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Summary

Harry Seidler, Sydney

Maison de montagne à Thredbo, Australie

(page 245–247)

Dans les montagnes en Nouvelle Galle du Sud, à proximité de la station de sport d'hiver Thredbo a été érigée une maison pour skieurs. Ce travail hors de l'ordinaire, dans un paysage exotique et charmant a été exécuté dans une solution de pleine fantaisie particulièrement voulue qui inspire à l'hôte une atmosphère légère de vacances. La maison semble prête à quitter le sol. L'on doit également y accéder par une longue passerelle inclinée. A-t-on atteint la partie séjour spacieuse et bien ordonnée située à l'étage supérieur, que soudain s'aperçoit au travers d'une dalle de verre posée dans le plancher, le ruisseau de montagne écumant ou gelé selon la saison. De la véranda d'insolation on aperçoit au loin, par dessus les arbres, la pente de ski avec ses pistes, ses champions et ses débutants.

La construction de colonnes, entraits et poutres est imprégnée en noir. Les élégantes doubles colonnes sont remarquables. Les parois sont recouvertes de bois de frêne clair du pays Les soubassements et le corps de cheminée sont en pierres naturelles.

Prof. Dr. Roland Rainer, Vienne

Maison de campagne à St. Margarethen dans le Burgenland

(page 248–250)

Le chaud climat du sud marque le maigre paysage au sein duquel la petite maison de campagne a été construite. Une carrière des environs fournit les matériaux de construction pour tous les murs. De plus, l'architecte a pris du bois de sapin pour plafonds et toit.

La maison se compose d'une seule grande salle de séjour avec deux couchettes et une petite niche pour cuisiner. Douche, WC et débarras s'y ajoutent à l'est.

Au sud se trouve une grande cour entièrement emmurée, plâtrée, recouverte de gravier, fermée en pergola et comportant une table et un banc en bois. Vers le nord également, la salle de séjour se prolonge extérieurement par une pergola. Des vignes grimpent partout le long des murs chauds et des pergolas en minces profils métalliques.

Les fenêtres donnant au sud sont condamnables par des jalousies coulissantes. Au nord, de grands clapets de ventilation en bois se trouvent au-dessus des vitrages.

Le plafond est constitué d'un solivage et d'un revêtement en bois de sapin, les planchers sont recouverts de dalles en pierre naturelle.

A l'intérieur, les murs sont chaulés. La petite maison s'adapte harmonieusement et sans se faire remarquer au paysage simple: une partie de la nature, un morceau de travail humain cristallisé.

J. P. Weber, Rotterdam

The youngest generation of Finnish architects

(page 214–215)

The publications that have appeared in recent years that have been concerned with Finnish architecture mainly stress two aspects:

Firstly, the fact that Aalto developed a very distinct and personal idiom. Secondly, the fact that the generation following Aalto feels strongly challenged by current international trends and regards any possibilities of development from the traditional premises as wholly out of the question.

The quality of Aalto's work is hardly doubted any longer, not even in Finland, where many architects even up to a few years ago sought to discount Aalto as an undisciplined outsider. In the meantime, it has been recognized how closely bound to the specifically Finnish environment are the expressive qualities of his buildings, which are in fact reactions to the given physical milieu. Architects of the younger generation have come round to this positive recognition, whereas the middle generation, including among others Ervi, Blomstedt and Revell, deliberately continue to ignore Aalto's achievement.

With regard to international influences on Finnish architecture, we can only come to positive conclusions; something very similar can be observed in all fields, owing to progress in communications.

The early work of Aalto is itself influenced to the utmost by the movements prevailing at that time, e. g. that stemming from Bauhaus.

Yet Aalto's great merit is that he took the influences coming into his country and refashioned them so that they became a continuous stimulus and also formulated a characteristic Finnish style, combining the traditional and the progressive, by the force of his own personal creativity.

This highly significant factor is more than clear to the youngest generation of architects, not least because architects like Eero Saarinen, for example, despite their firm artistic grasp, have in their recent willful creations pushed the development of architecture into a kind of inchoate formlessness and lack of discipline. There is a fresh awareness of the fact that one is a "Finnish" architect, on account of specific problems and not just owing to romantic prejudices. Attempts are being made not to utilize influences to plan artificial agglomerations of buildings, as can very well be a way out in countries with a population density of 200 and more per square kilometer but to build in accordance with the realistic demands of life in Finland now and in the foreseeable future, to clarify these influences and to intensify them.

