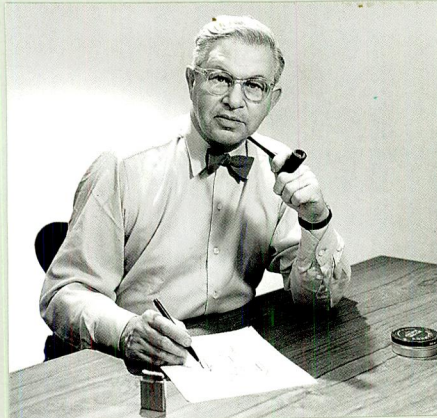


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Faculty of Design, Department of Industrial Design



Arne Jacobsen: Architect and Designer

By John Noel Montayne

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Introduction

While on a study trip to Denmark one begins to realise that everything surrounding you has been designed. The interesting thing is that most of the buildings and objects still in use were designed, mainly, by a group of architects in the middle of the twentieth century. The interesting point being that these designs still look strikingly modern. This thesis is going to examine one of those architects, namely Arne Jacobsen, and try to distinguish some of the reasons why his buildings and products are still looking so young and vibrant.

One of the hallmarks of Arne Jacobsen design is its close relationship to his architectural projects. He had a vivid interest in both the large and the smallest detail, and he never considered his buildings complete until they were ready for use. His designer's eye visualised everything from carpets to ashtrays. Many of his earliest architectural projects incorporated complete interior styling. And when he built a herring-smokehouse at Odden Harbour in 1943 he concluded the job with a design for the firm's packaging for smoked caviar.

Every project which Arne Jacobsen undertook was designed to the finest detail. Not all of his projects included interior styling though he did stress to all his clients the importance of the total design environment.

Throughout all of Arne Jacobsen's work there is a constant theme of designing for the total environment and he was never satisfied with just designing an architectural space. Arne Jacobsen was always attempting to link both the architectural space and the objects within the space together. He considered the object and the building as important as each other and that they must rely on each other for perfect harmony.

This thesis will attempt to examine this relationship, that is the relationship between his products and his buildings. It will examine the level of detail he would

reach when designing either and how he would force technical limits upon himself as part of his fascination with technology.

Throughout all of Arne Jacobsen's work there is also a distinct geometric relationship between the interior spaces in his buildings and the objects he designed for them. Much of his architecture is strict and rectilinear yet by contrast his designs are curvaceous and soft formed.

It will examine his influences which spanned from his strict classical training to international architectural influences, which included the work of such architects as Le Corbusier and Mies Van Der Rohe. The work of Le Corbusier was of great importance to Jacobsen especially in relation to the studies of proportion which Le Corbusier documented in the 1920's. This thesis will examine Jacobsen's application of Le Corbusier's proportion theories using the Stelton product range as an example.

This thesis will also examine his work with materials, techniques and utility qualities which was constantly guided and determined by an unyielding search for clear, balanced pictorial or form expression. It will also examine his design process, the way in which he tackled projects.

This thesis will begin with a summary of his training and will then examine his early architectural works. Throughout this thesis particular projects will be looked at to emphasise Jacobsen's varied design qualities, such as detailing, design methods, application of materials and proportion.

Arne Jacobsen's work spanned from 1927 and until 1971 when he died and because of this large span of work it is important to choose only some examples of his work which display this relationship as an architect and an industrial designer. The aim of this thesis is not just an examination of his design methods as an architect or an industrial designer but to try to understand why his

buildings and products are still in fashion or as the design term would say; timeless.

His Education

Arne Jacobsen wanted to be a painter but at the age of eleven his new friends at school, Mogens and Flemming Lassen, persuaded him to join them and opted for architecture instead. His father was grateful for this advice.

After four years at the Technical School and an apprenticeship as a bricklayer, he entered the Copenhagen School of Architecture in the Royal Academy of Fine Arts in 1924. He obtained his diploma in 1927 and was awarded the Gold Medal the following year. His academic career was the classical Danish architectural training; the architect being at the top of the hierarchy of craftsmen and a follower of the Fine Arts tradition. Thus in Denmark, unlike other countries, the architect's field of application is different than that of the engineer; a fact that could explain the constant attention to textural effects, material and detail. However, classical styles did play their part, in the new training style different types of buildings were examined: schools, churches, housing, museums, ect.

The study of old buildings was the path to understanding the nature of architecture in the Danish classical training system. When designing new buildings the student had to be prepared to find a norm, a type, to fulfil the demands of new techniques, new materials, and a new social structure, requiring a common as opposed to an individual design.

P. V. Jensen-Klint taught Arne Jacobsen design theory. He believed that "the architect must capture the aesthetic values of former times, but in a way which harmonises with his individuality. He must not copy, but create something of his own (Jorgensen, 1990, p.60). Jensen-Klint preached that there was nothing nostalgic about beginning one's studies with older Danish architecture." This was how the student respected the development and identity of the individual and the local society. There

was no great change and no demand for a design revolution, as there had been in the Bauhaus. Jacobsen pursued the slow transition from historicism through classicism and functionalism to modernism.

The Academy professors did not like modern bluff and warned against the new formalism. He was guided by them in all his Academy projects. His Gold Medal entry, a national museum, was the mature fruit of his education. In the park, his old playground, which forms part of the Klampenborg seaside resort, he planned the main buildings and an open air museum amongst the old trees. The volumes and plans are simple and clear, with yellow grey plastered brick facades and copper roofing. The interiors would be grey and white, with steel windows.

Jacobsen was certainly not born into modernism but, like the previous generation, was able to build in any style his clients required. One of his first houses he designed was his own white, airy and sunny house of 1928 which had a very modern look, with large steel windows, a flat terrace above the drawing room, with an outside staircase to the garden, and a hygienic looking laboratory (See fig.1). But fundamentally the plan was still traditional.

It was this combination and knowledge of different styles that made Arne Jacobsen an excellent architect who was able to apply himself to any type of a project: whether a small Summer house or a large town hall, it was all as much of a challenge to Jacobsen.

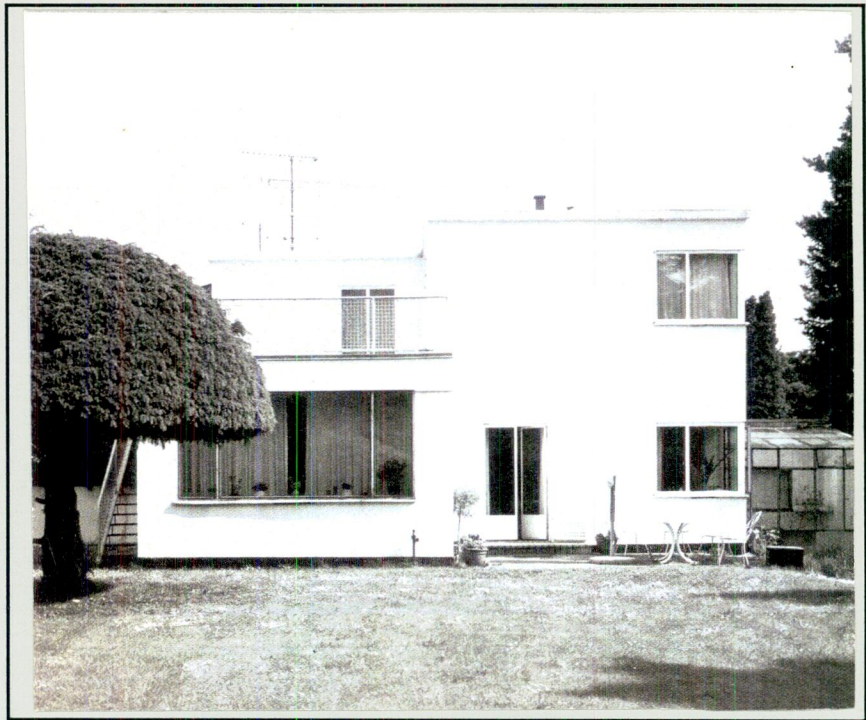


Fig.1: Arne Jacobsen's Own House, 1928

The Modern Approach

The first section of this thesis is going to deal with Arne Jacobsen's earliest works. That is from 1929 until 1937. All of his work in this period was mainly residential houses but he undertook two very important projects in those years. One was a competition entry for a House of the Future and the other a conversion for offices in a painting supply store in central Copenhagen.

The reason for choosing these two examples is because these pieces were the first modern Danish buildings to be seen in Denmark at this time. The first project, the House of the Future, was just a concept project but it was a taster for the public and their reaction was, at the time, very enthusiastic.

These two projects also show Jacobsen's development in relation to the application of geometry to his work. This area will be dealt in more depth at a later stage but it is important to realise this development. Both of these pieces were based on simple geometry but there is a striking difference between the visual hardness of both. In the House of the Future the hard lines of the geometric edges are replaced with soft, large radiused corners in the Stelling's house. This is a way of softening the visual image. With the House of the Future there is no attempt to soften the strict geometric image. The furniture in this concept project related directly to the rooms whereas his later pieces of furniture act as a contrast to the architectural spaces by using more free organic shapes.

The House of the Future

Arne Jacobsen's breakthrough as an architect came in 1929 with the winning design for the contest on The House of the Future (See fig.2). The concept was temporarily realised in connection with a large housing exhibition, and 27 year old Jacobsen designed with his study companion Flemming Lassen. The House of the Future was the really the introduction of modern architecture on Danish ground. There had not yet been built a truly modern house in Denmark and functionalist tubular steel furniture was virtually unknown.

