Architecture and furniture: Aalto

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AALTO

ARCHITECTURE AND FURNITURE

AALTO

THE MUSEUM OF MODERN ART
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FOREWORD

Six years ago when the Museum of Modern Art opened the first exhibition of modern architecture in this country, attention was focused on the fundamental qualities of the new "International Style." The work of Gropius, Miës van der Rohe, Oud, Le Corbusier and others was shown to have been conceived with a basically functionalist approach, and to have been carried out with a common set of esthetic principles.

Since then, modern architecture has relinquished neither the functionalist approach nor the set of esthetic principles, but both have been modified, particularly by the younger men who have since joined the established leaders. Among these none is more important than Aalto.

Like the designs of other men first active in the '30's, Aalto's work, without ceasing in any way to be modern, does not look like the modern work of the '20's. The younger men employ new materials and new methods of construction, of course, but these only partly explain the change. The buildings of men working naturally in an already established style[1] are less assertive of that style's tenets than those earlier and more puristic buildings which were establishing the style with a necesarily stringent discipline. Certain materials and forms once renounced because of their association with non-modern work are now used again, in new ways or even in the old ones. To the heritage of pure geometric shapes, the younger men have added free organic curves; to the stylistic analogies with the painters, Mondrian and Léger, they have added Arp. Personal and national qualities are more apparent than a decade ago.

Aalto's designs are the result of the complete reconciliation of a relentless functionalist's conscience with a fresh and personal sensibility. This reconciliation demands tact, imagination and a sure knowledge of technical means; careful study of Aalto's buildings show all three in abundance. The personal character is most obvious in the delightful inventiveness of his forms and his handling of materials. The national character, closely allied, can be seen in the general Scandinavian trimness, and above all in the use of wood, Finland's principal building material. Aalto's thorough knowledge of the various properties of wood guides his imagination in putting them to work architecturally, under the direction of his unique esthetic sensibility.

[1]Including the recent work of many of the older men, Le Corbusier, Gropius, Mendelsohn, etc.

In his furniture, the audacious manipulation of wood might be thought bravura were it not always justified by the physical properties of the material. As in his architecture, Aalto's designs are a result of the same combination of sound construction, suitability to use and sense of style. Any one of the chairs is the result not only of a painstaking study of posture, the properties of laminated wood and esthetic considerations, but also of the study of efficient (and consequently economical) mechanical methods of mass-production. In fact, a major distinction of the furniture is its cheapness. Low-cost housing of good modern design has been produced for the last fifteen years; now, probably for the first time, a whole line of good modern furniture is approaching an inexpensive price level.[1]

On behalf of the President and Trustees the Curator of Architecture wishes to thank the following owners of Aalto furniture for their generosity in lending to the exhibition:

Miss Marion Bacon
Mr. Geoffrey Baker
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Mr. and Mrs. Alistair Cooke
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JOHN McANDREW
Curator of Architecture and Industrial Art

[1] Additional information on Aalto furniture may be obtained from the Department of Architecture.

ARCHITECTURE

The modern movement in architecture since the War has produced only a few figures of the stature of Alvar Aalto. Had his major designs been executed in the great countries of Europe, instead of in his native Finland, he would today be well-known throughout the world. As it is, the present exhibition of Aalto's work represents the formal introduction of this great architect to the American public.

Alvar Aalto is today 40 years old; he was still a student when the World War ended. By that time Finnish architecture had already passed through a period of romantic nationalism which had begun in the late 19th century. The leading figures in this self-consciously "native" movement were Gallen, Londgren and Eliel Saarinen, of whom Saarinen is best known to America because of his widely popular and much imitated design for the Chicago Tribune Building (awarded second prize in the international competition of 1922), and his subsequent work at the Cranbrook School in Michigan. But the movement from which Saarinen's work stems has long been spent. In Finland today a more rational although no less expressive architecture flourishes healthily.

The great surge of building activity in Finland following the War brought with it new architectural ideas and forms from western Europe. These ideas, exemplified in the work of Gropius, Le Corbusier and Oud, first took root, naturally enough, in Turku (Abô)[1], Finland's Baltic port. Here, a small group of young architects, stimulated by contact with the Congrès Internationale d'Architecture Moderne (CIAM), began the struggle to introduce the new doctrines to Finland. In the forefront were Alvar Aalto, Erik Bryggman and others.

Many obstacles beset the progress of the Turku group. They had to overcome the traditional prejudices not only of the public but also of other architects, particularly those who served on competition juries. The romantic nationalism of the pre-war period was no longer a strong factor in Finland's architectural development, but in the 1920's the new movement was impeded — as, to some extent, it is even today — by the influence of the fashionable and chaste classicism of the Swedish and Danish pseudo-moderns.

[1] Place names are here given in Finnish. The Swedish forms also in common use are given in parenthesis. But Helsingfors (Swedish), well established in English, will be used instead of the Finnish Helsinki.

Aalto's first great opportunity came in 1927 when he won the competition for the Viipuri (Viborg) Municipal Library with a straightforward modern design. The site was on the edge of a wooded park neighboring a large pompous church in the neo-Hanseatic Gothic manner. The local clergy, and others, were alarmed at the threatened proximity of what they considered an architectural outrage and they set to work to prevent its realization so successfully that construction was put off until 1934. Fortunately, however, this seven year delay was used by Aalto to prepare an entirely different design, far more carefully studied in detail. Aalto considers the Viipuri Library the first building he has had time to finish properly.

While the library project was being delayed by ecclesiastical opposition, Aalto continued to practise and to engage in several architectural competitions. In 1928-1929, the newspaper offices and printing plant of the *Turun-Sanomat* in Turku were constructed from his designs. In this reinforced concrete building, particularly in the great room housing the printing presses (plate 1), Aalto demonstrated his growing sureness in the functional approach and his vigourous imagination and tact in the use of materials. The sturdy tapered piers and mushroom capitals are not only the natural forms resulting from reinforced concrete construction, but are also vividly expressive of it.

While the influence of the new architecture was spreading to the whole of Finland, Aalto set up his office in Helsingfors. There he found designers of similar views, among them young Yrjo Lindegren who was later to design the great Helsingfors Olympic Stadium now nearing completion. As more and more competitions were won and more projects completed by the young architectural radicals, the public granted them a greater measure of confidence.

SANATORIUM AT PAIMIO (PEMAR) In 1932, work began on one of Aalto's greatest buildings, the South-West Finland Tuberculosis Sanatorium outside the little town of Paimio just north of Turku. Two hundred and ninety patients and a staff of doctors, nurses and maintenance employees make up a completely self-contained community.

From the pictures of the model and the isometric drawing (plates 5 and 3) the Sanatorium is seen to be composed of a long main wing "A" housing the patients; a central block with stairs, elevators and other vertical services; a smaller wing "B" for the dining room, social rooms

and clinic; a "hotel" section "C" for the hospital staff and general kitchen; and the power house group "D". Set around the main structure are the doctors' homes "E", the employees' building "F" and the garage "G".

The disposition of these elements is the result of a carefully coordinated plan whereby the functions of each separate block are taken into account and all are considered in relation to the natural characteristics of the site, the surrounding country and the all-important sunlight. For example, the main wing "A" faces SSE in order that each patient may receive the full morning sun directly on his bed; the block of open-air terraces at the end is bent slightly southward to enjoy the midday and afternoon light. The wing "B" containing the dining room and social rooms is turned so that these spaces too may be flooded by the direct rays of the sun. The other elements of the plan are phototropically oriented with similar care.

The illustrations indicate the qualities of the Sanatorium buildings; these striking architectural effects are not achieved at the expense of the occupants, nor, as so often happens, with inadequate regard for them. Aalto's architectural credo stresses the necessity of satisfying the requirements of the people for whom any structure is built. At Paimio the ordinary patient spends 60 percent of his time in bed, the severe case 100 percent. With this in mind, Aalto designed as his basic unit a two-bed room conceived in terms of the tubercular patient's physical needs and the psychological effect on him of his surroundings. To save the eyes of anyone lying on his back from the reflected glare of shiny hospital-white, the walls are painted a soft indefinite tone and the ceiling a shade darker. Natural light pours through the window; artificial light is placed above and behind the head of each bed so that the light source is never in the patient's line of vision. The usual hospital room is not only visually harsh; it is also acoustically disturbing because of its hard slick surfaces. At Paimio three walls of each room are "hard" and one is "soft." The "soft" wall is made of thick slabs of insulating board covered with a jointless cellular material about 1/8 inch thick. The usual hospital noises are conspicuously absent.

In many details, particularly in those which relate most closely to the occupants themselves, Aalto reasserts his ingenuity. The ordinary wash basin causes water to splash. As hand washing is necessarily frequent in a hospital, Aalto designed a special basin which receives the falling water

at an angle of 30 degrees without splashing. Continuing his analysis—and solution—of even the smallest problem relating to the patient, he designed a door knob which really fits the hand, has good leverage, protects the door and does not catch clothing. His fool-proof swinging door closes itself easily by the automatic action of gravity. A low-temperature heating panel forms a large part of the ceiling and in combination with the ingenious, draftless window ventilation insures a constant temperature with a minimum of dust-laden air currents. The wardrobes are made of light plywood hung from the wall, so that they do not interfere with easy cleaning of the room.

The standard room units are piled six high like great building blocks to form the main wing of the Sanatorium. On its roof and at the eastern end of each floor are open-air terraces where the occupants of the separate units assemble during the sun-bath period. The psychological relation between the individual and the group in a tuberculosis sanatorium is a very delicate one. Aalto's scheme, successful in practice, provides two kinds of terrace space—a large roof garden for new and less infectious cases, accommodating 120 patients in groups of 20, and small solariums for more serious cases with 24 couches in groups of four. It was Aalto's idea that, with a little care, the doctors could nurture the special character of each group, and by encouraging an easy transfer from group to group make it possible for each individual to find the most congenial milieu.

The construction throughout is reinforced concrete. Outside walls consist of 4 inches of concrete with a 4 inch facing of brick and a 1¼ inch interior facing of compressed cork. No formwork was used in pouring the concrete of these walls, for the brick and cork membranes were set up first and the concrete was poured into the space between. The brick is surfaced with stucco and the cork with plaster.

It is not possible to discuss all the detailed problems and their solutions here; the sum and synthesis of all these solutions produce the finished structure. This is not to say that the form of the whole follows automatically from the solution of the parts. Aalto is no relentless theory-bound functionalist; he feels that a completely rational architecture must be esthetically expressive. His esthetic is not at variance with the demands of function but is, rather, a living part of it.

LIBRARY AT VIIPURI (VIBORG) After a seven year delay, Aalto's revised but not compromised design for the Viipuri Municipal Library was placed in construction in 1934. It was opened a year later, and in planning and equipment remains one of the most efficient libraries in Europe. A visit to Viipuri reveals that the local clergy were wiser than they knew; not only the church but almost any other structure would have suffered in juxtaposition to this novel and handsome building (plate 10).

Here in one great design are found the discipline of a true functionalist, the imaginative expression of a vivid and original artist and the integration of both qualities with contemporary industrialized building technique.

It is characteristic of Aalto's buildings that they "read" clearly even to the layman. The Library is a highly complex design, but the elements are so well arranged that their relationship and purpose are made apparent immediately.

The Library has two functions: in addition to the normal library services it provides a community auditorium, club rooms and buffet facilities. The larger block houses the library proper, and the smaller contains a lecture room on the ground level and club rooms on the floor above. The larger block consists of one great windowless room, illuminated through a series of circular light-wells in the roof. An upper level of this room is used for the circulation desk and book shelves; a lower level for reference and study. The children's reading room is on a still lower level. The library office is in the center and communicates directly with the several librarians' desks and, by lower corridors, with every other portion of the building. From the librarian's commanding central position, it is possible to observe and control all three sections of the library.