Prof. Aarno Ruusuvuori, Helsinki

The basic course in the training of architects in Finland

(page 216–217)

The number of subjects involved in the training of architects is steadily growing. At the same time the rapid development of these subjects is entailing the constant expansion of professional training courses. The mushrooming of technical – economic – scientific subjects constitutes a permanent menace.

Course subjects and hours cannot be increased. The work of the first two years, for us in Finland at least, is almost a threat to the students' health.

Expansion horizontally seems to be impossible. Training in design has decidedly to be expanded vertically in order to ensure a proper balance.

The milieu, practical training and work in offices of very diverse quality have already profoundly influenced the students. Thinking and expression can occur at widely varying levels. What has been seen, learned by heart and the conventional world of designs tie up the capacity to express oneself, because they offer an unlimited fund of clichés ready for application.

The circumstance that the previous art instruction in the schools does not appear to take sufficient account of the development of the visual capacity only furthers the tendency to deviate from the right track.

Architecture in essence is an abstract quantum in space. Its compositional treatment, indeed even its precise comprehension are extraordinarily difficult. Everyone of us has concrete evidence of this on all sides.

Architectural composition is a continuously self-renewing organism, adapting itself flexibly to changes and needs for growth. Above all, it has to be elastic.

Such a compositional totality is composed of very many sets of factors. A totality best serves the constantly evolving transformations of life itself. The partial structures of this totality should constitute purely articulated autonomous elements. This also guarantees the development of the various parts autonomously and independently of one another. The job of the composer is to supervise the formally correct cohesion of these adjacent and reciprocally interacting partial structures.

Only in this way is it possible to achieve a harmonious architectural totality.

For the above mentioned reasons in part, and also under the influence of Vassily Kandinsky, the basic training in architectural composition has in the last eight years been reorganized at our Institute.

Series of exercises clarify and intensify the understanding of space and its compositional articulation.

The training projects are structurally progressive. The number of composition elements is stepped up gradually during training.

The initial element is the sphere, the most sharply limited spatial shape from the standpoint of its internal properties. From here as a point of departure the student proceeds step by step to the unlimitedly differentiated realm of elements available in architectural composition.

In the training projects the basic spatial shape is the cube. It constitutes the outermost boundary of the compositional totality. Everything that takes place within its edges has to stand in relation to this given "setting".

The projects are geared to analysis rather than to synthesis. In them what is mainly investigated is the tensions and reciprocal relationships between given compositional elements and the basic cubic spatial quantum.

There are used as basic elements spheres and rods of specific direction and surfaces. One of these projects investigates the effect of colour in space.

In the subsequent training phase the same basic cubic unit is frequently used. The problem is the composition of the spatial structure for an arbitrary organism, whose size is given. The resolution of the problem presupposes the functional analysis of this organism. The transition to composition on two planes is made and thus the first step toward architectural composition.

After the projects tied to the total shape, there follows an exercise in which out of simple formal elements a growing spatial totality, in a specific design, is to be composed. In the final phase, as a further factor, we have the problem of light and its influence on space. The study of materials, their structural and characteristic properties, makes up the subject-matter of this course. These final projects always have a concrete background; in this way man and his scale constitute the criterion for all solutions. The composition exercises are voyages of discovery and real-life play in the three-dimensional world, the student being expected to realize the subtle web of life as a multifarious, ever-changing play of forms in the light.

Prof. Aarno Ruusuvuori, Helsinki

Weilin & Göös printing plant, Tapiola

(page 218)

This building, which was planned in 1962 and has been under construction since 1963, displays a consistent application of a large-scale construction in response to the requirement of large continuous utility areas on the upper level. For this reason all installations and constructional support points were concentrated at four places. Each of these points is a hollow shaft, with the roof suspended from its head. On the inside of the shaft all the vertical installations mains are housed. All parts subject to pressure (supports, shaft) and all those subject to bending (ceilings) consist of reinforced concrete; the tension rods supporting the roof are concrete-encased steel cables.

Toivo Korhonen, Helsinki
in association with J. P. Weber

Student theatre in Tampere, 1962

(page 219)

The assignment was to give the students a chance, by way of a great number of easily manipulated elements, to articulate the "theatre" themselves in such a way that at any given time there is created an active and integral interaction between performer's action and spectator's reaction, this being achieved by special arrangements. In line with the fire regulations in force in Finland for halls of public assembly, and in the interests of variability, the audiences are under 100 persons. In this way the studio theatre is not covered by any restrictive provisions of the law.

