TWENTY YEARS OF SELECTED MODERN FURNITURE DESIGN

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PREFACE

The growth of modern furniture design has been taking place for some seventy years and is still in the process of being developed. Modern furniture was designed as a result of the sweeping social and economic changes in the early 1900's. Since then modern furniture has become well-thought-out designs emphasizing comfort, beauty, form and functionalism.

Since the modern furniture movement is still in progress, and is relatively new, it has been difficult to obtain definitive information. The purpose of this study is to relate selected aspects of modern furniture design so that a more thorough understanding of modern furniture design can be gained.

I am deeply appreciative to the following for the loan of material used in this study: Herman Miller Incorporated, Knoll International Incorporated, and Laverne International Limited.

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The writer is deeply indebted to her husband, children, and parents for their patience, understanding, and encouragement during her graduate study, and wishes to take this opportunity to dedicate this study to her mother and father for making graduate study possible.

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INTRODUCTION

What Is Modern Furniture Design?

Modern designing is a term used to include aspects of present-day practice which depart widely from traditional or conventional models. By definition modern is a fluid style based upon a continuing effort to adapt furniture and backgrounds in form and function, to the changing moods of contemporary life. (9) It avoids mere prettiness, seeks simplicity through elimination of ornamentation on structural forms, and unites the direct and incisive quality of straight lines with the softening effect of sparingly used curves. (9) Adapting design to function, it is streamlined for comfort and beauty in the modern manner. (9)

Modern furnishings represent a fresh approach to the use of space, and feature clear-cut lines and easily maintained surfaces. These designs are varied to suit formal or informal living, large or small homes. Oriental and Scandinavian influences are evident in modern furniture styles, fabrics, and accessories.

Characteristic of the modern influence is built-in furniture or furniture with separate units that may be grouped or stacked to appear built-in. Much modern furniture has a see-through quality that gives a feeling of free space. Such pieces as desks or tables may seem suspended in air without visual means of support; this floating quality contributes lightness. Modern styles depend upon line, form, grain of wood, and texture of fabric more than upon carving or other embellishment.

As mentioned earlier, modern design may be formal or informal. The finish of the wood and the kind of upholstery used determine whether the piece looks sophisticated or casual. (24) With dull finishes, woods look informal, woods finished with a soft sheen go with many different kinds of materials while woods finished with a high gloss are formal in appearance. Upholstery of a rough texture is similarly informal while smooth fabrics create a formal statement.

In 1950 Edgar Kaufmann (19) stated twelve precepts of modern design, in his pamphlet, What is Modern Design?, these precepts still apply to modern design even twenty-three years later.

1. Modern design should fulfill the practical needs of modern life.
2. Modern design should express the spirit of our times.

3. Modern design should benefit by contemporary advances in the fine arts and pure sciences.

4. Modern design should take advantage of new materials and techniques and develop familiar ones.

5. Modern design should develop the forms, textures and colors that spring from the direct fulfillment of requirements in appropriate materials and techniques.

6. Modern design should express the purpose of an object, never making it seem what it is not.

7. Modern design should express the qualities and beauties of the materials used, never making the materials seem to be what they are not.

8. Modern design should express the methods used to make an object, not disguising mass production as handicraft or simulating a technique not used.

9. Modern design should blend the expression of utility, materials and process into a visually satisfactory whole.

10. Modern design should be simple, its structure evident in its appearance avoiding extraneous enrichment.

11. Modern design should master the machine for the service of man.

12. Modern design should serve as wide a public as possible, considering modest needs and limited costs no less challenging than the requirements of pomp and luxury. (19)

In 1973, Wolf Von Eckardt reviewed the evaluation of a design against the background of two decades of American life, 1953-1973. This begins with the fact that the Korean War was coming to an end then twenty years later the total withdrawal from Viet Nam. Between these two events GI Home

Loans reached an all time high in 1954. The first successful orbit of a United States satellite and the admission of Alaska as the 49th state took place in 1958. The Civil Rights Act of 1967 declared an end to discrimination in housing. In 1970 the population of the United States reached 203,184,000; this was the same year we made our third moon landing. In 1973 Picasso died, there was a major cutback in government funding of subsidized housing and the Museum of Modern Art opened the Charles Eames furniture show. Against this background there continued a "restless search" away from the International Style and towards a more pragmatic expression of the community, of what people need and want. (34)

Designers of modern furniture have been influenced by these and many other factors. Among these are: the speeded-up tempo of living, the rising standard of living, the mother working out of the home, and smaller apartments and homes. Realizing these forces behind the styles of today, designers are making furniture to fit the faster pace and the more complex existence; they are designing furniture for comfort and convenience. (24)

In order to distinguish the good from the bad in the design of today's modern furniture, one should realize that good modern design must be well proportioned and well built. It should employ fine woods, plastics, metals, fabrics and

simple, straight or slightly curved shapes. Today modern design has no pre-determined shapes or ornaments. (24)

CHAPTER II

HISTORY OF MODERN FURNITURE DESIGN

The furniture of today with its well-thought-out designs emphasizing comfort, beauty, form, and functionalism, is versatile. Modern furniture is simple, with straight or curved lines that emphasise the horizontal lines. Although the 'birth' of modern furniture has no specific date, some authors feel there has been modern furniture since the early 19th century. Through the many years of its development modern furniture design has grown up through various stages.

The Industrial Revolution was a great force in the development of twentieth century furniture design. The social revolutions that were concurrent with the Industrial Revolution created the initial purpose for the machine-made product: to turn out, inexpensively, by the yard what had been made by hand, expensively, by the inch. (35) A major portion of the population of the western countries moved into a middleclass status creating new demands for symbols of success. These symbols, including fine furnishings and handcrafted accessories, were the materials of aristocracy. The machine therefore, attempted to copy in large quantities the

hand-produced arts of the upper classes.

As the number of the status seekers grew, the machine was able to produce and satisfy the growing demand for status symbols. By 1830 there was little demand for hand crafted products, machine-made imitations flooded the market. The closer a machine made product resembled a hand-product the better it was considered; this idea carried into the first half of the present century.

The Thonet name has also been associated with the growth of contemporary furniture, since the early 19th century. Michael Thonet invented the process of bentwood furniture production in 1840. He designed chairs of which all parts were beechwood softened by steam and then bent into continuous structural layers. (35) Thonet's furniture won the highest awards at the World's Fair in London in 1851. (See Figure 1) After Thonet died in 1871, his family continued to manufacture furniture, and by 1891, 7 million bentwood chairs had been produced. By 1921 the concern owned many factories. They started the mass production of tubular steel furniture and manufactured chairs by Breuer, Van der Rohe, and Le Corbusier. This vast organization is now called Thonet Industries.

In 1850 the Arts and Crafts Movement began in England led by William Morris. The movement suggested new design values and attempted to concentrate on honest workmanship

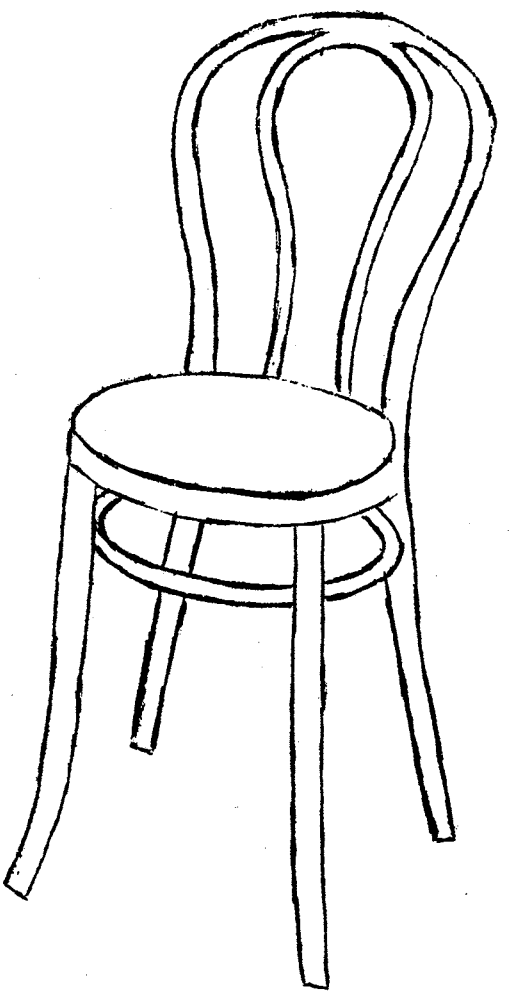

Figure 1. Bentwood Side Chair by Michael Thonet

and fair expression of materials. Had this search of honesty not led Norris back to the Middle Ages, his individual importance in the development of contemporary design would not be questioned. (35)

In the latter part of the nineteenth century another movement arose with many new concepts. The movement began to set the stage for the ideas and technology of the twentieth century, replacing the old design philosophies. The movement was called Art Nouveau.

Henri Van de Velde was responsible for establishing the Art Nouveau movement. The major contribution Van de Velde made to this group was his interest in revitalizing the machine as a tool for the designer. (33) He attempted to bring about an understanding between the artist and the manufacturer,

The Art Nouveau movement was responsible for many unusual home furnishings, and the forms of the period were completely new in relation to the traditional designs of the past. The concept presented by Art Nouveau was complete surface ornamentation. No structural change was introduced. Instead, curvilinear shapes, buds and flowers were emphasized in large sizes, almost out of proportion.

America was not left behind in Art Nouveau design. Although the people most responsible for the movement were in Europe, there were artists in the United States who were

very active. One such designer was Louis Tiffany, who developed an irredescent glass that sparkled in beautiful colors. (33) Tiffany named his new glass "favrile"; many of his pieces are extremely fragile and delicate, designed as flower forms with thin stems and wide flaring tops. (33)

Another Art Nouveau designer was Hector Guimard, a Frenchman. His work is also typical of the movement, using plant shapes and flower forms that twist and curve on the surface of a piece. Guimard's designing included an asymmetrical desk, a forerunner of the L-shaped desk of today, made of African and olive ash woods. (See Figure 2.)

Art Nouveau was shortlived. As a style it lasted less than three decades, partly because it had little relation to architecture. (2) It served the purpose of clearing away the clutter of excessive eclecticism, opening the way for a genuinely contemporary expression. (2)

The de Stijl was the next major movement in design and architecture. Its main force was in Holland from 1917 to 1928. However, this movement certainly was not limited to the Netherlands, for it slowly inched forward until all of Europe and the United States felt the impact of its ideas. (33)

The inception of de Stijl came from the famous de Stijl magazine; around this publication the de Stijl group was formed. The group consisted of a variety of talented men

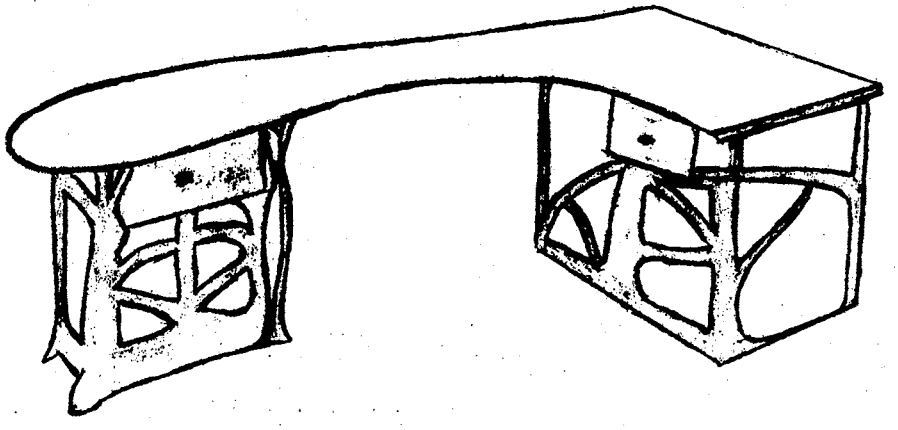

Figure 2. Art Nouveau desk by Hector Guimard

from many fields, and was led by Theo van Doesburg, although he was certainly not the most noted of the group.

