

AN INVESTIGATION OF FURNITURE DESIGN
AS AN EVOLUTIONARY PROCESS

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PREFACE

The belief that man's achievement of a successful environment is dependent upon all elements fulfilling their function with maximum efficiency was the primary motivation for this study.

Research indicates that if maximum efficiency in design is to be achieved it requires the involvement of both consumer and designer. Good design and personal taste are such intangible things that adequate definition can only result from personal experience. It was, therefore, the purpose of this study to explore certain design experiences to ascertain their effect upon the achievement of a personal design philosophy.

The desire for increased personal knowledge, skill, and understanding of those factors which influence the achievement of well designed products was fulfilled through the study of furniture design problems.

It is now hoped that the implications manifested by this study may be applied to the more effective education of future designers and consumers.

I would like at this time to express my appreciation to Associate Professor Christine Salmon for her patience and guidance throughout the study.

Also, I would like to thank Assistant Professor John Tate

and Professor F. C. Salmon for their interest and assistance. Gratitude is also expressed to Dr. Elizabeth Hillier for her help in initiating the study and for her contributions as a member of my committee.

Finally, I would like to thank my wife, Betty, for without her patience, perseverance, and persistence this study would never have been completed.

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CHAPTER I

INTRODUCTION

It is estimated that at the current rate of growth the population of the world will double by the year 2000. This prolific multiplication of people imposes problems of staggering magnitude upon the technology of modern man. The most obvious problem is available space - space for growing food, space for the greenery necessary to preserve the breath of life, and space for living.

An airplane emitting tons of foreign matter into the air or shattering the peaceful serenity of a community with its approach, trespasses against the living space of the individual. A chair which proffers comfort and fails to provide it, a sink that is too low, a cabinet that offers awkward access, or a door knob that rewards its use with a skinned knuckle; all these things represent infringements upon man's habitat.

If a successful environment is to be achieved in this period of increasing space encroachment and diminishing personal identity it is imperative that all elements of man's environment fulfill their function with maximum integrity. The problem is to define maximum integrity.

Review of Literature

For an object to fulfill its function, it must be well designed. Most experts concur that good design represents the fulfillment of a need. They further agree that need is something more than just function. A container that holds water does not necessarily result in a well designed flower vase. It must contain aesthetic qualities as well. Here is where the disagreement occurs. Consider just the area of furniture design and observe the differences in expressed philosophies.

Finn Juhl describes furniture as an

... individual work of art, not modestly subordinating itself to its surroundings, but creating a striking effect, bearing the stamp of its creator's genius. It should be a unique and distinctive work of art, but its functional qualities must not be tampered with.¹

Conversely, a new generation of designers propose

... a piece of furniture as something ephemeral which lasts a year and which is thrown away and replaced. ... What we are trying to do is satisfy a need, not impose an aesthetic.²

Actually, these statements conflict only in part for both agree that under no circumstance do you sacrifice function. The disparity occurs in attempting to determine whether aesthetics represent a part of the function.

Jens Risom believes that furniture does more than fulfill a physical need. He states that,

People need wood. ... The human being needs a line texture, a depth texture, and a certain visual security in furniture, which a piece of wood can give.³

This philosophy is substantiated by Professor Paul Sivadon, who, in describing the office designs at Marcel Riviere Institute, states that "The offices are small enough for the patients to take in the furnishings and identify them (which is reassuring)." He further indicates that the "Onus on the designer" is to provide an environment which works to assist in fulfilling man's psychological needs and to do this requires inclusion of familiar objects or materials, for these are vital in providing man with a feeling of security.⁴

Much has been written about design and design philosophy. In fact, it is difficult to find a designer, of any note, who has not expounded upon the philosophy of creativity.

The Klint school regards a piece of furniture as an implement which should fulfill its purpose in the same way as a workman's tool does, ... it should have a simple and not too unusual form so that it can glide into any interior without becoming conspicuous,⁵

"Diametrically opposed to the Klint conception is the idea that a piece of furniture should be regarded as an "individual work of art ..."⁶

The range of divergent philosophies makes it possible to substantiate almost any position in a design discussion, with expert verification. It also makes it impossible to develop a personal design philosophy based solely upon the written word. In fact, the idea that citing a number of authorities lends credence to a design evaluation is apt to produce undesirable consequences. An excellent case

in point is provided by the Good Design Program.

The Good Design Program, sponsored jointly by the New York Museum of Modern Art and the Chicago Merchandise Mart, was established to examine the foreign and American market for examples of excellence in the home furnishing field.

Good Design choices (according to the catalog) are based on eye appeal, function, construction and price, with emphasis on the first ... in its pronouncements on design, the museum has frequently stressed the importance of function and structure as the basis of appearance, yet it continually contradicts these declared doctrines by making purely visual choices. Sometimes, as in the striking example of a handsome group of case goods - cabinet and shelves designed by Charles Eames - function has been considered so subordinate to appearance that the pieces were included in the show despite the fact that their structural defects were serious enough to necessitate redesigning the entire line. Those who had already bought the pieces, influenced by what they may have regarded as museum endorsement, were less inclined to admire their good looks once the errors of construction became apparent.⁷

The Good Design program did much to elevate design standards in the area of home furnishing, but obviously not without criticism. Unfortunately, the criticism is poorly directed. It should rather be directed towards the consumer who buys simply because of program endorsement or who buys because it is an Eames design. The proposal of these pieces as examples of good design merely represents the opinions of the judges, based upon individual taste. Obviously, knowledge and experience dictate that their choices will be more valid than those of the laymen, but knowledge and experience do not make their judgments

universal nor infallible.

Professional evaluation does not free the layman from the responsibility of making personal appraisal based upon individual need and circumstance.

Maynard Lyndon, in discussing design, makes the following observation relevant to personal evaluation.

Year after year, we may live with an awkwardly shaped or placed piece of hardware, and seldom realize that there may be a better way. Most children grow up, and accept this same silent dilemma of their parents. They learn to live with the same door that hinges on the least logical side, the shower faucets under the stream of water, ... Why should they question such things if their parents haven't?⁸

Further evidence of the importance of involvement was supplied by a solicited evaluation of the table, representing a solution to problem one of this study.

That table is better than the one designed by someone who schedules table design from 10:00 to 12:00, Monday through Friday. What I'd really like to say is, the masses don't deserve that table. They deserve the one that was created between ten and twelve. To say that makes me feel very strange and selfish, but on the other hand I also cringe to think of standing at the end of a long line of tables stacked end to end like some gigantic perspective drawing. And to imagine them dispersed in houses throughout the country, occupied by people who don't appreciate them, ... I think it has something to do with my philosophy of musical concertizing. Those who attend concerts to show themselves should not be permitted to enter. The Italians in the Crow's Nest of the Opera houses in this country are the only ones who laugh at the funny lines because they are the only ones who really understand it all.⁹

Contrast this apparent denunciation of people's aesthetic awareness with a quote by M. C. Richards: "The artist, the philosopher, the scientist, the laborer, the

craftsman, the homemaker, is a poet when he feels and tells through his being the whole story."¹⁰

Conflicting statements? Careful analysis indicates quite the contrary. Both statements are in complete accord and lend much credulance to a design philosophy expressed by George Nelson:

Every design is in some sense a social communication, and what matters is not so much the importance of the object - this is generally out of the designers control - as the emotional intensity with which the essentials have been explored and expressed. Truth is a most important quality in design of any dimension and people tend to recognize it when they see it.¹¹

Statement of Problem

This thesis was initiated to analyze design problems as educational experiences. Research indicates that if maximum efficiency in design is to be achieved, it requires the involvement of both consumer and designer. This requires education, not vicarious verbal description, but rather exposure to educational experiences which entail participation in the solution of actual design problems.

Purpose

The purpose of this study was to:

1. Increase personal knowledge, proficiency, and understanding in the area of furniture design and construction.
2. To draw implications from this understanding that may be used in teaching furniture

design and construction.

3. To investigate the depth of learning involved in solving a design problem, with the idea of using design development as an educational tool for motivating student growth and development in areas of general education.

Hypothesis

It is hypothesized that it is not the problem itself, but rather the degree of intensity involved in seeking a solution, that determines the quality and extent of learning that occurs. Because there is a tangible product involved in this type design problem solution, motivation is more readily achieved. Since intensity of involvement and motivation are closely related, it is felt that this type of educational experience is of equal value to designer, producer, and consumer.

Methodology

Three design problems were selected for solution in an effort to determine what type of educational experience would best provide the involvement research indicated to be necessary for formulating a healthy design philosophy. These problems were expressed as simple statements and required progress through paper development, material choice, and acquisition, actual construction, designer evaluation,

and evaluation by others who might represent potential consumers.

The three problems as stated were:

1. Design and build a table to be restricted only by the intrinsic properties of the material used.
2. Design and build a chair which reflects the unique talents of the designer.
3. Design a chair which is low in cost, can be knocked down for shipping and does not impose an aesthetic.

Problem descriptions were diverse and abstract in an effort to determine the role initial restrictions play in effecting the solution. Statements were also kept simple to determine whether such factors as personal need, consumer need, economics, material characteristics, material restrictions, equipment limitations, time restraints, and other elements which influence solution, would manifest themselves without initial declaration.

Construction was accomplished in facilities comparable to those which may be found in any high school Industrial Arts wood shop.

Evaluations were obtained from the actual use of the pieces by: the designer, the designer's family, a consumer, interior design students, and members of the Interior Design Department at Oklahoma State University.

Limitations

The primary purpose of this study was to analyze design problems as educational experiences. Consequently, problem descriptions have been confined to a general discussion of such specific areas as technology and economics.

As is indicated in the discussion of future research, areas such as technology, economics, and sociology all influence design solution, but the extent of research inherent in each area places any kind of comprehensive individual study beyond the scope of this thesis.

FOOTNOTES

¹Esbjorn Hiort, Modern Danish Furniture (New York, 1957), p. 8.

²"Something to Make You Sit Up," Realities, No. 215 (October, 1968), pp. 62-65.

³"Continuities of Jens Risom," Interiors (October, 1959), p. 150.

⁴"Our Space Within the Space Around Us," Realities, No. 215 (October, 1968), pp. 84-87.

⁵Hiort, p. 8.

⁶Ibid., p. 8.

⁷Ada Hunteable, "How Good is Good Design?" Craft Horizon (March-April, 1955), pp. 15-23.

⁸Maynard Hale Lyndon, "Design for Children," Architectural and Engineering News (February, 1969), p. 40.

⁹Personal interview (written), Illene Lind.

¹⁰M. C. Richards, Centering (Middletown, Connecticut, 1966), p. 67.

