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ROCHESTER INSTITUTE OF TECHNOLOGY

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

MASTER OF FINE ARTS

CONTEMPORARY FURNITURE AND THE PURSUIT OF COMFORT

By
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May 1981

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INTRODUCTION

Comfort is a rather ambiguous concept that is generally referred to without precise meaning. This is due to the fact that comfort, like pleasure, is largely a subjective matter. Obviously, what may prove to be comfortable to one person may just as well prove to be uncomfortable to another. There seems to be a number of reasons that can account for this difference.

From a theoretical point of view, close quantitative analysis can suggest specific physical reasons to explain the differing responses. This approach considers comfort as simply a matter of providing appropriate anatomical support to prevent any unnecessary physical annoyances while in the state of repose. Such systematic analysis of the human factors associated with seating is a rather late development in the history of furniture design. Most historians agree that the highly specialized requirements of modern technology initiated the first investigations into seating fundamentals and these specialized applications led to our present industrial design criteria for seating comfort. Whatever the reason, quantitative standards of comfort have emerged for the first time only recently.

Although this late development is a very positive step in defining the subject of this investigation, its relative impact upon domestic furniture in general has been, as a consequence of its late appearance, rather weak. This specialized knowledge has been limited to a rather narrow sector of contemporary furniture design while the vast majority of seating has been, and continues to be, influenced by many less concrete factors.

The long history of furniture design confirms man's great flexibility in sitting habits. Whether it be on a stone, a stump, or a throne, man has proceeded to sit with a general disregard for his physical needs. If this is true, and some of the incredible chairs of the past suggest it is, one can only conclude that other factors, beyond physical imperatives, were deemed more significant.

Even to the most casual observer it is clear that the appearance or form of seating furniture of the past two hundred years has undergone great change while its function of accommodating the human body, in whatever fashion deemed appropriate, has changed less radically. That is to say, the physiology of man is essentially the same, less perhaps some statistical changes in height, weight, etc., while the form of modern furniture has gone through a long series of formal variations that cannot be accounted for by size alone. Therefore, before pursuing the specialized engineering aspect of

comfort, it seems appropriate to develop an overview of modern furniture design in its historical context. By doing so, perhaps some useful insights can be distilled that are of value to the contemporary designer interested in a balanced definition of comfort. To accomplish this objective, it seems worthwhile to backtrack in time and examine briefly some of the more obvious influences that have altered the evolution of contemporary seating design.

In the final part of this investigation, both the technical and historical segments will be employed in discussing the furniture pieces that constitute the studio portion of this thesis. They will provide the framework necessary for discussing my work in a meaningful manner, for discussions of an aesthetic nature generally have a tendency to ignore many pertinent considerations. By humbly recognizing one's relative place in the vast complex of cultural history, perhaps a realistic assessment can be obtained.

I. COMFORT IN HISTORY

HISTORICISM

Historicism is one factor that has played a tremendously important, if perhaps not positive, role in modern furniture design. This term refers to the deep seated affection for furniture styles of other historic periods. Alternating waves of fashionable reproductions and stylistic adaptations dominated the vast majority of high volume furniture pieces intended for mass consumption beginning in the early nineteenth century. This preoccupation was in keeping with Classic Revival architecture that had come to dominate the arts throughout this period. Such furniture suited the Victorian taste for the romantic, and fit perfectly into the eclectic landscape.

This period of revivalism is categorically condemned by virtually all commentators on the subject. Perhaps this outright copying and free use of classic motifs can be faulted for its lack of originality and its failure to recognize the predominant social forces of its time; but, it provided the element of continuity so sorely lacking in much contemporary furniture. From a broad cultural standpoint, this intimate familiarity of historic forms by the Victorians provided a bridge to link the

rich cultural fabric of untold generations with their own time. This is a consideration almost entirely ignored in our own time by so many designers attempting to make completely original design statements.

John Henry Belter probably best epitomizes the Victorian mentality with his incredibly elaborate Rococo forms. He was quick to serve the fashion of the day with little regard for the historical context of his designs. The great demand for furniture created by the emergence of a growing middle class led to imaginative technical innovations to facilitate the creation of designs otherwise too labor intensive to be produced economically. His patented laminating process of 1856 was widely imitated and helped to produce furniture in previously unheard of quantities.

Belter, nevertheless, showed a clear lack of interest in the creative possibilities of new manufacturing processes that might have led to more appropriate furniture forms. It was left to other inventive furniture makers in different parts of the world to correlate manufacturing technique with visual form. As one historian comments, "Ironically, the men who pioneered industrial production created, using new methods and new materials, furniture in outmoded forms."¹

Because historical style was the dominating factor in furniture design, comfort was largely ignored as a major design

determinant. Certain examples certainly make an impression of comfort due to their luxurious size, generous use of fabrics and stuffing, and highly developed upholstery techniques. But usually, comfort was a by-product rather than a preconceived intention.

In this regard, at the risk of overgeneralization, it should be remembered that the social mores of this period did not really provide a place to partake of comfort. The prevailing formality of social behavior, at least in public, precluded gestures, sitting or otherwise, that suggested self-gratification. In contrast to the present casual attitudes about such matters, the Victorian mind found no fault in a little discomfort to assure proper etiquette.

TECHNICAL INNOVATION

While the Victorian taste of the nineteenth century continued to explore every conceivable stylistic possibility, a portion of the industrial sector began to generate furniture of an entirely different kind. Iron found its way into furniture making for the first time when more efficient smelting processes made the use of iron cost effective. These products, though, found a rather limited application to outdoor use. The general result of this new technical capacity took the curious form of imitating designs originally created in different mat-

erials.

This period of invention also generated an endless stream of mechanical appliances designed for specialized seating requirements. Among the most interesting must be noted the barber chair, the wheel chair, folding chairs, the turning and tilting forerunners of the office chair, and specialized fittings for Pullman railroad cars. No clear direction, however, seemed to develop from this heyday of patent furniture.

