Surface Versus Structure: Alvar Aalto and the Finnish Wooden Churches

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Paradoxically, the Finnish modernist Alvar Aalto achieved distinction not only as one of the early founders of the International Style movement in Scandinavia but also as one of that movement's most potent early challengers. No sooner did Aalto's first functionalist works like the Turun Sanomat newspaper plant of 1929 in Turku introduce Finland to the radically cosmopolitan aesthetic of the International Style' than did his own proclivity toward a quite peculiarly Finnish regionalism become clear, for instance in the undulant wooden ceiling of the lecture room in his Viipuri Library of 1935. Organically—even sensuously—sculptural in form, finished in earthy wood, hanging a-tectonically, and rather irrational in function despite Aalto's earnest claims for its acoustic properties,[2] this unusual surface seems far removed from the harshly white, pragmatically based, industrially oriented machine aesthetic of high Modernism as practiced between the two World Wars. To mid-century critics this pungent and "strikingly novel" ceiling gesture of Aalto's was interpreted as a result of the action of a peculiarly Finnish regionalism upon him--a fundamentally Karelian, deep-

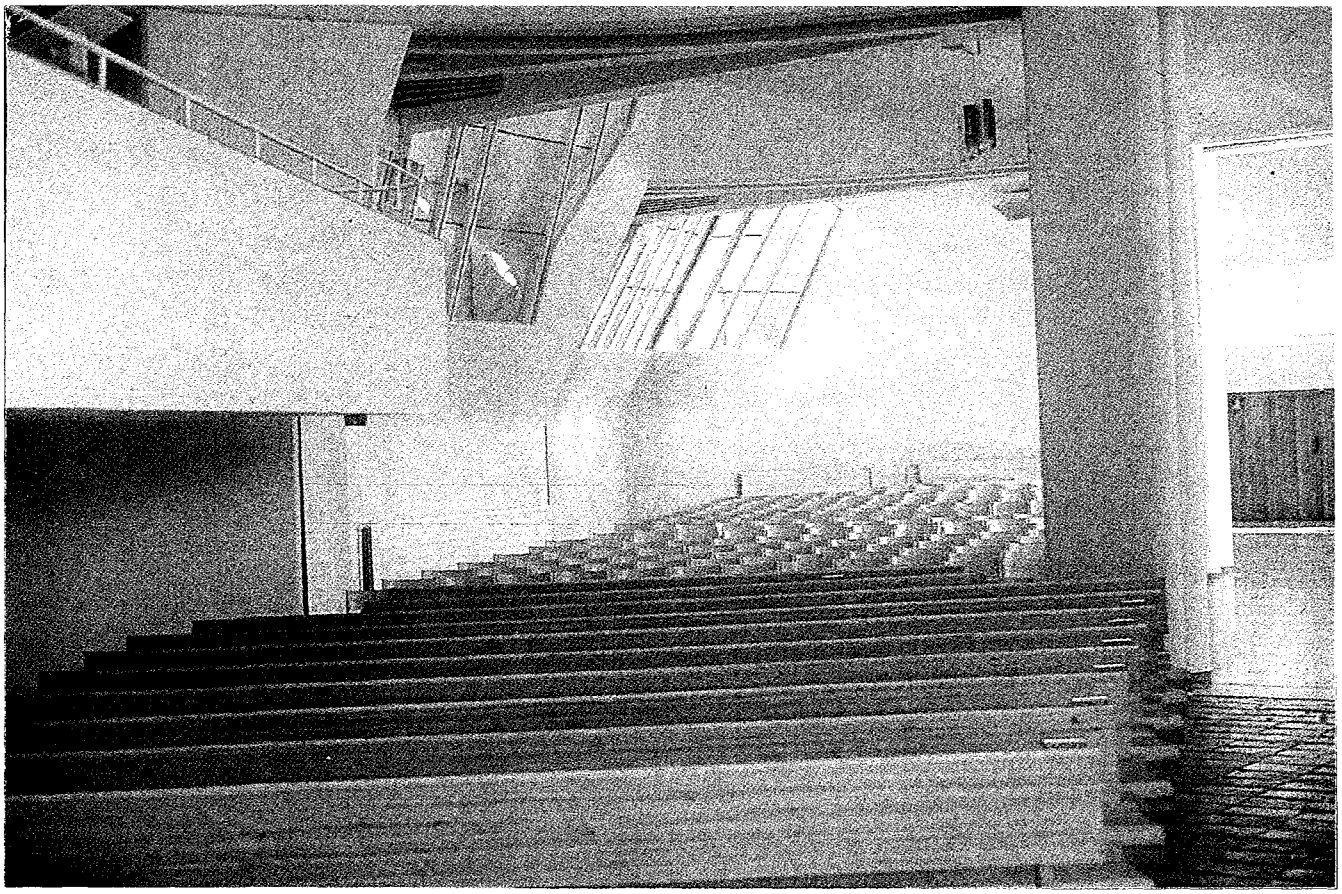

Fig. 1. Interior view of Aalto's Vuokenniska Lutheran Church of 1959-59 near Imatra (Photo by Author).

forest, back-to-nature primitivism that even the powerful aesthetic tremors emanating from the Weissenhofsiedlung could not fully shake from him.' As if to confirm the importance of such organic touches to his work, Aalto himself wrote just a few years after finishing Viipuri that "architecture's inner nature is a fluctuation and a development suggestive of natural organic life."[4] Even as Aalto was in the process of busily importing a more or less fully-formed Corbusian aesthetic across the Baltic Sea to Scandinavia, he steadfastly refused to fully jettison the specific character of the region he called home.

Of course Le Corbusier, the International Style's *maître*, had interspersed occasional hand-drawn curves into the harsh orthogonality of his own plans of this period, as at the Villa Savoye. But Viipuri's wave-like, rhythmic gesture was of an entirely different order of magnitude, and was also pithy in material in contrast to the primary colors of Le Corbusier's plaster abstractions. In truth even the Turun Sanomat Building, probably Aalto's most Corbusian-inspired production, gave witness that Aalto's fidelity to the International Style would be brief. Deep down inside, far back from the street, it possessed a structural gesture wholly alien to the tectonic and syntactic rigors of Corbusier's idealized *Maison Dom-Ino* frame, that ultimate structural—and formal—arbiter of International Style taste. Columnar forms rise up in the newspaper press room tree-like, and then organically fuse with floor slabs.[5] Here it is hard to speak, as a Modernist would, of a precise dichotomy of purely horizontal or purely vertical structural members—of slabs or columns.[6]

Organically formed elements were not to remain small or peripheral events in Aalto's ultimate development; highly gestural ceiling-scapes and complex renditions of structure—conditions which were *submerged* inside his early International Style volumes—were to *emerge* and run riotously throughout the entirety of Aalto's forms in his later years. In addition, these components increasingly came to interact—the strangely-formed structural members intersecting or blending in the oddest of ways with exotic, frond-like, overhead surfaces. The sail-like vaulting of Aalto's much later Imatra Church, where arcuated beams variously fuse with, support, or slash through the billowing membranes, shows this evolution **(Fig. 1).** As Demetri Porphyrios has written, Aalto's later works in particular seemed to have no concern for "that ethical cornerstone of Modernism: the distinction between structural and non-structural members." This blending, which to the "Modernist eye . . . must have been a gross irritation," only increased as Aalto's career progressed.[7] Understanding precisely what first provoked Aalto's proclivity toward irrationally-shaped and supported ceilings is thus of considerable importance for understanding the distance that gradually developed between Aalto and the internationalized uniformity of high Modernism as defined and canonized at MOMA in 1930.