¹¹George Nelson, Problems of Design (New York, 1957), p. 6.

CHAPTER II

FINDINGS

Problem 1

Design and build a table to be restricted only by the intrinsic properties of the material used.

Designers are frequently inspired by nature's creations. The shape of a limb, the pattern of a flower, the colors of a sunset or a very handsome landscape all have served as inspiration for both fine art works and utilitarian objects. Fine artists usually experience a greater degree of freedom in implementing this motivation, however, for the functional requirements of the utilitarian object impose restrictions which may severely temper the original inspiration.

The commission to create a piece of furniture restricted only by the intrinsic qualities of a piece of wood, therefore, seems more in the nature of a fine arts project. It is, in fact, a contradistinction of the desired design procedure, which proposes that the physical requirements of an object determine material selection as a result of functional mandates.

The objective of reversing the process is to analyze the effect of conceiving a piece of furniture aesthetically

rather than from a functional need. The utilitarian classification of the finished product imposes strong initial restrictions, but these are hopefully modified by allowing the character of the material to suggest the function.

The material for this problem was made available by a friend who had discovered two rugged looking pieces of 2" red oak, 1'-0" wide and 6'-0" long. The original request was to: "just clean up the pieces and glue them together." Inspiration did not occur until the rough dull finish of the outside surfaces was removed to expose the provocative material beneath - a material which personified the character of the individual who had provided it. A large, strong, highly outspoken individual; no challenge too great, no task too small, the disposition and physique of a stevedore with the sensitivity and gentleness of a surgeon, which in fact, he is.

Inspiration necessarily provokes questions of procedure which in turn serve to direct the problem. How can this provocative material be best presented, for maximum appreciation, in a utilitarian manner? The slab-like quality of the material suggests a table, but what kind of a table? A coffee table seemed best suited for two reasons: (1) The dimensions of the available material, (2) A coffee table imposes a minimum of functional restrictions.

Every effort was made to preserve the very rugged, nature beaten character of the material. Knots, windshakes,

and drying checks were accentuated. It did become necessary to re-saw the original pieces, however, in order to remove excessive warps and cups. The pieces were then glued with the annual rings facing in the same direction to preserve the original character of the material. This procedure violates suggested gluing practice, which recommends alternating annual ring direction to minimize cupping, but was deemed more practical aesthetically and also mechanically. If the pieces do cup, they produce a more easily controlled uniform curve rather than the undulating surface which may result from the recommended process (Figure 1).¹

The legs were designed to grow out of the top, not naturally, but, honestly as a result of man imposing his functional needs upon the material, much as knots result from the honest imposition of nature's function. The compulsion to make the legs part of the top rather than just elevating supports, resulted in a base structure which required no glue. Each piece serves to lock the others in place, producing a physical unity which augments the visual integrity (Figure 2). This evolutionary manifestation was a rewarding bonus, for it served to amplify the value of material exploration as a source of design inspiration.

A linseed oil finish was used to protect and enhance the material characteristics. This type of finish was selected because it does not produce the under-glass, hands-off effect suggested by surface coatings, but rather invites tactual as well as visual exploration and serves to

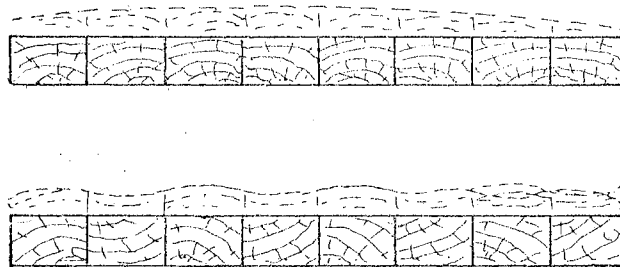


Figure 1. Annual Ring Placement for Gluing

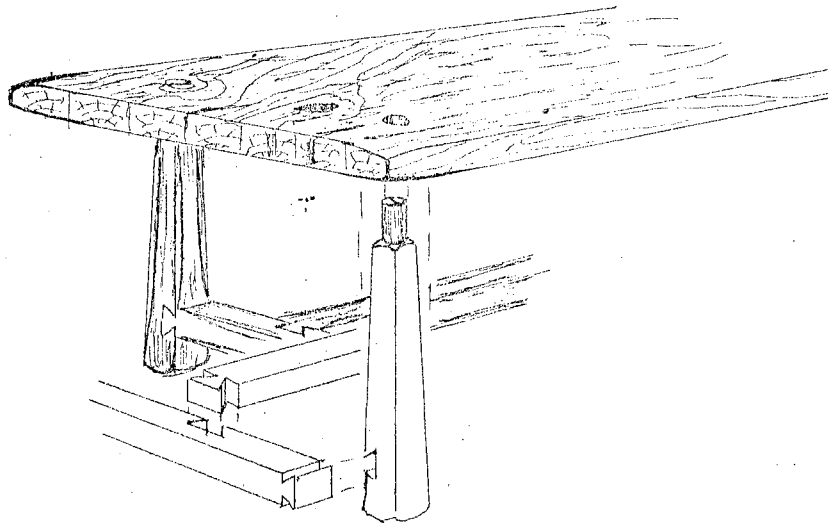


Figure 2. Interlocking Joint System

strengthen the wood's efficaciousness.

Willard Stone, in a personal interview, stated that one of the most difficult aspects of creating a wood sculpture is knowing when to stop ... even after fifteen years of experience he finds it difficult to determine when a piece is finished. The reason for this is because he is a man of extreme sensitivity, with much to say, working with a material with much to say, in a strictly aesthetic art form, which imposes few restrictive limitations. He must search for that instance when both artist and material have had their say.

It would be presumptuous to compare this table with a Willard Stone sculpture, but if a parallel can be drawn, it would be that in the case of the table the complete statement was made by the material. The builder had nothing to say, his function was to discover and display the materials message, much as one hangs a picture on the wall or arranges flowers in a vase.

This problem then seems to indicate that the furniture designer is a craftsman, an individual capable of discovering and presenting beauty for the enjoyment of others, an individual who is looking to present an aesthetic experience rather than impose it.

How does one evaluate this project? How may one determine the quality of design? The designer is satisfied, he feels that the presentation is complete. The recipients are delighted, husband and wife express extreme satisfaction

with the results. How does a panel of experts evaluate the table? Would they keep it if someone gave it to them? Where would it be used if it were a gift? Where would it be used if purchased? What financial value do they attach to it?

Perhaps the most important question is how does emotional involvement effect general acceptance of design? Does the value of custom furniture result from the close personal relationship attainable or is this type of involvement also instrumental in producing designs for general consumption?

An interesting aspect of expert evaluation is the diversity of comments provoked. Happily, this table provokes some emotion. Few people politely comment, "it's nice." Comments were more on the order of the one by the interior design student, quoted at the beginning of the paper. The table is a very personal thing, interpreted by many as an expression of friendship between builder and owner. It is felt that some "truth in design" was accomplished by the fact that when a request for photos was sent to the owner, the request resulted in the receipt of 36 detailed slides which explored at least as many facets of the table as have been explored by the designer.

At the opposite end of the reaction spectrum were comments which inquired about the knots and other of nature's defects. "Are you going to leave the knots in the wood?" "Are you going to repair the cracks?"

Reactions of the type cited above, came after the table was presented as a finished piece of furniture and led to the conclusion that: Truth in design does not, will not, and should not result in universal acceptance. Reactions will vary according to individual differences. The best the designer can do is be truthful with himself.

Problem 2

Design and build a chair which reflects the unique talents of the designer.

A chair was chosen for this problem because chairs seem to stimulate a curious fascination in those designers concerned with man's habitat. Mies van der Rohe, Alvar Aalto, Eero Saarinen, Marcel Breuer, all architects of international renown, are equally famous for their chair designs. They do not represent exceptions either, for it would be difficult to name an architect who has not, at one time or another, devoted his talents to the creation of a chair.

A quote by George Nelson helps to explain the charm of a chair.

At least one of the exterior walls is made of plate glass and disappears. Many portable lamps are being replaced by architectural ... i.e., invisible lighting. Storage cabinets have been swallowed by the remaining walls. Sofas tend to become built-in seating. In this disappearing landscape the chair remains as one of the unassimilable objects and as a consequence it becomes very conspicuous.²

The chair represents a piece of environmental

sculpture. Because it is conspicuous, it must provide a pleasant visual experience, but unlike the museum piece with the do not touch sign, the chair must be touched. It must be explored with the entire body, for its function is anatomical support. This makes the chair a unique form of sculpture, for it must provide what it professes to offer. The chair must not only invite, it must also fulfill the invitation.

A chair, quite paradoxically, provides great opportunity for sculptural expression, with a minimum of freedom, for the orthopedic dimensions of man are quite constraining. The chair's fascination results not from freedom, but from the uniqueness of the problem. A problem which offers an infinite number of solutions, as is demonstrated by the number of famous chairs found in history. The Windsor chair, the Chippendale chair, the Thonet chair, the Barcelona chair, the Eames chair, though all unique solutions, as different as their creators, share equal recognition as pinnacles of chair design.

A furniture designer who has not designed a chair compares to an architect who has not designed a building.