The most striking feature of the main reading room is the overhead indirect illumination. Although the 57 circular light-wells are 6 feet in diameter they are so designed that no direct sunlight can penetrate to the room. As the maximum angle of insolation in Viipuri is 52 degrees, the sun is never high enough to send rays straight down through any one of the deep wells. The rays pass first through a sheet of prismatic diffusing glass, strike the conical sides of the well and are then reflected down into the room. Each circular opening sends down a larger circle of diffused light which is overlapped by neighboring circles of light, so that

a reader's book is lit from many indirect sources at once and a white page cannot reflect light up into his eyes. The books on the shelves are safe from the harmful effects of direct sunlight. The vast room is bathed in a soft shadowless light, ideal for reading, conducive to quiet. At night the artificial light is reflected from the high white walls above the bookcases, and is equally restful and diffused.

The smaller building block shown in the air-photo (plate 10) contains an auditorium on the ground floor. Whereas the library rooms are windowless in order to shut out those factors inimical to quiet and study, one whole side of the lecture room is clear glass opening out broadly to the leafy park. This hall is used by the community for lectures, debates and meetings. In keeping with the democratic traditions of the old city, the room was designed so that members of the audience rising to speak in any one part of the auditorium would have the acoustical advantages usually reserved for the man on the platform. The wave-like contour of the sound-reflecting wood ceiling (plate 16) was the result of detailed study and experimentation: a tract of dead forest provided the 30,000 knotless Karelian pine strips.

Wherever wood is used, it is neither painted nor stained, but left to display the integral beauty of its color and grain, for esthetic as well as practical reasons. Both the Sanatorium and the Library have furniture of Aalto's design, and it, too, shows the natural beauty of the wood, varied by occasional painted surfaces. Seen always against the white of the walls, the woods take on a more positive color and ornamental pattern. The photograph of the main stairway (plate 12) shows another characteristic simple and fresh device, the use of climbing plants as a generic element of architectural design.

Simple though it is, the building never seems dull nor severe, for every glance discovers some handsome and practical innovation, like the reading room or lecture hall ceilings, or finds some pleasant new combination of plaster, wood, glass, multicolored books and green foliage.

THE FINNISH PAVILION AT THE PARIS EXPOSITION It is a great tribute to the system of open architectural competitions that, through this method of selecting a design, Alvar Aalto won the opportunity to produce several of his finest buildings. This fact should cause us in the United States to regret that the competition idea is so infrequently resorted to here. In 1936, Aalto won a competition for the design

of the Finnish Pavilion at the 1937 Paris Exposition. Most critics are agreed that this Pavilion was one of the two or three most distinguished in Paris and that it represented a vigorous expression of the work and culture of the Finnish people, as well as a personal triumph for Aalto.

The Finnish Pavilion stood on a very prominent site to the right of the Trocadero Gate. In character with his own modesty and that of his country, Aalto erected no such bold, pompous facade as did the Jugoslav architect whose building occupied a similar site across the way. Instead, to the Trocadero crowds, Finland's face was represented by a grove of stately trees. This was not only part of a brilliant architectural conception, it was good exhibition psychology. Paris is hot in the summertime and the average, foot-sore visitor welcomed the inviting shade of Aalto's trees as a relief from the sun and the aggressive fronts of the other buildings.

The expectations of the visitor were more than rewarded by the building itself. The trees led into a small, open court surrounded by shaded outdoor exhibits constructed of Finnish woods. Beyond this was a large room open in the center to the sky with vines climbing up out of view. Several routes led the visitor further down the sloping site into the final great exhibition hall—an approach in delightful contrast to the long, restless labyrinths of the "forced traffic" plan of many other pavilions.

Wood is Finland's chief product and Aalto used it freely and in a number of fresh and unusual ways for the Pavilion itself and for the interior exhibits (plates 18-21). In all this variety, the material is always employed logically and with a unique understanding of its essential qualities. Slender columns were strengthened against lateral bending by slender inserted strips. At the middle, where the tendency to bend would have been greatest, the reinforcement was greatest. At the top and bottom, where there was no likelihood of bending, there were no strips. Other columns, more slender still, were knotted together with peeled withes so as to keep each other from bending.

Aalto's scheme for the Pavilion concentrated on the interior design. It was, of course, natural for one with his rational attitude towards architecture to emphasize the exhibits in a building for exhibition purposes rather than the building in which the exhibits were to be housed. Unfortunately many of the interior displays were given to others to design and fell below Aalto's high standard. He was also handicapped by the opposition of diplomats to novelty and by very small appropria-

tions of funds. But in spite of these obstacles, the Finnish Pavilion is one of Aalto's most successful buildings.

HOUSE AND OFFICE AT HELSINGFORS In 1937 Aalto built his own house in Munkkiniemi (Munksnäs), just outside Helsingfors (plates 24 and 25). Perhaps not a major work, it has a special interest as a project for which Aalto was both architect and client. The working space of the house is separated from the living rooms by a terrace and porch on the south, or garden side. This wing, which is used more than any other, is faced with vertical wood siding reminiscent of the Pavilion in Paris. On the north side, or entrance, the surface material is stucco. The interior walls are covered with canvas, woven fibrous material or natural wood. The vertical construction is brick and steel and the floors are of reinforced concrete. Like his other buildings, this one is also noteworthy for the use of ivy and creepers as an essential part of the decorative scheme. The fresh informality of the house reflects Aalto's own spontaneity. In its design he was assisted by his architect wife, who has frequently been his collaborator.

Alvar Aalto has more buildings to his credit than the few which are described in this essay. Nevertheless, the Sanatorium, the Library and the Pavilion suffice to reveal his architectural credo and to make those interested in living architecture look forward to the new work that he will do.

SIMON BREINES

FURNITURE

The creation of new furniture was implicit in the development of a new architecture. The most obvious relationship lay in the formal elements. Straight lines, smooth and sanitary surfaces, simple proportions and pure color were as applicable to the chairs and tables within a house as to the structure by which the house itself was formed. Moreover the new brightness and openness of spaces shaped to clearly defined use made necessary the restudy of the uses and dimensions of inside accessories.

In a deeper sense, furniture changes not only to "harmonize" with the modern house but because, like the house itself, it must be re-created for contemporary life and derived from contemporary production methods. The designer works no longer with a manual craftsman but with a manufacturer employing machines; his materials are no longer largely restricted to "natural" ones, such as wood, but include many that are synthetic, such as steel, aluminum, plastics and plywood. The user of the furniture retains the same human frame and muscles as always, but his sitting habits change with the introduction into his environment of new factors such as the automobile and short skirts.

Of the developments which have produced changes in furniture, the one that perhaps best rewards study in connection with Alvar Aalto's designs is the growth of furniture-making by machine. With the arrival of power-driven machinery, furniture-making was altered and machine process substituted for handicraft. The immediate influence of the machine, however, was to stultify the development of design. It made possible the cheap and accurate reproduction of the old handicraft patterns, so that machine objects were produced with the idea of giving a handicraft quality. Several generations passed before it was discovered that machine work produced characteristic esthetic qualities of its own and likewise had its natural limitations. The power production of objects implied new qualities and new potentialities.

Walter Gropius has pointed out the nature of the change in saying that "the difference between industry and handicraft is due far less to the different nature of the tools employed in each than to subdivision of labor in the one and undivided control by a single workman in the other."

MACHINE AND ESTHETICS The subdivision of labor changed living habits and industrialized society. We ask, "In what way was this done? What was the 'subdivision of labor in the one' (industry) and 'undivided control by a single workman in the other'?"

Under handicrafts the single workman produced an object in all of its parts, starting with design, and following through all of the steps in the manufacture. With the machine the workman became a link in the long chain of production. He carried through only one step or part in the manufacturing process.

This meant that in machine production the individual did but one thing in all of his working time and that only limited skill and a minimum of mental exertion or creative effort were required of him. This was a tremendous change in working method. It developed some few individuals who could organize and direct, while others (the masses) were required to work mechanically with their hands in operating the machine. The vast "upset" in working method resulted in a change in society, not alone for the groups engaged in manufacture but in business as well. In business the office worker was developed—the clerk, the accountant, the specialists in every line of work. The agglomeration of many workers around industry and in cities was a natural outcome of specialization of labor. The urgent need for more rational methods of town planning was recognized and only partially solved. What occurred was not confined to a single country and it is not possible to determine the exact place of its inauguration since its manifestations appear simultaneously in many different countries.

STANDARDIZATION While the machine acquired new values with the advent of power machinery, there was at first little change in the product. It was not until our own time that we began to assimilate the machine and a "new machine aesthetic, unselfconsciously developing," as expressed by J. R. Richards, "not being imposed from without. To this new aesthetic the opportunities of rationalization that the machine brings, the progressive impersonalization of design, the new emphasis on the product rather than on the process of making it and the discovery of the abstract aesthetic virtues of machines themselves have all contributed. The difference is between a humanistic aesthetic and an abstract one."

As a routine of production "models" or types were evolved which

could be extensively reproduced in vast quantities. These types became the embodiment of forms for specific purposes, refined by use and investigation. The combination of logical form and perfection of shape with character of finish and interrelation of parts imposed by the machine is what we expect but have not fully realized under the new order. Most important of all—standardization made quantity production possible and, because one result of quantity production is lowered cost, objects were made available to the great masses.

Standardization necessitated an acceptance of order. It meant that all possible thought and skill must be used in the design of a flawless model suited to the process and worthy of large-scale reproduction *before* the machines started to turn. It was no longer natural or possible to produce forms of unlimited variety. It was necessary to evolve types possessing universal value. Only thus was it possible not only to lower costs but to turn the machine process into a machine *craft,* a worthy successor to the old handicraft because of its unashamed reliance on its own methods and its own forms of excellence.

DESIGN AND MANUFACTURE The development of furniture may be described as an interplay between designer and manufacturer, and between both and the consumer.

The greatest contribution of the designer probably lies in his power of intuition. Rarely does an invention arrive entirely by way of a reasoned program. Roebling heard of wire being used in a new way in the form of rope, and his mind jumped to the idea of using this rope first to draw canal boats up inclined planes and then to replace chain on suspension bridges. Breuer, in our own day, saw a bicycle, and his mind jumped to the idea of using a similar tubular frame to support a chair. After the first intuition, imagination supplies intermediate steps. It is then that reason and science enter. These check and *control* the direction of intuitive thought. Even "pure" scientists, such as Pasteur and Marconi, have found intuitions of great value in solving an intricate problem. They have had the ability to follow up their intuitions, using the laboratory and other technical means to control and develop concepts that at first were merely "felt."

Useful intuitions differ from random fancy in the fact that they arise in minds already well stocked with knowledge and aware of the problems to be solved. Successful modern design is impossible without a back-

ground of familiarity with the new materials, processes of manufacture and specific requirements.

Alvar Aalto as a designer of furniture must be considered not as a unique creative artist who suddenly appeared to give us a completely novel kind of furniture. His accomplishments were in a clear line of development. In the design of Aalto chairs we can perceive the applied experience of chair designers who immediately preceded him – Marcel Breuer, Miës van der Rohe and others. Aalto's first chair with plywood seat and back was mounted on a tubular frame as a base. This chair was made in 1932. A short time later he followed it up with a wood supporting frame, making the entire chair of homogeneous material. The material required for support was now heavier in section but even lighter in weight than tubular steel. This change from steel to wood meant a great gain in simplification of manufacture.

Aalto hastened to set up models for industrial manufacture, creating a complete line of chairs, tables, settees and beds. He allied himself with a manufacturer (ARTEK) in order to secure systematic and wide distribution.

