

The Importance of 'Spirit' in the Architecture of Eero Saarinen





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CHAPTER 1

INTRODUCTION

This theses is an analysis of the architecture of Eero Saarinen (1910 - 1961). For the purpose of this thesis four buildings were chosen that reflect the diverse range of skills and to evaluate his handling of each commission or programme. It will show how Saarinen approaches every building with fresh enthusiasm in the hope of bringing out of each problem a particular solution exclusive to that building, how he maintains a consistency of theme throughout a building (not throughout his architecture), and how he expresses the use of the building in its structure.

Before looking at Saarinen this thesis will outline the principles of twentieth century architecture and show the influences which Mies van der Rohe (1886 - 1969) and Le Corbusier (1883 - 1966) had on Eero Saarinen.

The term 'Modern Architecture' can sometimes be confusing as many past eras have referred to their own architecture as modern. The modern architecture we refer to today may encompass the inventions of the late nineteenth century right up to present day, and was conceived in reaction to or perhaps evolved from the supposed chaos and eclecticism of various nineteenth century rivals of historical forms. Each age of the past possessed an architecture expressive of its time. This new architecture set out to rediscover its path. The aim was to achieve a new architecture based on the principles of functionalism and rationalism. It was not the intention to create a new style to add to the numerous styles of the past but to create a new rational approach to design and architecture ; a definable approach, to make use of new materials and construction techniques and to fill the needs of modern industrial societies.

By the 1920s the 'International Modern Style' had evolved - expressive language of simple floating volumes and clear-cut geometries, a style shared by such diverse architects as Le Corbusier, J.P.Oud (1890 - 1963), Gerrit Rietveld (1888 - 1964), Walter Gropius (1883 - 1969) and Mies van der Rohe. This was claimed to be the one true architecture of the twentieth century.

These architects were attempting toward one aim in their connection with the Bauhaus but later developed their own distinct approach to the problems of function and rationality. Thus the architecture which was supposed to have expunged tradition founded a tradition of its own.

In a sense I align myself humbly with Le Corbusier and against Mies van der Rohe, although I admire his achievements immensely. (Saarinen A., 1968, p 6)

Mies van der Rohe believed that the form of his buildings should be the expression of their structure. Quite obviously Saarinen believed form should do more than simply express structure.

Structural integrity is a potent and lasting principle and I would never want to get far away from it. To express structure, however, is not an end in itself. It is only when structure can contribute to the total and to the other principles that it is important (Saarinen A., 1968, p.6)

Mies van der Rohe was to evolve a clear and simple structure which answered the needs of the building honestly and significantly.

It is absurd to invent arbitrary forms, historical and modernistic forms, which are not determined by construction, the true guardian of the spirit of the times. (Blaser, 1972, p.8)

In his buildings he sought to express the significant driving forces of our era : the economic order in which we live, the discoveries of science and the technology and the existence of the mass society.

Saarinen's construction method employed in such buildings as the M.I.T. Auditorium, Cambridge, Massachusetts (1950 - 1955), and the T.W.A. Terminal, John F. Kennedy Airport (1956 - 1962) demonstrate how different Saarinen's approach is. At J.F.K. Saarinen employed such construction techniques to reflect the spirit of flight. In the strictly functional sense the forms are arbitrary, but Saarinen saw it as part of the 'function' of the architecture to reflect this spirit.

At the Illinois Institute of Technology, Mies applied the same architecture to all the buildings and there is little differentiation between the church and the hall despite the different activities they house. In contrast to this, Saarinen's General Motors Technical Centre, Warren, Michigan (1948 - 1956) combines different types of architecture relevant to the activity within. A modular precise structure reminiscent of the precision associated with the mass production of the car industry was chosen for the main part of the building while the display room for 'concept' cars is a vast metal dome surrounded by trees. The almost hemispherical bright polished surface has an air of space age technology, symbolic of the futuristic cars it encloses.

Curiously the main building is particularly Miesian in style. Despite Saarinen's disapproval of Mies's philosophy it is not surprising that the building fits into this category. Saarinen did admire Mies's achievements and would not dispute his ability as an architect. Since, in effect, Mies's approach to architecture reflected the machine age and mass production Saarinen was able to find the spirit he required in such an approach. 'I [Mies van der Rohe] believe that

architecture has little or nothing to do with the invention of interesting form or with personal inclinations.' (Blaser, 1972, p.8)

Le Corbusier during the 1920's believed the house should be a 'machine for living', freed of unnecessary clutter of the customary bourgeois dwelling of the time. He also attached great value to the engineer's aesthetic and mass production, and saw that the solution to the problem of defining the architecture of 'the new era' seemed then to lie in the transformation of the engineering aesthetic into symbolic forms of art. However, he did not wish to replace architecture with engineering or artistic expression with mere functionalism. His book Vers Une Architecture (Towards a new Architecture) is permeated with a lofty view of the role of art and emphasises the poetic value of sculptural form. The imaginative entrance hall of La Roche House, designed by Le Corbusier in 1923, is comparable to the interiors of certain Baroque chapels. Likewise Saarinen attached great value to sculptural form. This is manifested in his T.W.A. Terminal where his approach to vaulting problems is not unlike that of Baroque architecture.

Le Corbusier's desire to instill spiritual content in his buildings is perhaps nowhere more evident than in his chapel at Ronchamp. The chapel elicited much admiration for its poetic form but criticism for its purely visual appeal.

The sensational impact of the chapel on the visitor is significantly not sustained for any great length of time and when the emotions subside there is little to appeal to the intellect, and nothing to analyse or stimulate curiosity. (Stirling J., 1956, p.155)

An equally, if not more important, influence of Saarinen's work was his father Eliel (1873 - 1950), and the school of Cranbrook.

At General Motors and in his other work Saarinen readily acknowledges a number of his father's influences : a sense of spaciousness and orderliness, the complementing of existing structures, the use of bodies of water to provide focal points, resistance of a set style, a fondness for expressive materials. (Larrabee, Vignelli, 1981, p.56)

The Saarinens had come to the United States in 1923 from Finland, where for two decades Eliel had been one of his country's leading architects. In 1922 he had won second prize in a competition for the Tribune Tower in Chicago with a design that has almost become more famous, and more widely imitated than the one by Raymond Hood which was placed first and was actually built. Eliel decided to go to the United States for a visit at a time when the building trade in Finland was sluggish, knowing little more of Chicago than it was the home of Louis Sullivan (1856 - 1924) whom he greatly admired. Sullivan's rave review in Architectural Record must therefore have pleased Saarinen and perhaps encouraged him to stay. Sullivan described the Tribune Tower as 'a masterpiece' not a 'lonely cry in the wilderness' but a 'voice resonant and rich, ringing amidst the wealth and joy of life' (Larrabee, Vignelli, 1981, p.16) Sullivan was surprised that a Finlander, who had never built a tall office building should so quickly master the problem, and that a 'foreigner' should produce a design so completely in the American spirit.

Eliel Saarinen had been a part of that extraordinary burst of vitality which occurred in Finland around the turn of the century. Stirrings of independence and revived interest in the national culture in Helsinki in the 1890s brought together a group of painters, sculptors, craftsmen, musicians and writers for whom 'the world opened up' (Larrabee, and Vignelli, 1981, p.16)

The two decisive influences on him had been Finland's trees and lakes, and his childhood visits to the Hermitage Museum in Leningrad. The design of the manmade landscape he encountered as a young man dissatisfied him ; it seemed to speak with a different and lesser voice than Rembrandt or the birch trees. Such influences are evident in Eero's work also, the sculpture like form and the harmony with nature. *He later studied in Russia.*

In 1907 Eliel Saarinen visited the studio of Peter Behrens, where Gropius and Mies were to work. He later showed great admiration for Gropius's achievement in uniting the elements which formed the Bauhaus.

George Gough Booth and wife Ellen Scripps Booth living in Bloomfield Hills began to establish in 1908 institutions in the vicinity - The Brookside School for Children, the Cranbrook School for Boys and Christ Church, Cranbrook. At Booth's son's suggestion he brought Eliel Saarinen to this Academy of Art. Eliel went on to design many of Cranbrook's buildings. Saarinen brought to the academy a 'rich creative atmosphere...It is not an art school in the ordinary sense. It is a working place for creative people'. (Larrabee, Vignelli, 1981, p.16) *was prof of Arch at University of Michigan.*

It was here at the Cranbrook Academy of Art that Eero Saarinen met Charles Eames. Eames looked at Saarinen's work as having the beauty of a puppy. He saw Saarinen as being an engagingly rumpled man, sleeves rolled up, tie undone, shirt coming out of the trousers. This was not unlike his architecture, workmanlike, rather than self-consciously "creative". He also noted that his architecture had no assertive individual style ; there is no Saarinen trademark.

The thing that they [Saarinen's designs] have in common was the fact that, to a remarkable degree, each building turned out to be in itself a model of the problem. (Larabee, Vignelli, 1981, p. 50)

date ^ Together ~~Eero~~ Saarinen and Eames won an international competition for furniture design conducted by the Museum of Modern Art in New York. This was the first significant achievement in this field by Americans. The chairs, tables and cabinets with which Eames and Saarinen won the competition were not only advanced in visual conception but also in method of construction. The chairs were formed of foam rubber covered with upholstery over plywood shells, not bent in two dimensions (as Aalto and Breuer) but in three.

While at Cranbrook, Saarinen worked amongst people such as the architect Harry Weese, the sculptor Harry Bertoia, the designer Ray Kaiser, as well as Florence Schust. As a result of being part of such a creative environment, together with his earlier education in sculpture, Saarinen learned to appreciate architectural principles far beyond those utilitarian ones.

There was great mutual admiration between Charles Eames and Saarinen. Niels Diffrient who went to work for Saarinen in 1948 recalls how Saarinen's personality would change when Eames visited.