It was a circular building located by the sea; circular buildings are always progressive, and the happy couple could travel by helicopter, car or boat. Machines carried out all domestic chores, so that they had to have a room for keeping fit. This future life scenario was anticipated right down to the minutest detail, and to their surprise, people took it all seriously. The criticism was the that it was to similar to a dentist's clinic: sterile and inhuman. The architects had to explain that this was just a draft plan, and that these new materials and machines were already incorporated into their everyday housing.

The interesting thing about this utopian house is that it is based totally around the geometry of the circle, including even the furniture in this geometrical idiom (See fig.3). This house was demonstratively modern in design.

The controversial House of the Future became a turning point in the development of Jacobsen's white functionalism. It was also the first house which Arne Jacobsen, together with Lassen, designed all the way through, including interior decoration, colours, furniture and textiles.

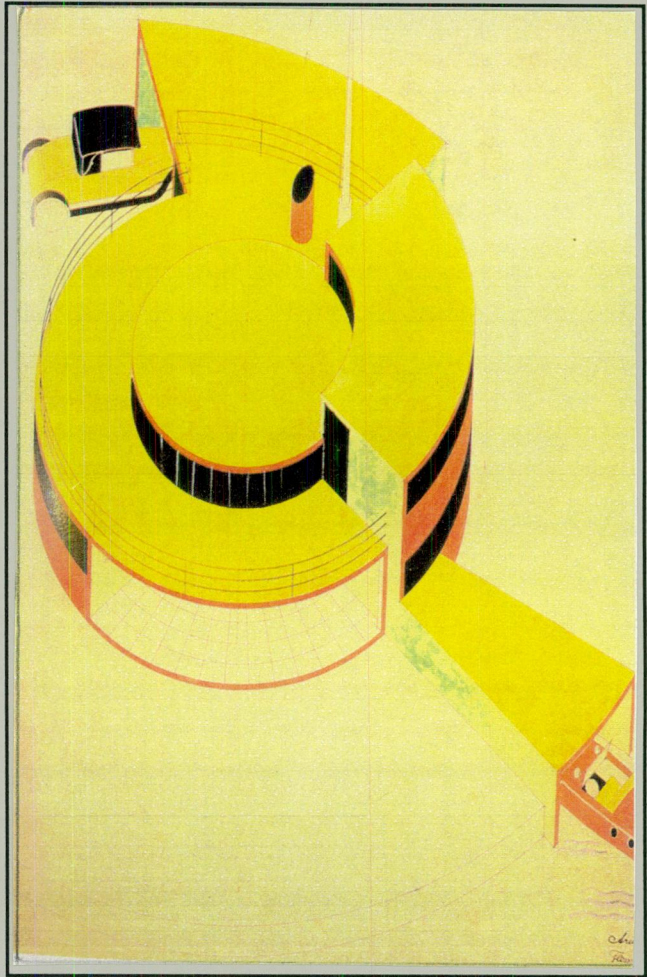


Fig.2: The House of the Future, 1929

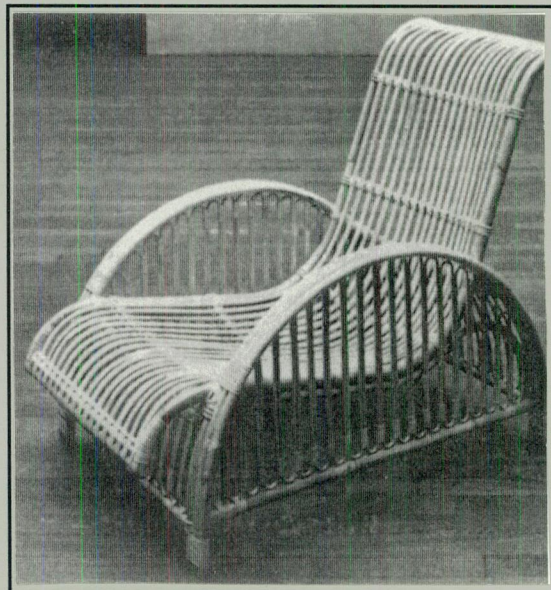


Fig.3: Basket Chair, Designed for the House of the future

Stelling's House

During an architectural class excursion, while studying in Denmark, to a building located on a corner in the centre of Copenhagen the true mastery of the Arne Jacobsen was realised. The Stelling's House, is likewise a turning point in the life's work of the architect Arne Jacobsen. Indeed, the building, basically, has been designed as a classical urban edifice, but by virtue of its sober-minded, mechanical appearance and its relative freedom from reference, it points toward Jacobsen's later principal works, such as the SAS building.

In 1934, Arne Jacobsen's architecture studio prepared several various suggestions for the new business offices of A. Sterling's painting supplies stores. The size of the parcel and its proportions dictated a very shallow building depth. The public authority's demand about retracting the wide facade far from the line of the curb reduced even further the constructional area to only 170 square meters, including a narrow light shaft. As a compensation special permission was granted for the floors of the office space to project out from over the tiers of the ground level for 20 centimeters. The work on the project was commenced in the spring of 1936 and the building was finished and ready in 1937.

Stelling's House is five storeys high (See fig.4). The secluded top storey was originally designed to be a residence. The building has been erected as a slab-beam construction in reinforced concrete with bearing exterior walls at the floors of office space, which are supported by rectangular-sectioned pillars at the two storeys containing the store. The pillars and the parapet have been constructed from reinforced concrete, smoothly covered with spray-painted iron plates, which now appear to the eye with a pale charcoal gray hue (See fig.5) The 390 centimeter wide shops windows are uninterrupted in their span between each of the pillars. They are smartly fitted with the plates of iron and are surrounded at their edges with a moulding which, like the

