# MOOSH351NG T1985



Department of Industrial Design

Contact Chair Design: Folding, Stacking and Flat-pack/Knock-down Chairs

By

Gerald Gillen

1998

National college of Art and Design Faculty of Design Department of Industrial Design

Contact Chair Design: Folding, Stacking and Flat-pack/Knock-down Chairs

By Gerald Gillen.

Submitted to Faculty of Art & Design and Complementary Studies in Candidacy for the Degree of Bachelor of Design, 1998

## ACKNOWLEDGMENTS

I would like to thank my tutor, Dr. Paul Caffrey, for his support and guidance throughout my thesis.

Also, the library staff of both N.C.A.D. and Trinity College, Dublin, for their help with my research.

# CONTENTS

I

		Page Nos
•	Introduction	1-3
•	Chapter 1- An introduction to Chair Design Chapter 1:2-History of "Contact Chairs"	4-8 9-14
•	Chapter 2- Social Changes and Scandinavian Design	15-25
•	Chapter 3- The Influence of Materials in the Contact Market / Wood	26-36
•	Chapter 4- Metal	37-44
•	Chapter 5- Plastic	45-51
•	Conclusion-	52-54
•	Bibliography-	55-57

### PLATES

- Fig:1- An office chair within the 'Larkin Administration Building', designed by Frank Lloyd Wright, 1904.
- Fig:2- The "Barcelona" chair, designed by Ludwig Mies Van der Rohe, 1929.
- Fig 3- The "Memphis" chair, designed by Michele de Lucchi, 1983.
- Fig:4- An Italian Camp bed, 1877, designer unknown.
- Fig:5(i)- An example of the "X" frame.
- Fig:5(ii)- An example of the "Scissor" frame.
- Fig:6- The "Plia" chair, designed by Giancarlo Piretti, 1968.
- Fig:7- The "Ant" chair, designed by Anrne Jacobsen, 1952.
- Fig:8- The "Wenger" folding chair, designed by Hans J. Wenger, 1949.
- Fig:9- The "No.14" chair, designed by Michael Thonet, 1959.
- Fig:10- The "Less" stacking chair, designed by Marco Ferreri, 1992.
- Fig:11- The "Less" stacking chair, designed by Marco Ferreri, 1992.
- Fig:12- The "AX" chair, designed by Peter Hvidit, 1950.
- Fig:13- The "Neptune" chair, designed by Ernest Race, 1953.
- Fig:14- The "Butterfly" chair, designed by Sori Yanagi,1952.
- Fig:15- The "Wassily" chair, designed by Marcel Breuer, 1925.
- Fig:16- The "Equity" chair, designed by J.H. Pollard, 1990.
- Fig:17- The "Landi" chair, designed by Hans Coray, 1938.
- Fig:18- The "Plia" chair, designed by Giancarlo Piretti,1968.
- Fig: 19- The "Polyprop" chair, designed by Robin Day, 1967.
- Fig: 20- The "Miss Tripp" chair, designed by Phillipe Starck, 1992.
- Fig: 21- The "Miss Tripp" chair disassembled, designed by Phillipe Starck, 1992.
- Fig: 22- The "Blow" chair, designed by Aurelia Zanotta, 1969.

# INTRODUCTION.

"Transformations always have something magical about them, even with an object as functional as a piece of furniture. It is a dual appeal of practicality and surprise that has made contact furniture so popular." (Fiell, 1991, p.87).

The contact chair is any chair that can be folded, stacked, dismantled, converted or simply carried. Whether as an army kit or part of the paraphernalia of travellers, explorers and nomads, its purpose at all time and in every place has always been the same: to provide home comfort with a minimum of fuss.

Most designers in today's demanding world agree that the "contact chair" is more technical and challenging than that of the "terrestrial chair". This thesis is an examination of the "contact chair" during the twentieth century. Its aim is to address and identify the key area off its success. The study will look at the revolution of the machine age which brought with it pioneering research into new methods of steam bending by Michael Thonet which was to produce the first series of mass-produced chairs in 1857.

New manufacturing processes and materials such as wood-laminates, plywood, tubular steel, and plastics such as polyprop, where introduced in the1920s, 1930s and 1950s. These were to reshape the future of the "contact chair", opening new possibilities in function, form, and aesthetics. This meant the chair could develop alongside the changes in societies throughout the twentieth century, which was a determining factor in bringing contact furniture from obscurity to a leading fascination among designers. Both the introduction of new manufacturing processes into chair design and the influence of Scandinavian design, captured the imagination of a declining society after the war, and there emerged various new styles of furniture. Social changes within society during this period also contributed to this development, e.g. the "pop throwaway culture". Also in the late twentieth century, living spaces were becoming increasingly smaller to that of the early twentieth century homes and therefore the "contact chair" grew in popularity.

This period between 1950 and 1960 seen the introduction of Finmar-IKEA-and Habitat which were, and still are to some extent, major influences in contact furniture. Such stores usually operate in a fairly narrow band of customer profiles and in terms of industry penetration, they are not large. However, the notion of being in the right place at the right time is clearly part of their success. By selling 'flatpack' and a wide choice of services, they became a success story and are today some of the leading design outlet stores worldwide. IKEA, with undoubtedly the most success to date, continue to expand their empire around the world, setting up stores in the U.K, U.S.A, and across Europe.

The idea of flat-pack furniture has remained constant, since its first mass produce in the later half of the ninetieth century by Michael Thonet. The flat-pack phenomena has endlessly increased in the past decade, with a number of world famous designers introducing their ideas of flat pack design.

One of the major problems for the retailer or consumer in terms of the "ordinary" chairs is its transportation. The "contact chair", by using the minimum amount of space, is able to reduce the cost of transportation. Hence flat-pack furniture is aimed more at the consumer market opposed to folding and stacking furniture which is aimed at the domestic market. The period 1940-1960 was one of expansion for the furniture industry and for furniture retailing. It also seen the most exciting advances in the evolution of the modern chair.

Referencing from Penny Sparke, Furniture, Twentieth Century Design, / An Introduction into Design Culture; Philip Garner, Twentieth-Century Furniture; Simon Esterson, The Modern Chair; Jonathan - M Woodham, Towards the Twentieth Century; Mel Byars, 50 Chairs Innovation in Design and Materials; Charlotte Fiell, Modern Furniture classics; Michael Collins, Towards Post Modersims; Clive Edwards, Twentieth Century Furniture; Philippe Garner, Twentieth-Century Furniture; Richard Hollis, Modern Chairs 1918-1970; Karl Mang, History of Mordern Furniture; Johannes Splat, Folding chairs.

# CHAPTER 1- AN INTRODUCTION TO CHAIR DESIGN. CHAPTER 1:2- HISTORY OF "CONTACT CHAIRS".

#### Chapter 1 : An Introduction to chair design.

Sitting is an activity fundamental to everyday life. If any item of furniture is essential it must be the chair,

"More than any other type of furniture the chair can be seen as a barometer of social change" (Charlotte Fiell, 1995, p.6.).

While its primary function remains constant, technical developments during the nineteenth and twentieth century respectively have enabled designers to create an infinite variety of solutions, opening new possibilities for change in the construction and design of new furniture. This was no more so evident during the wake of the industrial revolution in the later half of the nineteenth century when the chair became an industrial product, leaving behind the craftsmanship which had come accustom with chair design, to design for mass production.

This was mainly as a result of the pioneering research into steam-bending of wood laminates and later solid wood by Michael Thonet. With the material and structural continuity of early steam-bent laminated chairs, Thonet set an important precedent in the evolution of the Modern chair by introducing his first chair series of mass produce chairs in 1857. This seen the chair develop, to become the focus of attention among a multiple of designers, no more so than that of architects.