In sharp contrast to the mechanical fantasies of the Victorian mind stands Michael Thonet of Vienna. His early experimentation in about 1830 led to wood bending techniques that could be used in conjunction with traditional manufacturing processes. This substitution of certain handmade parts with mechanized equivalents was not unlike that of Belter in its early stages. Soon, rich orchestrations were to emerge that demonstrated the full capability of the bentwood process.

Only until designs that were intended for mass production began to emerge, did technical methods and visual forms approach convergence. Progressively greater mechanization of manufacture began to eliminate some of the complex shapes that had originally assured popular acceptance. Thonet in most cases continued to maintain his curvilinear style that was, strictly speaking, not wholly the result of a new mechanized process, but rather the residual aesthetic of his Victorian

circumstances. Certain designs underwent continued simplification like chair number fourteen. In 1900 it became his best selling piece out of a total of fifteen thousand pieces of assorted types produced at twenty-six factories world wide.²

Thonet was able to capitalize upon some of the most significant components of his age: the rampant spirit of the Industrial Revolution with the demands of a new social class, in a form of honest construction that was both inexpensive and versatile. This is probably more of an industrial manufacturing achievement, however, than an achievement of furniture design. For it seems that Thonet could have just as easily mass produced other widely consumed products with similar production techniques. In a very direct sense the process had ultimately come to dictate form. This is quite opposite to Belter, who cleverly adapted new methods to accomplish pre-conceived forms. Since wood could be successfully bent in high volumes with great efficiency, the technique was used exclusively; whereas its use in conjunction with other methods might have led to even greater utilitarian success. The impression is that the process was extended beyond its appropriate field of application due to factors not directly related to seating. Ideas about quantity, expansion, economics, etc., seem to have had a much greater impact on the forms than more mundane aspects such as comfort. Thin back members, hard and flat sitting planes,

and sloping arm rests bear out this general lack of concern. Thonet, like Belter, was looking beyond the purely functional dimension of the chair.

THE ARTS AND CRAFTS MOVEMENT

Thonet's impressive success became the core upon which further mass production design could be built. This achievement was in marked contrast to certain other attitudes gaining strength in the second half of the nineteenth century. A deep chasm began to open up between modern production methods and more traditional ideas of craft. Considering the widespread disregard for living conditions found in the expanding industrial towns of England, one can appreciate the reluctance of some to see its products in a favorable light. Individuals like John Ruskin and William Morris could not divorce the products of industry from their social and moral implications. Ruskin saw mechanized industry as a negative force responsible for the slow disintegration of a more desirable social order. In his search for a more organic relationship between industry and society, he came to admire the Middle Ages as an ideally integrated period where a properly scaled community of craftsmen was incorporated into the total social fabric.

What Ruskin stated in theory, Morris attempted to accomplish in form. His first commandment was perfection of

craftsmanship, for this symbolized salvation from what he perceived as the spreading social oppression of uncontrolled industry. As always, craftsmanship proved expensive. Because of his high standards, the products of his workshop became luxuries unattainable by the masses who he saw as the prime victims of shoddy factory made products. Morris's theory and practice became contradictory but he planted the seeds for a long line of similar experiments in combining art and craft in accordance with the medieval ideal while at the same time systematically salvaging a long list of all-but-lost crafts.³ Morris was able to understand, if unable to practice, the need for a balance between the machine made and the handmade so that the creative process would not be diverted from pertinent design issues.

It is reported that Morris, a large man, found the ornate chairs of his Victorian age uncomfortable.⁴ This led to perhaps one of the first serious attempts in modern times to consciously build comfort into a chair. The widely imitated Morris chair incorporated a hinged back that could be adjusted to suit the user. Although its nonassertive character owes much to its thirteenth century antecedents, Morris seems to have pierced the superficial aesthetics of his time while addressing a genuine seating problem.

THE AVANT-GARDE

The philosophical ideas of Ruskin and Morris were to linger for some time while small numbers of artists and craftsmen grouped together throughout Europe and experimented with a wide diversity of design ideas. Shortly after the turn of the century the conservative aesthetics and humanistic concerns of Morris were overshadowed by a growing interest in a more abstract approach to art and design. Designers and architects were strongly impressed by the visual clarity and precision commonly found in machines and machine made products. Le Corbusier was probably the earliest artist to expound upon the formal virtues of locomotives, automobiles, airplanes, ocean liners, etc., for he recognized a characteristic of their form he felt to be directly applicable to architecture and interior design. Hence, his famous pronouncement: "The house is a machine for living in."⁵ This expressive power of pure form was soon to be understood and appreciated as never before. This new awareness became the common element that brought together many divergent groups into a major design movement.

By this time the machine and its superior production capacity had been all but universally accepted. The great conception of the era thus emerged: the synthesis of industry with the new awareness of form to serve the needs of mass

consumption. No other art school or design center in the present century has articulated the machine aesthetic as comprehensively and exerted such a comparable influence on architects and designers as the Bauhaus. This phenomenon seems to be due to the strong philosophical formulations originally made by Walter Gropius. Ironically, his early idealism reveals its lineage from Morris; for the word "bauhaus"—literally, "house for building"—carries overtones of lodges where, in the Middle Ages, masons and designers lived while working on the medieval cathedrals. The school's manifesto called for a similar unity of creative effort in which all branches of design could be pulled together. But in its new form it was to be centered around Gropius's new principles of functionalism. In 1925 Gropius wrote:

Convinced that house and furnishings must be meaningfully related to one another, the Bauhaus will attempt by systematic, experimental work in theory and practice—in the aesthetic, technical, and economic fields—to derive the form of each object from its natural functions and the conditions of its use...A thing is determined by its essence. In order to design it so that it functions properly—whether it is a vase, a chair or a house—its essence must be studied; for it shall have to serve its purpose absolutely, in other words, fulfill its practical functions, be durable, cheap, and "beautiful."⁶

Functionalism today is generally regarded as a doctrinal view of design that holds that function is the only factor that should influence design. It is not clear whether Louis Sullivan,

who is credited for first saying "form follows function," meant that form inevitably will follow function or that form should follow function. The phrase is generally used to suggest the latter interpretation. This is somewhat appealing in its simplicity and describes with some accuracy how strictly utilitarian objects like military equipment and industrial plants with precisely defined functions are designed. On the other hand, when considering simpler everyday objects such as chairs that lack such a tightly articulated function, it becomes more difficult to evaluate design success. Although the choice of a chair may be made for a particular use, once chosen, the chair suggests a variety of uses. A chair can hold people of different sizes and shapes for different lengths of time and for different activities. Perhaps this inadequacy of the functionalist doctrine in part accounts for the great leap into form.

