1978

Some visual elements in typography: a study using original works

Penny Dorfman

Iowa State University

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SOME VISUAL ELEMENTS IN TYPOGRAPHY

A Study Using Original Works

Penny Dorfman

A thesis submitted to the Graduate Faculty in partial fulfillment of the requirements for the degree of Master of Arts

Iowa State University
Ames, Iowa
1978
Signatures have been redacted for privacy
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CHAPTER I

INTRODUCTION

A work of typography must be not only suitable for its purpose and easy to produce, but also beautiful.

Jan Tschichold

Typography was originally a craft which evolved from the invention of moveable type by Gutenberg in 1440. In this thesis typography is considered to be the creative endeavor of arranging letters, words, and images for the purpose of communicating ideas, either through the printing process or through other media.

Typography is a field which has become revolutionized by photocomposition and propelled by the computer. However the technology of typography has moved too quickly without the necessary classic training and understanding of basic principles. These principles have become lost in fast and easy production.\(^1\) Because of the numerous advances in technology together with a growing population, the world is rapidly becoming overwhelmed with printed words. We are hardly able to absorb or use all of the communication produced for books, newspapers, magazines, packages, brochures, letters, posters, and documents. In this explosion of printed material, typography should be far more than simple printing. Clearly new concepts in typography will have to be developed to satisfy the demands of this rapid technology in an age of science. Even the use of a "universal type" for machine printing may become accepted.\(^2\) However, no matter what systems of photocomposition
evolve—whether it be cathode-ray tubes, digital storage, or the laser beam for generating characters, qualities of simplicity, directness, and originality in typographic design should not be lost. Legibility and readability should be combined in a total design concept. Then, perhaps, typography could arouse greater interest and invite reading.

The initial appeal of any printed page is visual. "Good typography depends only secondarily on types, primarily on the way they are used." More attention, therefore, should be paid to some of the basic elements and principles of design without losing the thought or image that the author intended to communicate. Typography should reflect a close association between form and content. In addition, it should be free from tradition and express the time in which it exists. Ultimately, typography should express a certain quality of timelessness.

Good typographic design should integrate the elements and principles of design to achieve a total balance and unity, or oneness. This emphasis on design might well increase public awareness that typography can be visually aesthetic and perhaps improve communications.

At this point it is necessary to clearly state the way in which some of the design elements such as contrast, form, texture, black and grey values, color, space, and rhythm relate to typography.

Contrast

According to Jan Tschichold, contrast is the most important element in all modern design. Contrast means opposites. "Differences in qualities are measured by contrast." When a dark image is juxta-
posed with a light image, when a large image is juxtaposed with a small image, or when a negative or reversed image is played against a positive image, contrast results. The strongest visual effects are achieved when contrast is the greatest.

In graphic design, the white of the paper and the black printing ink are extreme forces in the design process. The act of reading itself is made possible through contrast. If the contrast between the paper and the ink is not great enough, the legibility will be impaired.

In typography, contrast relates specifically to variation in typefaces, size, weight, color, texture, structure, form, direction, and space. It is based on a unity of differences.

Form

Form is the external appearance of a shape. In typography, form assumes a two-dimensional aspect in which shape and area dominate. Form becomes the area which a shape covers having only length and width.

The design element line has a close association with shape. Line is the path of a moving point which leads the eye through space. It is made visible by the fact that it contrasts with the surface on which it is drawn. Shape could not exist without line as it indicates its edges. When a line is drawn, a shape is automatically created within the line.

Typography uses shape or form as an expressive element. In the most elementary sense form relates to the different shapes of the letters of the alphabet. In a larger context it relates to the different type
families. A type family is a subdivision of a major category of typefaces. For example, the sans serif category includes such families as Futura, Helvetica, Univers, and hundreds of others.

In addition, the form of a single line of type creates a thin, narrow rectangle. In a group of lines the eye tends to connect the end of the lines and its overall shape becomes apparent. This group of lines can be considered a mass. With the exception of the individual letter, mass usually appears as a rectangle or a square as it is seen in contrast to the paper on which it is printed.

Texture

Texture in typography can be analyzed by three interpretations. First, texture can be the result of repetition of the dominant design characteristics of each individual letter. Another interpretation deals with the texture of a particular typeface which comes from the distribution of weight in each letter and from the design of the letter itself, thus involving the interplay of weight and structure. The structure of the letter determines the kind of texture and the weight determines the relative roughness. Finally, there is the texture of a finished composition. Here texture is affected by any differences in the thickness of lines used in the vertical and horizontal, and by any variation in the space that separates the lines in one direction or another.

Typographic textures can be subtle and unobtrusive or obvious. Typefaces with little contrast in their vertical and horizontal strokes
have an even texture, and can be likened to a plain weave, or more subtle in essence. Typefaces whose strokes have a more vertical emphasis have the more obvious texture of a corded fabric.\textsuperscript{15}

In addition to this visual texture, there is also texture of a tactile nature. This relates to the actual texture or composition of the paper stock itself, or any other material, on which the type is printed. Papers with a soft fibrous surface are classified as "antique papers" and are generally used for books and in letterpress printing. "Sized papers" have porous surfaces which have been filled with a size to make them tougher and more resistant to erasure. This kind of paper is used mostly in offset lithography because the sizing tends to resist the ink pressed into its surface by letterpress. "Calendared, filled, and coated papers" fall into a third category. The surface of these papers is smoothed by being passed over heated metal cylinders at the end of the paper-making process. Some of them have fillers added to the pulp to create a luster. Most of these papers are best suited for offset lithography and are used most commonly in commercial printing and magazine publishing. This describes only a limited number of paper surfaces of which there is a very wide range.\textsuperscript{16}

Black and Grey Values

Black is the best known color for typography. It is the darkest and therefore has the greatest contrast with white paper. It also has a cold and neutral feeling. There is an unlimited scale of grey values between black and white. These grey values are achieved by variations
in type size, weight, and width and the spaces between letters, words, and lines.\textsuperscript{17}

Also, there is the illusion that a darker mass may appear closer than a lighter mass and that a dark mass may seem darker in a light area and a light mass may seem lighter in a dark area.\textsuperscript{18}

Color

All color is made visible through light. Color is perceived visually because of the way in which light strikes and the way in which our brains interpret the message transmitted by our eyes.\textsuperscript{19} Each person reacts individually to color. Therefore the effect of a color or color combinations is always different.\textsuperscript{20} This makes color an extremely relative element.\textsuperscript{21}

Color, in typography, can be a very attractive visual element.\textsuperscript{22} Contrasts, amounts, and rhythm play a significant role in relation to color. The designer can use color for functional, logical, emotional, and aesthetic purposes.\textsuperscript{23} Color can be used for identification, for emphasis, or to produce an overall effect. In addition, color can often evoke psychological feelings. Red might impart heat, danger, excitement, or aggression; while blue might impart distance, cold, or cleanliness; and green, peace, quiet, or freshness.\textsuperscript{24}

In typography, color can be used in a number of effective ways. Two different bright colors can be used by putting large areas of these colors close together in a lively contrast.\textsuperscript{25} Massing of color, which is organizing the use of color in a few convincing areas, is also
effective. An even greater effect will be created by using the second color more sparingly. In relation to proportion, it would be better to avoid the juxtaposition of two colors in equal amounts. This sets up an uncomfortable rivalry and the eye has more difficulty in distinguishing which color is meant to dominate. If a small amount of a bright red is placed next to a large amount of black, the red will appear to have richness and luminosity. If a large amount of a bright red is placed next to a small amount of black, the red will dominate, producing a sharp visual effect.

For whatever purpose, the use of color in typography arouses visual excitement and emotion, and thus increases the effectiveness of the author's message.

Space

In typography, the unprinted area of the page, or the white space, is important in relation to what is printed. The white space should not be a passive background. Both the white space and the black areas of typographical symbols should be considered of equal importance. There are visual changes in the white space. These variations come from the strength of the white which depends on varying sizes of the black areas. To create further interest, the white areas should be in unequal relationships. This is also true for the white areas within a typographic structure and the white areas, or margins, which surround the structure, thus creating strong tensions and movements within the composition.
Rhythm

Rhythm is the regular repetition of the same form in intervals of space. Typographic rhythm occurs in the repetition of the vertical, horizontal, diagonal, and curved linear forms of the individual letters; in the regularity of letter spacing; in the regularity of space between words; in the repetition of lines of type or masses meaning groups of lines of type at well-defined intervals; and in the repetition of a single letter, or a word. Rhythm can also be seen in the varying length of words and lines of type, and in graded sizes of type. Even typographic rules, which are lines of varying thicknesses used horizontally, vertically, or diagonally to separate display type or columns of copy, have rhythm when they occur repeatedly in uniform spaces. This is also true of simple geometric ornaments which are used to decorate a page. In addition, the format of the paper can create a rhythmic pattern in the symmetry of the equilateral square or the stressed rhythm of the edges or sides of the rectangle. The position of the word, the line of type, or the type mass can further create a rhythm with the format of the paper.

In relation to the page typography of books, rhythm appears more subtle and unobtrusive. The similarity of type and spacing in successive chapter headings establishes the overall rhythmic pattern. It sets the tone of the text while sustaining the reader's interest and concentration on the author's message.

The use of these elements and principles of design have been ap-
plied to typography in a series of creative examples in this thesis. On a two-dimensional level examples range from books, brochures, and film titles to more abstract designs with type. In addition, there is a sculptural structure which integrates typography in the form of booklets.35

These particular examples were created to take advantage of the available resources at Iowa State University. These include the Iowa State University Press, the Publications Office, Media Graphics, and the Media Resource Center. A broad span of typographical uses have been covered, including some future trends. However these are not without limitations. The examples do not include typography used in newspapers or on packages. Only ready-made typefaces have been used and they were limited to those available from the local printers.

The main purpose of this thesis is to show through these selected creative examples that applied typography, regardless of media, can be visually aesthetic as it is used in relation to design. Typography should reflect legibility, directness, simplicity, and clearness of expression. The aim is to create a richer visual vocabulary and to project through these examples the need for visual fluency in visual communication.
CHAPTER II

THE RELATIONSHIP OF ORIGINAL WORKS
USING TYPOGRAPHY TO ELEMENTS AND
PRINCIPLES OF DESIGN

Design for the Book, Choosing and Using Home Equipment

The seventh edition of Choosing and Using Home Equipment by Elizabeth Beveridge is a soft cover book published by the Iowa State University Press. This laboratory workbook falls into the category of textbooks, a major category of books published by the Iowa State University Press.

This book was designed within certain parameters. Decisions concerning the basic format, the method of typesetting and printing, the type of binding, the selection of paper, and the use of color were made by the press.

The format of the book is 8 1/2 x 11 inches, with a plastic comb binding. This informal binding allows the book to lie flat when open, therefore facilitating its use for students.