It was very natural for the earlier designers of furniture from the Bauhaus to suppose that Aalto, with his academic training, was a designer by instinct – not one who delved long into the property of materials and methods of production as a preliminary to design. In reality Aalto has exemplified the combination of intuition and science in all of his architecture and furniture. In his tuberculosis sanatorium at Paimio, Finland, he applied a new version of cantilever structure to the frame of his building, releasing free ground space for the use of patients. For this same building he devised a draftless window and a lighting fixture which scientifically reflects and diffuses light and has ingenious vertical walls which do not collect dust.

In addition, Alvar Aalto has the ability to give his furniture the natural appearance and character of wood. The material is expressed in the shape of his chairs and in their finish. Some American designers of chairs wrought in aluminum unfortunately continue to simulate with metal the forms developed for wood because of the past popularity of wood.

In the making of his chairs Aalto employed plywood with different degrees of veneer thickness. Plywood is simply a structural reformation of an old material. It consists of layers of wood veneers dependent for their strength on being bound together with modern synthetic cements.

The fibres in the middle layer of a "three-ply" sample run at right angles to the fibres of the two outer layers. Plywood with four, five, six or more layers is built up on the three-ply as its manufacturing foundation.

The formation of plywood in layers permits it to be bent into curved shapes by stretching and compression under heat or steam. For the piece that forms the continuous back and seat of a chair it can be used as thin as a quarter-of-an-inch. Because of the cross-grained lamination, expansion and contraction under changes of heat or humidity become negligible. Nor can plywood split or warp under normal conditions.

The plywood most generally employed by Aalto is birch, a product of heavily forested Finland. This wood has outstanding qualities of firmness and hard surface combined with unusual pliability. It has few knots and immense gluing strength. The color of Finnish birch is a pale yellowish shade with occasional markings like watered satin. The birch of our northwoods is similar except that its color is usually a pale reddish tan. Birch has been called the ideal plywood for general purposes.

Many of Aalto's chairs and tables have a peculiarity of a different sort. They are designed so as to "nest" or "stack" in great numbers with the result that twenty or more occupy no more floor space than one. The average user of furniture is well aware of the convenience this brings in narrow living quarters; but to the manufacturer and distributor the feature is still more important, since it saves space and therefore costs at every point; in factory storage, in crating, in transportation, in warehouse and in showroom. The cumulative advantage is enormous.

Aalto respects the qualities of plywood so that his use of the material varies under a wide range of conditions. The bearing surface of the chairs or other furniture, that is, the area in contact with the floor, is never the edge of plywood, which would be injured with moving, but on the *flat face* of built-up layers of wood. The straight shaft of a stool or table leg is one piece of solid wood which is laminated where the leg is bent—a patented Aalto invention. Since chair seats are subject to unusual strain, they are sometimes reinforced by the addition of one or more layers of veneer.

FURNITURE AND THE USER Aalto's experiments as recounted illustrate the relationship between the designer and the manufacturer, leaving still to be considered the growth of new furniture forms in relation to changes in use.

DINING

READING

The consumer may be considered as a person with a threefold character: he has a skeleton and set of muscles that have not changed appreciably throughout all his centuries of sitting; but there is a good deal of variety and change in his habits and also in his tastes.

MECHANICS OF SITTING Not only do we inherit the bodily sitting mechanism of our fathers, but sitting has become the most universal occupation of mankind in what may be termed sedentary modern life: we should be expert sitters. While sitting we work, relax, read, dine, and do our "running around" in vehicles of transportation. So convinced are we of the virtue of sitting that we prefer "settled" civilization which radiates from the "seats" of culture and of learning. Our physical well-being, enjoyment and efficiency are dependent on how we sit. Nevertheless, despite all our experience and tradition of sitting, there is nothing we do so badly.

RELAXING

DRESSING

Despite the ardent work of specialists in posture, only schools and institutions are general users of scientific chairs for even the common and ancient habit of sitting upright, in which there should be pelvic and lumbar support so that the spine can function as a true supporting column, balanced about the line of gravity with the weight distributed around it. There is a multiplicity of other ways of sitting, however: sitting for dining, for reading, for relaxation or lounging; sitting for work; sitting in gatherings, at school and church, in the stadium, the theater or the public assembly; sitting in vehicles such as autos, trains and airplanes. Each way of sitting has specific characteristics, resulting in different design criteria.

Long sitting, as in the theater, requires maximum comfort, a shaped back to throw the head into position for natural vision, and limited space; dining may be considered to require upright sitting with back support while the chair for relaxation or lounging has lower height, sloped seat,

arm rest, spacious width and depth, inclined back; it may even include head rest and adjustability to different positions. The so-called Morris chair was a heavy-handed attempt to devise a chair with *all* of the characteristics required for relaxation. The great fault of the Morris chair was its size and its comparative immobility.

AUTOMOBILES AND SHORT SKIRTS The uses of seating that have been mentioned are mostly permanent ones, and the functional criteria that they set up for design are relatively unchanging. On the other hand, there are always changes going on in the environment that affect such apparently permanent habits as posture in sitting.

One such change was the introduction of the automobile. The first cars carried stiff upright seats that reflected the coeval habit of stiff upright sitting. But gradually, for the sake both of easier operation and greater comfort and safety in motion, the seat was altered to its present shape, with a low backward sloping bottom and supporting back. Cushion resiliency was developed to synchronize with the spring action of the car. The absence of the bars and straps used by the passenger to steady himself passes unnoticed because the seat itself acts as a wedge to hold him in. This gradual adaptation of the car seating to operational needs, comfort and safety has belatedly been initiated in the design of furniture for the house.

Concurrently with the rapid expansion of automobile travel after 1918, there appeared feminine attire with knee-length skirts. Whether or not this liberating attire was in part the result of the car is outside our discussion; but there is no doubt that in concert with the car it had a powerful effect in encouraging low-swung chairs and settees in the home, the club and the cocktail lounge. To have sat in such a contrivance would have been almost physically impossible in a bustle!

THE NEED FOR SAVING TIME AND SPACE Among the causes of change in the habits of the consumer is the necessity of adapting himself to machine economy in his home as well as at work. That is, not only are his house-furnishing needs produced by machine but they tend to become mechanical in the effort to save time and to utilize a minimum of precious space. This is demanded in apartments where space is rated at a high square foot cost; living and dining and, on occasions, even sleeping accommodations are sometimes combined in a single room. For

the apartment where preparation of food takes place in a kitchenette or an alcove concealed from the living room by doors and therefore a part of the living space, industry has devised refrigerating boxes operated by gas or electricity built over or under the electric range. This arrangement saves the housewife space and steps. Beds for some apartments have been mechanized, so as to swing into closets. Settees that do double duty for day use and for sleeping are standard apartment equipment for overnight guest or visiting relative. After all, the familiar metal bedstead, spiral springs and factory-made mattresses of today date back only to 1916. The feather bed, according to Department of Agriculture studies, did not become obsolete until 1918.

Under the pressure of space economy, the equipment of apartment and home has changed from suites of furniture to a minimum of movable "pieces" supplemented by built-in seats, storage space and beds. For storage, the old-fashioned "bureau" — erroneously denoting a chest of drawers for storage of clothing and not a writing desk—is disappearing with the development of highly organized closets with storage and dressing appurtenances and tiers of trays industrially produced for fitting into that vacuity of space which architects seem content to offer their clients.

Closets are now produced which are not only perfectly adapted for storage purposes but are constructed to serve as partitions and so become as much a part of future houses and dwellings as the prefabricated bathroom of Buckminster Fuller. These closets are metal compartments similar in finish to metal kitchen cabinets. Storage space for every purpose is organized with expanded metal shelves and racks for shoes. The backs can be soundproofed. These same closets can become, for economical house construction, not only partitions but also the internal supporting structure, thereby eliminating closets as so much dead weight.

The skyscraper bookcase startling America in 1927 turned out to be short-lived and did not appreciably increase reading. Bookcases are smaller or are not present in the apartment, being replaced by the circulating library. Dining tables are no longer of massive and space-consuming structure. They are small, showing, among other things, how vast-ramifying can be the effect of smaller families. These tables fold into small dimensions with drop leaf or, for the dinette, fold into the wall, releasing floor space for other purposes. The vacuum cleaner popularized overstuffed furniture which continues in popularity.

The design of chairs and all furniture, then, is conditioned by dimen-

sions for purposes. It is no less necessary that furniture with specified characteristics be marketed so as to be available in large quantities to the majority of buyers. This implies standardization of design and mass production. A chair with good design becomes available to hundreds of thousands of home dwellers at a cost far less than the same chair custom-built for special purchase. Likewise, a chair of good design is no less a chair with "good lines" because it is one of the hundred thousand made by machinery instead of being a unique object made by hand. There is nothing about the limitless duplication of furniture and objects of daily use which requires them to be esthetically inferior.

DESIGNER, MANUFACTURER AND PUBLIC TASTE The manufacturer is not anxious to force new standards on the consumer. He is interested to know what the consumer will buy. This is what we may term "pandering" to popular taste. The consumer holds the whip hand and controls demand. Whether they spring from wise decisions or from mere whim, his wants are charted and serve to influence a program for new models. The Metropolitan Life Insurance Company made a study of expenditures for new designs in industry, in which a lace manufacturer testified that 99.9 per cent of his production compassed new styles and designs; a glass manufacturer, that 75 per cent of his production was concerned with new styles; a furniture manufacturer, that over 50 per cent was of new design. The emphasis placed on "styles" in the trades is responsible for the frequent decline of interest in the staple items and the insistent demand for what is new. Most manufacturers follow the practice of "trying out" new designs in small lots and some of them make very careful preliminary studies.

New furniture designs other than those originated by the manufacturer ordinarily receive little attention from him. A private designer seeking production usually begins by creating the model and then trying it out in stores and exhibitions to measure the appeal to the consumer. When this appeal is found to be of appreciable volume, then manufacturers will outbid each other in order to place the design in production. The less expensive the item and the more extensive the clientele for which the object is intended, the greater the safety in trying out novel designs.