Out of this small but active group came a style of architecture and design that was to make a considerable mark on future generations. The hallmark of de Stijl was the use of flat planes, rectangles, and squares, and a composition that replaced formal balance with active and informal balance. (33) The cubes and squares, which characterized this movement, were not limited only to architecture and painting but were used as well in sculptural forms.

The major furniture designer of this group was Gerritt Rietveld. He applied the de Stijl philosophy to seating, as can be seen in his chair designed between 1917 and 1919. (Figure 3) Although one cannot say that the pieces he designed are the most comfortable in appearance, they do express the idealogical goals sought after by the group and offer to the world new materials in conjunction with new ideals. (33)

The de Stijl ideas can be seen in America through the work of Frank Lloyd Wright. Many of Wright's homes are constructed of the same rectangular and square forms of the de Stijl. Even in the furniture that Wright was designing, the familiar shapes of the de Stijl were evident.

Another approach to a twentieth century style developed in Germany. The Industrial Revolution came to Germany late,

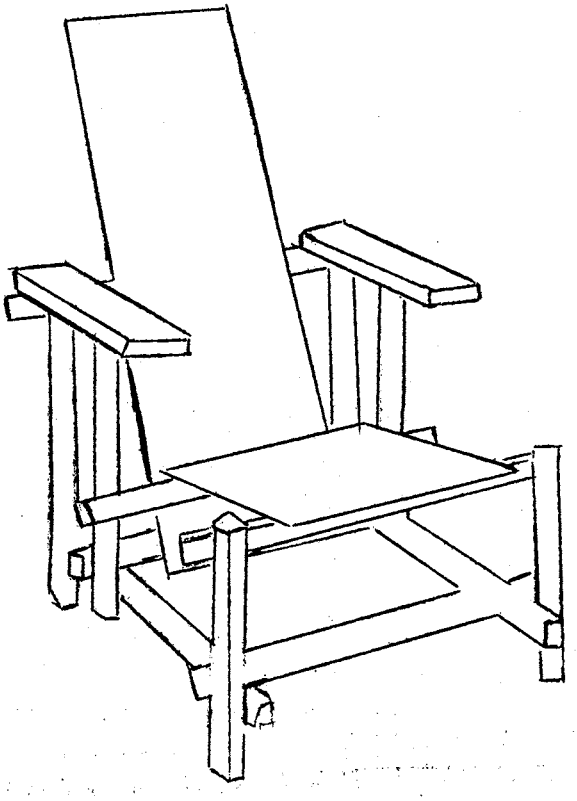

Figure 3. Chair designed by Gerritt Reitveld

giving its leaders a chance to learn from mistakes of their competitors. In 1907 the first Werbund was organized, a coalition of industrialists, artists, and workmen dedicated to the production of honest, useful, and beautiful things through industrial processes. (3)

Viennese-trained architect, Peter Behrens, was the leader of the cause. The most influential leaders of twentieth century European architecture came under his influence. (3) Le Corbusier, the Swiss born architect, Walter Gropius and Mies Van der Rohe, who soon became directors of the famous school at Weimar known as the Bauhaus.

The youngest of the Werbund leaders, Walter Gropius, who by founding the Bauhaus, really began to solve the problem of reconciling art and an industrialized society. He wrote the following account of his founding of the Bauhaus:

> This idea of the fundamental unity underlying all branches of design was my guiding inspiration in founding the original Bauhaus. During the war I had been summoned to an audience with the Grand Duke of Sachsen-Weimar-Eisenach to discuss my taking over the Weimar School of Arts and Crafts from the distinguished Belgian architect, Henri Van de Velde, who had himself suggested that I should be his successor. Having asked for, and been accorded, full powers in regard to reorganization I assumed control of the Weimar School of Arts and Crafts, and also of the Weimar Academy of Fine Art, in the spring of 1919. As a first step toward the realization of a much wider plan--in which my primary aim was that the principle of training the individual's natural capacities to grasp life as a whole, a single cosmic entity, should form the basis of instruction throughout the school instead of in one or two arbitrarily 'specialized' classes--

> I amalgamated these institutions in a Hochshule fur Geslaltung, or High School for Design under the name of Das Staatliche Bauhaus Weimar. (15)

As soon as the Bauhaus was established at Weimar people began to criticize the school's goals and aspirations. The press, as well as the community, was very confused and completely misunderstood the aims toward which Gropius, the faculty, and the students were reaching. It was for this reason the Bauhaus left Weimar in 1925 and went to Dessau, where the local government and community were willing to let the group experiment and even erect a building of their choice. (33) The building was designed by Gropius and has been a landmark since it was constructed.

The faculty at the Bauhaus was made up of artists, industrial designers, craftsmen, photographers, and architects. The teachers were little known at first, but their names have echoed through the art world since they established the school in 1919. Men like Paul Klee, Lyonel Feininger, Wassily Kandinsky and Oskar Schlemmer, and Lazslo Moholy-Nagy and Joseph Albers all contributed varied points of view to the totally new educational program in the field of art. (33)

The Bauhaus, it has been noted,

> ...established principles that even now, the contemporary designer and artist might well heed, recommending that:
>
> 1. mass production and industrialization should

be the primary concerns of the student and that of individual craftsmenship.

2. schools of design should bring together the arts of paintings, architecture, crafts, and industrial design and eliminate the differences between 'applied arts' and 'fine arts'.

3. schools of design should have faculties some of whom are progressive in thought and creative in practice to balance those who are primarily interested in the preservation of the traditional techniques and theories.

4. students should be a part of and participate in current twentieth century activities and should not seek refuge in the security of the past. (1)

The Bauhaus presented a thorough slate of ideas for the pursuit of a close understanding of handicrafts, architecture and mass production. Walter Gropius (15) wrote:

> The Bauhaus workshops were really laboratories for working but practical new designs for present day articles and improving models for mass-production. To create typeforms that would meet all technical, aesthetic and commercial demands required a picked staff. It needed a body of men of wide general culture as thoroughly versed in the practical and mechanical sides of design as in its theoretical and formal laws. Although most parts of these prototype models had naturally to be made by hand, their constructors were bound to be intimately acquainted with factory methods of production and assembly, which differ radically from the practices of handicraft. It is to its intrinsic particularity that each different type of machine owes the 'genuine stamp' and 'individual beauty' of its products. Senseless imitation of hand-made goods by machinery infallibly bears the marks of a makeshift substitute. The Bauhaus represented a school of thought which believes that the difference between industry and handicraft is due, far less to the different nature of the tools employed in each,

> than to subdivision of labour in the one and undivided control by a single workman in the other. Handicrafts and industry may be regarded as opposite poles that are gradually approaching each other. The former have already begun to change their traditional nature. In the future the field of handicrafts will be found to lie mainly in the preparatory stages of evolving experimental new type forms for mass-production. (15)

The guiding principle of the Bauhaus was therefore the idea of creating a new unity through the welding together of many "arts" and movements; a unity having its basis in a man himself and significant only as a living organism. (4)

Most of the active members of the Bauhaus are known throughout the world. They have continued to influence design even though the Bauhaus was disintegrated in the early 1930's. (33) Nello Ponente (28) wrote:

> The Bauhaus was now in disruption, its ideals and its very existence violently threatened by the reactionary forces irrestibly on the rise in Germany, which stigmatized it as an instrument of internationalism. Groupius was withdrawn in 1928; in 1933 the Nazis, having come to power, closed down the Bauhaus. Klee had already left it in 1931 for professorship at the Dusseldorf Academy. Storm clouds were gathering over Europe....Peace, freedom, and the rediscovery through the work of art of man's social vocation -- these were the aims the Bauhaus had set itself and struggled for. In their stead came war, dictatorship and social anarchy. (28)

Since Bauhaus people are so important as makers of twentiety-century design, a brief look at a few of them is necessary. Many of them actually made specific contributions to home furnishing designs, and are still making important

additions today.

Marcel Breuer studied at the Bauhaus, and as a designer-craftsman became the first master of its furniture workshop. (35) His introduction of tubular metal chairs opened up a complete new approach to furniture design, which, although revolutionary in conception, now is accepted in thousands of households around the world. (33) George Nelson (23) described his innovations:

> When Marcel Breuer developed his tubular steel chair 26 years ago, he dramatically demonstrated a fact that had been hinted at by Thonet's bentwood chair and the old fashioned ice-cream parlor chair; namely, that the mainspring of progress in the technique of manufacuring furniture lies in bringing new materials into the field. Breuer's achievement was two fold: first he used a new material; and second he applied a new design principle to the chair by substituting a double S-shaped support for the conventional four legs. This move eliminated many joints; gave the chair comfortable resiliency at low cost. Soon the idea was applied to other metals besides steel.... (23) (See Figure 4)

Several of the chairs Breuer designed in the 1920's are now being produced by Knoll International for the contemporary home. Breuer is still actively working in architecture in the United States, where he came after the Bauhaus closed. (33)

Ludwig Mies van der Rohe, an architect, replaced Walter Gropius as director of the Bauhaus in 1930. Because of the Nazi organization in Dessau, he moved the Bauhaus to Berlin. The school operated in Berlin until 1933 when it was closed,

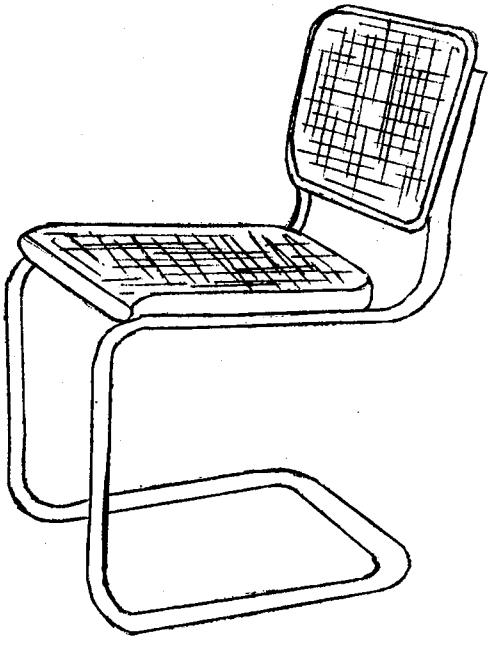

Figure 4. Tubular Steel Chair
by Marcel Breuer

Mies van der Rohe left Germany in 1937 and came to the United States, where he has worked in architecture ever since. His most famous furniture design, the "Barcelona" chair, is technologically a masterpiece, using, as it does, the cantilever principle and taking advantage of the elasticity of the metal of the curved legs and back. (See Figure 5)

Another extremely important figure at the Bauhaus was Lazslo Moholy-Nagy. He joined the Bauhaus as a teacher in 1922 and remained there until 1928. After he left the school he came to the United States. Here he became the Director of the New Bauhaus in Chicago, and later he opened the School of Design in the same city. He died in 1946.

The Bauhaus became international in its influence, and well-known artists and architects--former teachers at Bauhaus--brought its ideas to the United States. (2) Here these ideas have been used over and over again and they are still in use today.