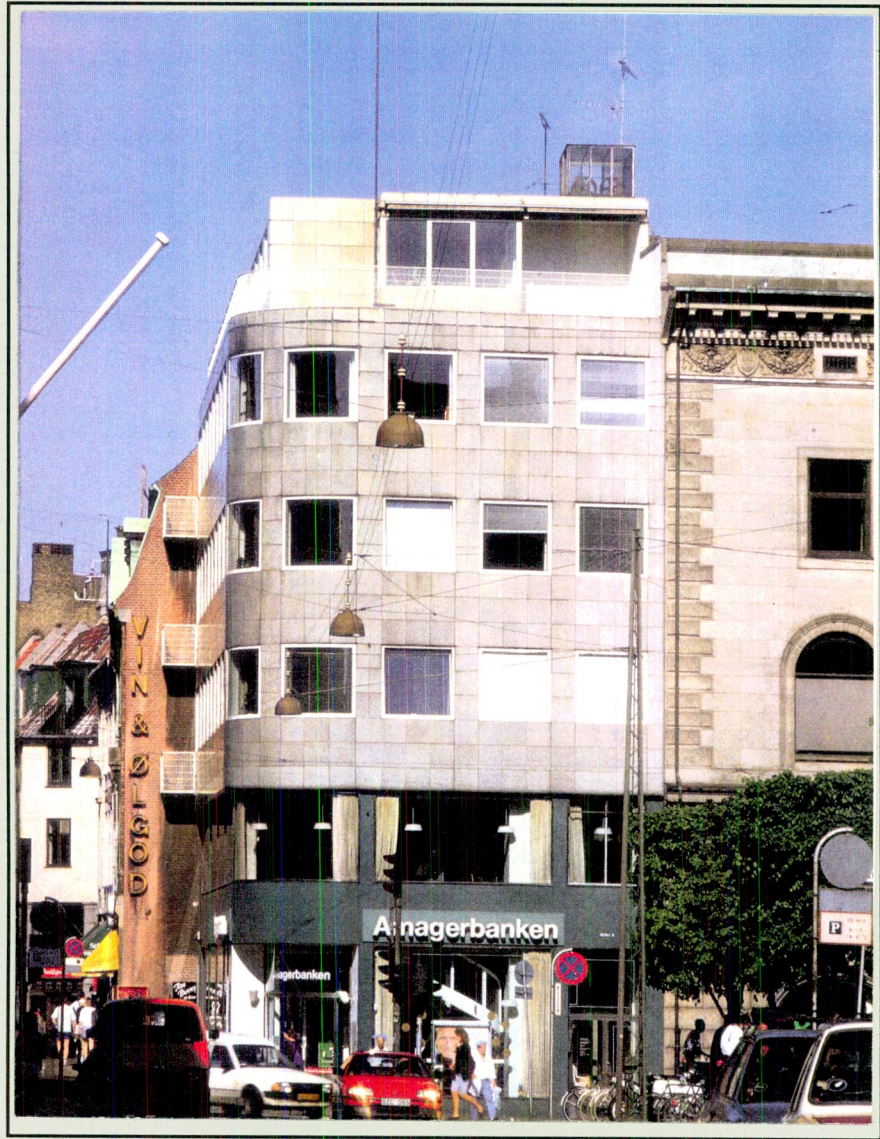


Fig.4: The Stelling's House, Copenhagen

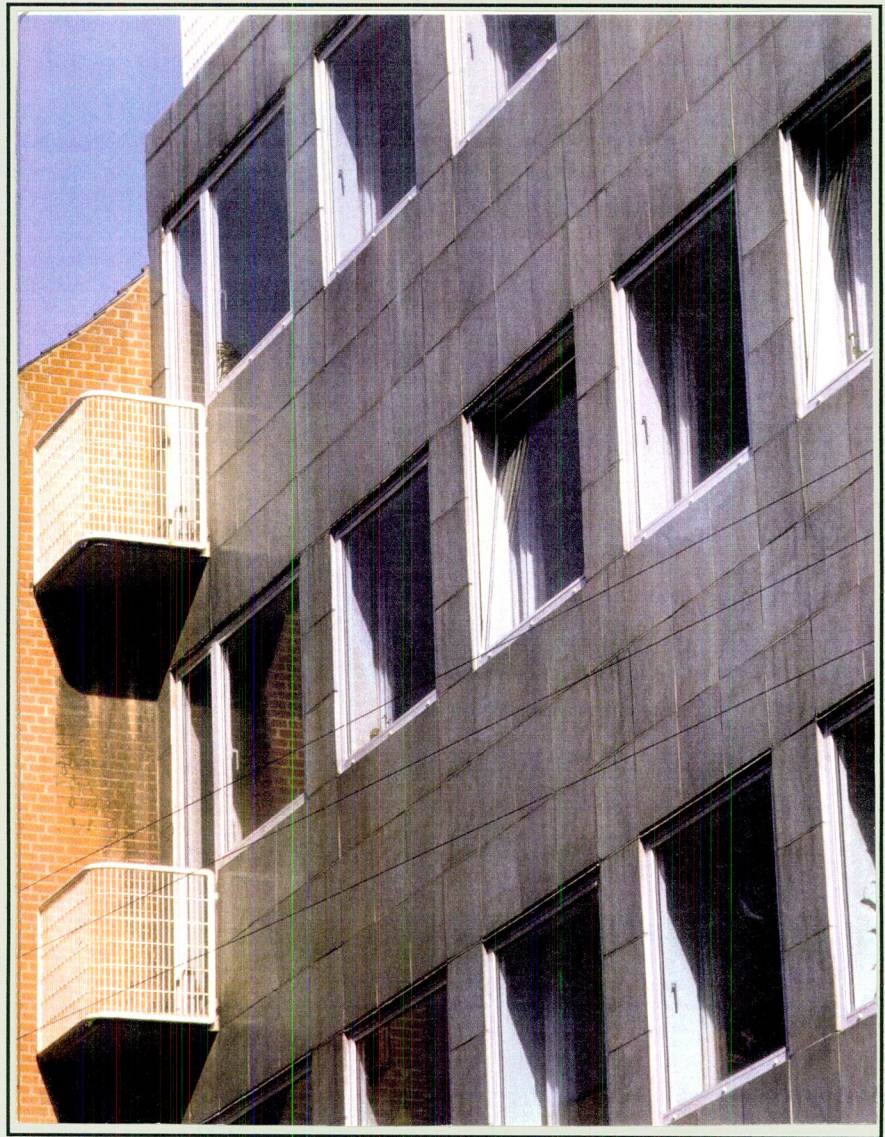


Fig.5: The Stelling's House, Side Edifice

wide double door at the entrance to the store and also the door leading to the staircase, is made from stainless steel.

At the level of the three office space storeys the exterior bearing concrete wall is covered with square, gray-glazed ceramic tiles in a 53 centimeters square module. Correspondingly, the windows are, as well, square, white painted steel windows. The same materials recur at the top storey.

At the top of the edifice, upon the flat plane roof, the elevator mechanism has been fitted into a small glass pavilion, which, like the railing encircling the top storey and the three narrow balconies along the indented alcove facing out toward Skindergade, has been executed in white painted iron.

But what is interesting about the exterior of the Stelling's House is that the references which are presented are not motific. The smoothness of the facade, the hardness and precision of the tiles, the roundedness above and below, which around the corner results in a double curvature, all of these are feature which approach the essential character of the machine. On the other hand, the early modernism, to great extent, otherwise made its references, and here, more to the factory than to the machine, to the industrial world for its motifs. It referred more to the steamship than to the high-technological phenomena like automobiles, planes and industrial machines.

"Had the International Style really been abreast of advanced technology in structures, for examples, its characteristic shapes would more likely have been curved than rectangular" (Jordy, 1982, p.50). For example, the doubly curved surfaces of Stelling's House can trigger associations with the fuselage of an aeroplane, or with the turbines in a power plant. The bottom section, with its windows framed with steel mouldings and spray painted steel plating seems refer more to the automobile. The references, however, are not

motific. They embrace, rather the fact that the building's exterior possesses characteristics which are common to machines and industrial products: Curvature, hardness, smoothness and precision. The smoothness and the roundness are continued in the interior of the Stelling' House. The surfaces of the wall in the staircase, for example, are filled with putty and coated with a glossy oil paint.

The Objects and the Space

Within his interior world Jacobsen developed his own aesthetic in his definition of objects within his space: sometimes he designed furniture for a specific location, like the three-legged Ant chair for the Novo insulin factory. On other occasions he created an environment for already-designed furniture.

Applying industrial production methods to the world of architecture was the next step: prefabrication and the link to Mies van der Rohe aesthetic was fundamental. Jacobsen imported these aesthetics to Denmark but without losing the traditional identity of his own Scandinavian background. When designing St Catherine's in Oxford he also adapted to the aesthetic of the country he was designing in.

Jacobsen's production as a designer covers a full range of objects. His interest in design dates back to when he was a student and he designed furniture in the fashionable styles of the time. His first international recognition came at the 1925 world exhibition in Paris when he received a gold medal for a chair.

Defining each and every element that is part of an architectural space as an integral part of architecture provokes a vital need to control and define all these small details.

Thus, doorknobs become essential parts of doors, which are at the same time intimately linked to the wooden veneering of the wall in a two-story high corridor that is the formal hub of a particular composition. At the same time he integrates a lamp that is periodically repeated, generating a warm atmosphere punctuated by the reflections of the doorknobs on the polished floor.

The rest of the rooms repeat the same formula. Other elements appear on the scene, standing free from the walls and emphasising the personality of each space: the pieces of furniture. These are defined as specific needs

are detected, and they are designed to be in harmony with the established atmosphere. A good example of this kind of integration is the Aarhus City Hall (See fig. 6) where all the pieces that help create the interior atmosphere were specially designed: the curved wood stacking chairs in the main hall (See fig.7); lamps made with a combination of bronze, brass and opal glass that provide light for working or indirect light to create a misty atmosphere (See fig.8); wood, leather or wicker chairs chosen for their distinction; doorknobs and doorknockers of brass or bronze and clocks for end of every corridor (See fig.9). All these elements responded to a need that stemmed from the architecture itself. It was only later that the idea of producing them commercially occurred.

When Jacobsen fled to Sweden during World War II work was scarce so he decided to dedicate this period of his life designing objects and paper and textile prints.

This was the beginning of a period of pure design, ranging from production all the way to the marketplace. Jacobsen's objects were born of vital needs and not as pieces to be integrated into specific spaces. From then on his new architectural spaces would combine this approach with his earlier concerns. The designs of Arne Jacobsen are typically very simple in form. His objects are born of simple geometrical shapes that are combined to obtain the final product. The new environments combined objects born out of this new pure design process with those born out of the architecture itself, and the combination frequently gave rise to others that he used in later projects.

The Ant chair (See fig. 10), designed for the Novo factory canteen is a good example of this, Jacobsen proposed that the Fritz Hansen factory manufacture three hundred three legged chairs. Serial production and commercial distribution were considered at a later stage. The next chapter will study this chair in depth. It is also important to examine the way in which Jacobsen designed his furniture in relation to the building they were being placed in. The interesting thing is that they acted as a

contrast more so than a part of. The SAS Royal Hotel and St. Catherine's college in Oxford are good examples of this.