The point of departure for the plan is a room of 17 m. × 18 m.

and a large number of coffer elements measuring 1.15 m. × 1.15 m. × 0.30 m. The coffer elements are so constructed that they can be stacked in all directions. Moreover, there are present in each element 2 tubular attachments permitting the assembly of 2 folding chairs or a 15 cm-high footboard. The coffer elements, built of wood, weigh around 53 kg. Thus two students can with ease transform the auditorium in a short time without any aid from technical installations.

Toivo Korhonen, Helsinki
in association with J. P. Weber

Constructive timber structures, 1962
(page 220–222)

These investigations are intended to spur further initiatives on the part of the timber industry in Finland to extend the possibilities of the employment of timber in construction.
The basic idea was to press waste products of the timber industry into plates by means of binders, these plates then, depending on the particular use envisaged, being assembled to make several plate units capable of spanning large intervals.

A.

Investigation of an element for a supporting construction in one direction. We sought to employ hard fibre plates 2 cm thick in such a way that by means of bolts several unit plates could be assembled to form a girder capable of bridging various spans in different directions.
These requirements gave rise to a trapezoidal plate with 6 holes for bolts. Thus we had the possibility of choosing among three different girder directions and their various combinations. The spans that can be selected are very various depending on the number of plates employed. The plate measurements used in the trials are:

Thickness: 2 cm., Height: 150 cm., Length: 180 cm. (measured from plate axis to plate axis).

This resulted, e. g. with a maximum girder thickness of 6 plates, in the following maximum girder spans and plate numbers:

1. With overhang:
$6 \times 1.80 = 10.80$ m.
$= 6+5+4+3+2+1 = 21$ plates

2. With free placement on 2 supports:
$11 \times 1{,}80 = 19.80$ m.
$= 1+2+3+4+5+6+5+4+3+2+1$
$= 36$ plates

a) Unit plate, the 3 combination possibilities of the elements and the resulting girder direction.

b) Example of a bilaterally projecting girder.

I Plan
II Elevation, three linear
1–3 Deformation possibilities

B.

Investigation of an element for a plane supporting construction.

Considerations and results are on the basis of the above investigations. In order to explore still further differentiated fields of application, the construction was not restricted to one direction. The elements are glued one under the other in one direction, in the other direction connected by means of plywood angular sections fitted perpendicularly into glued grooves. Owing to the glued connection the spatial deformation possibilities are variable as desired.

a) Penetration and connection diagram of the elements in two directions.

b) Example of a projecting plane supporting surface with asymmetrical superposition of corners.

I Plan – support load + support traction
II Section, in one direction linear development, in the other direction curved development.

Timo and Tuomo Suomalainen,
Tapiola near Helsinki

"Temppeliaukio" church, Helsinki
(page 223–225)

The rocks dominating the site signify for the resident of a densely inhabited area the presence of an agreeable bit of wild nature. It is for this reason that the architects, in their plan awarded 1st Prize in 1961, have sought to emphasize the character of the terrain itself.
The building, under construction since 1963, has thus been completely integrated in the rocky hill. While the annex buildings are left free to hug the rocky site, only for the central part of the total complex, the middle of the actual church, was there deliberately selected the mathematical, abstract shape of the dome. The transition between the exact dome and the irregular rock left visible in the interior of the church is constituted by a continuous encircling skylight. The stairs running on the west side to the hill form the intermediate link between the two annex groups, which are used by two different denominations. The interior of the church was designed with a special view to rendering it suitable for holding concerts of church music. It has a seating capacity of seven hundred, a podium for the choir and an organ, plus an open space to accomodate a hundred-man orchestra. The colour scheme on the building inside and out is white, this colour being reinforced by the natural shade of the surrounding rocks.

Timo Penttilä, Helsinki

Municipal theatre, Helsinki
(page 226–228)

