for the logo that gives the reflection, provides an option of making a perfect color gradation.	Getting the right tone to get the closest possible relationship to color gradation was very difficult.
Work hours were more here because I was experimenting and "playing" with the texture-pattern mode to get the best "metallic look".	There was no "play" involved. I set my rules and followed the time schedules because I did not want to fall behind. But, mixing color pigments was one disadvantage that took me longer to do, and which caused me to miss the deadlines.

Flat graphics is a very popular technique used in the design field. I chose this type of illustration for its simplicity and its powerful effect for an image.

A. Type: Flat Graphics
Computer Graphics Generated

Figure 2.1 shown on pg. 21

Title: The Runner

1. Time: 2 hours and 20 minutes
2. Materials: 1 roll of 20 exposures, ASA 100
Ektachrome daylight 35mm Kodak film

150mm zoom lens, tripod

one 5 1/4 inches double sided, double density
soft sector disk
3. Cost: \$25 ten 5 1/4 inches disks
\$30 color prints (c prints), 8x10 inches
\$10 slides development
\$9.50 rental fees for zoom lens
4. Flexibility:

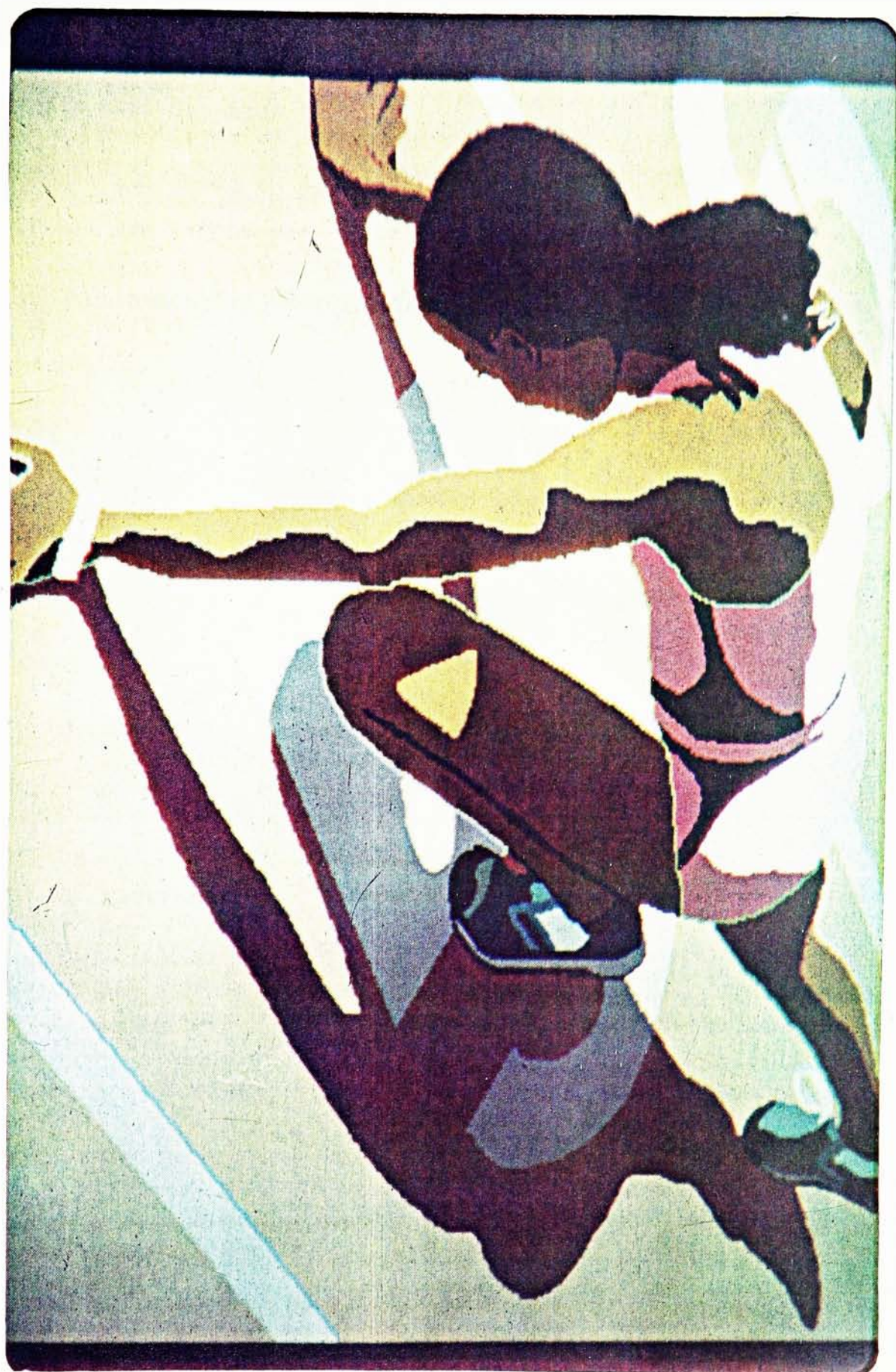
The filling option gives fast results. I used the scanner to duplicate the photo of the runner from a magazine. This process took about ten minutes to have the image grabbed. The scanner provides the four-color processes using the colored filters. This enabled me to get the exact colors I wanted.
5. Color: I used the colors that were grabbed by the scanner, using colored filters. The image-grabber give blends of colors and I can either omit some or keep all for color adjustments.
6. Dependability:

Getting the right colors from the scanner provides the beauty of natural tones that I can develop for shades and lights. There are some highlights and shades in the image

that help me create the necessary tones and give that strong impact of form and structures.

7. Author's Alterations:

I was told to add a few more contour lines to develop more impact to the figure, which helped make the colors look stronger.



B. Type: Flat Graphics
Traditionally-Rendered

Figure 2.2 shown on pg. 24

Title: The Runner II

1. Time: 6 hours and 15 minutes
2. Materials: 1 hot press illustration board
1 box of seven Liquids acrylic paints
3 red stable brushes
1 roll of frisket film
razor blades
masking tape
plastic jar
old rag
ruling pen
t-square, triangle, and ruler
palette
tracing paper
slide projector
3. Cost: \$1.50 illustration board
\$17 box of Liquids acrylic paints
\$9.50 slide projector rental
\$3 masking tape
\$8 roll of frisket film
4. Flexibility:

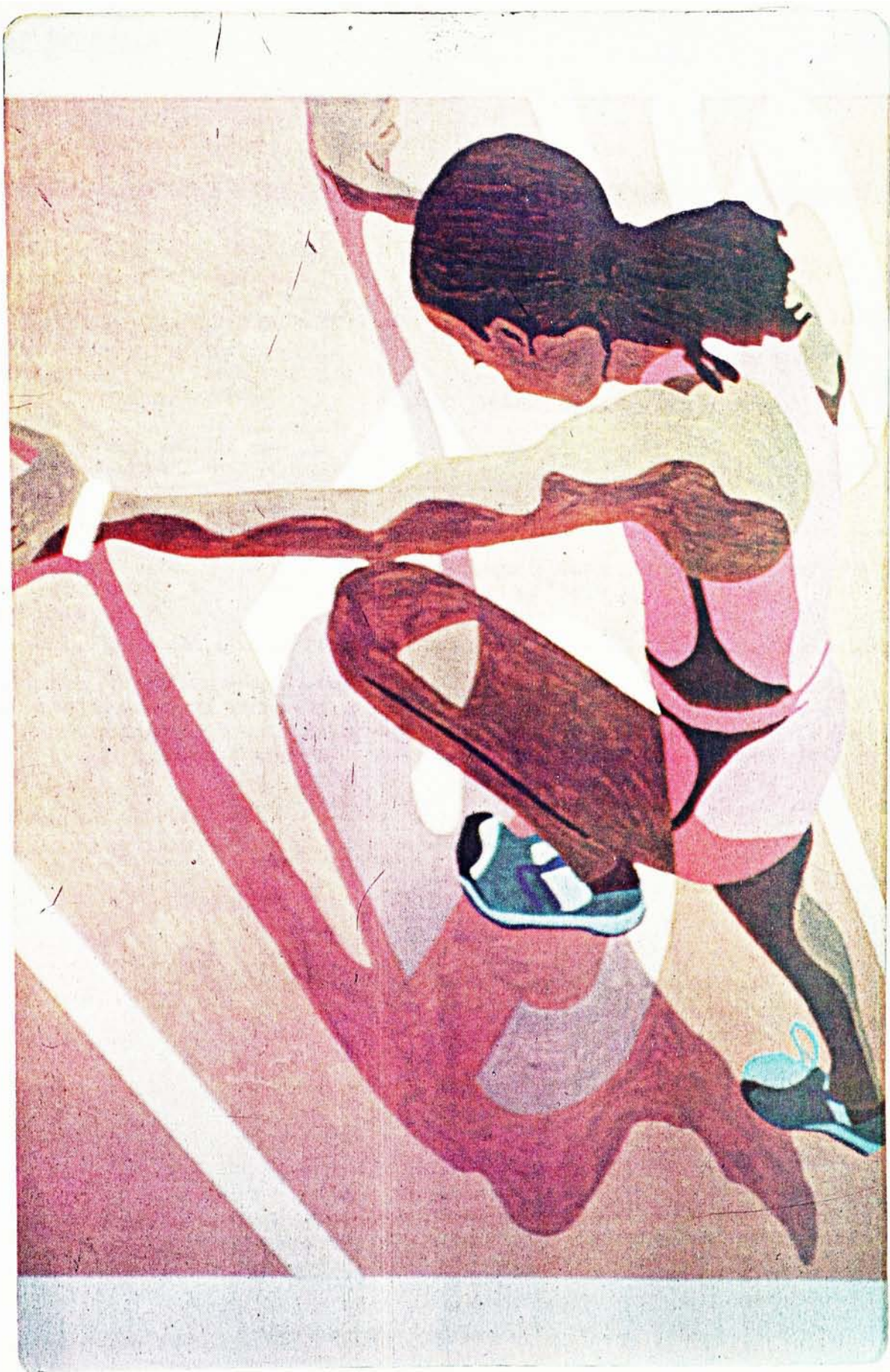
It took me longer to mix the colors and it was not easy to get the right tone. The brushstrokes give marks that I did not want, and caused the colors to become weak.
5. Colors: The colors are very light and bright. I only mixed three colors to get the blend for the shade or light of the image. It took me 2 1/2 hours to mix the colors. After painting some areas, I left too much paint that I did not need anymore.