Fig.6: Aarhus City Hall, Interior



Fig.7: Curved Wood Stacking Chair



Fig.8: Light for the Aarhus City Hall

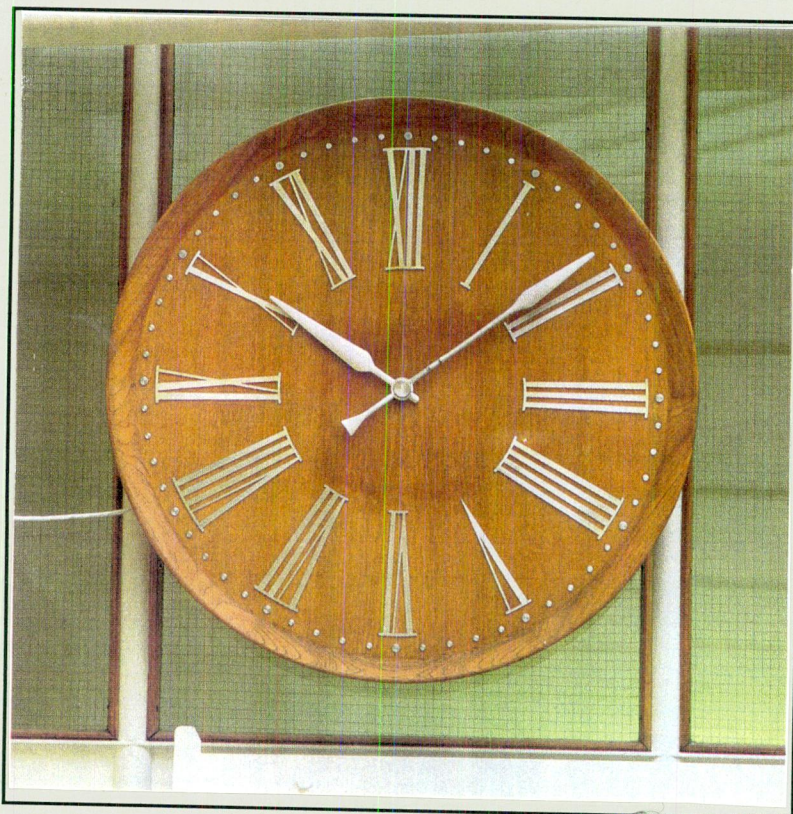


Fig.9: Clock for the Aarhus City Hall



Fig.10: The Ant, Designed for the Novo Factory Canteen

The Ant

As the belief in the social dimension of modernism decreased during and after The Second World War, the need to expand or emancipate the formal language of modernism increased, to extend its palette and emphasise the natural texture of the materials. Running parallel with the spread of modern - more spacious - interiors, the sculptural quality of furniture, their contours in space, were more in focus. In 1957 Jacobsen told the press: "Those of us who work in house construction know that space is scarcer everyday. Thus, furniture has to take up less space. I have designed my chairs so that they may be stacked, thus leaving more free space"(Beascoa, 1991, p210).

It can be seen from the quote above that Jacobsen was aware of the reduction in space in modern living when he set about trying to design a chair for the people. In his design he incorporated the seat and back in one piece of moulded plywood, and a three legged tubular steel frame. The two elements are combined by just one joint in the middle under the seat (See fig. 11). The continuous seat and back element is further stabilised on the frame by three rubber washers (See fig. 12). These washers and the resilient effect of the moulded plywood contribute to the comfort of the chair.

Using moulded plywood was not all-together a new idea because in the 1940's American architects Ray and Charles Eames started experimenting with double-curved steambent plywood with an eye on the industrial production of chairs. The moulding in two directions was made possible by a technique developed in the aeroplane industry. Among the chairs which grew out of these experiments was what was later known as The Eames Chair - two double-curving shells, seat and back respectively, hung on a steel pipe frame (See fig. 13).

In Denmark, Fritz Hansen's furniture factory had experimented with steambent plywood for many years.

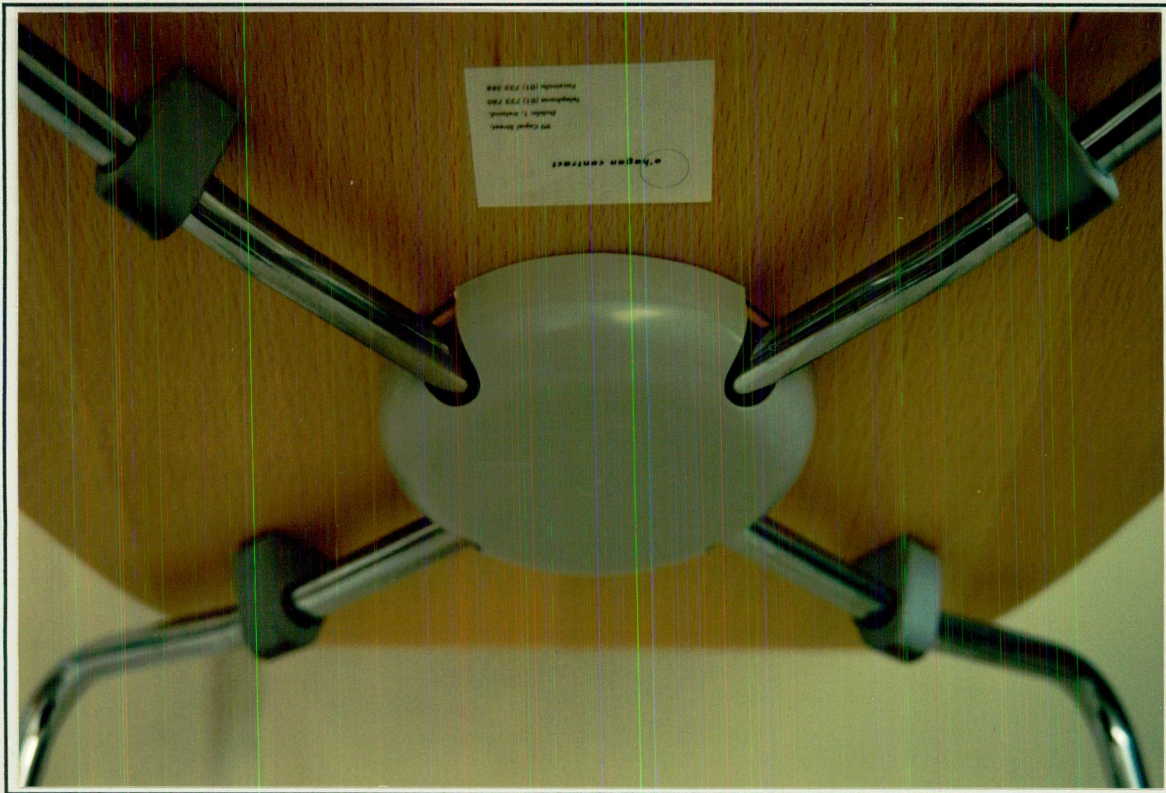


Fig.11: The Under Seat Element Of The Ant Chair



Fig.12: The Rubber Washer Of The Ant Chair

But when Arne Jacobsen presented his model of a moulded plywood to the firm, they were not enthusiastic. It was only when Arne Jacobsen was able to order 200 copies of this chair for the new canteen he was designing for Novo that he succeeded in convincing the factory to develop the chair fully and produce it 400 copies. Since then, Fritz Hansen has produced over 5 million of them (See fig. 14).

In order to mould the double-curved seat shell in one piece, it was necessary to narrow it at the join between seat and back. This was the technical argument for the characteristic waist profile which to the give the chair its name; The Ant. But this narrowing and the three legs of the tubular steel frame are also expressions of the need to minimise the use of material - a characteristic of Arne Jacobsen's work from that period.

This chair refers us back to the late twenties, when new ideas appeared in two components: the structure of the chair and the seat itself. These two parts not only differed in function but also in material. The structure was metal, which made it possible to vary the form. For the seat a warmer and more yielding material, such as leather or cloth, was used to give more comfort.

Jacobsen's chairs combines this and links it to a more traditional logic in the use of legs, although taking it to the "structural extreme" by eliminating one of them.

This produces a degree of imbalance solved by allowing a subtle rocking movement where the two parts of the chair joined. The joint is designed as a "meeting knot". The seat rocks around this knot with a margin that is limited by rubber stoppers in the upper part of the legs, that constrain any further movement. The result is a certain elasticity that offsets the hardness of the wood, which maintains its traditional warmth despite having been industrially processed.

The Ant clearly distinguishes itself from its predecessor, The Eames Chair, by reducing seat and back to one

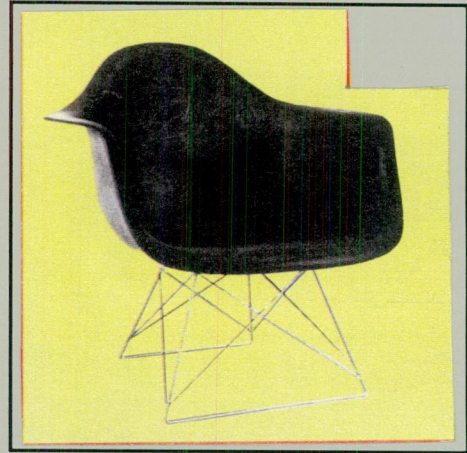


Fig.13: The Eames Chair



Fig.14: The Ants

continuous element and by being stackable (See fig.15). The Ant not only represents a decisive leap in the development of the modern industrially produced chair, but also in its orientation to the mass market. It was conceived as an everyday chair and Arne Jacobsen set a maximum retail price on it.

Also in terms of materials it demonstrates an minimalisation. The strength of the laminated plywood shell has been utilised completely and the tubular steel is as thin as physically possible. Its slowness makes the chair easy to handle and very flexible in use.

The Ant marks a turning point in Arne Jacobsen's career as a designer. With this chair he distances himself from the Danish furniture tradition and furniture craft, as well as from excessive modernism. He had discovered his own style which was modern and international, but also clarified and personal. The Ant was the beginning - the starting point of all his major works in furniture. The chairs - and it was the chairs - which gave Arne Jacobsen an international reputation as a furniture designer.

At the same time Arne Jacobsen's architecture, and thus the interiors which his furniture was created for, becomes more international. Sharper in its consistent rectangularity. Minimal and concise in expression. Bricks and wood tend to be replaced by steel, glass, aluminium and polished stone, industrially developed materials with no regional characteristics. This causes a sharper contrast between the objects and the space they are placed in. It also suggests that Jacobsen was attempting to soften his architectural spaces with the soft organic shapes such as The Ant. But even though Arne Jacobsen's style is certainly inspired by colleagues such as Mies van der Rohe he still kept his own personal style which can be seen throughout his work.