The Finish architect, Alvar Aalto, continued the work of Breuer and Van der Rohe. Aalto realized the cantilever potential of wood and he was able to design chairs that paralled the tubular steel chairs of Germany. Aalto used white birch as the working material. The qualities of the wood and firmness and hard surface combined with unusual pliability. Aalto founded his own manufacturing plant in 1936 and his furniture was distributed throughout Europe and

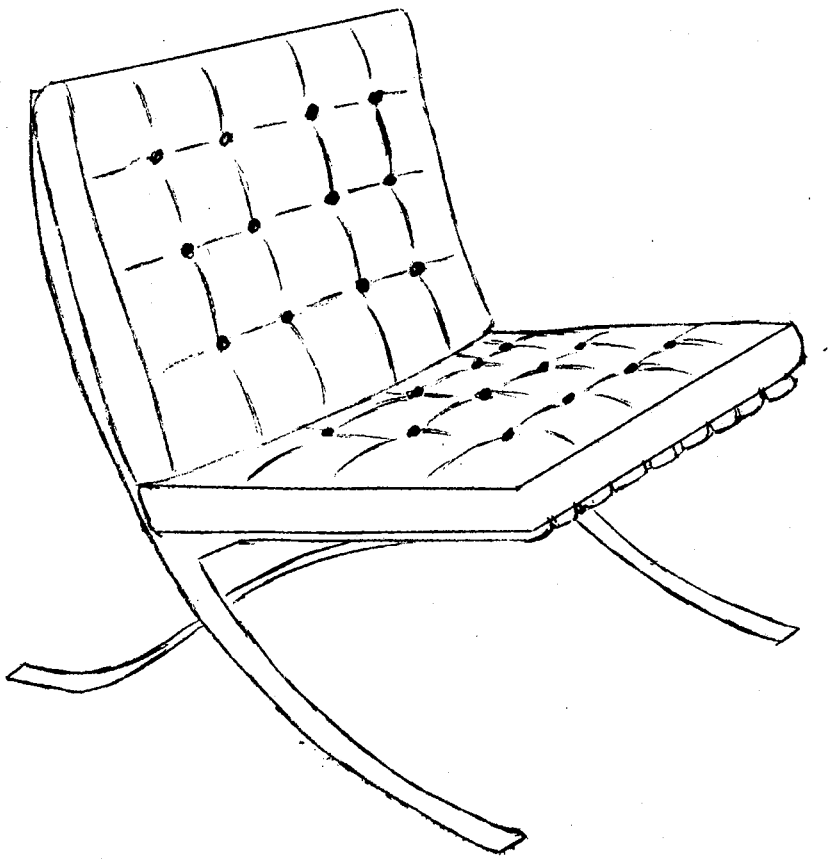

Figure 5. Barcelona Chair by Mies van der Rohe

the United States. This Scandinavian furniture was the second European collection of modern furniture to enjoy popularity. (Thonet Industries brought designs to this country in the 1920's.)

In the 1930's, Alvar Aalto, Bruno Mathsson, and Kaare Klint continued their work in Scandinavia, and Breuer designed a group of molded plywood furniture for Isakon in England. Much of Breuer's tubular steel furniture was copied in Europe and the United States. (35) There was little additional significant furniture designed before World War II. (35) Instead, French and English designers became involved with low, freely formed furniture that became known as "modernistic." The selected forms of this style were expressive of the restlessness of the period rather than the materials that were employed.

After World War II, a remarkably high level of industrialization had been reached in the United States and many metals had been improved and refined. Plywood was extensively used and plastics were both developed and produced. This environment of high industrialization using both new and man-improved materials was to become the first American contribution of today's furniture. (35)

Eero Saarinen, Charles Eames, Hans Wegner, and Finn Juhl were the post-war designers. In 1941 Saarinen and Eames won first prize in the Functional Furniture Competition of

the Museum of Modern Art. The winning chair was made of plywood shells fitted with foam rubber and upholstered. Then in 1946 Eames' first group of molded plywood and metal furniture was exhibited at the Museum. These chairs were produced commercially and are among the most significant chairs that have been designed during this century. Wegner and Juhl, both Danish designers, used much wood in their post-war designs. Wegner's designs were symbolic of the high level of integrity and refinement found in Danish contemporary furniture, while Finn Juhl's designs were much more sculptured.

The few years following 1950 are still referred to by many people as the "Good Design" years. The following was taken from Furniture Forum, 1970:

> The ten years from 1949 to 1959 were certainly some of the best years for good furniture design in the United States. It was during this period that names such as Charles Eames, George Nelson, T. H. Robsjohn Gibbings, Edward Wormley, Eero Saarinen, Finn Juhl, Hans Wegner, Arne Jacobsen, Isamu Noguchi and many others were known to a vast number of consumers as well as architects and interior designers. Good contemporary furniture was one of the most popular styles for residential furniture as well as furniture for contract interiors. It was during this period that an organization of retailers known as C. F. R. was formed. This was a national organization of retailers who sold good contemporary design exclusively and included shops in all parts of the country. By far the most important contribution to the "Good Design" years was made by Mr. Edgar Kaufman and the New York Museum of Modern Art, who together with the Merchandise Mart in Chicago, spread the work of "Good Design" throughout the country.
>
> In addition to American designs, the fifties also saw the beginning of an important amount of

> contemporary designs imported into this country from Europe. Though much of the avant-garde in modern furniture and lighting came from Italy, the most important exporters of modern furniture were the Scandinavian countries, Denmark, Sweden, and Finland. From Finland came the designs of Alvar Aalto and from Sweden, the furniture of Bruno Mathsson. Much of the furniture of Aalto and Mathsson was actually designed years before, and had been shown in museum exhibitions. Both designers were pioneers in the field of bent and moulded plywood and their classic designs are still to be found almost everywhere in the world where good modern furniture is sold. From the standpoint of continuing popularity and success of the American market, there is no question that Danish design has been by far the most important, not only from the standpoint of imports alone, but also the strong influence which Danish design had on the look of American furniture for a number of years. The designs of Jacobsen and others certainly changed the look of furniture in Denmark and Sweden, as well as the United States. (14)

After 1959 there was a sharp decline in the use of well-designed modern furniture for residential use. Such terms as "Return to Elegance," "Eclectic," and "Mediterranean" dominated the furniture scene. Many shops specializing in modern furniture had to change their image or go out of business. Only manufacturers who worked mainly with contract interiors stayed with modern furniture. Of course, a few outstanding designs still found their way to residential interiors, such as the Eames lounge chair. There were many theories as to why the American consumer was rejecting the clean lines of modern design. Some people no doubt wanted their homes to offer a complete change from the modern environment in which they worked, while others felt the more

luxurious look would reflect their affluence.

By 1965 there was a renewed interest in the furniture of the Bauhaus School. Many of the classic Bauhaus furniture designs were soon imported into the country and as in the case of Danish Modern, the Bauhaus look soon influenced the look of much of the furniture being produced domestically--tables of steel and glass, sofas and chairs with steel frames and upholstery of leather and suede.

The Bauhaus revival was the catalyst needed to release a whole flood of new designs. In a remarkably short period of time, a number of talented designers and adventurous manufacturers in Italy created a small revolution in the furniture industry with their use of color and form made possible through the developments in the field of plastics. (14) For the first time plastic was used as plastic and not a substitute material to look as wood. Many of the manufacturers in the United States now have plastic programs.

A famous furniture designer, Jens Risom, wrote in Furniture Forum, 1970:

> On the <u>one</u> side we can be proud of a large group of excellent designers in this country, educated, trained, skilled and talented, as well as furniture manufacturers who can ideally handle the job and are eager to go much further. On the <u>other</u> side, the consumer, I am convinced has been well informed by our advanced home furnishings publications of "what can be done" and "what is being done elsewhere." The missing link, however, is that important man or organization who is going to successfully get those two groups together. (14)

CHAPTER III

DESIGNERS AND THEIR CONTRIBUTIONS TO MODERN FURNITURE DESIGN

The designers of today have a rich heritage to study when they create furnishings for the comtemporary home. Art Nouveau broke from traditional patterns and European de Stijl and Bauhaus groups developed new design philosophies that our designers strongly consider when they work with new materials and concepts. Also, the contribution of American artists and architects introduced a new vocabulary of ideas and technology into twentieth-century design. Architects are responsible for various facets of our modern design world, for it is through the many individuals from this discipline that furnishings have been reborn in new forms and exciting plastic concepts. (33)

Among the more fascinating aspects of mid-twentieth century furniture production has been the arrival of the so-called "name designer." (25) In eighteenth century England and France the best of furniture designs were hallmarked with the name of the maker. These men, such as Duncan Phyfe, were cabinetmakers; they made and designed the furniture that car-

ried their names. Today, the name designer supplies the concept and the manufacturer works it out. This system is almost a postwar American invention.

The list of modern furniture designers is long, but there are some designers who have contributed more than others. It is necessary to limit this study to a select group of designers. These designers include: Charles Eames, George Nelson, Florence Knoll, Eero Saarinen, Harry Bertoia, Warren Platner, and Edward Wormley.

Charles Eames

Charles Eames can be called one of America's most famous designers. In 1946 the Museum of Modern Art exhibited Eames' first group of molded plywood and metal furniture. These chairs were commercially produced by Herman Miller Incorporated and are among the most significant chairs that have been designed during this century. He is the universal designer, and has designed toys, wedding cakes, moving pictures as well as buildings and furniture. (35)

Charles Eames was born in 1907 in St. Louis, Missouri. He developed an interest in engineering and architecture while working for a steel company during his high school years and gained a scholarship in architecture at Washington University. Leaving the university at the end of his second year, he opened his first architectural office in St. Louis

in 1930.

Eames studied with Eliel Saarinen at the Cranbrook Academy of Art and worked on combined projects with Eero Saarinen. (33) In 1936 Eliel Saarinen offered him a fellowship and later a teaching post at Cranbrook.

As an extension of their architectural work, Charles and Eero, with the help of Ray Kaiser (who had studied painting with Hans Hoffman) prepared a set of designs for the Museum of Modern Art's Organic Furniture Competition; the designs took the two first prizes, but because they involved non-standard methods (plywood molding of complex curves; bonding of wood to rubber and to metal) and war was imminent, production was halted. (6)

Charles Eames married Ray Kaiser in 1941 and moved to Southern California. While in California Eames designed motion picture sets of Metro-Golden-Meyer and worked at developing low cost techniques for wood lamination and molding. The research became an independent research laboratory, and during the war was commissioned by the United States Navy to produce molded plywood splints and stretchers. This experimental work led him to create the eventually famous Eames chairs that were exhibited at the Museum of Modern Art in New York in 1946. (33)

The molded plywood chair, by Eames, revolutionized chair sitting, by being designed to fit the body. The molded

seats and backs were joined to the chair frames by rubber mounts that absorbed shock. The frames themselves were of heavy plated metal or wood. The plywood chair was small, light, practically indestructible; and it had been developed for low-cost mass production. The available woods included walnut, birch, calico ash, and oak, plus red or black stained plywood. They were manufactured by Herman Miller, Incorporated.

Eames' next furniture development was the first use of reinforced plastic in a consumer product--the fiberglass shell chairs. This chair was molded of colorful plastic, impregnated with glass fibers. (25) The shape of the one piece chair and the principle of molding, on which it is based, have been widely copied in Europe and Japan as well as in the United States. (25) (See Figure 6.)

With furniture production under way, Eames began working with architectural projects and films. He designed his own home and began working with communications.

By 1956, the lounge chair and ottoman began to replace the molded plywood as the "classic" Eames chair. It is constructed of molded laminated plywood, steel, aluminum and leather. (See Figure 7.)