6. Dependability:

I depended on the quality of brushes I used to control the strokes on the image. I also depended on the quality of paint to enable me to get the nice blend of two colors.

7. Author's Alterations:

I had to darken the colors a bit and fix the strokes into a smoother texture in order to get the strong impact of flat graphics.



Comparison/Contrast

Computer Graphics Generated | Traditionally Rendered Illustration

Solid colors are sharp and clear. No textures shown.

Solid colors are weak with very obvious brushstrokes shown.

Colors are easy to get for the shades and tones of the figure. Imagegrabber inputs the fine tones from a photograph which can be used to sharpen the colors more.

Mixing colors took me 2 1/2 hours to make the tones. Later, I had too much paint on the palette.

Work hours took me 2 hours and 20 minutes to develop the image.

Work hours took me 6 hours and 15 minutes to develop the image.

Computer graphics generated has the impact of producing brighter colors which makes this image a more powerful look.

The concept of the colors is more of a rough sketch rather than a formal impact that fits the relationship to this type of illustration.

Making a collage is one form of editorial concept that I wanted to develop, because it is a very powerful way of communicating a lot of information. To give the images some interrelationship I overlapped each of them. In this research, I experimented with depths and textures to form a powerful visual effect.

B. Type: Collage-Combination
Computer Graphics Generated

Figure 3.1 shown on pg. 28

Title: Horton Plaza

1. Time: 5 hours
2. Materials: 1 roll of 20 exposures, ASA 100
Ektachrome daylight Kodak film

150mm zoom lens, tripod

one 5 1/4 inches double sided, double density
soft sector disk
3. Cost: \$25 box of ten 5 1/4 inches disks
\$30 color prints (c prints), 8x10 inches
\$10 slides development
\$9.50 zoom lens rental
4. Flexibility:

Using the image grabber gives a nice result to colors. I can move four photos around to get the best "collage" look and composition. The flexibility is that I can move the photos around over and over again in a short time.
5. Color: Colors give softer pastel tones.
6. Dependability:

The capability of using the text function is useful. I depend on the style of the type that will work with the image.
7. Author's Alterations:

The first typography was too small. I changed the size to six points larger. The type was also too light in color, and had to be made darker.

H O R T O

*The new
and old*

A Z Z A



A. Type: Collage-Combination
Traditionally Rendered

Figure 3.2 shown on pg. 31

Title: Horton Plaza II

1. Time: 9 hours

2. Materials: 1 hot press illustration board
1 box of seven Liquids acrylic paints
razor blades
3 red sable brushes
old rag
plastic jar
palette
masking tape
tracing paper
frisket film
ruling pen
gerotype transfer lettering
slide projector

3. Cost: \$17 box of Liquids acrylic paints
\$1.50 illustration board
\$3 masking tape
\$8 roll of frisket film
\$9.50 slide projector
\$3 half sheet gerotype transfer lettering

4. Flexibility:

It was easy to create surfaces in the collage. To create depth for the photos in showing a 3-dimensional look was more difficult and time-consuming.

5. Color: The colors are a bit lighter and not as strong. The technique took longer, but was more creative. I used a lot of values to create the pastel tones. Paint gave a nice color result for this image.

6. Dependability:

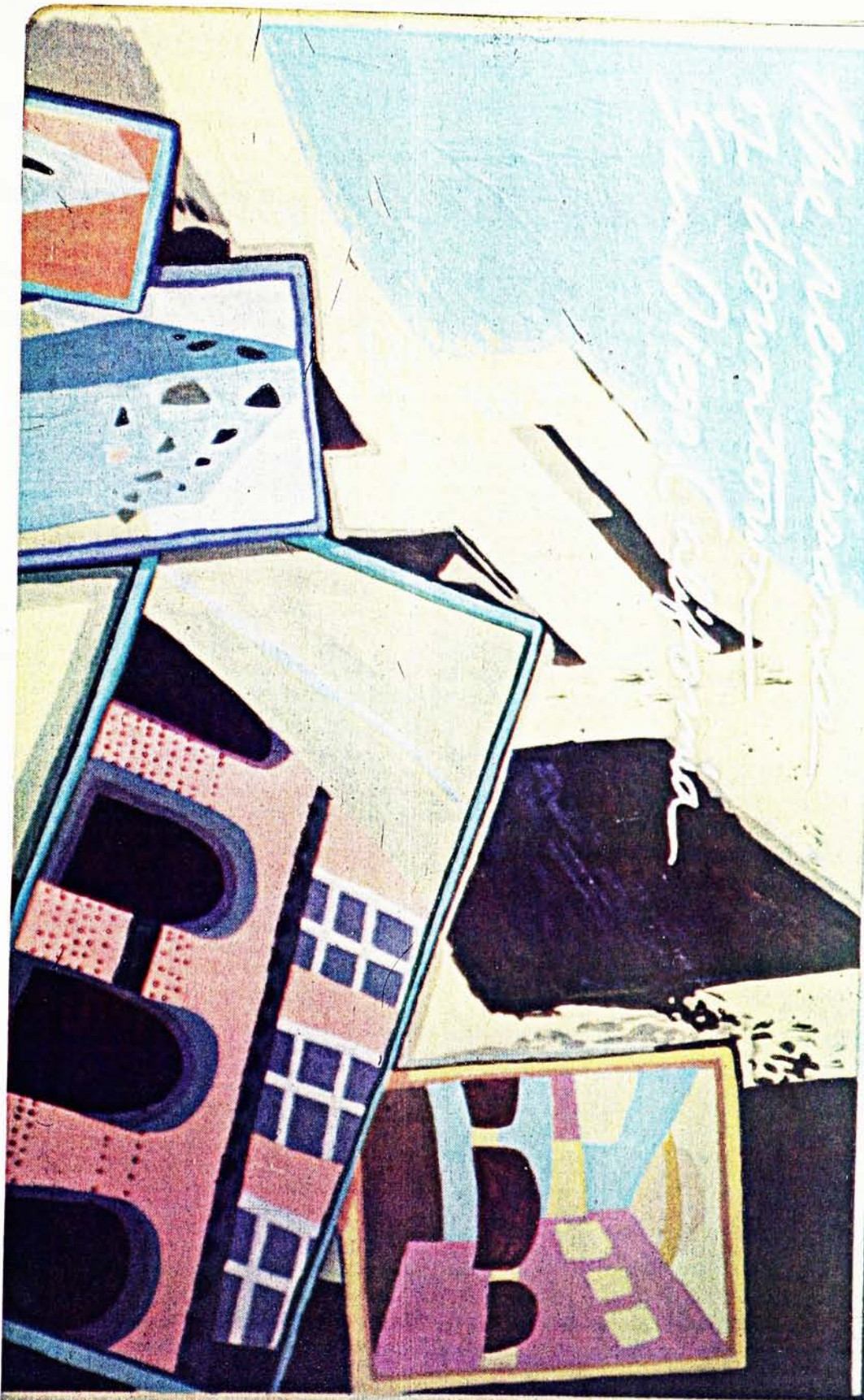
This process is not as dependable because it depends on many different steps and processes.

7. Author's Alterations:

I had to darken the type on the background to give more contrast. The color on the type and the back building were too close to the same tones, and they made the type difficult to read.