This project was awarded 1st Prize in 1959 in a public competition. It is an interesting example of how in Finland a plan is carried through from competition to execution. The architect, 28 years of age in 1959, has an opportunity, during the period after the competition, to develop his idea with employers, consultants and experts in line with the specific problems involved, in such a way that the initial conception was further clarified and reinforced.
In this way, both the architectural specialist and the theatre-goer experience the marked spatial clarification of the given assignment.
It is plain from this manner of proceeding that all involved in the programming, the planning and construction conceive their task as being the furthering of a given development, namely:
Programme – Competition – Compromise – Realization.
The site for the new theatre, a small park, is the east side of a large continuous green zone running around a lake. On its west bank Alvar Aalto is planning a number of new cultural centres. On the north there are situated the Fair Grounds and the Olympic Sports Arena.
The theatre is set in a rocky hill in such a way that a large part of the utility tract vanishes into it. The public entrance is situated at the end of a slight incline: left of the ticket windows, the entrance to the large hall, right, to the small hall. From the foyer of the large hall, through a big glass wall, there is a view out over the park and the lake on to the city.
The balcony and the orchestra of the large house accommodate 945 spectators, the small hall, a studio stage, has a seating capacity of 250. The stages share joint storage and workshop facilities. Intervening utility rooms cut out the possibility of noise transmission.
From the personnel entrance in the rear there is access via a separate stairwell to the dressing-rooms and offices. Restaurant and stage deliveries are effected through an inner courtyard on the west side of the complex.
The entire building is constructed of reinforced concrete. The walls of the foyer and the masonry wall running along the way to the entrance are of white marble. The exterior walls of untreated concrete are insulated on the inside by cellular concrete. Window sections, smoke vents and roofing are of copper. Aside from various obligatory concessions made necessary by the preconceived shape of the building (angle of 60° or 30°) these elements reinforce the leading initial ideas of the project: an unambiguous and sharply apparent spatial sequence: Outer tract – entrance – cloakroom – foyer – orchestra entrance – balcony entrance.

Ilmo Valjakka, Helsinki

Vanttinen home, Espoo West End, 1962
(page 229–230)

The building is on a site which to our way of thinking is all but ideal, but which for Finland is not exceptional at all: a point of land washed on three sides by the sea.
The entrance to the house is reached by way of the isthmus to the north. Just before entrance is made into a special tract, a focal point is reached: The threshold of the living-room, from which, on the inside of the house, there can be seen clearly what characterizes the situation as a whole: on three sides, the sea and, above, the clouds, visible through a skylight.

Ilmo Valjakka, Matti Mäkinen, Helsinki
Tampere commercial school, 1960

(page 231–232)

This project has to do with a typical structure evolved with reference to specifically Finnish circumstances. Owing to the vast sites still available in Finland, there is a marked preference for ground-floor plans, and this is particularly the case for school buildings.
Climatic conditions, however, do not permit open courtyards to be used, among other things, as communications elements among different tracts. All internal passageways are, owing to the long winter, possible only in the shape of inside corridors. For this reason designs are sought after which possess the two, seemingly contradictory features: ground-floor plan only and compact construction (easily heated corridors kept as short as possible). In the project here presented, utilizing a slope, this dilemma has been resolved in an interesting and convincing way.

Prof. Dr. med. E. Grandjean and
U. Burandt, Zurich

The physiological design of easy-chairs
(page 233–236)

Systematic analysis of seating comfort in relation to various seat shapes

1. Introduction

Lay and Fischer (1), before the First World War, had already worked out formulas for car seats on the basis of measurements of bodies and weights. Their seat was characterized by an angle between the seat and the back of 105.3°. The authors also furnished precise data on the distribution of the weight of the body over the different parts of the seat and the back-rest.
In 1945 Hooton (2) published the results of his researches carried out at Harvard University on the bodily measurements of 3867 persons, researches on the basis of which he worked out proposals for the construction of seats for railway carriages. He proposed the following measurements:

depth of seat	51 cm.
height of back	71 cm.
height of elbows	26.6 cm.
width of hip	48 cm.
height of seat	43 cm.
distance between armrests	49 cm.

The profile of the back-rest was the object of a special study by Akerblom (3). On the basis of anatomical and orthopedic research, he came to the conclusion that in all types of seats the back ought to be firmly supported in the lumbar region. His seats are characterized by a typical cushion adapted to the kidneys, by inclined surfaces and by relative lowness, 38 to 41 cm.
Lippert (4), in order to develop an airplane seat for passengers and pilots, based himself on the body measurements of American soldiers. As opposed to Akerblom, he preferred a rounded back, i. e. concave, which gently bends the back of the seated person.
Recently, Keegan (5) published a criticism on differents types of seats. In the first place, he drew on medical and orthopedic considerations and concurred largely with the findings of Akerblom. His proposal for an easy-chair presents, independently of upholstery, the following measurements:

depth of seat	41 cm.
height of seat	41 cm.
inclination of surface of seat (hard)	5°
angle between surface of seat and back	105°

In the meantime Schneider and Lippert (6) have been proceeding from a fresh point of view, that of seated posture. They propose support for the pelvis at the tailbone by means of an angle in the rear part of the seat. In this way the lower part of the back will have a more straight and rigid posture. The authors believe that such a position when seated will be better for the spinal column and for the muscles of the back. Special research (7) on work seats have shown that this position of the seat surface was disagreeable to many of the testers and sometimes even painful.
The perusal of the literature shows that the proposals for the shaping of seats are based on anthropometric measurements or that they are derived from medico-orthopedic considerations. It is a striking fact that the point of view of simple well-being has been all but ignored and has not been systematically tested.
According to our conception, for the development of an easy-chair one ought not to consider the anthropometric and orthopedic viewpoints but rather the subjective well-being of the person who is to sit there. We think that an easy-chair which is comfortable for persons in good health ought also to be correct from the orthopedic point of view.
For these reasons we have investigated the comfort of a large number of testes in relation to different seat profiles. We hoped as a result to arrive at the establishment of a physiological profile for an easy-chair which offers to users a great capacity to provide well-being and relaxation.