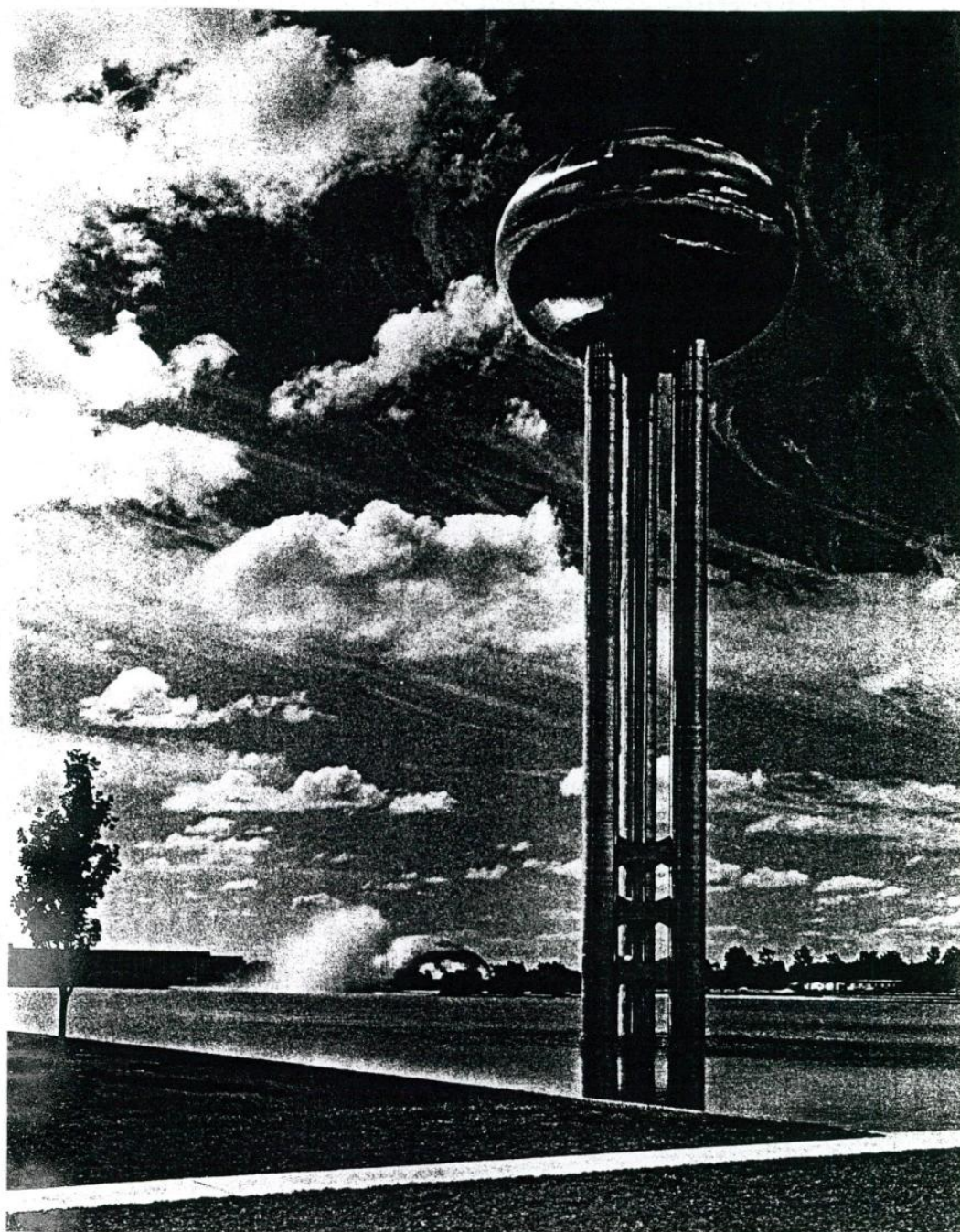
Eero was very sombre and solid always, when Charlie was around he was different, more bubbly ... the two of them would just pass ideas, like sparring between them, over furniture thoughts they had. (Larabee, Vignelli, 1981, p.56)

The two had different ideas and different skills. On one hand Saarinen had a great ability to deal with overall form. Eames, on the other was particularly skilled in handling detail. In a sense Saarinen's opinion that 'this is not a period of refinement' is

perhaps an attempt to justify his different approach than that of Eames. In moments of dissatisfaction Saarinen would reproach himself for thinking only of the big forms, while others like Eames concerned themselves with details. But, said Eames, 'in many respects this is where his greatness lies'. (Larrabee, Vignellie, 1981, p.57)

CHAPTER 2

GENERAL MOTORS TECHNICAL CENTRE



The author Ian McCallum said that Saarinen was heavily influenced by Mies van der Rohe in his design for the General Motors Technical Centre. The building definitely incorporates the Miesian discipline, in terms of overall planning and the characteristic structural vocabulary of curtain walling. To a large degree the building is reminiscent of the Illinois Institute of Technology (Mies) though the need for such a variety of size and shape of buildings, determined in part by the very different activities that they house, from the power-house and engine test cells to the styling centre, made impossible the use of the simple pure Miesian technique. 1/2

Saarinen had three goals in this project : to provide the best possible facilities for industrial research ; to create a unified, beautiful and human environment; and to find the appropriate architectural expression.

General Motors, indeed the car industry, is that of metal work.- a precision, mass production industry. Hence, this should be reflected in the design of the building.

Metal was chosen to form the structure of the building as it is used extensively in the motor industry. From structure, down to the smallest detail, the intention was to give the building the well made, mass produced image which at the time America's car industry boasted. The building appears to be assembled rather than built. 'The architecture attempts to find its eloquence out of a consistent and logical development of its industrial character.' (Saarinen A., 1968, p.30)

Saarinen does not deny the influence of Mies but it could be argued that many of his ideas have their roots in the Mid-West in early automobile factories of Albert Kahn (1869 - 1942).

*Clearly connected with
Cranbrook The Brothers -*

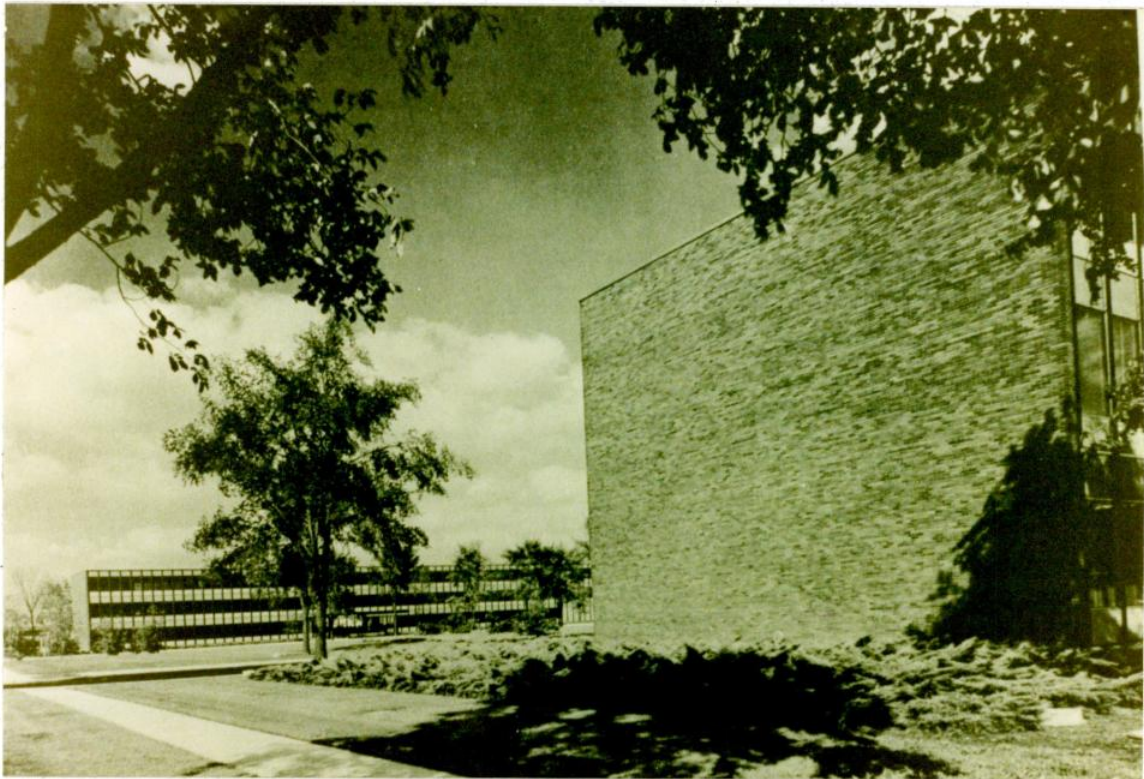
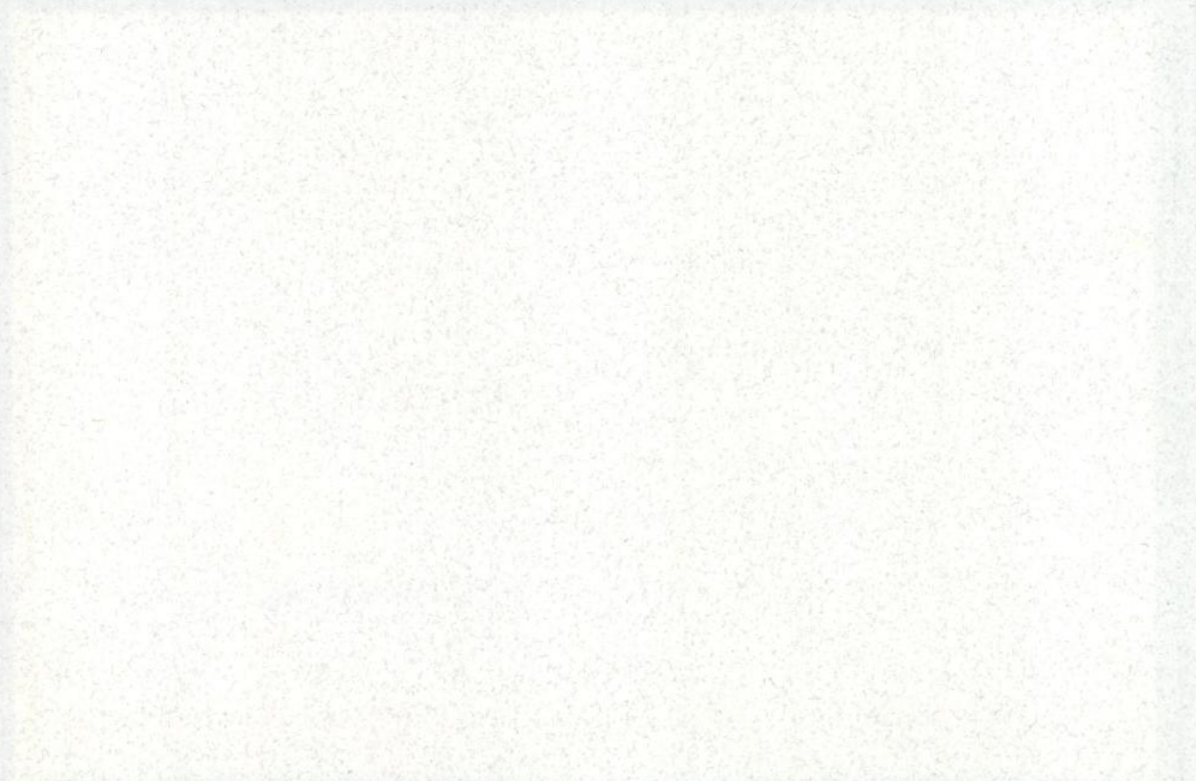


Fig. 1 General Motors Technical Centre

place
date



In order to achieve maximum flexibility much of the building's construction is modular, including laboratory, heating, ventilation, and fire protection facilities, as well as furniture, storage units, wall partitions. Apart from all this making economic sense, it gave unity to the theme of the building.

Considering the site occupies the central 320 acres of an approximate 900 acre area, it is almost more comparable in scale and complexity to a university city than to a factory. In order to achieve architectural unity between these horizontal buildings, the 25 buildings were arranged around an artificial lake. The pool, 22 acres, provides a hard architectural horizontal line while strengthening all the vertical lines in buildings by reflecting them, as well as providing a dominant open space.

The building gives the impression that it is placed on the edge of a large garden, thanks to the surrounding forest. Saarinen paid particular attention to heights of buildings to use to his advantage this green belt, while also using the idea of varying heights to introduce a controlled rhythm of high and low buildings.