The book is printed in black ink on white paper by the offset printing process. A second color of ink was used only on the cover. The text is set in 11 point Baskerville Compugraphic with one point leading between the lines, and in two columns, 19 picas wide with justified margins. The chapter titles are set in 36 point Futura Medium in a flush-right arrangement over the right column, with 12 picas white space below each title before continuing the text. The book is divided
into five sections with several chapters in each part. The chapters are further subdivided with A, B, and C level headings. The section titles (Figure 1) are set in 48 point Futura Demi-Bold, flush-right, with a rule separating the section number from its title. The A level headings are 24 point Futura Demi-Bold, lower case, "hang left," a term which means that they hang out slightly into the left margin. The B level heads are 14 point Futura Demi-Bold caps, centered within the column. The C level heads are 10 point Baskerville Compugraphic italic caps, flush-left within the column. The chapter titles repeat on each page as running feet adjacent to the folios or page numbers which appear in 30 point Futura Demi-Bold. (Figure 1 includes a two-page spread showing a chapter title, A, B, and C level headings, running feet, and folios.)

The book has a number of tables and a few diagrams, but no other illustrations. The table titles are considered B level heads but appear in a flush-left arrangement. Most of the tables consist of contrasting thick and thin horizontal rules. However, many of these tables were positioned vertically.

The type on the front cover (Figure 1) is a combination of 72 point Futura Bold and 36 and 24 point Avant Garde Extra Light transfer lettering. The half-title page repeats the same type as the title on the front cover but is reduced in size. The title page using a two-page spread (Figure 1), again repeats the same typefaces as those used on the front cover, but in a slightly different layout.

The overall shape of this book is a rectangle. By setting the type
in two columns, the reader sees the repetition of the rectangle, two on each page, with a strong vertical emphasis. A stronger vertical stress is created by the use of Baskerville typeface for the text with its greater contrast between thick and thin strokes and its less heavily bracketed serifs. The repetition of the plastic comb binding and the rules of the tables positioned vertically add further vertical play.

In strong contrast to the Baskerville typeface is the simple, bold sans serif typeface used in the section headings, chapter titles, and A and B level heads. Their repetition throughout the book establishes an overall rhythmic pattern. The reader feels a strong beat at each occurrence. The section headings, and A and B level heads especially create a strong horizontal stress in contrast to the overall vertical feeling.

The texture of this book appears visually to be one of a more obvious nature. The Baskerville typeface with its strong contrasts in thick and thin strokes resembles a corded fabric and the great variation in space that separates the lines resulting from the many subheadings and the almost outline-like form of writing create a loose irregular knit. In addition, and in contrast to the Baskerville typeface, are the regular and bold weights used in the section titles, chapter titles, A and B level heads, and folios which create a visual coarseness at intervals of occurrence.

The use of rules provides further contrast as they emphasize the abstract qualities of the letters. Rules have been used in each section title to separate the section number from the title. The repetition of
the rule also occurs on the front cover and the title page. The use of a thin rule on the title page was intended to join the elements of the layout, therefore being a key to the positive effect of the entire two-page spread.

The amount of white space in the margins departs slightly from its traditional use. The plastic comb binding and the "hang left" arrangement of the A level heads require the gutter margin and the space between the columns to be larger than usual. The difficulty of this layout is due to the fact that it is a more technical type of book, with many small parts, and it is written in outline form. There is an inconsistency of white space in the bottom margins and between the various subheadings. On several pages the bottom margin particularly appears too small visually. Overall, the white spaces seem to be in relatively pleasing proportions, both to each other, and to the measure of the text and the page.

The design of the front cover (Figure 1) was created to harmonize with the text pages by expressing the author's message through typestyles and color. Simplicity, efficiency, and energy are emphasized in this edition of the book. The simple, bold, sans serif typeface, Futura Bold, used for the title and the small vertical separation between the publisher's name and the city advance toward the eye in white on a rich golden-orange background of color. This particular color was chosen to create the feeling of warmth, and therefore to express the theme of energy more effectively. The black plastic comb afforded contrast to the white title and, in terms of color, did not compete with the title. The lightweight,
sans serif typeface, Avant Garde Extra Light, used for the author's name, publisher, and edition number appears in black. This contrasts with the title both in color and in typeface. The Avant Garde Extra Light typeface, in its two different sizes, complements the Futura Bold typeface. Although there is a strong contrast in weight, there is a similarity in shape, particularly in the round letters. The typographical elements of the front cover are in a flush-right arrangement. This asymmetrical composition repeats on the half-title page, the title page, the section titles, and in the chapter titles. The repetition further adds to the overall rhythmic flow and unity of the entire book.

Brochure to Advertise Books in Home Economics

The Iowa State University Press uses direct mail brochures as a major means of advertising. This brochure advertises recent books in Home Economics. It features Choosing and Using Home Equipment, a recently published book.

This brochure was designed within certain guidelines. Decisions concerning the method of typesetting and printing, the inclusion of copy for 23 books, their order, the use of color, and the use of illustrations were made by the press. The basic format was limited only to the extent that, when folded, the brochure had to fit into a legal-size envelope. There was a bit more latitude in the selection of the paper which was chosen from available samples.

To accommodate all of the necessary copy, the format of this brochure
is four pages, folded horizontally, 8 1/2 x 11 inches each. The text is set in 10 point Baskerville Compugraphic with one point leading between the lines, and in two columns, 21 1/2 picas wide with justified margins. The book titles are set in 14 point Univers Bold caps in a flush-left arrangement above the text for each book. The display type which includes "Books in Home Economics" and "Iowa State University Press, Ames" is set in three different sizes of Helvetica transfer lettering throughout the brochure. The brochure was printed by offset lithography on 70-pound ivory Hammermill Offset paper with a vellum finish and in two colors of ink, black and a red hue, which have a matte finish.

The brochure includes three illustrations. The most important illustration on page one relates directly to the featured book, *Choosing and Using Home Equipment*. It also relates generally to the other two books mentioned on that page. There is a second illustration on page three relating to the books about food and a third illustration on page four relating generally to books about sewing. The illustrations are line drawings in an almost silhouetted manner on a black background. The objects in the illustrations are superimposed to create a feeling of transparency, and as the lines of the original objects overlap, they create new shapes. The illustrations not only add variety to the brochure, but also provide a pleasant place for the eye to rest while the mind absorbs what it has read.

The overall shape of the brochure is a rectangle. This rectangular format changes in size when the brochure is opened to be read. This
change in size also contributes to a continual contrast in directional stress. At first, a small rectangle, 8 1/2 x 3 inches (Figure 2), appears as the brochure is removed from its envelope. Here the placement of the display type in 72 point Helvetica creates a horizontal feeling. As the brochure is unfolded, a larger rectangle, 8 1/2 x 11 inches (Figure 2), appears. In contrast to the initial horizontal appearance, the vertical position of part of the display type, the size and position of the illustration, and the use of Baskerville typeface for the text help to create a more vertical stress. When the brochure is opened to pages two and three, the change to a more horizontal stress is due in part to the large rectangular format, 17 x 11 inches (Figure 2). In strong contrast to the Baskerville typeface used for the text are the simple, bold, sans serif typefaces used for the book titles and display type. The position of the Helvetica typeface used for the display type and the repetition of the Univers Bold typeface used for the book titles add a further horizontal emphasis as they appear as thin, horizontal rectangles. This horizontal pull is reinforced by the use of a second color, the red hue, which contrasts strongly with the black text type and the ivory paper. Finally on page four of the brochure (Figure 2), the same format and similar vertical stress reoccurs.

This alternating change in directional stress and the change in size of the rectangular format help to establish an overall rhythmic pattern. The repetition of the typeface and red hue used for the book titles adds to this rhythmic pattern. Its occurrence at fairly regular intervals
creates a strong, but even beat as it contrasts in typeface and color with the black Baskerville typeface. Even the Baskerville typeface creates a small rectangle of type which repeats rhythmically as the text for each book. In addition, the three illustrations with their black background create an even stronger visual beat as they occur.

The rhythmic alternating reoccurrence of the bold, sans serif typeface of the book titles in a red hue and the serif typeface of the text in black create a more obvious visual texture overall. Again the use of the Baskerville typeface with its strong contrasts in thick and thin strokes resembles a corded fabric. The repetition of the space used within the text describing each book, contrasting to the variation of space used to separate one book from another, further adds to a loose, irregular textural appearance.

This more obvious visual texture contrasts to the more subtle actual texture. The paper stock itself has only a very slightly porous surface and the offset lithographic printing process produces a very light impression of the image on the paper. This process can be described as "laid on" the paper rather than impressed into it. Both the kind of paper and the printing process used create a crisp and smooth appearance.

The layout of this brochure, in relation to the use of space, was more difficult because of the tremendous amount of copy to be included. There is an inconsistency in the space used for the margins and in the space used to separate one book from another. The outside margins particularly appear too small visually. Both the spaces within this typo-
graphic structure and those which surround it are in unequal relationships, not quite in the most pleasing proportions.

Color, or rather the second color, is used in this brochure primarily for functional purposes. The red hue is used in the display type for emphasis and in the book titles for identification as it contrasts with the black used for the text and with the ivory paper. This particular hue was chosen not only for its contrast with black, but to evoke an overall feeling of warmth. This is also true in the use of ivory paper instead of white. By using a small amount of the red hue juxtaposed to a larger amount of black, the red hue appears to be richer and more luminous. These unequal amounts of the two colors create a stronger visual impact. The use of colors in this particular way helps to communicate the message more effectively and adds to the overall visual aesthetic quality of the brochure.

The design of the brochure was created to express simplicity, efficiency, and warmth through design elements. The repetition of typefaces and color along with a contrast in typeface and color; the similarity in the design of the illustrations which act as a contrast when juxtaposed to the text; and the similarity of form in the use of rectangular shapes, but with a contrast in size and direction, together create an overall harmony. This balance of similarities and contrasts helps to produce a total visual unity of the brochure.

*Women of Action in Tudor England* is a hard cover book by the late Pearl Hogrefe published by the Iowa State University Press. This scholarly book falls into a category which the press calls trade books rather than textbooks. A trade book is one which is published for people in a particular business or profession. This book, however, has a broader appeal and could interest people in several professions, academicians, and the general public.

Decisions concerning the basic format, the method of typesetting and printing, the type of binding, the selection of paper, the use of color, and the inclusion of copy on the back cover of the dust jacket were made by the press.

The overall format of the book is a 6 x 9 inch rectangle. The book is printed in black ink on an off-white paper by the offset printing process. The text is set in 10 point Baskerville Compugraphic with two points leading between the lines, and in a single column, 26 picas wide, 42 picas deep, with justified margins. The book is divided basically into nine chapters, each describing a different woman of achievement who lived during the Tudor age. The chapter titles are set in 24 point Garamond Bold italics in a centered arrangement above the text. There is a 5-pica space between the chapter titles and the beginning of the text. Instead of subtitles, a white space approximately 3 1/2 picas deep is used when there is a change in subject matter within each chapter. The names of the women and the folios repeat on each page as running heads and are set in
8 point Baskerville italics. In addition, the book includes photographs and line drawings which appear as two-page spreads at the beginning of each chapter (Figure 3).