The Bauhaus's main influence as an institution, as it were, was applied design and probably did more to dignify the work of modernist designers than any other until very recent times. For the school strongly held to the idea that it is much harder to design a first-rate teapot than to paint a second-rate picture.⁷ The strong link to industry was encouraged and much emphasis was placed on designing for mass production. Though most objects were conceived as industrial prototypes, the demand for Bauhaus purity was usually too small to justify mass production,

and this accounts for the rarity of such objects today.⁸

Just as Morris chose to concentrate on a rather incomplete conception of design with his inability to reconcile the machine and its positive potential, so too this school pursued its aesthetic objectives largely oblivious to the broader context of contemporary culture. The aesthetic delight of seamless steel tubing and dynamic spacial schemes occupied their attention while a design philosophy that incorporated a comprehensive understanding of human needs escaped them. The furniture manifestations of this period were no exception, developing hand-in-hand with the architectural precepts soon to be known as the International Style.

The failure of modern architecture, generally accepted in our postmodern era, is discussed at great length by Robert Hughes in his recent book, The Shock of the New. The inability of major architects to compromise their preconceptions of form for reasons of basic human practicality is poignantly analysed. Such famous architectural monuments as the Unite' d' Habitation are shown to be far greater successes as monumental sculpture than as living environments. A look at modern architecture and its basic flaws is appropriate here, for its furniture was conceived as an integral part of the major spacial and structural components. The same design principles dictated both architectural and seating forms. In fact, the designing of

furniture was generally regarded by many architects as a means to test out formal ideas in small scale.

The relative success of these ideas is ironically illustrated when the furniture now in use in the Unite' is examined. The original furnishings designed or chosen by Le Corbusier have been almost entirely replaced by common, mass produced, period pieces deemed more livable by the current tenants. The Unite' is crammed with plastic chandeliers and imitation Louis XVI bergeres, just the furniture Le Corbusier struggled against all his life.⁹

Lewis Mumford, of course, was aware of modern architecture's narrow scope decades earlier. His analysis of the Guggenheim Museum is especially revealing where he shows that the overriding concern for form was pursued to such an extent that the visually dynamic gallery made it very difficult to display works of art properly—the major function of the museum! Mumford, before criticising Wright publicly, arranged an extended stay at one of his houses. He discovered in one instance that the original, staggered, trapezoidal shaped beds designed by Wright were quickly replaced by the owner, for they made it impossible for him to practice normal matrimonial functions.

This rather simplistic approach to furniture design is clearly manifest in the Barcelona chair, probably the most

widely admired chair of this era. Its formal refinement and unprecedented clarity of form symbolize the design precepts it presupposes. Yet, the lack of any human trace is likewise apparent. The simplified planes of the back and seat offer no compromise with the human body, just as its ideal placement in the spacial environment fails to recognize any human presence. And just as Morris failed in his attempt to give quality and refinement to the blue collar consumer, Mies van der Rohe's monument of modern elegance, at the other extreme, became the standard fixture of executive suites and offices of corporation presidents—the status symbol of its time.

II. COMFORT IN THEORY

CULTURAL FACTORS

This brings our discussion to the latest phase in modern seating design. This phase is unique to our time for it is not simply a new style or aesthetic orientation. It is an analytical, quantitative approach generally regarded as the province of industrial design. It is distinguished from domestic furniture design in that it is generally employed by those designing products for mass production destined for public or institutional applications. This methodology has made inroads into the domestic market only to the extent that some industrial designs have been found suitable for certain stylistic treatments of private residences. On the whole, however, the vast majority of high volume domestic designs are produced without benefit of these design advances.

This is unfortunate, for ours has become a sit-down culture. Seating is playing an increasingly significant role in everyone's life whether or not we choose to recognize the fact. The average man today spends as much as two hours commuting behind the wheel of an automobile or in a train so that he can spend roughly eight hours behind a desk. The commute is

repeated at the end of the day and followed by an evening spent sitting. This average day is usually spent in seats the experts now consider structurally inadequate if not downright unhealthy. Beyond the immediate discomfort that most people have come to accept as a matter of course, a large number of physical ailments have been linked to improper sitting.¹⁰ Thus, the need for some concrete means of dealing with comfort becomes quite apparent.

It must be said in the beginning that the development of comfort indicators is a somewhat treacherous endeavor, for many experts see sitting as an unnatural condition in the first place. The position we call sitting is perhaps a compromise position, for man seems to function better, either when he is erect and moving, or laying on his back and resting. Sitting can best be seen as the by-product of social and cultural habits and conditions that have no direct relationship to man's physiology; unless, perhaps, we look at his continual dependance upon a prosthetic device as a result of a condition that will not mend—walking upright. The instruments for sitting are not basic to survival like food, shelter, and clothing, but rather, the artifacts of culture. As one expert suggests, "A chair is the first thing you need when you don't really need anything, and is therefore a peculiarly compelling symbol of civilization. For it is civilization, not survival, that requires design."¹¹

With this in mind, we probably should admit that comfort is basically an unsolvable problem. Nonetheless, some standards of comfort have emerged in the last few decades that are of some interest. They are the result of accumulated information generated by specialized seating studies. Advanced technology and its great strides in space exploration, modern warfare, mass transportation, etc., has created uniquely demanding seating problems previously unknown. These studies of confined seating for extended periods have incorporated the expertise of various specialists. The most up-to-date research by anthropologists, behavioral psychologists, medical doctors, biologists, physiologists, etc., has been applied to the elusive problem of sitting comfortably. Great volumes of data concerning body measurements, points of stress, thresholds of fatigue, etc., have been collected and analyzed.¹²

SEATING GUIDELINES

It is not my purpose to present detailed statistical information that can be used directly by the designer, for this is beyond the scope of this discussion. Such information has been presented with great success by many authors more intimately acquainted with this field of knowledge, and is readily available. My interest is of a general nature because this body of knowledge represents an important development in the over-

view of seating design. A fundamental advance is indicated: style has been transcended for the first time and functionalism has been given specific meaning.