The chair became a remarkable outpouring of creative energy, converging essential characteristics of complete architectural languages: Technical or formal, symbolic or pragmatic. This has happened partly for reasons of expediency. But the very familiarity of the chair also gives a special resonance to successive transformations of its traditional elements.(Meadmore,1974,p.3.)

The chair had began to convey essential social changes in design architects. Charles Rennie Mackintosh, was an architect / designer for whom chair design became a highly important theme. He introduced chairs that exemplify every phase and subtle evolution in his work. Chair design for Mackintosh began to convey a minigerization of his buildings, an essential part of a total environment. Other such design with the same ethos can be illustrated with work such as Frank Lloyd Wright's, who's "Larkin's administration building" in 1904 claimed to be the first office designed with purpose-made metal furniture. Also Ludwig Mies Van Der Rohe, who's 'Barcelona Chair' (which takes its name from the international exhibition of 1929), was specifically designed for the interior of the German Pavilion.

Figure 1: An Executive office within the Larkin Administration Building designed by Frank Lloyd Wright in 1904 and claimed to be the first office designed with purpose-made metal furniture.



The chair became a self-conscious set piece for Avant-Guard designers and architects, each introducing their own new concept structure. The chair became an almost obsessive cult.

The motivation behind the Bauhaus output of chair design was largely based on the design for production, with few exceptions. The results are characterised above all by a self - conscious functionalism, a pairing down to essentials in keeping with the demands of industries' production. A strong emphasis was placed on new materials to be used such as chromium plated steel, the usual appeal which interacted directly with the marriage of design technology.

Within the Bauhaus chair design two names emerged as chair designers of importance; architect / designers Marcel Breuer and Ludwig Miles Van der Rohe. Their designs seemed to favour the stylish curved chairs, using the popular tubular steel newly introduced during the early 1920s.

The Bauhaus was creating a new error in chair design revolutionising chair design in the twentieth century, by using metal in a way never done before in the history of chair design.



Figure 2: Example of the new style introduced due mainly to new materials and manufacturing processes. The chair is the "Barcelona" chair, designed by Ludwig Mies Van der Rohe. The form is based on a folding-stool known as the "Sella curulis" which was designed for ' The German Pavillon International Exibtion', 1929.

Chair design has indured a lot of abuse over the years because of the aesthetical and fundamental approach which was due to the increase of materials available to the designer such as heat moulding, thermoplastic material, slender metal, aluminium, new synthetic material and plastic, the newest material since 1955 to be used in chair design. It became a more specialised field during the 1960s with famous chair/ furniture designers emerging such as Ettore Sotsass, Andera Branzi, Aldo Cibic, Michele de Lucchi, Marco Zanini, Achiller Castiglioi, Hans Coray, Firsoicramer, Eero Aaarnio, Don Aldson Gunnar, Harry Bertoia. Each of the above designers had carried chair design through the 60s / 70s to meet the next era

in chair design which was to be "Memphis".

"Memphis" was the name of a collection of furniture, fabric and ceramics designers who gathered around Ettore Sottsass during the 1981 Milan furniture fair. Key indicators of the movement are the use of bright or "feminine" colours and geometric volumes perched upon the tubes, so favoured by Modernist designers such as Miles Van der Rohe.

Sottsass once said,

".....Memphis is not new, Memphis is every where".

(Charlotte and Peter Fiell, 1995, p.32.)

F i g u r e 3 : E x a m p l e o f Memphis Chair design. Designer, Michele de Lucchi, a key example of t h e M e m p h i s movement; bright 'femine'colours

and geometric shapes.



Chapter 1:2 : History of "contact chairs."

Chair design is humbled by the fact that we can sit on almost anything. You will find the chair discussed at great length throughout the world of design, in terms of a problem with materials; an aesthetic problem; as a problem with the effect it has on spaces.

According to Peter Smithson, writing in the"Cantilever Chair".

"Of all pieces of furniture, the chair is most able to carry, like some portable shrine, the essence of the style of the period. People rarely collec cupboards or dressing tables or stools, but to collect chairs is common: It is probably that we see them as domestic pets... they have legs, feet, arms, backs, they are symmetrical in one direction; like animals, like ourselves.' (Smithson,1986,p.21)

The chair became an icon of the twentieth-century. It reflects the social and economic change in design during the twentieth century; it best expresses the essence of specific decorative styles. It also is particularly susceptible to the evanescent influences of taste and popular consumerism. To date the most obvious chair design to reflect the social and economic change during the twentieth century is "contact chair design"- the folding, stacking, knock down design of chairs. Life has almost become inconceivable without contact chair design in all its forms and variety.

It has developed with change in terms of technological trends and in terms of its social environment, which has begun to accept the contact chair as an essential product in today's life style and society.

Originally designed for informal garden-use or emergencies, Contact furniture acquires a permanent place in the home, symbolising a new found freedom in domestic furnishing.

Folding / portable furniture has an illustrious ancestry, dating back to ancient Egypt 1300 BC, where folding chairs were a sign of great wealth and power. Evidence such as this was also found in 1472 when Charles, the Bold Duke of Burgundy, was the first known to use a camp bed. Also in 1756, French records mention filed furniture kits comprising of a canopy bed, a blanket, a stool and a table which took two minutes to assemble and could be stored in canvas sacks when dismantled.



Figure 4: Example of a Folding camp-bed, designed in 1877 and issued to the Italian Army. The metal frame, sail cloth support, Kapok matteress and pillow all store away in a sack. It has the terrestrial "X-frame".

From the remotest time, the folding chair has been based on the very simple design of "X-frames". The two frames forming the stool were secured by a pin where they intersected, enabling the chair to fold. Later there were even tip-up seats (similar to the ones found today in cinemas) designed firstly by Jean Prouve in 1924 for use in lecture halls and which are common in today's sports stadiums and taxi cabs.

In the ancient empire of Mesopotamia and other old civilisations, the folding chair was also the commonest form of seating. In the Middle Ages the folding chair furnished Dignitaries and Army Commanders with a seat.

The 'scissors chair', a construction as early as the fourth century BC, was made of narrow slats interlaced so as to fold- with the result that the chair took up little space when closed. It consisted of wooden slats interlaced like combs. These were to be found in both Germany and Italy in the early renaissance.

X-frame



Sicissor-frame



Figures 5(i) & 5(ii): Example of X frame and Scissor frame chairs..

Chinese folding chairs of the 18th century had a Bentwood-like back with iron fittings and a foot-rest. They could therefore not be completely folded.

In the 19th century, during the euphoria created by the vast expansion of industrial and mechanical facilities, designs were produced in America and also in Europe for mechanical furniture with a range of diversity greatly exceeding anything existing today.

In the late 1920s the architects Heinz and Bado Rasch brought out a publicacton, parallel to the Bauhaus, called 'Der Stuhl' (The Chair) to which they showed the production of their workshop. In this workshop it was claimed that the essence of the folding chair lies in the organic character of the folding design,

"just as a man can huddle himself up, so the chair can be folded together, and as the human body can be huddled up in different ways so there are different ways of folding a chair."(Wittman, 1982, p.5).

Throughout this stage of Contact chairs, technical requirements were formally met by a system of levers and also the use of hinges, screwed pivots, rivets and springs. Today, on the otherhand, light tubular steel, aluminium, Bentwood, fibreglass and plastics are used. The new folding chairs allow a much higher degree of adjustment to novel conditions, prompted mainly by a desire to save space and to keep the weight light.