The design of a chair must necessarily begin with this thought: "A chair is not a chair until someone sits in it."³ What dimensional standards may be used as a base? (See Figure 3.) Investigation of individual measurements indicate that there is great variation in human dimensions. If the chair is to be tailored for an individual, the

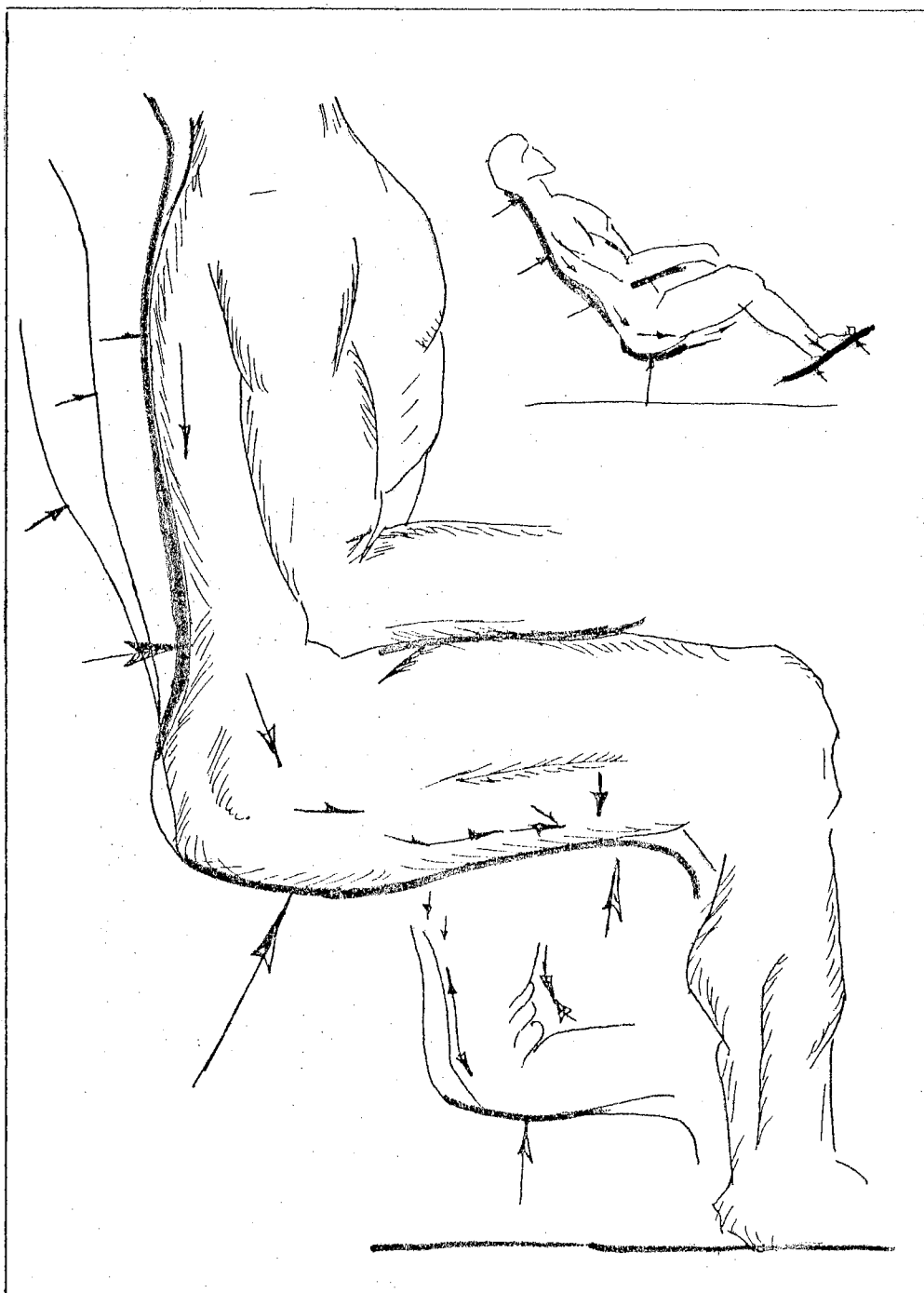


Figure 3. Dimensional Requirements for Seating

problem is comparatively simple, but if the piece is created for mass consumption, then there is need for much research and compromise.

There have been many attempts to provide dimensional guide lines for seating needs, but the most comprehensive one found by the author is a study by Clara A. Ridder called Basic Design Measurements for Seating. In developing these measurements, Miss Ridder constructed a very flexible seating unit which could be used to measure the body at frequent intervals, in various sitting positions. The positions used were the result of research, by Miss Ridder, which indicated that man needs chairs for three basic kinds of activities.

These chair needs are: (1) Chair for dining, writing or games, (2) Chair for talking, viewing or listening, (3) Chair for relaxing or reading.⁴

The knowledge that man sits in different ways to perform different activities provided the first limiting factors in designing a chair. What kind of a chair is it to be?

A chair for relaxing and talking was selected because it was felt that when one is eating or working the functional aspects of the chair overshadow the aesthetic needs of the sitter. It should be noted at this point that a chair for talking and relaxing combines two of Miss Ridder's categories. This was done to accommodate television which must certainly be classified with the most adept relaxers.

The dimensions that resulted from Miss Ridder's

research, provide a functional base for fulfilling the primary requirement of a chair; to provide a support unit, an envelope capable of containing the human body at salient points. Design at this stage is not concerned so much with shape, which is relatively fixed by the functional base, as with the execution of the shape; those material considerations and structural requirements which are much more closely associated with the discipline of engineering than with the process of free expression implied by the statement of the original problem. Figure 4 illustrates the part structure plays in shape evolution.

A chair for relaxing requires a pliable seat. A hard surface must be individually tailored if it is not to be uncomfortable. This is obviously impossible when designing for mass consumption. The alternative then is a seat which is flexible enough to make allowance for individual physical variations.

The determination of basic support locations led to the next step which is implementation. Canvas slings, nylon cord, cane, moulded fiberglass, and foam rubber are a few of the many methods which have been successful in bolstering man's posterior. The selection of one method over another is quite arbitrary. It may be determined by available skill, available material, cost, available time, and/or personal prejudice.

First choice was leather on a foam base tufted to provide a soft, inviting look. Unfortunately, cost became

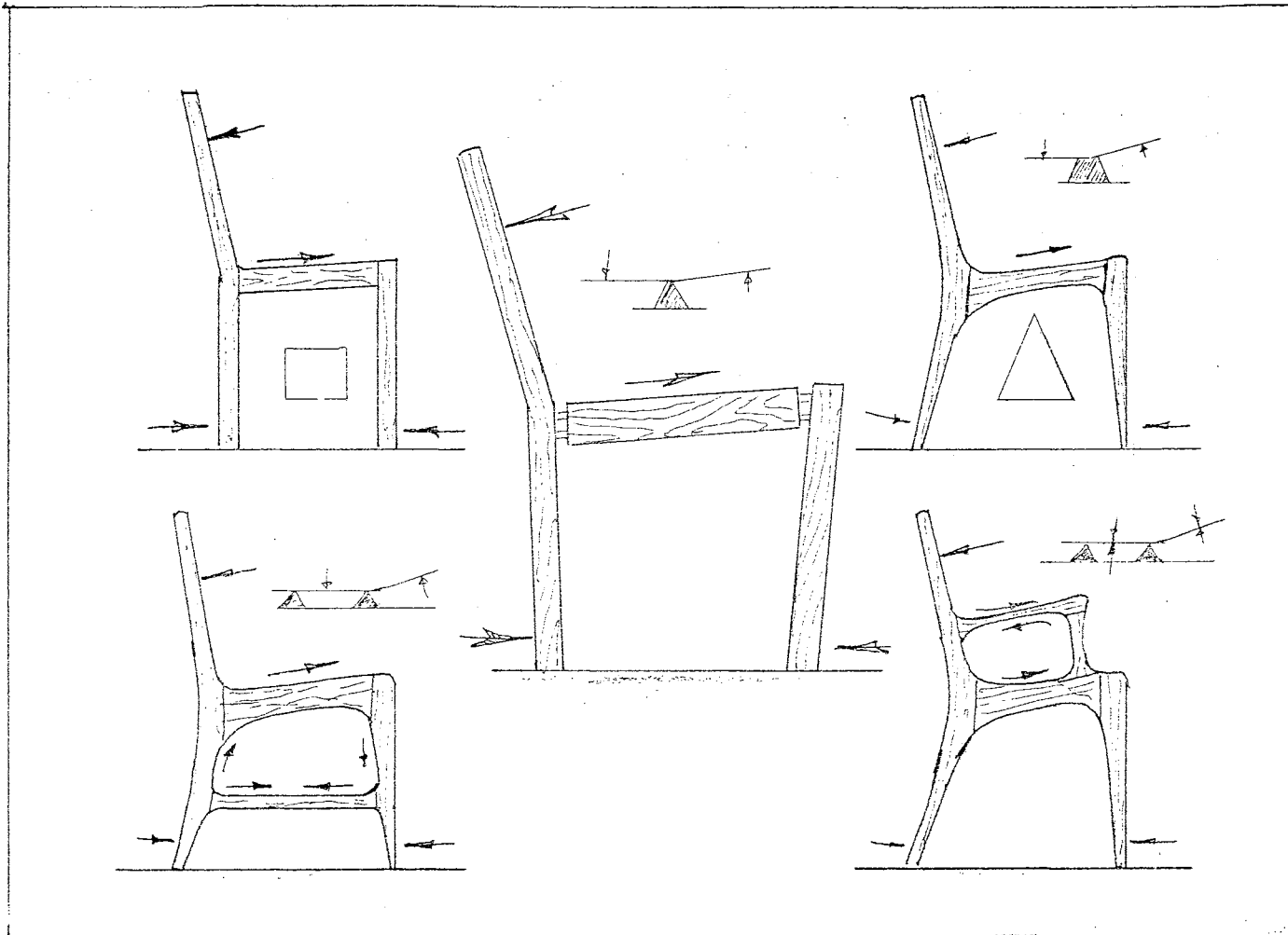


Figure 4. Effects of Structure on Design

a factor at this point and vinyl was substituted for leather. This economy provided cause for regret. Manufacturers have been quite successful in creating visionary similarity between vinyl and leather, but their success has not been nearly so great in those areas which effect the other senses. Vinyl simply does not react tactually the way that leather does.

These reactions are the result of hindsight, for in the planning process, primary consideration was given to the sculptural aspects of the chair. Black, tufted, leather-like vinyl, presented as a soft, unassuming, curved seat, was to provide a visual seating environment not likely to offend anyone. In short, a safe, visual cliché was used to insure initial acceptance of the chair's functional proficiency. Designer skill was to be displayed by the deft manipulation of wood rather than with the unfamiliar upholstery materials.

Skill, personal prejudice, and a firm belief in man's need for wood as a psychological stimulant, made material selection automatic.

Shape development was almost as automatic, for the organic origin of wood naturally stimulates a desire to recreate the effortless change of direction so majestically apparent in trees and flowers. Limbs do not protrude from tree trunks, nor leaves from flower stems, they flow out; always with sufficient material at the joint to provide a smooth change of direction and reassuring strength (Figure 5).