2. General programme and methods

To achieve the aims above-mentioned, we built a test chair with multiple adjustments, into which different profiles were introduced and which can be tried out by testers.

2.1. The test chair

In the case of the test chair[1] represented in ill. 1, the inclination of the back, that of the seat as well as the height of the armrests and the height of the bottom can be set in any position at all without any sort of intermediate graduation. The seat bottom and the backrest rest on 3 frames into which a large number of wooden slats are fitted. This application allows for a supplementary profiling of seat and back surfaces. Over the whole seat there has been stretched a foam-rubber mat 6 cm. thick (hard Latex quality) as well as a matting of wadded ticking 1.5 cm. thick.

2.2. The chair profiles tested

In a preliminary test we had chosen on the one hand 3 seat profiles which offered, as required by Akerblom, kidney cushions, more or less sharply accentuated, and on the other hand a profile with straight backrest and another with a slightly concave backrest.
The 5 profiles analyzed are shown in ill. 2; their principal construction measurements appear in Table 1:

1 The test chair was manufactured by the Schweiz. Industriegesellschaft at Neuhausen by the Rhine Falls (Switzerland), to whom we owe our thanks for the assistance rendered to our researches.

Table 1: Construction measurements of the 5 profiles

*) Measured from the lowest point of the upper sides of the slats less 3 cm.

In a second test chair we tested a profile VI which had resulted from the first series of tests. This profile and its most important dimensions are shown in ill. 4.
In a third test series there was examined a series of variants of the most important construction elements, the basis being a slight modification of profile VI.

2.3. The methods of analysis

During the testing of the chair we registered and tabulated the spontaneous movements of the test personnel according to the method of Grandjean, Jenni and Rhiner (8). There were measured at the same time the distributions of pressures on the surface of the seat. To do this, we made use of a vulcanized 6-cell cushion of foam-rubber, which was connected to a manometer. The order of the tests is shown in ill. 5. The pressure value was read on the 6 manometers at regular 6-minute intervals.
Before and after the tests, the testing personnel had to answer a questionnaire containing a series of questions relating to sensations of fatigue and

those in specific parts of the body, and comprising a judgment on each of the construction elements.

2.4. The order of the tests

In the first test series there were selected 10 men aged 25 to 65. The shortest measured 166 cm., the tallest 180 cm.; the average height was 173 cm.

Each test comprised 2 75-minute sessions; in the first, the testers had to relax, in the second, they had to read a detective story to keep from falling asleep. The testers had to fill out the questionnaire at each session in the first 8 and in the last 8 minutes. During each session the spontaneous movements and the pressure distribution pattern were measured on the surfaces of the seat. Each tester had to try each of the 5 profiles, the order of which had been determined by chance.

In the second test series we had 36 men and 16 women at our disposal. The age of the men varied between 24 and 63 (average 38); their height, between 163 and 187 cm. (average 172). The age of the women varied between 18 and 53 (average 34) and their height from 152 to 171 cm. (average 161.4 cm.). These heights correspond almost exactly to the figures that we had arrived at the previous year with a large number of worker (9).

We tried out profile VI and the 1st class profile during the rest period. Each test lasted, for each tester, 8 minutes each time, after which a questionnaire had to be filled out.

In the third test series profile VI, modified, was to be analyzed, the same 36 men and the same 16 women being at our disposal. The different chair measurements were varied until each tester thought he had found the most comfortable positions. Each test was carried out once while the tester read and once while he rested.

The same analysis was then repeated in 4 angles of seat inclination (20°, 23°, 26° and 29°).

3. Results

3.1. The analysis of the 5 profiles of the first test series

The registration of spontaneous movements showed that the testers had a tendency to shift least often with 2nd class profiles and most often with first class profiles as well as Wegner. However, as the variety of the results was truly considerable, the differences could not be guaranteed.