Today we are familiar with the deck chair covered in canvas. It is no trouble to set up, dismantle, transport and store. Today great importance is attached to dimensions in the folded position. The Italian Plia chair by Giam Carlo Piretti is a functionally sound design. It is an efficient modern reworking of the traditional wooden folding chair. The central element behind the design is the use of the light alloy die-cast joint that allows the folding of the chromium plated steel structure to fold with a thickness of 5 centimetres. Two sheets of transparent or coloured 'celidor' are fixed and screwed onto the structure and form the back.



Figure 6: Example of the Plia folding chair, an excellent example of the progress of the modern chair through the evolution of the twentieth century.

"Knock-down or Flat-pack chair" design became increasingly popular in the 1960s, after a breif spell in the early twentith century, with such products as Micheal Thonet's "No 14 chair". At this stage however, society was not yet ready to spend money on products which would dismantle. Such products were looked upon as unfinished as they were assembled by the retailer before sale.

Although relatively expensive, this 'Transformation furniture' was highly successful, moreso because of its novelty than its flexibility.

Knock-down furniture was highly favoured by the consumer because it could be purchased and easily transported to the home for assembly on the same day. This not only reduced manufacturing costs, but also eliminated part of the expense of shipping, by reducuing unnecessary bulk. Retail outlets such as Finmar, IKEA and Habitiat were founded on this new furniture-retailing concept. The major difference between pre-war Modernism and post-war Modernism was the feeling for discreet luxury and a mellowness which was seldom present in the pre-war era. Scandinavian furniture design had perceived a mode of functionalism, rejecting what was seen as the clinical and essentially hostile appearance of the Bauhaus furniture, for mass production which traditional materials did not provide. It aimed to work towards a new style based on a respect of tradition and in-particular, the tradition of wood as a materiel for use in furniture. This was one of the main reasons why Scandinavian furniture burst onto the international market and captured people's imagination in a major way. It used traditional materials to produce good quality furniture for a good cost.

It provided the ideal model of the domestic interior for a number of different reasons. It rejected the harsh forms of functionalism that many people associated with the hard years of the 1930s. Through its light forms and decorative surfaces, it communicated instead an essentially optimistic and human aesthetic which pointed the way forward out of austerity. It was a friendly style which combined the past with the future and expressed a democratic approach towards living - an important factor for a world which had just witnessed the advantages of talitarianism. For these reasons Scandinavian domestic design became increasingly fashionable internationally.

Other reasons why Scandinavian furniture became so successful was that the 1950s was such an exciting and dynamic period in terms of the development of design. Communication was taking place on an international level, encouraging active, creative cross-fertilisation between different countries.

The 1950s seen dramatic changes throughout the furniture industry no more so than in the contact market. The era favoured mainly the flat-pack market which became a major priority among designers and manufacturing companies such as Race Manufacturing Ltd and Knoll manufacturing Ltd. Also Scandinavian designers such as Anrne Jacobsen's, Hans J.Wenger, Alvar Aalto and Peter Hvidit were uncovered, who were four of the major contact designers to come from Scandinavia during the 1950s. They designed such chairs as the "3107" stacking chair (1955), the "AX" flat-pack (1951), the "Ant" chair (see figure:7) and the Hans Wenger folding chair (see figure:8). These were moulded from beech plywood, and natural coloured or painted. Indeed the "AX" flat-pack was probably the first Danish chair designed expressly with the needs of mass production in mind.



Figure 7: An Example of the "Ant Chair".

The cut-outs increased the natural flexibility of the plywood. Rubber dampers used to connect the steel legs to the seat enhanced the chairs flexibility. It was a one-piece seat and the back consisted of nine laminated layers (the seven inner ones are beech, the two outer teak, oak, or maple) which are steamed at a high temperature, and bonded with heat-resistant cement.



Figure 8 : Example of the Hans J. Wenger Folding chair.

Hans J. Wenger folding chair (1949). It is made from oak with Spanish cane. It is characterised by extreme simplification and logical, formal, constructive articulation in the tradition of Kaare Klint. (Later to be redesigned in 1966 by Kay Korbing).

Pioneered by the Scandinavian design, a number of changes took place which dramatically altered the relationships between mass produced furniture and the public. According to the social historian Arthur Marwick, 1957 marked

" the advent of the consumer society, from this point more people than ever began to take part in the adventure of buying new furniture."(Graphic,Oct.'96,p.43).

This statement was echoed through the 1960s in the Pop era. The major cultural revolution that occurred across the 1960s was the burgeoning of the wealthy youth market. This coincides with Terence Conrans' (founder of Habitat), project to revolutionise the way that furniture was sold by providing 'package good taste' for a young market which wanted to buy a complete lifestyle rather than a suit of furniture. This was offered by Habitat and IKEA in the 1960s.

In response to this changing mood, as well as the ever-diminishing size of many homes, furniture experiments began to emphasise flexibly and portability. The importance lay, in the words of Reyarn Banham on

"Massive initial impact, but small sustaining power"

(Spark, 1986, p.86.)

Another success of Scandinavian design was Marketing, drawing attention to the initiatives of the companies acting as wholesale imports of Scandinavian goods. This in affect had a direct influence on the consumers of Scandinavian goods as its availability in shops resulted in Scandinavia aesthetics becoming main stream. The best remembered names are those of Finmar, Donasco and IKEA and it was indeed these companies that dominated the field of Scandinavian exported goods. "Finmar" was founded in 1934 by Philip Morton Shandon, (a stalwart of the British reform movement) to export Alvar Aalto's plywood furniture from Finland. In 1949 however, it was reconstituted under the ownership of a Dane, Paul Ernest Stemann, and concentrated on Danish goods.

Finmar flourished during the 1950s. It expanded considerably beyond the bounds of its original pre-war sphere of activities, when it had been exclusively concerned with the work of a single designer and manufacturer "Alvar Aalto". After the war Finmar no longer dealt solely with Alva and Finland, but imported goods from Denmark, Sweden, Italy and Germany.

Prominent amongst the goods on display in the Finmar show room were chairs designed by Hans Wenger, including Johannes Hansen, Arne Jacobsen (the "Ant" chair), and a particularly popular line in the flat-pack line, the "AX" bent plywood and laminated wood chair by Peter Huidt.

This was to mark a substantial change in the direction of the business. It expanded Finmar Ltd considerably beyond the bounds of its original pre-war status and increased the company's wealth and status by penetrating a net of bureaucratic import restrictions which effectively kept out any competition, allowing Finmar freedom to supply a growing market. One of the conditions of import restrictions was that the furniture was collapsible or small and could be fitted easily into consignments.

The advantage of knock-down furniture to an importer lay in its reduced transport cost; as a result much furniture of this type was imported from Scandinavia. Imported containers reduced shipping cost further, and Finmar beleived that this was the only way he could be profitable.

20

One particular piece of knock-down furniture imported by Finmar from 1951, the "AX" chair, contributed to directing the interest of foreign furniture importers towards Denmark, thereby greatly furthering Danish furniture export. With the added virtue of its knock-down construction, it was a chair with a reputation aimed at a relatively well-to-do consumer rather than a needy factory worker, and characterises a broader shift in the direction of the Danish furniture industry. From 1934 until at least 1955, it can be argued that Finmar played a substantial part in creating a contemporary Scandinavian furniture market.

The company is not widely known for such furniture today however because it acted as a wholesaler and lacked the public profile of a retail firm. Its success also suffered when it had to face competition from other firms exporting Scandinavian furniture such as IKEA in 1950, Dansco in 1955 and Scandia 1957.

Less well-known although unlike Finmar are still operating today, was the firm of Scandia. Today Scandia operate exclusively in the contact market, the domestic market has almost dryed up.