The typeface used on the dust jacket (Figure 3) includes several sizes of Garamond Bold and Garamond Bold italics, in a flush-right arrangement. In addition, there is a border design which acts as a symbolic representation of the contents. Similar decorative designs can be seen in the women's clothing and in the architecture of the Tudor era. This border design is 8 pica wide and runs vertically on the outer right-hand side. The same design repeats on the back of the dust jacket. The dust jacket is printed in two colors of ink, dark wine color and mauve on a glossy white paper. The title and the author's name appear in white which contrast with the dark wine background. The subtitle, "Nine Biographical Sketches," is mauve and the border design is dark wine on the mauve background. On the spine of the just jacket (Figure 3), the title is white and the author's name and the publisher are in mauve, both on the dark wine background. Here the title appears vertically as one line of type so that when the book is placed flat on a shelf the title can be read correctly from left to right.

The book itself is bound in an off-white linen fabric by the "sewn binding" method. The signatures are placed next to each other and the sewing is done through the gutter of each signature and then across the back. 8

The layout from the spine of the dust jacket is repeated on the spine
of the book, but is printed only in the dark wine color which contrasts with the off-white fabric. The end papers, which conceal "the folded-in edges of the binding cloth and the fabric which hinges the case to the bulk of the book," are also wine colored. This repetition of color from the dust jacket to the end papers provides a visual transition from the jacket to the book.

The layout of the title which appears on the front cover of the dust jacket is repeated on both the half-title and title pages of the book. On the half-title page it is smaller in size and is positioned in the center of the upper portion of the page. The type appears white on a 40% screen tint used for the background. A screen is the concentration of dots used in the halftone process. This process involves placing a screen tint sheet between the negative and the offset plate during exposure of the plate. The 40% refers to the percentage of solid black used in the screen. This is based on a grey value scale where white is 0% and black is 100%. The particular screen tint used in this book produces a light warm grey.

The title page (Figure 3), which sets the mood for the book, consists of a two-page spread. The title is positioned on the left-hand side, in the upper portion of the page close to the center of the spread. The author's name is repeated in typeface and in size from the front cover of the dust jacket and is positioned on the right-hand side about midway on the page and opposite the subtitle, also close to the center of the spread. The border design from the dust jacket is repeated again on the
right-hand edge. The border design and the publisher's name appear in the same screen tint as the background of the half-title page, which contrasts in value with the rest of the type and with the paper. This asymmetrical design helps to reflect the active lives of the women described in the book.

The half-title page is repeated after the introduction before the beginning of the text. This separates the preliminary pages from the rest of the book. These preliminary pages can be considered as a unit rather than a series of isolated pages. The use of the same typeface and the same centered arrangement of the headings as in the chapter titles provide a visual transition between these pages and the body of the book.

The design of the body of the book creates a vertical stress with the use of the Baskerville typeface for the text which is positioned in a rectangular mass on a rectangular format. The white space used to indicate a change in subject matter within the chapters provides a contrast and a change in directional stress. Although this white space appears as a thin rectangle, positioned horizontally, the overall stress remains vertical.

In a somewhat more subtle contrast to the Baskerville typeface is the softer, more elegant Garamond typeface. It is characterized by a small amount of contrast between its thick and thin strokes, its open and round letterforms, its scooped but sturdy serifs, and its oblique vertical stress. The Garamond typeface is repeated throughout the book in the dust jacket, the half-title page, the title page, and as headings in the preliminary pages to the chapter titles within the book. This typeface
was chosen to interpret the book's content in a more effective manner. The softer, more elegant quality of the Garamond typeface, especially in its italic form, reflects in general the handwriting of these nine women. As a major means of communication, their handwriting played a large role in their varied activities and accomplishments. Their handwriting was not only expressed in the form of personal letters, but in keeping the daily record of accounts and in the translations of manuscripts, to name a few.

The repetition of the Garamond typeface in bold throughout the book establishes an overall rhythm. Although the contrast between the Garamond and Baskerville typefaces is more subtle, there is a contrast in weight and type size. The horizontal white spaces used within the chapters add to the rhythmic pattern as they occur regularly. This rhythm flows gently throughout except at the beginning of each chapter. The bold use of the photographs and line drawings in a two-page spread creates a strong beat at each occurrence. This variation provides rhythmic interest as it further creates a pattern and contrast. This strong contrast occurs in the juxtaposition of the photographs and drawings with the type. The photographs and drawings are combined in an asymmetrical arrangement which is juxtaposed to the symmetrical arrangement of the type, particularly in the chapter titles. These photographs and line drawings not only act to stimulate the reader's interest, but give a clearer idea of the people, places, and activities that made up the Tudor world.

The overall visual texture of the book appears to be more obvious in
nature. Although the white space used both within and around the typographic structures is relatively uniform, the Baskerville typeface creates a more visual coarseness with its contrast between thick and thin strokes. This more obvious textural quality is further emphasized by the total proportion of the Baskerville typeface used in relation to the amount of white space. The inclusion of the photographs and drawings and their placement help to create an additional irregular textural quality.

The use of color in this book appears primarily on the dust jacket. A small amount of color does extend to the spine of the book and to the end papers. The two colors, as well as the typefaces, were chosen not only for contrast but to express the book's content more effectively. The dark wine color and the mauve impart a richness, nobility, and regality which add flavor to the biographical sketches of these nine women. These particular colors were used to produce this overall effect, as well as for aesthetic purposes. A larger amount of the dark wine color is juxtaposed to a smaller amount of the mauve used in the subtitle and border design and the white used for the title and author's name. This use of color adds to the quality of richness and creates a stronger visual impact.

A major concern in book design is to achieve an overall unity throughout its many parts which have such varied functions. In this book the format, text, photographs, and drawings have been integrated into a unified whole through design elements. This is achieved primarily through the repetition and contrast of typefaces and color, through the
repetition and similarity in the kind of drawings and their layout with the photographs which become a strong contrast as they are juxtaposed to the type, and through the similarity of form in the use of rectangular shapes. These repetitions, contrasts, and similarity of parts resolve into a balance to create an overall, unified visual effect.

The Book, Reprographics

The term reprographics refers to graphic reproduction processes used by industry such as photo-offset lithography, silk-screen printing, relief printing, spirit duplication, mimeograph production, electrostatic copying, diazo reproduction and many others.

This book, Reprographics (Figure 4), incorporates laboratory experiences dealing with some of these graphic reproduction processes. Photo-offset lithography, silk-screen printing, and relief printing were used to solve problems in the graphic mode which simulate actual production. The problems include the design for a personal logo, a personal letterhead, the book cover, a booklet of poems, a woodcut, and a design for a mirror. Each problem includes a detailed outline of the procedure used and the cost, as well as several parts of the production such as preliminary designs, negatives, and plates. Also included are many short papers on a variety of topics relating generally to reprographics. These papers are examples of spirit duplication and mimeograph production.

Personal logo design

The personal logo includes two similar designs (Figure 4) printed in
black ink on white paper using the photo-offset lithographic process. The typeface used is 24 point Helvetica caps transfer lettering and the basic format is a 2 1/2 inch square. In each design the entire typographic structure is positioned diagonally at a ninety-degree angle intersection within the square. One design has a black diagonal strip, four picas wide, centered within the square. The other design has a black triangle placed in the upper left-hand corner flush with the sides of the square. In both designs the type is white where it overlaps either on the black strip or on the black triangle.

The most important element in either of these two designs is that of contrast, not only black against white, but a contrast in direction within the typographic structure. A focal point is created at the degree of intersection of the type masses. The direction of movement is in contrast and a point of tension is established, therefore creating a more dynamic design.

**Personal letterhead design**

The personal letterhead was designed to include a halftone photograph (Figure 4). It is also printed in black ink on white paper using the photo-offset lithographic process. The basic format is an 8 1/2 x 11 inch rectangle. The typeface is Avant Garde Extra Light transfer lettering, in two sizes, 36 and 24 point. It is positioned horizontally, one line at the top of the page and one line at the bottom of the page. The two lines of type are connected by a thin vertical rule running down the left side of the page. The halftone consists of approximately a two-inch circular
photograph of a dog's head, positioned in the lower left-hand corner of the page.

The use of the halftone provides a contrast in the visual texture, both with the smooth white space of the background and with the light weight sans serif typeface. It becomes the focal point of the design as it is juxtaposed to the more dominant white space of the background or unprinted area of the page.

Cover design

The cover design for this book (Figure 4) employed the photo silk-screen printing process using white ink on beige paper. The same design is repeated on brown paper that appears on the first page of the book. Several examples of this design using different colored papers and some using two colors of ink are also included.

The typeface used is 84 point Helvetica lower case transfer lettering. The design creates a typographic mass by repeating the word "reprographics" four times. Each word employs an alternating directional change as it divides into three syllables, "repro," "gra," "phics." The three parts are at a ninety-degree angle of intersection with each other. This typographic mass is positioned asymmetrically in the lower right-hand portion of an 8 1/2 x 11 inch rectangle. In some examples the design bleeds off the right-hand side of the page.

Again the most dominant element is that of contrast. Both contrast in color and contrast in direction are used in this design. The contrast in color varies with each example as the white ink is applied to several
different colored papers. In those examples using two colors of ink, black and white, the inks contrast in color with each other and with the different colored papers. The use of white in one of the "reprographics" words with the other three in black creates a focal point in the designs using two colors of ink. The alternating contrast in direction of the type creates points of tension at each ninety-degree angle of intersection. The repetition of the word "reprographics" and its layout establishes an even beat and rhythm within the typographic mass. This contrasts to the strong beat that the typographic mass creates as a unit by its position in the lower right-hand portion of the page as it is juxtaposed to the unprinted area.

Design for a booklet of poems

This is a four-page booklet of five poems\textsuperscript{17} with illustrations using the photo-offset lithographic process in two colors (Figure 5). It is printed on one side of the page in both blue and green inks on pale blue paper. The format of the booklet is a 6 1/2 x 9 inch rectangle. The typeface used for the poems is 18 point Melior Roman transfer lettering and illustrations consist of line drawings.

Each poem employs a different typographic layout (Figure 5). The irregular form that these typographic structures create act as an expressive element. The Melior Roman typeface, with its open face and broken curves, adds a further expressive quality to the poems.\textsuperscript{18} The typographic structures contrast with the paper on which they are printed and with the illustrations. The illustrations add variety as well as expand the
central idea of each poem.