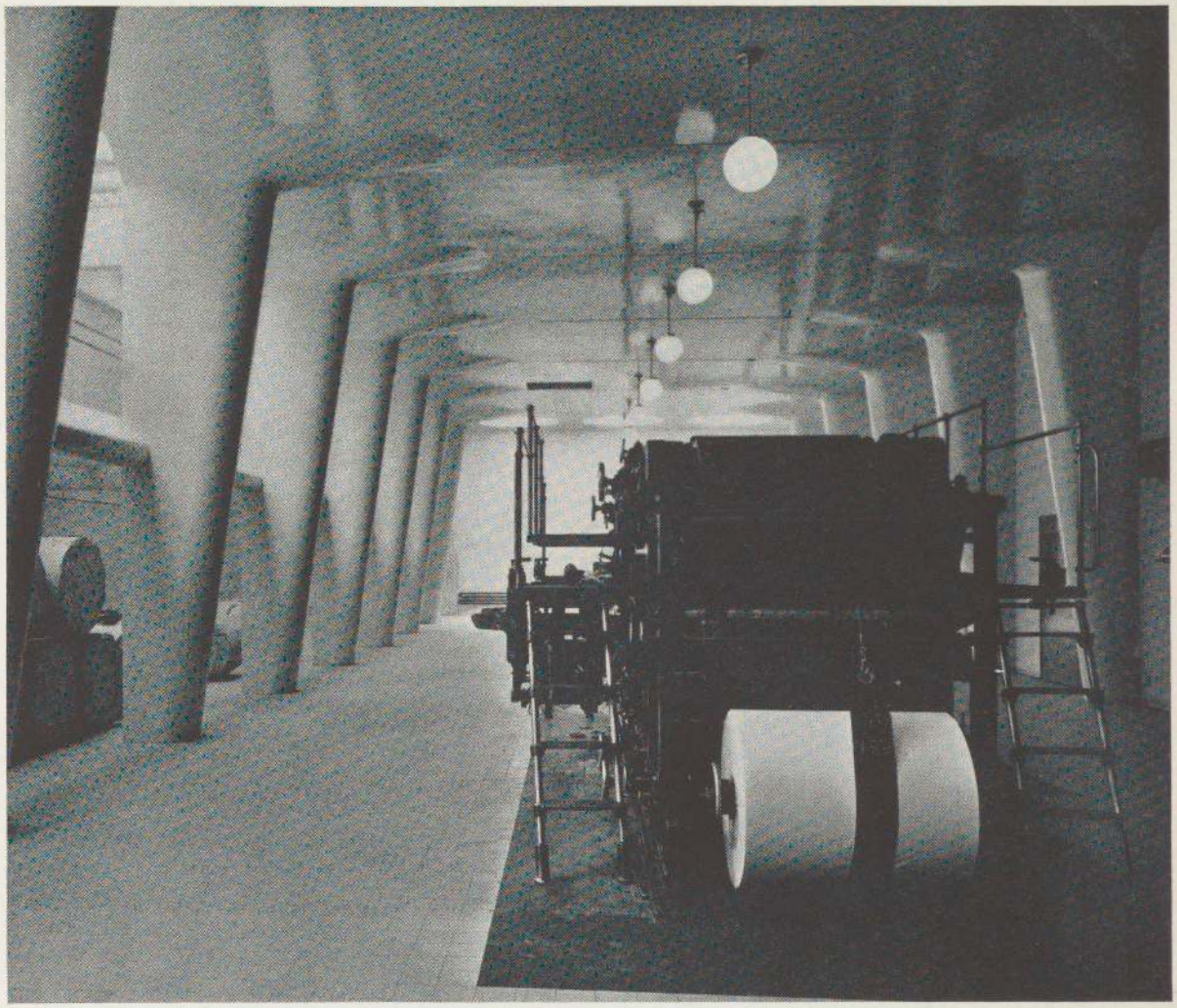
The American manufacturer gives no attention to a search for results of high esthetic quality; but vast sums are spent in discovering public

wants and then producing and widely advertising them. Popular taste seems to be at variance with good design and we need not look to mass-production to raise artistic standards.

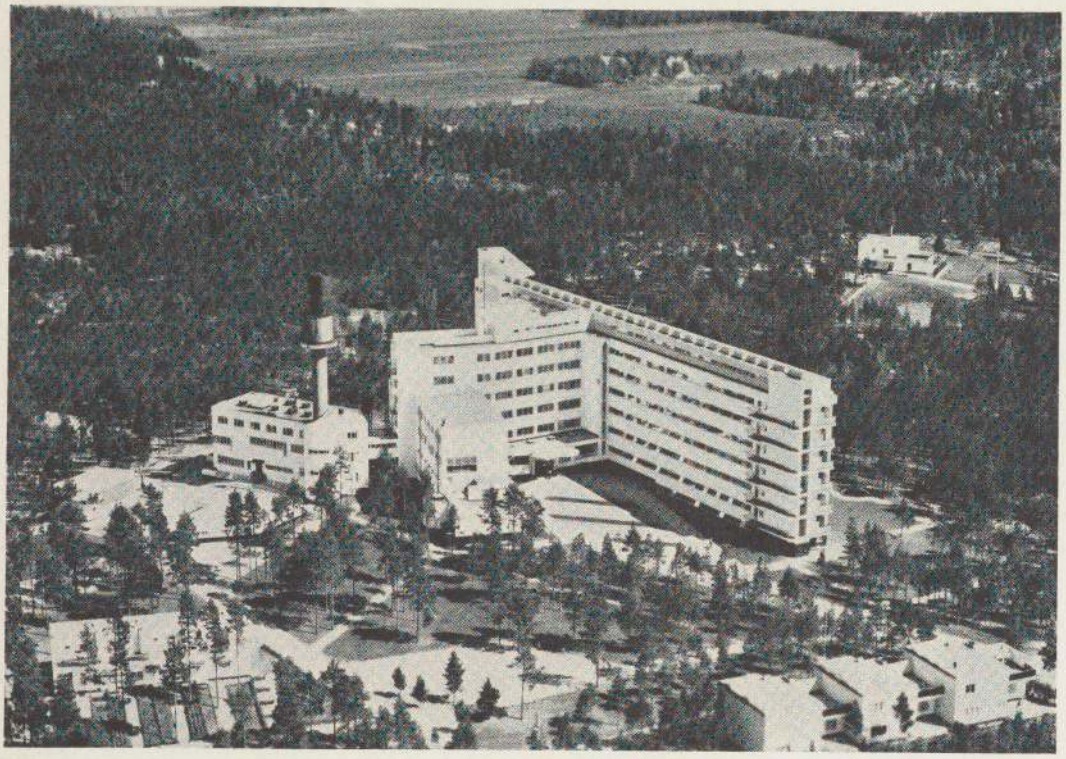
Demand for what is new, whether furniture, dress or lipstick, becomes linked with fashion and, according to Paul Bonner, "It is the people of wealth and culture who start the fashion. From that point it grows. . . . Today publications of this country are giving enormous impetus to public demand for fashion, no matter what the object is, from the smallest peak to the point where it is universally accepted. They are hitting on it almost immediately, whether it is furniture, interiors, architectural details for country houses, silks for dresses—no matter what. Publications are vying with one another to spread the information as quickly as possible that such and such a thing is the last word. So that the time it takes for that fashion to rise from the little peak where you have a limited production, a limited appeal, to a universal demand, is shorter today than it was, and it will be still shorter tomorrow. You are being educated about the people as a whole."

Given the peculiar nature of human beings, well-made and well-planned new designs for furniture have a chance of rapid mass acceptance only if they succeed in pleasing ephemeral desires and whims. Museums and publications can present to public view such excellent examples as the furniture of Aalto. Assuming that the public understands and accepts, a splendid piece of work has been done in the dissemination of good design.

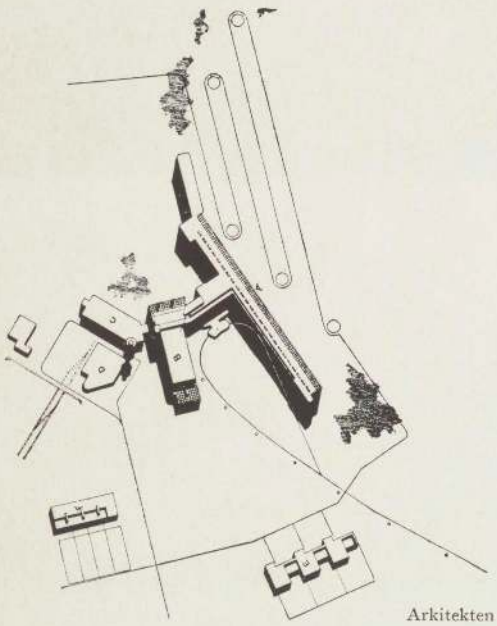
A. LAWRENCE KOCHER



1 *Turun-Sanomat* Building, Turku, 1930. Press room.



2 Tuberculosis Sanatorium, Paimio, 1932. Air view of site. The various wings of the building are oriented for maximum light and air.



A Patients' and nurses' quarters

B Administration and consulting rooms

C Kitchen

D Power houses

E Doctors' houses

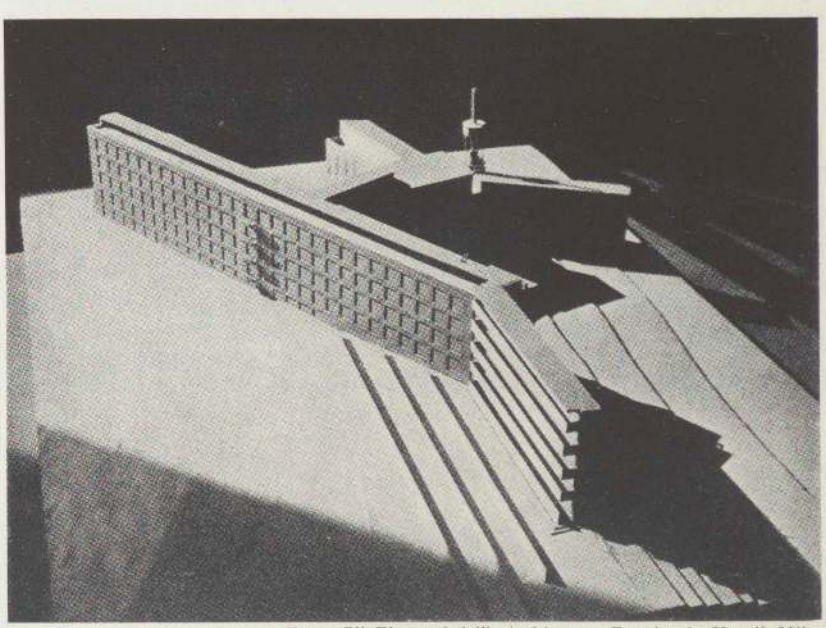
F Employees' houses

Arkitekten

3 Tuberculosis Sanatorium, Paimio, 1932. Isometric site plan.

The Architectural Record

4 Tuberculosis Sanatorium, Paimio, 1932. View of main entrance.

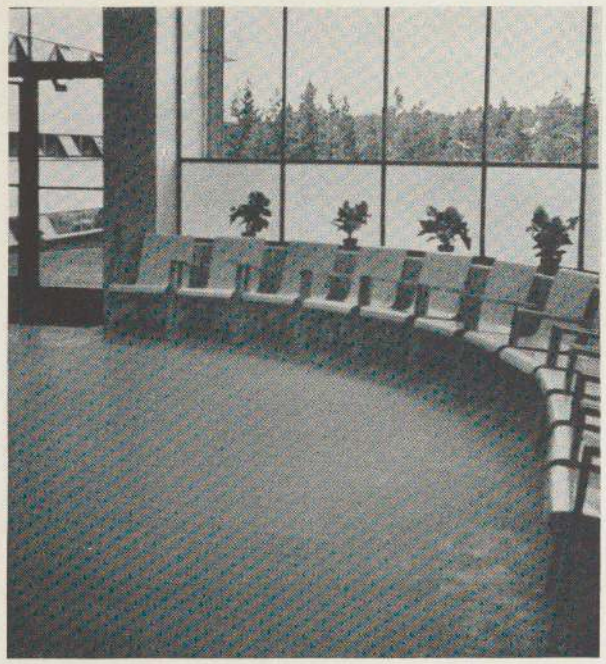


From *Gli Elementi dell' Architettura Funzionale*, Hoepli, Milan

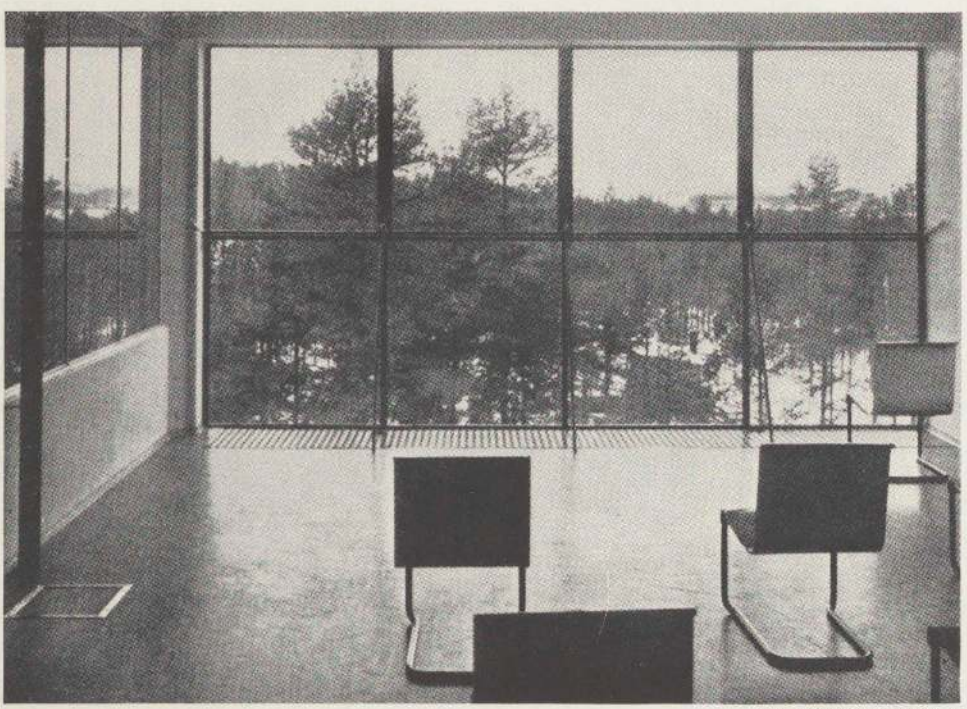
5 Tuberculosis Sanatorium, Paimio, 1932. Model.