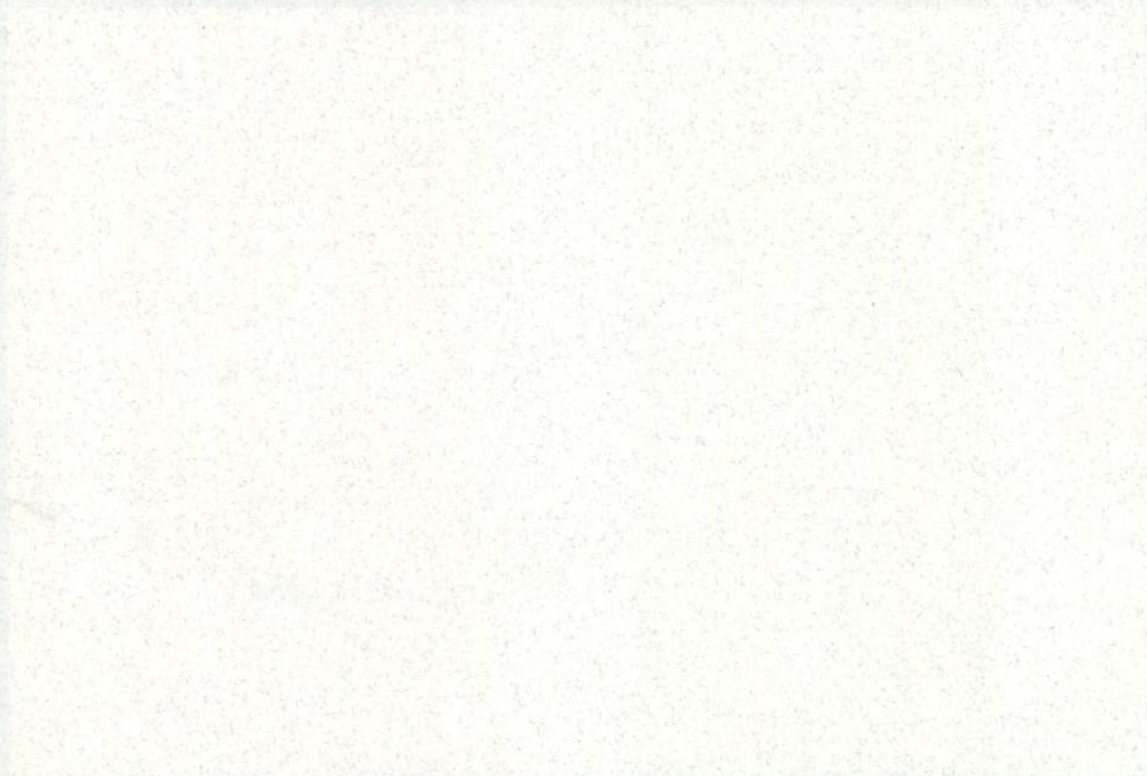
Brilliant colours are used on a large scale to help bind the building together. Great big end walls of the building are painted blue, red, yellow, orange or black. Many of these walls are about 40 feet high, and each is of one colour, appearing to be cards or colour in space. Glass and metal walls contrast due to their standardised neutral colours.

A large fountain, an upright curtain of water 115 feet wide and 50 feet tall was used as a vertical focal point. Another vertical accent is the stainless steel clad water tower standing 132 feet high.

On the whole the building was designed on automobile scale and the changing vistas were conceived to be seen as one drove around the complex. However, in front of the restaurant is a small-scale pedestrian court yard.



Fig. 2 The 115 feet wide, 50 feet high curtain of water



Each of the staff organisations requires its own "personality". This desire was, in a sense, architecturally answered in the main lobby of the five groups. Four of these used a staircase as a visual climax. The staircases take the form of large scale ornamental technological sculptures.

In general the shop areas are big open areas with long span construction. All the mechanical facilities were organised with the structure to avoid the slum-like appearance of factory buildings. Colour was used on the machines to make them aesthetically pleasing as well as to unify them in their total environment. In the dynamometer buildings, the free standing exhaust pipes are strong elements in the composition.

Many technical firsts were achieved in the construction of the General Motors building. It represents the first significant installation of laminated panels and the first use anywhere of a uniquely thin porcelain faced sandwich panel which is a complete prefabricated wall for both exterior and interior. The ceilings in the drafting rooms are the first developed completely luminous ceilings using special modular plastic pans. Perhaps the most significant development is the use of the neoprene gasket weather seal, which holds fixed glass and porcelain enamel panels to their aluminium frames.

As mentioned previously the building would appear to have strong Miesian connections. It is hardly likely that this is entirely coincidental, though one might argue that this is true to a large degree.

This architecture really carries forward the tradition of American factory buildings which had its roots in the Mid-West in the early automobile factories of Albert Kahn.
(Saarinen, A., 1968, p.6)

when?
Kahn employed a staff of over 600, producing 19% of all architect-designed industrial buildings in the United States.



Fig. 3 The Metal Water Tower

The firm's earliest industrial works are relatively conventional. The Packard Motor Car Company Plant, completed in 1910 used the standard multi-storey factory arrangement of its day. However, it was distinguished by the straight-forward expression of its reinforced concrete structure.

Later the George N. Pierce Plant in Buffalo presaged a significant innovation in factory planning - single-storey structure lighted from above and based on a modular system of potentially limitless extension. Like Saarinen's building, this adopts the idea of the mass-produced modular architecture, though in this case it predates its implementation in the automobile industry. Here the design was apparently developed for reasons of lighting and flexibility without regard to the production process.

The Ford River Rouge Plant (1917 - 1939) buildings collectively display the principle features that characterise Kahn's factory design : exposed steel structure, linear disposition of the plan, sawtoothed roof profile, clearstorey lighting combined with large window walls, standardised elements and rapid low cost construction.

Though the General Motors building may not be all that visually comparable to many of Kahn's buildings, in terms of architectural function it is very similar.

Kahn's factories placed a high priority on function. They were designed to provide the best possible facilities for automobile manufacture, thus by adopting many of Kahn's ideas, Saarinen was able to provide the required facilities as well as convey the appropriate architectural expression.

While Kahn ignored the symbolic and formal implications of his work and remained dedicated to the purely pragmatic solution, Saarinen used this natural aesthetic to his advantage. This enabled him to achieve the expression he set out to achieve without any sacrifice, economically as well as functionally.

CHAPTER 3

U.S. EMBASSY CHANCELLERY



The U.S. Chancellery on Grosvenor Square is a very simple, symmetrical building designed to fit with this symmetrical square. (Saarinen A., 1968, p.56)

Arguably, the one serious blot on Saarinen's career - one's first impression is one of an over-designed attempt at blending with traditional London architecture, but instead making a bold and perhaps typically American statement.

Grosvenor Square has a special significance to the Americans. When J. Adams, the first American Minister, came to London in 1785, he rented No. 9 on the north east corner of the then fashionable square. In 1913, twenty years after Bayard came as first American Ambassador, Walter Hines Page still had to find his own residence, and chose No. 6 Grosvenor Square. At this time the embassy offices were in Victoria Street.

Though the original eighteenth century buildings of Adams's times are long since gone, the square has largely been rebuilt. These early twentieth century buildings without much distinction have the merit of comprehensiveness and scale.

Saarinen 's design was the winning entry in a limited competition. His winning scheme in the embassy competition was unquestionably the most polished.

It is important that the embassy building be harmonious with the Square, but it also had to be a proud building in its own right, for an embassy building is an important building both to the host country and the guest country and therefore, I believe it should be a landmark.
(Saarinen A., 1968, p. 56)



Fig. 4 The U.S. Chancellery

This harmony was sought in various ways. The mass and general cornice height - the silhouette against the sky - conform to those of the buildings in the square. This achieves a kind of four-dimensional planning reminiscent of Roman architecture.

Portland stone was used as building material. It would seem appropriate as it is used on many of the official buildings around London. Saarinen also chose it because of its aging properties.

It is a stone, moreover, which - if used with broken surfaces - gains with time a beautiful pattern and texture of in and out surfaces, time and London soot and rain and wind would make this a dramatically dark building. (Saarinen A., 1968, p. 56)

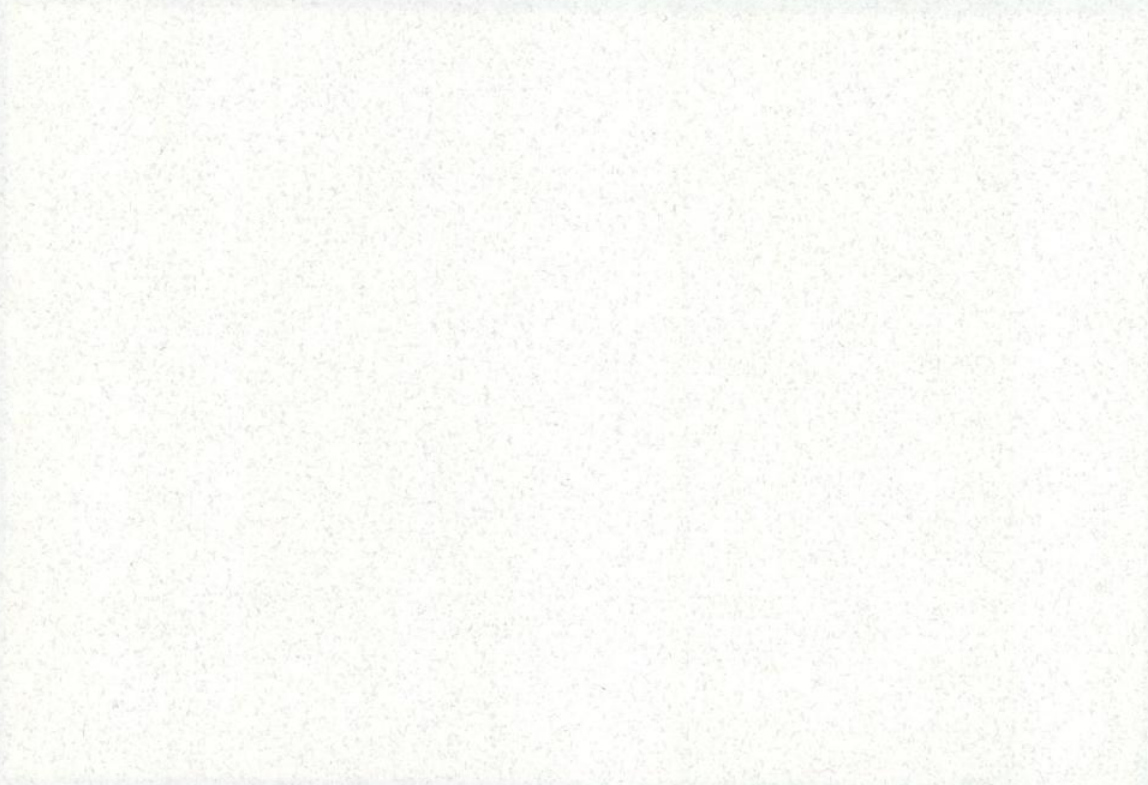
This observation is quite valid, and when taken in the context of classical architecture the effects can be quite striking, though it is unlikely that this was intended. Unfortunately, quite often after years of weathering, the patina effect is sandblasted to restore the building to its original state. The aging effect has resulted in a look of poor preservation rather than enhancing the form. Saarinen adopted traditional Georgian window proportions, though the link is hardly apparent due to the facade's interlocking chainlike frames which give the impression of a solid wall punched with windows, or perhaps a glass wall overlaid with concrete frames.