In spite of the support of the three Scandinavian design super powers (Finland-Finmar, Denmark-Dansco and Sweden-IKEA), the one that found it most difficult to establish substantial trade links and distribution in the UK was Finland. Towards the end of the decade, in 1959, with the backing from the Finnish foreign trade association, an export furniture show was held in Helsinki. It was at this show that a new Finnish quality mark was launched and the exhibition, which included work by twenty - two of Finland's leading furniture designers and sixteen different manufacturers, attracted buyers from many countries. It was at this exhibition that particular attention was drawn to the concept of "Knock-Down" furniture or "Flat-

packed" furniture, i.e furniture that could be exported in its component state or partially assembled to be constructed on arrival by the consumer in the country of their destination. This not only reduced manufacturing cost but also eliminated part of the expense of shipping by reducing unnecessary bulk. Stacking chairs such as Limari Tapiouaara's tubular steel "Nana" chair, were also promoted as economical designs for export for the same reason.

Scandinavian design has helped to inspire craftsmen and manufacturers. Thus the direct and indirect influence of Scandinavian furniture design is widely acknowledged and in spite of the difficulties, by the end of the 1950s Scandinavia had made its mark on the furniture design of the twentieth Century.

Its furniture design possessed an excellent ability to design for massproducton whilst still maintaining the quality and style expected from a hand made product. This evolves from an ability to understand and use materials of every kind to their maximum. The result is a product that is highly complex yet understated in appearance. This has become the trade mark of Finnish design.

"Scandinavian furniture takes pride of place in this setting where elegance stems from simplicity." (Scandinavian Journal, 1997, p. 58).

The opportunity was taken to sell flat-pack furniture directly to the customer so that they might assemble the furniture in their own home. This satisfied the demand for immediate gratification as well as reducing costs, but demanded quality construction. It is perhaps no coincidence that these developments parallel the growth of the "Do It Yourself" movement.

The Swedish were the innovation in this field. The Swedish expertise in

prefabricated parts was essential for the growing export trade between Scandinavia and the rest of Europe and the USA. Alongside this Design expertise, the development of the special fittings, such as cams, bolts, screws, plates etc, were vital to the success of the flat-pack furniture. The Construction and ease of assembly also had to be considered.

Two major companies had their role to play in the mass consumerism of knockdown furniture. They were IKEA and Habitat. IKEA was founded in 1950 by Ingvar Kamparad and was originally a mail order company. Its "mysterious" name is actually an anagram of the founder's name and two towns in the area where he lived: 'I' and 'K' from his own name(Ingvar Kamparad) ; 'E' and 'A' from the names of the two towns( Elmtaryd and Agunnaryd). IKEA is now the world's largest furniture retailer, specialising in the stylish but inexpensive Scandinavian designed furniture. Each year IKEA manages to grab a growing piece of the market by serving almost 190 million customers in 26 countries and has a \$5 billion a year turn over.

Ingvar Kamprad founded IKEA as he was frustrated by the poor quality of goods available to people of modest means. In the late 1940s, he set out to change that with an almost missionary zeal. He began first by striking deals with furniture makers in the area, offering to fill orders for their factory over-runs. They were delivered in a milk truck, and sold at a steep discount. Later Kamprad realized that he could fit more furniture into the truck if the pieces were stacked. The ready to assemble industry was essentially born and IKEA grew so rapidly that his partners became rivals. They stopped selling him overstocks. Kamprad then had to find suppliers outside of Sweden - establishing early on, the IKEA concept of "global

souring". He opened a showroom in 1953 in Almhult and followed it five years later with the first IKEA store.

Terence Conran's Habitat stores opened on the Fulham road in 1964. Similar to Ingvar Kamprad, Conran had pre-conceived ideas on the furniture market. Conran, unlike Kamprad had studied in design at the London Central School of Arts & Crafts and by the early 1950s was selling textile designs and making furniture in a basement studio. He was inspired by the principles of the Bauhaus to use technology as a means of bringing affordable, good quality design to the mass market. The 1951 Festival of Britain helped his cause. The event was planned as an end to war-time austerity and it gave the green light to young designers with ideas. Conran's modern furniture was quickly taken up by architects and designers doing modern hotels, hospitals, schools, shops and offices. By making well priced, well made furniture and mostly flat- pack furniture for home assembly, the furniture was not only easy to transport but cheaper to produce.

A combination of wit and a strong belief that times were changing and young people wanted to live in a more relaxed way, led Conran to start up "Habitat". This later became one of the most successful furniture and lifestyle retailing operations in the world, and is now owned by IKEA.

Throughout the 1950s, Modernism was adopting to the new approach of the Scandinavian chair design and new research in technology, particularly in plastic. This led to new and more challenging forms in Contact chair design.

Unlike the geometric forms which designers had become accustomed to by the early modern movement, (which at best only offered the possibility of structural and material unity), a truly functional unification of the chair with its user could be realised through an Organic approach to design. This was more concerned with the way people actually sit, rather than the way they ought to sit.

Eero Saari and Charles Eames, after intensive research in the late 1940s and early 1950s, developed several seminal chair designs in fibre-glass(reinforced plastic) that achieved a hitherto unrealised organic unity of design.

Conclusively in Italy, designers such as Marco Zanuso began exploring the potential of foam and rubber as a suitable material for upholstery and its successful application led to a new confidence of expression in chair design. By the Mid-1950s, the chair became more sculptural in form to better accommodate the human body while counteracting the geometric regularity of the novel and increasingly prevalent built-in storage units.

In doing so, the chair became one of the central points of the modern interior. The mass production of low cost durable products for the domestic and contact market after the second world war, was viewed as an essential and therefore worthy social objective. CHAPTER 3- THE INFLUENCE OF MATERIALS IN THE CONTACT MARKET / WOOD.

Chapter 3: The influence of materials on the contact market / Wood.

Chairs have always been made from a variety of materials, but it was during the nineteenth century that a number of attempts where made to introduce new materials into the chair industry. Some were successful and laid the groundwork for later developments; others were commercially unsuccessful so were never realized.

The nineteenth century was mainly concerned with wood and metal materials that were used in innovative ways. Continued developments into new materials took place but were relatively minor.

That was until the twentieth century, when enormous progress in the development of materials was to be one of the controlling factors in contact chair design and manufacture. New materials such as plastic, tubular steel and wood laminates were now used in Chair design and proved to be much more economical and efficient in terms of transport and manufacture.

This proved to be the success of the stacking chair (i.e flat-pack/knockdown/folding), with large numbers being produced, manufactured, and distributed to schools, colleges, offices etc. An obvious example would be the Robin Day "Polyprop" stacking chair designed in 1962. It is one of the world's most common stacking chairs. Materials have a great many attributes, the obvious ones include:-

1. <u>The structural</u>: Improvements of performances in the use and economic reduction in cost.

2. <u>The Tactile</u>: Feel, comfort, and interaction with body when coming in contact with chair.

3. <u>The Physical</u>: Lightness, ease of cleaning, and appearance.

Materials have overwhelming power; they can deter or reassure a customer when purchasing any product.

The increasing research and development during the twentieth century has increased the possibilities that exist in chair design. The introduction of new materials has allowed the designer and manufacturer a great degree of control. Josef Albers wrote:

every work of Art starts from a specific material, and we must therefore first study how that material is constituted. The complexity of the form is dependent on the material with which we are working.(Clive Edward, 1994, p. 54.)

#### Wood:

The steam bending of solid wood (by machine), of Michael Thonet in 1857 was deemed as the innovative success of the ninetieth century. The pioneering research and development which Thonet set became the starting point for mass production.

The first of the "New style furniture" was derived from Art Nouveaux, with its curvist flowing forms. This is clearly evident in such chair design as the Thonet "Rocking" chair designed in 1860, and the Thonet No. 13. Both are good demonstrations of the endless possibilities of the bentwood process.