H O R T O M P L A Z A

*The new museum
of downtown
San Diego California*



Comparison/Contrast

<u>Computer Graphics Generated</u>	<u>Traditionally Rendered Illustration</u>
The type is crisp and sharp, much easier to place on the image, and easier to read.	Rendering the type was difficult to do. The brushstrokes were hard to control, especially when working on small items.
Moving around the photos from the image grabber was a time-saving solution.	Moving around photos on traditional illustration requires many rough sketches using tracing paper, to get the collage I want.
For placing letters on the image, the computer has the function to provide an outlined box that supports the designer in placing the letters accurately.	I have to measure the space and find the balance to put the letters on. Of course, I have to mark dots on the image which can cause dirt.
If the colors on the background do not go well with the other images, I can call the color editing, using the hue function, and find the one that would work. I can do this very quickly.	I had to decide on the colors first before I began to paint. I would take out some tracing paper and color over the image with markers to make the judgement.

Using special effects to simulate a "today" (high technology) image. Most popular for use in communicating to a young audience (8-25 years old).

A. Type: High Technology
Computer Graphics Generated

Figure 4.1 shown on pg. 36

Title: The Digitizing Pen

1. Time: 6 hours and 10 minutes
2. Materials: 1 roll of 20 exposures, ASA 100
Ektachrome daylight 35mm Kodak film

150mm zoom lens, tripod

one 5 1/4 inches double sided, double density
soft sector disk
3. Cost: \$25 a box of ten 5 1/4 inches disks
\$30 color prints (c prints), 8x10 inches
\$10 slides development
\$9.50 zoom lens rental
4. Flexibility:

I like using a pattern to create a special
effects look. I began to know more about
the technique of using the pattern mode that
provides special effects looks.
5. Color: The colors are unbelievable. They are
perfectly representative of a "metallic
look". The color gradation provides the
smooth, shining look.
6. Dependability:

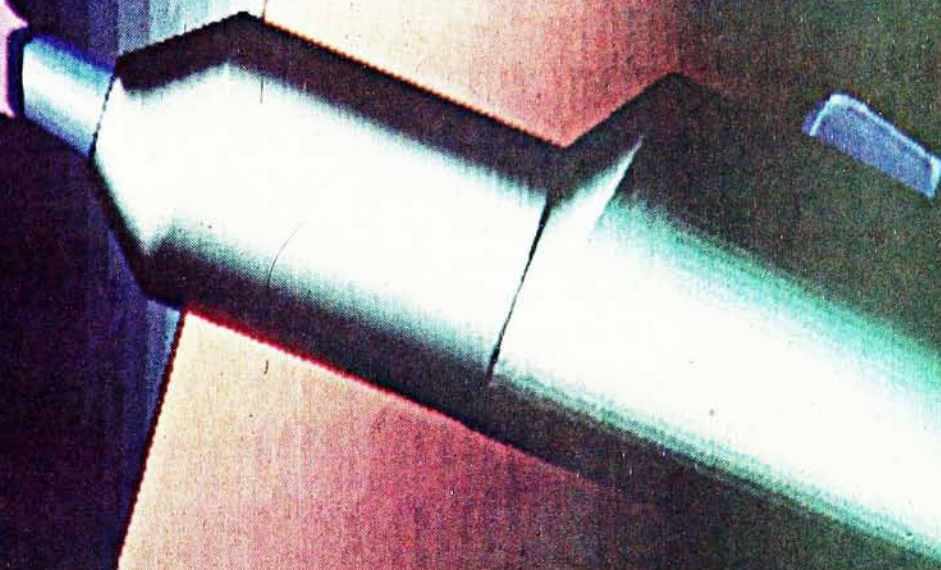
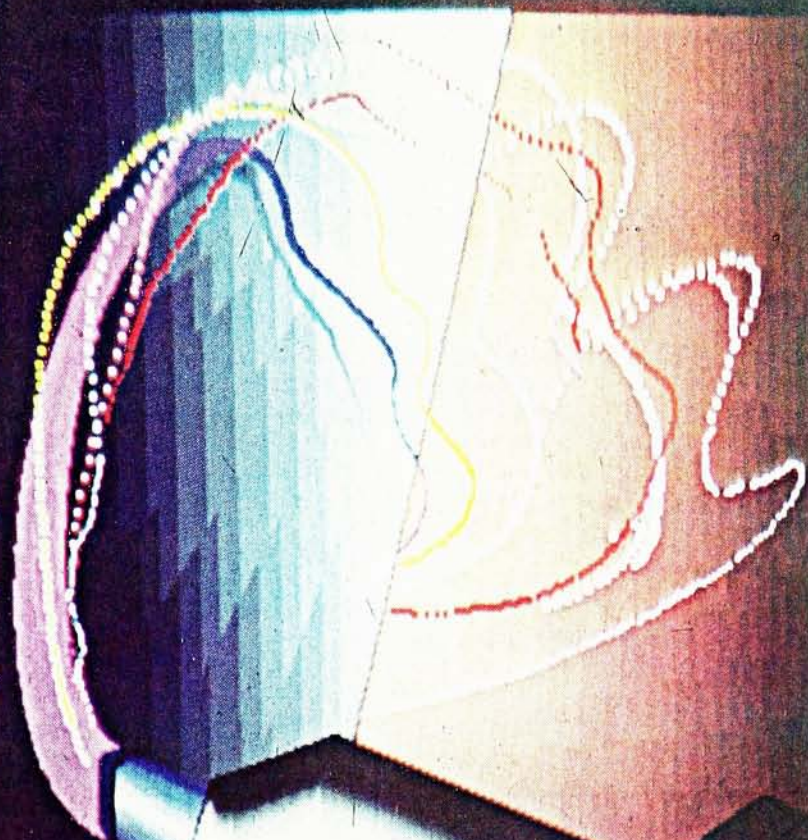
The shading function is dependable,
especially for the metallic look. If the
colors do not look right, I can adjust the
color spread.
7. Author's Alterations:

The shape of the pen was adjusted. The back
ground was changed into a diagonal horizon

line. The type was too small and dark. I enlarged the type to six more points. The shape of the upper pen was out of proportion.

C
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B. Type: High Technology
Traditionally-Rendered

Figure 4.2 shown on pg. 39

Title: The Digitizing Pen II

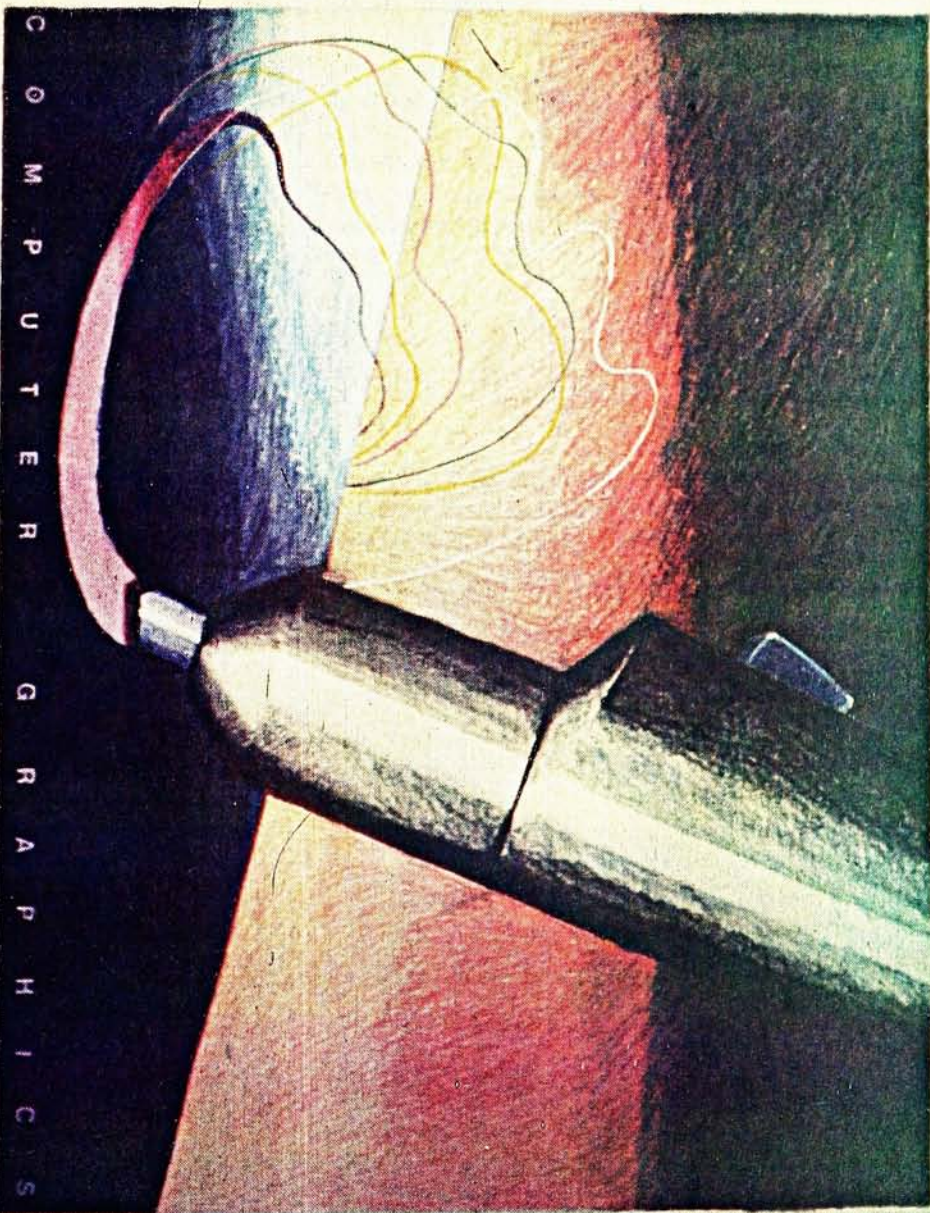
1. Time: 7 hours and 30 minutes
2. Materials: colored pencils
1 hot press illustration board
masking tape
1 roll of frisket film
3. Cost: .75 for each colored pencils (total of 14)
\$1.50 illustration board
\$9.50 slide projector rental
\$3 masking tape
\$8 roll of frisket film
4. Flexibility:

The texture using colored pencils, gave the wrong visual look for high technology for it has too much visual texture and was not strong enough. Airbrushing will work better. I worked with an airbrush, but then I ended up with ink spots sprayed too hard. I decided not to work with airbrush. It would have taken me longer to do better.
5. Color: The colors are quite different when they are overlapped with layers of colored pencils. I put 4-5 colors to make a new blend.
6. Dependability:

I had to depend on the technique that colored pencils can provide for a "metallic look". It did not work very well. It is the totally wrong kind of medium to use for a high technology style.

7. Author's Alterations:

The entire image looks like a rough sketch, and it has a very weak color. I did not do any changes. I would have to do another image but with a different medium, possibly with airbrushing. Next time I will spend some time warming up my skills with airbrushing.



Comparison/Contrast

<u>Computer Graphics Generated</u>	<u>Traditionally Rendered Illustration</u>
High Technology means power, special effects, and three-dimensional objects. The computer graphics work very well with the uses of high technology style. It has an almost perfectly realistic way of giving the image a strong impact. The system has the capability of making a good three-dimensional looking object.	High Technology in this style does not have the capability of making this image effective without spending a lot of time. It does not have the impact for making a special effects look strong enough. Airbrushing is one of the best tools to work with to achieve this "high tech" look, but special facilities are needed.
The system has the flexibility to make the texture into a smoother blend with added highlights.	Using the wrong tools does not help to give a smooth reflective image. Getting a smooth texture can be used by airbrushing.
The colors absorb the viewer's eyes better in the CRT. The colors have the blended mixture of depths that can be seen easier in the CRT.	Viewer's perceptions of this image are different, depending on how close a person is to it. Standing back a little bit helps gives a better result when looking at a realistic object.

To investigate how effective charts and graphs can be produced. I am experimenting with elements that have the capability to communicate specific information, and with colors that give meaning to the viewer's eyes.

A. Type: Charts and Graphs
Computer Graphics Generated

Figure 5.1 shown on pg. 44

Title: Snacks are Important

1. Time: 3 hours

2. Materials: 1 roll of 20 exposures, ASA 100
Ektachrome daylight Kodak film

150mm zoom lens, tripod

one 5 1/4 inches double sided, double density
soft sector disk

3. Cost: \$25 box of ten 5 1/4 inches disks
\$30 color prints (c prints), 8x10 inches
\$10 slides development
\$9.50 zoom lens rental

4. Flexibility:

Changes that must be made are the numbers
and ratios, where they are often modified at
certain times. I can save the image on the
disk and use it again to change specific
items in the charts and graphs.

5. Colors: Color is important, because it communicates
a lot of information and attracts attention.

6. Dependability:

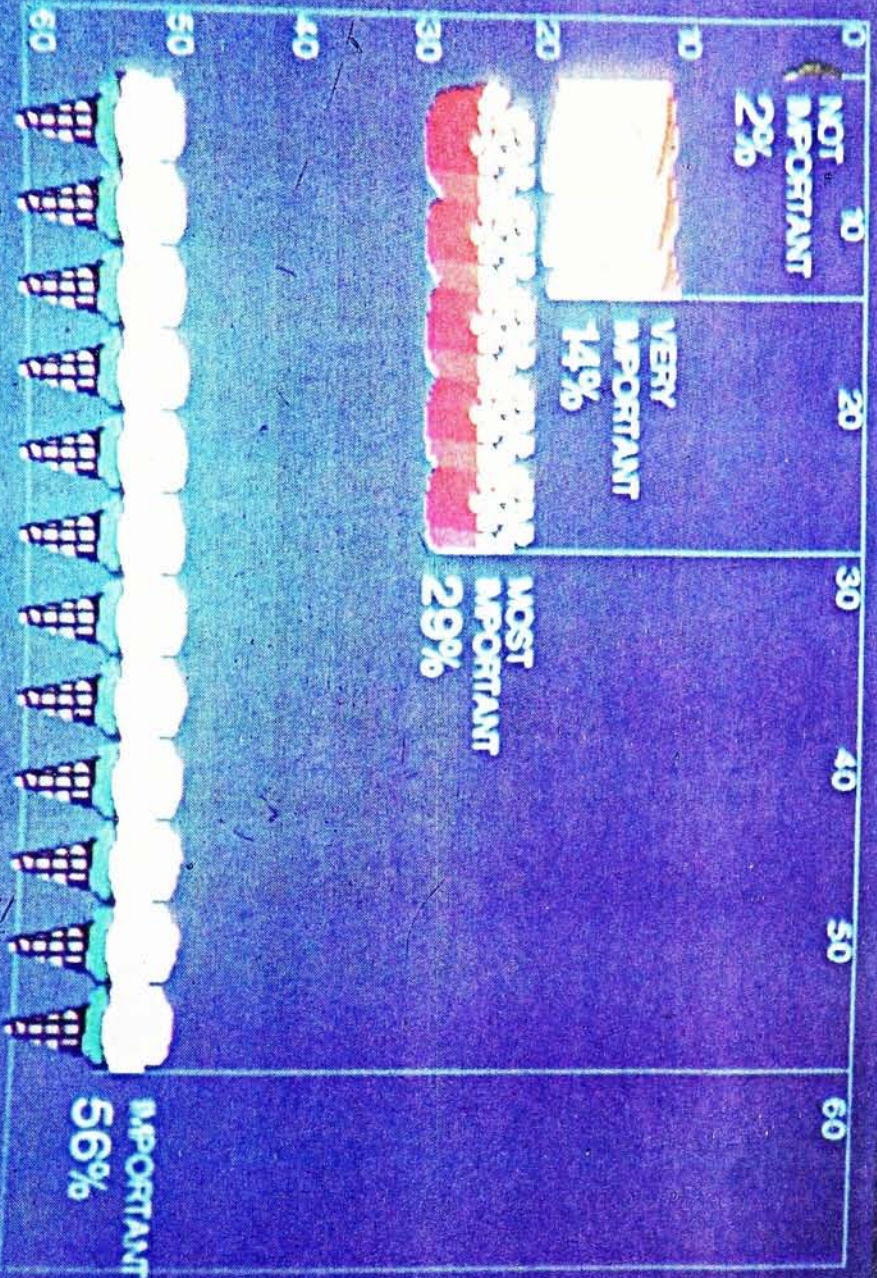
This system is very dependable, easy to save,
easy to change and very fast all the time.

7. Author's Alterations:

The banner was too short and the logo was
too big. I fixed both into a better shape.
The logo is fitted into the banner. The
letters were difficult to read. I lightened

the colors and I enlarged the size to six more points. I added a few more depths for the background that would help the small images to stand out more.

How Important Are Snacks



B. Type: Charts and Graphs
Traditionally-Rendered

Figure 5.2 shown on pg. 47

Title: Snacks are Important II

1. Time: 12 hours

2. Materials: colored pencils
a box of seven Liquids acrylic paints
razor blades
t-square, triangle, and ruler
ruling pen
1 hot press illustration board
old rag
plastic jar
palette
masking tape
frisket film
tracing paper
3 red stable brushes
slide projector

3. Cost: .75 each for colored pencils (total of 14)
\$17 a box of Liquids acrylic paints
\$1.50 illustration board
\$9.50 slide projector rental
\$3 masking tape
\$8 roll of frisket film

4. Flexibility:

The flexibility is less efficient in traditional illustration. Sometimes, a frisket film will tear the paper off the illustration, because it was pressed too hard. The ruling pen makes a mess by adding too much paint.

5. Color: Painting the background was still another difficulty of making gradated colors. I used no more than ten shades. The paints used were mixed with three colors---purple, red and a lot of blue. I added some white for the light shades. Colored pencils helped to cover the lines of gradated colors.