The major factors consistently found to be important to comfort can now be briefly outlined in simple terms. Comfort basically involves the spine, neck and head, thighs and buttocks. To begin with, maintaining the spine in a slightly concave contour, as seen from behind, has proven to be perhaps the most essential factor influencing comfort.¹³ Large overstuffed chairs that are generally regarded as the ultimate in comfort actually allow the back to sink down into a position that curves the spine outward in a convex direction. A backrest that does not maintain the natural curvature of the lumbar region will inevitably induce backache.

In addition to the critically important lumbar region, chairs with high backs must provide adequate thoracic support. This upper part of the backrest should be wide enough to provide support for the upper arms and allow the body to assume many postures. For the body is not built to be stationery. Movement is extremely important and a chair should provide the means to satisfy the body's need for frequent position changes.¹⁴ The thoracic region at shoulder blade level is nearly flat, and as a consequence, tight backrest radii must be avoided as they tend to round the shoulders and create

muscle strain.

Sacrum support below the lumbar region can increase comfort by stabilizing the pelvis and distributing back pressure over a greater area. Back support below the sacral area is undesirable because it would press against the buttocks which expands during sitting. Such pressure tends to make the sitter move forward, thus losing correct back support.

Another major consideration that strongly influences comfort is the configuration of the chair seat. It must be of sufficient length to provide adequate support under the thighs to avoid overloading surrounding tissues. Yet, seat lengths must not be so great as to contact the back of the leg and thereby force the sitter to slide forward away from backrest support. Some clearance must be provided to avoid undue pressure on the underside of the thigh that over time might cause the leg and foot to fall asleep. It also allows the feet to move back as an assist in rising from the chair. Seat widths must be such that they fully support the buttocks and prevent contact with seat edges. Seat heights should not be so great as to allow the legs and feet to dangle and cause nerve and blood vessel pressure in the thighs. Optimum seat heights have been determined that will accommodate almost all adults. Seats must not be too low for they tend to overstretch the hamstring muscles when the legs are extended, or tilt the pelvis backward

eliminating the proper lumbar curve. Adjustable or incremental seat sizes are desirable for accommodating children. Ideal seat angles can vary widely depending upon specific chair use. Hard, flat seats used for prolonged periods cause the sitter to become restless, for excess pressure on tissues impedes blood flow creating fatigue and pain. A seat contoured to fit the buttocks helps avoid this problem. On the other hand, deep soft padding will allow the pelvic cage to sink excessively and load will be transferred to surrounding flesh, creating discomfort. Also, it rotates the thighbones upward and causes abnormal tension in the hip muscles. This is prevented by allowing the sitter to sink only a given distance. Bottoming should likewise be avoided with appropriate cushioning.

Armrests are another critically important factor in maintaining a proper sitting posture. Appropriate armrest height is dependent upon the softness of the seat cushion, the height of the sitter, and his particular arm length. Due to such size variations some compensation will probably occur. This adjustment usually results in excess strain in the shoulders. If the rests are too low, the sitter will haunch, if too high, upward pressure will result. Getting in and out of a chair is important, especially for the aged, and armrests should be designed to aid in this operation by being sufficiently high and sturdy. The most comfortable rests are long enough to support the full arm

and the base of the hand.

In some situations where backrest angles are severe, headrests are required; otherwise the sitter tends to slide forward to secure support for the head and will consequently assume a poor posture. The most effective headrest is actually a neckrest, for if something is placed directly behind, the head will roll around. The best place to put support is up under the skull for this tends to stabilize the head. Headrests can be a particularly difficult problem in seats designed with built-in headrests such as airplane chairs. This is due to the fact that the greatest variations in body size occur above the lumbar region toward the head. Accommodating this great latitude in size is not easily accomplished with a built-in fixture. A loose pillow seems to be the simplest and most practical solution.

BODY MEASUREMENTS

In order to implement the seating guidelines outlined, specific body dimensions are required. This is a source of major concern for the designer, for body sizes vary widely. Good anthropometric surveys have been conducted that encompass all variations of the total population. The surveys cover male and female adults and children. In addition, factors such as locality, age, race, and socioeconomic level have been included to insure realistic representation. Measurements have been

taken using standardized methods for accuracy and consistency.

The accumulated data is generally broken down into percentiles. Simply put, these values represent the percentage of people that share the same standing height. Thus, the designer is provided with a tool that indicates the specific dimensions that are suited to a certain percentage of the general public. By utilizing these figures, he can anticipate the degree of suitability of any design dimension.

The great range of body sizes, however, requires the designer to choose what sector of the total group he intends to address. Although the large majority of people share a similar range of body dimensions, a design built for the average male or female will not necessarily work well for very large males or very small females. An accommodation of 90 to 95 percent is generally regarded as adequate, for greater percentages can make designs too complicated and expensive.

In addition, percentile values represent average body proportions. But certain ethnic types like Orientals and Blacks do not fit the standard proportional breakdown. For example, they generally have the same sitting height as whites, but their legs tend to be shorter or longer in proportion to their trunks. In addition, rotund, muscular, or thin body types can influence seat width, abdominal clearance, etc.