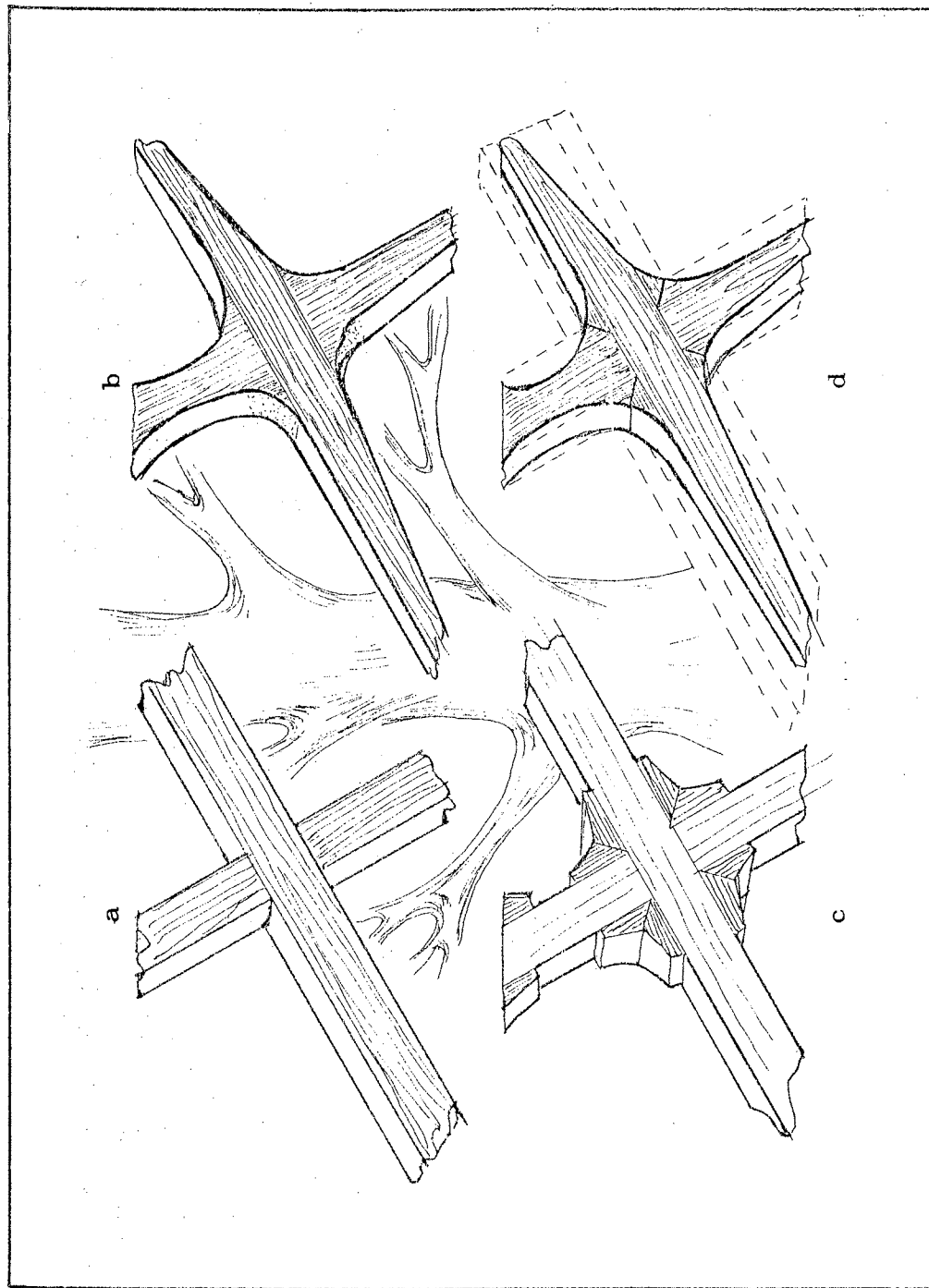


Figure 5. Evolution of a Leg

Attempts to recreate the effortless transition from leg to rail or arm to leg were somewhat frustrated by grain character and direction, for wood fibers are by nature straight; comparable to a handful of straws. When a tree limb grows out of the trunk, nature creates its own transition piece in the form of a knot. Man must look to mechanical solutions in solving this problem.

Three methods of achieving direction change with wood are: (1) A joint system, such as the mortise and tenon, dowel or lap joint, which allows long grain fibers to be glued in contact with long grain fibers. (2) Laminating - The wood is cut into strips thin enough to bend. These strips are then formed around or into a jig and glued together to preserve the desired shape. (3) Steambending - Steam is used to make the wood fibers more pliable, thus allowing the stock to be bent around or into a forming jig (Figure 6).

Steambending of stock as thick as is used in this chair requires equipment much more sophisticated than was available. It also would require a different joint treatment causing alteration of the desired shapes (Figure 6-c). The technique does introduce many alternative shape possibilities though, and certainly represents an excellent area for future research.

Laminating was not selected as a solution for reasons similar to those cited for steambending. In addition, laminating results in a man-made product which, by the

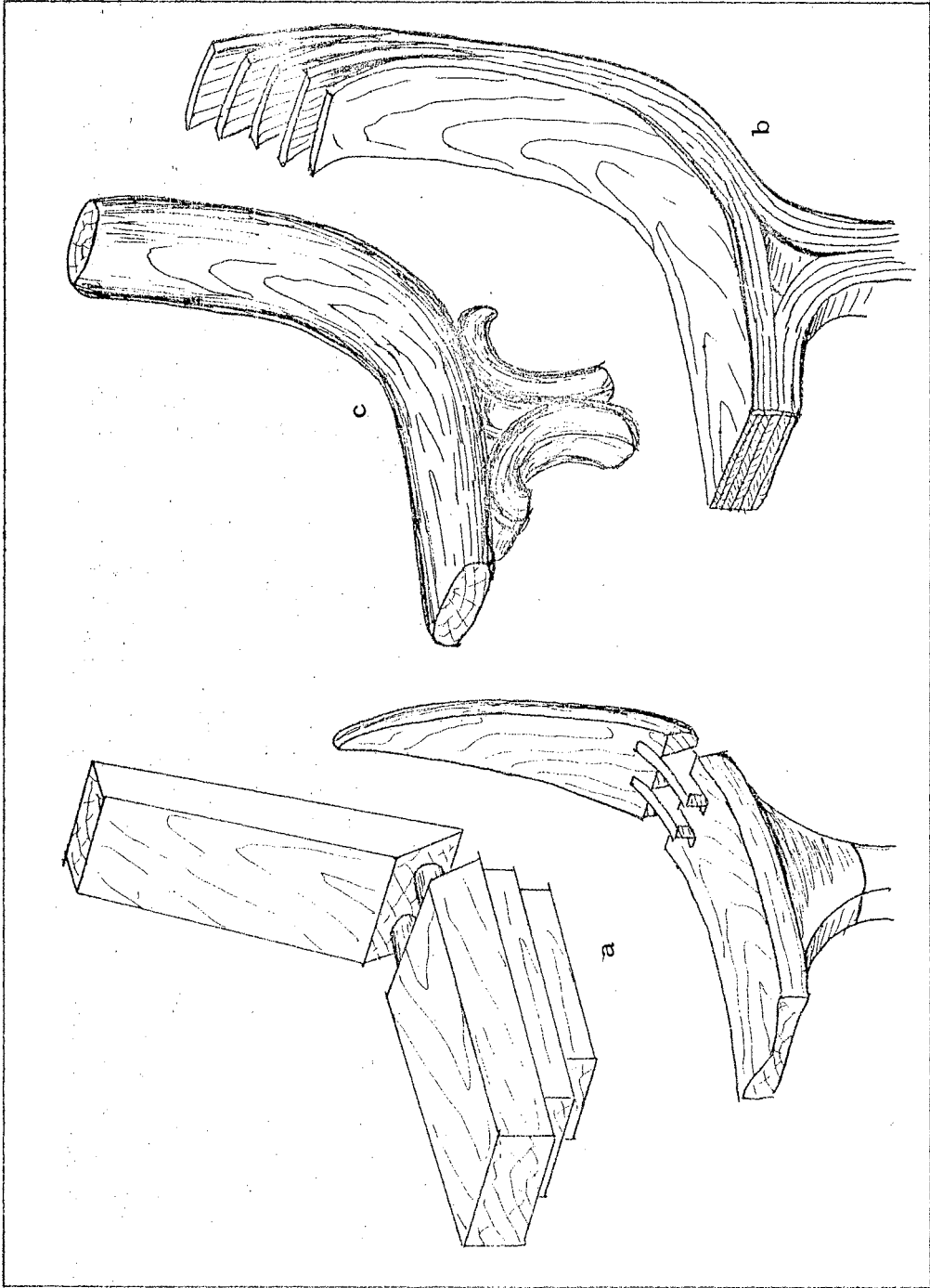


Figure 6. Effects of Construction Systems on Design

nature of its structure, is an obvious wood mutation. Readily visible glue lines, while not always unpleasant, seem in strong conflict with grain patterns on sculptured forms. Here again, construction techniques open up another source for design inspiration. Future research is definitely indicated (Figure 6-b).

The use of joints and glue to change grain direction also requires a degree of finesse, for if an acute angle is to be effected in this manner, it must be softened and strengthened within a radius (Figure 5-a).

Since grain fibers run in a straight line, the use of a radius will result in very short grain at one end (Figure 5-b). This condition is highly undesirable for these short fibers are fragile and tend to chip out. This tendency to chip may be overcome by mitering the radius as shown in Figure 5-c, but care must be taken, if stock is added to form the radius, that grain and color match. If the radius is to be formed from one piece then matching is no problem, but cost is, for this method results in considerable waste (Figure 5-d).

Another construction decision played an important role in aesthetic acceptance. The back rail of the chair may not be needed as a structural member, but it is definitely necessary aesthetically. Without this rail, the arms become separate units, devoid of visual ties, creating a seat that seems to float as a third unsupported member. The elimination of the back rail would destroy visual continuity, but

it would also result in a chair which could be easily disassembled for moving or shipping. This knock-down quality would be a tremendous advantage in producing for a mass market as it would reduce cost considerably. Back rail deletion would also reduce construction costs since its design requires almost complete hand-crafting (Figure 7).

Lower shipping costs, easier and faster assembly and diminished construction costs represent strong arguments against the inclusion of a back rail and if cost was the sole criteria for judgment there would be no back rail. But, the problem was not to design a low cost chair. In fact, cost was not even mentioned in the original problem, so the rail was included. If the chair is to represent the unique talents of the designer, as originally stated, then visual integrity is at least as important as function.

In evaluating this chair one conclusion stood out above all others. When design problems originate with the desire to display designer talent, they frequently disregard the needs of the user. When consumer needs are also considered, but with less intensity, they provoke a type of compromise; a compromise that fails to satisfy either designer or consumer.