Structural expression is achieved on the ground floor by the exposed diagonally opposed concrete beams. They come to a point on the outside of the building and are also visible inside.

Possibly the best part of the building is the ground floor. The upper floors are raised on a peristyle and a podium producing a Greek temple-like effect. The podium is a glacis which sweeps from street level up to the building broken at the entrance by steps. This is quite unconventional, nevertheless seems to lighten the building.



Fig. 5 The Stained Facade



In the original design of the building the interlocking facade seemed to have greater elegance and was less confused. One may find this confusion slightly disturbing, it is neither concrete nor glass. Saarinen predicted that in 50 years the dirty London atmosphere will have produced the desired effect, therefore as the building could be said to be in a transitional period it may be unfair to say whether he has been successful or not.

The gold anodized aluminium alongside the white stone is a subtle and attractive detail, though when seen against the discoloured black Portland stone seems too much of a cliché not helped by the watery effect of anodizing.

Saarinen believed it to be important that the building expressed stateliness and formality, which he felt he achieved. Perhaps this was Saarinen's justification for setting the building 40 feet back. Unfortunately this upsets the continuity of the square.

The interior of the building should not go unnoticed as it is possibly the most successful part of the building. The square when viewed from the piano nobile takes on a new look, as this unlikely viewpoint is higher than ground level, yet lower than first floor. The canteen in the basement suffers from the grandeur of the piano nobile. Descending from this high roofed floor to the basement could give the feeling of claustrophobia, though this is lessened by Saarinen's careful manipulation of lighting and acoustics.

Saarinen paid particular attention to detail. He carefully reflects many of the exterior forms in the interior. The cruciform section echoing the form of the main structure is used in the banister supports as well as on the nuts beneath the staircase securing these supports.

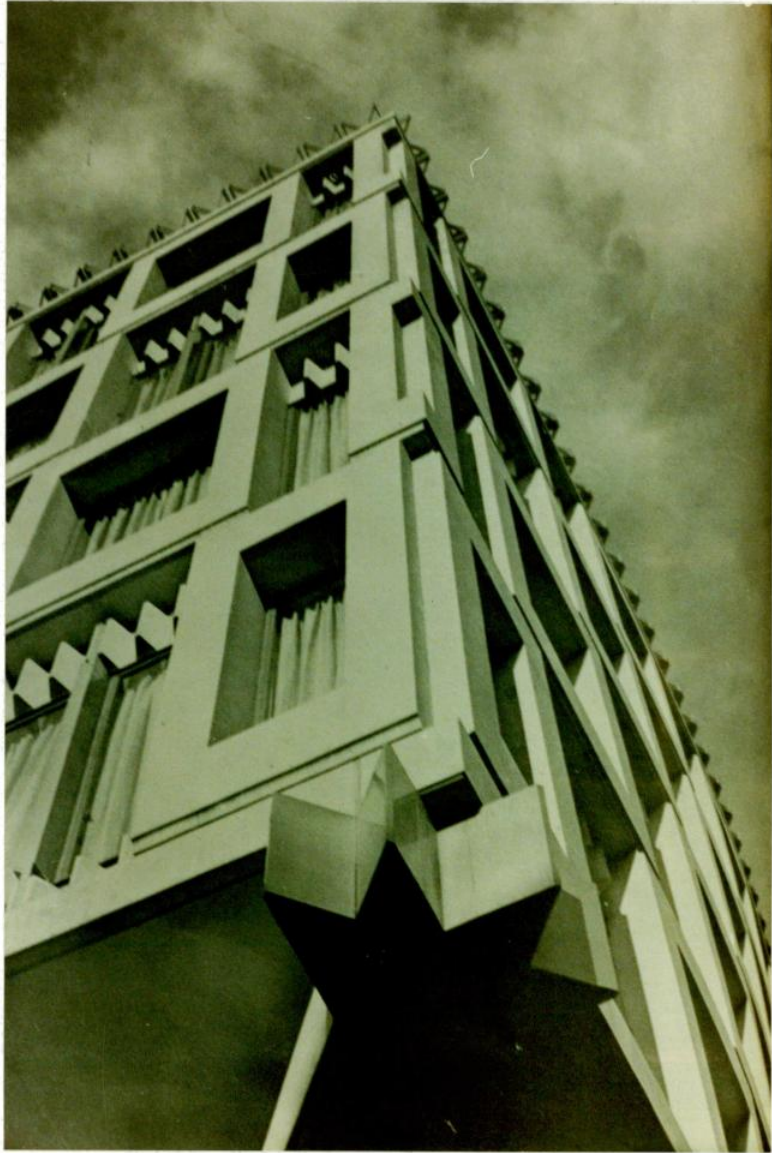
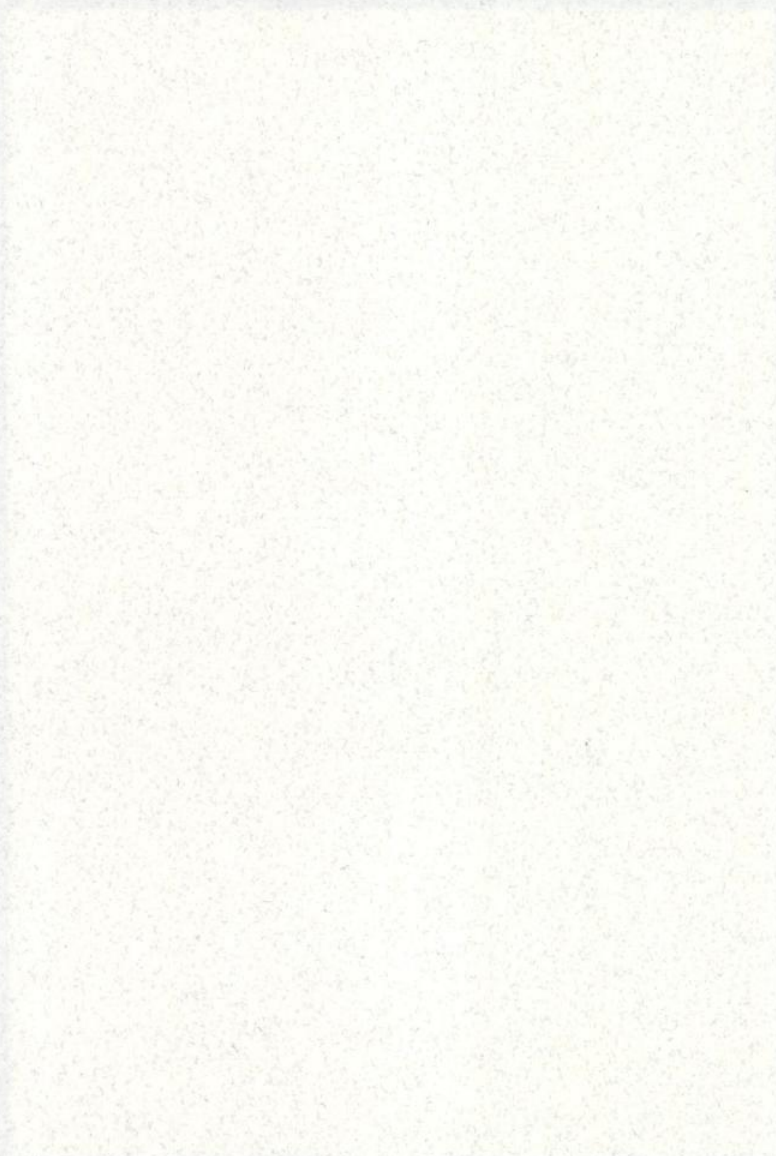


Fig. 6 Corner Detail



In the library Saarinen designed the bookshelves and chairs to add to the unity within. The balcony for further book storage is notched to allow the main structural columns pass through. It is only when close one realises these columns do not support the balcony, instead it is cantilevered. This hint of structural dishonesty makes this an interesting feature.

The ceiling in the Cultural Division's auditorium again reflects the cruciform theme in diagonal orientation of the recessed panels.

The building is redeemed by its details. However, good architecture should not have to be so closely examined to reveal beauty. The relentless consistency and uniformity within the design indicates that the design was much laboured. This labouring seems to have resulted in almost an academic solution rather than an aesthetically pleasing one.

I believe we achieved a completely integrated relationship between the inside and the outside and that our detailing on the interior carries through the theme of the outside completely. In my own mind, the building is much better than the English think - but not quite as good as I wished it to be. (Saarinen A., 1968, p. 56)