III. COMFORT IN PRACTICE

The following discussion concerns itself with the three seating pieces designed and constructed as the studio portion of this thesis. Because the spectrum of possible seating types is quite broad, dealing specifically with each type would be unrealistic. Therefore, the three pieces presented here have been chosen to represent in a general way the vast range of seating types, while at the same time present individual seating problems that would require contrasting solutions. Each problem has its unique set of design constraints as well as its own historical reference, for each piece was conceived to address the problem of comfort from a unique point of view. Every design presupposes a set of philosophical tenets, whether or not the designer is conscious of them, and they have their subtle influences even if they cannot be clearly articulated. There are many such latent ideas present here and the following discussion will attempt to bring some of them to light.

SYMBOLS

This chaise lounge owes a great deal to the author's interest in the furniture of the past. There are a large number

of historical examples that seem to represent a tradition of excellence that, to my mind, is seldom approached by contemporary standards. In our technological age that is characterized by advanced electronic minaturization, we have lost our sense of monumentality. That is, because furniture has been generally relegated to a utilitarian status, it has lost its symbolic properties. Furniture pieces seldom represent important expressions of personal values and ideals, but have become the burdens of domestic existence. This no doubt is due to our changing social habits and values that embrace obsolescence and erratic social mobility. But, some of us still feel the need to manifest permanence and durability. This can still be successfully done in furniture form, for furniture made for domestic use is part of our personal living environment and this, at least in part, is not subject to the outside pressures of modern society. The great interest in interior design at the present time testifies to the fact that many people feel the need to create a private refuge away from the complexity and chaos of contemporary life. Perhaps this spells an end to interest in matters of public good, replaced by personal issues that can be successfully controlled. In any event, fine furniture of the past seems to represent to many a more gracious and genteel life style.

This point continues to be proven by the ever increasing

sums being paid for fine "antique" examples. Age is not the prime criterion, for some rather recent examples of outstanding aesthetic merit have likewise brought outstanding prices. The role of the investment speculator cannot be underestimated. But financial security manifest in valuable domestic pieces, that can be used and lived with to enrich one's private domain, seems to solve two problems at once. The great investment of capital in works of art, as a hedge against inflationary pressures, dramatizes the stabilizing power of objects created with the universally respected qualities of craftsmanship and character. It is rather ironic to see a world that is so conspicuously proud of its elaborate technological achievements make the relatively simple creations of artists its unalterable standard of value. This idea begins to suggest a psychological dimension to comfort, something even more subjective than physiological well-being discussed previously. For the mind must be put at rest before the body can truly relax.

The chaise lounge presented here was built in the spirit of such timelessness. That is not to say that it presumes to be of equal merit with so many outstanding examples of the past, but hopefully at least, it shares some of the constituent qualities that have made them so. Its construction is quite traditional with perhaps the exception of the vacuum formed portion of the under body and the synthetic webbing utilized as its primary





cushioning device. Otherwise it retains many characteristics that are clearly dated.

Scale is perhaps its most conspicuous trait, for it makes no compromises with contemporary interior scale. In this sense, too, it belongs to another age when rooms and their furnishings were conceived in a much more heroic dimension, at least for those who could afford the privilege of generous personal space. The common standards of the past, in this regard, are only now becoming truly appreciated, especially in heavily urbanized areas where the most basic accommodations require substantial financial sacrifice.

Likewise, the generous use of material and the substantial dimensions of specific members reiterate its primordial theme. With the growing scarcity of choice raw materials the use of large quantities of solid hardwood has been largely confined to the small scale craftsman while industry has almost entirely adopted techniques that require much less precious material. Wood in general has taken on a diminished role in furniture manufacturing with much emphasis being placed upon synthetic materials.

As for sitting properties, the reclining position has obviated most of the critical anatomical geometry necessary in upright chairs. This is in keeping with its relaxed role in the genial environment, for such a reclining configuration seems to

characterize its basic contrast to the more rigid sitting modes surrounding our work-centered existence. The basic unnaturalness of the sitting position has been mentioned before, but this telltale fact has made no impression upon the dominant forces in our lives that require rigorous work postures for extended periods. The chaise, however, provides more back support than most of the common household furniture in general use for this furniture is devoid of any body control whatsoever. The nonintegrated nature of man's life is pointedly symbolized by the extreme differences found between working and leisure seating modes that exist to accommodate the singular, unchanging human form.

This chaise lounge is admittedly an anachronism, but the conscientious student of history can plainly see that the latest conditions of life are not necessarily the most desirable. Furniture that can help narrow this gap can make a contribution toward man's general well-being far beyond simple utilitarian service. Such an idealistic theme would probably strike a familiar chord with Belter who understood the need to consider history before narrowing one's sights upon any particular seating solution.

FORM AND PROCESS

The lounge chair and ottoman to be considered next is the

second seating problem in the series of three. This piece was conceived in an attempt to apply state-of-the-art information concerning ideal sitting posture. The basic seating guidelines outlined in the theoretical section were employed in the creation of a chair that was intended to be very contemporary in both appearance and application. It was hoped that the theoretical principles, so convincingly presented by highly regarded devotees, could be proven accurate and practical. With these objectives in mind, the design emphasis of the chaise lounge could be changed from a highly subjective approach with historical overtones to a more objective problem solving one.

Since the functional requirements of the chair were essentially defined by seating theorists, it appeared to be a rather simple matter of incorporating their specific requirements into a visual form of my liking. But this proved to be far more difficult than initially anticipated. Thoughtful consideration afterwards seems to suggest that the problems encountered were those resulting from flaws in my basic design process. The simplified approach incorporated to address the subtleties of sitting comfort proved to be inadequate for the complexity of the task. It appears worthwhile then to consider design as a process to more fully understand its influence upon critical seating problems.

Chair design is considered the acid test by most designers

for it has proven to be perhaps the most difficult problem of its kind. A successful chair design that provides adequate seating comfort and a stylish appearance at the same time can sustain a designer's reputation for decades. So in retrospect, it was rather presumptuous of me to think that I could accomplish this in the very short time allotted.