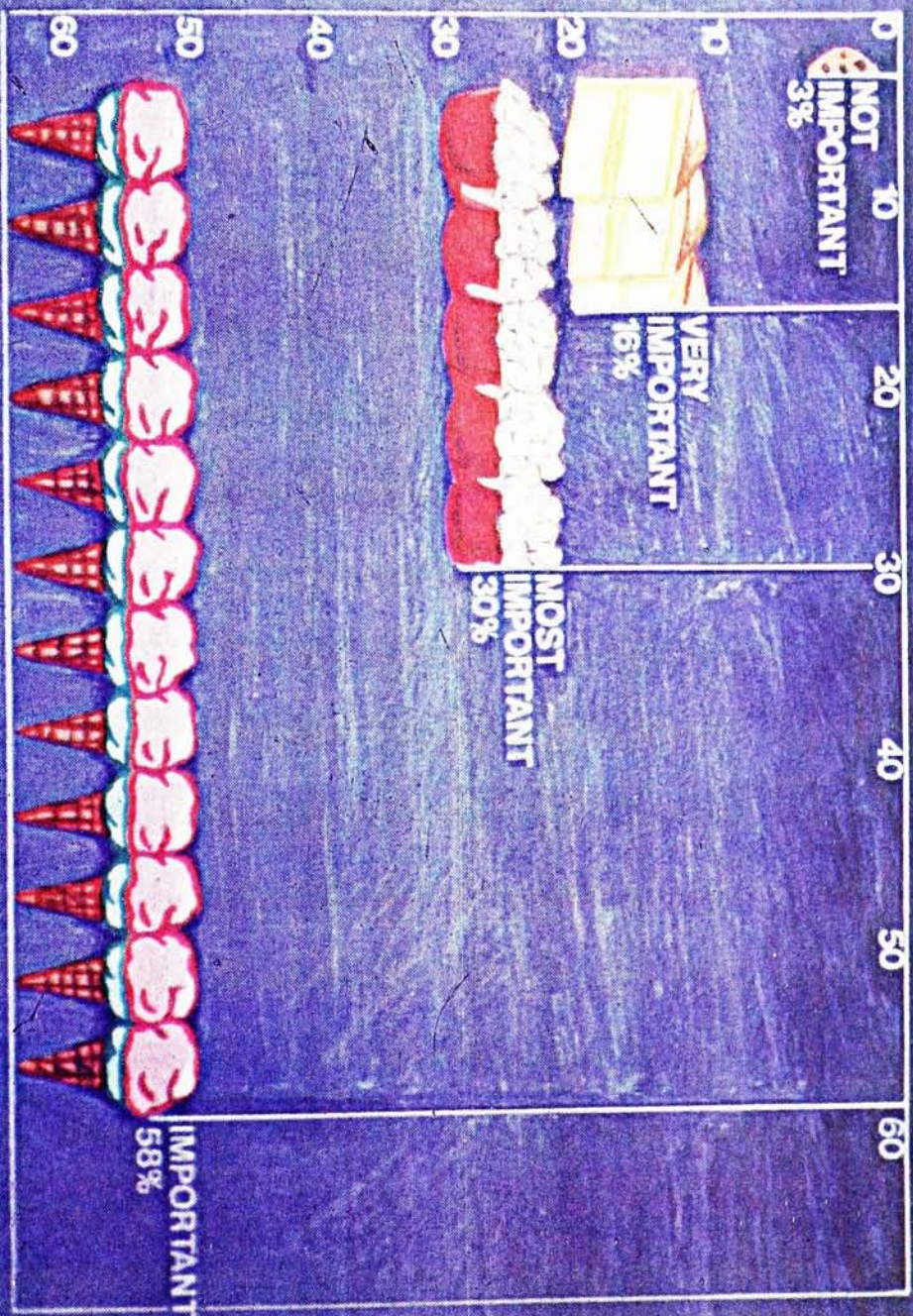
6. Dependability:

Using paint and other media is less dependable, because of the factors beyond my control like weather conditions (humidity). Because the work is totally dependent on me, if anything is physically hurting, or things are on my mind, it can effect the end product.

7. Author's Alterations:

First, I started with hand lettering to make prints. It did not look clean and sharp. So, I used the gerotype transfer letters and then embossed over the letters with another color.

How Important Are Snacks



Comparison/Contrast

<u>Computer Graphics Generated</u>	<u>Traditionally Rendered Illustration</u>
<p>Colors seem to be very powerful for charts and graphs. They communicate information. The colors are solid and absorb the viewer very well. This is important for this design concept because the computer has the tools to create this kind of imagery.</p>	<p>The softer colors here are successful for a different function than developing charts and graphs. This approaches a totally different aspect of design, because the colors are weaker and too flexible. This is a different concept that does not work well with charts and graphs.</p>
<p>Textures are smooth and give the images more impact. There are no brushstrokes or marks to detract from this type of design.</p>	<p>Textures are shown by the brushstrokes. It is not easy to provide a smoother texture. This causes the entire image to look more like a coloring book.</p>
<p>Using the computer is most demanding in this design. It is the technology that gives the updated style.</p>	<p>Traditional illustration is inappropriate for this style of design. It does not have the character to fit this style of charts and graphs.</p>

To experiment with colors and textures that are extremely important to this style, and to investigate which tools provide a better technique.

A. Type: Fashion Illustration
Computer Graphics Generated

Figure 6.1 shown on pg. 52

Title: Fashion Illustration

1. Time: 45 minutes

2. Materials: 1 roll of 20 exposures, ASA 100
Ektachrome daylight 35mm Kodak film

150mm zoom lens, tripod

one 5 1/4 inches double sided, double density
soft sector disk

3. Cost: \$25 of ten 5 1/4 inches disks
\$30 color prints (c prints), 8x10 inches
\$10 slides development

4. Flexibility:

Using the texture-pattern mode gives the repetition of the same pattern I made the first time. Preserving the pattern in storage can be a tool-kit for later times. I will not need to create the same pattern again.

5. Color: Texture-pattern mode develops interesting connections to colors. Big black dots interact with thin pale yellow lines to give new relationships to colors. Other created lines and dots with colors encountering each other built some character. Colors develop that character of a new "fabric look".

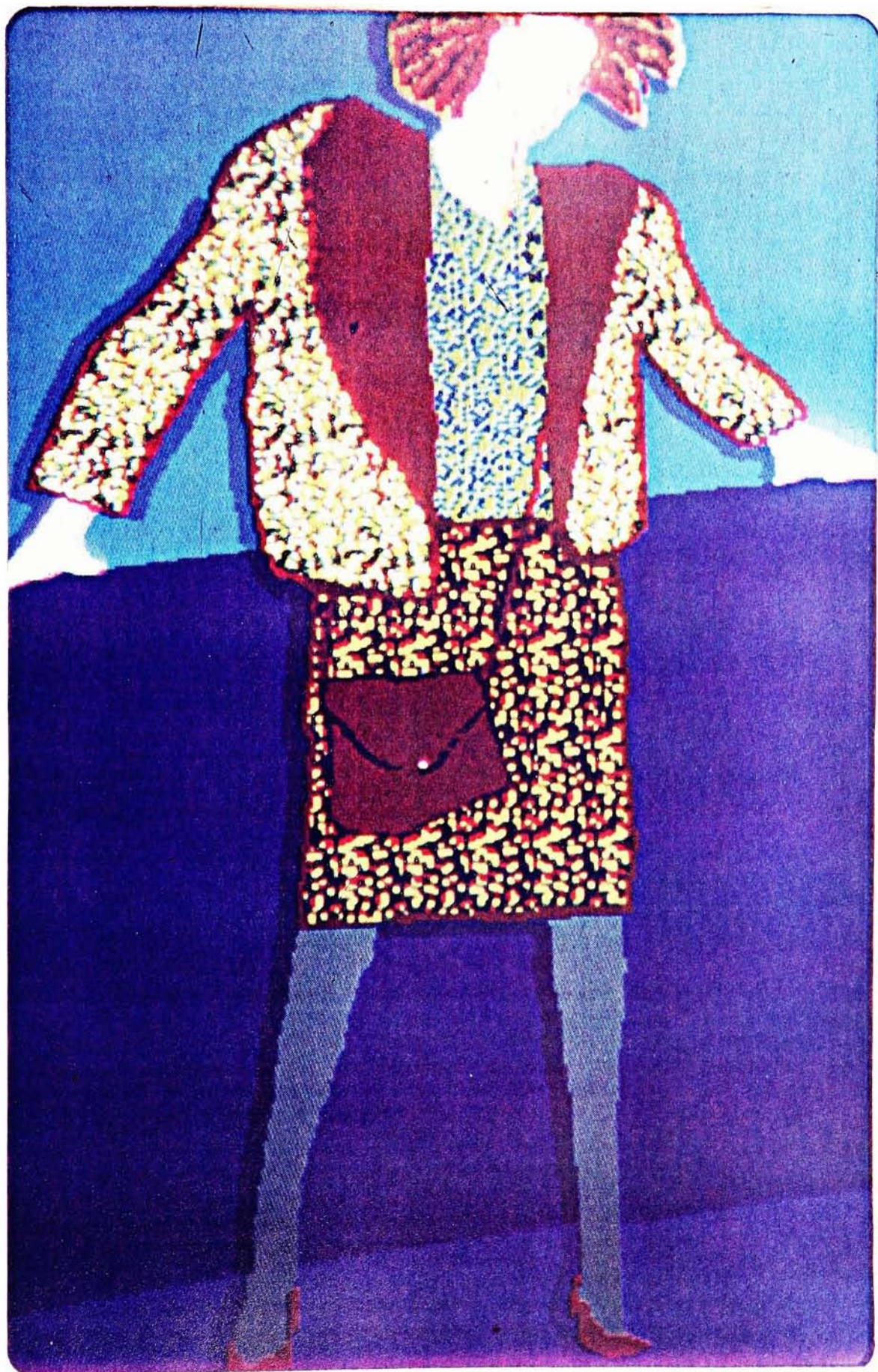
6. Dependability:

Developing new patterns help me use the techniques that the computer provides. The texture-pattern mode makes a repetition.