6 Tuberculosis Sanatorium, Paimio, 1932. West elevation of patients' and nurses' block.

7 Tuberculosis Sanatorium, Paimio, 1932. East elevation of patients' sun terraces showing cantilevered balconies.

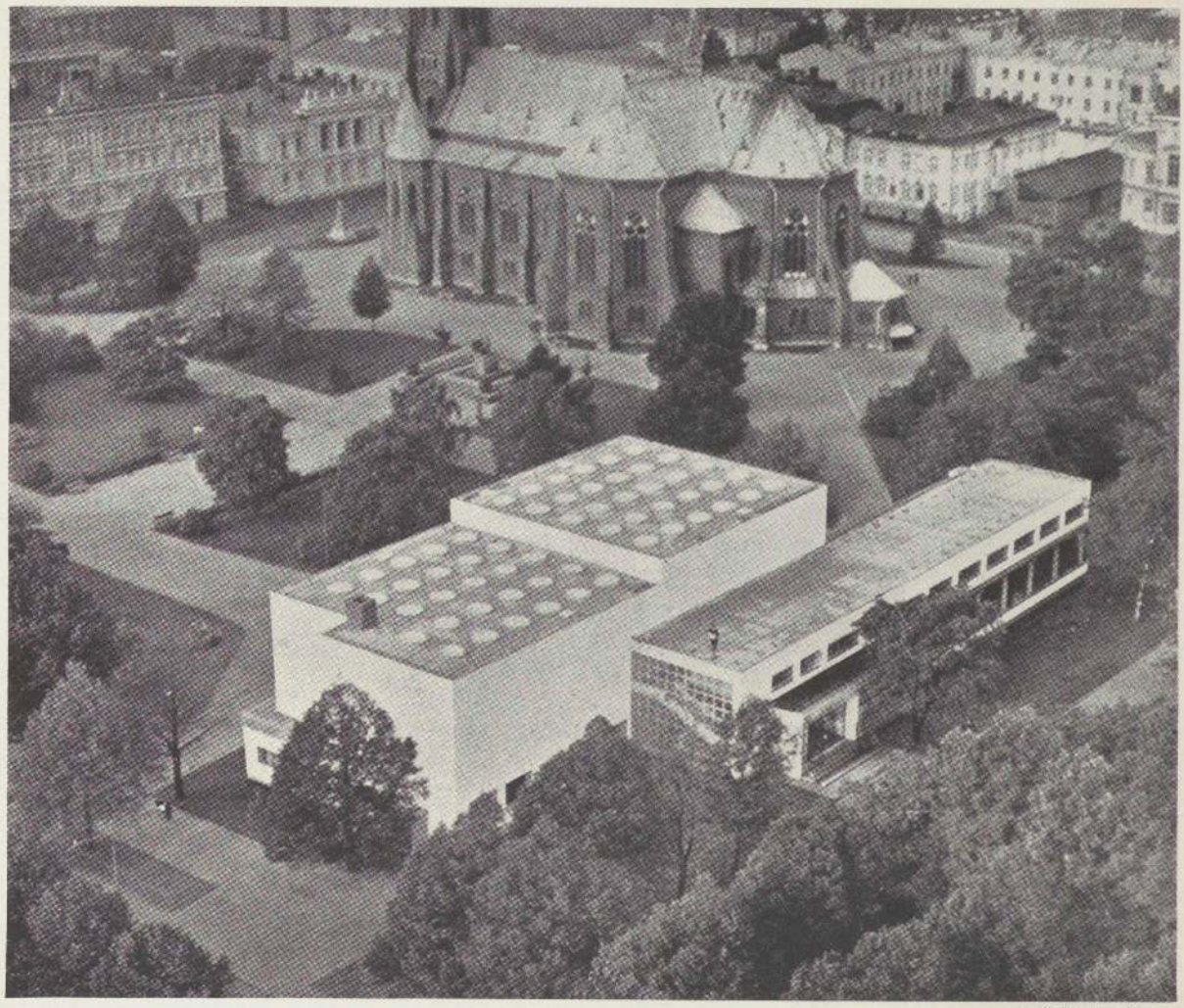


8 Tuberculosis Sanatorium, Paimio, 1932. Entrance hall with Aalto chairs.



The Architectural Record

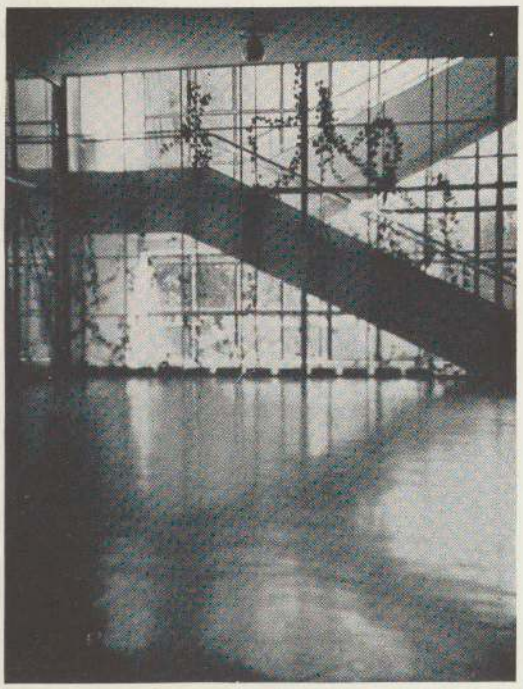
9 Tuberculosis Sanatorium, Paimio, 1932. Patients' reading room on second floor.



10 Library, Viipuri, 1934. Air view of building and site.

From *Viipurin Kaupungin Kirjasto*

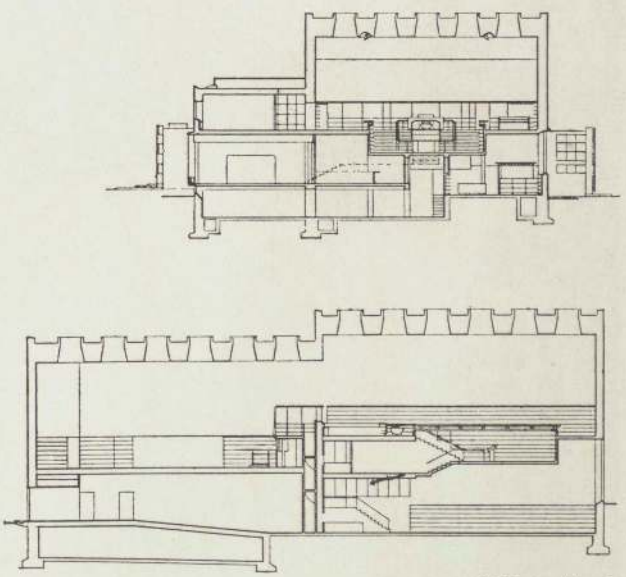
11 Library, Viipuri, 1934. Exterior view of main staircase.



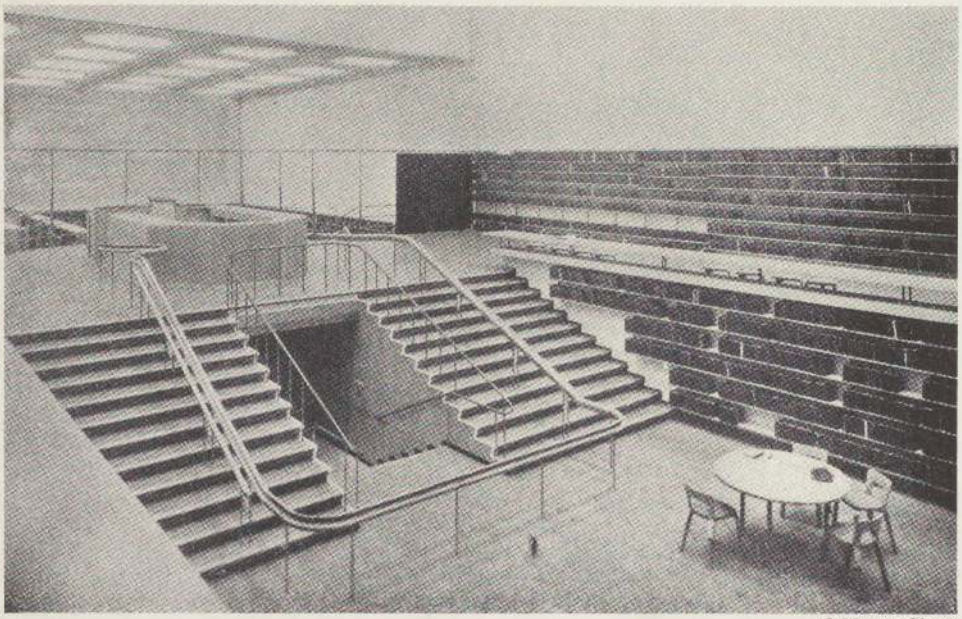
12 Library, Viipuri, 1934. Interior view of main staircase. The metal window divisions form a trellis for the vines which are planted in boxes along the landings.

From *Viipurin Kaupungin Kirjasto*

13 Library, Viipuri, 1934. Side view of main entrance, lecture hall block.



14 Library, Viipuri, 1934. Cross section (top). Longitudinal section (bottom).



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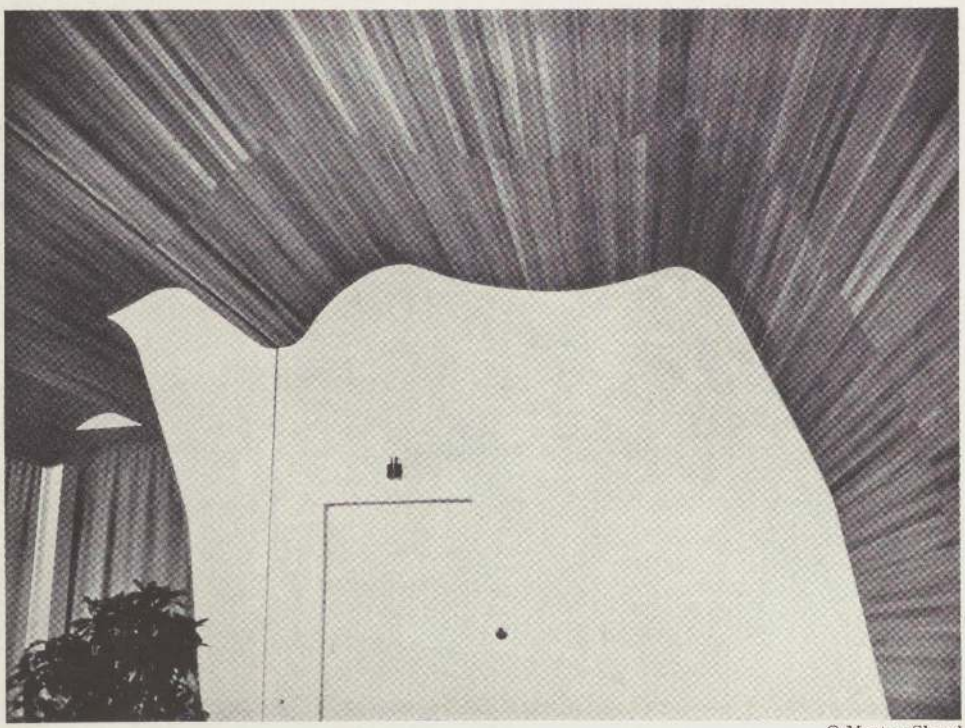
15 Library, Viipuri, 1934. View from open gallery, looking down on lower level of lending section.