I began on the drawing board and developed a sitting profile that appeared to satisfy all the ideal seating guidelines. First, the specific type of seating was chosen. In this case a lounge chair was felt to be an appropriate compliment to the chaise lounge, for they share the element of relaxation as opposed to work, while the lounge chair would require all the specifics associated with an upright chair. This immediately generated the approximate seat height and angle as well as the seat-to-backrest relationship. Secondly, the size of person to be accommodated was chosen and this generated seat dimensions, lumbar placement, armrest heights, etc. Many cushioning possibilities were considered and the final choice was based upon anticipated control and ease of fabrication. My consideration of pertinent physiological facts seemed to be exhaustive. At this point the basic structural concept based upon modern laminating techniques was finalized. The leg and armrest structure was delineated and its relationship to the chair body set. I felt I had created a harmonious whole by utilizing bent

laminations throughout. This similarity to a number of successful production chairs insured its appropriateness for its intended application. After careful review of the extensive number of design factors, I felt I was ready to build. The rest is history and the inherent shortcomings of the result are a matter of record.

Afterwards, further research into the design process revealed that many successful designers do not attempt to design chairs on paper, for they are all too familiar with the uncertainty such an approach can cause. They may begin in this way, but inevitably resort to full scale mock-ups, for this allows them to test their assumptions. In other words, there is no substitute for trial and error in chair design. Adequate testing that can allow modification in the design is the key to the many interrelated factors that a successful design must satisfy. The large percentage of chairs that are inadequate in their sitting characteristics suggests that inadequate testing is all too widespread. Certain famous designs that have proven their design quality are noted for the extraordinarily thorough testing they have undergone. Scores of prototypes created over a long period of many years often precede their mass production.

Another obvious advantage of a full scale mock-up is that the designer can more accurately sense the formal qualities of the design. Had the design in question been rendered three





dimensionally and in full scale, perhaps its inherent cumbersome-ness could have been prevented. For as one perceptive critic commented, the chair at first sight does not promise to be comfortable. This, unfortunately, is proven in fact when the chair is sat in, although subsequent cushion modifications have made the chair useable.

Studies have been conducted that demonstrate how important visual impressions can be.¹⁵ In one instance, a number of persons were asked to evaluate the relative comfort of a series of different chairs while blindfolded. Afterwards they were allowed to see the chairs and again rate the respective comfort of each. Upon seeing them, the ratings inevitably changed up or down depending upon the visual suggestiveness of the particular chair. This study confirms that fact that there are visual clues that can strongly influence our perception of comfort. Perhaps experience has conditioned us to make certain intuitive associations with regard to comfort and the lack of such signs will immediately alert us to potential problems.

Taken further, this idea suggests that the sensitive observer can often anticipate functional problems from a purely visual standpoint. Perhaps nature has taught some of us to intuitively sense the appropriate relationship between function and form—the ever present concern that has haunted designers

for centuries. The lounge chair and chaise lounge share an interesting relationship in this regard. The chaise lounge makes a strong statement in support of historical awareness while the lounge chair suffers from its absence. For what is extensive trial and error but concentrated evolution under controlled conditions? An examination of the finest examples of design throughout history reveal that the consummate examples are the products of long, patient evolutionary processes. Seldom has history generated a first time success. Nature again supplies the perfect model, for her wealth of highly tuned and perfectly adapted creatures constitute design at its finest.

Many designers admit that it is much more realistic to set out to improvise upon an existing design by refining its basic qualities than it is to design from scratch and hope to achieve an adequate level of refinement. The Parthenon, the Gothic cathedral, and Japanese architecture are a few choice examples. Of course, this process can be allowed to progress too far and degenerate into mannerism just as domestic animals can be bred to a point of neurotic behavior. Once again we are required to exercise our intuitive powers of discernment to sense the appropriate degree of development. And it is this dimension of design appropriateness that will be explored in the following discussion.

STRUCTURE AND BALANCE

Faced with the somewhat disappointing results of the previous design problem, it was felt that some modifications in design approach were in order. The most obvious adjustment required was the need to utilize the advantages of the full scale mock-up as outlined above to more fully anticipate the outcome of the finished form.

But first, a choice had to be made as to the type of seating to be designed. The rocking chair seemed to be an especially apt choice, for it shares a number of common elements with both the chaise lounge and the lounge chair. It is at the same time a unique type of seating. Its origins are steeped in history while it provides comfort in a very simple and direct manner. The rocking chair has always been associated with a simple lifestyle, the likes of which contrast markedly with the image projected by the other two seating pieces. Although affluence is generally associated with luxurious living and the comfort it can provide, most of the truly comfortable chairs to date have been the achievement of the middle class.¹⁶ While the affluent minority furnish their homes with the latest stylistic triumphs, the ubiquitous adjustable recliner has found its way into almost every other home. Practicality seems to often take precedent over tastefulness. Furthermore, the rocking chair is said to have institutionalized

American informality by making the bad manners of leaning back in a chair acceptable. No doubt Belter and his contemporaries had trouble dealing with this, for the Victorian mentality considered the rocker a lazy and ungraceful indulgence and could not fathom their growing popularity.

The Shakers seemed to have understood that in order for a chair to be comfortable it need not be pretentious. They illustrate even more clearly than the Victorians how moral beliefs can influence the form of furniture and its inherent comfort. Their credos, "Beauty rests on utility," and "Every force evolves a form," predates Louis Sullivan and the modern principles of functionalism by a hundred years.¹⁷ Perfect utility was their only concern and the resultant forms were of no consequence provided they fit into the general interior scheme and were compatible with their strict laws of behavior. Perhaps the Shaker rocking chair was the indirect result of their uncompromising design rigidity. By simply adding rockers to one of their standard chairs, movement was created that made the hard seats and straight backs more bearable.