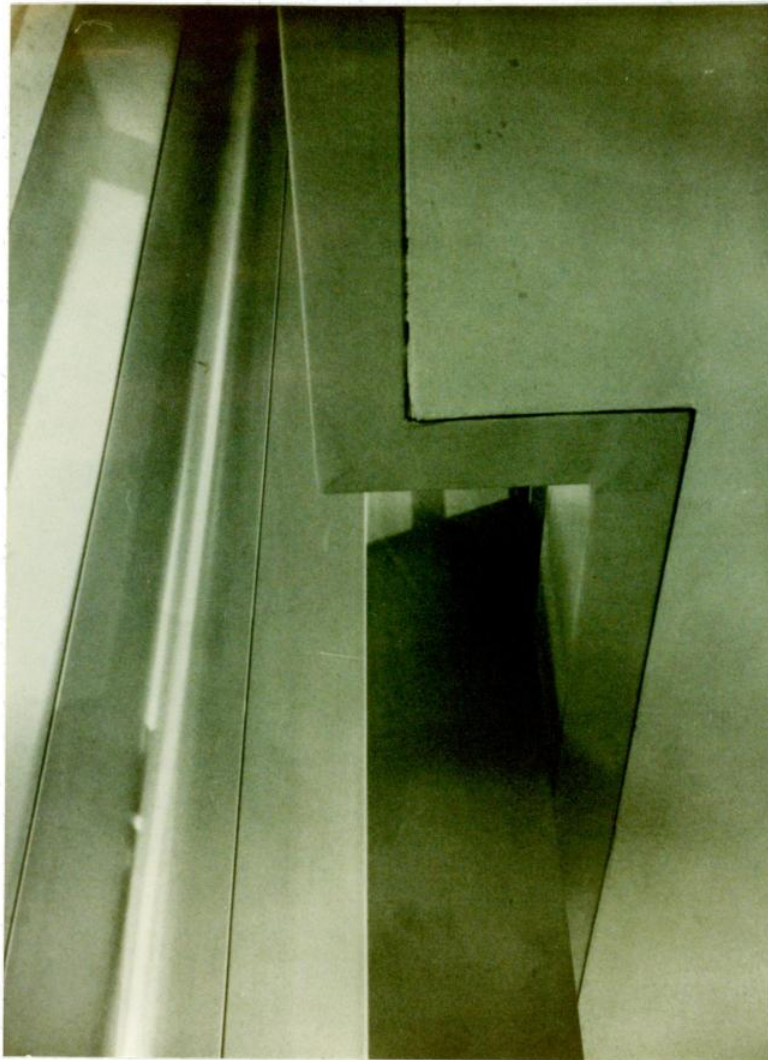
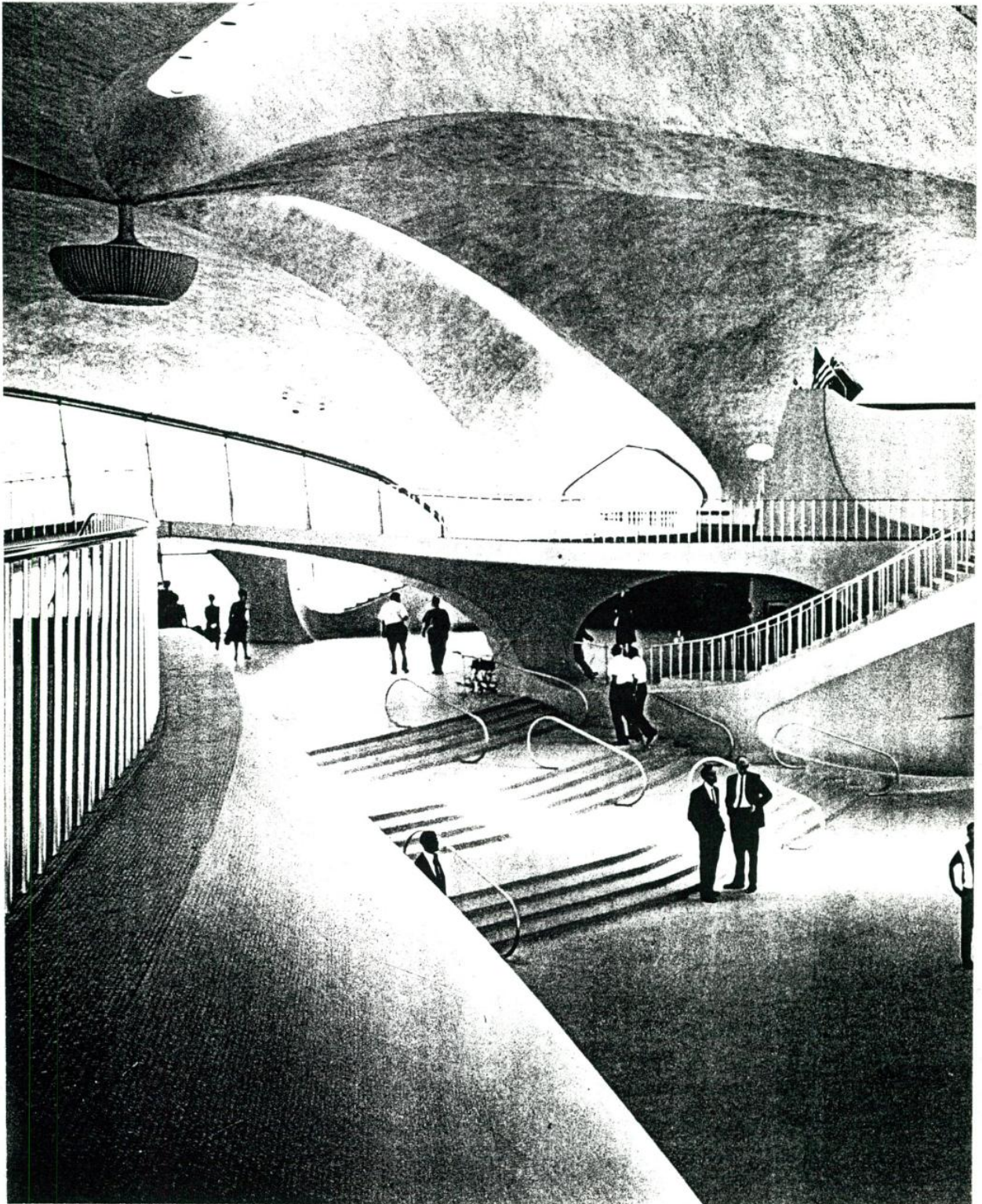


Fig. 7 Cantilevered Balcony

CHAPTER 4

T.W.A. AIRPORT TERMINAL



In this building Saarinen set out to first of all create, within the complex of terminals that make up J.F.K., a building for T.W.A. which would be distinctive and memorable. Secondly, to design a building in which the architecture itself would express the drama ~~and~~ specialness and excitement of travel.

Saarinen believed the building should reflect movement and transition rather than be static. The structure consists essentially of four inter-acting barrel vaults, supported on four y-shaped columns. Together these vaults make a vast concrete shell, 50 feet high and 315 feet long. The purpose of these shapes was to emphasise the upward soaring quality of line, rather than the downward gravitational one common to many domed structures. Saarinen believed that sense prevailed in the M.I.T. Auditorium. Similarly the columns were sculptured to emphasise this upward movement. Bands of skylights separate the four vaults, increasing the sense of airiness and lightness.

Saarinen's theme remains consistent throughout as with most of his work. Once adopting the basic form of the vaulting, he committed himself to using this family of curves. All the curvatures, all the spaces and elements, down to the shapes of signs, and information boards, have a consistent character.

One might compare Saarinen's solution to that of Baroque architecture, the desire to create dynamic space. Baroque architects, within their limits of technology, attempted to create a type of non-static architecture.

Colquhoun makes little of Saarinen's use of vaulting.

And the shallowness of his claim to be expressing the poetry of the programme is exposed from a comparison between the Yale university hockey rink and the T.W.A. airport at Idlewild,

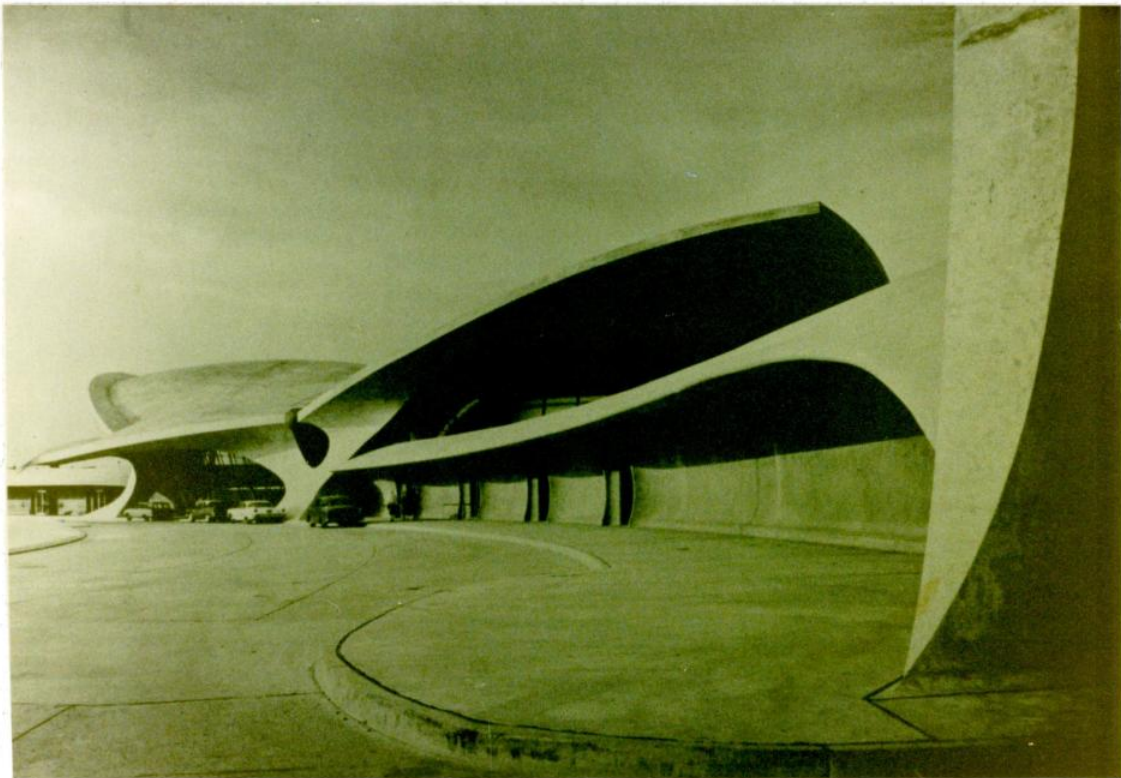


Fig. 8 T.W.A. Terminal Building

each wing the same basic repertoire of forms, yet each performing a radically different function. (Colquhoun, 1962, p. 465)

Such a comparison shows a simplistic interpretation of the forms. Structurally the buildings are similar and both achieve a dramatic impact due to their structure. However, this is as far as the link is carried. The intention of the T.W.A. terminal was to express an upward-soaring sense. This is achieved by the cantilevered shells extending from the y-shaped columns. Their skyward direction and decreasing cross-sectional thickness together with their unsupported summits gives the building its weightless quality. In fact, this effect is so successful that one could imagine the shell departing from the ground if it were not for the steel glass framework tying it down.

In the case of Ingalls Hockey Rink, the dominant feature is the spine-like concrete arch. Here the sweeping cantilevered extensions at either end are used to counteract the downward aspect of the arch.

One might argue whether Saarinen's reasoning behind choosing such extravagant forms is sound or whether it is an excuse for self-indulgence. Then again, is it wrong for an architect to indulge? After all, the object of any architecture must be to create a structure which pleases the eye. There is no doubt that when one does indulge added enthusiasm is there, the desire to make it really work. Of course, this is not to say that an architect should let this interfere with other functional requirements of the programme. An ego trip is perfectly acceptable, perhaps desirable, when in the interest of good architecture. This may often get confused with the desire to make an impact, frequently resulting in complete disregard for site and environment, perhaps even function.