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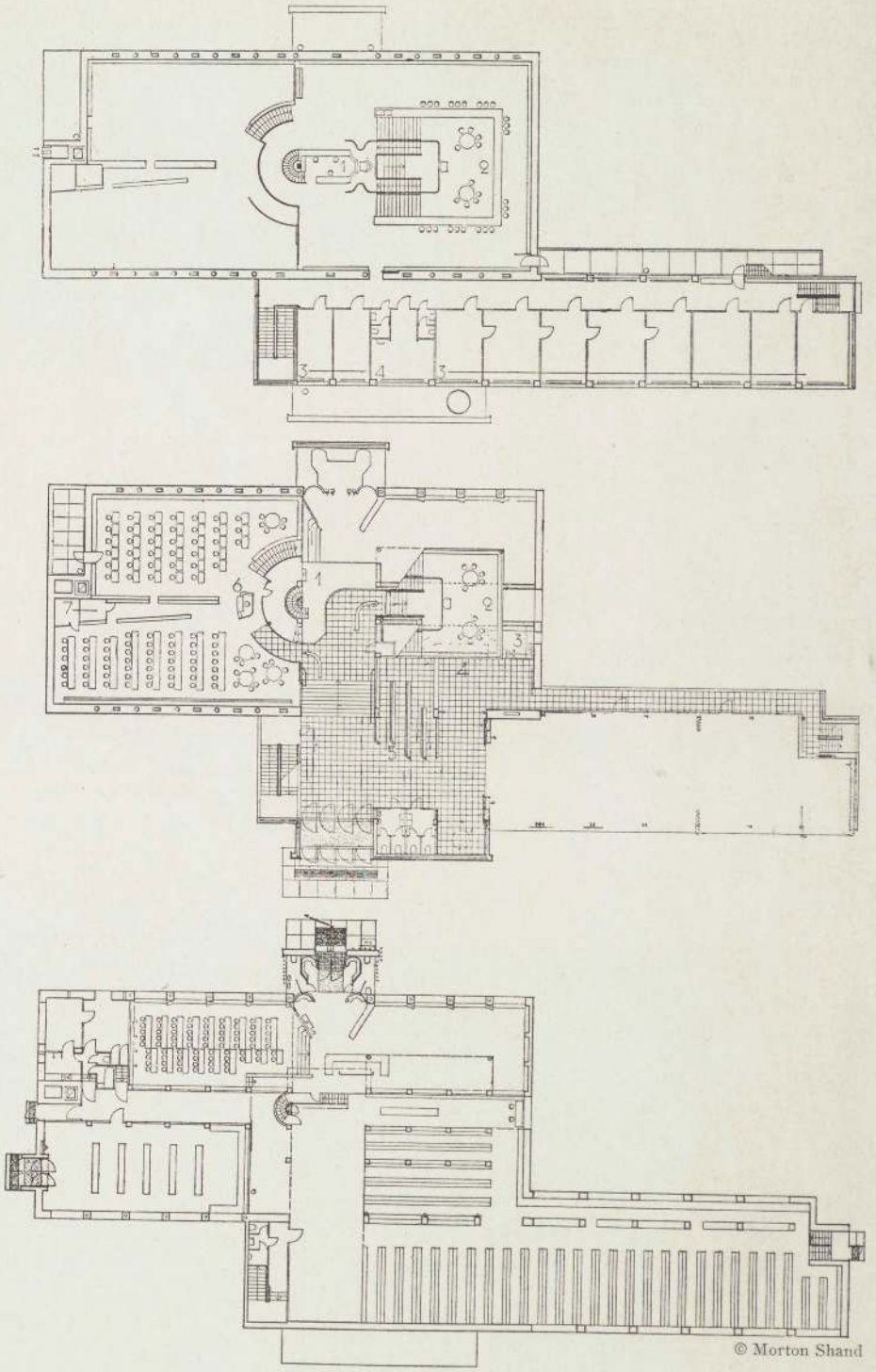
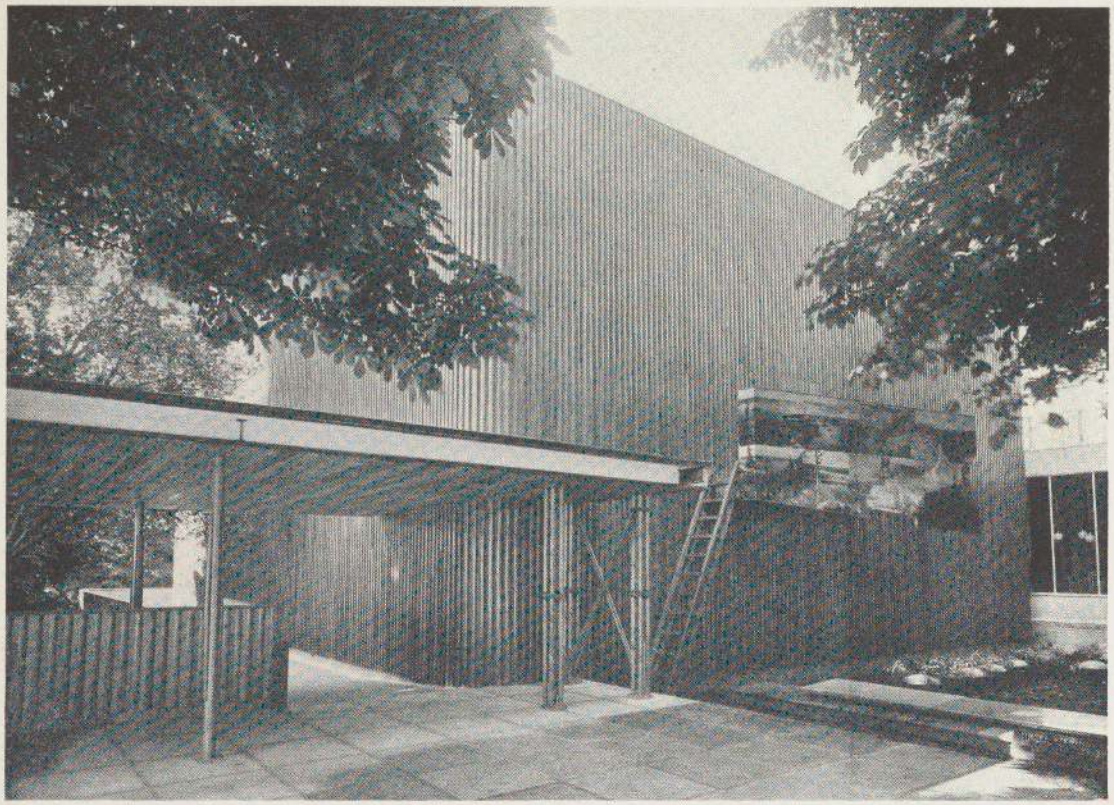
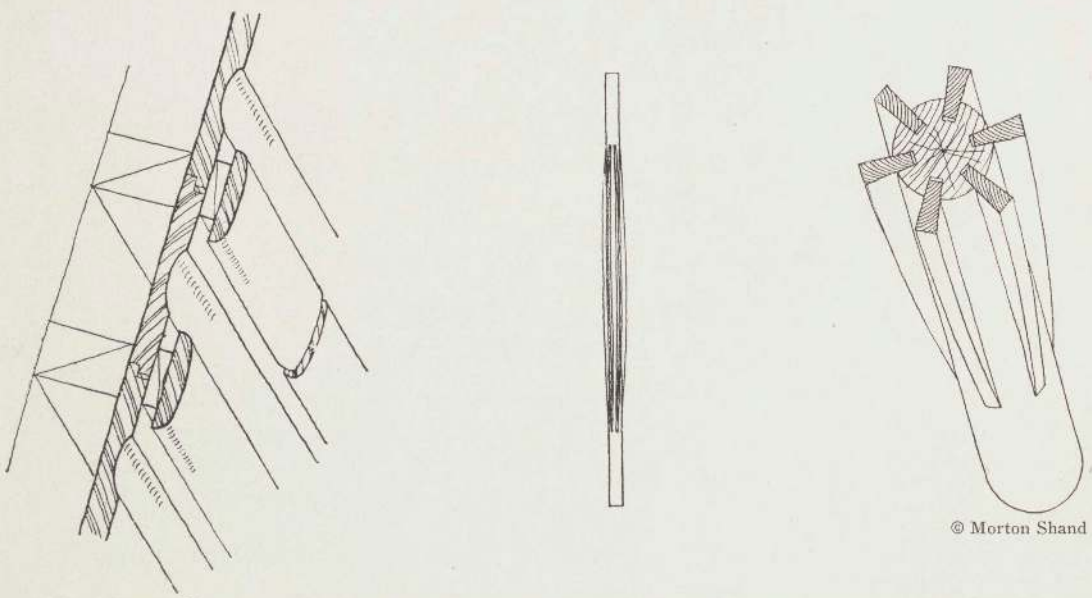
16 Library, Viipuri, 1934. Detail showing acoustic wood ceiling, continuing to floor to form wall behind speaker's platform.



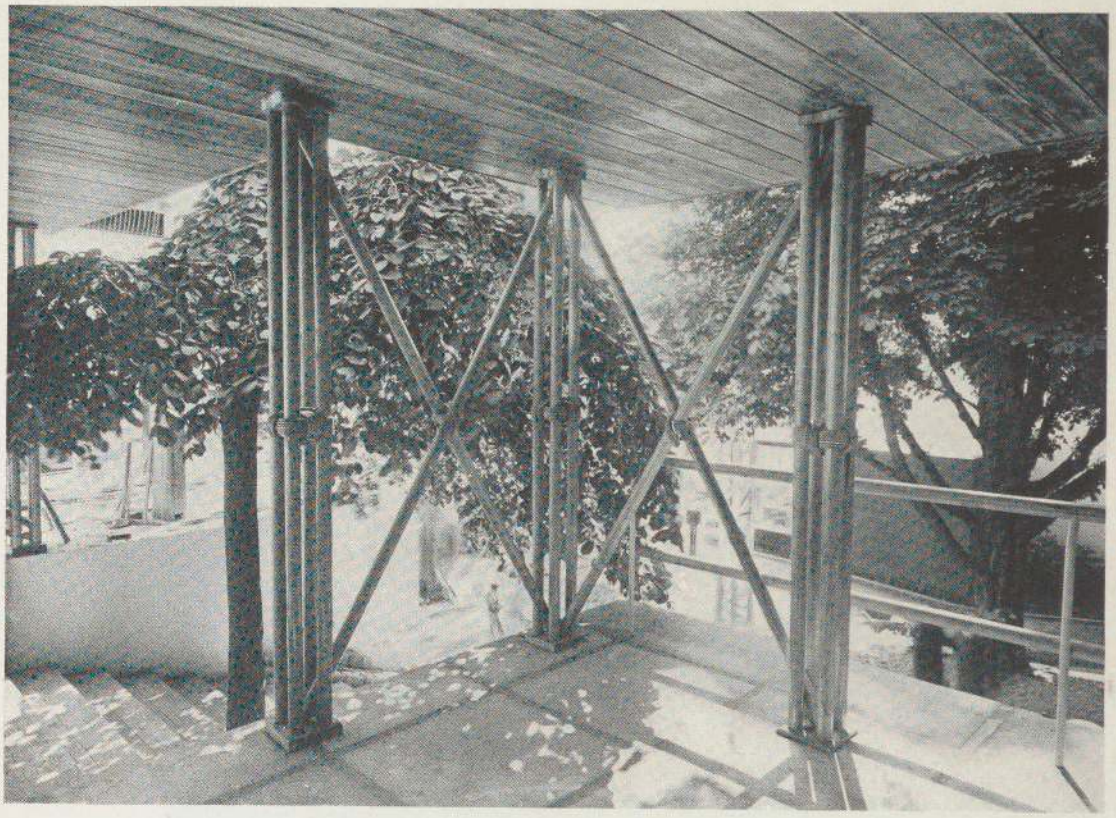
17 Library, Viipuri, 1934. (Top to bottom.) Second floor plan. Upper ground floor plan. Lower ground floor plan.