Thonet also produced what is considered the first Modern Furniture in the mid- ninetieth century and perfected a steam process for bending hard wood by machine. In brief, the technique is a process of streaming solid beechwood elements, thus making the sap evaporate and leaving the wood pliable. The desired shape is then achieved by the warm elements being forced down in the mold.

This process was inexpensive and was to be used by Thonet to develop the first known "knock-down " chairs which were shipped unassembled to both sides of the Atlantic in 1877 and reassembled by the shop owner before displayed for sale. This meant more chairs could be sent at a lower cost of shipment and this proved to be an important break through in modern furniture.


## Figure 9:

The chair is a good

example of how successful the process of interlacing shapes are-.Below: An example of the steam



bending process of the Micheal Thonets No.14. Here we can also see an example of the first flat-pack chair being shipped across the Alantic in 1877.





a view en meer en een oor oor alle gumnee meert on gumen beuntsennem , mus er ort om swons i it strugg i r

example of nov-coccestric the process of antennetic snapes rife-Decomposed. An example of the strengt

No.14 Here we can also see an

example of the first flat-pack chan being

shipped- across the Alanac in 1877.

Scandinavian has had a major role to play in the re-birth of wood. Wood was at the fore-front of chair design and became almost obsolete with the introduction of new materials such as metals and plastics.

The use of bentwood declined rapidly with the introduction of metal, especially tubular steel in the 1920s and 1930s. Chair designers focused on the new possibilites which would lay within the new material. Although not forgotton, solid wood took a back seat although re-emerged in the 1950s due to Scandinavian influence and the new manufacturing processes.

The use of advanced technology in the "Less" stacking chair, also made of wood, lies not in its minimal form but rather in the construction of the "upholstery" on the seat and the back rest. A layer of Softwood placed over the padding, behaves like upholstery fabric. The chair and stool designs by Marco Ferreri utilize the technology of softwood, a material that is a laminate of fabric and wood. The fabric and wood layers are thermally bounded and moulded under pressure and padded with a sheet of polyurethane foam. A soft, flexible, surpassing seating surface is created. The polyurethane sheet is placed only in the central part of the seat and back, and the Softwood is attached at the perimeter by hot die-pressing. The fabric becomes soft and acts as an adhesive at high temperatures, eliminating the need for a glue additive. Ferreri's symbolically minimal design statement places technology on a pedestal. The manufacturer, Nemo, has been assigned the exclusive rights to the process for the furniture industry, although a technologically advanced material similar to Softwood has appeared in the production of leather fashion accessories.



Figure 10: "Less" Stacking chair, *Above*: On Base an inner layer of fabric combined with a layer of polyurethane foam, leaving a soft wood top which acts like an upholstery.. *Below*: Available with a beechwood frame, clear or black painted. Seat and backrest are clear, medium grey, blue, orange, or green.



The back rest is fitted into the stiles through (6mm wide) and riveted.

Parts of the superstructure are glued together, and the seat and backrest are held together by eight bolts and eight screw rivets.





Peter Hvidt's 'AX' flat-pack chair, (1950) was manufactured using layers of beechwood glued to a mahogany Arne Jacobsen core. Legs and armrests, made in one piece, were attached to the back with dowels. Seat and back, no longer necessary in terms of construction, consist of padding covered with leather or fabric. It was transported in a disassembled form, for economical shipment.





Figure 12: Shows Peter Hvidt's "AX" flat-pack Chair design. Above *Left* showing the seat as it is shipped in disassembled form, *Right* showing the padded version of the seat. Below showing the wooden version on the seat in an environment.



Figure 12: Shows Peter Hvidi's ("AX" flat-pack Chair design. Above Let

bowing the start as it is shipped in disassembled form. Reput showing the

tadged version of the sear. Below show are the wooden version on the scat-

inomiouves no hi

The introduction of wood laminates to the construction of contact furniture in the 1920s came when improvements in glues allowed laminates to become lightweight structural components. They received success in the contact market due mainly because chairs could be easily transported, lifted, stacked, assembled and disassembled and therefore they were ideal for mass production. Another form of wood laminations around this period was plywood, even lighter again. It was more flexible and durable and therefore could be easily worked with. This was to be the next innovation in material of this decade. It brought with it the production of the more successful stacking, folding and flat-pack chairs of the time, such as Alvar Aalto's "Armchair" 1935-39, and Nils Holger's "Spanoto".

## 'Neptune' deck folding chair.

Ernest Race's 'Neptune' deck-chair marked the entry of his company into the field of contact furniture. This chair was one of several commissioned by P&O for the Orient line to make use of the optimum space on the linear. Race used a plywood of beech laminate bonded with a urea- formaldehyde waterproof adhesive to withstand the extreme climate changes but also to withstand the salt water and caustic soda solutions used to wash down the decks. The thinking behind the design was that the same profile could be used for both the seat and the back rest, consequently saving on the cost of mouldings. Ergonomics would imply that such an idea is impracticable. But with extensive prototypes and testing confirmed Race's idea was found to be sound. The seat and back rest were moulded from preformed plywood and the "X-shape" folding technique.



Figure 13: Example of the folding/stacking chair-The'Neptune'folding chair.



Another well-known and much talked about piece of wooden furniture is the "butterfly stool". It can bee seen as a harmonious synthesizes of eastern and Western culture. Highly favoured in America during the 1950s, it was easy to dismantle and transport. Designed in 1954 by Sori Yanagi, the Butterfly stool used plywood moulding techniques (made famous by the Eameses ) to mass produce the stool at the Tendo Mokko Company. The stool features an unusually clever construction: two identical forms are attached together symmetrically around the axis using two screws underneath the seat and threaded brass rod. This yields a shape which on the one hand is reminiscent of the torii (portals) of Shinto shrines, and it resembles the wings of a butterfly, from which the name is taken from.

It subsidizes space by folding into one and other and again uses the steam bending process of Michael Thonet to accomplish the forms.



Figure 14: Example of a Folding chair- The 'Butterfly chair'.

Highly favoured in Amercian during the 1950s, as it was easy to dismantle and transport.

# CHAPTER 4- METAL.

#### Chapter 4: Metal

With the introduction of metal in 1920, in particular tubular steel, the stacking chair gained interest from designers such as Marcel Breuer, Ernest Race, Arne Jacobsen, and Mies Van Der Rohe.

Developments in tubular steel in technology by Machinfabrik Sack in 1921, produced tubes with thinner walls which could be adopted to furniture. Lighter and less rigid than its predecessor, it was used in bicycle design of the period, making it more suitable for bending and adopting them to furniture shapes.

The first convincing results were credited to Marcel Breuer with his initial use of "steel-tubing" for furniture on his 'Wassily' chair (1925). His was the first of a range of tubular products that would be developed worldwide.



#### Figure 15:

"Wassily" Chair. Marcel Breue Centerville. This gravity-defying chair seems to hover on the surface of the floor. Straps and tubes, solidity and space, work on the eye, drawing us to the coloured rectangular obelisk. Once established, tubular furniture became quite successful, hosting component parts in some of today's most successful contact chairs, such as Robin Days "Polyprop" (stacking chair), J.H Pollarad "Equity" (flat pack chair), Gastone Rinaldi "Dafne" (Folding Chair) and a range of Arne Jacobsen Chair designs including the "3107" series and the "Ant".

Sheet Metal also made a minor impact on the contact chair design but was to have more success in the 1960s. The introduction of tubular steel and metal, proved quite successful. It was not one welcomed from some designers and critics, e.g the English critic John Gloag wrote,

" Metal is cold and brutally hard, and... it gives no comfort to the eye."

In response to this Charlotte Perriand, the young associate who had joined LeCorbusier's architectural firm the previous year said,

"Metal plays the same part in furniture as cement has done in architecture. IT IS A REVOLUTION". (M.Woodham Jonathan, 1997,p.102).