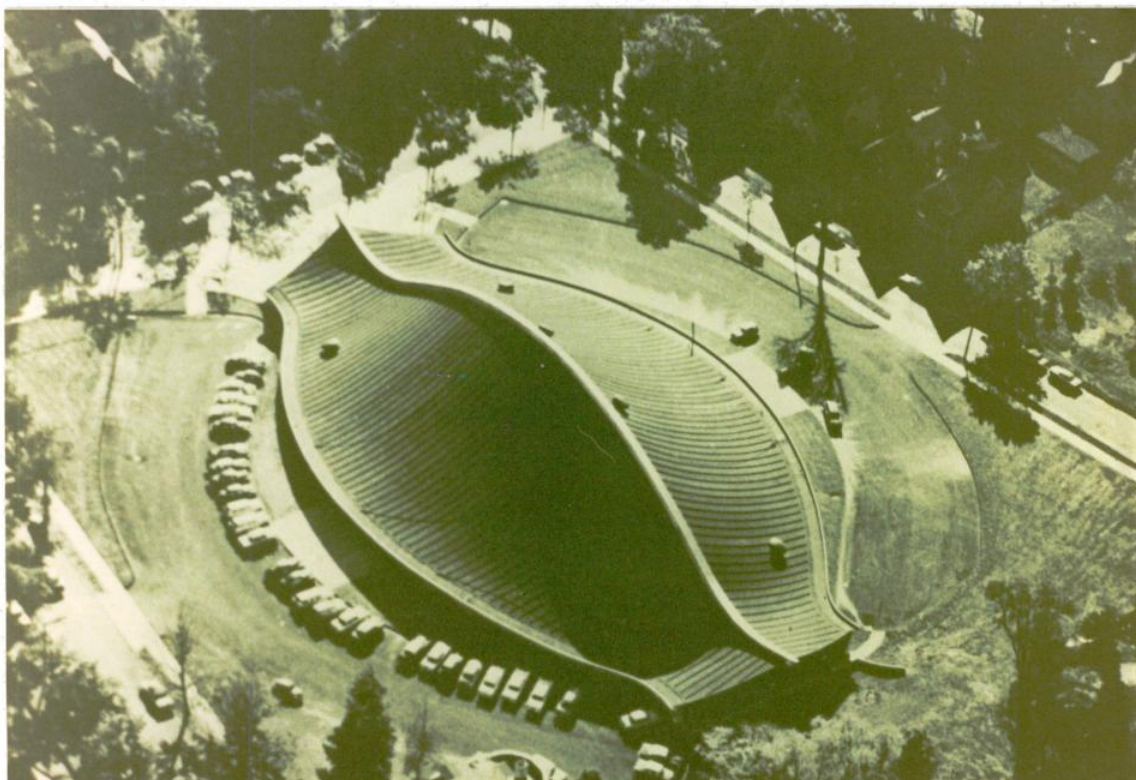


Fig. 9 Ingalls Hockey Rink / *date*

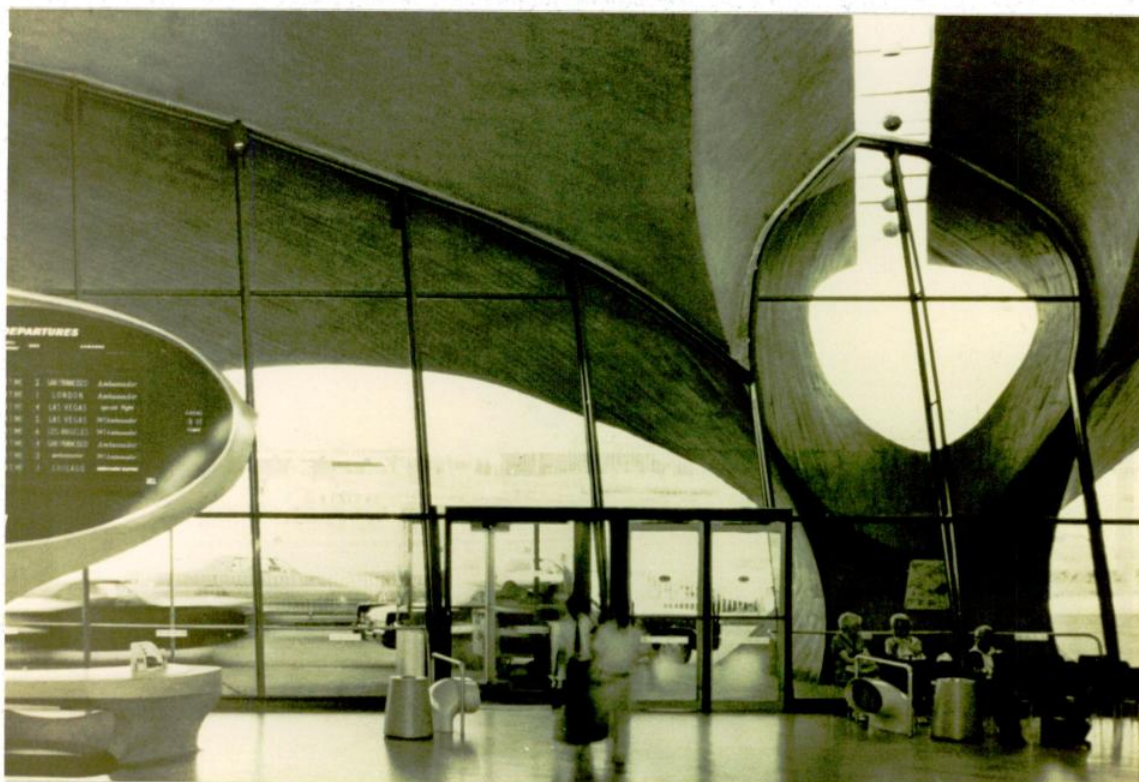


Fig. 10 Sculpted Y-shaped Column

With this in mind, one must ask, is it necessary for a building to reflect what it is used for ? Often the architect has a moral obligation. For example, to build a church resembling a factory may be in bad taste, and vice versa. In the case of an airport, the judgement becomes less straight forward. However, Saarinen believed the building should be a reflection of the associated activity, that it should evoke the excitement of air travel. Again one could argue that this interpretation is naive, as to many, air travel is often tedious and irritating. Therefore, this becomes a part of the building's reflection. To the jet set businessman this may be so. The comfort and security of the aircraft offers little excitement, perhaps boredom. This does not suggest he is bored with defying gravity !

This is often a mistake made when analysing the building - he did not intend to imitate a bird or a plane.

The fact that to some people it looked like a bird in flight was really coincidental. That was the last thing we ever thought about. Now, that doesn't mean that one doesn't have the right to see it that way or to explain it to the layman in those terms. (Saarinen on his work, p. 68)

Instead the intention was to create a building which provoked an image of flight.

The true extent of the excitement and drama created by the building is not apparent in many of the orthographically projected drawings. In fact, in a plan view, the shell-like structure becomes arbitrary and confused. It was only through Saarinen's ability to resolve in 3D, together with extensive model work, that made this building achieve the excitement intended.

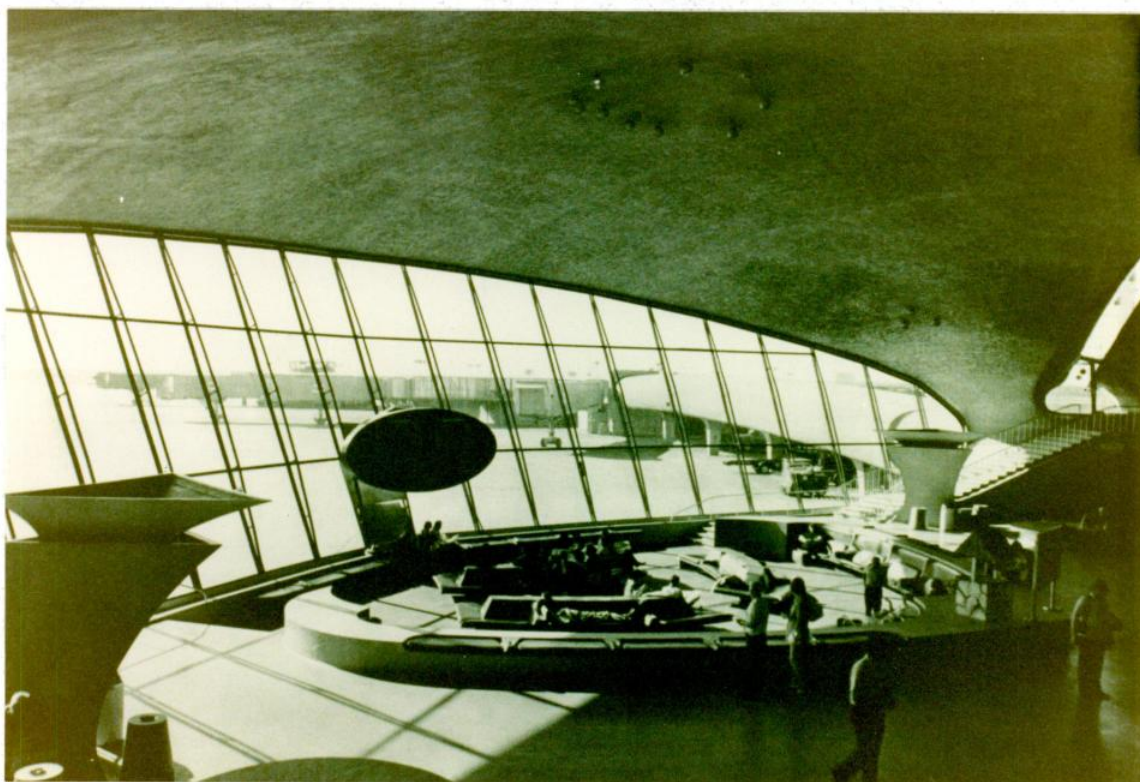
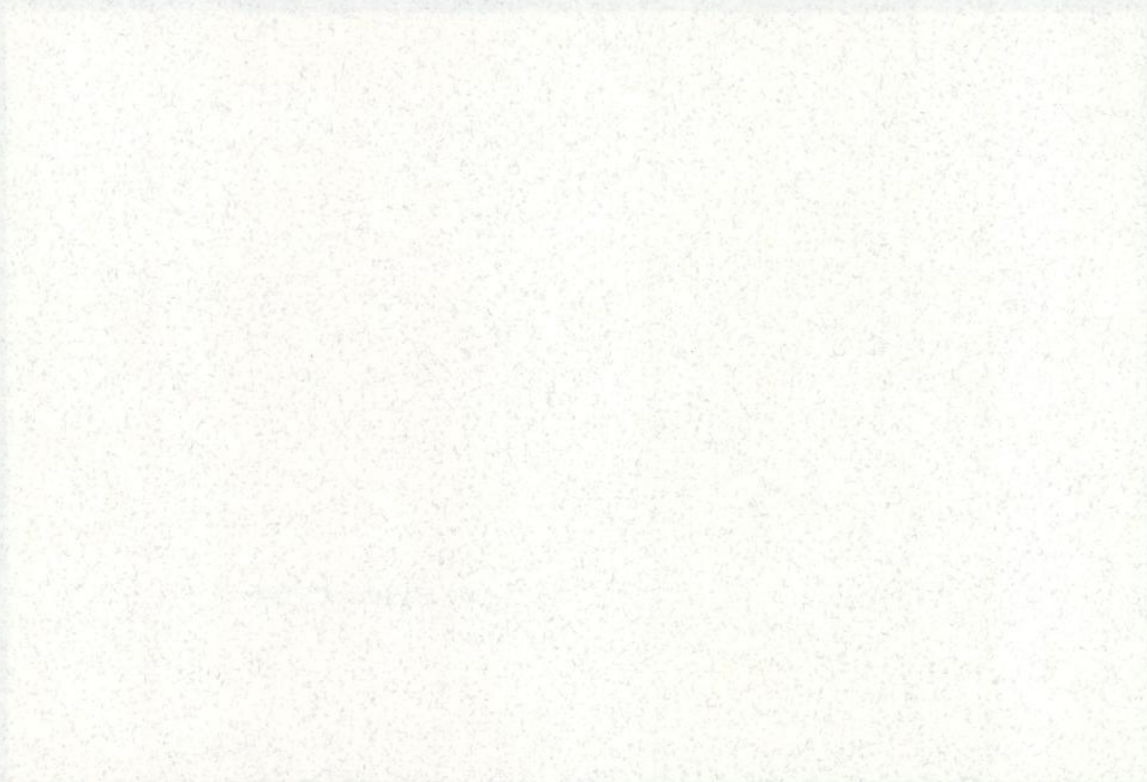


Fig. 11 Interior, T.W.A.