AALTO AND THE FINNISH WOODEN CHURCHES

While not in any way disputing the action of some sort of generalized, organic regionalism upon Aalto's development, I nonetheless want to offer a much more specific Finnish source for his most characteristic signature element—the peculiarly a-tectonic vault. The little-known 17th- and 18th-century Finnish wooden churches, which dotted the landscape where Aalto was born, may have been his inspiration.[8] These small and rather brooding woodland sanctuaries possess many qualities that resonate, across the intervening centuries, with Aalto's spatial sensibility.

The sections of many of Aalto's buildings and many of these wooden sanctuaries contain oddly curving and evolving vaults, unexplained offsets of structure, strange beams lancing boldly across the spaces, and primitive--almost rude—stackings, collisions and blendings of all these elements **(Fig. 2).** While different materials, geometries and styles clearly exist here, there is still an obvious regional debt to trace. Aalto, one suspects, would have had it no other way. His sense of respect for precedent was clear from some of his earliest writing—for example when he wrote in his 1922 article entitled *Motifs from Times Past* that: "Our ancestors will continue to be our masters."[9] With the exceptions of the major centers of Helsinki and Turku, each of which had more lengthy architectural pasts, the rest of largely rural Finland had only these churches, however modest, as ancestral examples of monumental building.

Aside from his strong interest in Finnish regional traditions in general,[10] Aalto had specific reasons to carefully

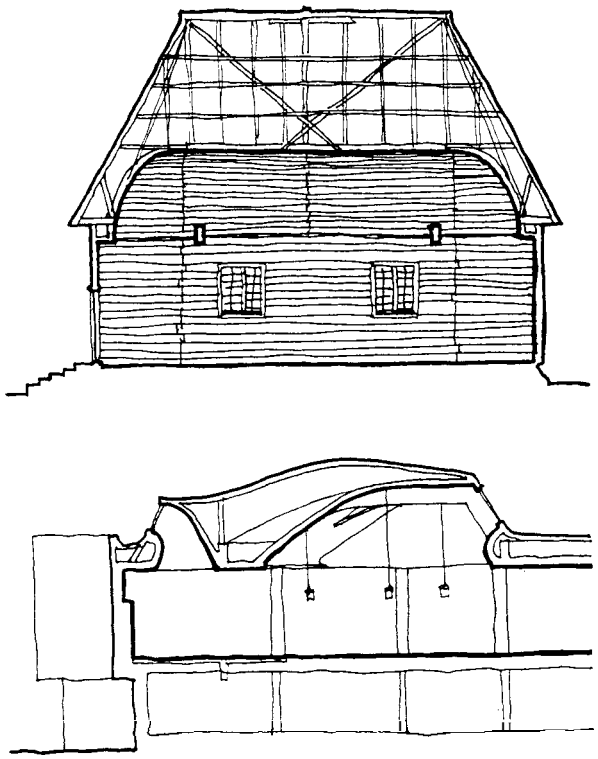

Fig. 2. Comparison of the sections of Aalto's Municipal Library in Kokkola with the Church of Kallankari (Drawings by Author). Note the inset perimeter wall beams on each side that support the trusswork and vaults of the wooden church.

study examples of these old churches. Many of his very first commissions were for renovations or enlargements to wooden sanctuaries which had been built near his childhood home of Jyvaskyla, where he had centered his early practice. Beginning with his bell tower addition to the Kauhajarvi Church in 1921, Aalto began a long series of varied interventions that ranged in scope from a minor chancel revision such as the one he proposed for the Korpilahti Church, to a proposal for a large parish hall addition to Carl Ludwig Engel's revered Kemijärvi Church." Yet even as he worked to understand these regional churches, and no doubt absorbed much from them, Aalto seemed to have understood that he would somehow have to ultimately rework, not copy, any lessons he learned. In 1921, as he started to work on these churches, he wrote: "Nothing old is ever re-born, but it never completely disappears either. And anything that has ever been always re-emerges in a new form."[12] The International Style would itself provoke a transformation in Aalto's use of these vaults.

VAULTS, STATICS AND THE OSTROBOTHNIAN BLOCK-PILLAR

The most distinctive—in fact virtually unique—characteristic of Finland's wooden churches is their unexpected and rather irrational interior vaulting. Not only is it somewhat surprising to suddenly come upon such complexity of geometry and space inside these remote and bluntly box-like buildings, but the perplexing manner in which these vaults are supported defies any simple explanation, either visual or tectonic. The source of these effects can ultimately be traced, with some effort, to a small but significant necessity of their construction.

These Finnish wooden churches were built of heavy timbers, laid horizontally and notched at the corners.[13] At its most basic level, this kind of log construction inherently encourages an ambiguity of surface and structure since the wall membrane of the building simultaneously performs both tasks of enclosure and support. The skin and bones in such a building are essentially one in the same, and a blending or even total negation of their separate readings is inevitable. But the ambiguity in the Finnish wooden churches went much farther than this. Horizontally-laid log walls impose one difficult constraint peculiar to this kind of construction, and the Finnish solution was itself unique, as well as being uniquely contributory to exactly this ambiguity of surface and structure. The length of any wall in true log construction is always sharply limited by the length of the timbers. To achieve a linear nave space longer than one log, several logs had to somehow be joined end to end. Simply abutting or interweaving them would leave a weak joint in mid-wall with no perpendicular bracing. In the fifteenth century, the master craftsmen of Ostrobothnia, the north-central region of Finland, developed a 'block-pillar' system—"a curious form of timber buttress, square in plan and hollow, partly inside and partly outside the building" that encased the weak joint, bracing it stoutly from all sides.[14] The oblong church at Tervola of 1689 best exemplifies this type of axially lengthened plan **(Fig. 3).**

These block-pillars were not only useful for carrying a portion of the weight of the horizontal timbers of the walls themselves—thus reducing these walls inherent tendency to bow outward or buckle under self-weight[15]—but were also important for carrying much of the imposed load of the roof trusswork, especially on the longer, otherwise unbraced sides of the building. In order to transfer **a** large portion of