Research into the distribution of body weights on the 5 surfaces tested were likewise subjected to a great variety of analyses. There resulted significant differences among the pressure patterns, among the testers and among the 5 profiles. The guaranteed statistical finding is interesting; according to this, the loads on the 6 pressure cushions were similar. On the contrary, the 2nd class and Akerblom profiles show the greatest loads on the pressure cushions in front and the lowest on the cushions in back.

The results of the inquiries concerning the comfort of the different parts of the body at the end of the session are drawn up in Table 2. The figures correspond to the classes and were computed following the totals for the 10 testers for each of the 7 parts of the body.

(Grade 7 represents the worst rating and grade 1 the best.)

Table 2: Classification of the feeling of comfort for the 7 parts of the body during reading (R) and rest (Rt) at the end of the session

The results in our opinion seem to be particularly striking; the comfort of the different parts of the body was assessed by the testers in very many different ways while reading or while resting. The differences are especially striking in the ratings given to chairs designated 1st class, Akerblom and Wegner. In all the chairs the comfort of the head and of the nape was judged badly. This part of the body appears in particular to be the touchstone.

Responses relating to fatigue during the seating test have enabled us to draw up a scale of values for the growth of fatigue for the 5 profiles. These are drawn up in Tables 3 and 4. In the same way we proceeded to the evaluation of the ratings, to the qualification of the profiles and to the valuations of the 5 profiles which the testers themselves classified at the end of the test series. In the same Tables we have drawn up the classification of the 5 profiles in relation to spontaneous movements and to loads on pressure cushions. Here, value 1 signifies restrained movements, possibly great differences in pressure among the 6 cushions.

The concordance of the 5 evaluations was tested by the Kendall method. We found, for reading, a concordance of $W = 0.66$ and $W = 0.68$ for rest. The two concordances with $p < 0.001$ were very significant.

This means that a systematic concordance exists among the 5 criteria, which in any case says nothing as to the clarity of the evaluations.

Table 3: Evaluations of 5 criteria during reading

Rating 1 means restrained movements, great differences in pressure, large growth of fatigue, the worst aptitude and the worst rating.

Table 4: Evaluations of 5 criteria during rest

The development of the ratings of the detailed construction elements yielded the following results:

a) Seat heights between 42.5 and 44.0 cm. were judged good.

b) Armrest heights between 22.5 and 25 cm. were often rated "too little".

c) Seat depth was rated good solely in the Wegner profile, where it attained the maximum figure of 50.5 cm.

d) The inclinations of the seats between 12° and 20° were rated good during rest in most cases; on the other hand, during reading, the inclinations between 12° and 17° were rated as cramped.

e) Back inclination of 105° was judged good during rest, a smaller angle often being rated insufficient.

f) The inclination of the headrest, which was rated only during rest, was less clearly rated and was most often criticized adversely. This confirms the finding shown in Table 2, according to which the head-nape is the region most sensitive to feelings of discomfort.

3.2. The comparative analysis of Profile VI of the second test series

In the second test series we confined ourselves to the systematic questioning of 36 men and 16 women. Profile VI, analyzed, which we had developed in the results of the first series, was compared to the Profile 1st class, which in the first test series had been rated relatively good.

The results of the inquiries are assembled in Table 5 and are derived from the rating quotients yielded by the evidence submitted by the 52 testers. It is apparent from the Table that the new Profile VI clearly shows a growth in the direction of positive ratings. Especially worthy of mention are the increases in the "comfort" ratings for head and nape, for the back and for the thigh, for which, of course, the above statistics can be guaranteed accurate. Only the armrest height of 27 cm. was rated better in Profile 1st class.

Table 5: Rating of Profile VI and of Profile 1st class based on findings of 52 testers.

* These ratings with $p < 0.05$ are according to the "sign Test" clearly different.

3.3. The optimum positions of seat construction elements, cf. Ill. 3.)

The optimum positions of the most important measurements, as investigated by each of the 52 testers, have been assembled in Table 6:

Table 6: The distribution of the given chair measurements regarded as optimum by the 52 testers (Definition of construction elements, cf. Ill. 3.)

The results of Table 6 show that the optimum angle of inclination of the seat as well as that of the backrest is greater while resting than while reading. For reading higher seats are preferred, whereas for resting they are preferred tilted sharply back.

The optimum positions of the headrest offer a considerably greater choice. For resting the headrests could be adjusted in a vertical range of 10 cm. and 8 cm. in the horizontal. For reading the range of individual positions is still greater. We have observed that the testers were much more sensitive to the position of the headrest than to those of the other parts of the chair. This being the case, it will hardly be possible to guarantee a comfortable posture for a majority of persons by means of a fixed headrest position.