Metal won hands down, if not for its stylish novelty, for its functional attributes. It became a universal success in modern chair design, setting the new boundaries and taking chair design into a new age. Contact chair design benefited the most with the introduction of metal as it insured new life in a dying chair.

Another example of the use of tubular steel in chair design can be seen with the "Equity" armchair, designed by J.H.Pollard. It employed traditional leather with a plastic inner stiffener. This luxurious architectonic form has a presence that cannot easily be ignored and solves the problem of shipping a very large object.

The seat is made up of leather and polyamide-film, the seat rest is on the support

frame and there are four tubular-steel stiffeners for the leather support.

The tubular steel elements are made available by being either polished, chromium-plated, spray-painted with a metallic emulsion, or liquid-laminated with two layers of Softech (a baked-on finish is used with an 80-120 micron thickness).

The frame folds out from a central point and serves as the back, arm, and seat support. A folded one-piece upholstery is used: two layers of coated leather (black or tan) are fused with an inner layer of polyamide film. Several measurements of thicknesses of polyamide are inserted in various areas, depending on the stiffness required. There are inner supports for the seat (front edge, right; back side, left) that appear as arcs on the floor.



Figure 16: The "Equity" arm chair; *Left*, disassembled form, *Right* constructed form.

### <u>Aluminum</u>

Aluminum during the Ninetieth century was never a truly popular material for furniture making. However, there have been various reconsiderations of its potential. The benefits of aluminum were seen as its corrosion resistance, light weight, malleability, flexibility and resilience, and not least, the silver-like finish. When compared with tubular steel, however, it's weakness was a disadvantage.

Developments continued in Europe for specialized application such as in airships by the Zeppelin Company, who used L and Arnolds' aluminum tubular framed chairs in the airship "Hindenbury" in 1935. The combination of light weight and a modern image was clearly attractive to the airship builders.

In 1938 Hans Coray designed the "Landi". He used the latest developments of the time in aluminum technology, both in terms of alloys and hardening treatments. The shell was made for strength and flexibility whereas the leg structure is as rigid as possible. The finish is slightly crystalline in appearance as a result of heat and chemical treatments required for the shell's physical properties. This finish is one of the most satisfactory possible on aluminum. There have been dozens of chairs quite obviously based on the Landi, and in many cases these are neater, slimmer and more shapely, but surprisingly most of them now look dated compared with the original model - a testament to its underplayed styling and real concern with function and manufacturing suitability.



Figure 17: The "Landi".

"Landi" is the official outdoor chair of the Schweizerische Landesausstellung (Swiss National Exhibition) which was held in Zurich in 1939.

The "Landi" architect, Hans Fischli, invited submissions to a competition for over 1,500 new chairs for gardens, squares and parks in 1938. Since these were meant to have a link to Switzerland, it was decided that the material of choice be the "Swiss metal", i.e aluminum. Hans Coray, a self-taught designer, won first prize with a miniature model consisting of a perforated steel seat with a wire base. With the cooperation between Fischli-Coray-Blattmann (the metal-working company) and the Rorshach aluminum works the final result was a sensational chair that weighed a mere three kilos. One innovation feature was the development of a shell from a hard material ,( even prior to the Eameses' attempts at bending metal) which was moulded using a 300-ton drawing press. The perforation of the metal, an idea borrowed from the aviation industry, reduced the weight while the threedimensional shape of the perforation edges improved the stability. The development was supported by concurrent experiments by the Swiss Federa railway. The base feet were also made of moulded metal strips, the innovative Argon metal-arc welding joined the identical pairs of legs by the cross beams beneath the seat. All individual parts underwent special heat treatment, rendering the aluminum as a hard steel, and afterwards all that remained was to mount the seat on the lower base with screwed connections.

Since the "Landi" was intended for outdoor use, no caps were placed under the feet. In various stages these were first made of plastic wood, later of plastic, and at the end of the fifties to the present, from black and white rubber since the chair was increasingly used indoors. In 1962 manufacturers changed the number and the perforations, reducing the rows from seven to six and the original 91 holes to 60. This enabled mass production rather than individual processing and gave the springy seat greater stability, since the first models have a tendency to crack in the curved area between the seat and the back.

After the second world war a revival of the interest in aluminum was clear due to the shortage of timber,

"There could be a future for aluminum in both structure and decorative forms."(Edwards, Clive, 1994,p.55)

One of the most famous British chairs of the twentieth century was undoubtedly the Ernest Race "Antelope" Chair design in aluminum. Another chair made from aluminium was the "Pila" folding chair design. The light weight synthetic polymer chair allows the structure to fold in the form of "scissors" to a thickness of 5 centimeteres. Two transparent or colour sheets of 'cellidor' are fixed and screwed onto the structure from the back and the seat of the chair. The chair's stylistic elegance, space saving, light weight and inexpensiveness has kept it popular even in recent times.

The elegant chair, which is also suitable for outdoor use, has clear rounded forms, an oval section tubular steel frame, and transparent plastic surfaces. When folded up it can be hung on the wall hook made special for this purpose, but can also be stacked when folded out. Due to its straightforward construction and simple manufacturing, "Plia" can be produced at low cost and offered at correspondingly favorable prices. Over four million chairs have been sold since 1969.

In conclusion, the use of aluminum was seen as a pragmatic substitute for wood. Aluminum, while much lighter than steel, needed careful handling, Race developed a T-shaped profile for the legs, to ensure that there was sufficient material at the stress points to withstand any tendency to buckle. It is this quality of the material that gives aluminum chairs a distinctive form.



## Figure 18: "Plia"

I

Above: early skecths,

Right: Folding mechansim.

Below: the chair unfolded.





#### HIPLING 181 PHA

Anover carty skeetins,

Arear Folding mechansin

follow the circu uniolded

CHAPTER 5- PLASTICS.



#### Chapter 5: Plastics

The role of plastics is now so unambiguous that it is difficult to imagine a time when they were not a part of every day life.

The uses of plastic in chairs cover a wide range of applications including construction, finishing, gluing, upholstery covers and fillings, fittings, and accessories. Plastic furniture was pioneered in America by Charles Eames immediately after world war two.

The plastic chair appeared to realise the modernist dream of turning the making of the chair into a fully automated industrial process and unlike tubular steel chairs, offered the possibility of realizing a much wider range of shapes and forms.

In the early days however, it was a costly material, and this restricted the applications of plastic in furniture. Robin Day's Polyprop chair of 1962, designed for and produced by the manufacturers "Hille", was a low cost alternative to the fiber glass of "Eameses" Chairs. It was different because of its one piece shell, and was capable of being mounted on various bases. It has been used as the basis for all types of seating from Cafeteria Chairs to fixed stadium seating.

Polypropylene had been discovered in 1954 by Italian Nobel Prize winner Guilio Natta and Shell began to produce it in various formulations by the end of the decade. Its primary virtues were its lightness, high flexural, fatigue resistance and ineptness. It was thermoplastic so that it could be easily moulded and behave particularly well in injection moulding.

An instant commercial success, the Polypropylene chair was reckoned to be

(P) In the pression of the second output of the second static second se second sec

ted presentation and a second to a fifth a first second second present to the second of the second second second in the second to the second second

a major event in the design world. In the way that mathematicians place high value on the elegance of a solution, so too did designers applaud the "elegance" of the Day solution to the problem of seating. In the way that elegant solutions are economical, so too was this chair. It was made from only two apparently simple parts joined together by standard self-tapping screws. The tendency of polypropylene to flow slightly under stress meant that bosses and flanges which held the screws and redirected the imposed stresses could be moulded into the shell itself. Day correctly believed this could be done, despite discouragement from the plastic and screw makers.