For these buildings, Arne Jacobsen designed a number of chairs which had The Ant's shell as a common starting point. The most famous is Series 7 (See fig. 16) which

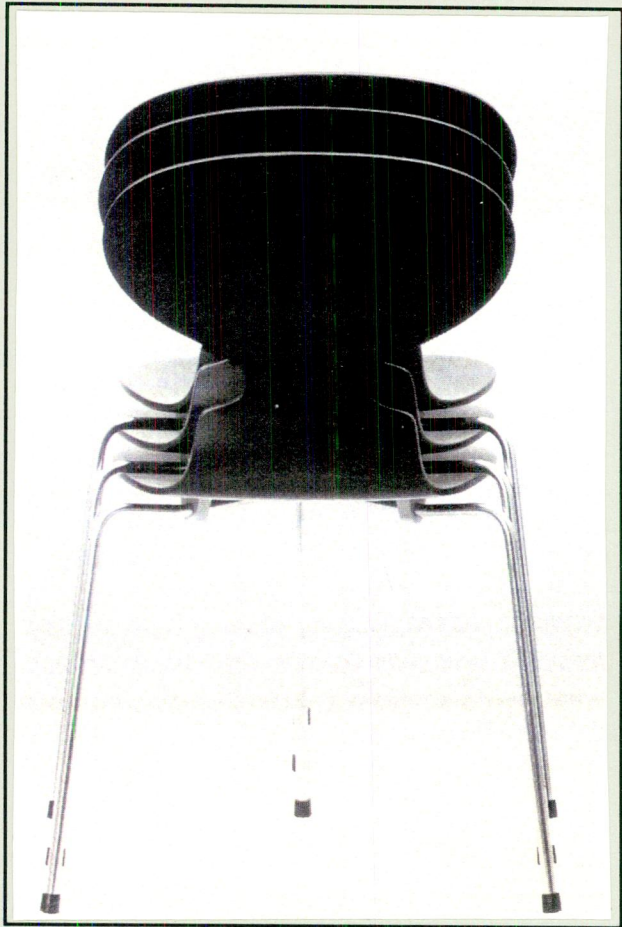


Fig.15: The Ant Stacked

was designed for Rødovre Town Hall in 1955. In the edition the chair has become more robust and has been equipped with four legs. In contrast to The Ant it can be equipped with elbowrests. Series7 is also stackable and is manufactured in many versions with different accessories. It is the most sold chair in Denmark.

All in all The Ant is an ingenious simplification of the idea of a modern, industrially produced chair for everyday use.



Fig.16: Series 7

The Royal Hotel, Copenhagen

The Royal Hotel (1956-61), also called the SAS hotel, in central Copenhagen has long since been declared one of Arne Jacobsen's major works (See fig. 17). Even though its layout is clearly inspired by Lever House in New York, designed by Gordon Bunshaft from Skidmore, Owings and Merrill, the Royal Hotel is a more beautiful building, and the touch of Arne Jacobsen is evident throughout the design. Here his eminent sense of proportion, his sense of colour and surface and the importance of detail manifest themselves in a large building, without at any time losing his grip the whole project. The Royal Hotel is first and foremost a stringently controlled and clarified total design. The high rise buildings interplay with the Danish sky brilliantly demonstrates that the late cool modernism can be extremely poetic.

Among the chairs he designed for the SAS, The Swan and The Egg are the best known. (See fig. 18 & fig. 19) Both realise an idea connected to the concept of organic form - the idea of a chair where seat and armrest are one continuous shape - a shell. In these designs, the use of unconstrained lines or, one might say, organic forms is combined with minimalization of material, constructive rationality and the demands of industrial production. It is interesting though that these wildly organic shapes are placed within a building which is strictly rectangular, the reason again being to soften the visual atmosphere so as to create an air of vibrancy (see fig.20).

Arne Jacobsen designed a great amount of furniture, lamps, fittings and textile, cutlery, glass, and tableware for The Royal Hotel. Included in this was the AJ Lamp (See fig.21) with its straight lines and the combination of oblique and right angles. Also included was the AJ Cutlery (See fig. 22). The intention in the shell chairs of eliminating an object's division into partial sections is rediscovered in his cutlery, where not even the form of the knife is divided into handle and blade. As in the other



Fig.17: The SAS Building, Copenhagen



Fig.18: The Egg Chair



Fig.19: The Swan Chair



Fig.20: The Interior Of The SAS Royal Hotel, Copenhagen



Fig.21: The AJ Light For The SAS Hotel

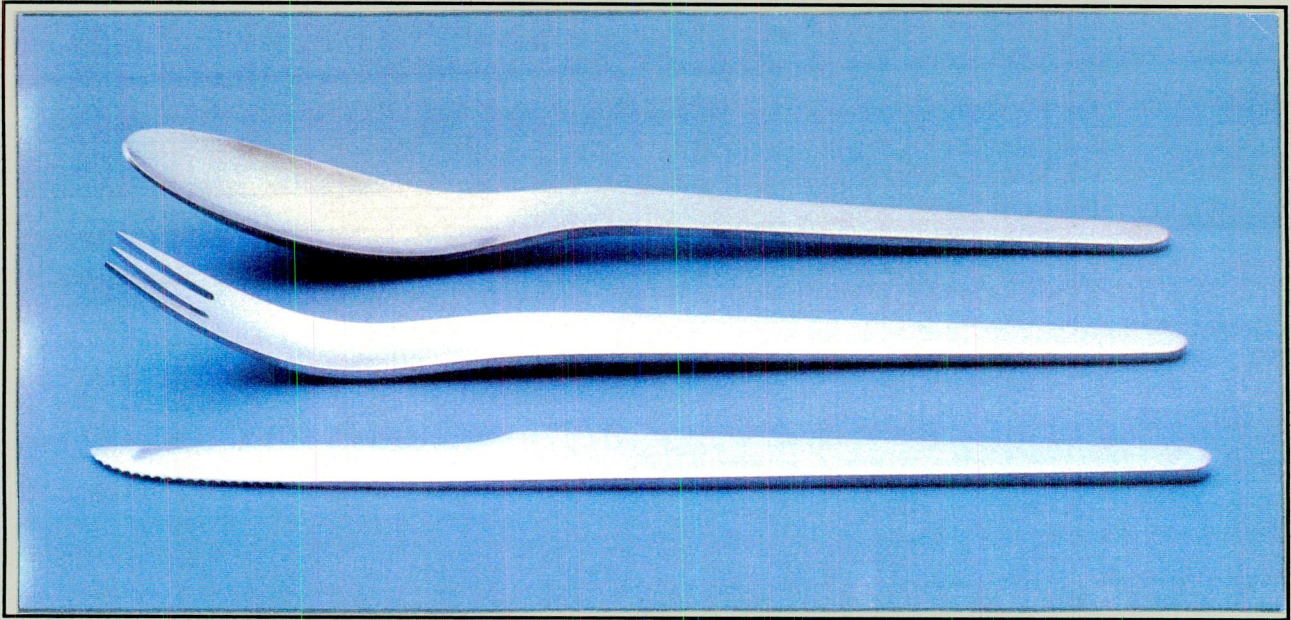


Fig.22: The AJ Cutlery For The SAS Hotel

items, this has also been reduced to one element, one form. The use of material as well as the formal deviations have been minimised in the extreme. That the design of this cutlery was radical is illustrated by the fact that it was used in Stanley Kubrick's futuristic epic 2001:A Space Odyssey.

Even though many of them were designed for the fashionable surroundings of the Royal Hotel, they are free of vulgar modernity which vitiates many other designers' work from that period. On the contrary, what characterises them all is in fact that they have been to be used - in everyday life.

In any circumstances it is remarkable that just these designs which in many ways are reflections of their time, for example in its preoccupation with organic form, are in fact not tied to that time. It is also remarkable that like few other products from that period, they give meaning to the hackneyed description: Timeless. Among these designs, the items of furniture in particular have been labelled modern classics.

St Catherine's College and the Oxford Chair

St Catherine's College in Oxford (1960-1963) is another of Arne Jacobsen's major works. It is designed as an axial complex of individual buildings situated around a central square - the quadrangle. The touch of the layout is classical with a reference to the traditional colleges. The individual buildings are distinctly modern, but endowed with a monumentality which has classical progenitors. In contrast to, for example, The Royal Hotel, the structure is emphasised as a significant element in the architectural expression.

For St Catherine's, Arne Jacobsen designed two series of chairs whose common factor was that they predominately curved in only one direction - in profile, while from the front they were more or less rectangular. Their seat and back section were in one piece, as a section taken from one of the benches which Arne Jacobsen had designed for earlier projects, where the seat and the back were one curved form which followed the body of the sitting person.

A concept for a chair's seat and back as one form made independent of the bearing construction. A concept which Arne Jacobsen had worked with long before, for example in the previously mentioned basket-chair for The House of the Future. But it is also a concept which has been utilised in a long series of modern chairs, among them Aalto's Paimio-chair.

This concept was expressed most clearly, but also in its most extreme form, in the Oxford chair whose tall back is simply designed as a piece of bent, slightly double-curved plywood with no upholstery, which is held up by a pillar foot made from four pieces of steambent wood. As a chair for the top table in Oxford it represents an image of hierarchy and status (See fig. 23). The chair, monumental as a memorial column, is one of Arne Jacobsen's most powerful works.