The rocking chair could possibly represent the first clear understanding of movement as an important factor in sustaining comfort, an idea subsequently rediscovered centuries later by modern scientists. Benjamin Franklin is sometimes credited with the original invention and this seems consistent with his

reputation for practicality. Regardless, the inventor of the rocking chair probably got his idea from the baby cradle that is universally appreciated for its soothing properties for use with those yet too young to be expected to assume a proper sitting pose.

The adaptive quality of the Shaker rocking chair is one that characterizes almost all examples throughout history no matter what their origin. The image of a conventional chair planted on rockers represented the major problem in designing a contemporary interpretation. Finally, exploration led to the idea of a cantilevered seat. But in order to utilize this principle, a stable structure would have to be provided. By joining the chair rockers with the extended seat members in a circular fashion at the rear of the chair, triangularity could be established with the backrest member. Because the triangle is inherently stable, unlike the square or rectangle most often employed in chair design, the visual problem was solved without compromising stability.

Structure is a term often used when talking about furniture, but it is not one that is clearly defined. In its most precise usage, structure is meant to suggest a dynamic inter-relationship among the parts that compose it. That is, it is distinguished from a simple construction that does not depend upon a mutual dependency of parts. Put another way, structure





is an abstract concept that refers to a system or principle of arrangement that is utilized to cope with the forces at work in any given problem, and its application generates a form that is a more direct result of, or reply to, those forces.¹⁸ This is an important clarification, for structures often possess very expressive qualities. When a structural concept has found an especially appropriate implementation, the visual result can be quite expressive, indeed. This aspect of structure, often referred to as tectonics, has been very significant in the history of architecture, a field intimately related to furniture, as previously shown. It has been associated with a long list of significant edifices throughout history.

The same principles of structure can be applied to furniture in simpler terms, as this rocking chair illustrates, for there are no members that are not essential to its realization. This is not to say, however, that each basic member could not take on a different profile, that the stretchers could not perhaps be consolidated, or that the cushions could not exhibit a different contour; but basically, beyond these cosmetic aspects, it has assumed an elemental form. The specifics of the design have been adapted to a rudimentary idea, not unlike examples found in nature. Implications of this conclusion can be drawn that are far reaching. For it suggests that perhaps there are some fundamental principles governing the relationship of form to

structure that should be adhered to in order to reach design solutions of this natural kind. Perhaps with refinement the virtues of pure structure could be exploited more fully, and a stronger expressive statement could make this idea more apparent. But the important fact is clear: dealing with a problem in terms that embrace its underlying natural structure will more readily lead to appropriate solutions and avoid the pitfalls that superficial design concepts often encounter.

It is beyond the scope of this thesis to construct an argument as to what constitutes good design or what is the best design procedure. But the historical, theoretical, and practical discussions of this text have consistently pointed out the shortcomings of narrowly defined design criteria; whether they are historical, technical, philosophical, or sculptural in nature. Applying excessive emphasis on any single design facet, without regard to the critical balance between the structural component and specific functional requirements, will result in a design that may seem distorted and less than fully effective in expressing the essence of the root problem.

CONCLUSION

This inquiry into seating comfort has proven to be a fruitful and thought provoking experience. It has raised as many questions as it has answered by revealing the manifold complexity of something as ordinary as an everyday chair. An appreciation of this complexity should humble the most ambitious designer. For when a designed object has direct human impact or social ramifications, it can no longer be taken for granted and dealt with casually. The great discrepancy between most chairs and the human body clearly characterize the general state of designer responsibility. Hopefully growing awareness can encourage the designer to approach his problems with greater sensitivity and concern, for the results of careless designing seem to accumulate and ultimately encroach upon all our lives. Human engineering has made some progress in this regard but it is not a panacea, for comfort is more than a physical phenomenon as we have seen. It is the intangible human dimension of design that requires the patience and insight of the artist. Perhaps someday the design and perfection of simple useful objects will regain the respect of the serious

designer. For despite the proliferation of extremely complex and sophisticated designs in our modern technological society, the simple pleasures of life, like a comfortable chair, probably possess a more personal and longer lasting meaning. Society has readily accepted random change in design, for stylistic variation can satisfy the fickle element in all of us. But too often superficial pleasure has cost us refinement that was generations in the making. We seem to waste a good deal of time and effort in reinventing common articles in stunning new forms while ignoring the lessons of the past and avoiding urgent problems yet unchallenged. The need for self-expression makes it difficult for the artist or designer to carry through with ideas initiated by others. But if we are to make genuine progress in human terms, the designer must satisfy his creative drive with less unique and less conspicuous solutions. Society will always recognize the exceptional talent and pay him his just reward, but some of us have more modest self-appraisals and simply look to find a useful and well integrated role in society. Perhaps this investigation into comfort has helped temper my attitudes in this regard and can provide lasting inspiration for responsible design practice in the future.

FOOTNOTES

¹ Karl Mang, History of Modern Furniture, trans. John William Gabriel (New York: Harry N. Abrams, 1978), p. 62.

² Ibid., p. 52.

³ Lewis Mumford, The Myth of the Machine, vol. 1: The Pentagon of Power (New York: Harcourt Brace Jovanovich, 1970), p. 156.

⁴ Robert Bishop, Centuries and Styles of the American Chair: 1640-1970 (New York: E.P. Dutton, 1972), p. 374.

⁵ Le Corbusier, Towards a New Architecture, trans. Frederick Etchells (London: Architectural Press, 1927), p. 100.

⁶ Walter Gropius, Principles of Bauhaus Production, cited by Mang, History of Modern Furniture, p. 108.

⁷ Robert Hughes, The Shock of the New (New York: Alfred A. Knopf, 1980), p. 199.

⁸ Ibid.

⁹ Ibid., p. 190.

¹⁰ Barbara Prete, ed., Chair (New York: Thomas Y. Crowell Publishers, 1978), p. 42.

¹¹ Ibid., p. 8.

¹² Neils Diffrient, Alvin R. Tilley, and Joan C. Bardagjy, Humanscale 1/2/3 (Cambridge: M.I.T. Press, 1974), p. 1.