7. Author's Alterations:

The first time I made the fashion illustra-

tion, the figure of a woman was not in the right shape. The shape I created was too short and chubby. There was no neck showing. I learned that fashion illustration means very stylish, slim, and tall. So, I made the second one. The second image that I created took 45 minutes to design the figure. This time I made the figure much slimmer, taller and stylish. The colors are good.



B. Type: Fashion Illustration
Traditionally-Rendered

Figure 6.2 shown on pg. 55

Title: Fashion Illustration II

1. Time: 6 hours and 15 minutes

2. Materials: 1 hot press illustration board
1 box of seven Liquids acrylic paints
razor blades
3 red sable brushes
old rag
plastic jar
palette
masking tape
tracing paper
frisket film

3. Cost: \$17 box of Liquids acrylic paints
\$1.50 illustration board
\$3 masking tape
\$8 roll of frisket film

4. Flexibility:

The brushstrokes gave a nice textural surface that the computer cannot produce. Thickening lines create some fabric looks with the controlling of a brush.

5. Color: There are different hue, chroma, and value to these colors in the image. The colors are effective for fashion illustration. It is traditionally made for that kind of image that develops different tones of colors.

6. Dependability:

I depended mostly on the brushes, and the way I controlled them. Creating some strokes provided aspects of texture-pattern.

7. Author's Alterations:

The first image did not go well as the figure was also chubby and short. I made a second one and tried to make the colors more challenging. I controlled the brushes and made some better textures. The colors are also good.



Comparison/Contrast

Computer Graphics Generated	Traditionally Rendered Illustration
<p>The texture-pattern mode has the capability of repeating a pattern and then saving it on a disk as a tool-kit for some other times. The repetition of a pattern is all the same.</p>	<p>I have to continue to finish making the pattern when the paints are still mixed and damped. It would be difficult to get the same pattern back in later times. No patterns are the same here.</p>
<p>There is no control on the brush where I can alter the thickness and thinness of lines at the same time. I have to change the sizes everytime I go into brush mode.</p>	<p>I can use the same brush and control the tip with my hand, making various thickness and thinness to lines without having to go back and forth using different brushes.</p>
<p>Getting the "computerized look" from low-resolution graphics provides new "fabric looks".</p>	<p>Playing around with the brush gives the similiar idea of creating lines for the new "fabric looks".</p>
<p>Colors are more flexible to choose from, when I want to develop natural colors, or anything that is not yet created.</p>	<p>You must have a whole selection of colors to create new ideas for fashion. They are expensive to buy, and are very time-consuming when mixing new pigments.</p>

To show humor in characters. Usually done in line for the casual look.

A. Type: Humor
Computer Graphics Generated

Figure 7.1 shown on pg. 60

Title: Dolly Parton

1. Time: 4 hours

2. Materials: 1 roll of 20 exposures, ASA 100
Ektachrome daylight 35mm Kodak film

150mm zoom lens, tripod

one 5 1/4 inches double sided, double density
soft sector disk

3. Cost: \$25 box of ten 5 1/4 inches disks
\$30 color prints (c prints), 8x10 inches
\$10 slides development
\$9.50 zoom lens rental

4. Flexibility:

The shading option gave the flexibility of making soft shades around Dolly's eyes, lip, and the whole hair. Also, the texture push average in the painting mode helps me smooth out the different tones on the hair.

5. Color: For the lip and the eyes, I can add a few highlights, using luminosity. This is very helpful, and enables me to make better judgements. The colors are bright to add some joyfulness to the image.

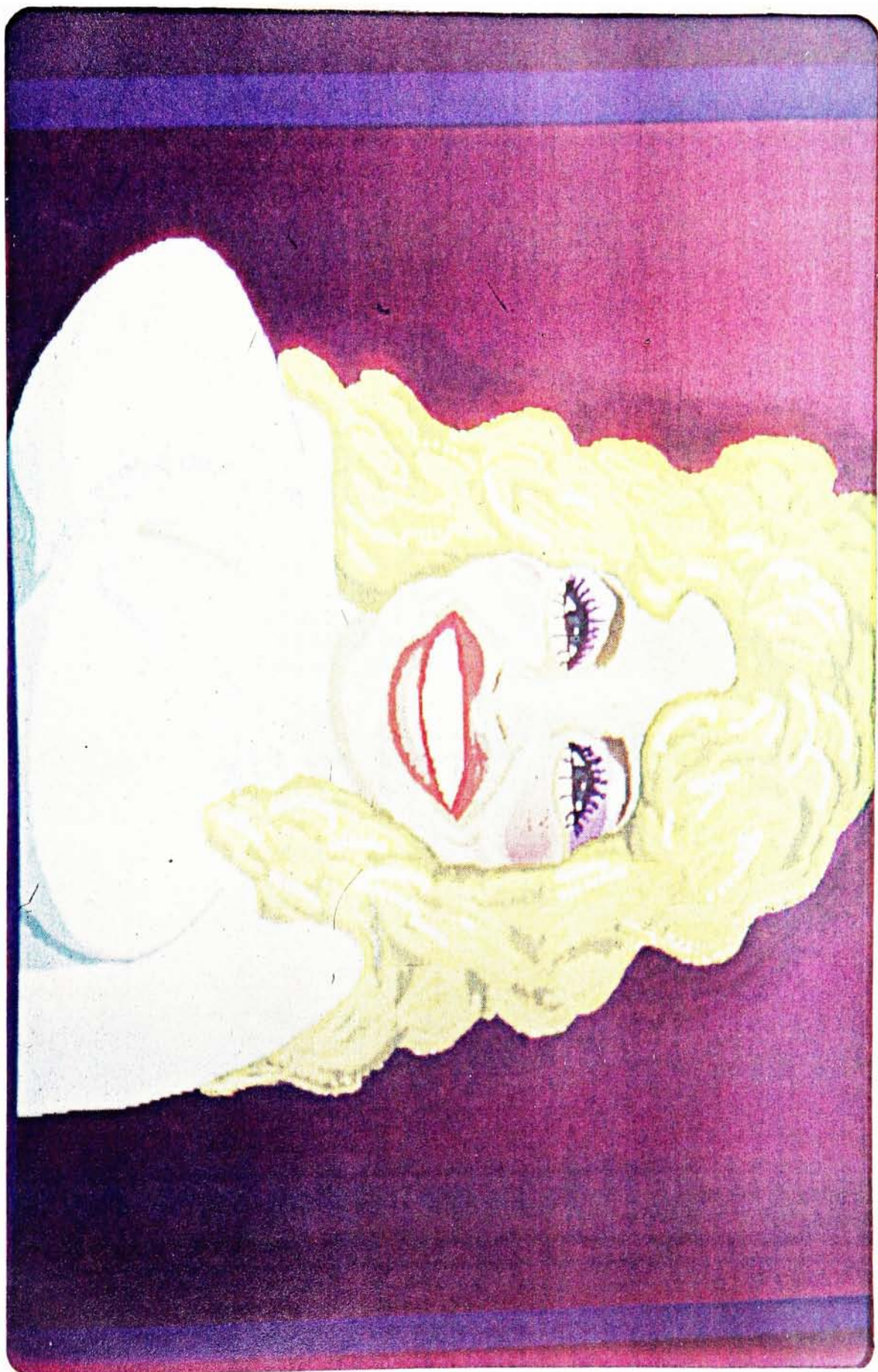
6. Dependability:

I depend on the zoom to focus on the colors to get some touch-ups. The close-ups help me clean up unnecessary colors and dots.

7. Author's Alterations:

The colors are effective in the computer graphics and it works well for this humorous type of illustration. The only

adjustment I had here was to smooth out the jagged marks in the background.