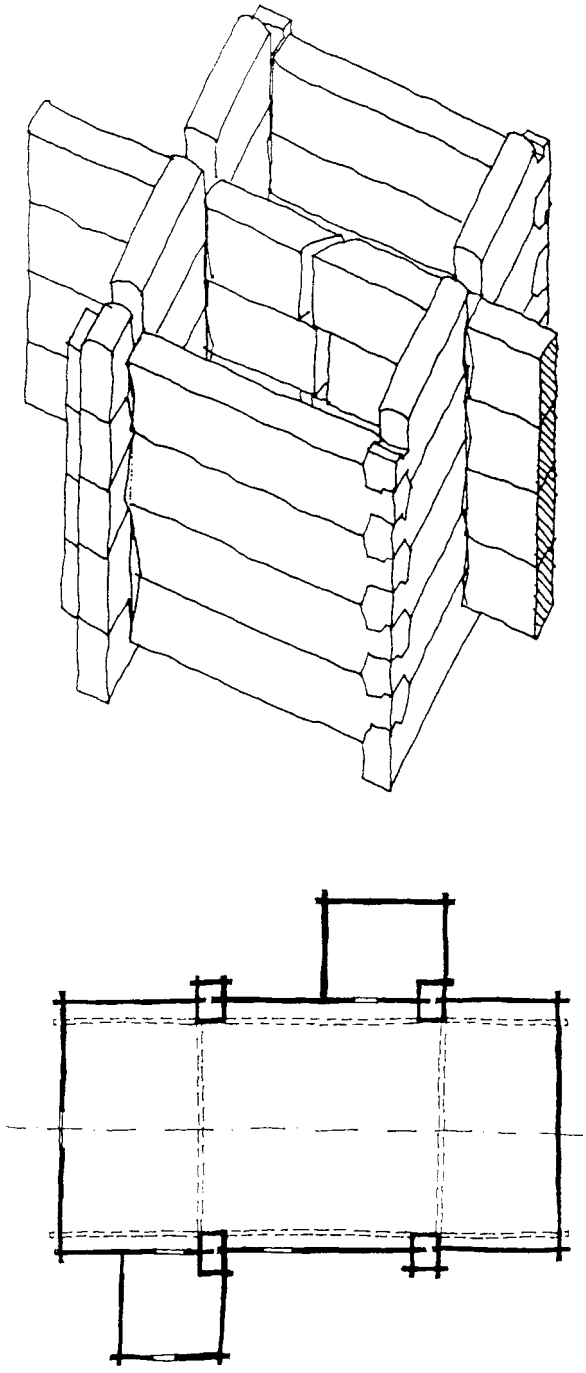

Fig. 3. Plan of the Church at Tervola and diagram of one of its Ostrobothnian block-pillars (Drawings by Author).

the roof load onto the block-pillars rather than onto the walls, the roof membering springs first and foremost from heavy timber beams that stretch from pillar to pillar, running parallel to the walls and aligned with the inner faces of these buttresses **(Fig.** 4). This, of course, also slightly reduces the necessary span of the roof trusswork. In section, these beams provide an unusual and highly characteristic offset of the roof structure toward the interior of the space.

It is this strange offset that, when coupled with the Finnish regional desire to have wooden vaults inside, greatly fosters the ambiguities of surface vs. structure already inherent in this kind of heavy timber construction. Given the position of the roof rnembering resting upon the inset beams, the vault's curving membrane naturally descends flush with these beams rather than upon the walls that stand several feet further outward. Having roughly the same facial dimensions as the heavy timbering in the building, the thin boards of the vault visually flow without interruption into the beams, seeming to fuse with them. All notions of thick and thin, support and supported, become hopelessly enmeshed. The vault, while airy and membranous in form, simultaneously mimics the heavy structural timber—all this while being paradoxically set inward from the true walls as if having no weight. Surfaces that might be tremendously heavy seem cut and lofted like paper. Further perturbing the readings, taut wooden tie beams, recognizable as purely structural members even if delicately stenciled, lash out across the nave space at the vault's haunches, searching for the solid support of the inset beams, and, in the region of the pillars, piercing abruptly into the vaulted surfaces as if they are mere fronds **(Fig.** 5). These tension straps are necessary restraints since the roof membering reaching over the vaults is typically not composed of true trusses, but rather of only a series of braces that impart some residual lateral forces outward to the block-

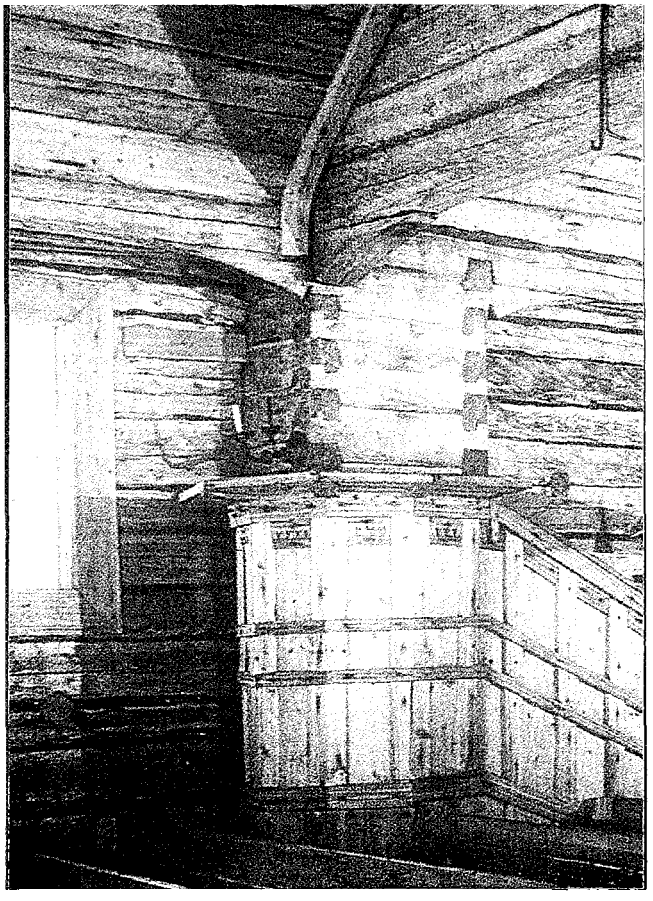

Fig. 4. Block-pillar in the interior of the Church at Sodankyla (Photo by Author). Note the joinery of the heavy timber, and also how these joints are all that distinguish the thick wall members from the thin vaulting boards above.