The repetition of these tests with the 4 angles of inclination fixed at 20°, 23°, 26° and 29° gives the optimum positions for resting whose average values are indicated schematically in ill. 6.

The result is that an increase in the angle of inclination of the chair diminishes its optimum height and reduces the angle of inclination of the head whereas the angle of inclination of the backrest does not change. This means that the testers have a tendency to maintain the same fixed body flexure in all the inclinations of the chair, while they alter their head posture so as to keep their gaze in the horizontal.

4. Discussion of the results

From our analyses it results that while resting there has often been found as comfortable an angle of seat inclination between 25° and 28°. This value is above the recommendations of Keegan (5) as well as above that shown by a great number of easy-chairs on the market. We ought in any case to point out that with marked inclinations sitting up straight is more difficult.

The angle of inclination of the backrest ranging from 105° to 108° judged by us to be optimum amply corresponds to the recommendations of Lay and Fischer (1) as well as to those of Keegan (5). Similar angle measurements, moreover, will be found rather often in different types of rigid easy-chairs.

The last test series demonstrated that people almost always prefer the same angle of inclination of the backrest of around 106°, whatever the angle of inclination of the seat backwards (cf. ill. 6). This finding does not coincide with the ordinary manufacture of the easy-chair, which normally presents a greater angle of back inclination depending on whether the backrests are more inclined.

Our tests have shown clear differences between resting and reading positions. We ought to draw from this fact the conclusion that no chair can be built which could be called optimum in the two conjoint functions.

As to the question whether a rounded backrest, i. e. concave, would be more convenient (Lippert 4) or whether, on the contrary, a kidney-support cushion (Akerblom 3), our results from the second test series have confirmed the exactness of Akerblom's interpretation. As regards the easy-chair, we can say, then, that the recommended orthopedic support of the spinal column is equally comfortable for healthy persons.

The headrest is particularly problematic. The results here expand greatly the comfortable positions that we ought to attribute in the first instance to the different individual thorax developments and their effect on head-nape posture. From these findings we draw the conclusion that only an adjustable headrest can guarantee a comfortable head posture for the greater number of people.

5. Summary

We tested different profiles with a large number of testers employing for the purpose a test chair with multiple adjustments. The criteria were: spontaneous movements, the distribution of pressure over the seat surfaces and the subjective opinions of the testers regarding fatigue, comfort and construction measurements. While the physiological measurements of the spontaneous movements yielded results that are difficult to evaluate, the perception of subjective feelings and the ratings on the development of a chair could be utilized.

The results can be summarized as follows:

1. During reading the majority of the testers prefer seat inclinations from 21 to 24°, backrest inclinations (cf. ill. 3) from 101 to 104° and seat heights from 39 to 42 cm.

2. During rest seat inclinations from 35 to 28° were preferred, backrest inclinations from 105 to 108° and seat heights from 37 to 40 cm.

3. For comfort during rest there was preferred a sizable support cushion for the kidneys whereas for reading the straight rigid position of the backrest was given preference.

4. With the headrests it was impossible to define conditions guaranteeing comfortable head posture for a majority.

5. During reading and rest a height of the armrests between 25 and 27 cm. was found to be comfortable (cf. ill. 3).

6. During reading and rest a seat depth ranging between 46 and 49 cm. was rated good.

Max Lüscher, Zollikerberg near Zurich

Vacation house on the Hallwilersee

(page 237–239)

Year of construction: 1960

The vacation house is always a pleasant assignment for an architect because prestige factors can be ignored. "Here I am simply a human being, here I can be one." Architect and owner appear without formal dress, rather in bikini and straw hat. And so the architecture of a vacation house is a very relaxed, free, uncomplicated affair.

The door gives direct access to the living tract, where the family cooks, dines, lives. A fireplace serves as social focal point. In front of the living-room and bedroom (rather bunks) there runs a wide covered veranda, with railing all around it and the roof overhang above it.

Vertical boarding on the faces, wooden boarding on ceilings and on floors, the whole thing resting on short concrete drums. Beneath the fireplace the wine cellar, plus wood storage and boat. How simple life can be when worries about prestige are dropped!

Plan and construction are in accordance with the modulor. The crossbeams and joists are tied in with the concreted drums underneath via steel anchor elements. The external walls are three-ply. All the timber is treated. The four square window areas of the west face can be closed with four equally dimensioned sliding wall elements. When opened, two walls always stand one behind the other in front of a solidly boarded part.