Saarinen maintained a consistence in form almost entirely throughout the building. Right from the massive concrete shell down to the human scale he created a total environment.

It seems sad that Saarinen never lived to see the building completed, though at an early stage of construction he seems to have realised his accomplishment.

T.W.A. is beginning to look marvellous. If anything happened and they had to stop work right now and just leave it in this state, I think it would make a beautiful ruin, like the Baths of Caracalla. [after his last visit to the site, when only the concrete vaults had been completed] (Saarinen on his work, p. 68)

CHAPTER 5

DEERE & COMPANY HEADQUARTERS



'John Deere is not just another architectural epigram based upon some over-simplification or distortion of the programme, or upon some arbitrarily selected structural image.' (Jacobus, 1965. p. 365)

The architectural character of the building comes largely from the character of the company and the site. The 600 acre site consists both of high table land and low river land, its edges broken by ravines. The building is situated on one of the ravines, achieving quite a successful link with nature.

In such a tree-studded site, where it would be intimately connected with nature, a strong, dark building seemed appropriate. (Saarinen A., 1968, p. 82)

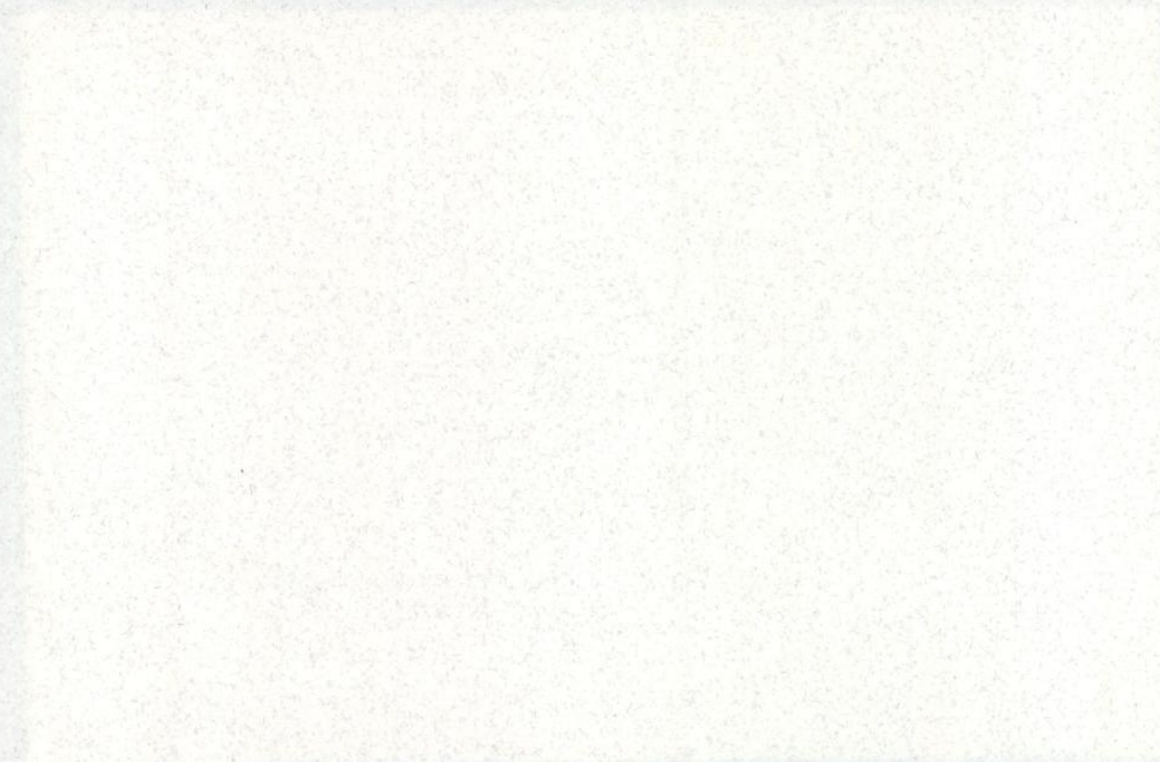
Perhaps an over simplification, the completed building conforms to this ideal though its success lies far deeper than this statement suggests.

The John Deere company is a successful farm machinery company. Farm machinery is not slick, shiny metal, but forged iron and steel in big forceful, functional shapes. Saarinen attempted to achieve this same image in its architecture, free from precision (small detail), glittering glass and spindly metal structure, instead a bold and direct structure using metal in a strong, basic way.

Saarinen wanted to emphasise the strength and robustness of this steel structure, unlike most steel constructions which hide their structure behind sleekly panes of tinted glass. The material chosen was economical, maintenance free, bold in character and dark in colour. A high tensile steel known as Cor-ten, which when left unpainted forms a protective coating of rust which unlike conventional steel prevents further corrosion. When corrosion reaches its peak the material



Fig. 12 Deere & Company Headquarters



becomes a cinnamon brown colour which makes a beautiful dark surface on the steel. Used extensively in railroad construction, such an application was completely revolutionary and has since been used in the Chicago Civic Centre as a major structural material (C.F. Murphy Associates).

The plan was determined both by the client's needs and the site. The eight storey administration building is placed crosswise on the floor of the valley. At its fourth floor level, glass-enclosed flying bridges stretch out to the laboratory and the exhibition building on the high slopes of the ravine. The complex is approached from below. Saarinen paid particular attention to how the building would be viewed as one approached it.

Instead of using curtains or blinds, vast steel louvres were designed. Unlike curtains and blinds, these do not obscure the view. They cut out direct sunlight for at least 90% of the time.

John Jacobus's words are perhaps a harsh criticism of Saarinen's earlier work, though are typical of the reaction much of his work evoked. What else might one expect in a time of modernist conformity.

Certainly the form Saarinen chose fits into the modernist theme, the overall simplicity. This, however, in itself should not be regarded as a turning point for Saarinen's architecture. We could have expected a similar design five years previously if such a problem had confronted him. The building's conformity is purely coincidental. The programme of the building required the structure to be basic and robust just as the company's farm machinery products are.

The sheltered ravine in which the building is sited offers a major view over a broad valley, a view which is framed by the low projecting



Fig. 13 Metal Louvres

hills. The site and the building become one due to Saarinen's skillful handling of the entrance. The meandering road through the ravine to the top of the rise allow one to proceed from the entry of the site to deep within, in a smooth sequential way. One can imagine how Saarinen delighted in the opportunity to handle the entrance in such a way. T.W.A. presented great difficulty in this respect ; apart from the site, the curving planes and lack of vertical lines made it difficult to fit in doors. With Saarinen's I.B.M. building at Yorktown he used a vast curved facade, as a visual device, to identify the building with its hillside site, the curve of the facade following that of the crest of the hill. At Moline, instead of concentrating upon one single image, he concerned himself with the integration of the building to its setting through the imaginative handling of space and circulation.

A major styling and functional detail of the building is the sunshade outrigging. It dramatises the simple mass of the building while giving character as well as protection. From the outside, at a distance they almost have the effect of venetian blinds, adding to the rectilinear form. From the inside they reinforce the image of the building's strong basic structure and to an extent limit the view of the surrounding landscape, in effect framing it. It is obvious that Saarinen wanted to take full advantage of the picturesque landscape, since throughout the interior partly glazed partitions are used extensively, so that even the private offices situated at the core of the structure have at least an indirect view of the park. As sunshades they operate effectively due to the distance they project, only on bright winter days is it necessary to use the interior shades.

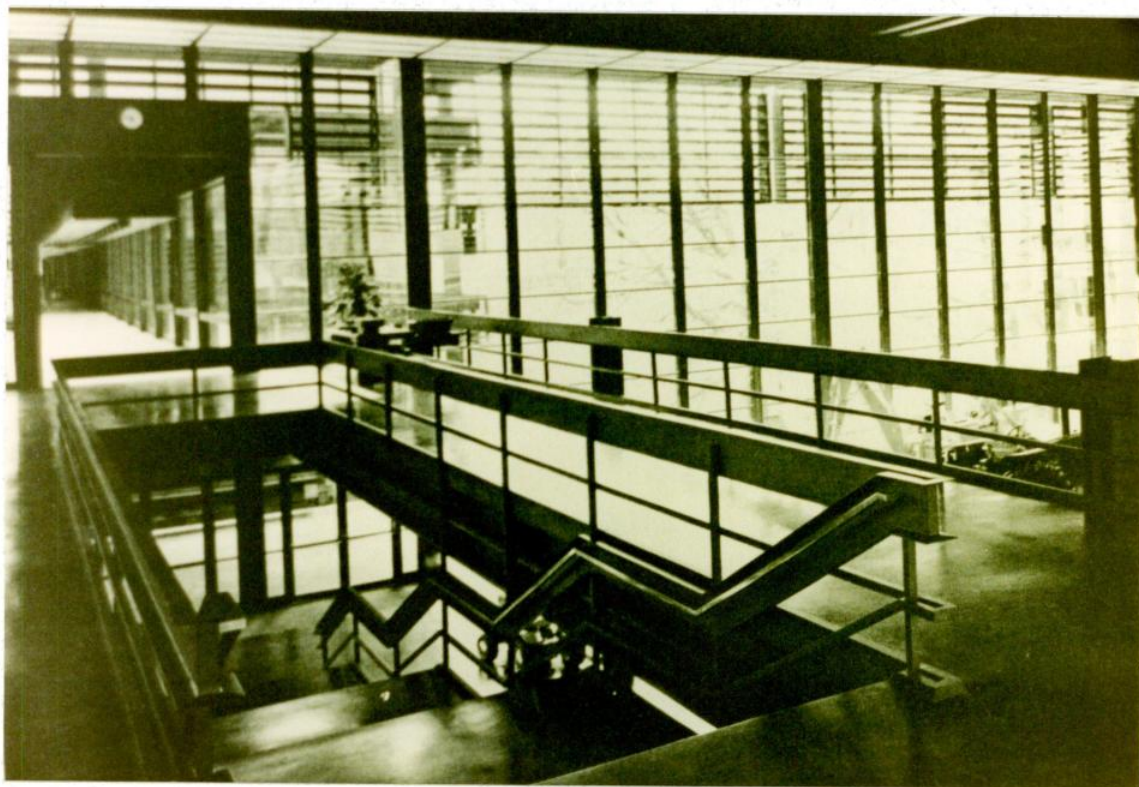
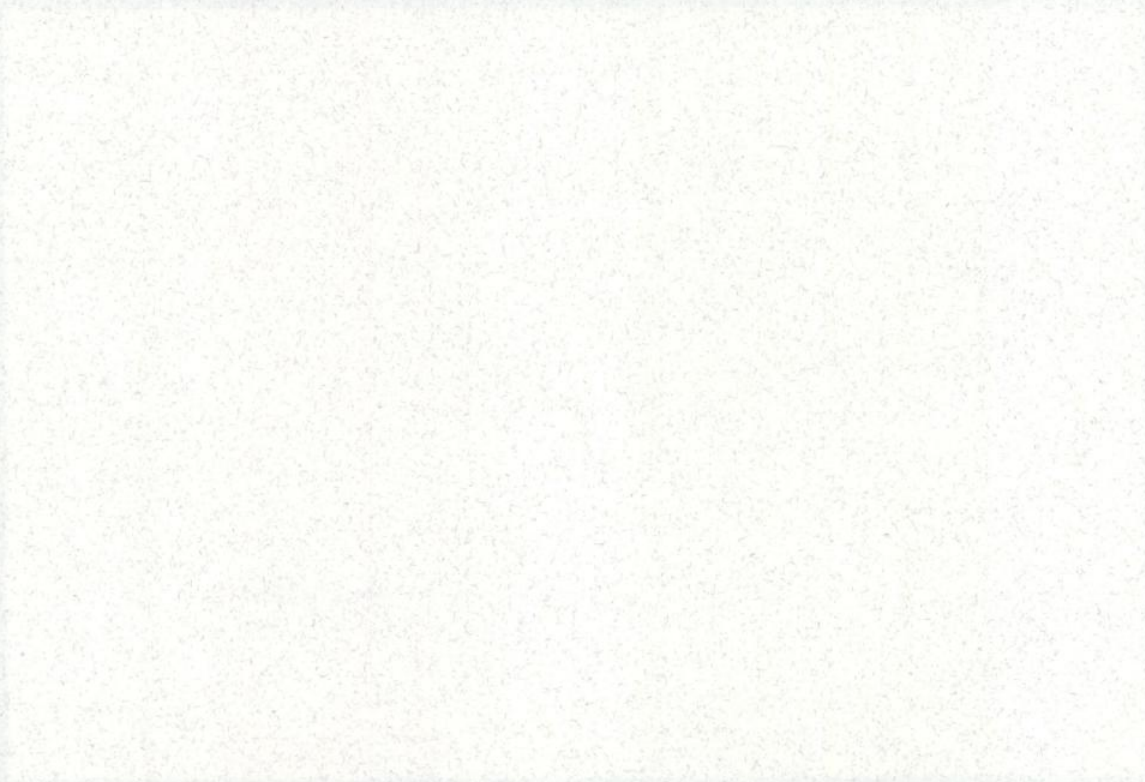