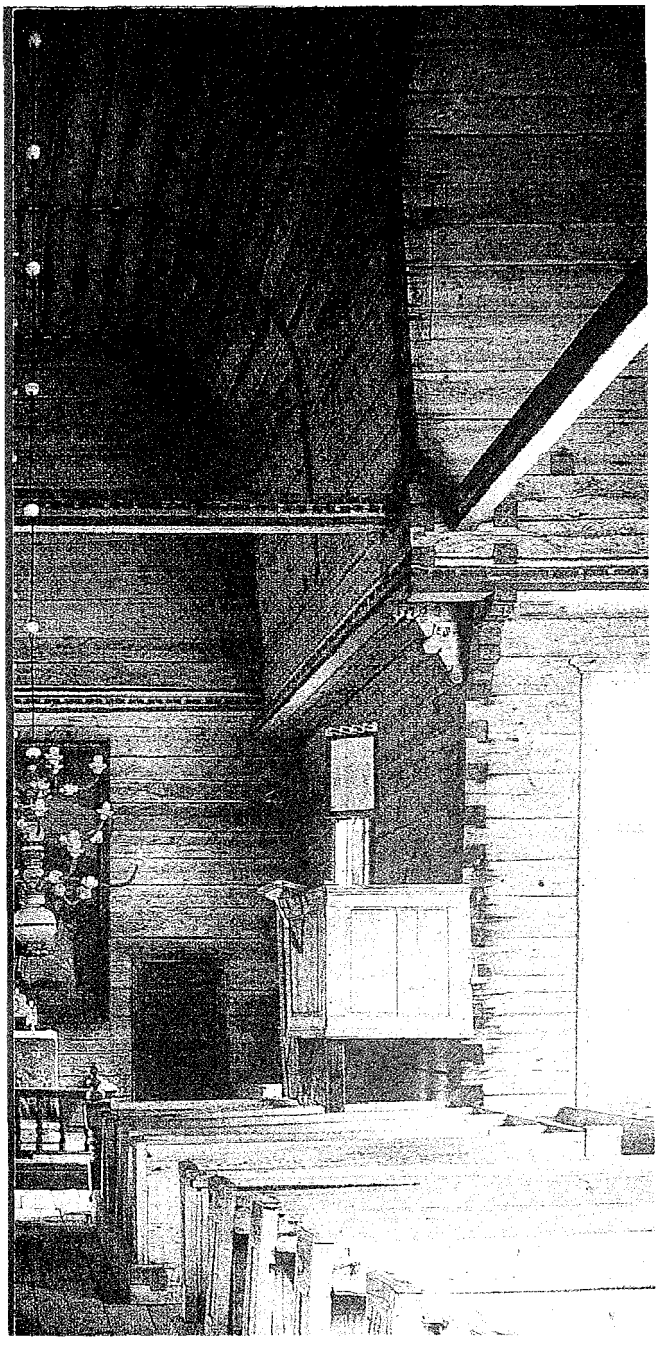

Fig. 5. Interior of the cruciform Church at Petäjävesi showing the re-entrant vaulting intersection (Photo by Author).

pillar's beams.[16] So complex, partially cloaked, and statically elusive is the overall result that on occasion only a partial removal of the vault for renovation helps unravel the basic facts of the situation." Of course the completely monomaterialic character of most of these churches' interiors only deepens all these ambiguities.

This system, curious yet still comprehensible when seen in the context of true Ostrobothnian-inspired block-pillar construction, became absolutely bizarre when it was translated into Finland's somewhat later cross-shaped churches, which generally lacked block-pillars.[18] Perhaps the most famous of these is Petäjävesi, built in 1765 near Aalto's hometown of Jyväskylä **(Fig.** 5). Probably influenced in plan by continental and Swedish Renaissance trends toward centrality, these wooden churches with four equal arms could dispense with the pillars both because their plan geometry did not require any wall to be longer than a single timber and also because their larger number of comers added an inherent perpendicular bracing in the central zone of the building. Further, perhaps given the increased stability of the overall form, or perhaps simply because the pillars were now gone, it was felt that the roof weight could (or perhaps simply had to) reach the ground directly through the heavy timber walls. A much more simple and clear expression of statics could have developed from these changes; instead, the distinctive inset beams were retained out of custom, even though the lack of any pillars for them to rest upon undermined their structural rationale.[19] In section, the horizontal bearing member at the haunch of the trusswork is left balancing precariously halfway over the wall, now with no real support to either side. The comer junctures of wall and vault at the crossing of the arms—very important and very visible intersections—are where ambiguity reaches an apogee. Occasional corbels, brackets or beveled zones of wood were placed at the crossing's corners to give some literal and visual support to the doubly cantilevering vault forms and tie them back to the walls, but the overall effect is of a unexplained levitation that defies any easy tectonic logic. Still mimicking the material character of the heavy timber below, the vaults now all the more oscillate between readings of light or massive, surface or structure. The tie beams still leap across the space, but now cut the vaults at seemingly even more arbitrary points as no pillars mark their positions. The vaulting itself becomes more structurally ambiguous in form. Beyond the fact that the cruciform plans inspired the additional elaboration of a flattened dome with false pendentives at the central crossing, wholly a-tectonic trefoil vaulting began to appear. The extraordinary interior of the church at Lemi, of 1786, an irrational fantasy of re-entrant arcs and drooping, fringe-edged cusps worthy of the Moorish Alhambra, best illustrates this development.[20] It is as if once the vaults had moved out and away from the walls, free and clear, anything ultimately became possible and desirable in terms of form.

To stress how regionally unique the character of this solution was, we should briefly contrast these Finnish churches' ambiguity of surface vs. structure to the absolute lucidity in this regard that one finds in the much better known and much older Norwegian stave churches. The stave churches are fundamentally of post-and-beam construction, rather than of horizontal timbers, and from this the difference in tectonic approach could not be more complete. Rarely, almost never, does an interstitial membrane blur with a structural element. True scissors trusses[2'] bring the roof weight to precise points and deposit it on beams, columns direct this weight straight downward, and precise zones of x-bracing lend clear lateral stability to the enterprise. Offsets of forces are virtually non-existent. Filling in delicately between all these structural members are surfaces of vertical boarding, which, while enclosing the form, never cloak or hide the skeletal members from within. Vaulted surfaces, which in wood construction are always rather ambiguous structurally, are largely absent.[22] The makers of these Norwegian stave churches seemed as intent on rationally expressing the dichotomy of structure and surface as the Ostrobothnian masters seemed intent on mystifying it. Both achieved their goal.

AALTO'S FIRST ATTEMPT

It should be no surprise to discover where Aalto lies on this spectrum between Norwegian clarity and Finnish ambiguity. In his very first realized commission for an entire church, the Muurame Parish Church designed in 1926 and built in 1929, Aalto's unmistakable debt to the specific tectonic traditions of Finland is visible, if one looks carefully.[23] Conceived just prior to his turn toward Modernism, this Tuscan-inspired basilica has primarily been studied as an obvious e x a m p l e along with his Jyvaskyla Worker's Club of several years before—of the influence of Italy upon Aalto following his voyage there in 1924.[24] But the church's spare Classicism, Albertian recessed facade arch, and numerous other literal Tuscan references should not totally blind us to the significance of its peculiar interior ceiling **(Fig. 6).** Wholly un-Tuscan in its structural equivocation, a curved wooden vault oddly insets several feet from the walls—exactly as seen in the old Finnish wooden churches. Tie beams leap across the nave, cutting arbitrarily into the vault, and, as if to totally obscure the underlying structural facts at the edge, a flat wooden fascia floats below, running fully around the sides and front like a horizontally laid proscenium arch, disengaging the visual and tectonic theatrics of the ceiling above from the real world of the heavy walls below.

Something of how Aalto arrived at this can be reconstructed from an early sketch he made for the interior.[25] Here the central vault—already inset—is flanked by cross vaults, and everything seems to rest more firmly and clearly upon the horizontal tie beams. Even though a flat fascia of Tuscan-inspired wood paneling already interrupts these beams before they reach the walls, the sketch conveys a sense of observable tectonic relationships. As Aalto adopted a more realistic attitude toward the scale, and no doubt also the costs,

Fig. 6: Interior view and section of Aalto's Church at Muurame compared with the section at Petajavesi (Photo and Drawings by Author).

he eliminated the cross vaults and the panel indications on the fascia, and slid the edges of the vault back beyond the fascia's lip. A set of relationships having a freedom from any tectonic literalness results, similar to that which Aalto found in the early Finnish wooden churches. The result became a tense and rather unresolved blend of Tuscan and Ostrobothnian influences. If further evidence is needed that Aalto was looking back not just at Tuscan sources but at the old Finnish churches as he designed Muurame, one can note the box-like window surround which projects partially inside and partially outside the body of his church, flooding the altar with light in Aalto's sketch. This, which seems so strange in plan, seems to have spatial if not functional roots in the similarly peculiar interior and exterior protrusions of the hollow block-pillars at the early Ostrobothnian churches.