B. Type: Humor
Traditionally-Rendered

Figure 7.2 shown on pg. 63

Title: Dolly Parton II

1. Time: 5 hours

2. Materials: colored pencils
1 hot press illustration board
box of seven Liquids acrylic paints
razor blades
3 red sable brushes
old rag
plastic jar
palette
masking tape
tracing paper
frisket film
ruling pen and ruler
slide projector

3. Cost: \$17 box of Liquids acrylic paints
\$1.50 illustration board
\$3 masking tape
\$8 roll of frisket film
.75 each for colored pencils (total of 7)
\$9.50 slide projector rental

4. Flexibility:

It was difficult painting the eyes and the lip to get the right tones. It was also difficult painting very small lines and making some shades. It was much easier coloring the hair, using three shades of yellow.

5. Color: The colors are bright enough to have a relaxing, comic effect on the viewer when looking at the humorous image. I used four colors for the background and provided some nice textures to make some activity.

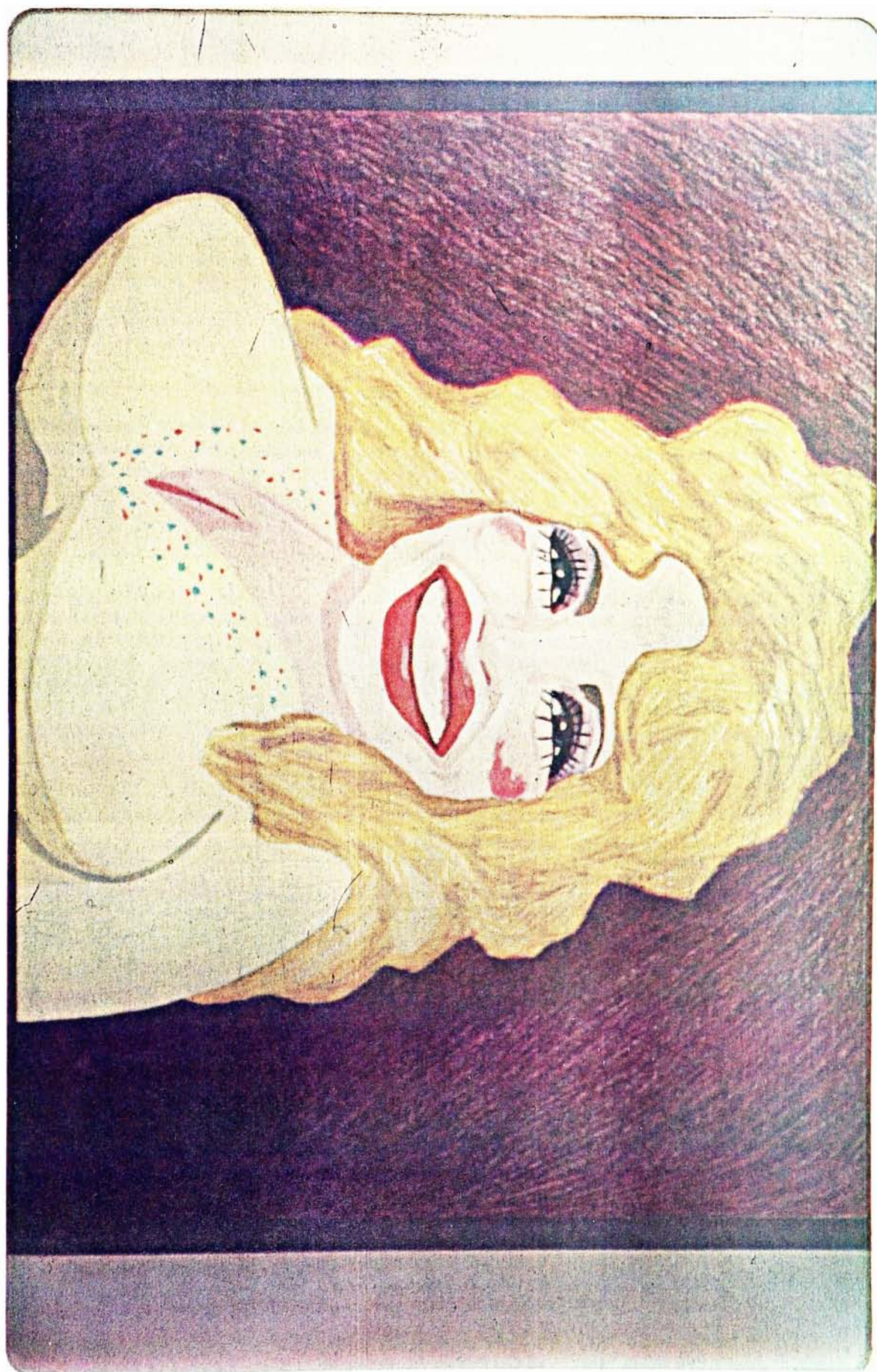
6. Dependability:

I depended on working with fine lines to get

the nice blends for the colors on the eyes
lip. It was not easy.

7. Author's Alterations:

There were very few adjustments to this
image nor any additions to the colors, except
that I had to fix the background a bit more
to bring out more textures.



Comparison/Contrast

<u>Computer Graphics Generated</u>	<u>Traditionally Rendered Illustration</u>
Working close-up on a fine line or shape in the image is easy by using a zoom in the system.	I had to use a fine brush and hold my hand still to make fine lines. I had to bring myself close to the painting and do careful lines, which tired my eyes very quickly.
I can create a better color solution to give the shining look of the lip by using the shading option.	I had to put a limited number of colors, to get a shining look on the lip. Otherwises, I would have so much paint on the lip that it would show depths.
Using the texture-push average from the paint mode can give me the opportunity to smooth the jagged colors on the hair.	I used colored pencils to do a lot of textural lines for the hair. It does not look well with smooth lines of paint for the hair. It looks different than the computer image.

To experiment with the techniques that the computer has in its software by using different brushstrokes, colors, and textures, similiar to those used in a traditional illustration.

A. Type: Editorial Illustration
Computer Graphics Generated

Figure 8.1 shown on pg. 68

Title: The Three French Women

1. Time: 4 hours and 30 minutes
2. Materials: 1 roll of 20 exposures, ASA 100
Ektachrome daylight 35mm Kodak film

150mm zoom lens, tripod

one 5 1/4 inches double sided, double density
soft sector disk
3. Cost: \$25 box of ten 5 1/4 inches disks
\$30 color prints (c prints), 8x10 inches
\$10 slides developments
\$9.50 zoom lens rental
4. Flexibility:

I had the opportunity to use the repetition
of texture-pattern for the three women. I
also had the opportunity to experience the
different sizes of brush to create some lines
and dots. The pattern making is very
flexible and fast to do.
5. Color: The colors that I used are mostly three
different shades of one color for each woman
and the shapes. Then I evaluated the
luminosity and saturation to get the right
connections for each tone of colors.
6. Dependability:

I depended on the lines that I was creating
with. The lines made some textures and
depths for each figure and the shapes. Then
I depended on the three shades of each
different color later.

7. Author's Alterations:

There was some need to do adjustments for the figures. The hands were out of proportion. The hair on each head was also out of proportion.



B. Type: Editorial Illustration
Traditionally-Rendered

Figure 8.2 shown on pg. 71

Title: The Three French Women II

1. Time: 15 hours

2. Materials: 1 hot press illustration board
1 box of seven Liquids acrylic paints
razor blades
3 red sable brushes
old rag
plastic jar
palette
masking tape
tracing paper
frisket film
slide projector

3. Cost: \$17 box of Liquids acrylic paints
\$1.50 illustration board
\$3 masking tape
\$8 roll of frisket film
\$9.50 slide projector rental

4. Flexibility:

The flexibility I had with this painting was the use of controlling the brushes. The textural surfaces provide a nice result.

5. Color: The colors are more challenging here, because I did not have to do so much mixing of pigments and get enough to paint the whole figure. I just added some new colors on the images by using my eyes to evaluate the colors.

6. Dependability:

I depended on the brushes and the lines that I created. If I discovered some interesting lines, then I would start depending on the brush that I painted.

7. Author's Alterations:

The lines are beautiful and very creative. The colors are almost perfect for the lines and textures. The only problem here was the hands were out of proportion. I painted over the hands and created a better shape. They came out better.



Comparison/Contrast

Computer Graphics Generated	Traditionally Rendered Illustration
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The colors are very effective in this image.	The colors work beautifully for this image. They work well for this type of illustration.
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I had better control of using the luminosity and saturation when making three shades of each color. I picked one color and then I used the luminosity or the saturation to adjust the tone. This is a very quick process to make new shades of one color.	I had to make my own mixing and use my own judgement in getting the right tone for each color. Sometimes, I would just mix the color without having to look for the right tone. It can be bothersome.
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For the last three categories, of reproductibility, updates, and storage, computer graphics generated illustrations and the traditionally rendered illustrations are discussed together.

Reproductibility:

There seemed to be more complications with the reproduction work on photo prints in the computer graphics generated illustrations than the traditional illustrations.

In the beginning of generating computer graphics, I used a camera scanner for duplicating photos. There was no problem producing photos with the imagegrabber. The pictures came out very well.