For students of international design the Polypropylene chair paralleled the experimental, very thin shell architectural designs of Pierre Luigi Nervi and Felix Candella; the stability of whose structures relied on an integration of material.

Equally important for design ideologists, the chair was almost instantly in a standard injection moulding machine-although getting that process right was no easy task and the machine themselves were immensely complicated and huge. For those many designers who believed that good design was a universal social right, the chair was entirely virtuous because it was incredibly cheap.

Plastic became a large-scale contact market. By using an expensive plastic material, combined with the injection moulding process, the product could be sold at a very competitive price.

Plastic is the most important material the contact market discovered to date and has unduobtedly increased manufacture and decreased cost. Plastic is also ideal for the contact market due to its durability and tactile qualities.

The Polyprop is one of the most successful contact chairs ever produced. A

• Provide a contract descenting website (see as and of the media contract contract of the c

n general de la servicie de la servi

single tool can produce four thousand seat shells per week and from 1968 to the present over 14 million chairs have been sold in twenty-three countries. Day writes;

Designers have responsibilities other than the profit motive, and must be increasingly concerned with conservation and the sensible use of the planet's resources... I am less interested in fashion than in a synthesis of good construction, good function and aesthetics. (Lyall,1981,p.49.)

Robin Day's Polypropylene chair has become a modern furniture classic. Like the Thonet bentwood chair, it is known all over the world, and widely imitated. It is still incredibly cheap.



Figure 19: Polyprop Chair: Injection-moulded polypropylene seat shell on chrome-plated shell and bent tubular steel base. single tool can produce four thousand seat shells per week and from 1968 to the

present over 14 million chairs have been sold in twenty-three countries. Day writes,

Designets have responsibilities other than the profit motive, and must be increasingly concerned with conservation and the sensible use of the planet's resources *I* am less interested in fashion than in a synthesis of good construction, good function and aesthetics (Lyall, 1981, p.49).

Robin Day's Polymopylane chair has become a modern furniture classic. Like the

Thonet bentwood chair, it is known all over the world, and widely inniated. It is

till incredibly cheap

Figure 19: Polyrep Chars 1 n J e c ri g n - u o u l d c d polypropylene scat shell on drome-plated shelf nd ban tabalar strel bese Another example of a chair made out of plastic, although this time a "Flatpack" chair is the "Miss Tripp"side chair, designed by Philippe Starck.

The original design was intended to be more sculpturally voluptuous and a self - contained unit, hence eliminating a carton package. Nevertheless, for economy of shipment, the customer purchases the dissembled chair in its own take-away box. The manufacturer "Kartel" has been known up to now, for its exclusive plastic production. This is the first time it had integrated wood into a plastic chair.

There is two component mouldings of polypropylene used and this forms the base of the seat, reaching a considerable thickness of about 8mm in the inner strata.



Figure 20: The "Miss Tripp" side chair.

The legs are of solid beechwood, slotting in the back to the mould and into cylinder tubes which are part of the mould from the base. The front and back legs

are fixed with plastic screws and the bottom of the legs are fixed with plastic guides/sliders to prevent the floor from being marked.

The main base is moulded from Polypropylene as two separate component parts. The mould itself is made up of a number of soft radius to compile a concave area and provide a comfortable sitting posture. The base also includes slits at the back so that the backrest may be easily slotted into the base. The back is compiled of plywood which has been formed using the bentwood technique and finished in a beech wood veneer. It slots into the base of the seat and is held by two screws.

In the original concept, the seat and back served as a package but due to production problems and expense, the final chair was to be packaged as a flat-pack cardboard container, similar to the one which can be seen in fig:21 below.

Figure 21: The disassembled "Miss Tripp" chair.



Other manufactural changes come in the form of its ease of assembly. The legs were changed from being force-fitted, to those with threaded plastic tops which the customer screws into the underside of the seat. The chair is easily transported due to its small dimensions and its light weight. The over- all dimensions of the chair are  $850 \times 660 \times 420$ mm, compared with the cardboard container  $150 \times 700 \times 500$ .

a i contaconsiste plastic autovic and the biologic of the page too, the company of the page provide the company and the page of the second provide the second terms and the second terms and the second terms are second to be a second terms and the second terms are second to be a second term a

Reference and the second s

ensisten and de ensisten and the second for the construction of the second second second second for the second s and the second second second for the first second se The "Miss Tripp" side chair undoubtedly shows the value of the flat-pack design. The form of the chair keeps with the terrestrial chair as it does not need to be folded or stacked. The chair has captured a distinctive elegance unfounded in any chair to date by using two different forms of materials of the latest technology.

The "Blow" Chair is another example of a Plastic chair and it also is a "Folding" chair. "Zanoltoa", founded in the 1950s by Aurelia Zanotta, manufactured some of the most Avant-Guard design of the 1960s, including the 1967 "Blow" chair by Donato D'Urbione, Paolo Lomazzi and Jonathan De Pas.

The "Blow" chair is the first inflatable chair successfully mass-produced in Italy. Inexpensive to manufacture, it possessed an intrinsic expandability that dismissed the traditional associations of high cost and permanence with chair design.

The inflatable "blow" chair is an icon of the 1960s 'throwaway' culture. Inspired by the Pop-culture and leisure time activities, the three architects designed their first piece of furniture adopting the construction principle behind an inflatable raft:- light, transparent, mobile, compact storage and inexpensive.

The "Blow" chair required a new production technology to be created, due to the fact P.V.C (Polyvinyl chloride) could not be glued like neoprene. A newly developed high-frequency welding technique for PVC (polyvinyl chloride) had to be used known today as "electronic welding".

The transparent, inflatable chair became the accessory for the pop environment.

- A set of the standard contraction funds when the contract state of the state of the state prostate of the second contract on the with free states of state of the based on the state of the state of the state of the state with free states of state of the based on the state of the based on the based on the based on the state of the state of the state of the state of the based on the based on the state of the based on the based on the state of the based of the state of the based on the state of the based on the based on the state of the based on the based on the based on the state of the based of the based on the based on the based on the state of the state of the based of the based of the state of the based of the based of the state of the based of the state of the state

(a) a construction of the construction of t

the second second second



Figure 22: The "Blow" chair -a transparent, inflateable chair.
# CONCLUSION

### Conclusion

Today we have come to accept contact chair/furniture as a way of everyday life.Life would almost be inconceivable without the folding, stacking or flat-pack/knock-down chair/furinture in all its forms and variety.(Splat,1982,p.5).

This view certainly emphasises the importance of the contact chair to life in today's world, where there is a need for both economical and effecient manufacturing. But if we consider Micheal Thonet's No. 14 chair, the first mass produced chair in the early half of the twentieth century, we find that it had to be reassembled before sale because society failed to accept unassembled products.

However a combination of alternative materials and social changes during the twentith century would change societys' perspectives on contact chairs.

Alternative materials to solid wood such as plywood, tubular steel, alumium and plastics, reduced the weight of chairs considerably and brought about new manufacturing processes and new possibilites in function, form and aesthetics. This meant the chair could develop alongside the changes in society throughout the twentieth century, which was a determining factor towards the success of the contact chair, e.g the inflatable PVC (polyvinyl chloride plastic) "Blow" chair which was an icon of the 1960s, 'throwaway' pop-culture.

There was a noticabe change in attuides towards the contact market during the 1940s - 1960s which led to an expansion for the furniture industry and furniture retailing. It was a period in which some of the most exciting advances in the evolution of mordern furniture occured, and various factors such as new materials, Scandinavian influences in 1950 and the pop culture of 1960 were all contributors.