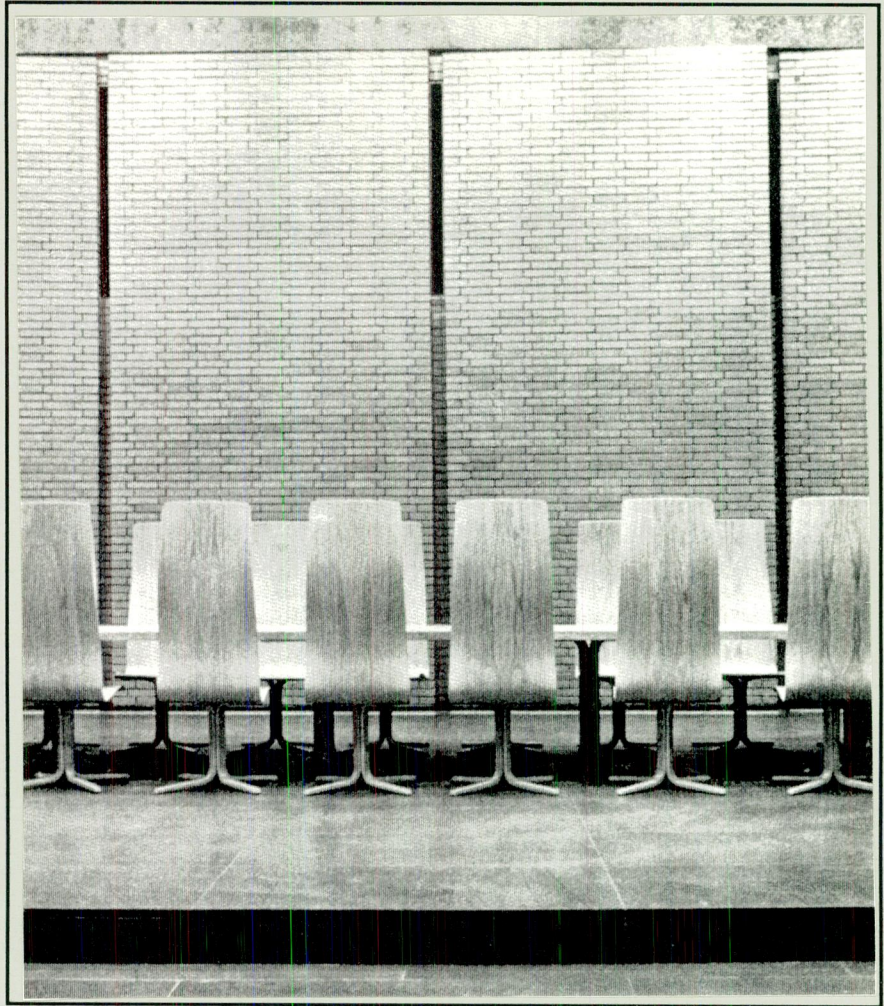


Fig.23: The Oxford Chairs and Table

This chair was never mass produced, but it was the starting point for the so called Oxford series, which compares to it as the mass-produced racing car compares to the handmade: Tamer, more comfortable, at once less sober and less hysterical - and not quite as interesting.

The Geometry of his Work

Arne Jacobsen's first modern chair was the basket chair that he and Flemming Lassen designed for The House of the Future (See fig.3). It had semi-circular side and was designed for a house with geometry based on the circle.

Later, the curves became softer and more liberated in relation to the circular geometry. A development which became apparent with the interiors for the town hall in Aarhus and Søllerød, where the cohesion between space and the objects and furnishings designed for it, reach new heights.

At the end of the 1950's the picture changes. The architecture becomes completely rectangular and, at the same time, the furniture is dominated by free curves or organic forms. Now the relation between space and its furniture is characterised by a striking contrast, which is particularly apparent in The Royal Hotel. The high-strung contrast between the rectilinear interior and heavily-curved chairs such as The Swan and The Egg.

Also his use of basic geometry is exemplified in both The House of the Future and the Cylinda-Line. The application of the divine circle.

But in both cases something else was going on also. In the beginning it was, for example, the most traditional furniture and the yellow brick houses of the functional tradition. In the end the more mannered and expressive architecture in whose fissures fragmentation lurks.

Arne Jacobsen's greatest chairs were created in the period when his architecture seems most delineated. Where its space is controlled by an obvious geometry.

In these rooms the chairs flourish.

From the free, organic curve which characterised Arne Jacobsen's work from the 1950's, he turned more towards

the basic geometrical forms, not least the circle, during the 1960's. At the same time he became very engaged with module-based addition-principles and systems. An interest which in his architectural projects manifested itself most clearly in the cubicle-based Kvadraflex building system for standard houses.

The interest in open systems and structures which grew with the addition of new elements emerged during the 1960's. This was among other things a reaction to the closed monolithic architecture of the 1950's, as seen, for example, in The Royal Hotel. Now the interest turned towards a more process oriented, structural and flexible architecture based on the combination of elements with common basic dimensions. the modular aspect, which is deeply entrenched in Danish architectural tradition, and had been so all along, was now accentuated.

This is, for example, expressed in the series silverware for called the Cyclinda-Line for Stelton. This was one of Arne Jacobsen's best and last design projects before he died. It was Peter Holmblad from the firm Stelton who after many attempts finally in 1964 convinced Arne Jacobsen to design such a series with the cylinder as the basic element.

This is the topic of the next chapter. It will deal with not just his ability to apply new technology to stainless steelware but his application of proportions to his range of products. This is what makes Arne Jacobsen's design's never to become old.

The Purism and the Proportions of The Cylinda-Line

Introduction

It is extraordinary that Cylinda-Line (See fig. 24) even exists. If today's parameters for product development, design, and marketing had been followed, Arne Jacobsen's rough sketches on a napkin would never have become the range of well designed stainless steel tableware.

First of all, there was no technology at the beginning of the 1960s that was able transform Arne Jacobsen's ideas about hollowware with a cylindrical overall form into stainless steel. Secondly, it was daring to launch a range of no less than 18 pieces without preliminary market research on a large uncharted audience.

Stelton was founded at the beginning of the 1960s to sell stainless steel hollowware for the company Dansk Rustfrit in Farevejle Stationsby, a little town in Northwest Zealand. The range consisted of sauceboats, platters, salad bowls, and Peter Holmblad was hired to sell them (Stelton Catalogue) Their design was mediocre, or actually, non-existent. It was supposed to be the basis for a range of products with a more contemporary look.

Through family connections, Peter Holmblad was able to present his ideas to Arne Jacobsen, but Jacobsen had plenty to do with new buildings, furniture design, and other things, and declined. Peter Holmblad was insistent, though, and during a dinner party he persuaded Jacobsen sketched a few ideas on his napkin. Jacobsen's sketches looked terse, logical, and functional. That was 1964, but three years passed before the range was first produced.



Fig.24: The Cylinda-Line From Stelton

The Material

Stainless steel is an exceptionally demanding material. If it is incorrectly or badly worked, steel shows its obstinate nature in the form of tension stripes and uneven surfaces. And this is the material Arne Jacobsen chose for his terse cylindrical and angular shapes. It was an almost impossible task, and it was actually necessary to develop new machines and welding techniques to meet Arne Jacobsen's requirements for seamless tubes with perfect, brushed surfaces (See fig 25).

It is precisely Jacobsen's unwavering demand for perfection that has made Cylanda-Line something special, in the first place, and also given Stelton's complete know how in the field of stainless steel. And this, in turn, has made it largely impossible for others to copy its product. Few others master this technology, and the company still leaps ahead, now that the production line has been supplemented with high-tech, computer-controlled pressing machines, laser cutters, rolling equipment, and brushing machines.

In contrast to the slow skilful process of silver stands the quick, mechanical process of steel. Stainless steel is a cheap raw material, is strong and wears well, is easy to clean and easy to handle in daily use. The hardness of steel and the necessary mechanical processing allows only for production of simple forms without too many complications. Thus hollowware in steel presents clear geometrical shapes without decoration or refined details.

But exactly this strict limitation in design and the lack of detail necessitates an extreme skill in proportioning the individual objects, if the finished product is to be attractive. In the best Danish steel-wares the simplification has been taken to its extreme consequence by concentrating on cylindrical bodies which are enriched by compact handles, lids and spouts.