When the images were completed, I was ready to have the reproduction work done in color prints. I asked one of my thesis committee, Mr. James Ver Hague, about producing slides by the Artronics/3M Corporation. I wanted to have the work done directly from the disks into higher resolution quality slides. This technique gives cleaner, and sharper edges. The system fills in between pixels which makes the images less ragged in shape. Unfortunately, I was running out of time. So, I asked Mr. Ver Hague about the color printer located in the class room; if it was possible to make some prints. He said, yes, and he would have to order some inks. Later, I found out the color inks would not arrive in time for my thesis work in the show.

At the meantime, the printer was down. The only choice I had left, was to shoot off the screen. I rented a 150mm zoom lens for my 35mm camera. This helps prevent curviness in the images. In order to get sharp colors, I used a Kodak film-Ektachrome daylight ASA 100. The shutter speed was one second, and I experimented with 2-3 fstops, from f/8 to f/11. I shot up to three exposures for each image to get a better selection. After the slides were developed, I had them made into 8x10 inches enlargements. After the prints were made, I brought them to show my thesis committee. They thought the prints were too dark. So, I decided to do another shooting.

I rented the same zoom lens, and bought the same kind of film. The job was better this time. I focused and adjusted the zoom carefully. I also adjusted the remote control on the CRT, and increased the tint brightness for better colors. I used a greater variety of fstops, ranging from f/5.6 to f/16. I shot more than three exposures for each image. After the slides were developed, I asked for higher quality prints. The photo lab said that using Cibachromes will give better prints. The prints here are neither the best nor the worse prints made.

This is one of the disadvantages that I had with computer graphics. Of course, it is more expensive to have the prints made in dye transfers. They take longer to be made into high quality prints, at least three weeks or more, depending on how many prints were developed. Again, it is possible to have good color prints made nicely, but not yet at this time with the equipment we have.

Updates: Updates are common. The computer makes only the change in that part of the illustration that relates to the new information.

Traditional methods require, most times, an entire new illustration.

Storage: Storage is the greatest advantage in the use of computer graphics. The ability to file images and the space-saving for an illustrator are invaluable.

Working with each of the eight categories of illustrations in both computer graphics and traditional illustration, I learned how each one responds differently to their own relationship with technology. I would like to evaluate the processes comparatively on a certain set of factors in the following areas that I developed for investigation. Each area is considered in the production and examination of all sixteen images.

Time is an ever-important factor to consider in comparing possibilities and problems in the use of computer graphics vs. traditional illustration. Several important aspects that I learned through research are to know the parameters of your design skills before you start knowing how to mix colors and to get the colors through example production, which saves time.

Second, is to understand the computer capabilities and to know how to use them properly. It was necessary for me to get familiar with the relative strengths and weaknesses that the computer has in the various software packages.

Third, is to plan decision-making and keep track of every record that I do for each design. This type of organization helps sort times and allows me to know what my duties are for each design. This is also true for traditional illustrations, but in a different direction with clerical record-keeping by hand.

There were some problems that I had with some designs. Sometimes I forgot to look at my time schedules, or I would ignore them for a short time. I tended to spend too many hours on trying to get the appropriate colors. Playing with the computer is one of the major time-consuming aspects of computer graphics. Playing with the computer, however, is both positive and negative. The good part is that I can discover something new from the screen. For example, making a special effect for the "Digitizing Pen", a "metallic look" on one specific area gives a surprising appearance, which I discovered. It is almost a miracle. The bad part is that I can get myself

carried away by spending too much time on the colors or adding more lines. Then I would end up with a terrible image or I would destroy the entire image without saving anything on the disk. These setbacks varied at different times, depending on how well I did with my time management.

Comparing the traditional illustrations and experimenting with handtools: there is really no "play" involved, except for acquired experience with handtools. I can get a nice result by controlling the paintbrush that I do not get from a digitizing pen. I have to watch time more carefully than I do with the computer. To complete an entire image with freehand drawing will take me at least 7 to 38 hours, compared to computer graphics generated illustrations that take 45 minutes to 20 hours. Mixing a few colors with pigments will take about 5 minutes to 2 1/2 hours until I get the appropriate tone. Finding colors and adding a little bit of luminosity and saturation will take 2-30 seconds.

Both the traditional illustrations and the computer graphics that I executed for this thesis used the same images and the same basic design tools. But they are different in relation to the amount of time that I spent on the aspects of the work mentioned above: mixing, achieving luminosity, freehand drawing, etc. Of course, the volume of work and demands of the situation will influence the decision to acquire and use computer graphics in the workplace in order to specifically save time. Such needs will vary.

As for materials, working with the Artro-nics/3M system, I only had to have a limited set of materials in order to work. A box of ten disks was enough for all the production work, and then for the final reproduction, I bought four 24 exposure rolls of Ektachrome film. I rented a zoom lens two times, and used my 35mm camera and a tripod. Comparatively, I must think of all the other materials that I need for traditional illustration, which are expensive to buy, and take up a great deal of space.

Colors are important factors as part of this research, to understand how they work and

what their basic principles are. I took a course in the winter of 1984 in "Color Perception", which I knew would be a benefit for my thesis. I studied colors thru trial and error in front of the color monitor. I began to get the feeling of how colors relate by using my own observation. I started to practice and used my experience on how colors interact with each other.

There are several issues which should be considered in using the computer system for colors; it should be noted in this case, the system was designed specifically for colors. First, the computer avoids mixing of paints which is difficult and tiring. Second, spending so much time on trying to get the right mixing colors, or just wasting so much time on trying to get the right tone in the traditional way of illustration, heightens an active interest in the use of the computer. Third, the computer permits a repeated use of an exact color by using the code numbers after the color palette is called up from storage in the system. Fourth, while making a flat or solid color, especially for "Charts and Graphs" and "Flat Graphics", the computer can avoid unnecessary textures like brush marks and strokes. The solid colors produced by the computer are strikingly powerful and makes them very bright, almost like neons. The color monitor on the CRT (Cathode Ray Tube) absorbs the viewer's eyes very well. However, colors can easily tire your eyes after for a long period of time sitting in front of the monitor. This is different with traditional illustration. The viewer's eyes absorb more of the textural surfaces so that colors become weaker. Although the colors on the traditional illustration are bright, looking at the image with the viewer's eyes makes that color weaker. The brushstrokes interfere with the eyes' absorption of the whole image which gives less attraction to the colors. The CRT that produces bright colors is made with no textures on the screen that can show depths by using the right tones, but it is not yet possible to produce any textural surfaces, unless the system has its program develop such depth surfaces onto color prints. Is that possible for the near future? This aspect relates to flexibility. The technique of drawing diagonal lines in the system or curved shapes produces ragged

edges. The pixels are limited in this system. Higher resolution is needed in order to make the lines look smoother and sharper.

There was something that I found very helpful about the texture-pattern mode in the program. The "Fashion Illustration" in the computer graphics generated illustration gives a creative texture. The texture transformed that "computerized look" into "fabric" looks. This is an excellent approach with limited pixels for fashion illustration. As for the pattern mode, I would first create lines and dots for the pattern, then go into texture mode which provides the capability to repeat a pattern. The system is like a texture on an engraved ink roller which repeats the same pattern as you roll along. But unlike an ink roller, you can use any type of painting functions (line, rectangle, circle, curve, and text). I can save that pattern I made on the disk and use it as my tool-kit for some other time. This is something that I cannot get from a traditional illustration.

Dependability in computer graphics is often evaluated by speed and time. The availability of colors also must be considered. I relied on how good the colors looked, and how they related to each other. Traditional illustration is most often dependent on high quality materials to give a nice result for an image.

Reproductibility, the capacity for obtaining high quality prints, seems to be more of a problem for the computer graphics from my thesis experiment than the traditional illustrations. The technology to produce computer graphics directly on hardcopy is not yet high print quality for any standard techniques at this time.

When meeting with clients for some specific rough sketches or final pieces in the computer graphics generated illustrations, the work can be revised or adjusted by the artists when the client asks to change the image at any given moment. This is one of the advantages that computer graphics has for the capability of the Author's Alterations. When the changes are approved by

the clients, you save the revised images and information in the system, and then come back later to do the same changes very quickly. Discussing with clients over traditional illustration can be very time-consuming. If the work requires a big adjustment, then it has to be done over again.

Storage is one the greatest advantages for computer graphics. As for the storage on the disk, I can save up to ten images per disk, depending on how many bytes the image have. Traditional illustrations are sometimes disorganized for me. I got tired of papers everywhere in the room. I lost some design work, and sometimes could not find it. Keeping the work in a clean, safe area can be a problem later on, when spacious areas became less vacant. I tended to put design work and tools in other rooms. When the illustrations were done, I kept them in the portfolio case.

Through this evaluation, I had an impressive experience in the process of research. I realize, through this thesis, that computer graphics will become dominant over traditional illustration. However, traditional illustration skills and training may always be required for a partnership with the use of computer technology.

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