#### 100

(a) A set of the original for the application of the contract of the set of the start of the

(1) Contract on the construction of the construction of the exact on the end of the end of the construction of the construc

ettaan oo konkutuuduudi 983. Copolynaa Taaboo ka maala 1310. 19 Jamma ee of too - - - - Sekara ee oo 90 maalii oo

Commencement of communicatian at a high level in design during the 1950s and 1960s, enabled Scandinavian design to make an influnce which would change the way furniture would be sold internationally.

Scandinavian design opened up new options by producing high quality goods at a low cost. This could be acheived by the chair being assembled by the costumer. Furniture retailers such as Finmar, IKEA and Habatiat were founded on the idea of self-assembley. It is an idea which is highly favoured by consumers because furniture can be purchased and easily transported to the home for assembly on the same day; supporting Peter Fiell's belief

> "that design was now a truly popular consumer 'product' that could bebought literally off the shelf". (Fiell, 1991, p84)

The pop-era which is best known for its 'throwaway culture' saw the introduction of new materials such as polyprop which is used in several of the most famous contact chairs, the "Rodin Day, 'stacking chiar', 1962", and the PVC Zanolta's "Blow Chair 1967". The pop-era was committed to design intended for high-volume, mass consumption. Major manufacturers were concentrating almost entirely on the contact market; indeed, the new decade seen progressive development of pure contact design.

There is quite sufficient regard to contact furniture at present due to the movement of Nomadism i.e. the moving about from one place to the next. This means that there is a need for furniture that can be easily compacted and transported in places such as Milan, London, Paris, New York.

The relationship between design and society has taken the contact market where it is today. Chair Designers today, in general, must have an ability to design

53

chairs that can be mass produced, mainly for reasons of cost efficiency.

Contact chairs have been around since 1300 BC and now more than ever have required a place in societys' homes, schools, colleges and public functions,

"It would hardly be an exaggeration to say that we are living in a contact-chair culture - such has been the influence of our mobility on the furniture we use".(Wistmand, 1982,p.15).

The future of contact furniture rests soley on the designer and materials. It would be difficult for anyone to design an "ideal" contact chair, as they have various forms and functions as we have seen throughout this thesis. However, there are a number of fundamental factors which can be noted, e.g Transportability,(weight, size, and structure); Flexibility,(material used) and Ease of assembly,(type of frame used). We might predict that in the future, the smaller and lighter the structure of the contact-chair, the more popular it will be. As Marcel Breuer said,

"in the end we shall all sit on resilient columns of air."

(Von Veqesack, 1996, p48)

## BIBLIOGRAPHY

### **Bibliography**

- Banham, Peter Reyner, <u>Theory and Design in the First Machine Age</u>, London, The Architectural Press, 1960.
- Burall, Paul, Green Design, London, Design Council, 1991.
- Byars, Mel, <u>50 Chairs Innovation in Design and Matreials</u>, Pro Design Series, 1997.
- Byars, Mel <u>Mutant Materials in Contemporary Design</u>, The Museum of Morderm Art, New York, 1995.
- Collins, Michael, <u>Towards Post Modernism</u>, <u>Design Snice 1851</u>, London, British Meseum, 1987.
- · Colombo, Sarah, Design Icons The Chair, Aumrum Press, London, 1997.
- Edwards, Clive D, Twentith Century Furniture, Manchester Press, 1994.
- Ernst & Sohn, Design-Innovational, Herausgeber, 1991.
- Esterson, Simon, <u>The Modern Chair</u>, ICA, Institute of Contemporary Arts, 1998.
- Fiell, Charlotte & Peter, Modern Chairs, Benedikt Taschen, 1995.
- Fiell, Charlotte & Peter, <u>Mordern Furniture Classics</u>, Thames and Hudson Ltd, London, 1991.
- Gandy, Charles, <u>Contemporary Classics, Furniture of the Masters</u>, Mc Graw-Hill Books Company, 1980.
- Garner, Philippe, Twentieth-Century Furniture, Phaidon Press Limited, 1980.
- Hennessy, James & Papanek, Victor, <u>Nomadic Furniture</u>, Studio Vista, London, 1974.
- Heskelt, John, Industrial Design, London Thames & Hudson, 1980.
- Hollis, Richard, <u>Modern Chairs 1918 1970</u>, The Whitechaple Art Gallery, London, 1970.
- Katz, Sylvia, Plastics Design and Materials, London, Studio Vista, 1978.

- Katz, Sylvia, Plastics Design and Materials, London, Studio Vista, 1978.
- Mang, Karl, History of Mordern Furniture, Academy Editions, London 1979.
- Marcus, George.H, Functionalist An Ongoing History, Prestel-verglay, 1990.
- · Meadmore, Clement, The Modern Chair, Studio Vista, 1994.
- Noblet, Jocelyn, <u>Industrial Design</u>, reflection of a Century, Paris Flammarion, 1993.
- Papanek, Victor, Design for the Real World: Human Ecology and Social Change, London & New York, 1985.
- Race, Ernest, Hazel Conway, The Design Council, 1982.
- Reyner, Banham, <u>Tubular Steel Furniture</u>, The Art Book Company 1979.
- Sembach, Klaus-Jurgen, Contemporary Furniture, The Design Council, 1982.
- Sparke, Penny, <u>An Introduction to Design and Culture in the Twenieth Century</u>, Routhedge, London, 1994.
- Sparke, Penny, Furniture, Twentieth Century Design, Bell & Hyman, 1986.
- Splat, Johannes, <u>Folding Chairs</u>, Birkhauser, Frank Wistman, Etsdorf/Austria, 1982.
- Sutherland, Lyall, <u>Hill-75 years of British Furniture</u>, The Art Book Company, 1979.
- Von Veqesack, Alexander, <u>100 Master pieces from the Vitro Design Museum</u> <u>Collection</u>, Ultra Design Museum and Authors, 1996.
- Woodham, Jonathan M, <u>Towards The Twenitieth Century</u>, Oxford University Press, 1997.
- Whiteley, Nigel, <u>Design for Society</u>, Reaktion Books Ltd, 1993.

## Articles

and wats.

- <u>Abitare</u> V. No 267 Sept, 1998, pp. 324-63
- Capella,- Juli, <u>Domus</u>. No.786 Oct. 1996, pp. 68-9.
- Davis Kevin, Journal of Design History Voulume 10 No.1, 1997. pp.39-51.
- <u>Design</u>, No.527, Nov 1992, pp.48-9.
- <u>Design</u>, No.529 Jan 1993 pp.13-15.
- Domus, Modular-Furniture, V. No695 June, 1988 pp. 10-11.
- Industrial Design V.31 Nov/Dec 1998 pp.81-2.
- Makikalli Maija, <u>Scandinavian Journal of Design History</u>, Volume 6, 1996.pp.68-97.
- Northedge Grundy Graphic V.52 Sept-Oct 1996 pp.42-47.
- Scandinavian Journal of Design History, Voulume 3, 1997 pp46-58.
- Vilto Magnago Lampugnani, Domus, No 775, Oct 1995, pp 69-73.

#### C. U.B.D.

- A REAL AND A SHORE A
- Capital States and American States (Second States)
- - 1939년에 1877년 1974년 1976년 1988년 1977년 1971년 19
  - Adding the ball state in the distribution
  - 1 EBL dd Skielsman (1995) "contrast state og pår."
    - Industry in the first state of the optimization
- e secondo el contrato de la construit. Nas la 1919 de construir de la construit de la construit de la construit A secondo de la construit de la
  - Sectors with a state of vierby of the other and the
  - 2014년 1월 1994 전 1994 전 1995 1995 1995 1996 1996 1996 1996 1996 1996 1996 1996 1996 19
  - bleen greeks met einer samele kompeten in om i met 👘