The slatted wooden vault at Muurame probably most closely resembles those in old Petajavesi, which seems appropriate as Muurame and this revered cruciform church lie only a short distance away from eachother near Jyvaskyla. As a child and young architect in this regional center, Aalto would have had ample opportunity to become familiar with Petajavesi, by far the nearest landmark of eighteenth-century Finnish architecture to him. Both Petajavesi and Muurame share exactly the harshly flat fascias against the walls, the inset vaulting, and the stark tie beams. Numerous ambiguities—what is support and what is not, how wall and ceiling relate, and how the wooden surfaces and tie beams juxtapose--reach across 150 years.

AALTO'S VAULT AND MODERNISM

While causing an undeniable break within his work, Aalto's transition to the International Style's vocabulary, circa 1927, did not end his use of the a-tectonic vault. Through Aalto, this old Finnish motif survived the iconoclastic tendencies inherent in Modernism, though naturally it did so in a somewhat altered state. Viipuri marked its reappearance, transformed. Again the vault is of curving slats of wood. Again it sets outward in the space, this time moving away from the lecture room's exterior glass wall. Of this relationship, Paul David Pearson writes:

> The seven bays of the acoustical ceiling correspond rhythmically to the windows, the troughs falling on line with each mullion, but in other ways the ceiling almost denies the existence of the glass wall. It drops well below the heads of the windows like a heavy swaged drape of wood hung against the glass. The projection of the ceiling stops about 10" short of the glass line, and the soffit is closed by vertical strips of wood.[26]

Thus once more, in section, Aalto leaves a complicated and quizzical zone at the edge. What is so different at Viipuri—the transformation—is the complete lack of any structural interplay with the vault. There are no pretensions here that the wooden sheet may be structure, either real or representational. Nor is its skin chopped through in any way with tie beams or other structural bones. It simply hovers without visible means of support. Any direct expression of tectonic ambiguity is gone, though tectonic mystery about how it is held up remains.

By the time Aalto finished Viipuri in 1935, orthodox Modernism's attitude toward surface and structure had fully progressed toward a rather rigid codification. The MOMA show of 1930 and Hitchcock and Johnson's subsequent book of 1932, in which Aalto's work received only one photograph,[27] had made the rules abundantly clear. Corbusian Modernism in its orthodox phase of the 1920's and 30's could accept many things, even somewhat overly-zealous sculptural flourishes within the basic language of orthogonal boxes.[28] But what this International Style brand of Modernism could never accept was a blurring of surface and structure. The free-plan, curtain facade, and other Corbusian devices were all to some degree predicated on establishing precisely a dichotomy of surface and structure, a system that had already been duly canonized at Poissy, Barcelona and Dessau by the late 1920's and had successfully spread its influence to most of the other contemporaneous strains of orthodox Modernism. For instance, Theo van Doesburg, of *de Stijl* fame, who at times was quite critical of some aspects of Le Corbusier's work, was, by 1929, "demanding nothing less than the complete independence of 'structure' and the function of 'enclosure' from one another."[29] All across Europe, so it must have seemed, the clarity--the almost ethical purity—f the structural system, that "apostolic message of the *Dom-Ino,"* had to be respected.[30] Even as Le Corbusier himself had begun to move at first gradually and then later increasingly toward a greater plasticity of form within his plans, his gestural walls or other sculptural surfaces typically did not touch the rationally deployed structure, much less ambiguously clasp it." Aalto, who as early as 1929 attended a CIAM meeting and was elected to its inner circle,[32] wanted desperately to be respected within the group that was coordinating the International Style's development. An astonishing conformity of language had spread across a dozen nations, and Finland could be no different. At this time Aalto was willing to compromise, though he would not be willing to do so forever. If anything, his continued use of a peculiar wooden vault at Viipuri even as it lost its characteristic blending of surface and structure illustrates how tenacious was Aalto's attachment to some thread of Finnish regionalism. Ostrobothnia was bound to eventually return even stronger.

The impact of Modernism at this time upon Aalto's handling of frond-like wooden surfaces can be seen again in two attempts he made at creating exterior, open air shells—one designed before his transition into the International Style and one from after. The first, his bandshell at the 1922 Tampere Industrial Exposition, is virtually half of the dome of old Petajavesi laid down on its side. Geometrical in spirit and strongly centralizing, it has a traditional flavor in spite of its lack of ornamentation. Structural wood ribs weave it together at its joints, while odd, unresolved struts shore it up from the platform on two edges.[33] Again, surface and structure intermingle freely, even somewhat awkwardly. The second open-air, wooden frond, his Choral Shell for Turku's 700 year exposition in 1929, changes all this. Fragmentary rather than holistic in form, it is wholly modern in feel. For our purposes, though, it is most important to note that it lacks any glimmer of support, ambiguous or otherwise. It has become a pure wooden sculpture that is held up somewhere, somehow, completely hidden behind the scenes, just like the undulant vault at Viipuri. With this choral shell Aalto moves as far away from an ambiguous blending of surface and structure as he ever will.

Some of Aalto's ambivalence, though, about this trend away from a visual intermingling of support and supported can be seen in another pair of proposals for wooden fronds, these both designed a few years after Viipuri. Each appears as a gigantic, sinuous surface housed in a huge interior room. In his Finnish Pavilion at the New York World's Fair of 1939, sloping sheets of wood are even more like hanging drapery than at Viipuri—offset inward from the surrounding box-like space, and even offset from each other, repetitive echoes of that distinctive Ostrobothnian touch. The supporting structure of columns and cables is carefully hidden behind, with no punctures through the wood membranes. There is still, of course, a mystery about how this is all supported, but there is no direct attempt to ambiguously intertwine surface and structure. In Aalto's 1937 competition entry for an extension to the Helsinki University Library, in contrast, the sinuous wood ceiling swoops down to be lanced abruptly by flaring, trapezoidal columns.[34] In section these canted columns rise up behind the sloping wooden surface, following its angle to the roof and supporting it as well as several interstitial floors to one side. Ostrobothnian taste reappears. Perhaps Aalto felt that in this competition project in Finland proper he could indulge once again, whereas in the high-profile, internationally significant New York assignment he could not. In any case, the Helsinlu Library scheme gives early evidence of the attitude that will ultimately prevail in Aalto's post-war works from the 1950's onward: a flagging of interest in the conceptual rigors of surface vs. structure as propagated by the International Style, and a return to the more ambiguous relationships he had enjoyed in the vaults of his Muurame church.