¹³ Prete, Chair, p. 44.

¹⁴ Ibid., p. 46.

¹⁵ Ibid., p. 43.

¹⁶ Ibid., p. 12.

¹⁷ Mang, History of Modern Furniture, p. 56.

¹⁸ Eduard F. Sekler, "Structure, Construction, Tectonics," in Structure in Art and in Science, ed. Gyorgy Kepes (New York: George Braziller, 1965), p. 89.

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Anderson, Eric A. and Earle, George F., ed. Design and Aesthetics in Wood. New York: State University of New York, 1972.

Bishop, Robert. Centuries and Styles of the American Chair: 1640-1970. New York: E. P. Dutton, 1972.

This large picture book is of value in so far as it illustrates the fascinating progression of stylistic change in chair design.

Clark, Kenneth. Civilization. New York: Harper & Row, 1969.

In this remarkable volume, Clark has surveyed the history and culture of Western man by concentrating upon those crucial periods that have made the most significant contributions to civilization and human understanding. He has chosen what he considers works of genius from the diverse fields of architecture, sculpture and painting, philosophy, music, and engineering. These examples can give the artist or designer much insight into human capability, for many of the examples are clearly extraordinary. On the other hand, his discussion of towering personalities can be a sobering experience for those who lack a realistic self-image. Clark's purpose goes beyond historical synthesis, however. He senses that once again civilization is somehow in jeopardy, for the many barbaric expressions of the twentieth century contrast sharply with the more humanistic essence of our precious heritage.

Diffrient, Niels; Tilley, Alvin R.; Bardagjy, Joan C. Humanscale 1/2/3. Cambridge: M. I. T. Press, 1974.

This manual, prepared by Henry Dreyfuss Associates, is the product of a thirty year compilation of data and probably represents the most advanced source of human engineering data available.

Greenough, Horatio. Form and Function: Remarks on Art, Design, and Architecture. Berkeley: University of California Press, 1966.

Grillo, Paul Jacques. Form, Function, and Design. New York: Dover Publications, 1975.

Hughes, Robert. The Shock of the New. New York: Alfred A. Knopf, 1980.

This personal assessment of twentieth century art has several pertinent chapters that directly relate to design issues, for the social forces that fermented the major phases of artistic expression likewise had significant impact upon the applied design fields. Of particular interest are the chapters, "The Mechanical Paradise" and "Trouble in Utopia." Hughes relates the role of the machine and modern architecture to the predominate conception of art as an instrument of social reform. He also exposes the role of shock value in works of the avant-garde, an element that still lacks proper perspective.

Kepes, Gyorgy, ed. Vision + Value Series. 6 Vols. Education of Vision. The Man-Made Object. Module, Proportion, Symmetry, Rhythm. The Nature and Art of Motion. Sign, Image, Symbol. Structure in Art and in Science. New York: George Braziller, 1965-66.

Under the editorship of Gyorgy Kepes, Professor of visual design at M.I.T., some of the world's foremost scientists, scholars, artists, and educators have contributed to this series oriented toward the reintegration of the technological, social, and artistic components of the contemporary environment. Aware of a fragmentation of experience that has led to many self-contained disciplines, Kepes has provided the format to stimulate communication that can interconnect the many diverse fields of study and create a more cohesive preception of our contemporary problems. This is required reading for the designer who seeks to find a relevant role in contemporary society. Because vision is a fundamental aspect of human insight and is central in the shaping of our physical and spatial environment, the role of the artist as a "living seismograph" serves a very essential purpose. But as Kepes sees it, most twentieth century artists have recoiled upon themselves. They have made a frantic retreat into isolation that has prevented them from thinking and acting in the

broad terms of cultural and social ideals. They generate illusionary spontaneity but miss a deep dialogue with contemporary reality. Of special interest is the volume devoted to structure where the concept is shown to be the central ordering principle of our era. Of great value is R. Buckminster Fuller's "Conceptuality of Fundamental Structures" and Eduard F. Sekler's "Structure, Construction, Tectonics." Of additional value is Pier Luigi Nervi's "Is Architecture Moving Toward Unchangeable Forms?" and "On the Design Process." In another volume, Herbert Read's "The Origin of Form in Art" is most valuable. Also see "From a Set of Forces to a Form" by Christopher Alexander and "Genesis of Design" by Marcel Breuer.

Le Corbusier. Towards and New Architecture. Translated by Frederick Etchells. London: Architectural Press, 1927.

Mang, Karl. History of Modern Furniture. Translated by John William Gabriel. New York: Harry N. Abrams, 1978.

This overview recognizes furniture as an expression of its age but is rather superficial in its treatment of important social issues. It is of some value, however, in sensing the complex evolution of contemporary seating.

Mumford, Lewis. The Myth of the Machine. 2 Vols. Technics and Human Development. The Pentagon of Power. New York: Harcourt Brace Jovanovich, 1967-70.

It is unfortunate that Lewis Mumford is not a name generally associated with the visual arts, for artists and designers could benefit immensely from his penetrating treatment of technology and its relationship to cultural history. He does not accept the widely held view that tool using is the only significant component of human development nor does he see most contemporary technical manifestations as necessarily being beneficial to man's long term interests. He has traced and analyzed the evolution of the fundamental forces that dominate contemporary life from their very inception and has subjected their pervasive influences to an intensely compelling conception of humanity. Mumford is, in the best sense of the word, a generalist and his scope is truly staggering. The two volumes noted here plus The City in History perhaps represent his most significant work. Together, they can provide the artist with a clear appreciation of his role in human events and guide him toward finding a meaningful purpose in contemporary life.

Prete, Barbara, ed. Chair. New York: Thomas Y. Corwell Publishers, 1978.

This book is an edited transcript of a recent seminar that featured a number of recognized seating designers. It reveals the great latitude in design methodology now in practice and demonstrates the relatively weak impact human engineering has had upon professional practitioners.

Read, Herbert. The Meaning of Art. Baltimore: Penguin Books Ltd., 1931.