Function may truly be a base below which one dares not go, but function must be established at the onset of the problem.⁶ In the case of this chair, the designer was obligated to decide what talent was to be displayed; talent as a wood sculptor or talent as a chair designer,

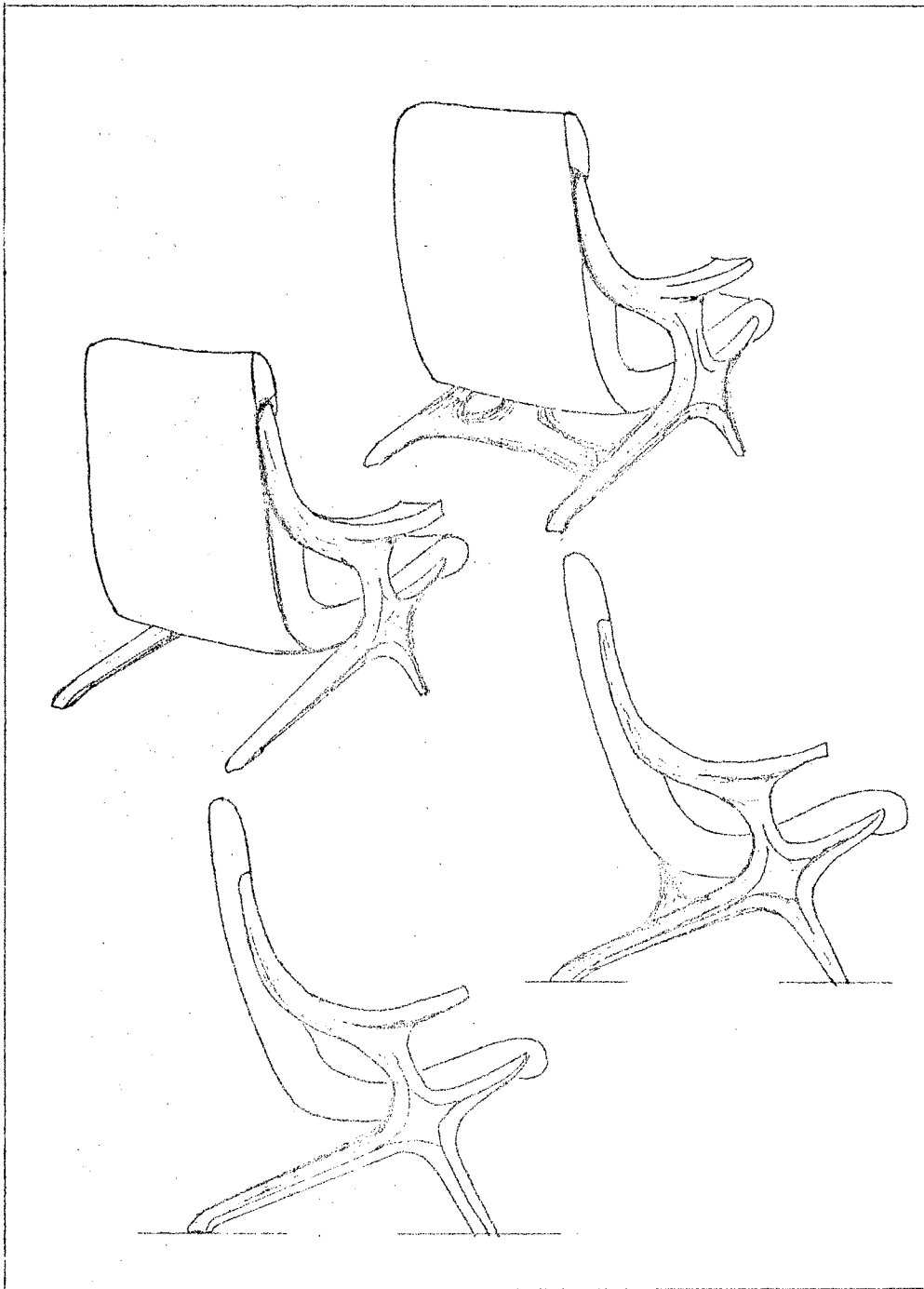


Figure 7. Effects of Aesthetic Considerations
on Design

Is this truth in design? Further research is indicated. Research which must include the problem of designing a chair which is low in cost and can be knocked down for shipping. A chair which originates with the desire to fulfill a function.

Problem 3

Design a chair which is low in cost, can be knocked down for shipping or moving, and does not impose an aesthetic. Impossible restrictions? Yes, because they are incomplete.

Criteria for fulfilling a need rather than imposing an aesthetic must include items such as construction cost, material cost, shipping cost, and ease of site assembly. With this additional information, perhaps a computer could solve the problem effectively, but it is doubtful. If a chair is to be completely devoid of aesthetic personality, it must be invisible. The only form of seating which fulfills this requirement is a stream or column of air and even this must provoke a reaction to the apparent defiance of gravity.

Accepting the fact that it is impossible to achieve design with only functional considerations somewhat tempers the original problem statement, but effort was still made to have the aesthetics of the chair result as completely as possible from functional mandates. To achieve this, the design problem was treated in a manner

paralleling the approach used by early settlers in fulfilling immediate furniture needs. Material selection, tool usage, in fact any current technological advantage available was considered to keep the problem current, but the primary concern was to provide a comfortable place to sit, at minimum cost, in minimum time, which could be knocked down for easy transportation and storage (Figure 8).

A rocking chair was selected for this problem because it provides flexibility without compromise. Basic seating dimensions must be adhered to, but the fact that the chair rocks provides individual opportunity for seat adjustment. Furthermore, a rocking chair permits aesthetic liberties because it says emphatically that its function is seating comfort.

It was hoped that an added advantage of knock-down construction might be to provide a seat mobility which would permit validation of Clara Ridder's dimensional standards. This kind of flexibility is impossible in a rocking chair, however, due to the importance of balance. In fact, adjustment of seat position can produce a situation comparable to the placement of unequal weights on a see-saw. If the chair is properly balanced, individuals make their own comfort adjustments automatically. This, undoubtedly, is a prime reason for the rocking chair's popularity (Figure 9).

Plywood was selected as the base material because it comes in sheet form. This condition permits both rockers