Charles Eames has introduced some of the most unique seating systems of our times. His latest seating units can

Figure 6. Fiberglass Shell Chair by Charles Eames

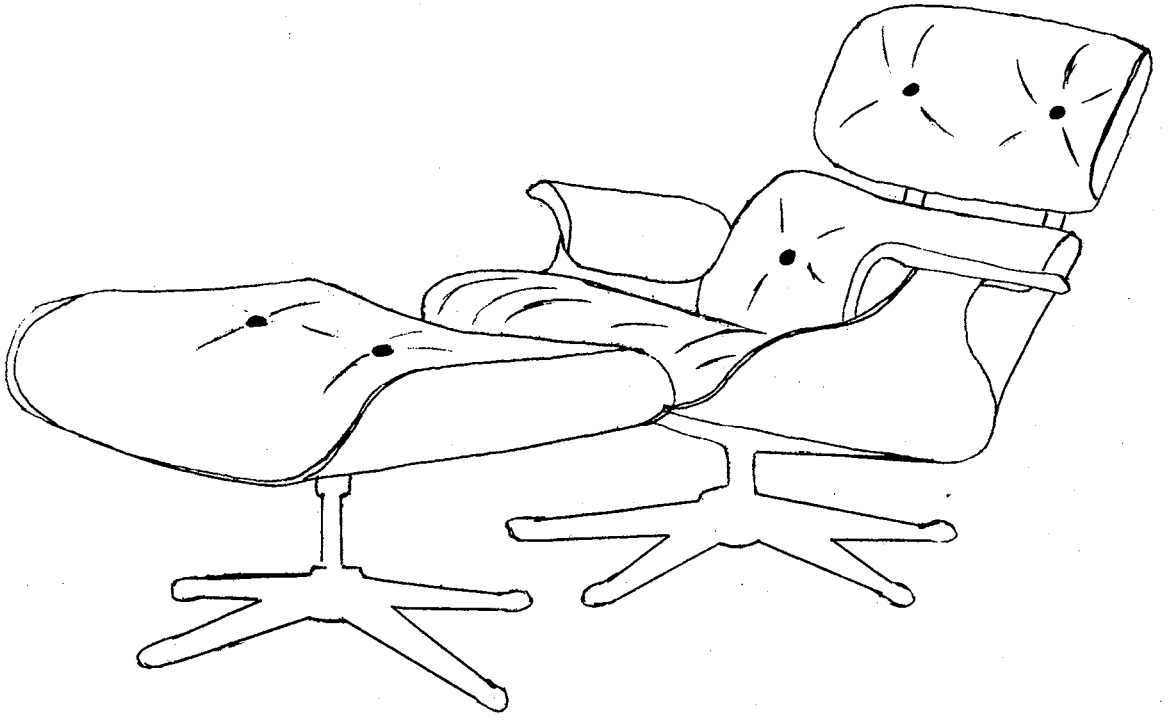

Figure 7. Lounge and Ottoman by Charles Eames

be seen at the O'Hara Airport, Chicago, Illinois, where a unique system of suspended upholstery is used: heat sealed vinyl cushions are held in tension between frames of polished cast aluminum.

George Nelson

Born in 1908 in Connecticut, George Nelson was trained as an architect at Yale and later traveled in Europe where he studied the architecture of past ages. (33) He spent several years doing editorial work for Architectural Forum but turned to developing a large collection of furniture for Herman Miller Incorporated during 1945 and 1946. (33)

Nelson opened his own office in 1947, practicing architecture, industrial design, research product design and development, commercial architecture and interior planning. An accomplishment of this company was the American National Exhibition in Moscow in 1959.

The furniture Nelson designs for Herman Miller, Incorporated is conservative in relation to those of some designers, but this comment does not imply any lack of imagination on his part. Nelson is a genius in the designing of furniture that answers the problems of storage in the home and the office. He incorporates small detailed devices into drawers and headboards without sacrificing the aesthetic qualities that make beautiful furniture. (See Figure 8.)

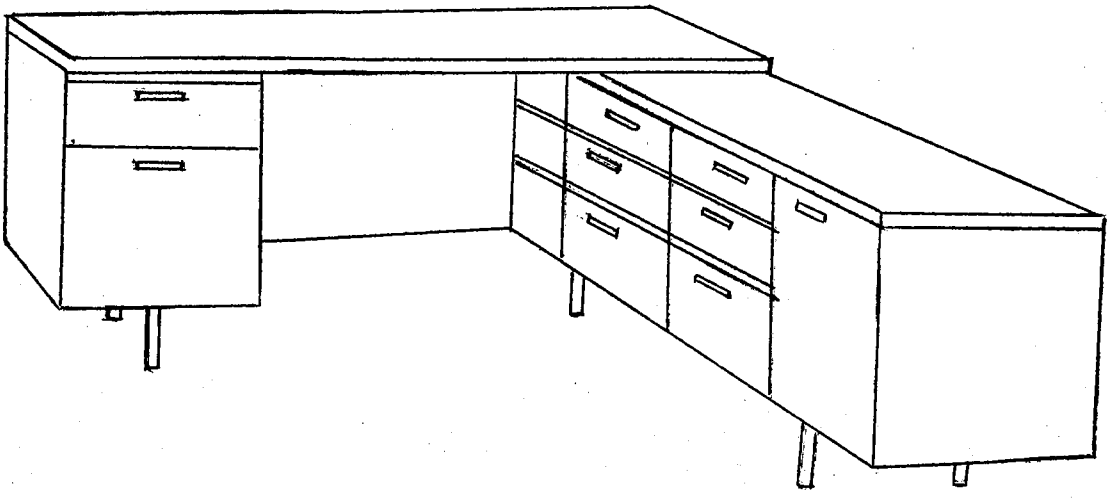

Figure 8. Desk by George Nelson

The Nelson office chair is his latest design. The chair has great support capabilities derived from an empirically calculated two piece rubber pan, suspended with a rigid, tubular steel frame. (6) This chair was specifically designed to provide any occupant with maximum comfort for extended periods of time.

Nelson has received many awards and honors including the Alcoa Industrial Design Award, 1965 and the Industrial Arts Medal in 1964.

Florence Knoll

Florence Knoll is best known as collaborator with other designers in her capacity as president of Knoll Associates, a firm that was formed with her husband in 1946 and that now has offices in many countries abroad as well as in the United States. (25) She was born in Michigan in 1917 and married Hans G. Knoll in 1943. After graduating from the Cranbrook Academy of Art in Bloomfield Hills, Michigan, she studied at the Architectural Association in London. Following that she received her architectural degree at the Illinois Institute of Technology where she studied under Ludwig Mies van der Rohe.

Florence Knoll then went to New York and joined the firm of Hans G. Knoll Associates as a partner and as head of the Knoll Planning Unit. In 1946, the present company,

Knoll Associates, Incorporated, was formed. Florence and Hans Knoll pioneered the advancing of modern furniture and textiles. With imagination and enterprise, their unique operation burgeoned into an international organization comprised of three factories in Pennsylvania, ten showrooms, and sales offices in the United States and sixteen showrooms and manufacturing facilities in as many countries including Belgium, Canada, Cuba, France, Germany, India, Italy, Sweden, Switzerland, Spain, Venzuela, England, Australia, Norway, Finland, and Mexico. (7)

The Knolls conceived the idea of collaborating with designers, encouraging their special talents. The Design Development Group is composed of several young designers, including Richard Schultz, Donald Retitt, and Vincent Caffiero. (33) This group works closely with a Planning Unit in research and development of furniture designs. Freelance designers are also called upon for various programs.

As head of the Planning Unit, Florence Knoll played the triple role of architect, designer, and design consultant. Her work included collaboration with architects on interior furnishings and also coordination of display in all Knoll Associates showrooms in the United States and overseas.

Of equal importance is Florence Knoll's contribution to the Knoll collection of furniture. Many of these pieces emerge from her drawing board as special orders, built to

the needs of the clients. Her furniture designs have consistently been selected as "Good Design" by the Museum of Modern Art, and she was given the first award for furniture design by the American Institute of Decorator's annual furniture design competition last year. (7) She is particularly noted for her application of the 'structural T' to a series of tables, a parallel bar and rivet construction system and a series of office furniture.

Florence Knoll believes that "good design is the sum of a designer's experience. It results from the ability to analyze and solve problems by organized thinking and imagination." (7) This philosophy is shown in her straight forward approach and by the resulting simplicity and clarity of her designs. This simplicity and clarity is shown in the chair designed by Florence Knoll in Figure 9.

Eero Saarinen

Eero Saarinen, architect, son of Eliel and Loja Gesellius Saarinen, was born in Kirkkonommi, Finland in 1910. In 1923 he came to the United States with his family, and in 1926 he designed his first furniture. It was simple wood furniture.

He studied architecture at Yale and then went to work with his father at Cranbrook Academy. (35) Saarinen designed all the wood chairs used throughout the building and the

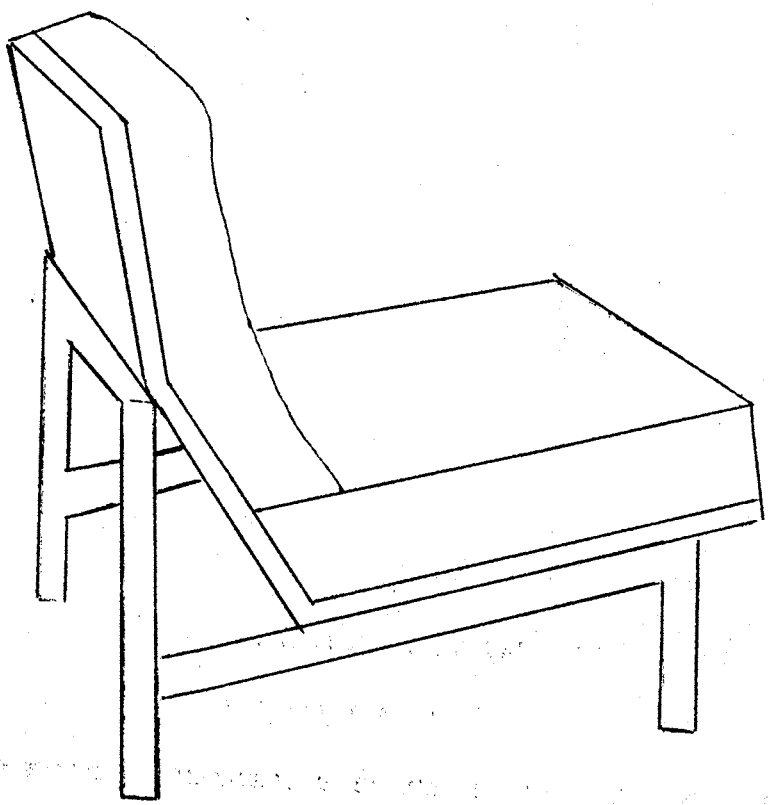

Figure 9. Armless Chair by Florence Knoll

tubular metal seating for the auditorium there.

In 1940 he was co-winner of two first prizes in the Organic Design Competition conducted by the Museum of Modern Art. Then in 1941 Saarinen won first prize with Charles Eames in the Functional Furniture Competition, also at the Museum of Modern Art. The winning chairs were made of plywood shells fitted with foam rubber and then upholstered. The legs were attached to the shell by means of electro-welded rubber connections. (35)

Saarinen's large molded plastic armchair, the 'womb chair', and a series of related side and arm chairs were introduced by Knoll Associates in 1945. Then in 1956, Knoll introduced his pedestal furniture group of molded plastic. This group consisted of tables, armchairs and side chairs. (See Figure 10.) Plastic pedestals are cast to form bases for tables and chairs. The chair pedestals fuse with the plastic seat back shells, a particularly original group designed by one of America's great architects and designers. This was the last group of furniture designed by Eero Saarinen. He died in 1961.