AALTO'S MATURE WORKS

A curiously deceptive yet nonetheless telling gesture toward a full re-involvement of surface and structure in Aalto's work occurred in his Maison Carré **(Fig. 7),** designed in 1956 and realized by 1959. This house contained a central gallery space with a ceiling surface once again highly reminiscent of Viipuri's. Long, low, and organically arcuated like that earlier frond, this sheet of wooden slats also offsets similarly in section away from the windows, dropping its edge below the window heads and leaving that distinctive gap. Carré differs, though, from Viipuri in that the long section through the ceiling shows two sharp, straight soffit-like reversals of curvature, one horizontal and the other lodged at an angle. These reversals inevitably read as beam-like intrusions into the wooden surface, which visually serve to support the

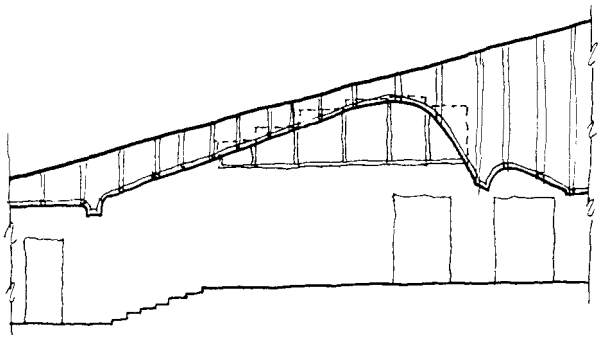

Fig. 7. Diagrammatic section of Aalto's Villa Carré (Diagram by Author).

downward arcing haunches of the frond. The white paint that Aalto specified for these short segments enhances their reading as structural intrusions into the natural wood surface.)' These straight soffits recall the soffit-like, outlying wall beams of the Finnish wood churches, where vaults swooped down to land seamlessly upon the beams, spatially fusing with them. At Carré the ends of these beam-like soffits just strike the adjacent walls at arbitrary points, again echoing their distant predecessors. The sense of statics at Carré, however, is even more deceptive and contradictory since these straight soffits are in fact entirely false structure. The section details show that the vault is supported from above, and thus these pseudo-beam inflection zones contain nothing. Here Aalto's desire to visually interweave the readings of surface and structure is so strong that a false sense of structure is generated to accomplish the goal. Viipuri had no hint of structural intrusions into the undulant surface, let alone false ones. By the time of Carré, any last glimmer of the International Style's dichotomy of skin vs. bones, and any echo of the ethical connotations that dichotomy may have once contained, is abandoned.

There immediately followed his masterwork at Imatra, the Lutheran Vuokenniska Church, also of 1956-59. This sanctuary was unquestionably Aalto's consummate effort in ambiguously blending together exactly that which the International Style had vowed to separate.[36] In the interior of the church, Aalto employs every conceivable device, every lesson from old Ostrobothnia, to intermingle the skin and bones. Any independent character that surface and structure might achieve in this space seems allowed only to establish the polar extremes from which the full extent of their eventual blurring can be better appreciated.

The lack of any wood on Imatra's vaults should not in any way deter this assessment. While at first glance Imatra's white shells could seem to lessen the sense of relationship to the other vaults of Aalto's we have discussed and also to those of the old wooden churches, this difference may, in

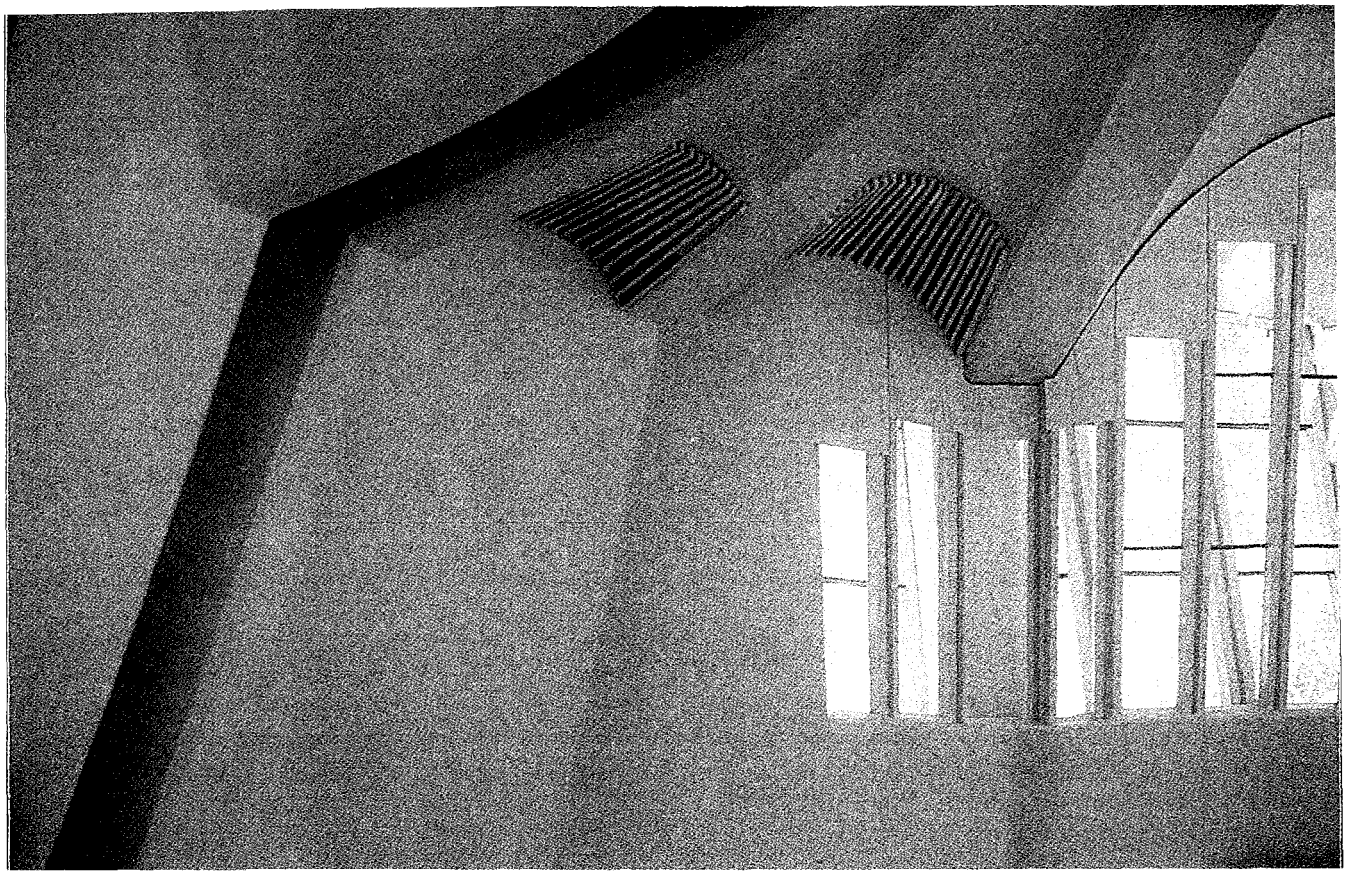

Fig. 8. Interior of Aalto's Church at Imatra (Photo by Author).

fact, actually be the most important contributor to the complete sense of tectonic ambiguity that pervades this space. Aalto built the interior vaults of Imatra entirely of reinforced concrete, and with this material he found a wholly modem counterpart to the traditional notched heavy timber construction, with its inherent ability to become skin and bones either simultaneously, alternatively, or in any combination thereof. In leaving the wood behind at Imatra, Aalto discovered something that could come even closer, in its monolithic application, to the homogeneous effect of the wooden churches' interiors, and thus could more fully replicate their contradictory blends of surface and structure, support and supported **(Figs. 8 & 9).** False members would not be necessary here, in this poured hollow. Further, vault and wall could now truly be one in the same, embracing in a myriad of fluctuating ways, with walls curving and then slanting upward to become the ceiling. In this building the states of straight vs. curved are of no consistent diagnostic use when trying to unravel support from supported.