Fig. 14 Interior



I know the problem is there and one must face it. But we felt it was more important to retain the open quality of the design, which could be enjoyed without sun problems for 90 per cent of the year, than to sacrifice it for a small amount of the time. (Saarinen A., 1968, p. 82)

Strangely enough, the heavy industrial louvres serve to integrate the workspace with the landscape. In contrast to vast open window spaces where one's view of the outside is unlimited, one might expect to experience a sense of sharp transition from untamed nature to the sleeky man-made controlled environment of the inside. By limiting the scope, the outrigging provides a rhythmic, measureable relation between the workers within and the verdant spaces without. The phenomena is very rare, perhaps non-existent in other glass-walled office buildings. One might parallel Saarinen's treatment of the facade with that of Le Corbusier in the Marseilles Unit.

As a result of this the working spaces are not dominated by enamelled and plastic surfaces or by luminous ceilings, which are ever present in office building of that time. Not that such materials and surfaces do not exist, rather they are controlled by nature.

Aside from the necessary dining facilities, Saarinen was required to incorporate an auditorium to seat 384. Once again, the simple basic structure is both sensible and beautiful. 'This is one of the most delightful small theatres to be found in the entire gamut of contemporary architecture'. (Jacobus J., 1965, p. 366) The machinery being the "actor", the stage with its revolving floor opening out onto a brick walled compound, which is used for machinery demonstration. The balcony design is in reverse, that is, the highest of the three tiers projects the furthest, the lowest the least. The effect of which makes the stage a strong focal point regardless of which level one sits at, due to the apparent absence of the other levels.

Finally, one cannot stress too much how Saarinen used to his best advantage the building to site relationship. Much of post-war office architecture like that of the Deere building was sited in suburban or rural settings, yet most of this contemporary architecture is stylistically based upon an urban relationship. Part of the charm comes from the steep, accidented site, which contrasts with the usual prairie-like site for buildings of this genre i.e. General Motors. The horizontal orientation, more common to such a building has been avoided, and the eight-storey block with surrounding hills has a certain privacy or intimacy attached.

The John Deere building demonstrates the best of Saarinen's skills, certainly at the time it was acknowledged to be his most mature creation. The building, no doubt, demonstrates the work of an immensely talented architect, though due to Saarinen's diverse range of styles which obviously do not fit neatly into any particular 'movement', it may not be valid to compare this with many earlier works.

CHAPTER 6

CONCLUSIONS

The buildings in this thesis were chosen because of their almost opposing styles as well as historically apt as the General Motors and the John Deere buildings mark the beginning and abrupt end of Saarinen's career.

Saarinen's enthusiasm to bring out of the particular problem the particular solution becomes obvious when we look at the four buildings alongside each other.

The external form of my work varies greatly. But inside the solution of every problem there are underlying principles that hold it together and join each building I have done to every other one the common denominator of my work is the constant philosophy - the constant respect for the principles in which I believe. (Saarinen A., 1968, p. 8)

Before any design work began, Saarinen would think out the real significance of the problem, what is its essence and how can the total structure capture that essence.

At General Motors his intentions were : to provide the best possible facilities for industrial research ; to create a unified, beautiful and human environment and to find an appropriate architectural expression. This expression came from the motor car itself. The building reflects the tight, precise machine aesthetic associated with the industry. The beauty of the building comes from its totality, as one drives around the complex one can see how Saarinen maintained a consistent theme. The utilitarian structure enhanced by brilliant blues, reds, yellows and black on the great big end walls of the building, together with the reflective pond and fountain and its harmony with its rural setting.

Despite this totality, the building's structure does not become monotonous, and though in form and construction the main part of the complex does not vary, each different area has some detail exclusive to it alone. The domed structure at the extreme right of the complex adds a definite element of excitement, contrasting in form, yet because of its reflective metal surface the element of precision is maintained. The dome and the stylish metal water tower are vast sculptures, works of art which compliment the sharp horizontal and vertical element posed by the rest of the buildings. It therefore seems appropriate that the metal dome should house the concept cars which are the works of art of the car industry.

At Grosvenor Square Saarinen's aim was to create a building which expresses its stateliness, while blending or harmonising with its surroundings. Saarinen did not want to duplicate the surrounding pseudo-Georgian composition.

Our architecture is too humble. It should be prouder, more aggressive, much richer and larger than we see today. I would like to do my part in expanding that richness.
(Saarinen A., 1968, p.5)

The problem was therefore one of creating a proud building which would not look out of place. To achieve this Saarinen borrowed many ideas from 18th Century architecture including the window proportions, the piano nobile and the Portland stone generally used on official buildings in London. It is through this choice of materials and the character of the architecture that Saarinen attempted to create a stateliness and formality which would express the meaning of the building.

The totality of Saarinen's design is evident from exterior to such small interior details as nuts and bolts as well as the furniture which he designed himself.

One feels that Saarinen himself was disappointed with the overall solution. However, it would appear that he toiled over the problems he encountered, trying to resolve them as best he could. Whatever one's views towards the building as a whole, one must respect how he achieved a completely integrated relationship between the inside and the outside. In this respect the building is an exception to the rule as in most of his buildings the outstanding feature is their form.

Saarinen's ability to handle form is perhaps best illustrated in his T.W.A. Airport Terminal at John F. Kennedy, New York. An airport terminal is the last building one enters before taking to the sky, therefore Saarinen felt it should reflect transition, between the earth and the sky. He felt that the architecture should possess a sort of weightless quality. He also claimed the building should be distinctive and memorable. One might feel this claim was simply made to justify the extravagance of the structure. This is not to say that it shouldn't be distinctive and memorable, but surely that is a requirement of all architecture, at least all commercial buildings since they act as an advertisement for the company. The challenge, however, should be to fulfill this requirement without the use of arbitrary forms which have little to do with the 'function' or spirit of the building. However shallow Saarinen's claim, he without doubt did achieve a distinctiveness in the architecture. The building uses expansive vaulting techniques to achieve this weightless quality together with upwardly soaring curves. The vast concrete shells are divided by bands of skylights to increase the sense of airiness. The entire concrete structure seems to be trying to leap into motion. The entire building right down to the information desk is made up to these sculpted forms, binding together the interior and exterior. The window and door frames, which by necessity had to be linear, beautifully compliment the sculpted forms and add to their soaring quality by appearing as taut ropes tying the building to the ground.

Saarinen did not believe that one formula existed for designing, what was right for one commission was not necessarily right for the next. The building's construction and aesthetic was not governed solely by its functional requirements. The architecture should, as far as possible, reflect what the building is used for. Saarinen's buildings show little evidence of a personal trade mark.

It could well be thought that this shifting of the ground rules is a lack of conviction or a lack of direction on my part. Whether it is or not, only time will tell.
(Saarinen A., 1968, p.6)

Perhaps if Saarinen's career had lasted longer he would have evolved a personal style, though it is not likely.

I feel strongly that modern architecture is in danger of falling into a mould too quickly - too rigid a mould.
(Saarinen A., 1968, p. 6)

There is a consistency in Saarinen's work, not in the style or structure of his architecture, instead a philosophical consistency. The commitment to answer, individually, the needs of the commission.

Saarinen's last commission was the John Deere & Company headquarters at Moline. It seems ironical how his career as an architect began and ended with such utilitarian buildings, while in between his styles varied so greatly. One could predict however that if Saarinen's life had not come to such an abrupt end the diversity would have continued.

The spirit of this building is not that different than that of the General Motors building, both companies producing mass-produced vehicles, the difference being their function. The car is a refined, highly technical machine whereas the agricultural tractor is a robust strong machine. The similarity between the buildings goes only as far as the form and the basic structural materials. Saarinen believed that the architecture of the building should convey the strong forceful and functional shapes of the forged iron and steel used in the machines. The building materials are common to many buildings, the use is different. Saarinen avoided creating a spindly, slick metal and glass building, where the metal's use is concerned primarily with structure and the glass with styling. The Deere building almost reverses this idea, to a large degree the glass is hidden by the metal louvres. The metal is used in a bold, direct way, unlike most metal and glass structures the building seems heavy and robust. Here Saarinen uses the forces of gravity to firmly tie the building to the ground, directly contrasting the effect achieved at John F. Kennedy. Similarly the technology of the aircraft and agricultural machinery is contrasting, therefore the essence of the building should reflect this difference. From the overall structure to the treatment of the steel (left unpainted) the building conveys its simplicity and strength.

The vast difference between this building and the T.W.A. Terminal demonstrates what essentially separates Saarinen's architecture from that of Mies, or for that matter, conformists of any particular style.

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PICTORAL

'Eero Saarinen, Deere & Co. Headquarters Building'

Global Architecture No. 6

PICTORAL

'Eero Saarinen, T.W.A. Terminal Building'

Global Architecture No. 26