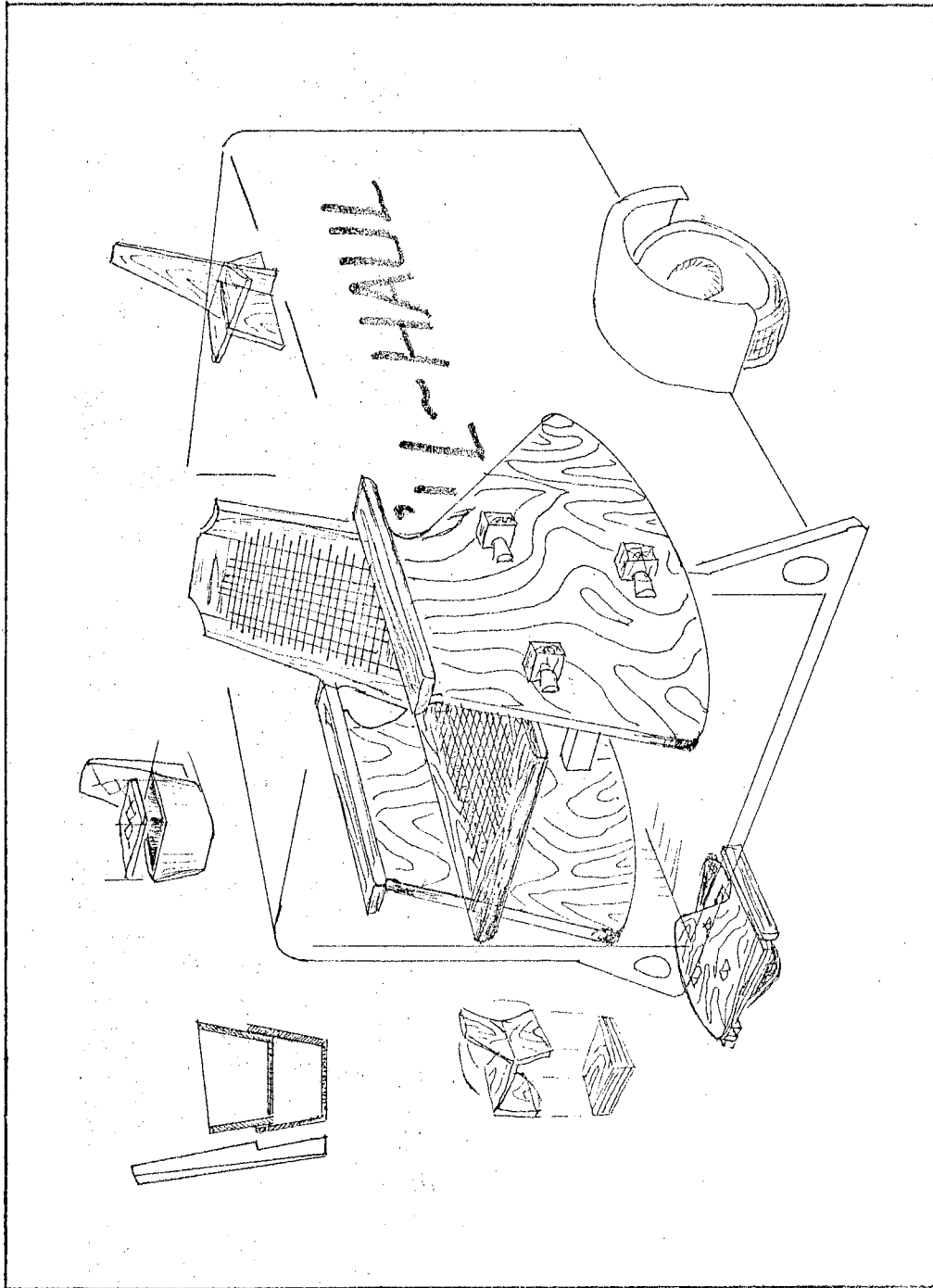


Figure 8. Furniture for a Mobile Society

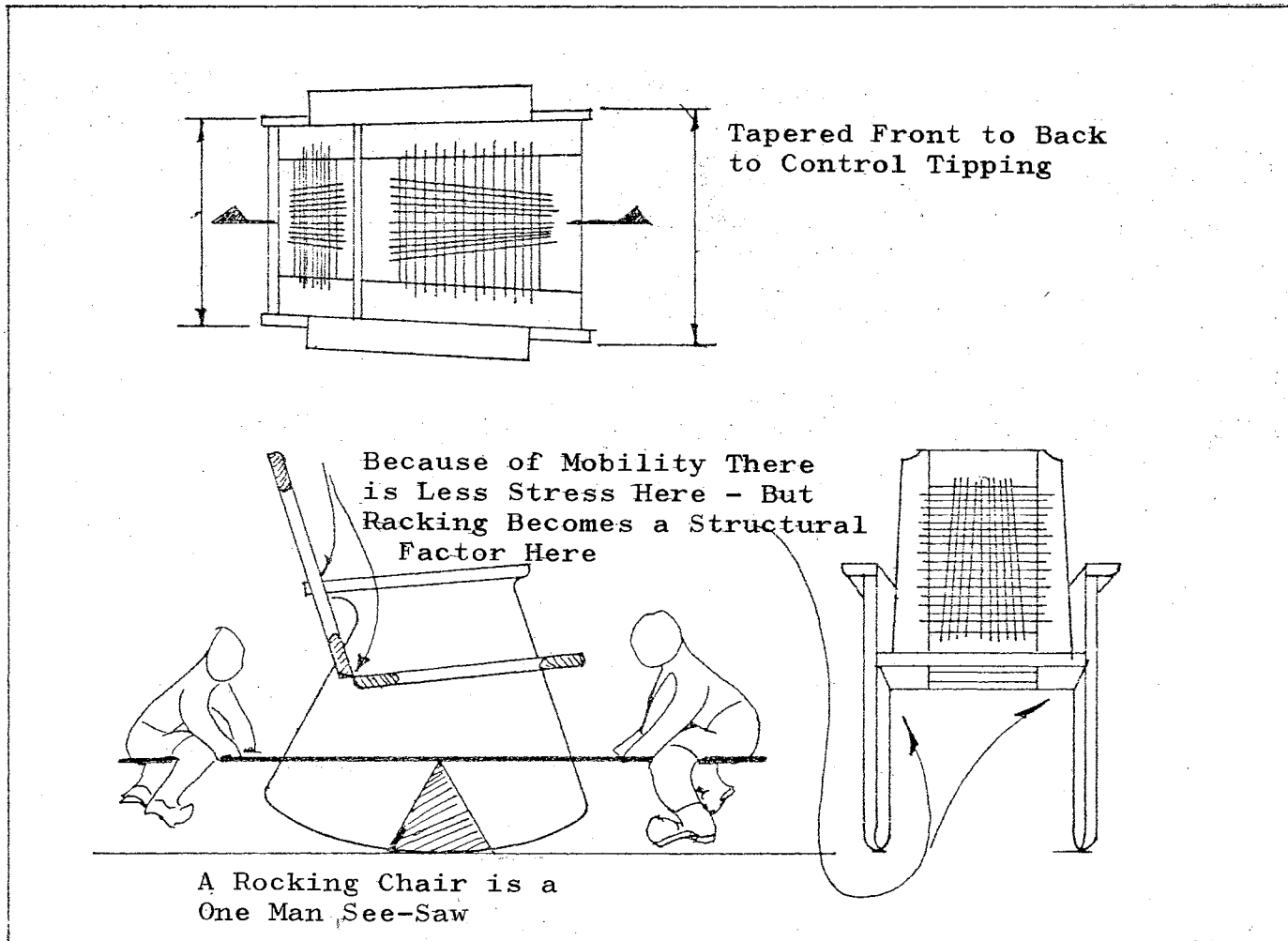


Figure 9. Structural Factors Unique to Rocking Chairs

to be sawed from a single piece of stock, without gluing, and without grain consideration as a structural factor. It should be noted, however, that the grain, on both sides, was placed in a vertical direction. This is strictly an aesthetic consideration, resulting from solid stock characteristics. Plywood, because of cross grain laminations, could have been used with the grain running in either direction (Figure 10).

Fir was chosen because of cost. Fir plywood is about two-thirds the cost of the next most expensive plywood. After completing the chair, it was observed that the use of a more expensive material could have resulted in an over-all saving because of working characteristics, in addition it may have had a more desirable appearance.

The tendency of fir plywood to chip or peel on the edges provoked the choice of fir solid stock for the seat (Figure 11-b). Here again the use of a more expensive piece of wood would have eliminated this structural deficiency with the resultant saving in labor offsetting added material cost. This decision was also influenced by the fact that the use of plywood for seat and back would result in short grain on the width dimension of both seat and back unless they were made solid (Figure 11-a and c).

The choice of a seat structure, from the three shown in Figure 11, was basically an aesthetic decision made by the designer. Visual comfort and grain direction were the determining factors and these two elements do not represent

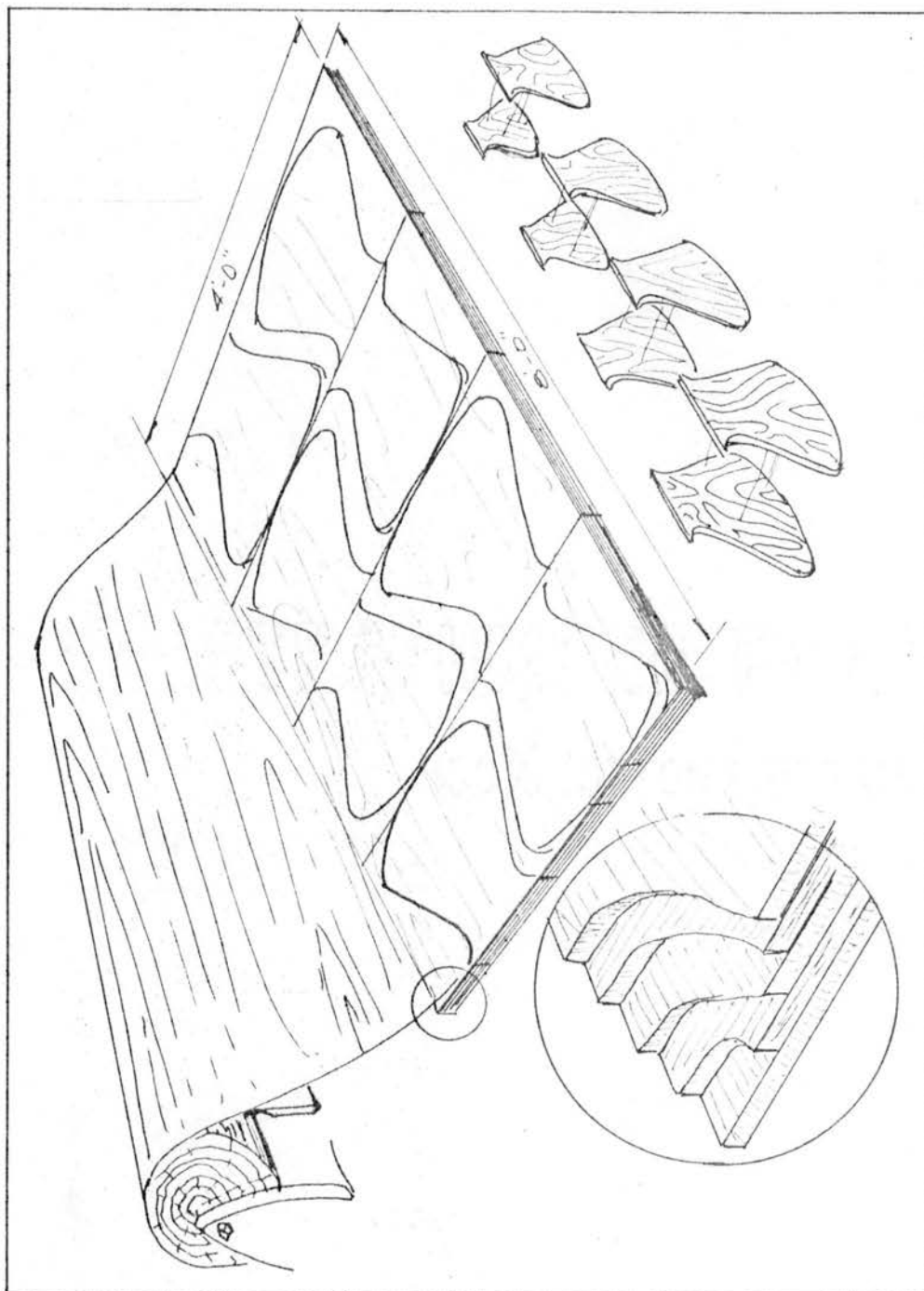


Figure 10. Advantages of Plywood

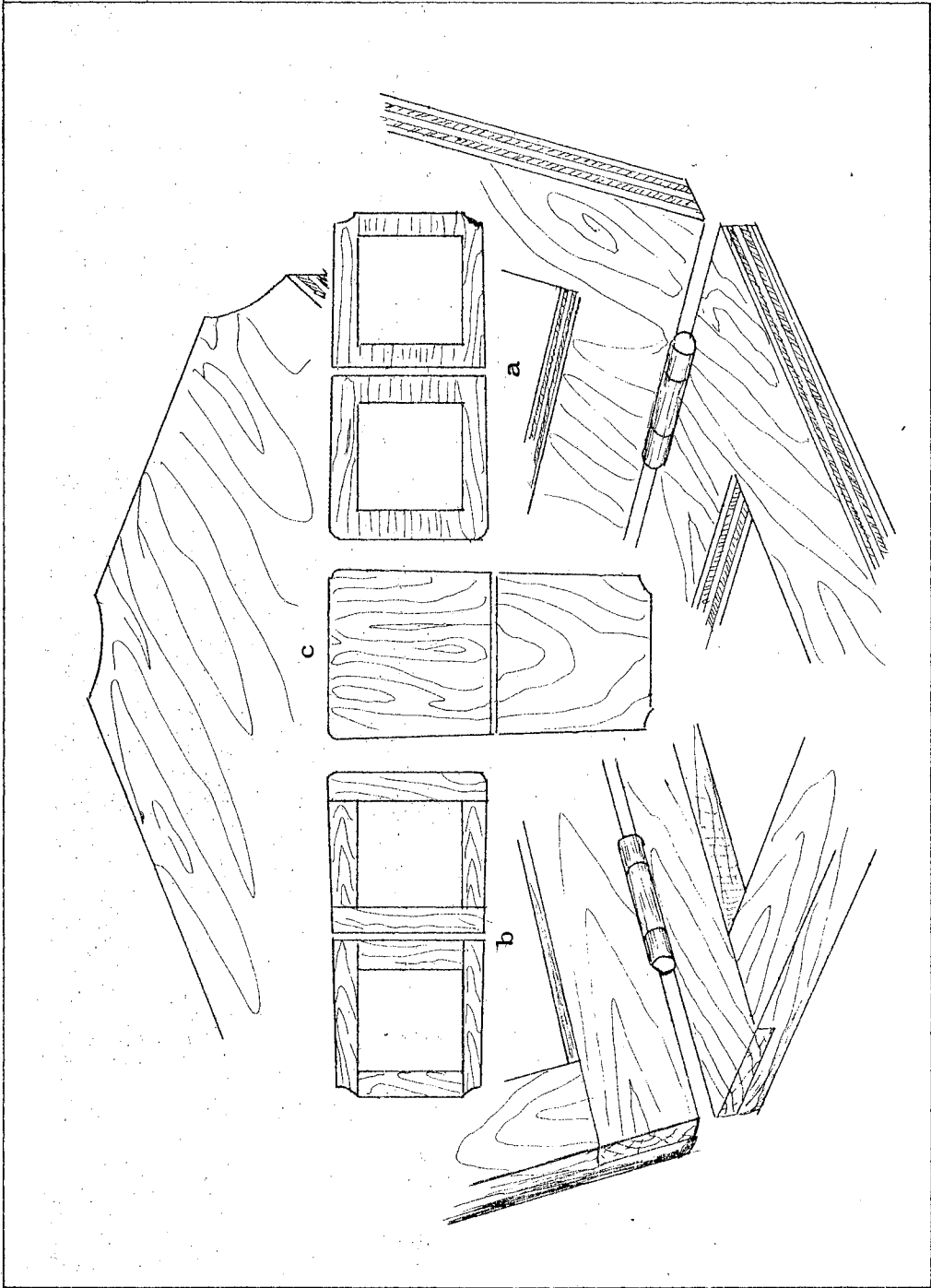


Figure 11. Development of Seat and Back

functional considerations. A solid, flat, seat (Figure 11-c) does not suggest comfort, and short grain patterns (Figure 11-a) on a structural member do not suggest strength. It must, therefore, be concluded that it is impossible to divorce personal values from design decisions if there is to be complete involvement by the designer.