Hans Wyder and Benny Frey
in the firm of Richner + Bachmann + Wyder, Muri in Aargau

Vacation House at Immensee on the Lake of Zug

(page 240–241)

The site acquired by a doctor and his family from Zurich confronted the architects with certain difficulties in the planning and execution of this country-house: It is situated at the foot of the Rigi with a drop of around 10 meters from the driveway entrance to the lake shore. It is narrow and faces northeast, i.e. sunlight and noise come from the south, while the view and quiet lie on the north side.

The house, in contrast to the neighbouring houses, is not situated directly on the lake shore, so as to create between house and lake a garden area sheltered from the noisy highway. The two-storey house is entered on the upper floor on the gallery of the living room. From there one has access to the bedroom tract on the same level or the living-dining room, the kitchen and the garden on the lower level.

The double-storey height of 4.70 m. in the living tract creates an impression of breadth and amplitude. The low height of 2.10 m. makes the dining room and the seating nook of the living tract cosy and intimate.

The view becomes apparent only on the lower level. The living room walls have window apertures, which are kept small, along the top, and in this way there is created ample space for hanging pictures and tapestries. Sunlight enters the living-dining room via a skylight and a window on the south side of the gallery, in addition to the window apertures on the east and west sides.

The great height of the living room required an above-average heat insulation of floor, walls and roof and a careful arrangement of the radiation units so as to ensure as uniform a heat distribution as possible during the cold weather. In summer the living room is pleasantly cool.

In the bedroom tract on the upper level there are 10 bed sites in 4 rooms. The rooms are small, but on the other hand they have as anteroom a cheerful game room, which also serves to keep noise out of the living room. The house has no corridors and forecourts at all. Every communications area has a double function and is integrated in the other rooms.

The exterior design is deliberately severe. The sharply delineated cubes of the living tract contrast with the rolling pre-Alpine landscape.

Marjatta and Martti Jaatinen, Helsinki

Vacation house with sauna at Puumala, Eastern Finland
(page 242–244)

On a forest lake at Puumala in Eastern Finland the architects have designed a small vacation house with sauna. The sauna is fashioned of timbers and habitable in winter. The vacation house is intended to be only in the summer, without heat insulation and with simple windows, which gave the architects a chance to work out many details without having to cope with the difficult problems occasioned by the Finnish climate.

Wood has been employed here almost exclusively. The roof structure is made up of nailed rafters; ceiling, walls and floors consist of planking. While the house is not being used, wooden partitions can be shoved in front of the terraces, runnings in metal tracks, this arrangement having been devised to prevent wild animals from entering the house through the glass walls that extend all the way to floor level. A garage is accomodated in a small separate building.

Harry Seidler, Sydney

Mountain House at Thredbo, Australia
(page 245–247)

The assignment was to erect a ski lodge in the mountains near the winter sports centre of Thredbo in the northern part of New South Wales. This was an unusual job, in an exotic landscape, and it was executed in a highly original way that instils in the guest a playful holiday mood. The house appears to be attempting to escape from the pull of the earth. Also, it has to be entered via a long ramp structure. When the visitor has once reached the living tract on the upper level with its interesting spatial disposition, he suddenly becomes aware of a mountain brook through the glass panel in the floor, the water either foaming or frozen up, depending on the season. From the sun deck there is a view out over the trees on to the ski slope with its experts' and beginners' runs.

The studding, joist and rafter construction is stained black. The elegant double supports are particularly noteworthy. The walls are faced with light ashwood from the locality. Foundation masonry and fireplace are of natural stone.

Prof. Dr. Roland Rainer, Vienna

Summer house at St. Margarethen in Burgenland
(page 248–250)

This stony landscape enjoys a hot southerly climate in summer. A quarry in the vicinity supplied the building material for all the walls of this small summer house. Moreover, the architect selected pine for ceiling and roof.

The house consists of one single large living-room with two bunks and a small kitchenette. Shower, WC and storage room adjoin on the east side.

A large, masonry wall enclosed yard is situated on the south side, paved and gravelled, with a pergola at the end, plus a wooden table and a wooden bench.

Also, to the north the living tract expands into a garden zone with pergolas. Vines grow everywhere over the hot walls and the pergolas of fine steel sections. The windows can be closed on the south side by means of sliding wooden shutters. On the north there are large wooden flaps serving as casements over the panes.

The ceiling is composed of untreated beams and boarding of pine, the floors are paved with natural stone flagging, as in the yards. The walls are whitewashed on the inside. The small house fits harmoniously and unobtrusively in the grand austerity of the landscape, unspoiled nature and a piece of crystallized human handiwork.

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Our collaborators

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