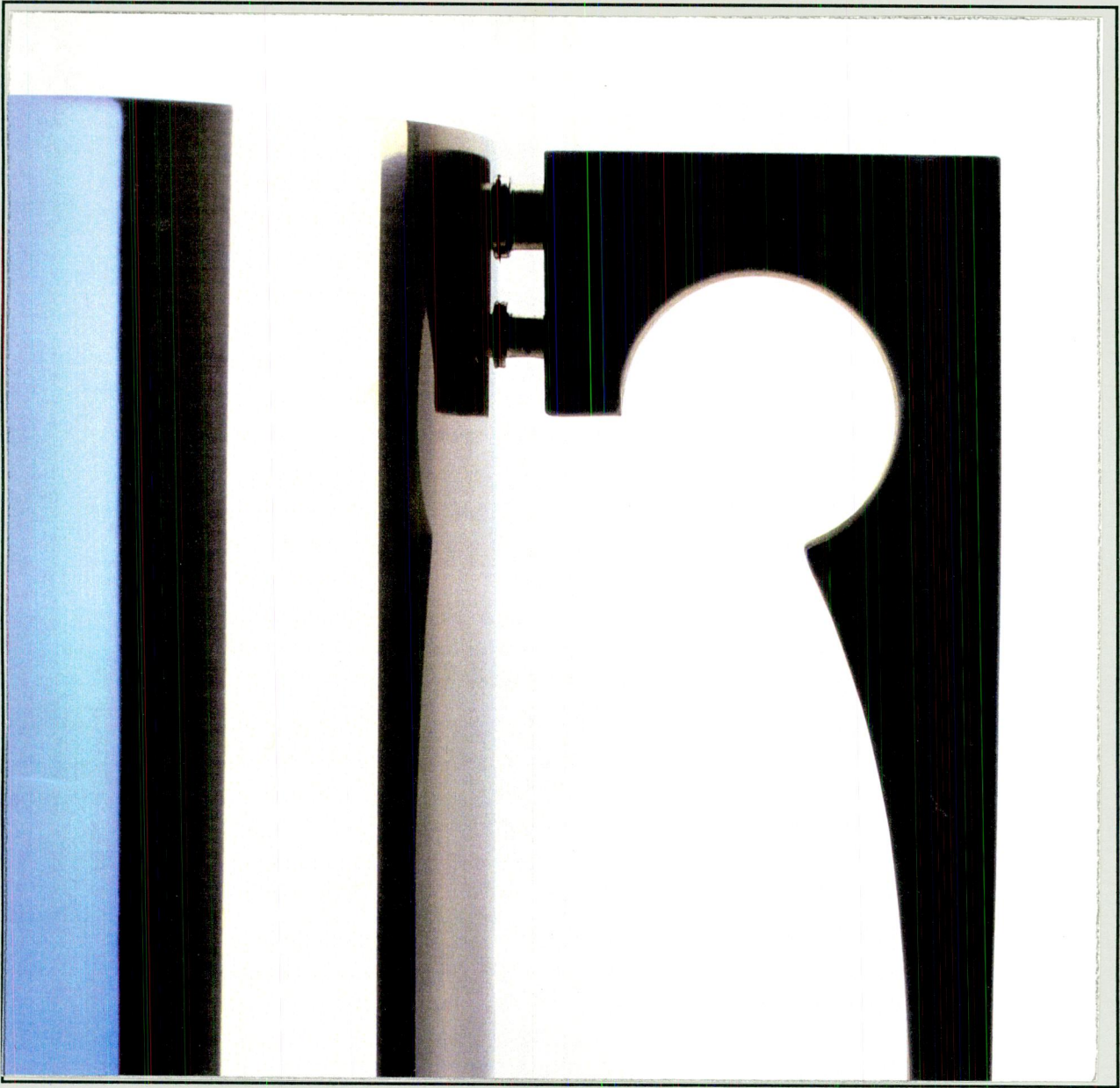


Fig.25: A Cyclinda-Line Detail

Proportion

But what is so important about proportioning and why is it useful? To explain this, imagine you are walking over a large field which stretches as far as you can see. In the distance an object looms above the horizon. As the light is failing you cannot recognise what it is, nor observe its colour or the texture of its surface. You do not know what material it is made of. Since there are no other objects about, such as trees or people, and you do not know how far away it is, you cannot judge its size. But in spite of this a part of the object's character will have impressed itself on you; you will have compared its height with its width. As you approach the object and recognise all the qualities of the object you will add further impressions until your idea of the object's character is fairly complete. But your first impression - comparison of height with width - will have conveyed to you an important part of the object's character. As can be seen in the situation above proportion is an important character in the way humans view an object.

We observe and experience all the shapes of our surroundings in this way. Whether we are looking at motor cars or animals, a comparison of height with width gives us a part of the object's character. It can be expressed in terms of mathematics and is called a ratio or a proportion.

When Arne Jacobsen was asked in a newspaper interview what comprises the architectural idea of beauty his answer was as follows. "The primary factor is the proportional. It is precisely the proportions which make the old Greek temples classic in their beauty. They are like great blocks, from which the air has been literally hewn out between the columns. And whether one looks at a building from the Baroque, the Renaissance or today, those one wants to look at, those one admires, are all well-proportioned, that is vital. Next comes the material, not mixing the wrong materials. And out of that comes of course the colour - and together the overall

impression."(Ninka, "Interview with Arne Jacobsen", Politiken, 28 Feb 1971)

It is these factors, proportion, materials and texture, that are the most important in the work of Arne Jacobsen. It can be seen that proportion was highest on the agenda for Jacobsen. In this chapter this idea of proportion will be explained on a simple level and examples of his application of proportions will be used to exemplify his ideals.

When examining the work of Arne Jacobsen it is important to understand the importance of the use of proportion in his architecture but especially in his industrial designed products. This is exemplified in the products of Cylinda-Line. Before examining objects from the Cylinda-Line in detail it is important to try to establish a set of rules that Jacobsen may have worked under when designing an object or a building.

The Modulor

There is little or no information documented in this area on Jacobsen's work but it is felt that he related his belief on proportion to the work of Le Corbusier and The Modulor. This theory was based on trying to establish "a new visual measure that would replace the Foot and Inch system of the Anglo-Saxon world and the Metric system of the other side."(Le Corbusier, 1951, p17). The plans and drawings of the architecture of past ages show how preoccupied architects have always been with the problem of ratio, not only of the overall shape of a building but also the smaller shapes. They considered the ratios of the outside walls. They also calculated the height, length and width of each room in relation to each other. What Corbusier was attempting to achieve was a scale which was based on mankind and nature because design should be based entirely on the users and therefore it should be a human scale.

Le Corbusier devised a system of proportions and measurements based on the Golden Section. This is a

number which is based on a mathematical proportion theory. This number is based on the division of half a square. The sides of this new shape all related to each with the proportion of 1:1.618. This wonderful number, which is also known as the Divine Proportion, the Golden Ratio, or the Golden Number, has more than mathematical applications; it is also significant in the living world.

The Golden Section was used as a bases for most of the Greek architecture and was also used by artists of the Renaissance. The system Corbusier devised consisted of two sets of figures. The first is based on the height of the average man (1.829 metres) If this height is divided according to the Golden Section (1.618metres), the longer of the two parts will correspond to the naval height of the average man. If this division is continued a whole range of figures is found which relate directly to the human figure. In using a proportionate system based on the Golden Section you are therefore following natural laws.

The mathematics of Le Corbusier's theory are quite detailed and difficult to understand in places but if the basic theory of creating a scale based on the human is understood then that is enough for the purpose of this discussion.

To prove that Jacobsen was a keen follower of Le Corbusier proportion theories let us examine a few of his objects to see if there is any relationship between his objects the that all important number 1.618. For the purpose of simplifying this explanation let us replace the Golden number with this symbol: Ω .

From the diagram (See fig. 26) it can seen that all lengths of this cocktail shaker designed by Arne Jacobsen for Stelton have been denoted by a symbol. These symbols represent lenghts shown below.

A=53.4mm

B=86.3mm

C=226mm

If A is multiplied by Ω (The Golden Section)

= B

If B x Ω^2

= C

It can be seen from this simple mathematical proof that Arne Jacobsen did apply the work of Le Corbusier to his designs and buildings.

Purism

Another important feature in these designs is his strict use of geometry and non-ornamentation. This is also directly related to the theories of purism which had been studied in depth by groups and architects such as Le Corbusier, De Stijl and the Bauhaus in the early twentieth century. The idea behind the purists was that design should be unsullied by ornament, fantasy or individuality and was to be inspired by the machine. This idea can be seen in Jacobsen's design of the Stelton range and also in the Vola range. The widespread influence of purism in architecture linked it with a joyless form of economic and technological functionalism that was not the intent of the originators.

At their most severe, Purism and its allies virtually eliminated modulation and transition curves from their works. Linear elements were largely restricted to straight edges and radius curves that symbolised machines.

When dealing with strict geometrical shapes as in the Cyclinda-Line the use of materials and textures is what will make the object visually soft or hard. Firm and clean materials such as steel and glass evoke the image of mechanisms of man whereas the use of materials such as rubber or plastics can evoke the image of living organisms.