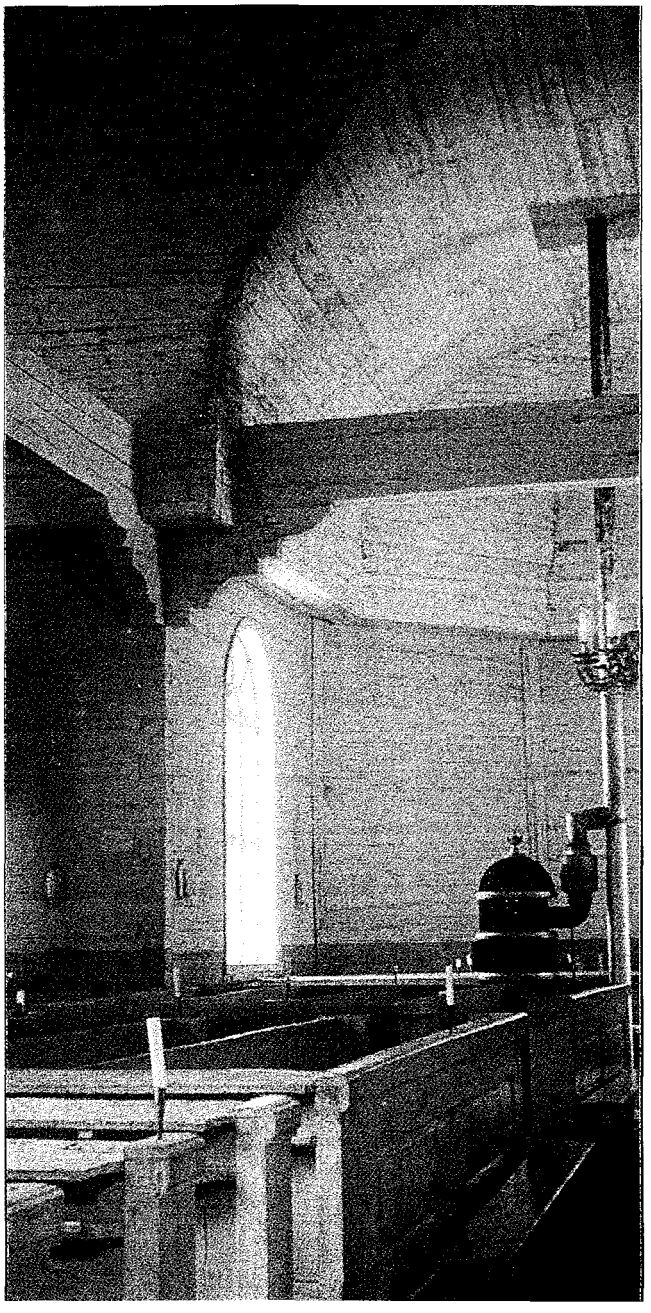

Fig. 9. Interior of the Church at Kiiminki (Photo by Author).

Recollections of the early wooden sanctuaries are a legion at Imatra. Like in these old churches, long and low beams interrupt Aalto's nave, crisscrossing and perceptually lowering the space as they fragment and frame one's views of the voluptuous forms above. These beams spread apart near the perimeter walls to reveal clusters of small vaulting reminiscent of the inflecting shapes of the trefoil vaulting at Lemi. The triplicate ends of these splaying beams then strike the slanting walls with utter capriciousness. One lands on a subtle projection of the wall that vaguely reads as a structural pier, one simply disappears into a slight fold in the wall, and one is seen penetrating the wall through glazing to find and rest upon what appears to be a trapezoidal column beyond **(Fig. 8).** Such an array of alternate tectonic perversities can hardly be generated by chance. It far surpasses, instead of mimics, the plunge of the wooden churches' tie beams into their vaulting. The peculiar cross-section of Imatra, with its series of almost cellular bays, calls to mind another wooden church—that of Torino. In both cases vaulting chops the nave into organically shaped capsules that ponderously lope toward the altar, each bay a combination of curved and oddly flattened segments.[37] The fractured, triangular shapes near the chancel of Aalto's church resemble forms in yet another old wooden example, that of Ruovesi, where the vaulting forms have been justifiably called "sculpturesque."[38]

After Imatra, Aalto would go on to create many more variations on these themes. Fascinating intersections of surface and structure proliferated in his works, appearing in libraries, auditoriums, and numerous other buildings of all scales and types. Never, though, would his homage to those Ostrobothnian masters be clearer or more extensive than at Imatra.

AALTO, CREATIVITY AND HISTORY

A large portion of Aalto's later fame rests upon the phenomenal and apparently inexhaustible creativity he showed in the handling of complicated roof and ceiling forms. The many powerfully-shaped "city-crown" volumes[39] that he designed for institutional and religious buildings and the distinctively-capped chambers he placed inside each of these volumes create an unique and unforgettable impression. While this burst of formal creativity in the last decades of his career no doubt resulted from many interrelated aspects of his work, one wonders if it would have been as rich without the lessons available in the Finnish wooden churches. Despite the extraordinarily original appearance of Aalto's ceiling-scapes, he did not conjure them from nowhere. When assessing the relationship of the Finnish wooden churches to Aalto, one is reminded of the words of Claude Levi-Strauss: "Whether

one knows it or not, one never walks alone along the path of creativity."[40] Aalto knew full well that he could not—and would not even if he could—walk alone, and, as is so typical of him, his choice of companionship was a highly regional one.

Demetri Porphyrios suggests at great length in his study of Aalto's extensive use of historical typologies that "Aalto was never a riddle and never a Modernist."[41] This study of surface and structure in the vaulting of Aalto and the Finnish wooden churches can only reinforce this impression. The strange forms of his ceilings and their even stranger sense of support need be no riddle to us, despite all their apparent idiosyncrasies. Seen as being founded solidly upon precedent—a regional precedent, no less—they not only explain themselves to us fully and well but also explain some of the distance between Aalto and the iconoclastic tendencies of orthodox Modernism. Could there be any better indication of what separates him from the aesthetic conformity of the 1920's and 30's—at least as practiced under the International Style?

NOTES

[1] Erik Bryggman must be credited with proposing the earliest *unbuilt* designs for International Style buildings in Finland, especially his Suomi Insurance headquarters extension competition entry of 1927. This pre-dated Aalto's own Corbusian-inspired buildings by at least a year. Aalto was to serve on the jury of the Suomi Insurance competition, and Bryggman's scheme obviously inspired portions of Aalto's Turun Sanomat building. It was Aalto's own *realized* buildings, though, that prominently placed the International Style before the public. See Paul David Pearson, *Alvar Aalto and the International Style* (New York: Watson-Guptill, 1978), pp. 77-78.

[2] *Ibid.*, p. 122.