Saarinen's design philosophies, as nearly as he related them to furniture alone, are best expressed in his own words:

> My father always used to say that from an ash-tray to a city plan everything is architecture. In

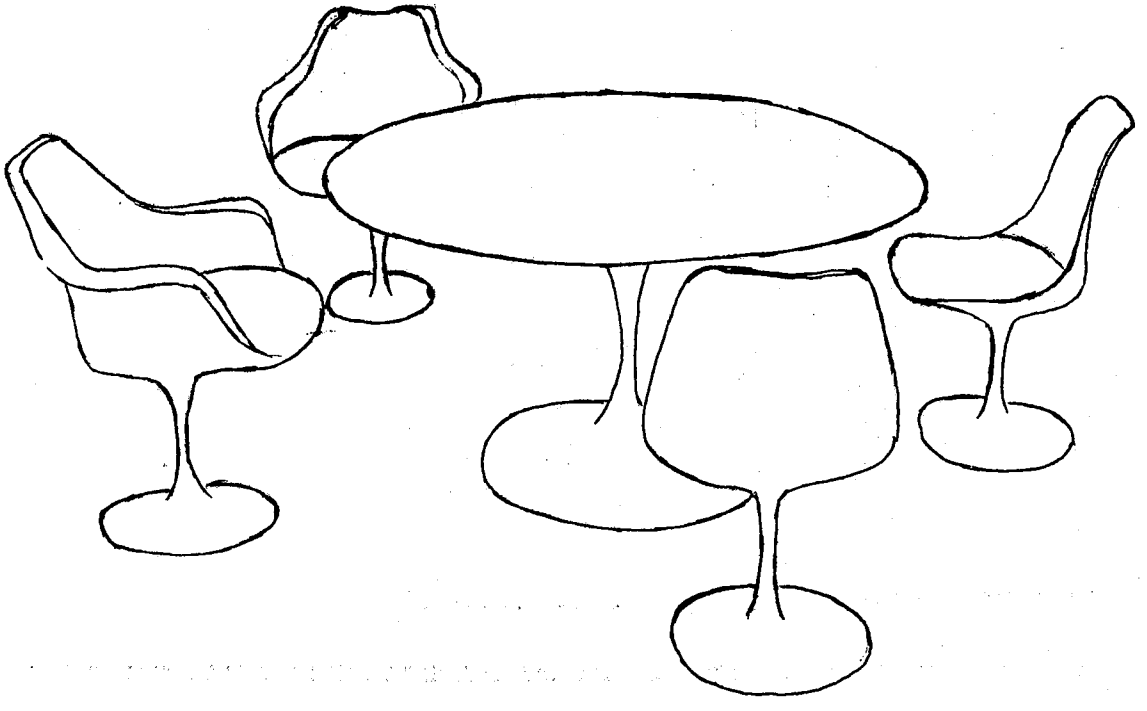

Figure 10. Pedestal Furniture Group by Eero Saarinen

> working out a design you always have to keep thinking of the next largest thing--the ashtray in its relation to the table top; the building in relation to the city. (7)
>
> What is seldom realized is that a person never sits in one stationary position. Actually, he moves many times so that it is ridiculous to work out a theoretical one position chair. However, during the course of study you use everybody who happens by as your prototype. Then gradually you stop asking people over 6 feet and under 4 feet because they are so non-conforming they could never be satisfied and you try to find a chair in which an average person can sit comfortably in a variety of positions. (7)
>
> A chair should look well as a piece of sculpture in a room. It should also look well when someone is sitting in it. Any finally it should be flattering to the person sitting in it. (7)

Harry Bertoia

Harry Bertoia was born in Northern Italy. He studied at Cass Technical High School, Detroit School of Arts and Crafts, and Cranbrook Academy of Art, where he later taught metal crafts and became well known for his jewelry.

Bertoia began his collaboration with Knoll Associates about 1947, after an impressive career in the arts. From the very first, his assignment was as simple as it was unusual: Florence and Hans Knoll told him to do whatever he liked if in doing it he developed some ideas for furniture. In his small workshop in Bally, Pennsylvania, Bertoia began. At first he produced a number of variations on his earlier sculpture. But soon the sculpture began to suggest new

forms for chairs and new methods of manufacture. His world famous wire chairs were the result. (See Figure 11.) The Bertoia collection was introduced by Knoll in 1952.

There is a close relationship between Bertoia's furniture and the sculptural forms he creates; in both metal is used in freely expressed lattice patterns that are delicate and that manipulate space in a particularly strong way. (33) The structures have a cellular regularity, organic like honeycombs, chemical like crystals. With neither a beginning nor an end, they lace through space without enclosing it, are jagged, unfinished, with a magical suggestion of continued movement.

Bertoia says of his work:

> In the sculpture I am concerned primarily with space, form and the characteristics of metal. In the chairs many functional problems have to be established first...but when you get right down to it, the chairs are studies in space, form, and metal, too. (20)

> My approach to design is to make the environment more pleasant and varied by merging the efforts of technology and the creative arts. (20)

Warren Platner

Warren Platner is a very talented architect and furniture designer. He studied architecture at the Cornell School of Architecture and then began working for an architectural firm. At one time he was associated with Eero Saarinen and

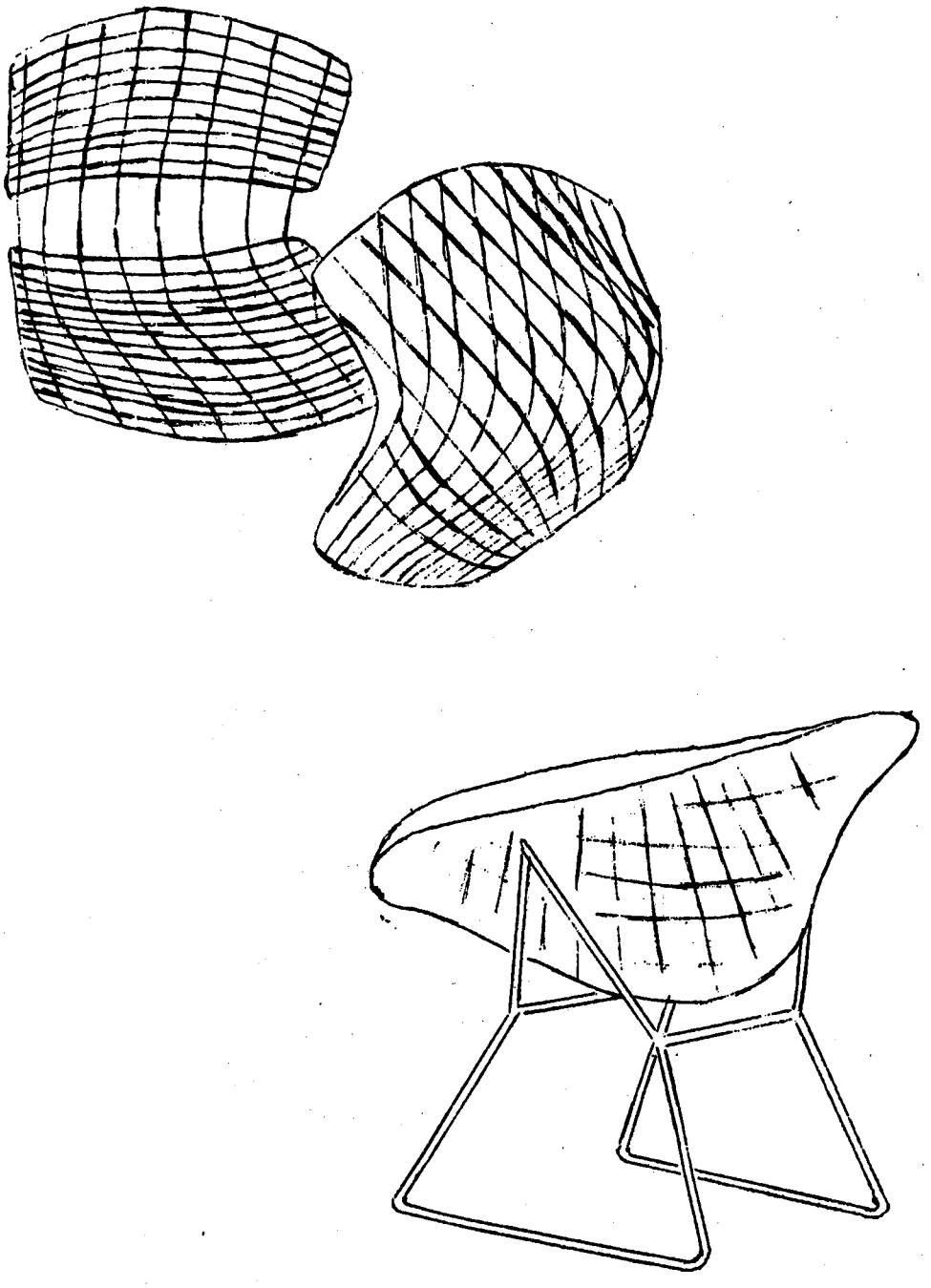

Figure 11. Wire Chairs by Harry Bertoia

Associates, after which, in 1968, he opened his own office of architecture and interior design.

The Platner Collection was the first furniture designed for commercial production by Platner, in 1966. His distinguished designs for the nine pieces which make up the collection are the result of several years of cooperation between Mr. Platner and Knoll's Design Development Group which realized the designs as producible products. Mr. Platner's initial designs were completed under a Graham Foundation grant.

The concept was daring: to make furniture in which frame and supports were to be one thing, not a miniature architectural construction. The material was wire--steel wire as in another Knoll design, Harry Bertoia's, but Platner's designs are very different, with parallel wires implying a shape and creating a graphic "picket-fence" illusion. (21)

Anticipating production problems Platner visited several steel-wire fabricators in the early stages of the design. Tieing wires like sheaves of wheat instead of meshing them (as did Bertoia) minimizes the number of necessary welds. Nevertheless the making of the chairs seems like a near miracle--considering the graceful flow of the forms. (See Figure 12.)