The frequent aesthetic decisions provoked a converse effort to make the chair "ugly". This effect was sought, not by diminishing requirements of craftsmanship, but by keeping everything as austere as possible. Priority was given to speed, strength, and ease of accomplishment. Loose pin, brass hinges were used to fasten back and seat together, because they allowed the two units to fold and disassemble. Barrel bolts were used to support the back in an upright position, again because of cost and convenience. Nylon utility cord was used for upholstery; nylon for strength and its tendency not to stretch, cord because it provides an inexpensive way to present a resilient seating area (Figure 12).

This chair is a joy; it is like working a puzzle with the solution a comfortable seat and nothing more. Perhaps it is this simple austerity which gives the chair a unique attractiveness.

Evaluation by others produced widely divergent reaction. Some people laughed and said, "It's great! A happy piece with no illusions or pretensions." Others shuddered in horror and exclaimed, "What are you going to

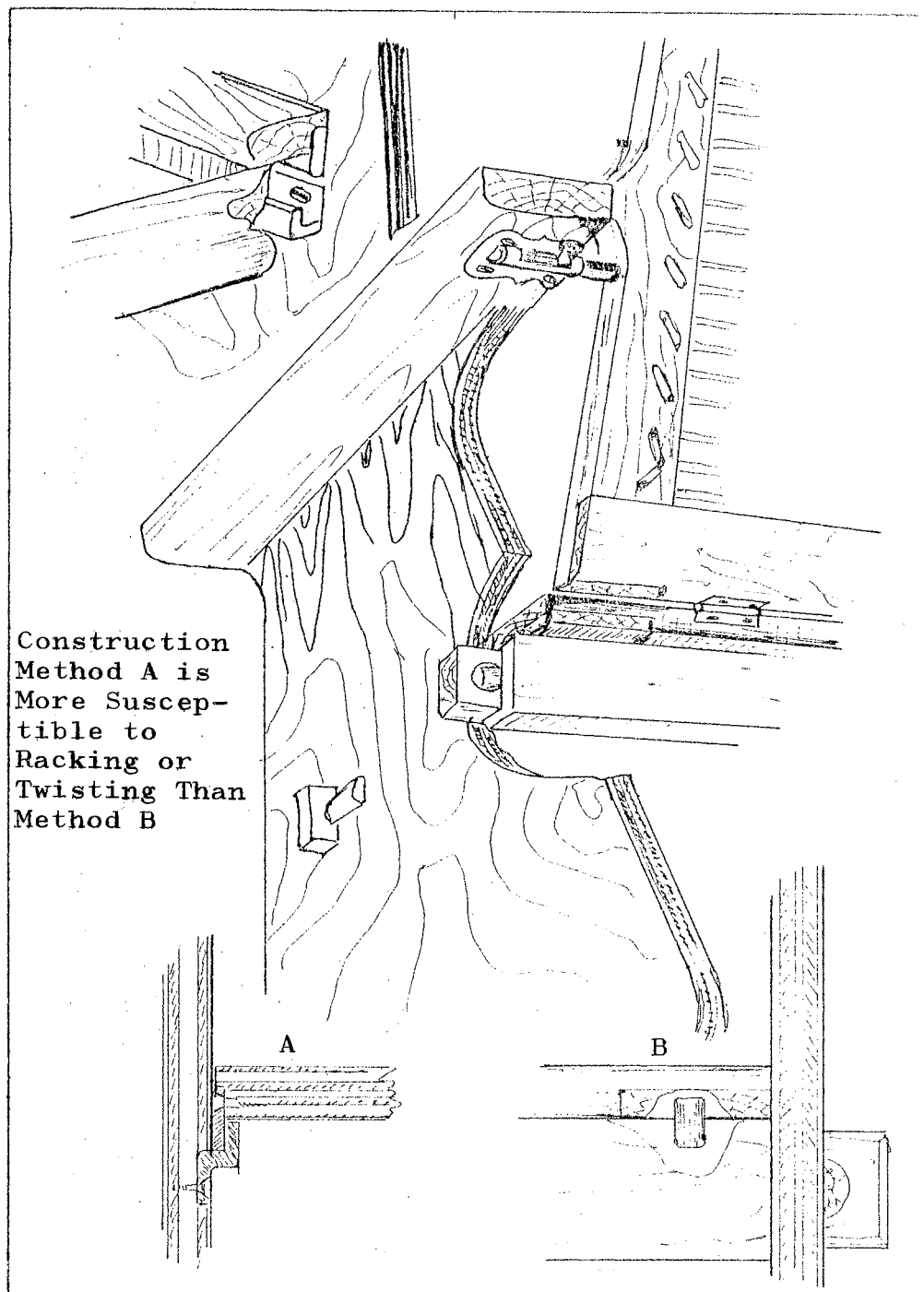


Figure 12. Mechanical Considerations for Rocking Chair

do with that thing?"

In problem 3, designer talent sought expression through the fulfillment of a strictly functional need. However, the solution of the problem, without aesthetic considerations, was vitually impossible. In fact, outside evaluation indicated that in attempting not to impose an aesthetic the tendency was to do just that.

FOOTNOTES

¹ John L. Feirer, Advanced Woodwork and Furniture Making (Peoria, 1954), Figure 12-3, p. 71.

² George Nelson, Chairs (New York, 1953), p. 7.

³ "Hans Wegner's One Man Show at Georg Jensen," Interiors (February, 1959), p. 84.

⁴ Clara Ridder, Basic Design Measurements for Sitting. Arkansas Experiment Station Bulletin No. 616.

⁵ George Nelson, Problems of Design (New York, 1957), p. 6.

⁶ Ibid., p. 9.

CHAPTER III

SUMMARY

This study was undertaken to explore some of the avenues of personal development available to the student through the use of design problems.

Three diverse problems were selected for solution in an effort to determine what type educational experience would best provide the involvement library research indicated as necessary for formulating a constructive design philosophy.

The solution of these problems required a total involvement which included: paper development, construction, and final evaluation.

Construction was accomplished in facilities comparable to those found in a high school Industrial Arts wood shop.

Evaluations were made by: the designer, the designer's family, a consumer, interior design students, and members of the Interior Design Department at Oklahoma State University.

Conclusions and Recommendations

Careful analysis of problems 1, 2, and 3 result in the conclusion that aesthetics are a very vital part of

function. The critical determination is the establishment of a functional base. In problem 1, the function of the table was the presentation of an aesthetic experience. In problem 3, the function of the chair was mobility and anatomical support. Problem 2 never really established its basic purpose and consequently resulted in a compromised double solution (Figure 13).

Another result of this study is the emergence of a personal philosophy which closely relates the design process with ecology. "Give nature an environment or situation and she will evolve a creature, adapting a toe here, an eye there, until the being fits the niche."¹ It must be the same with the furniture designer. Each situation requires a total involvement that constantly provokes new areas for study and resolution. Man must constantly adapt to his ever changing environment and so the designer must continually adapt to specific problem restrictions.

To teach design requires that the student be exposed to diversified experiences which will aid in developing a personal understanding of both himself and the society for which he creates. Utilitarian design represents a social comment and successful achievement is contingent upon what George Nelson describes as "truth" or "total involvement." Complete design problems demand exposure to people needs and material techniques.² This provides intellectual direction of a type not available from problems which fail to progress beyond paper conjecture.