[3] Henry-Russell Hitchcock, *Architecture: Nineteenth and Twentieth Centuries* (New York: Penguin Books, 1958), p. 514. For a comprehensive review of the impacts of nature upon Aalto, see: Demetri Porphyrios, *Sources of Modern Eclecticism* (New York: St. Martin's Press, 1982), pp. 59-81.

[4] Alvar Aalto, "The Influence of Construction and Materials on Modem Architecture," in Göran Schildt, ed., *Sketches, Alvar Aalto* (Cambridge: M.I.T. Press, 1978), p. 63. These words were written in 1938.

[5] As has been pointed out, Aalto used five different and unusual column types at the Turun-Sanomat. See: Nils C. Finne, "The Worker's Club of 1924 by Alvar Aalto: The Importance of Beginnings," in *Perspecta 27* (New York: Rizzoli, 1992), p. 64.

[6] In Aalto's other major International Style work of this period, the Paimio Sanitarium, completed in 1933, similar structural gestures of an organic character were made, for instance in the tree-like section of the patient's sun wing.

[7] Porphyrios, *Sources . . .*, pp. 4-5.

[8] In studies of the context of Scandinavian architecture as a whole, these early Finnish wooden churches rarely seem to generate more than a few lines of text. See, for example, Marian C. Donnelly, *Architecture in the Scandinavian Countries* (New York: M.I.T. Press, 1992), pp. 231-233.

[9] Schildt, *Sketches. . .*, p. 2.

[10] See Aalto's comments on Karelian architecture in *Ibid.*, pp. 80-83.

[11] For documentation on all these church projects, see: Göran Schildt, *The Complete Catalogue of Architecture. Design and Art* (New York: Rizzoli, 1994), pp. 40-43.

[12] Alvar Aalto, "Painters and Masons," *Jousimies*, 1921. Quoted from Aamo Ruusuwori, *Alvar Aalto 1898-1976* (Helsinki: Museum of Finnish Architecture, 1981), p. 69.

[13] For a full discussion of this kind of construction in Finnish churches, see: Lars Pettersson, *Finnish Wooden Church* (Helsinki: Museum of Finnish Architecture, 1992), p. 38. This source is the only extensive treatment of these buildings in English, and has ample photo and drawing documentation of all the examples discussed in this paper.

[14] Hans Jiirgen Hansen, ed., *Architecture in Wood* (New York: Viking Press, 1971), p. 51.

[15] This tendency was particularly pronounced near window and door openings, where the continuity of the logs was interrupted.

[16] In at least one case where these straps were not included, substantial problems developed over time that required the addition of more columns, see the Fagervik Church in Pettersson, *Finnish. . .*, p. 85.

[17] *Ibid.*, p. 7, for an illustration.

[18] The side arms of these cruciform churches allowed for a much more spacious church, and became immediately popular. Conversions of oblong block-pillar churches to cruciform plans even occurred, as at Voyri, see *Ibid.*, pp. 48-51.

[19] The roof membering still deposited considerable weight on the beams, and this now had to be transferred outward to the walls.

[20] The closest parallel in terms of proximity to the space of Lemi would be the elaborate interiors of the wooden synagogues of Belorussia, such as the one at Volpa. See Carole Krinsky, *The Synagogues of Europe* (New York: M.I.T. Press, 1985), pp. 225-230.

[21] For an extensive discussion of the development of roof membering in the stave churches, see Roar Hauglid, "The Trussed-Rafter Construction of the Stave Churches of Norway" (*Acta Archaeologia*, vol. XLIII: 72), pp. 19-55.

[22] When curved vaults occur in stave churches they hang within the space as obvious wood skins, without any structural reading, as happens over the chancel at Torpo. For an illustration, see Jerri Holan, *Norwegian Wood, A Tradition of Building* (New York: Rizzoli, 1990), p. 115.

[23] In addition to the alterations and renovations to the old wooden churches and his new Muurame church, Aalto proposed numerous churches during what Göran Schildt refers to as "his period of unadulterated Renaissance inspiration"--examples being the churches of Pertunmaa, Jamsa, Töölö, Viinikka, Jyvaskyla Rural Parish, and Taulumaki. None of these, to judge by the published documents, had a-tectonic vaulting as at Muurame. Trusses in the choir area of the Jamsa proposal were clearly exposed and rested firmly on the walls. See Göran Schildt, *Alvar Aalto, The Early Years* (New York: Rizzoli, 1984), pp. 185 and 227.

[24] *Ibid.*, p. 143.

[25] For a reproduction of this drawing, see: Schildt, *Alvar Aalto, The Early. . .*, p. 145.

[26] Pearson, *Alvar Aalto . . .*, p. 123.

[27] Henry-Russell Hitchcock and Philip Johnson, *The International Style* (New York: W. W. Norton, 1966), p. 97.

[28] Distrust of Scharoun's idiosyncratic curves at Wissenhof, though, show where the limits even of this were. See Karin Kirsch, *The Weissenhofsiedlung* (New York: Rizzoli, 1989), p. 187.

[29] Van Doesburg, no doubt feeling some competition from Le Corbusier, described Le Corbusier's work as "flat and without expression," but that did not keep van Doesburg from greatly respecting Le Corbusier's approach to surface vs. structure. Van Doesburg made a series of diagrams showing the evolution of modem structure, taking the process one step father than Le

Corbusier had done. See: Allen Doig, *Theo van Deosburg, Painting into Architecture, Theory into Practice* (Cambridge: Cambridge University Press, 1986), pp. 212-215.

[30] Prophyrios, *Sources* . . . , p. 5.

[31] There were exceptions to this, most notably in the apsidal dining room wall at Garches. But generally, even at Garches, the walls go through extraordinary gesticulations to avoid touching the structure, as one can see clearly in the master bedroom walls.

[32] Göran Schildt, *Alvar Aalto, The Decisive Years* (New York: Rizzoli, 1986), pp. 58ff.

[33] Pearson, *Alvar Aalto* . . . , p. 21.

[34] Schildt, *Alvar Aalto. The Decisive* . . . (New York: Rizzoli, 1986), p. *275.*

[35] In addition, Aalto gave these short, straight segments of wooden soffit in the surface at Carré a subtly different surface texture than the vault itself, using slightly bull-nosed comers on the vault slats and flush corners on the soffit slats. See the published details in Karl Fleig, ed., *Alvar Aalto, Complete Works* (Zurich: Verlag Für Architektur, 1963), Volume I, p. 242.

[36] In this vein, Robert Venturi was one of the first to call attention to the complex treatment of this space, see: Robert Venturi, *Complexity and Contradiction* (New York: Museum of Modem Art, 1966), p. 26.

[37] The vault pattern at Torino could have been influential in several of Aalto's other churches which have folded shells for roofs, such as at the Parish Church at Seinajoki, or the much earlier unbuilt first competition project for the Tehtaanpuisto Church.

[38] Riitta Nikula, *Architecture and Landscape, The Building of Finland* (Helsinki: Otava, 1993), p. 148.

[39] Prophyrios, *Sources*. . . , p. 28.

[40] Claude Levi-Strauss, *The Way of the Mask* (Seattle: University of Washington Press, 1982), p. 148.

[41] Prophyrios, *Sources*. . . , p. 12.