As the typographic layouts of the poems differ, so does the rhythm. In the first three poems the lines of type repeat in a more regular manner to form an alternating pattern. Although each poem forms a different pattern, an even beat occurs within the typographic structure. In the last two poems the lines of type do not repeat at well-defined intervals, thus creating an irregular beat and rhythm. These different rhythms which are created in each poem seem to express the thoughts of a child which quickly flit from one idea to another.

Color was used in this booklet especially for identification, emphasis, and to produce an overall effect. In this design blue acts as the primary color and green the secondary. The green is used in the poem titles for identification. It is also used in some of the illustrations for emphasis. A stronger visual effect is created by using the green more sparingly. These particular colors further add to the effectiveness of the poems' messages and create an overall freshness of a child's imagination.

The cover of the booklet consists of the word "poems" printed by means of vegetables, potatoes and turnips, in white acrylic paint on construction paper (Figure 5). One example uses green paper and the other magenta. The letters of the word "poems" are placed irregularly and overlapping each other on a diagonal. The letters are approximately three inches high and simulate a sans serif Gothic typeface.

Contrast and texture predominate in the cover design. The white
paint contrasts strongly with the colored paper on which it is printed. A very rough, nubby and irregular textural surface is created in the letters as a result of the vegetables used for printing. It enriches the surface and also contrasts with the less rough, but somewhat irregular surface texture of the construction paper. In addition, the cover as a whole contrasts in actual texture with the smooth paper used within the booklet. However, there is a similarity in the visual texture of this paper. It appears to have a mottled quality, especially as it is held to the light, which creates a visual textural effect very similar to that of the letters on the cover, but with less intensity. This similarity adds a pleasant harmony and unity to the booklet as a whole.

**Woodcut design**

The woodcut design (Figure 4) consists of a circle, five inches in diameter, containing a stylized butterfly with a few curved lines around it. Outside the circle is the word "papillon" which is the French word for butterfly. The letters are approximately 72 points and simulate a Futura lower case typeface. The word is positioned to the right under the circle. The design is printed in black ink on pale blue paper and one example is printed on a blue and white checked cotton material. Each example is printed within a rectangular format. The woodcut is an example of relief printing.

Texture and contrast are the two dominant elements used in this design. By using only a modest amount of ink, the uneven surface of the wood can be seen when the design is printed. This creates a rough visual
texture which contrasts with the smooth negative areas which were cut into the wood and the unprinted area of the background.

**Design originally intended for a mirror**

This design involved the lacquer film silk-screen process. It was printed on both pale blue and yellow papers in black ink. The design consists of a line drawing of a 1922 Model T Ford with the words "Touring Car" (Figure 4). The words simulate Korrina Bold typeface and are positioned in two lines to the right of the car in a way which integrates them with the illustration. This typeface was chosen for its decorative quality and to suggest an era of the past, but to retain a contemporary flavor. The entire design is placed asymmetrically in the lower left-hand portion of a rectangular format positioned horizontally.

Contrast is the most important element used in this design. The image area in black contrasts strongly with the color of the paper on which it is printed. The type is also in contrast with the illustration. There is proportionally an uneven relationship between the type and the illustration which helps to create a balance and unity to the design.

The integration of these various reprographic problems into the book is achieved mainly through repetition. The repetition of the procedure and cost for each problem and the repetition of several stages of production create a rhythm in the book as a whole. The design of the front cover is repeated on the first page as a quasi half-title page and again in connection with the photo silk-screen printing process. These repetitions and similarity of parts also add to the total unity of the book.
The inclusion of the short papers at the end adds variety as they expand the central theme of reprographics, therefore making the book more interesting.

Pre-designed Formats for Basic Printed Materials

A greater part of the technological development in typography is a direct result of the fact that phototypesetting can be computerized. This has led to the development and production of a vast number of electronic components, each with a different system and different capabilities. Today not only do typographic designers have to be aware of the different characteristics in each system, but more important is the need to develop taste and good typographic judgment in the people, generally office workers, who will operate these systems. A greater use of pre-designed formats or "canned formats" is one possible solution which was offered at the symposium, "Vision '77 Communications Typo/Graphics" sponsored by International Typeface Corporation.19 This involves the designing of a basic format which would be suitable for use with a variety of subject matter within certain categories of printed materials such as price lists, reports, brochures, and letterheads, to name a few. These pre-designed formats have a fixed layout which defines a definite proportionate relationship in which type, illustrations, and/or other matter can be fitted.

If these pre-designed formats were well-designed, they would not only be an aid for the people using the various typesetting systems, but their
use would be an economical advantage for both the designer and the client. The client could select from several different pre-designed layouts the one which best suited his needs without having to spend the money or time for a piece designed especially for him.

As the use of computerized systems for typesetting increases, even university publications are becoming involved with pre-designed formats. This section of the thesis includes pre-designed formats for a brochure to advertise a short course (Figures 6 and 7) and a poster/brochure to advertise graduate studies (Figures 8, 9, 10, and 11), both designed for the Publications Office at Iowa State University.

**Pre-designed formats for a brochure to advertise a short course**

The brochure advertising *Dog Health Symposium* was chosen at random as an example for a pre-designed format. Three different layouts were designed for the front cover and only one for the body of the brochure. There are variations in typeface and type size within these three layouts. However the same rectangular format, 3 x 8 1/2 inches for the front cover and 8 1/2 x 11 inches folded vertically into three parts for the body, was used for all of the designs. In addition, the same relationship of type weights, where the title and date appear in a bold typeface and the sponsor and place in a light typeface, was used consistently throughout, as was the different type size and combinations of typeface.

In each of the layouts the title, whether in a flush-left or flush-right arrangement, is stacked in block form, word for word. The words are set with a minus leading which means that there is less leading
between the lines than the point size of the letter. As a result some of the characters, especially those with ascenders and descenders, may touch or overlap. This tightly knit arrangement of type has become popular and can be considered a current trend in the use of typography.

One design or layout uses the type in a flush-right arrangement with a 3-pica right margin. The title and sponsor are stacked in a typographical block with a one point horizontal rule separating them which bleeds off the left-hand side of the page. Approximately a 15 1/2-pica space separates the title and sponsor from the place, and another 4-pica space separates the place from the date, leaving a 7-pica bottom margin.

Within this basic layout there are three variations (Figure 6). In one the title is set in 36 point Helvetica Bold, the date in 18 point Helvetica Bold, the sponsor in 10 point Helvetica Light with one point leading between the lines, and the place in 14 point Helvetica Light with one point leading between the lines. In another, the title is set in 24 point Times Roman Bold and the date in 18 point Times Roman Bold. The typeface and type sizes used for the sponsor and place are the same as those used in the previous layout. In the third variation, the title is set in 24 point Souvenir Bold, the date in 14 point Souvenir Bold, the sponsor in 10 point Souvenir Light and the place in 14 point Souvenir Light, both with one point leading between the lines.

The second layout uses the type basically in a flush-left arrangement. In this layout the title and sponsor are positioned in a typographical block diagonally in the upper portion of the page. A rule extends
diagonally in both directions from the last word in the title and then forms an inner connecting border two picas in from the edge of the page. The other typographical elements such as the sponsor, place, and date are placed within this border. There is a 13-pica space separating the title and sponsor from the place and a 5-pica space separating the place from the date, leaving a 6-pica space on the bottom inside the border.

Within this layout, there are two variations (Figure 7). One uses the same combination of Helvetica Bold and Helvetica Light typefaces as those used in the first layout. The other variation uses the same combination of Times Roman Bold and Helvetica Light typefaces as was previously used.

The third layout (Figure 7) uses both flush-left and flush-right arrangements of the type. In this layout the title and sponsor are in a flush-left typographical block which is positioned on a sharp diagonal in the upper portion of the page. A black triangle placed flush with the top and the left-hand edge of the paper separates the title from the sponsor. The type used for the title is the beige color of the paper as it is positioned within the black triangle. The place and date are positioned in a flush-right arrangement in the lower portion of the page with a 2-pica right margin. Approximately a 17 1/2-pica space separates the title and sponsor from the place and a 5-pica space separates the place from the date, leaving a 7-pica bottom margin.

Due to a higher production cost, there is only one example using this layout. However, other variations in typefaces and type sizes could have
been used. This example uses the same combination of Helvetica Bold and Helvetica Light typefaces as those previously used.

Contrast is the most important element used in all of these designs or layouts. The most obvious contrast occurs in the variation of type size and type weight with the use of the bold and light typefaces. The layouts using the combination of Times Roman and Helvetica typefaces have an additional contrast between a serif and a sans serif typeface. In the first layout there is a contrast in stress with the typographical masses positioned horizontally on a vertical format. The thin horizontal rule separating the title from the sponsor emphasizes this contrast. In the second layout the use of the rule as a border contrasts with the type. Its use helps to create a more vertical emphasis and adds to the total unity of the design as it surrounds or encloses the typographical elements. In the second and third layouts there is a contrast in direction with the type positioned both diagonally and horizontally. This helps to create a more dramatic movement. Variations in space within and between the typographical masses, which occur throughout, add a further contrast. This use of combinations of contrasts helps to create a greater visual interest and unity in each of the designs.

The body of the brochure was designed specifically to be used with the first layout of the front cover previously described (Figure 6). Although there is only one example, other variations in typefaces and type sizes could be used. The type used is a combination of Helvetica Bold and Helvetica Light in a variety of sizes. It is in a flush-left, ragged
right arrangement. The two folds in the paper act as columns in which the type is placed. The same horizontal rule which appears in the first layout of the front cover is repeated approximately 8 picas from the top and runs across the entire page. The rule acts to separate the most important information from the rest of the copy, and becomes a visual transition from the front cover to the inside of the brochure. Thus the rule becomes a key to the whole effect.

The title is set in 28 point Helvetica Bold and the date and the words "Registration Form" are set in 18 point Helvetica Bold, all of which appear above the horizontal rule. The main headings within the copy are set in 14 point Helvetica Bold and the copy is set in 10 point Helvetica Light with one point leading between the lines within the various typographical masses.

Again, contrast is the significant element used in this design, with the contrast in type size and type weight being the most predominant. As the bold typeface contrasts with the light typeface, the even textural quality created by the monotone strokes of the Helvetica typeface remains the same. The use of the bold typeface also acts as a means of identification within the copy. Its repetition establishes an overall rhythm and helps to create a unity within the design.

Pre-designed formats for a poster/brochure to advertise graduate studies

The poster/brochure advertising graduate studies in textiles and clothing was chosen arbitrarily as an example for a pre-designed format.
Eleven different layouts were designed based on the same copy set in columns 30 picas wide, 21 picas wide, and 14 picas wide. All of the type is set in a flush-left ragged right arrangement regardless of the column size, except for one layout which uses a flush-right ragged left arrangement. The use of these ragged or unjustified margins is another current trend in typography. Its use offers several advantages. The most important is the production of more legible copy. This is possible because the unjustified margins allow equal word spacing and less hyphenation. They also allow corrections to be made more easily. As a result the copy can be more effective and functional.