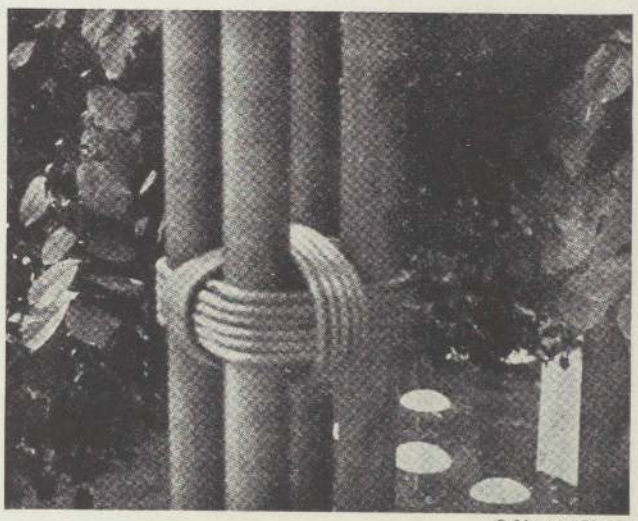
18 Finnish Pavilion, Paris, 1937. North elevation and open loggia showing vertical ribbed boarding with which building is faced and mushroom-like lights in garden.



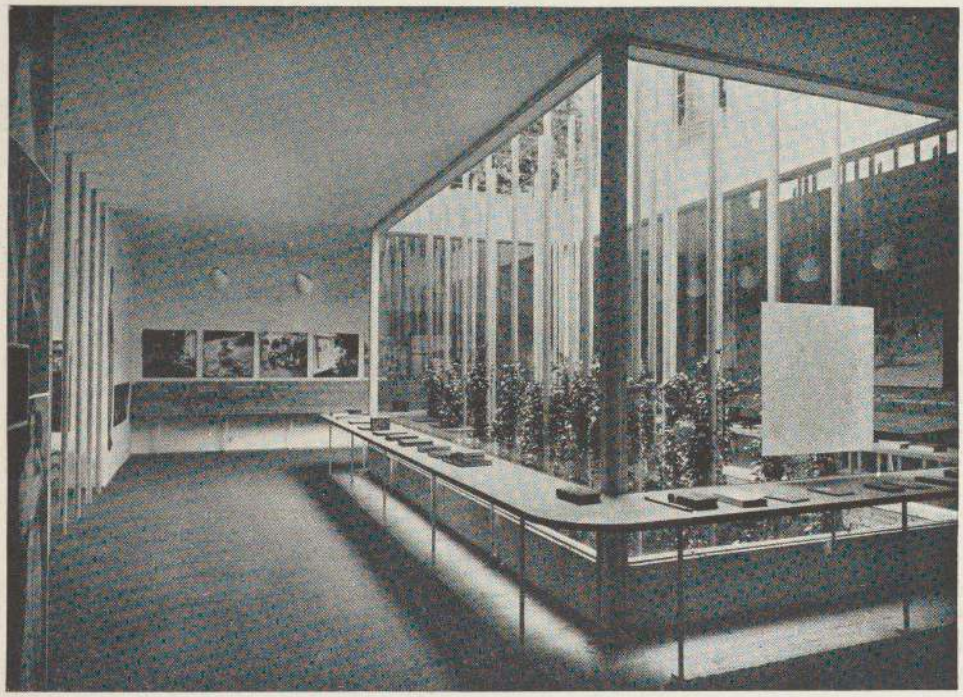
19 Finnish Pavilion, Paris, 1937. (Left to right.) Detail of boarding, natural wood finished with coating of clear varnish. Elevation of reenforced wood columns supporting loggia. Detail of column with projecting reenforcement fins.



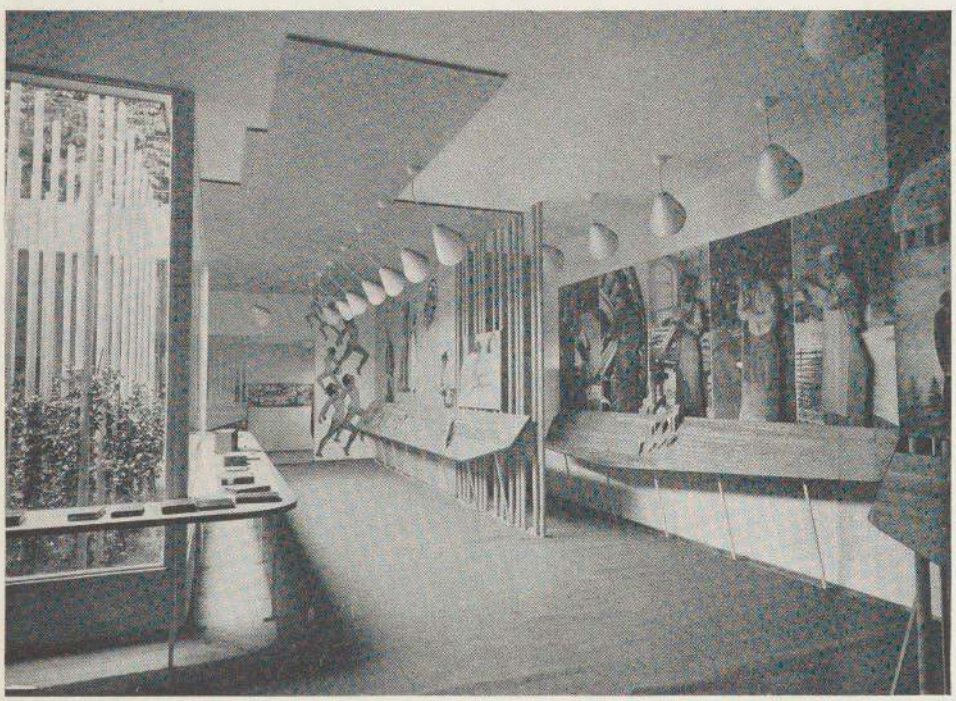
20 Finnish Pavilion, Paris, 1937. View of exterior loggia.



21 Finnish Pavilion, Paris, 1937. Detail showing withes binding quadruple wood columns.



22 Finnish Pavilion, Paris, 1937. View of central court and galleries.

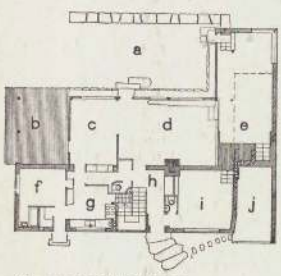


23 Finnish Pavilion, Paris, 1937. View of central court and galleries.

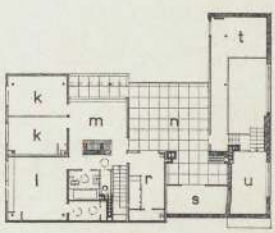
Arkitekten

Arkitekten

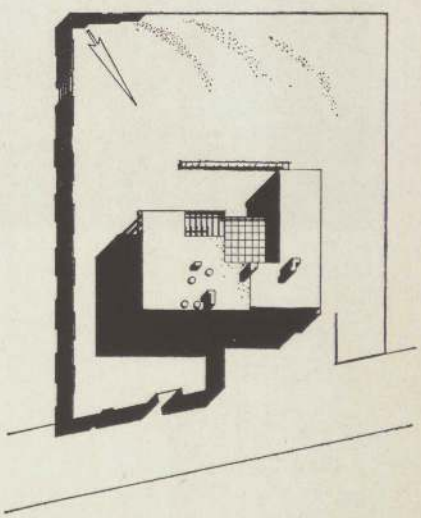
24 and 25 Aalto's House, Helsingfors, 1937. Views of south elevation and paved terrace.



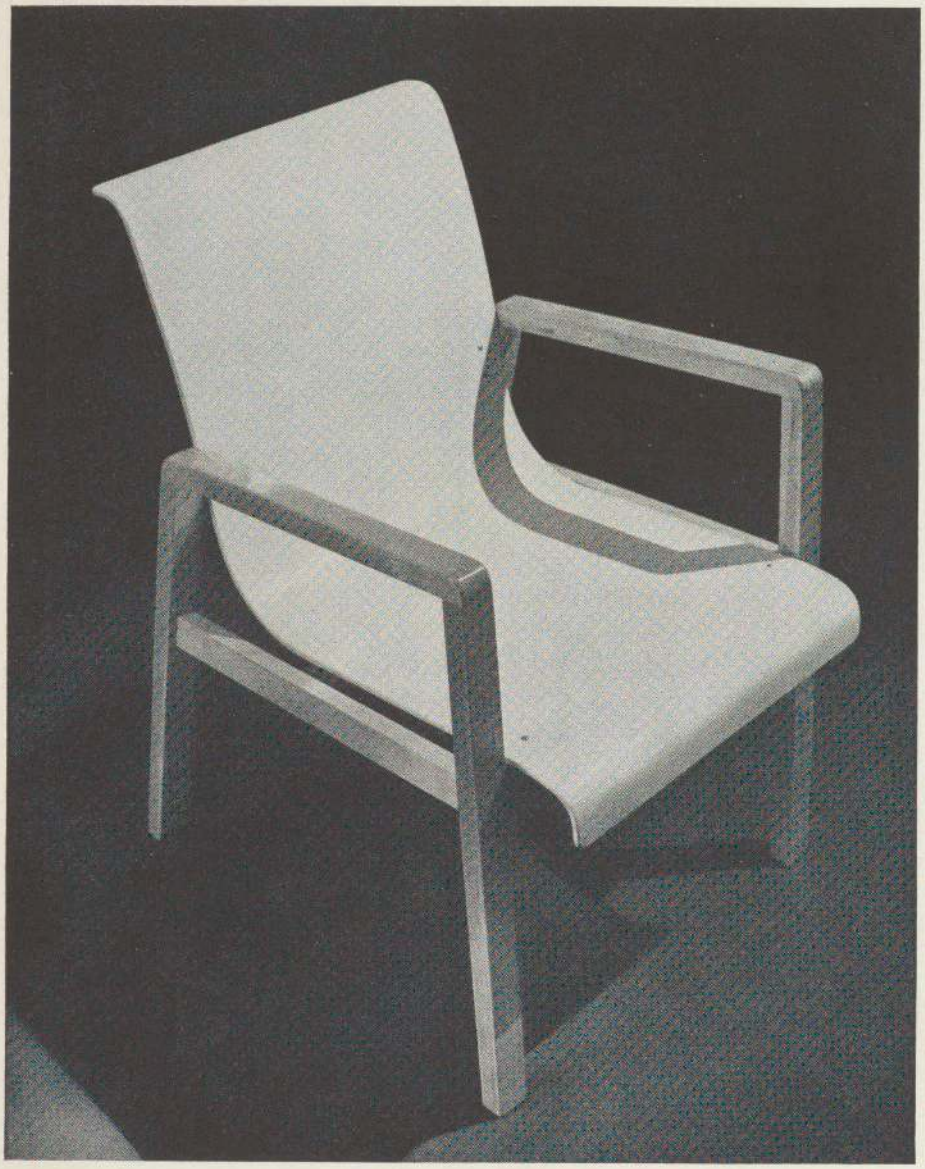
a Courtyard terrace
b Covered al fresco dining room
c Dining room
d Sitting room
e Studio
f Servant's room
g Kitchen
h Entrance hall
i Office
j Garage