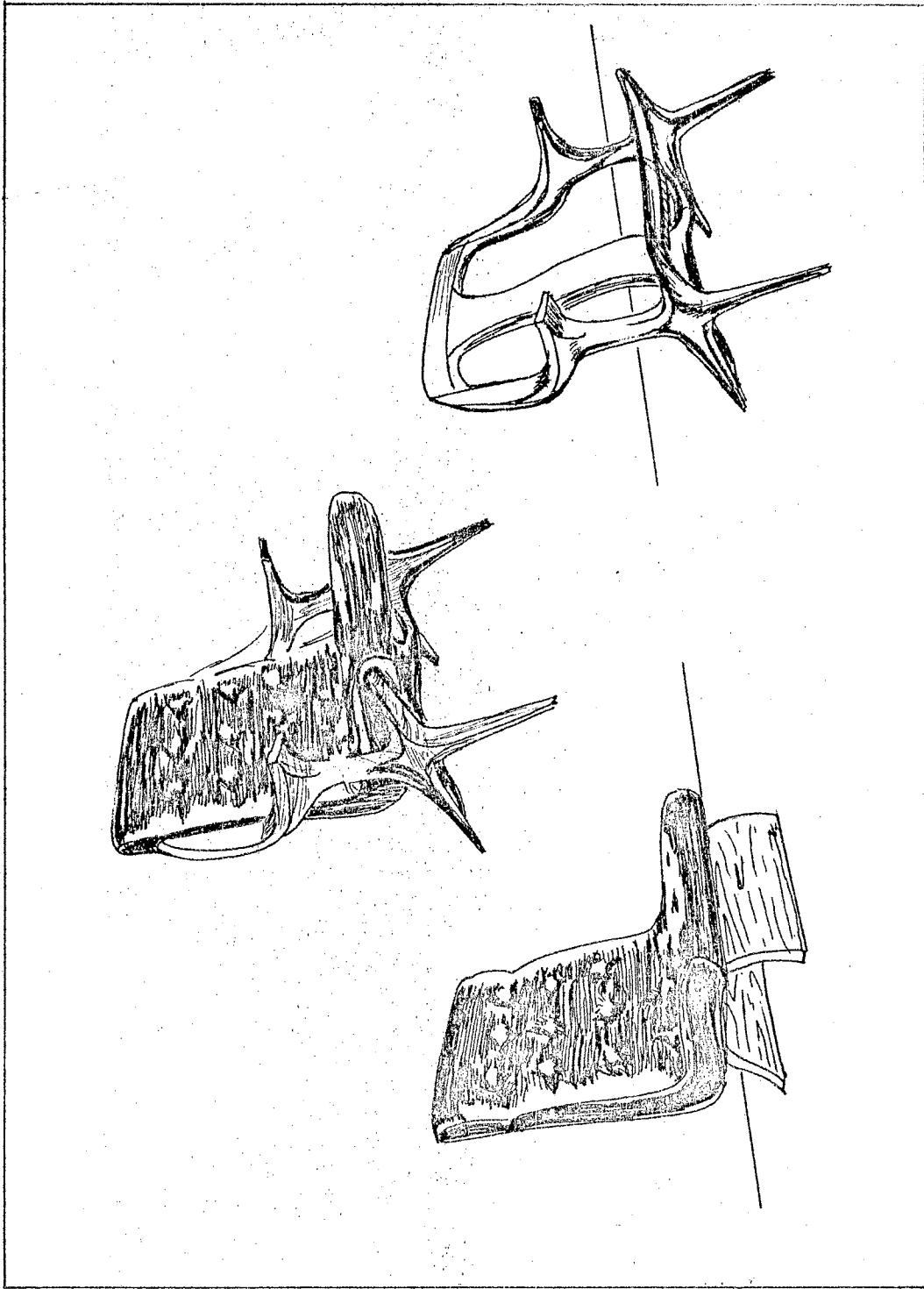


Figure 13. Double Solution to Problem 2

People and material impose restrictions and controls which are best learned by working with them. This statement is substantiated many times by the experiments described in this thesis. Problem 1 effectively illustrates the profound influence people and materials exert in motivating design. Problem 2 vividly illustrates the consequences of assuming that vinyl, because it looks like leather, will react like leather. Problem 3 points out that it is a simple matter to state that a furniture designer's task is not to impose an aesthetic. It is far more difficult, in fact perhaps impossible, to actually design without imposing aesthetics.

Designers are not taught, they evolve as a result of their experiences. It is the function of the instructor to provide situations which will help stimulate the evolution.

FOOTNOTES

¹Jean George, "That Astounding Creator - Nature," Our Amazing World of Nature Its Marvels and Mysteries (New York, 1969), p. 12.

²George Nelson, Problems of Design (New York, 1951), p. 6.

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APPENDIX

PROBLEM SOLUTIONS



Figure 14. Problem Solution 1

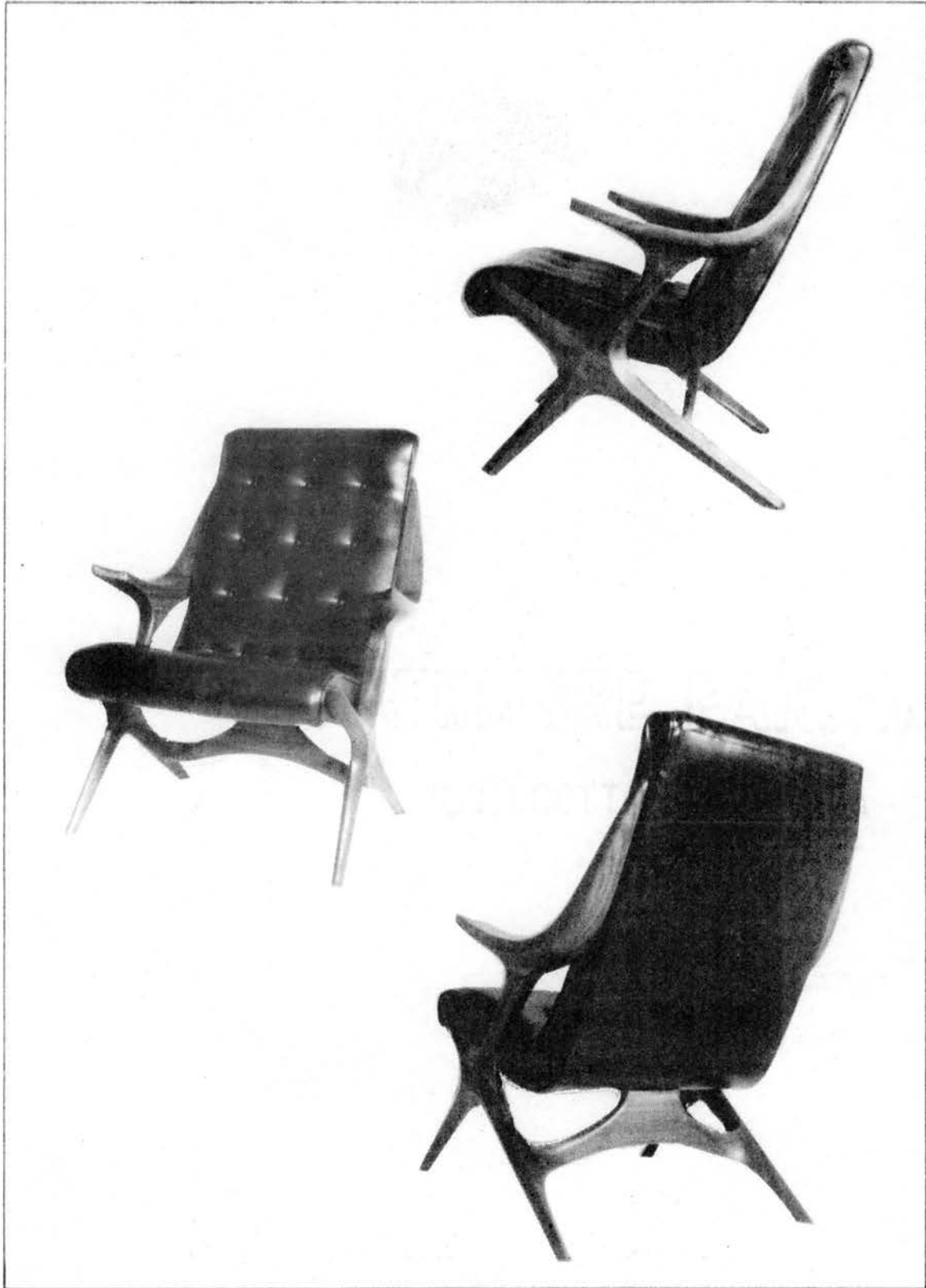


Figure 15. Problem Solution 2

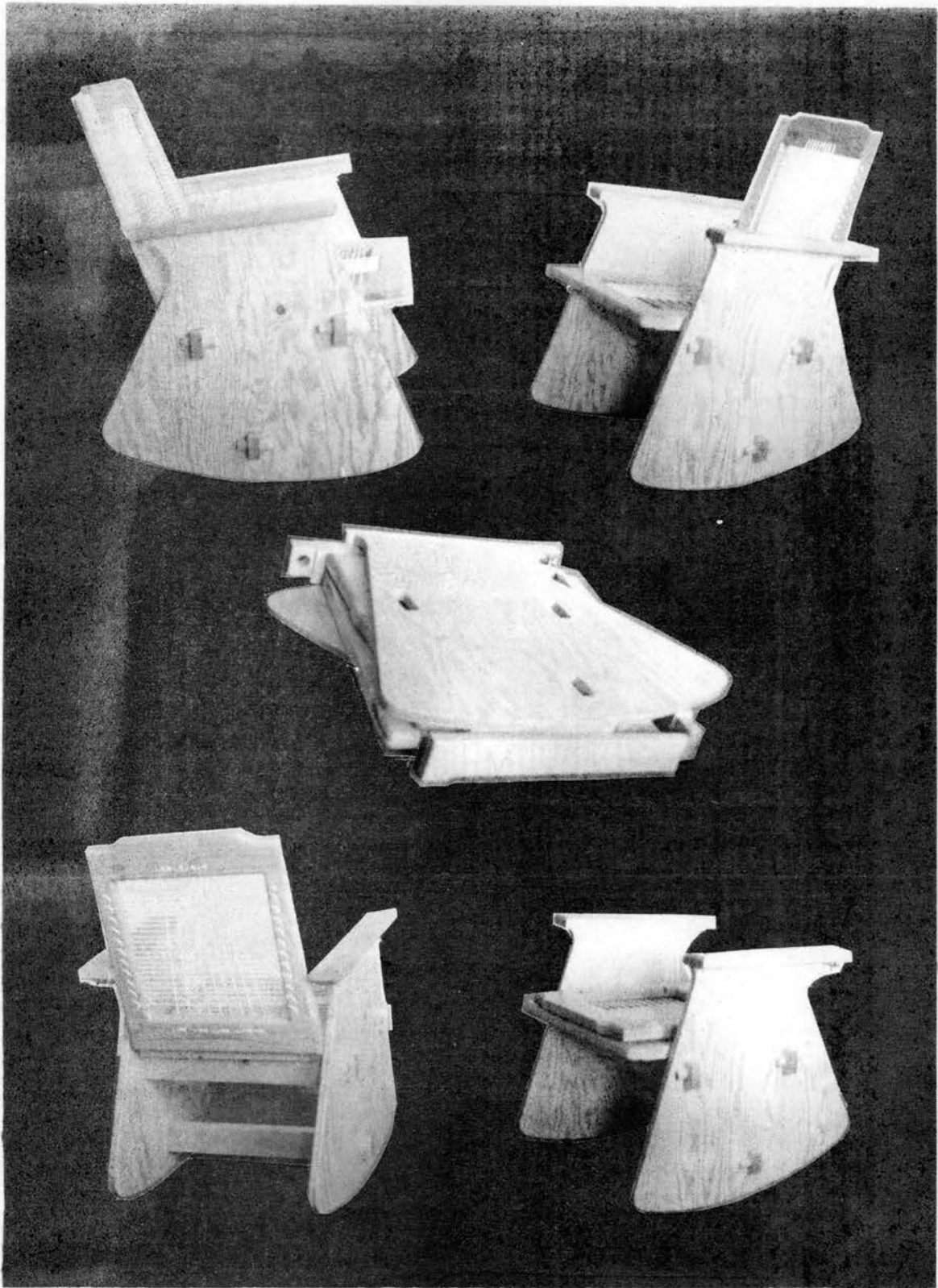


Figure 16. Problem Solution 3

VITA /

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