The same rectangular format, 8 1/2 x 14 inches, is used throughout. This size is just large enough to be seen when put up on a bulletin board, but not too large to be folded and mailed in an envelope. Some of these layouts were designed to be used with cards requesting more information. However, these cards could easily be integrated into almost all of the other layouts or deleted from those in which they occur.

The copy used for the body of the poster/brochure is either a combination of Helvetica Bold and Helvetica Light typefaces or a combination of Palatino Bold and Palatino Medium typefaces. Both combinations are set in 10 point with two points leading between the lines. These two variations in typeface are combined in several ways with two variations in the typeface used for display, Helvetica Bold and Times Roman Bold. Those designs using Helvetica typefaces for the body are combined with Helvetica display typefaces in some of the layouts and with Times Roman display
typefaces in other layouts. However, the designs using Palatino typefaces for the body are combined only with Helvetica display typefaces.

All of the titles are set in a bold typeface with two variations in type size, those set in 36 point and those set in 24 point. There are four variations for the layout of the title alone. They include the title stacked in block form, word for word, both flush-left and flush-right; the title set in two lines in a hang left arrangement; the title set in two lines in a centered arrangement; and the title set in three lines in a flush-left arrangement. However, in all of the layouts, the title is set with a minus leading.

The name and place of the institution are set in two combinations of type sizes, 24 and 14 point and 18 and 9 point. Helvetica and Times Roman typefaces are used in both of these size combinations and combine bold and medium or bold and light type weights. The type for the name and place of the institution is set in three lines, either in a flush-left or flush-right arrangement. In addition, all of these designs use the words "Iowa State University" in a bold typeface and in one line without any word spacing. This creates a tightly knit typographic mass.

The year, "1977," is set in two type sizes, 36 point and 14 point. The larger size is used only in bold, but the other is used in bold, medium, and light type weights.

Five of the layouts show the type set in one column, 30 picas wide, using only Helvetica typefaces for the body (Figure 8). In each of these layouts the column of copy is positioned approximately 18 picas in from
the left-hand edge of the paper. This 18-pica space creates a vertical rectangle in which all or some of the display type is contained.

In two of these layouts the title is set in 36 point Helvetica Bold, stacked word for word in a flush-right arrangement. It is positioned in the white space three picas from the body and is aligned with the top line of type in the body. The name and place of the institution are aligned with the body and positioned below it. This arrangement of type adds further vertical emphasis to a design which is already vertical in appearance because of its format. These layouts are the same except that one has an information card.

The third layout uses the title set in 36 point Helvetica Bold in the 2-line, hang left arrangement. It is positioned horizontally between the body and an information card about one-third of the distance from the bottom of the page. Approximately one-half of the title extends into the vertical white space. This arrangement creates a contrast in directional stress.

The fourth and fifth layouts use the display type in a flush-left arrangement with the title set in three lines and in 24 point. The display type is positioned in the white space with the name and place of the institution aligned with the top line of type in the body. There is a 13-pica space between that typographical mass and the title, and a 6-pica space between the title and the date. These layouts are the same except for the variation in the typeface used for the display and for two one point rules which have been added to one of these layouts. These rules
run vertically along the sides of the type used for the body. They not only provide a contrast with the type, but both join the elements in the body as well as separate them from the display type. In addition, the rules create a vertical emphasis to the design.

Three of the layouts show the type set in two columns, each 21 picas wide, again using only Helvetica typefaces for the body (Figure 9). In each of these layouts the two columns of type are positioned approximately 24-28 picas down from the top of the page. This creates a white horizontal rectangle in which some of the display type is positioned. All of these layouts use Helvetica Bold typeface in 36 point for the title.

One layout uses the title set in two lines centered in the white space above the body, 16 picas down from the top of the page. This particular use of type creates a contrast in direction. The display type and the bold type used within the body appear horizontally which contrast to the vertical position of the columns and the vertical format.

The other two layouts use the title stacked, word for word in block form, one set flush-left to go with the flush-left body, and the other flush-right to go with the flush-right body. The titles are positioned in the white space above the body and are aligned with the flush side of one of the columns. The date is aligned with the flush side of the other column and with the top word in the title. An information card is used at the bottom of the second column. This kind of typographic arrangement creates a more vertical appearance.

Three other layouts, which vary only in typeface combinations, show
the type set in two columns, each 14 picas wide (Figure 10). The two columns are positioned 18 picas in from the left-hand edge of the paper. This design uses the title set in 36 point and in the 2-line, hang left arrangement. The basic layout is similar to the one described earlier using the same title layout. The only difference is in the number of columns used and a variation in typeface combinations.

The remaining four layouts show the type set in three columns, each 14 picas wide (Figure 11). The columns are of unequal lengths which create a greater visual interest.

One layout uses a combination of Palatino and Helvetica typefaces. The three columns of type are positioned 24 picas down from the top of the page. The title is set in 24 point Helvetica Bold and is stacked, word for word, in a flush-left arrangement. It is positioned above the body and aligned over the first column of type, with a 3-pica space separating it from the body. The date is aligned over the third column of type and with the first word in the title. The name and place of the institution are positioned 2 1/2 picas from the bottom of the page and are aligned with the center column of type. The use of the three columns of type combined with this particular title layout create a strong vertical appearance.

A second layout uses a combination of Helvetica typefaces. The title is set in 36 point Helvetica Bold, in two lines centered above the three columns of type with a 2 1/2-pica space separating it from the body. The name and place of the institution are also centered approximately 4 picas from the bottom of the page. A contrast in directional stress occurs
similar to that described earlier in the design using the same title layout, but using only two columns of type.

The other two layouts, which vary only in typeface combinations, use one point horizontal and vertical rules which form rectangles in which the typographic masses are positioned. The rules form three vertical rectangles, each of which contain a column of type, and one horizontal rectangle which is placed above the other three and contains the display type. The title is set in 24 point and in the 3-line, flush-left arrangement. It is positioned 3 picas above the date. Both the title and the date are aligned with the first column of type. The name and place of the institution are aligned with the top line in the title and above the third column. The rules add a fairly strong vertical appearance as they contrast with the type. Their juxtaposition with the type further emphasizes the vertical quality of the columns. Again, the rules act to both join and separate the typographic elements in the layout.

The most important element used in all of these designs or layouts is contrast. All of the designs show a contrast in type size and in type weight, but those with the greatest contrast are the most effective visually. In effect, the most successful designs are those in which the type size of the title is the largest.

The layouts using Times Roman and Palatino typefaces for the display have an additional contrast as these serif typefaces contrast with the Helvetica sans serif typefaces used in the body.

The use of the bold typefaces, which repeat as headings within the
body, juxtaposed to the light or medium typefaces not only create a contrast, but help to organize the copy so that its content is communicated more effectively. This is more successful in the designs using Helvetica typefaces for the body.

The use of rules and the relationship of the unprinted areas to the typographic masses provide further contrasts as they help to establish a directional stress. Some of the designs show more contrast in direction, while others emphasize a more vertical appearance.22

This use of multiple contrasts heightens the visual interest and helps to establish an overall unity within each of the designs.

**Title and Credit Design for the Film, LUMIA II**

The film, *LUMIA II, Design of Dance*, is a Design Center project at Iowa State University. It was created by Mary Meixner and Betty Toman, and produced by R. B. Lindemeyer. The film combines art and dance in a way which demonstrates some of the basic elements and principles of design. The composition speaks a visual language. Sequences of images and image-forming shadows and sounds appear rhythmically, in time, on a screen. This occurs by means of light projected through celluloid. It exists for the moment of its perception by the eye and by the ear.23

There are three basic sequences in this film. Dancers move through a background of helium-filled balloons of various shapes and sizes made from an iridescent plastic film called Mearl invented at Dow Chemical Company24 (Figure 12). These balloons establish a visual character and
provide an overall atmosphere for the film. Various moods are created by using a different additive light mixture for each of the sequences.

The design and production of the title and credits include both inanimate and live action techniques. After the main body of the film was shot, the cinematographer zoomed in on the balloons and filmed several sequences, slightly out-of-focus, which were used as the background for the title and credits. (Figure 13 is an example of the balloons filmed close-up and slightly out-of-focus.) All three additive light filters were used during these sequences. The sequences appear as abstract shapes in which red, blue, and green "spots" of various sizes occur. They are on a black ground, some moving and some static. The type used for the title and credits appears white and was filmed separately from seven static scenes. The two rolls of film were then combined showing the type superimposed over the background of balloons. This was done by means of a special process performed in a film laboratory.

Three scenes appear at the beginning of the film which include the title and the copyright line in one (Figure 14); "A Design Center Project, Iowa State University, Ames" in a second (Figure 15); and "CREATED BY Mary Meixner" and "Betty Toman" in the third (Figure 16). In these scenes the type is static and dissolves over a gently undulating background of abstract shapes. Dissolves are transitional devices used to change scenes whereby one scene fades out as another fades in.25

The remaining credits appear in four static scenes at the end of the film. They include the dancers in one (Figure 17); the lighting, set
design, and titles in a second (Figure 18); the sound and cinematographer in a third (Figure 19); and the producer in the fourth (Figure 20). In each of these scenes the type is in a centered arrangement, but is placed asymmetrically in the negative spaces which are juxtaposed to the abstract shapes created by the balloons. Positioning of the type in this particular way also acts to complement these abstract shapes.

The typography used in the film was laid out on rectangular formats in a ratio of 4:3. This is a constant ratio or proportion used in producing all film. Various sizes and weights of Optima typeface were used throughout. The title is set in 72 point Optima Black caps and the subtitle, "Design of Dance," is set in 28, 48, and 72 point Optima Medium caps. The "Ds" in "Design" and "Dance" are in 72 point. Other letters are in 48 point. These words are set in two lines with no leading in between and with the "Ds" overlapping. The word "OF" is set in 28 point Optima Medium caps and is juxtaposed to the "D" in "Dance" along its base line. The entire subtitle is centered approximately two picas under the title. The copyright line is set in 18 point Optima Bold and appears horizontally at the bottom of the frame in the first scene. The credits are set in 16 point Optima Black caps and names receiving the credits are set in 28 point Optima Medium. The type used in the second scene is also set in 28 point Optima Medium. Although the type was set in these particular sizes, it becomes much larger when it is projected on a screen. The proportions, however, still remain the same.

The Optima typeface was chosen to establish a style for the film.
Its open design with a clear simplicity of a sans serif face, its differentiating weights in the main and connecting strokes, and its mildly tapered and scooped out stems and cross-bars create a definite classical grace which can be associated with dance. Its use also suggests a quality of timelessness.