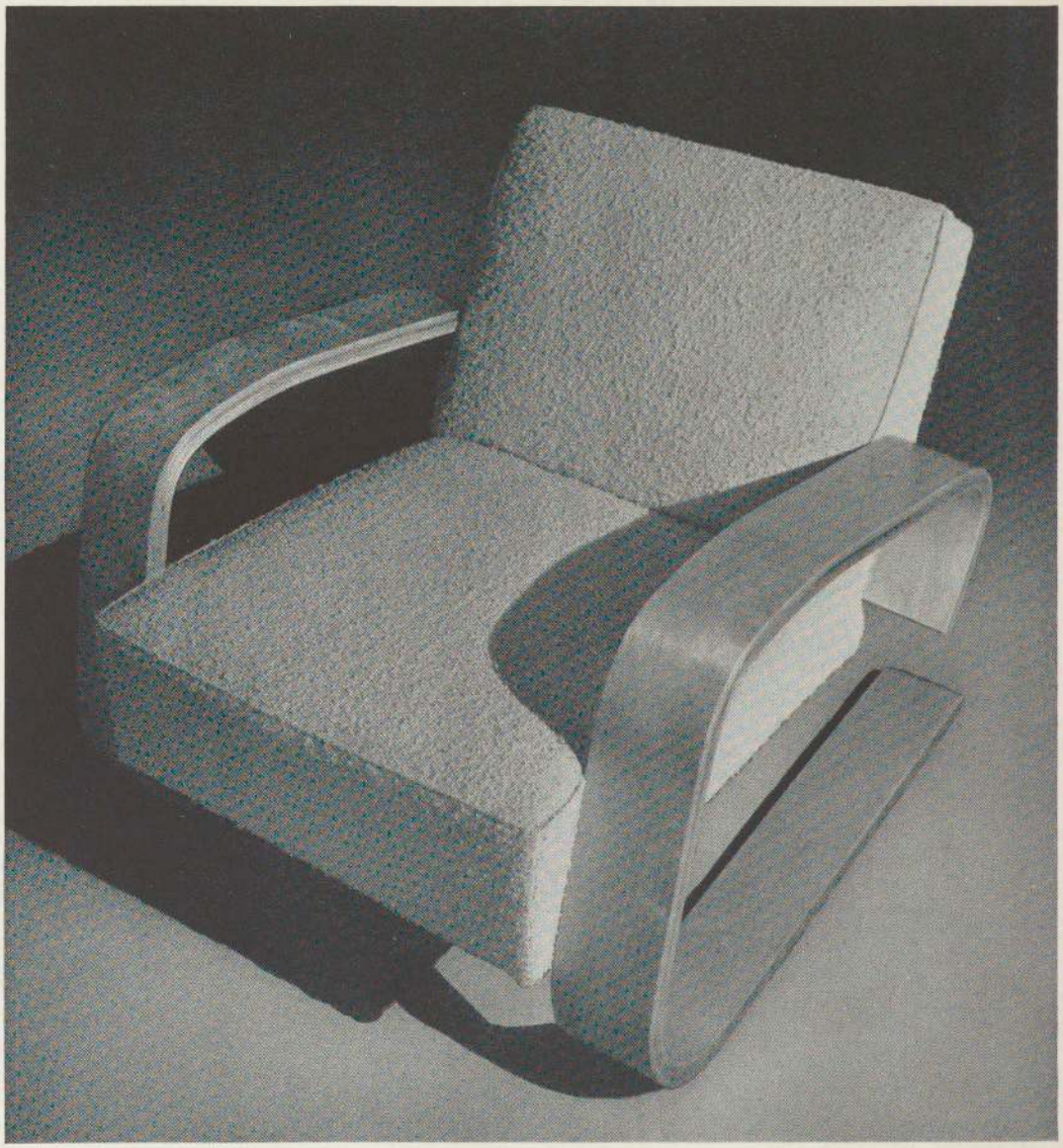


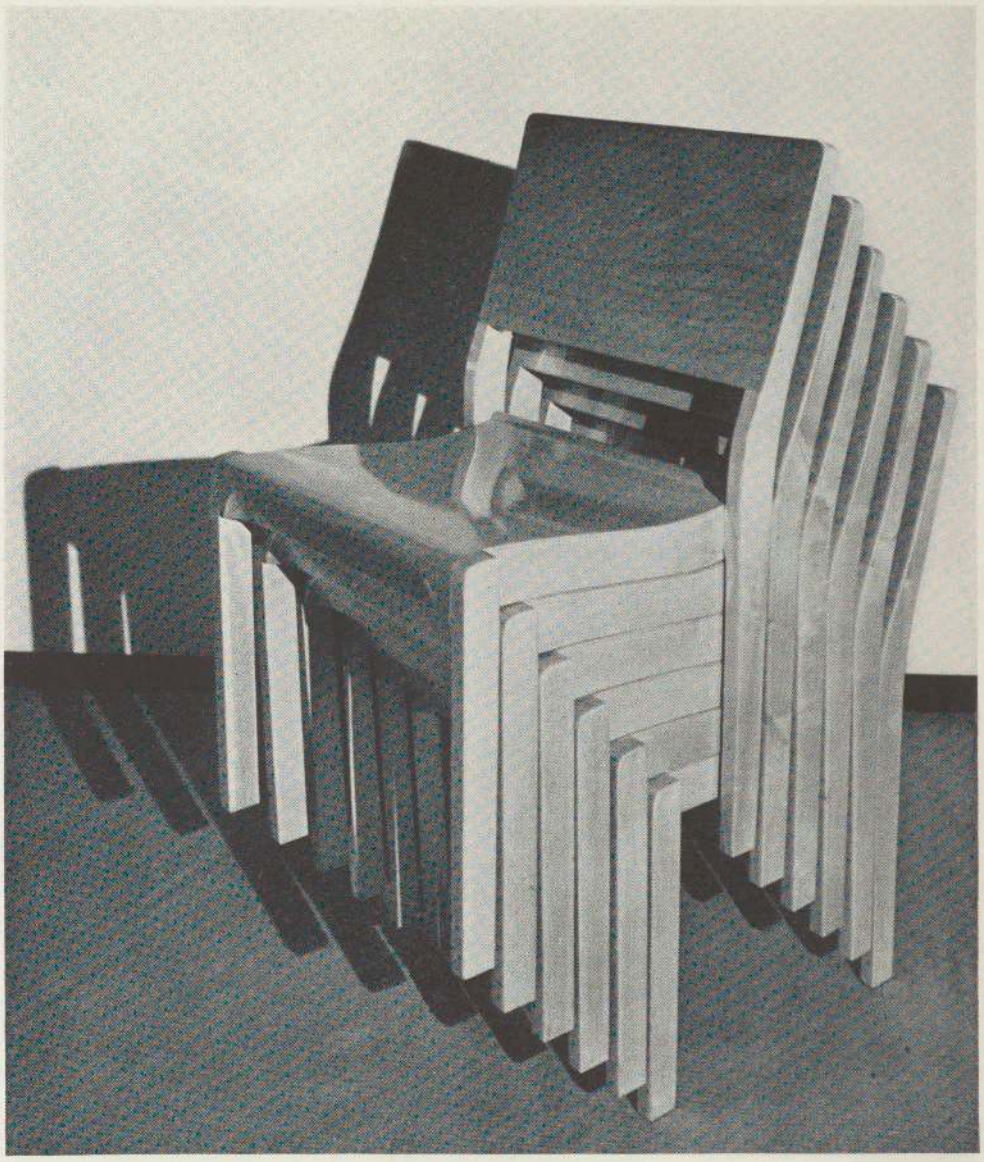
k Nurseries
l Bedroom
m Upstairs hall
n Open terrace
r Guest room
s Drawing room
t Studio balcony
u Architect's room



25 a-b-c Aalto's House, Helsingfors, 1937. First floor plan. Second floor plan. Isometric view of house and site.







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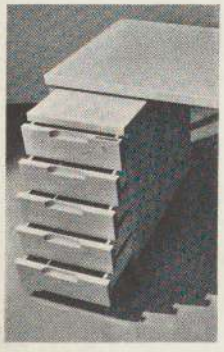

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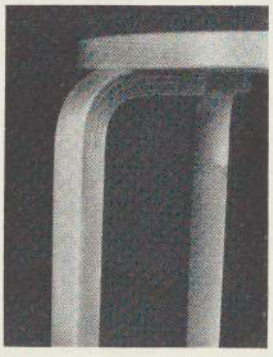

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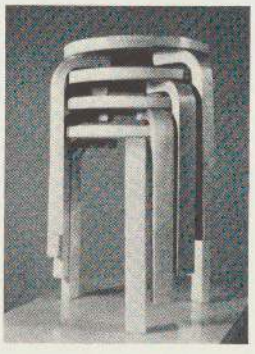

35

CHRONOLOGY

1898 Born, of Finnish-Swedish-Esthonian stock, father an engineer.

1921 Graduated as Architect from Helsingfors Technical College.
Work in the office of the Gothenburg Exhibition, Sweden.

1922 Tampere, Industrial Exhibition (first independent work).

1923-24 Jyväskylä, Trade Union Theatre.

1925 Marriage with architect Aino Marsio; all works after this date are in collaboration with Mrs. Aalto.

1927 1st prize in competition for design for block in which Finnish Theatre is located, Turku (Abo), completed 1928.

1928 Membership in Congrès Internationaux d'Architecture Moderne.
First prize in competition for Tuberculosis Sanatorium, Paimio.
First prize in competition for Municipal Library, Viipuri.

1929 Turku, *Turun-Sanomat* Building
Small apartment building
700th Anniversary Exhibition

1929-33 Paimio, Tuberculosis Sanatorium

1930 Oulu, Toppila Pulp Mill

1932-34 Viipuri, Municipal Library

1932 First chair design

1933 London, Aalto Exhibition
Zurich Aalto Exhibition

1935 Artek, Ltd. founded, for manufacture and distribution of Aalto furniture, etc.

1936 Helsingfors (Munkkiniemi), own house.
Milan, Trienniale, special Aalto section.
Planning of all sites and building schemes for the Ahlström Co from this year onwards.

1936-37 Anjala, twin paper mills

1937 Paris, Exposition, Finnish Pavilion. Sunila pulp mill and housing, community plan, etc.

1938 New York, Museum of Modern Art, Aalto Exhibition.

MEMBER: Congrès Internationaux d'Architecture Moderne. Comité International pour la Réalisation des Problèmes Architecturaux Contemporains.

CORRESPONDING MEMBER: Société Belge d'Architecture Moderne et des Urbanistes. Moscow Academy of Building Art. Royal Institute of British Architects.

Three thousand copies of this catalog have been printed for the Trustees of the Museum of Modern Art at The Spiral Press, New York. Of these, 1311 copies have been reserved for members of the Museum.