While his Knoll furniture was the first of his designs

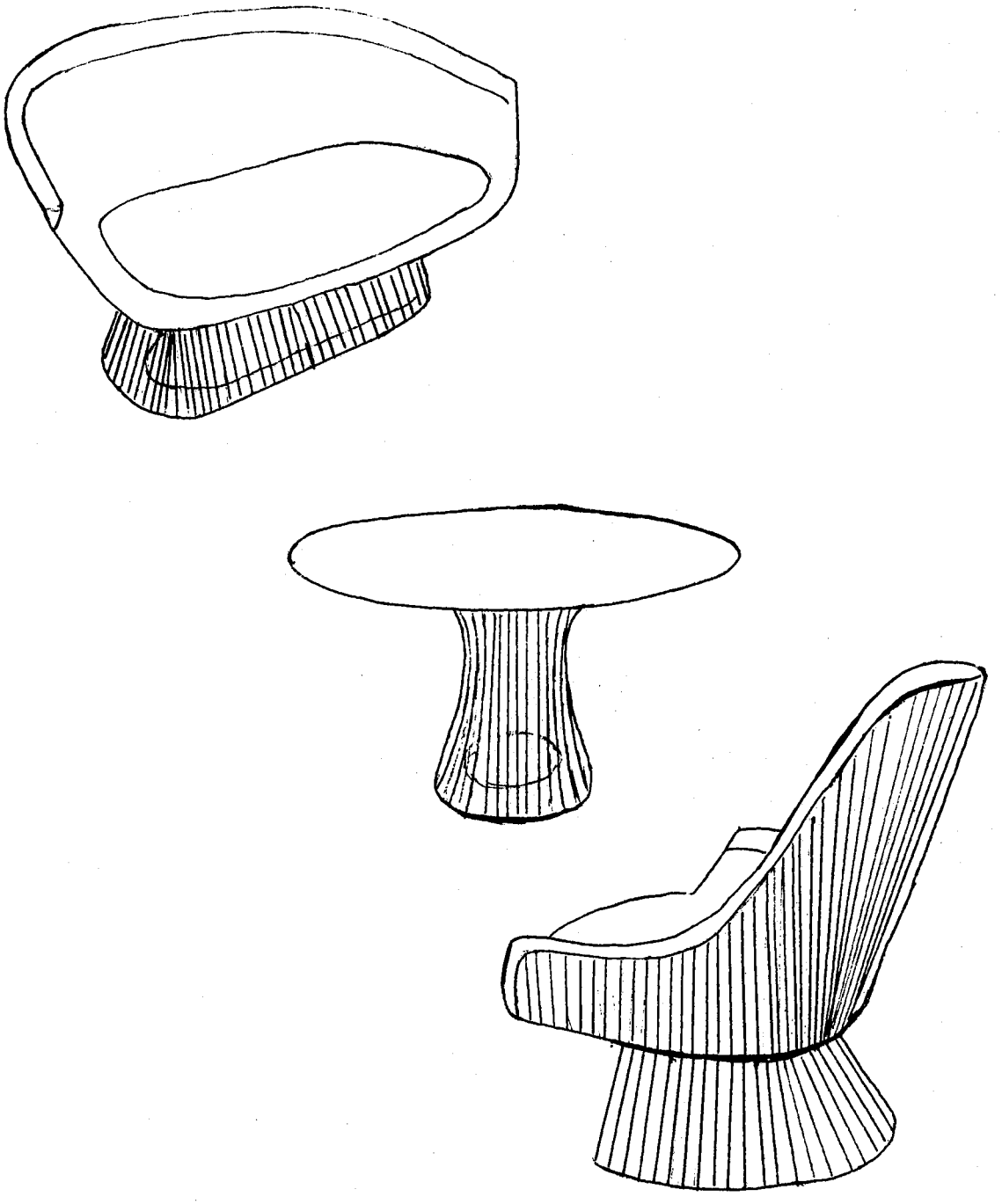

Figure 12. Steel Wire Furniture by Warren Platner

to be commercially available, Mr. Platner has often designed furniture for the many interiors he has been charged with creating. In addition to producing interiors consonant with the exterior character of a building, he conceives of interiors as integrated environments, designing all details. (7) For example, his work on the restaurant in the building for the Columbia Broadcasting System included the design of furniture, lighting fixtures, fabrics, china, flatware, and the development of new materials, finishes and methods of construction.

Platner's line of executive furniture for Leigh Company was described as; magic, muscle, and majesty. In evokes the thrust of mighty trees. This line of executive furniture, designed in 1964, comprises two related groups--the dramatic pedestal group which includes benches, wood-wrapped sofas and arm chairs, desk-tables, and storage cases; and a more conventional group on legs.

Both groups have a sobriety which is arresting in itself. Materials are sumptuous and natural, and are put together into forms that are rectilinear, plainer, and automatically recognizable as familiar furniture shapes. (26)

After Platner gained his own firm one would expect him to put furniture designing aside. Instead, he rose to the greater challenge of moderately priced furniture, furniture for rugged contract situations, big buildings and big spaces.

The line consists of a dining chair, sofas in various lengths, ottomans and benches, one cabinet in any length, low rectangular and square tables in many sizes. The wood in the furniture is natural finished and the upholstery is soft and wrinkly.

Mr. Platner's professional awards include the Rome Prize in architecture, the Advanced Research Fulbright Award in architecture, and the Graham Foundation for Advanced Studies in the Fine Arts Award in furniture design. (7)

Edward Wormley

Edward Wormley was born in Illinois and he cannot remember when he did not intend to become an interior designer. After high school he proceeded without delay to the Chicago Art Institute, and was later employed by Marshall Fields, Incorporated. In 1931, on a Marshall Field recommendation, he was sent to fill the request of President Niederhauser of Dunbar for a furniture designer "with a more modern approach." (10) He has except for two-and-a-half years during the war, designed for Dunbar continuously. He has designed rugs, lamps, fabrics, a globestand, interiors, and display.

Wormley's furniture is invariably comfortable, well proportioned, elegant, and suitable. (10) His furniture design has much variety, in his refusal to cling to one dominating form which could be called his own invention and which

might seem to sum up his style. Dunbar pieces might be round or square, small or large, sculptural or architectural.

Many of Wormley's very early designs have a timelessness and remain in today's Dunbar catalog. The ash, cane, and brass armchair designed by him in 1954, still enhances many interiors today. (See Figure 13.)

Wormley states:

> I have been called a 'gradualist'. I do not shrink from the term, and I might even say I find it apt. I have a real admiration for the design of the past and I am quite frank to say that too little design today can compete in interest, ingenuity, and beauty with best traditional design. To say this however, does not mean that I believe for one moment in reproducing old design for present day use. We must continue to work with contemporary materials, techniques, and especially within the framework of our own highly developed and everchanging distribution patterns. (11)

Wormley does not design furniture per se, as sculpture might be designed, but as a tool which must serve some visual and functional purpose in an interior. (10) He anticipates the many shapes, sizes, and moods needed to fulfill the full range of architectural situations that may occur in a space that needs to be planned and furnished. (10) This has kept the Dunbar catalog fresh and useful long after other collections have become dated.

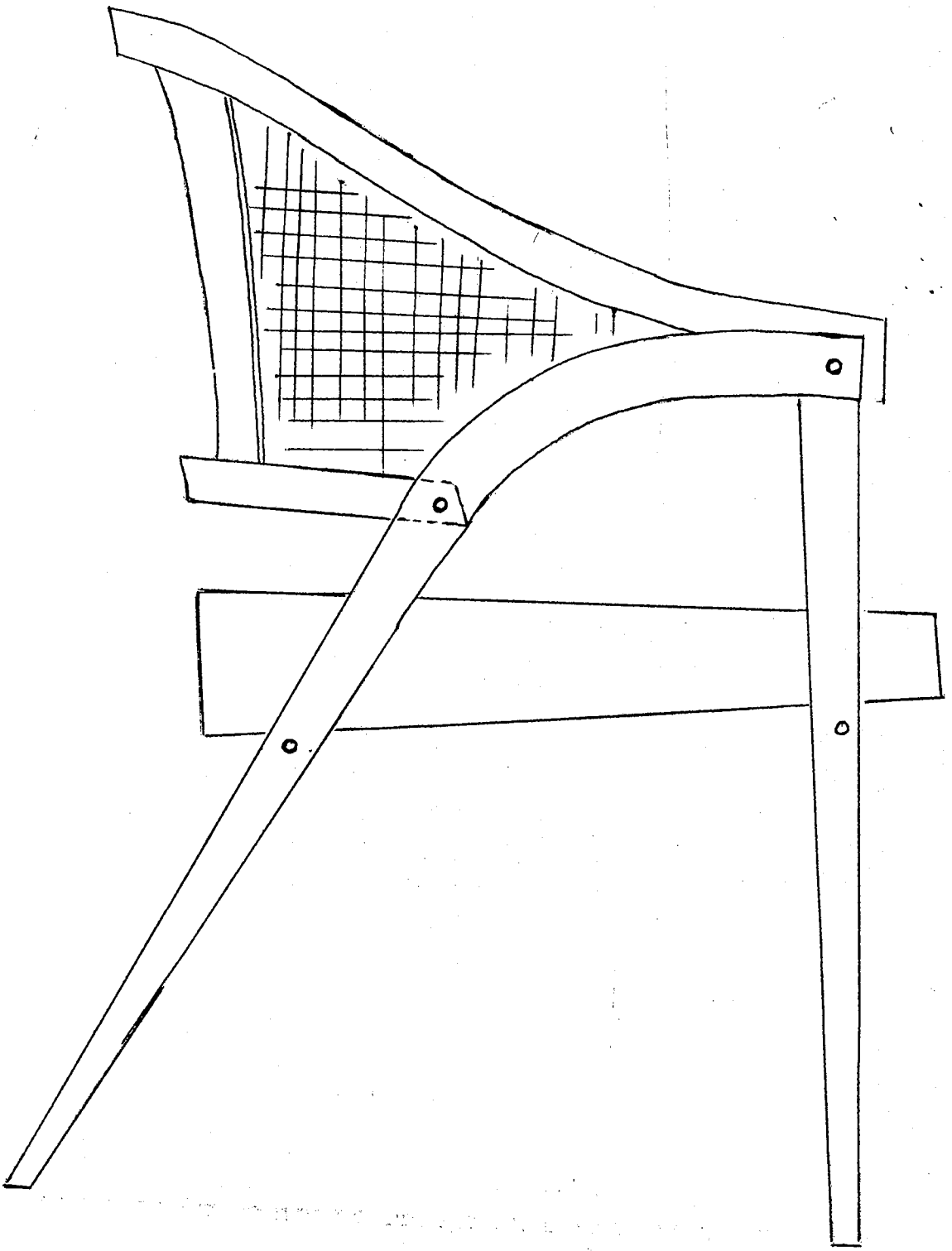

Figure 13. Armchair by Edward Wormley

CHAPTER IV

MANUFACTURERS OF MODERN FURNITURE DESIGN

There were furniture companies producing well-designed objects before World War II, but it was not until after the war that the really stimulating sources began to manufacture in amounts significant enough to make a strong, lasting impact on furniture design. Obviously it is impossible to list all the companies that have contributed to furniture design, but it is necessary to examine one or two in order to gain insight into the organization of these firms. Two companies seem to stand out as being most responsible to promoting acceptable twentieth century design in this country as well as in Europe. (33) Some of the best ideas in furnishings that this country has ever seen were introduced by Knoll International, Incorporated and Herman Miller, Incorporated.

Furniture companies like Knoll and Miller, which have kept their standards high, have been able to set and create trends. A person need only glance through advertisements in national magazines to see the designs which have been

based on designs sold by Miller and Knoll.

Knoll International, Incorporated

Knoll International, Incorporated, was conceived a short 25 years ago as "Knoll Associates." The two people who created the organization, shaped it to their vision, and lent it their name, are no longer with Knoll. (20) Hans Knoll died in a car accident in 1955 and Florence Knoll retired in 1965. It is a tribute to them and to the validity of their idea that Knoll International today commands some of the most exciting design talent in the world and is able to produce work anywhere in the world to their standards of design. (20)

The Knoll firm was established in 1938 by Hans Knoll, 24 year-old-son of a successful German furniture manufacturer. Young Knoll, who had settled in the United States the year before, had been born in Stuttgart in 1914, educated in Switzerland and England. In 1944, when the Hans G. Knoll Furniture Company was a one-room office-showroom in New York, Knoll met a girl in Michigan named Florence Schust, who was working in New York.

The war was on and labor was scarce. Miss Schust asked a young architect, Eero Saarinen, to try his hand at a chair that would sidestep the shortages. He designed a series of models whose frames were cut out of laminated wood and the

seats and backs were interwoven strips of canvas. The chairs were easy to make and sold well. Soon Florence Schust left her job to join Knoll as a partner and to establish and head the firm's interior designing operation, the Knoll Planning Unit. In 1943 she and Hans Knoll were married.

During the next eight years the New York showroom was twice enlarged and moved, a textile division was organized, and Franco Albini, Harry Bertoia, Isamu Noguchi, and Mies van der Rohe were added to Knolls role of designers. Florence Knoll also designed furniture, but did not emphasize it, since the pieces were "bread-and-butter fill-ins," everything needed to enable a designer to design a complete home of office.