Contrast and texture are the two dominant elements which appear in the title and credit design. Contrast occurs in the variation of type size, which is especially effective in the design of the subtitle. Contrast also occurs in the variation of type weight with the use of the medium and black or extremely heavy weights together. The type itself, which has a sharp, smooth visual texture, contrasts strongly with the uneven and somewhat fuzzy visual texture of the abstract shapes used for the background. The "objective impersonal character" of the Optima typeface allows it to be combined effectively with this particular kind of background.

In addition to the use of contrast and texture, a sensation of space is created by the moving background of abstract shapes. Not only do the shapes move slightly in the natural air current, but additional movement occurs in the actual panning of the camera in the first three scenes. The type has a visual appearance of seeming to float in a galaxy of red, blue, and green shapes.

In film, sequence is an important design consideration. The frames or scenes should "flow" into one another. The use of the balloons as abstract shapes in the background for the title and credits provides a
logical and consistent transition from the title, to the body of the film, and then to the credits. The close-up and slightly out-of-focus shots act as an abstract reference to the more realistic shots of the balloons which occur in the main body of the film. This repetition, as well as the repetition of the same typeface throughout, creates a rhythm and helps to establish a well-blended unity overall.

Designs with Type

In contrast to some of the more conventional uses of typography, this section of the thesis involves a series of ten abstract designs in which type provides the basic material for the designs. These designs go beyond individual letters to create new forms of expression. Each design was handset and then printed on a proof press. Type from a variety of fonts was used, some wood, some metal. The examples relate to four basic designs with variations in three of them. They include four variations using the letter "O" and the "period" (Figure 21); three variations using the letters "I" and "L," the number "1," the "period," and the "exclamation point" (Figure 22); two variations using the "ampersand" (Figure 23); and one design using the "I," "L," the number "1," and the "period" (Figure 24). There are no variations of this last design.

Variations using the letter "O" and the "period"

The basic design involves the letter "O" and the "period" combined in a variety of typefaces and sizes. Variations in this design relate to the repetition of the basic design in each of the pieces. This is achieved
by putting the same paper through the press several times and in various positions. A certain amount of ink is absorbed each time the paper goes through the press, resulting in a gradation in value.

One variation shows the basic design repeated four times (Figure 21). Initially the paper passed through the press twice, the second time at a slightly lower position. The paper was inverted and the same process was repeated. Two white "O"s were cut from color-aid paper and glued to the center of this design. This was done to break up the almost black density created by the overlapping in the printing and to add variety in the form of an additional texture. These two "O"s also act as a focal point.

This design has a vertical rectangular format and was printed in black ink on white paper. It is framed with a double mat, a thin black inner mat and a grey outer mat.

A second variation shows the basic design repeated three times, once with the paper right-side up and twice with the paper inverted (Figure 21). It was printed in black ink on white paper. This design has an overall vertical rectangular format, but the inner opening of the dark grey mat is cut in an irregular shape. The contour of this inner opening is a combination of curved and straight lines, vertical and horizontal. This particular kind of inner opening complements this design and further emphasizes the contour shapes of the "O"s.

The third and fourth variation each show the basic design repeated twice (Figure 21). The paper was then torn around the overall contour of the design and mounted on a dark ground. Before the designs were mounted,
counter shapes in three of the "O"s were cut out to show the dark ground. Both of these variations have a vertical rectangular format. One was printed in black ink on cream paper and mounted on a dark brown ground and framed with a cream mat. The other was printed in black ink on white paper, mounted on a dark grey ground, and framed with a white mat.

Black, grey values, texture, and contrast are the dominant elements used in these designs. The gradation in the black and grey values created by repetition of the basic design is most prominent. There is the illusion that the darker letters appear closer than the lighter ones, except for the two white "O"s used in the first variation.

The grey values also involve texture and contrast. An uneven surface is created when the design is printed in succession due to the decreasing amount of ink on the press. This creates a relatively rough texture, both tactile and visual. This texture combines with the somewhat heavily textured paper and contrasts with the more uniform texture created by the letters which were first printed when the press was fully inked.

Texture also involves an interplay of the weight and structure of the letters used. A relatively uneven visual texture is created by the rather bold weight of most of the letters. This contrasts with a more uniform visual texture created by relatively less contrast between the strokes of the letters.

Additional contrast occurs in the variation of typeface and type size. The use of the periods which form solid circular masses, contrasts with the open contour shapes of the "O"s. Their contrast in size and form
add interest and variety as they are scattered freely throughout. This multiple use of contrasts together with the use of similarity and repetition of elements helps to establish rhythm and harmony in each of the designs.

Variations using the letters "I" and "L," the number "1," the "period," and the "exclamation point"

The basic design involves the letters "I" and "L," the number "1," the "period," and the "exclamation point." It combines both solid and outlined letterforms or typographical elements in a variety of typefaces, sizes, and weights. The design creates a pattern of rectangular and square shapes except for the three triangles created by the upper portions of the exclamation points. The shapes formed by these typographical elements and their juxtaposition in the surrounding space give a definite linear quality to the design. One large, thick rectangular element is used which divides the composition almost in half. Its linear quality has so thickened that it appears as a plane surface. A random placement of the other typographical elements appears on either side of this large, thick shape, most of which are positioned in the same direction and parallel to each other.

Variations in this design relate to the use of color in rectangular and square shapes of varying sizes. These colored shapes, which appear as accents, are cut from color-aid paper and glued to the original designs. All of these designs have a rectangular format, but vary in their directional emphasis.
The first variation is printed in black ink on a light grey paper (Figure 22). Color occurs in the addition of six turquoise rectangles and two turquoise squares. These colored shapes have been carefully interspersed throughout the design. This design is framed with a double mat, a thin black inner mat and a grey outer mat, a few shades darker than the paper. The design itself has a vertical appearance, but its overall direction is horizontal.

A second variation is printed in black ink on white paper (Figure 22). Five red rectangles, two red squares, and one white rectangle have been added to this design, again carefully positioned throughout. The design is framed with a triple mat, a thin red inner mat, a slightly thicker black middle mat, and a white outer mat. The design has a horizontal appearance and its overall directional format is vertical.

The third variation is printed in black ink on beige paper (Figure 22). The design involves the addition of seven turquoise rectangles and three turquoise squares. This turquoise has a slightly different shade than the one previously described. The design is framed with a black mat. Its overall directional format is horizontal, but its appearance is vertical.

The use of texture, contrast, and color are predominant in these designs. Texture involves the juxtaposition of the typographical elements to their surrounding space. A more uneven or rough visual texture is created by the variation in size and thickness of these elements and in the variation of space surrounding them. This uneven and relatively rough
visual texture is further emphasized by the use of a somewhat heavily textured paper. However, a contrast does occur with the use of the color-aid paper which has a smooth and matte texture.

Other contrasts occur in the variations in size and weight of the typographical elements. Solid forms contrast with outlined forms, and the linear direction of the composition contrasts with the direction of the overall format. The use of color involves further contrast as it is juxtaposed to the black shapes created by the typographical elements.

Not only was color used as a contrast with the black, but it was also used for emphasis and to create an overall effect in these designs. The particular choice of colors combined with the directional position of the composition reflect a contradiction in this mood or overall effect.

The use of turquoise in the first variation combined with the black and shades of grey used for the paper and the mat seems to impart a cool and restful feeling even though the typographical elements are in a vertical position. This design could be described as "verticals at peace."

The small amount of red used in the second variation appears to have a richness and luminosity because of its juxtaposition with the larger amount of black. Its use seems to impart an excitement and aggression which is unexpected when combined with the horizontal position of the typographical elements. The overall vertical format helps to reinforce this feeling.

The use of turquoise in the third variation acts as a complement to the beige paper and appears to create an overall feeling of warmth. Its
use on the thick, black rectangular shape tends to break up the exceptionally heavy weight of this element.

In each of the designs, a greater visual effect is created by using the color sparingly in relation to the amount of black. This particular use of color also adds variety and creates a greater visual interest in the designs.

In addition to the texture, contrast, and color used in these designs, a sense of movement appears to be inherent in the linear quality of the compositions. The linear shapes created by the typographical elements repeat throughout to create a rhythm; and a powerful, emphatic beat is felt at the occurrence of the large, thick rectangular shape. This repetition combined with the harmony of the other design elements coheres in a visual unit.

Variations using the "ampersand"

This design involves the use of the ampersand in various typefaces and sizes. The two designs are alike except for their directional format and color (Figure 23). One was printed in turquoise ink on cream paper. It was framed with a dark grey mat positioned vertically. The other was printed in black ink on rust paper. It was framed with a dark brown mat and positioned horizontally. The most unusual feature in this design is the mat. The outer edges have a rectangular format, but the inner opening consists of an irregular contour shape. The implied line created by the outer edge of this irregular shape further emphasizes the contour shapes in the ampersands.
Contrast and texture are the two dominant elements used in this design. Contrast occurs in type size and in typeface. Two outlined ampersands add further contrast as well as variety to the design.

By using only a modest amount of ink, an uneven surface is created when the design is printed. This creates a relatively rough visual texture which combines with the somewhat heavily textured paper. Variations in size and weight of the ampersands and in the space surrounding them further emphasize this uneven textural appearance which contrasts with the smooth visual and tactile texture of the mat.

An additional contrast occurs between the straight angular lines of the outer edges of the mat and the irregular contour of its inner opening which also acts as a visual transition from the mat to the design to achieve a total harmony.

**Design using the letters "I" and "L," the number "1," and the "period"**

This design involves the letters "I" and "L," the number "1," and the "period" used in various typefaces, sizes, and weights (Figure 24). The composition consists of rectangular and square shapes which were created with these typographical elements. Two large, thick rectangular shapes make up the center of the composition. Their linear quality has become so thick that they appear more as plane surfaces. The other typographical elements are placed selectively around these two dominant shapes. Most of the elements are placed beside each other in a vertical position with no space between the pieces of type. This particular juxtaposition of the typographical elements creates fine white lines, running
horizontally and vertically, which seem to be framed in black. The linear pattern of these white lines appears to have a greater visual impact than the larger black shapes surrounding them. The white lines appear intensified and seem to take on greater luminosity because of their thinness.

The design was printed in black ink on white paper. A quotation from Some Contemporary Elements in Classical Chinese Art by Tseng Yu-ho was added to the composition after the design was printed. The quotation appears in white on the two larger black center shapes and was set with 36 point Optima transfer lettering. A PMT was then made from the design, and subsequently framed with a pearl grey mat. The mat has a rectangular vertical format. However, it has an irregular inner opening which consists of vertical and horizontal lines that conform specifically to the contour of the design.