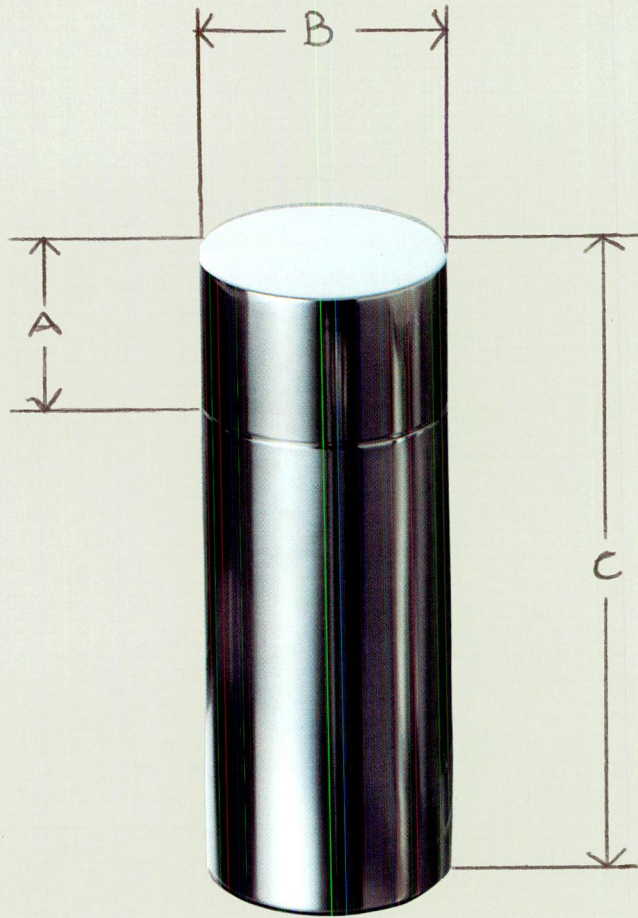


Fig.26: Proportion Diagram

It is clear in this case that Jacobsen was trying to display the image of mechanisms and industrialisation but has attempted to soften this by slightly brushing the steel so as to reduce the effect of starkness and cleanliness.

It is important when dealing with such strict forms that the detailing of the object and the softening of the edges are well executed. An edge expresses a change of spacial quality from one density to another. The change need not be abrupt and in this case Jacobsen has broken the monotony by using a simple detail and somehow creating a detour for the eye to follow.

Conclusion

Today, architecture is a specialised occupation whose practitioners often put the efforts of a lifetime into a little corner of the profession. One chooses a speciality, or is chosen by it, and keeps to it all through life. It may be office blocks, hotel and congress buildings, industrial buildings, blocks of flats, museums, family houses or restorations - or perhaps a branch such as town planning or landscape architecture.

What makes Arne Jacobsen so exciting is not just the quality and amount of his work, but also the breadth of it. When you compare the way in which architects specialise today, Jacobsen was a renaissance man whose work covered the whole field from the very modest conversion of the small family house to some of the most distinctive hotels, schools, universities, sports grounds, and residential areas.

Interestingly his methods as an architect differed from those he used as a designer in one principal respect: the use of drawing. His buildings were drawn in meticulous detail even though they look as though they were accomplished in one single effortless line (See fig 27) whereas there are, generally speaking, no drawings of his products, at least no drawings made by the drawing office before production started.

With his products he would make some preliminary sketches but preferred to work with a long series of 3-D models (See fig. 28). Prototypes would then be made by tradesmen and manufacturers production departments in continuous dialogue with Jacobsen himself. This evolutionary process was common to his architecture in that one idea often contained the seed for the next. His methods thus resembled nature in its production of concise, complete, elegant results without superfluity.

Several other features characterised Jacobsen's modest design theories which are coming back into fashion. He

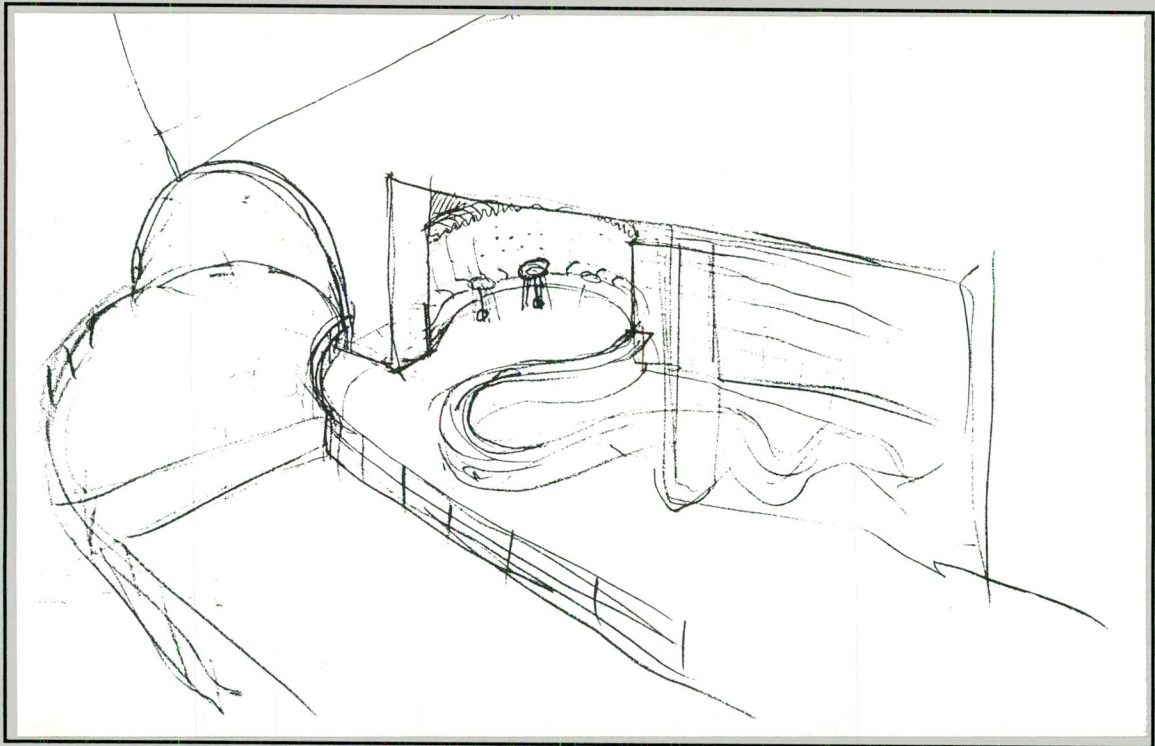


Fig.27: An Arne Jacobsen Sketch

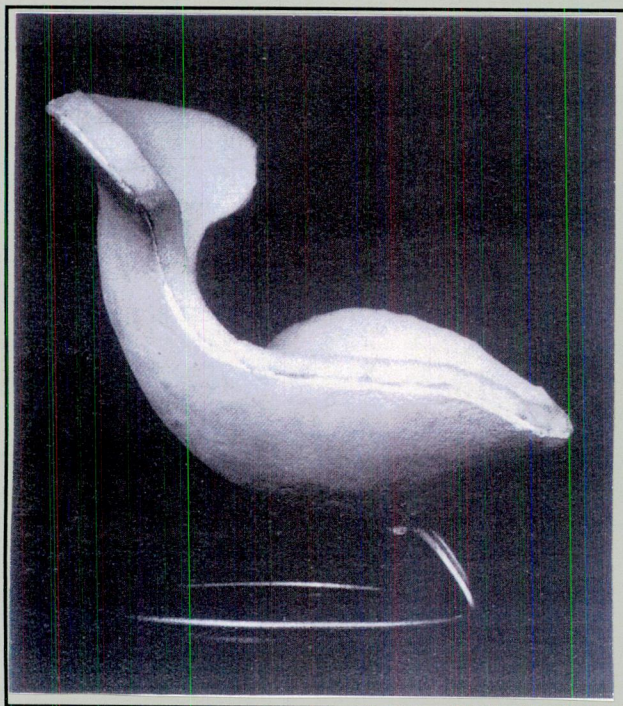


Fig.28: Furniture Model

had a strong belief that design should be a service and that the practitioner should suppress the ego in favour of the promotion of the care of duty to the user. Despite being highly original he worked not to shock but to serve. Another feature of Arne Jacobsen's work is his fascination with technology and his practice of pushing at its limits and sometimes even creating new limits.

With the Ant chair, the Egg and the Swan and much of Arne Jacobsen's other Fritz Hansen furniture Jacobsen goes to the limits of the technically possible with constructions in double curved plywood, in reinforced foam material, or simply because of the slender dimensions. For example the narrow waist of "The Ant", which has given the chair its name, was not dictated by aesthetic or functional consideration for production. The veneer simply had a tendency to curl at the spot where the curvature radius was smallest. The cuts in the sides relieved the tensions and made the chair suitable for production.

Much of his work was intended for a specific production technology and designed within the rules of that technology - the known and, in many cases, also the unknown, which had to be explored first and was always used with true mastery.

Likewise, Stelton's Cylinda-Line was thought out in the production process. The name indicates a limitation, chosen by the designer, for the body of the items: the cyclindrical form. In addition came the desire to work exclusively in the dimensions that were standard for drawn tubes in stainless steel. It later transpired that the drawn tubes were too expensive. They could not compete with the production of the cyclindrical items in steel sheeting with argon welding. However, the standard diameters were retained.

The limitation that Arne Jacobsen chose for his designs was also, in many cases, the deeper urge to create what is today called minimal construction.

To obtain a deeper appreciation of Arne Jacobsen's work it is important to bear in mind that as a young man his wish was to become a painter. It was his father who persuaded him to concentrate on architecture but Jacobsen's interest in painting and sculpture can be sensed in his architecture and his design work. It is evident in his work with both texture and form, in the proportions of a building and the form of its carcass, an item of furniture, a door-handle.

Arne Jacobsen saw all his projects as a study of the total environment. He always looked at buildings in their context, their grounds and gardens and with their contents: fittings, furniture and even sometimes fabrics. Out of Jacobsen's architectural projects were generated a series of definitive and archetypal domestic objects. The judgement rests not only on aesthetic criteria but on their commercial longevity.

Indeed, most of Arne Jacobsen's work - both architectural and design are evidence of that special blend of intellect and intuition we call talent.

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