As the war receded into the past, Knoll added expensive furniture to their line. Some were of extremely luxurious materials such as teak, and by designs of a boldly curved, almost baroque quality, such as Eero Saarinen's famous upholstered plastic and metal "womb" chair of 1946, and Harry Bertoia's lyrically beautiful wire frame chairs. (12) Meanwhile, Mrs. Knoll obtained the rights to several of the great classic designs of the modern movement: Mies van der Rohe's ineffable, regal "Barcelona" chair--whose diabolically difficult chrome cantilever and sumptuous hand tufted leather lifts the retail price to something in the neighborhood of one thousand dollars, the Stam variant on Breuer's steel

tube-spring cantilevered chair and the disarming bentwood and rattan side chair of Joseph Frank, etc. (12)

In 1951 a larger New York showroom was opened on Madison Avenue. It became the hub of an international enterprise with showrooms, salesrooms, and factories throughout the United States and 18 foreign countries including Belgium, Canada, Cuba, France, Germany, India, Italy, Sweden, Switzerland, Spain, and Venezuela.

Competition was coming up fast--Herman Miller had formed its own architectural team under George Nelson, who enlisted people like sculptor Isamu Noguchi to design furniture. (21) Herman Miller's most serious threat, however was Charles Eames, who had worked with Eero Saarinen on the molded furniture which won first prize in Modern Furniture competition in 1941. Eames and Saarinen worked together on these designs at Cranbrook Academy, and Don Albinson, a student of Eames, built the models there.

Hans Knoll was killed in a tragic auto collision in 1955 and Florence Knoll became the vital link in the design progression of the firm. From the time of Hans Knoll's death until her resignation in 1965, Florence Knoll maintained Knoll's leadership in the architectural and design worlds and expanded the company's influence with the corporate patron that made these worlds possible. (20) She had learned the design craft from masters and her leadership was percep-

tive. The progression of the company reflected the fullness of her personal taste.

As Florence Knoll designed interiors for the business world, she was also developing furniture designed to meet the needs of these clients. She moved away from the birch and walnut to teak and rosewood. Never was the "Knoll look" more elegant.

In 1959 Knoll was sold to Art Metal Incorporated. In December 1960, Mrs. Florence Knoll Bassett retired from the presidency to become a design consultant to Knoll; the presidency was assumed by W. Cornell Dechert. In 1965, Mrs. Bassett retired completely from the company, although she is still designing interiors on her own.

Meantime three things have happened. Knoll has become a big company; the market for "architectural" furniture has multiplied even faster than Knoll; and dozens of companies have sprung up to offer not only copies of Knoll classics but original designs of comparable quality. (21)

In 1967, Knoll became a subsidary of the well known financial company Walter E. Heller International. Knoll's commitment to design continued unchanged: the rights to the Hans Wegner Collection were secured; the Gavina group was purchased; bold new fabric designs by Wolf Bauer of Stuttgart were introduced: and the enlargement of the accessory collection was begun with the addition of Angelo Mangrarotti's

marble and glass vases and bowls. (20)

The Gavina Company, acquired by Knoll in 1968, was formed in 1960. It quickly became a center for the avant-garde designers of Europe. Gavina group designers included Marcel Breuer, Sabastian Matta, Kazuhide Takahoma, Vico Magistretti, Tobia Scarpa, Pier Castiglioni. The Gavina Group brought to Knoll new and exciting design directions for homes and offices--certainly the seating designs by Matta and Takahoma approach Breuer's prediction that, "...in the end we shall sit on resilient cushions of air." (20)

Design Development Group and Planning Unit

The Knoll factory spreads out on an East Greenville meadow in Pennsylvania where there is plenty of room for expansion. The expansion in floor space and in number of workers indicates clearly that the United States division of Knoll has quadrupled in the last decade.

Management of the factory requires much flexibility, since almost every order is a custom order. Every design collection requires its own group of specially built machines and tools, its own combination of machine and hand operations. (21) Every Knoll design therefore represents two sets of problems: First, the design is created--on its own merits of appearance, function, and appeal. Second, a way has to be found to duplicate the object exactly and in quan-

tity. (21)

The Design Development Group is composed of several young designers, including Richard Schultz, a graduate of the Institute of Design; Don Petitt, a graduate of Carnegie Tech; Max Pearson, a graduate of the University of Michigan; William Stephens, a graduate of the Museum School of Art in Philadelphia; Vincent Caffiero and Robert De Fuccio. This group works closely with the Planning Unit in the research and development of furniture designs. In addition to the impressive staff of designers in the Planning Unit and Design Development Group, freelance designers are called upon for various programs. (33)

At work the members of the Design Development team do battle with sewing machines (figuring out a way to sew leather tapes of leisure furniture), electric welders (working out the welding procedures for new wire furniture), and mechanical saws. In the course of solving the production problems posed by their designs, almost all of them have become inventors. The Knoll Planning Unit has designed offices and public areas for many of the major buildings in the United States. Each project is planned in a miniature scale model. Emily Post used this technique in the early 1900's to present various architects' work to clients. Introduced again by Florence Knoll in the late 1940's the technique is now widely used by other design firms.

Knoll's receptiveness to new ideas has stimulated the international design community. (20) There is a long list of designers who have contributed to Knoll in America and abroad, and they are constantly working to keep Knoll on the crest of change. As the pace accelerates Knoll continues to develop designs, using new materials and techniques, for a variety of life styles. It can be said that Knoll is as synonymous with modern furniture and textiles now as it was in 1946--"only an idea could spread so far."

Herman Miller, Incorporated

The Herman Miller Company is located in the small town of Zeeland, Michigan, the center of the Dutch tulip farms. Zeeland is only a few miles from Grand Rapids, which was at one time the furniture capitol of the world. Herman Miller Incorporated was at one time a producer of period reproductions, but its chief designer, Gilbert Rohde, convinced the company to go to modern furniture design. The firm's goals were cited in 1950 when the company published a book titled The Herman Miller Collection:

> ...its goal is a permanent collection designed to meet fully the requirements of modern living. The collection is to be permanent in the sense that it will not be scrapped for each market, or for each new 'trend' as announced by the style experts. It is designed to grow, not necessarily in size, but in the perfection of its component parts. No piece will be kept if a better design can be developed to take its place, nor will a given way of making

> things be followed simply because that's the way they were always made. (33)

D. J. De Pree is President of Herman Miller Incorporated. He has been with the company since 1909. Following is the speech given by D. J. De Pree, in 1956, at the Design Congress in London:

> Here was a small struggling furniture factory in a small town near Grand Rapids, Michigan, known then as the furniture capital of America. There were more than 4,000 furniture manufacturers like this located in some half a dozen states, the majority of them larger than this company. In 1932, a group of local businessmen bought control of the company for the purpose of making high quality bedroom furniture in traditional design. By this they believed they would fill a worthwhile niche in the industry. Like most of the other furniture manufacturers, the product was sold by commission salesmen who each handled several lines. These lines were on display in the exhibition buildings at the several furniture markets. The buyers from the important stores across the country would visit these markets, take a look at each line, and tell the salesmen what pleased them or displeased them (mostly the latter) about the prices, designs, and quality. By this time the market situation had deteriorated to the point where they were held four times a year. The demand was always for something new. There was constant guessing by the leading buyers as to whether the popular thing next season would be Louis XVI or Queen Anne, or Hepplewhite, or Sheraton, or Adam or what. This was followed by a scramble on the part of most manufacturers to follow the leaders. The buyers continued to be the connoisseurs of what was correct and they were always demanding from the salesmen certain changes in the trim or the ornamentation or the finish, and most often the price. Sometimes the changes were as minor as putting new buttons on the vest in order to get a different suit.
>
> The pressure of the buyers was transmitted through the salesman to the factories and virtually reduced them to mere fabricators with very little control of

> what they wanted to make and almost no control of the sale of their product to the people who were going to be long-time users of it. This semi-annual and sometimes quarterly change of designs resulted in short life for each design, many close outs sold at damaging discounts, and almost constant sample making for new lines. (30)
>
> The situation could hardly have been worse but there were two more things impending which added to the serious plight of the small furniture manufacturer. The first was the establishing of rather large and modern furniture plants in the southern part of the United States, nearer to the source of much of the lumber being used and where the labor rates were considerably lower. This southern competition, aided by the trading down policies of the stores, became a serious threat to the long-standing leadership of Grand Rapids furniture. (30)
>
> Then the nationwide depression struck in 1930. The facing of business disaster brings heart-searching and examination of wrongs. One gets a new feeling of accountability to God for what he is doing for people--for those who make the product and for those who have to live with it. (30)
>
> In 1931 Gilbert Rohde walked into our Grand Rapids market display unannounced (we think this was providential). Rohde was an artist and a student of current living needs. He rather quickly demonstrated that he knew how to find solutions to living problems in today's homes. (30)

Twenty years ago in the forward of the first catalog of the Herman Miller Collection, George Nelson wrote:

> From the viewpoint of the designer, which is the only viewpoint I can assume with any degree of propriety, the Herman Miller Furniture Company is a rather remarkable institution. Seen solely as a business enterprise, it is probably indistinguishable from thousands of others scattered throughout the United States. It is a small company, its production facilities are adequate, but not unusual, and it is run by the people who own it. What is remarkable about this enterprise is its philosophy--an attitude so deeply felt that

> to the best of my knowledge it has never been formulated. Stated in its bare essentials, this philosophy, like others that have been solidly based, is so simple that it sounds almost naive. But it is not widely held by business, and perhaps it would be naive if it were not so astonishingly effective. This company today occupies a very solid position as a manufacturer of modern furniture and enjoys prestige all out of proportion to its size. (30)

The attitude that governs Herman Miller's behavior is compounded of the following principles stated by Nelson.

1. What you make is important. Herman Miller, like other companies is governed by the rules of the American economy, but I have yet to see quality of construction or finish skimped to meet a popular price bracket, or for any other reason. Also, while the company has materially expanded its production, the limits of this expansion will be set by the size of the market that will accept Herman Miller's kind of furniture; the product will not be changed to expand the business.

2. Design is an integral part of the business. In this company's scheme of things, the designer's decisions are as important as those of the sales or production department. If the design is changed, it is with the designer's participation and approval. There is no pressure on him to modify design to meet the market.

3. The product must be honest. Herman Miller discontinued production of period reproductions almost twelve years ago because its designer, Gilbert Rohde, had convinced the management that imitation of traditional designs was insincere aesthetically. (couldn't believe this story when I first heard it, but after my experience of the past two years, I know it is true.)

4. You decide what you will make. Herman Miller has never done any consumer research or any pretesting of its products to determine what the market 'will accept'. If designer and management like a solution to a particular

> furniture problem, it is put into production. There is no attempt to conform to the so-called norms of public taste, nor any special faith in the methods used, to evaluate the 'buying public'. The reason many people are struck by the freshness of Herman Miller designs is that the company is not playing follow-the-leader. Its designers are therefore not hamstrung by management's fear of getting out of step. All that is asked of the designer is a valid solution.
>
> 5. There is a market for good design. This assumption has been more than confirmed, but it took a great deal of courage to make it and stick to it. The fact is that in furniture as in many other fields, there is a substantial segment of the public that is well in advance of the manufacturers. But few producers dare to believe it. (30)

The above quotations define the problem and present the solution which provided life to Herman Miller, Incorporated. A climate for problem-solving and change was established and continues to this day.

The philosophy and the objectives of George Nelson are still important at Herman Miller today. The commitment of D. J. De Pree, George Nelson, and Charles Eames to this idea continues as part of the life of management today.