Contrast is the dominant element used in this design. Contrast occurs in the variation in size and weight of the typographical elements used. The thin white lines created by the juxtaposition of these typographical elements contrast strongly with the heavier black linear shapes surrounding them. Further contrast is added by combining the lettering with the basic design. Another contrast occurs between the regular outer edges of the mat and its irregular inner opening. This inner opening further emphasizes the overall contour of the design and acts to integrate it with the mat to create a unified whole. This multiple use of contrasts helps to create visual interest and unity in the design.
Experiences in Color and Light: A Structure Using Booklets

I invite you to learn to see.

Josef Albers

The experience of color for most people is primarily in the subtractive mixture process. Since color perception teaches us that a color is almost never seen by itself and that it is related to qualities of sensation, visual experiences in color and illumination would allow for its greater learning and understanding. This section of the thesis involves a three-dimensional structure housing eight experiences dealing with color and light (Figure 25). Five booklets accompany this structure and are incorporated in its design.

These experiences and booklets are meant to emphasize that color mixture in the contemporary world of art no longer depends on pigment mixture alone. Light can be broken into color seen as the visible spectrum. Blacklight allows experiences with the invisible electric range beyond the visible spectrum. Some reflected colors, which could not be duplicated by using pigment, occur in the actual platelet structural elements of certain feathers reflecting light. Spinning discs allow experiences in subjective or induced color, a phenomenon which can occur when the stimulus is only black and white. And finally, perceptual changes in color can occur through the mysterious relationships between color and form, and through the interaction and interdependence between one color and another.

The structure itself consists of eight interchangeable 8 x 8 x 8 inch three-sided, clear, plexiglas modules. Each module was formed from
one piece of plexiglas which was bent in two places by strip heating. In this process the line to be bent is centered over the heating element. After the plexiglas is heated thoroughly, it is bent gently to a 90 degree angle, keeping the heated side on the outside of the bend. It is then held firmly until cool. These modules are stacked, asymmetrically, like blocks, on a black plexiglas base. Inside each of these modules is a 4 x 4 x 4 inch plexiglas cube demonstrating an aspect of color or light.

One experience involves seeing the visible spectrum through prisms (Figure 26). A mobile of prisms hangs from the center inside of a five-sided plexiglas cube. The construction consists of eleven tiny triangular prisms hanging at various lengths, on nylon thread, from the inside of a three-inch circular piece of plexiglas attached to the top of the cube with a plastic screw. The cube is open in the front with a mirrored back and a white bottom. The remaining sides of the cube are made of clear plexiglas. This allows the sun to shine through the prisms and reflect tiny spectra from the mirror onto the white ground.

There are three experiences dealing with structural color where light behaves as a multilayered interference phenomenon. One experience shows examples of structural color in nature. This is a five-sided cube with an open bottom. The top contains five color slides of the hummingbird. One side contains a morpho butterfly on a white ground (Figure 26); opposite the morpho is the eye of a peacock feather also on a white ground. Each of these is sandwiched between two pieces of thin plexiglas. The two remaining sides are clear plexiglas.
A second experience in structural color shows man-made iridescence in a plastic film called Mearl (Figure 26). Two opposite sides of the cube show the Mearl film on a transparent ground, another side on a black ground, and opposite the black, the film is shown on a white ground. Each example of the Mearl film is used in the shape of a three-inch circle, sandwiched between two thin pieces of plexiglas, and attached to the outer sides of the clear plexiglas cube with plastic screws.

The third experience in structural color is concerned with the transparent and reflecting diffraction spectra seen from finely-ruled grids on plastic (Figure 26). Diffraction is the spreading of a beam of light which occurs after the light goes through a narrow line opening. The design and construction of this cube is the same as the one incorporating the Mearl film. Two opposite sides of the cube show circles of transparent diffraction spectra, and the other two opposite sides show circles of reflecting diffraction spectra.

Another experience involves optical mixtures which deal with subjective or induced color, and with perception of pattern and motion. It consists of several discs, each in a different pattern and/or color, which spin, one at a time, on a black plexiglas cube (Figure 27). The cube has an open bottom and inside is a tiny battery operated motor whose flywheel projects through a small opening in the center of one side of the cube. The flywheel spins when it is activated by a switch attached to the back of the cube. Each disc creates a different optical mixture as it spins.
A sixth experience involves perceptual illusions and color mixture. One side of the cube deals with the illusion of a middle mixture in overlapping shapes constructed with pieces of colored acetate sandwiched between two pieces of plexiglas (Figure 27). A blue triangle appears to be superimposed over a yellow circle on a white ground. The middle mixture or area which is common to both the triangle and the circle is green. In addition to the illusion of mixture, is the illusion of transparency. The green middle mixture seems to lose its opacity and appears transparent.

An example of the Weber-Fechner Law is shown on the opposite side of the cube. This relates to the formula necessary to produce a visually even progression in mixture. The visual perception of an arithmetical progression depends on a physical geometric progression. Strips of blue acetate, 1 x 4 inches, are placed next to each other in a geometric progression. The first step has one strip, the second has two strips, the third has four strips, and the fourth step has eight strips. These strips of acetate are sandwiched between two pieces of thin plexiglas.

The other two sides of the cube which are opposite each other show color mixture. One side is yellow acetate and the other blue, both sandwiched between two pieces of clear plexiglas. Green, which is the result of mixing yellow and blue, is seen when the cube is viewed from either of these two sides.

A seventh experience involves seeing into some of the ultraviolet, the invisible part of the spectrum by using blacklight (Figure 27). A blacklight is connected to the center of a black plexiglas base, 4 x 4 x
2 3/8 inches. A clear acrylic tube, four inches long and four inches in diameter, sits on top of the blacklight and rests on the base. Fluorescent string, in six different colors, is glued to the outside of this tube in an abstract linear pattern. When the blacklight is activated, the phenomenon of fluorescence can be seen. Energy from the blacklight rays is absorbed by the electrons of the substance being activated. In this example, it is the string. This causes the electrons to move around violently, and as they slow down, they release this energy in longer wavelengths which appear in visible colors. This phenomenon of fluorescence can also be seen in a piece of quartz rock which is placed on a piece of clear plexiglas above the blacklight in the structure. In addition to the quartz, three small rocks, fluorite, willemite, and wernerite, have been glued to a black disc. They fluoresce under blacklight. These are examples of fluorescence in nature.

The eighth cube involves an experience with liquid crystals (Figure 27). Four samples of liquid crystals have been taped, each to one side of the cube, with black pressure-sensitive tape. One sample greenish-blue in color, reacts both to water and to the touch. This one turns blue when touched and turns bronze which fades to green when wet. The other three react only to the touch. One sample, which is black, turns greenish-blue, then fades to bronze when touched. Another sample which is midnight blue, turns greenish-pink when touched. The last sample which is black, turns pinkish-bronze with hints of green when touched.

In addition to these eight experiences, there are five booklets to
accompany the structure (Figure 28). They are titled, *Catching Rainbows*, *Structural Color*, *Spinning Circles*, *Homage to Albers*, and *Beyond Thresholds*. These booklets explain the experiences and act as a complement to them.

The booklets and the discs for the optical mixture experience have been placed in a four-sided rectangular structure (Figure 29). The interior was designed to resemble a book case with shelves. There are three compartments, one for the booklets, two for the discs. The exterior was designed to resemble the hard cover of a book. The interior and the pieces relating to the front and back covers are constructed with black plexiglas. The part relating to the spine of the book is white plexiglas. A list of the contents and the names of the author and the designer appear in black type on the white plexiglas spine (Figure 29). A transparent PMT was made from the type which is sandwiched between two pieces of thin plexiglas. This mini-structure containing the booklets and the discs is housed in the lower module which intersects the horizontal and vertical direction of the structure.

The overall rectangular format of these booklets is 6 x 7 inches. The text is set in Courier 12 on an IBM Selectric II. This is a slightly squared serif typeface. The text has justified left-hand margins with ragged right. Xeroxes of illustrations are planned layouts throughout the text. The titles are 24 point and 18 point Serif Gothic transfer lettering in a flush-left arrangement. The paper is Kimberly Clark's Classic Laid in natural white and the covers are Kimberly Clark's Zodiac Colors with a
seaweave finish. The booklets are bound in saddle stitch. In this process each booklet is opened in the middle and two wire staples are inserted through the back. A limited edition of three copies of each booklet was produced.

The form of these booklets relates to the rectangle, both in the actual shape of the paper and in the visual shape the text creates as the black ink of the type contrasts with the natural white of the paper. An even texture is created by the use of a minimum amount of leading between the lines and by the use of a typeface which has little contrast between its vertical and horizontal strokes. This even visual texture contrasts with the paper which has an uneven finish. The horizontal direction of the type is in agreement with the horizontal pattern of the weave of the paper. This horizontal direction contrasts with the more vertical textural weave of the paper used for the covers. Contrast also occurs in the use of italics for the subheadings and in the variation of typeface and size used for the titles. The larger, heavier sans serif typeface of the titles contrasts with the smaller, lighter weight typeface of the text.

Variety occurs in the use of illustrations which are designed to fit throughout the text and act as a contrast to it. The use of illustrations relieves the monotony of unbroken text, and adds interest and visual stimulation for the reader.

Rhythm and movement occur in the repetition of the same typeface, one for the titles and one for the text, in each of these booklets. Repetition also occurs in the unequal relationships of the white areas, both in
the margins and within the text.

The use of color occurs primarily in the booklet covers and in the form of colored stock. In printing processes, stock refers to paper. Except for Spinning Circles for which the cover is black and white, each booklet cover is a different color. These colors contrast with each other and with the black type used for the titles.

The cover for Catching Rainbows has six layers of paper, each one a quarter inch longer than the previous one on the front cover. This creates a vertical strip along the right-hand edge in the colors of the spectrum. The red, which is the shortest, is on the left-hand side of the strip and continues on around to become the predominant color used for this cover. The cover for Structural Color is aqua and metallic pinwheels have been added in a variety of colors. These pinwheels form a rectangular shape under the title and represent the quality of iridescence described in the booklet. Yellow is used for the cover of Homage to Albers and purple for the cover of Beyond Thresholds. Two rectangular pieces of fluorescent paper of different sizes, one "signal green," the other "saturn yellow," are glued to each other and to the purple cover of Beyond Thresholds. The title appears on the "saturn yellow" rectangle. All of these colors were chosen not only for their aesthetic value, but to help express the booklets' content more effectively.

Since the Albers booklet deals with perceptual illusion, color is also used to illustrate the illusions which the reader will experience. Here the arrangement of color is logical and relates specifically to
content.

The cover for *Spinning Circles* is white with a transparent and black overlay. The acetate overlay contains a radiating line figure in a five inch circular shape. The title can be seen through the transparent part of the figure. This particular cover relates to perception of pattern and motion and visually expands the booklet's content.

It is the combination of these various elements exhibited in the type, paper, illustrations, and covers which are integrated to create a sophisticated, but informal expression of typographic design.