Much in Herman Miller has, of course, changed. Design has evolved from a personal contribution made by George Nelson and Charles Eames to a team effort which recognizes the need for the involvement of many kinds of talents. (30) The Herman Miller program has become international because of their philosophy, their objectives, their products, which

have helped to solve problems of living in the United States, and are also needed in other countries.

CHAPTER V

MATERIALS OF CONSTRUCTION

In the years of development between the World Wars a new code was framed for the choice and use of materials, which introduced into our homes a number of unusual substances previously reserved exclusively for industry. (18) Since then concrete and steel, glass and plastics have become more familiar and are taken for granted as mediums of interior decoration. (18)

It is necessary for a designer to have a sense of appropriateness concerning materials. Wood, the traditional material of the cabinetmaker, is now more common in the industrial form of plywood than in the traditional solids and thin veneers that were the materials of the antique periods. (13) As wood becomes more costly metals, plastics and other materials will become more important for economic and technical reasons.

The materials used in the making of furniture are of utmost importance, for a piece of furniture is only as good as its materials. To make a piece of furniture in our mechanized world and not to relate it to today's living would be

unreasonable.

To use modern materials such as plastic, aluminum, glass and other newly developed materials in the forms of yesteryear is equally unfitting. Even though many of the materials being used in furniture production are not new, techniques of manufacturing are new.

Wood

Although no one material is best for all furniture, the material most commonly used is wood. It has been used throughout the history of man for furniture and still has not lost its usefulness. In modern furniture, the tendency is to use fewer surfaces that cover up the grain and more finishes that bring out the warmth and color of the wood. French finishes with oil and simple sealer finishes are recommended by experts who wish to see a natural product. Furniture with heavy and thick varnish finishes applied to surfaces is more work to maintain. Teak and walnut employing a soft oil finish are less apt to show wear over long periods of time.

Each kind of furniture wood--solid, plywood, and veneered--has its own suitability: solid wood for structural parts and areas that are to be carved, plywood for its great strength relative to weight and veneers where matching of grains is desired. (2) There is little, if any, warping in

plywoods now, and after the layers have been laminated together, they will stay together for a long period of time. Eames' first laminated wood chair, manufactured in 1946, is still holding up under many situations and circumstances. (33) Veneer panels (made by gluing thin sheets of choice wood onto plywood) can be costly or inexpensive depending on the techniques used. (2)

There are some disadvantages to wood as a furniture material. Solid wood is inclined to warp and may swell or crack. (2) The supply of fine hardwoods is becoming scarce and its cost continues to rise. Mass-production techniques require highly standardized, uniform materials, and the composition of natural materials like wood tends to be variable. (2)

Plastics

It all started more than 100 years ago--with an amateur inventor looking for a better billiard ball. He invented celluloid, and for the next 40 years, that was the plastics industry. After World War II, plastics really boomed, and today they're molded, pressed, stamped, and present in every phase of our lives.

It's only during the past four or five years that plastic furniture manufacturing became important. Breakthroughs in chemistry opened the way to 'engineered' materials. The

engineered plastics will do whatever the designer has in mind. They need not imitate wood, or any other material.

Today, plastics are not considered as low-cost substitutes in home furnishings. Rather, plastics are used for their own characteristics and ease in maintenance.

Plastics have been in use for some time for upholstery coverings, in table tops, and as cushioning materials. (2) They are also combined with wood for greater strength and wearability. Distinctive furniture is being made from colorless or colored transparent and opaque plastics, such as acrylic, and printed and textured vinyl and polyester films can be laminated to molded plastic or inexpensive wood panels to produce finished surfaces. (2)

There are two important types of plastic used in the new furniture: Thermoplastics and thermoset plastics.

Thermoplastics become soft when exposed to sufficient heat and harden when cooled, no matter how often the process is repeated. (31) A thermoplastic can be used over and over again in different forms and shapes. Major plastics of this type include acrylics, polypropylene, vinyls, polystyrene, ABS, and nylon.

Thermoset plastics also soften when initially heated, but then go through an internal chemical change resulting in added hardness and relative inertness. (31) Once hardened, they can't be returned to a liquid state. While thermoset-

ting plastics are most often used in high-pressure laminating they can also hold together reinforcing materials that make up the body of the finished product. The reinforcing materials may be cloth, paper, wood, or fibers of glass.

Plastic laminates and vinyl upholstery had some of their first uses in furniture. Today, these plastics have been greatly improved. Laminates are not rigid. There are now flexible vinyls imprinted with wood grains. The effect is to make lower cost materials look like costly woods.

Within the past few years, translucent acrylics have become extremely popular. Their see-through qualities give contemporary furniture a light and airy appearance and at the same time these designs seem not to take any space in a room. (31) This type plastic was used in the 'Invisible Chair' by Laverne.

Opaque and polyurethane are two of the most popular plastics in home furnishings. Opaques are molded into unconventional shapes. They're colored in vivid hues or pure white or black. While polyurethanes can be used either hard or soft, in cushioning foam for upholstery and bedding, adhesives, wood-finishing components, and parts which look like wood.

One of the more revolutionary developments in plastic is inflatable vinyl furniture. It offers the person on the move great convenience--simply deflate it for travel, and

then blow it up on arrival. Inflatables are made in clear or colored vinyls.

Mass Art is a relatively new furniture company working with inflatable vinyl. One of the companys best productions, the Mass Air Chair, is in clear vinyl with lucite base or in solid-color plastic with a take-apart tubular aluminum base which breaks down to packageable size of 28" x 14" x 4". The chair incorporates a brand new Mass Art concept: replaceable modules, which can be comfort-controlled by over-or-under-inflation. (8) Convertible bases are being designed to transform chairs into couches. (8)

Both Knoll International and Herman Miller have produced elegant chairs using plastics. Soft sculptural shapes can be obtained with plastics, and the final product is extremely easy to maintain. (33) Although this product once cracked and pitted easily, they no longer deteriorate so quickly. Instead, they retain their brilliancy and strength for many years. (33)

The following paragraph was taken from the article, Plastics Explosion, in April, 1969, Better Homes and Gardens:

> Until recently, plastics were in what might be called the replacement era. They proved themselves better in thousands of applications than the materials of the past. Now plastics are on a new threshold--call it the innovation stage--when these man-made substances create objects that could never be built before. New shapes, new designs, new applications are virtually limitless. This versatility will permit a grace, a

> technological beauty that may well become the hallmark of a new American culture. There's no doubt that plastics have become real professionals in the materials world. (31)

Metal

An important part of our furniture is metal. With the introduction of new metals, companies are incorporating more and more into furniture. Techniques for shaping tubing, metal rods, and wire, and agents for bonding metal to wood, glass, and plastics have made possible new and exciting furniture designs. (2) The use of nuts and bolts helps in furniture construction and can add the ornamentation that has been removed by utilizing simple materials. A beautifully polished chrome or stainless steel bolt is very attractive as part of a chair and certainly reflects the machine-oriented times in which we live. (33)

Metal can be highly polished, as are the stainless steel legs of the Barcelona chair designed by Mies van der Rohe; or metal can be given a satin finish lacking high shine. (33)

Tubular steel furniture was first totally accepted by the consumer in the early 60's. It was rejected before this time because people felt it was too cold and technological. This feeling has now changed and dull chrome finishes are as popular as lacquered finishes.

Metal is seldom used alone in a piece of furniture but plays instead only a small role in a total piece. (33) Unless the furniture is for outdoor use, some other type of material is combined with metal. A table, for example, may have stainless steel legs, a bronze apron, and square bronze legs. (2)

Aluminum is being used in tables, chairs, and case goods. It has been introduced by Charles Eames for indoor furniture, though once we thought of it only as a material for pots and pans or patio furniture. Eames' experimentation has brought this light material into the home for use in the living room. (33)

Fabrics

Fabrics should not be excluded from the list of materials in furniture manufacturing. Fabrics remain one of the most important components in furnishing an interior. Fibers, the basic strands from which yarns are spun, are of two kinds--natural and man-made. (2)

The basic natural fibers are cotton, linen, silk, and wool: cotton is still widely used despite the rapid rise in popularity of synthetics. Cotton rates high in versatility, economy and durability, while linen, silk, and wool are less versatile and more expensive. They are used in curtains, upholstery, and wall coverings. These natural fibers are being

replaced and combined with many man-made fibers.

There is a long list of man-made fibers. Man-made fibers used in interiors include those made from cellulose, chemicals taken from other substances, and chemicals having a mineral base. A few of the man-made fibers are covered here.

Rayon, a cellulose product, stands on its own as a beautiful and useful fabric. There are four basic types of rayon, but they are marketed under forty-five different trade names. Rayon has poor resistance to soil and abrasion and is relatively inexpensive.

Nylon, which is noncellulose, is widely used in fabric upholstery. This fabric clings to every curve of the furniture form and is simply slipped over and stretched on. (31) It is wrinkle and dirt resistant and hangs extremely well, so is also suitable for draperies and curtains.

Polyester is another very important noncellulose fiber. This fiber is produced from elements derived from air, water, and petroleum. Fabrics made of it are wrinkle free, easy to care for, washable, quick drying, and have good resistance to deterioration by sunlight.

Good modern textiles are made for our decorative use by every type of production. One of the leaders in textiles whose work has bridged several areas is Dorothy Liebes. In the textile world she was generally known as the "First Lady"

of the loom. (3) She works in handweaving, custom-weaving, and industrial weaving. Her fabrics are characterized by subtle elegance and are outstanding for their dramatic color brilliance.

Many firms such as Herman Miller (fabrics designed by Alexander Girard) and Knoll International design their own fabrics to be used with their furniture. (3) Many designers such as Dan Cooper, Stig Lindberg, Noemi Raymond, and Angelo Testa design and print fabrics for interiors. These are established names in textile designing.

An exhibition, "Fabrics International," held in New York at the Museum of Contemporary Crafts in 1961, helped bring about a closer relationship between handweavers and industry. (33) Some of the new developments were experimented with by craftsmen.

CHAPTER VI

SUMMARY AND CONCLUSIONS

The purpose of this study was to research selected aspects of modern furniture design. The areas of study were: history of modern furniture design, designers and their contribution to modern furniture designs, manufacturers of modern design, and materials of construction.

The modern movement in furniture design began in the early 1900's and is still in progress. Modern furniture design has been influenced by the de Stijl and Bauhaus groups, Art Nouveau and various other art disciplines. Although its impact on the public was minor until after World War II, modern design has advanced greatly since then.

Charles Eames, George Nelson, Florence Knoll, Eero Saarinen, Harry Bertoia, Warren Platner, and Edward Wormley are seven outstanding furniture designers. While all the modern furniture designers cannot be mentioned here several others have also contributed to the field, and their additions have helped bring high standards to the consumer.

Some of the most avant-garde ideas in furnishings that this country has ever seen were introduced by Knoll Interna-

tional, Incorporated and Herman Miller, Incorporated. These two companies seem to stand out as being most responsible for promoting twentieth century design in this country as well as in Europe. With the help of many inspired designers these two companies have brought from other countries products that have helped change the face of American design.

Changes in design concepts and the many new kinds of furniture have brought about a great variety of new manufacturing techniques. In general, these techniques are associated specifically with the materials used: wood, plastic, metal, and the various coverings--fabric, leather, or plastic. These materials are very important in furniture manufacturing, for a piece of furniture is only as good as are its materials and the way the materials are employed.

Conclusion

Modern furniture design developed as a result of social and economic changes in America and Europe in the early 1900's. Among these are the speeded-up tempo of living, the mother working out of the home, and smaller homes and apartments. As a result modern furniture has been influenced by various design movements and design groups, and has become noted for simplicity of line, lightness of scale, refinement of detail and honesty of materials and construction.

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