In relation to the entire structure, very simple geometric shapes have been used throughout. The use of the circle and the square predominate. By designing a modular construction, visual interest is created through multiple views of the same form in an orderly manner. The square is repeated both in the structure and in the cubes for the experiences. The circle is repeated as part of the construction in several cubes. It appears in the Mearl film, the diffraction spectra, the discs for optical mixtures, and the middle mixture illusion. The circle is also repeated in the shape of the bulb for the blacklight and in the cylindrical tube with the fluorescent string. The repetition of these shapes creates an overall rhythm and movement in the design.

Variety is achieved through contrast. The most obvious contrast is between the circle and the square. By their repeated use, these two opposite shapes are brought into harmony. Contrast also occurs in the use of materials. The paper used for the booklets and discs, the various mate-
rials used in the construction of the experiences, and the plexiglas contrast with each other. Another contrast can be seen in relation to balance. The individual components of the structure are formally balanced, but the structure as a whole is an asymmetrical arrangement. Contrast in direction of movement occurs in the placement of the rectangular mini-structure containing the booklets and the discs. Its position in the lower module intersecting the vertical and the horizontal produces a point of tension. The rectangular shape becomes the focal point created by the 90 degree angle of intersection of the modules. The use of the rectangle for the focal point adds greater visual interest as it both contrasts with the circle and the modular use of the square, and complements the rectangular shape repeated in the base of the structure.

This multiple use of contrasts along with similarity of parts combine to create unity in the overall design of the structure. The viewer not only "learns to see" through the visual experiences, but also discovers how applied typography can relate to a three-dimensional design in a more unusual manner. The structure and the experiences can be viewed as a piece of sculpture, as well as impart an opportunity for greater awareness through the addition of the booklets as part of the structure.

A major limitation of this structure must be explained. The original intent to make a structure that could be freely handled by the viewer was prohibited by the design and the material. Plexiglas, although a very sturdy material, retains fingerprints and scratches easily. Because the three-sided modules were made by strip heating rather than from a mold,
they are not exactly the same size. (The error can be up to 1/16 inch.) This means that the modules are not completely interchangeable and they tend to be less sturdy when they are stacked. With unlimited funds, five-sided cubes which stack like blocks could be made. In retrospect, I would still choose plexiglas as a medium because its smooth, transparent texture seems to relate so well to experiences in color and light.
CHAPTER III

SUMMARY

Despite tremendous competition from electronic media in communication, printed words still occupy a prominent place in our environment and deserve creative and well-designed solutions in their presentation.

These original works, where the communication of ideas has been primarily expressed through printed words, are intended to reflect the importance of the elements and principles of design in creating a greater fluency and visual aesthetic quality overall. Their typographic design combines diverse elements into organized visual units. The elements of communication have been assembled in a harmonious and unified whole either through a uniformity of similar elements or through the use of contrasting elements, or a combination of both. The individual results depend on the way in which these elements are organized in relation to each other. The interplay of similarities and contrasts can produce stimulating and visually appealing effects, especially when there is a greater awareness of the basic principles of design.

With a better understanding of these basic design principles and their application comes greater freedom and originality in the creation of new forms in typographic design. Many fields have become fertile for experimentation in typography. Some interesting developments have evolved in the field of book design. Radical departures from the traditional format and typographic conventions are being explored. The book, Silence, by John Cage uses different forms of typographic presentation
to achieve the typographical equivalent of musical rhythm and structure in addition to letting open space into the typographic page. In the play, La Cantatrice Chauve by Eugène Ionesco, visual form is created through typography. One does not read the play, but rather attends the performance which is typographically staged.¹

Other unusual experiments in book design have been brought together in a recent exhibit at the Fredrick S. Wight Galleries at UCLA. The exhibit, entitled "Words and Images," displayed many book-like objects which appeared quite unlike books. The most striking example was Buckminster Fuller's "Tetrascroll." It comes in a 41 inch pyramid-shaped wooden box. The pages are hinged triangle shapes which can pop up into pyramids. The text, most of which was positioned upside down, also appears in a triangular shape.

These examples demonstrate the importance of the visual experience. Although it is not called a book, the structure dealing with "Experiences in Color and Light" could be considered an experiment in book design in relation to these examples. When viewed as a whole, the three-dimensional structure is a definite departure from the traditional book format. Typography is used in the form of booklets and becomes an integral part of the entire structure. The three-dimensional effect creates a visual experience far beyond that possible from the booklets alone.

Another area of interest concerns typography in motion, especially the typography used in television and film. What better place to experiment with motion so inherent in these media? Two events prompted
experiments in this area. One was the production of a series of abstract films by Norman McLaren of Canada's National Film Board in which lines, dots, loops, numbers, and other shapes are animated across the screen. The second event was the growth of the television industry and the need for more originality.\textsuperscript{2} The design possibilities are numerous and have only begun to be explored.

Some experimenting was done along this line in the creation of the title design in \textit{LUMIA II}. One idea was to make use of the colors in the spectrum produced by a set of six triangular prisms. The letters in the title would move across the screen through a background of spectra. The idea of filming only the shadows of these letters and their movement was also explored. In addition to movement, certain angles of the camera could create distortion and elongation in the letter forms. These ideas did not involve animated typography, but rather typography in actual motion. Possibilities of animated typography only evolved later and as a result of this experimentation. However, lack of time and funds prohibited further study.

Both the field of book design and the entire field of movement in typography have become rich areas for new ideas and definitely merit further experiment. New concepts will have to be developed which deal with time, space, and three-dimensional effects to create a "ballet of communication."\textsuperscript{3}

No matter what new forms or concepts develop, typography should continue to strive for simplicity, legibility, clearness of expression,
and the enduring quality of timelessness. Freedom in typographical experimentation and in exploiting new technological developments, without losing the ability to apply the basic elements and principles of design, seem paramount to more effective visual communication.
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15 Ibid., pp. 29-31, 35, and 77.

16 Ibid., pp. 37-40.

18 Hurlburt, Layout, pp. 64-65.


20 Rüegg and Fröhlich, Basic Typography, p. 116.


22 I discussed the use of black as a color in typography in the section describing "Black and Grey Values." This section will concentrate on the use of other colors.

23 Rüegg and Fröhlich, Basic Typography, pp. 116-117.

24 Bain, Display Typography, p. 57.

25 Tschichold, Asymmetric Typography, p. 67.

26 Dair, Design with Type, p. 71.

27 Tschichold, Asymmetric Typography, p. 68.


29 Ibid., p. 52.

30 Ibid., p. 16.

31 Dair, Design with Type, p. 111.

32 Ibid., pp. 103-104.

33 Ruder, Typography, p. 18.

34 Dair, Design with Type, p. 104.

35 I have also created three plexiglas sculptural structures which will not be a part of this thesis because they relate to letterforms in three-dimension, rather than typography. However, they will be included in my graduate exhibit.
Chapter II

The Relationship of Original Works
Using Typography to Elements and
Principles of Design

1Rules, in relation to typography, have been defined in the section
on "Rhythm" in the INTRODUCTION of this thesis, p. 8.

2I prepared the camera-ready copy for the front cover. The same
copy was used to shoot the half-title and title pages.

3James Craig, Designing with Type: A Basic Course in Typography, ed.

4Jan Tschichold, Asymmetric Typography, trans. Ruari McLean from

5In the printing process some changes occurred which altered the in-
tended typographic result. Only one thin rule was to be on the front
cover. It was to both separate and join the title from the statement
on energy conservation. The rule was intended to be only as long as
the word "EQUIPMENT," and to be placed equidistant between the base
line of the word "EQUIPMENT" and the top of the first line about
energy.

6Here I departed from a major guideline in typography by using
different sans serif typefaces, Univers and Helvetica, in the same
design. Because of the limitation of typefaces, sizes, and weights,
I felt it was permissible to make this compromise. Before deciding
I asked the printer to set samples in various combinations of type-
faces, sizes, and weights and this seemed by far the best solution.

7Carl Dair, Design with Type (Toronto and Buffalo: University of

8Roy Paul Nelson, Publication Design (Dubuque, Iowa: Wm. C. Brown

9Dair, Design with Type, p. 120.


11John E. Cogoli, Photo-Offset Fundamentals, 3d ed. (Bloomington, Ill.:

12Craig, Designing with Type, pp. 34-35.
13 Dair, Design with Type, p. 118.

14 The mirror broke, so the same design was printed on paper instead.

15 I only authored one of these papers, "Future Trends in Typographic Symbolism."

16 This was the only black and white glossy photograph that I had available at the time.

17 These poems were authored by my daughter, Debbie Dorfman, who was 10 years old at the time.


20 The page design of this thesis uses unjustified margins.

21 Rolfe G. Rehe, "Justified or Unjustified Typesetting - That is the Question...Or is it?" Inland Printer 178 (November 1976): 108.

22 A specific use of rules and directional stress was discussed earlier in relation to the individual layouts.


24 According to the Mearl Corporation, Mearl iridescent film is a brilliant colored plastic film which derives its color entirely from light interference. It contains no pigments or dyes. Incident white light is separated into two fractions on reflection from the multilayer thin film structure. The reflected fraction has one color, the transmitted light the complementary color. Displaying the unique characteristic of iridescence, the colors change with varying angles of illumination and viewing. This film is less than one-thousandth of an inch thick and contains more than 50 uniformly thick layers of polypropylene alternating with the same number of uniformly thick polystryene layers. The specific thickness plus the angles of incidence and observation, determine the actual color.


29. The type used in these designs and the press on which they were printed belong to Ron Fenimore, Professor, Applied Art Department, Iowa State University.


31. Dair, Design with Type, p. 35 and p. 37.


33. Tschichold, Asymmetric Typography, p. 68.


37. A PMT or photo-mechanical transfer is a reproduction process used to reproduce high contrast original art work. In this process the negative is transfered to a specially treated paper or transparency as it goes through a processor. The process involves a diffusion transfer and is based on the same principle as Polaroid.

38. The properties and characteristics of the Mearl film were discussed earlier in a note in the section on "Title and Credit Design for the Film, LUMIA II."

39. These discs are housed with the five accompanying booklets in a mini-structure. The details will be discussed in relation to the booklets.


41. Ibid., p. 55.
Chapter III

Summary

1 Carl Dair, Design with Type (Toronto and Buffalo: University of Toronto Press, 1967), pp. 145-148.

2 Ibid., 138.

3 Ibid., pp. 141-142.
SOURCES CONSULTED

Books


Dair, Carl. *Design with Type.* Toronto and Buffalo: University of Toronto Press, 1967.


Periodicals


Rehe, Rolfe G. "Justified or Unjustified Typesetting - That is the Question...Or is it?" *Inland Printer* 178 (November 1976): 108.


*Upper and Lower Case* 3 (July, September, and December 1976): entire issue.

*Upper and Lower Case* 4 (March, June, and December 1977): entire issue.

**Interview**


**Film**