biddeford house

mit
undergraduate thesis
department of architecture

leonard leo salvador

Cambridge, 23 August 1954
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Dear Dean Belluschi:

In partial fulfillment of the requirements for the degree of Bachelor in Architecture, I herewith submit my thesis entitled, "Biddeford House".

Respectfully,

Leonard Leo Salvador  
23 August 1954
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introduction
Introduction:

This thesis was undertaken for a three-fold purpose. In its order of development and chronological precedence it now exists in the following form.

Firstly, to fulfill the request of designing and building a house for Dr. Joseph Patane, a surgeon and general practitioner in the urban and rural areas of the town of Old Orchard Beach and the cities of Saco and Biddeford, Maine. His inability to contact an architect capable, as he put it discreetly, of designing his house, and his severe criticisms of the architecture available, induced his asking for my advice. Though unaware of the contemporary approach to architecture, his demands and sensitivities encouraged my concluding that he had the latent awareness of comprehending, fully and with facility, the basic approach I had to offer. It would have shattered my personal integrity to allow such a consciousness to be compromised by his choosing a stylized home, colonial or otherwise. Consequently, my decision to assume responsibility of designing his home was made.

Out of this, subsequent other rationalizations began to present themselves, one of which was my desire to investigate thoroughly and tangibly the design of a highly personal substance... a house. It was impossible for me to capture the real meaning of house design in the classroom, and I felt the need of fulfilling my understanding of it as an adjunct to my architectural studies. I sensed my weakness and withdrawal from such problems and I wanted to assure my confidence in this one aspect of design. Out of this experience I could hope to understand the integrating of such simple and basic units into the development of urban concentrations. Here was the opportunity to grasp the essence of that very important unit before embarking onto advanced studies in sociology and planning, which are forthcoming in my
education.

The problem also afforded the opportunity for a first hand experience at architecturally educating the client to comprehend the basic fundamentals of form, expression, and functionalism, and to develop a didactism which to me seemed very important. The client must be able to understand your dialectics if he is to benefit fully from your analysis and conclusions.

What I expected to gain only began with these thoughts.

Secondly: To further my comprehension of the real and practical problems of building. I knew I would find the pencil design constantly in revision when I arrived at adapting standard building materials to the design. This would inevitably bring me in position to discuss various aspects of the building with the construction men in the area. What advice they had to offer with respect to their abilities and experience would greatly influence my decisions; and they have. The many direct associations with these men made me realize the need of compromising my paper ideas to their practical considerations and experience, and deepened my insight for the need of the architect-builder integration of talents. I expected problems of this nature to arise; however, their depth and variability were revealing.

Lastly: The realization that no modern residential unit existed in this area, indicated, at least to me, a proclivity to latency and retardedness in the symbolic sense. How could an area, only ninety miles north of Boston, be so lacking in architectural symbols which mark our progressing cultural development? This is what attracted my curiosity, and this is why I felt impelled to do my share in this "crusade" for modern architecture and its acceptance. Thus I set my goal to show the socially conspicuous (in the Veblenian sense), and the indifferent, the true
introduction

contemporary meaning of the word Architecture, uncompromised by any eclecticism
or hucksterism of the speculator builder, or the false concepts of our slick
magazines. This attitude, I sincerely hoped, would deter this regressing
cultural situation by stimulating to a certain degree the consciousness of
the existing population towards building a sounder democratic culture free
of symbolically associated barriers through which so many people display their
propensities for demanding the Georgian, the Colonial, the Cape Cod, and the
New England Ranch Type houses. It is appalling to realize the extreme pro-
fundity of these concepts. Those who adhere to these ideas can understand
the basic concepts of functionalism; however, their social awareness pre-
dominates in their choice of a home. As Kennedy notes,¹ due to the current
Selectivist philosophies it is now considered bad taste to mix styles, and
"the Selectivists themselves go so far as to derogate even the monumental
continative-dynamic environments because they are not pure. Thus, up to date
New Englanders restrict themselves to 'Exclusive New England Type Ranch House' ".

I saw my solution as an innovation to the local architecture which
previously had been developed by local Traditionalists, and Semi-Modernists;
and as a redirecting force towards the development of sensical design. The
opportunity was afforded of performing a good deed of designing and building
a real house which would stand as a symbol and influence the general opinion
of the local builders and many observers who are looking forward to its
completion with interest and curiosity. My awareness of the need for a
modern house as a stimulating element in this area was accentuated by the
architectural obtuseness of the local construction men. In addition, by
association with professional men of wide cultural experience, who were not
involved in the problem except as critics, my convictions to establish
locally an example of modern architecture were strengthened. The house, to
a certain degree, has become the "talk of the town". It would therefore seem that my original stimulatory intent is already bearing fruit. The only modern building in the area is Mr. Koch's new York National Bank in Old Orchard Beach, Maine, only five miles north of Biddeford. However, this is a commercial building and is not subject to the controversy and dissident opinion which a residence designed in the same spirit would evoke.
the client and the program
The Patanes began to think of building a home in 1947, a year of significance to them in that it marked the beginning of a new life. Dr. Patane had just completed his formal training as a surgeon and was ready to establish himself. Maine became his choice. Besides professional factors, he was motivated by reasons relating to his background and that of his wife. Both were born and brought up in the congestion, noise and confusion of New York City which they heartily disliked and hoped some day to escape, to an area where they could fulfill their life's plan less subject to the influences of mass living to which they had been exposed.

In Old Orchard Beach, a town of about five thousand, sixteen miles southwest of Portland, on the coast, Dr. Patane gradually prospered, and the texture of Maine living appealed to both him and his wife, the friendliness of the people, their informality, the freedom of unlimited space and the richness of an unspoiled countryside. Circumstances, however, dictated a chief discordance: a dwelling nondescript in design, spatially inadequate, functionally impotent, a daily thorn in the family's side, a problem which increased day by day as a new pattern of living was established. The Patanes realized that sooner or later another dwelling would be needed, and the idea germinated then of building one. By Fall of 1953 the problem required action, and at this time was financial-wise feasible. The family now included four daughters, ages fifteen (twins), eight, and six, respectively.

As the need for a new dwelling crystallized, the Patanes groped. They discarded the idea of buying an old house and remodeling it. Looking at the more recent construction in the area they saw an assortment of Cape Cod and ranch-type dwellings which failed to appeal to them. They knew
vaguely that architecture offered more than this stylized approach, this mass standardization of form without regard for function, this obsolete adherence to meaningless design, even though technologically modern. They decided to investigate with open minds. The results of this inquiry led them to a decision where architecture would contribute to them personally, and perhaps to their community.

The problem of designing a dwelling for the Patane family revolved about the personality structure of the individual members and their daily living habits and needs, as well as consideration for the functioning of the family unit as a whole. Financially a cost of approximately twenty-five to thirty thousand dollars was decided upon.

Dr. and Mrs. Patane are progressive in their general outlook. They both enjoy music as part of their daily experiences, the doctor being highly trained in pianoforte, and having recently acquired a Hammond organ. Both are serious readers and consider that periods of solitude are necessary for recuperation from the inroads made upon one's nervous reserves by the stresses of modern living. They are conscious of color, form, and design as related to impression and mood; they favor simplicity in all things.

Mrs. Patane is a busy housewife and mother. Her general approach is warm and friendly. In her household duties she is orderly and efficient and since her daily program is so full she tries to save time for other things besides repetitious domestic details. She wants a home designed for maximum efficiency, ample for the activities of her growing family. Space must be available for sewing, laundering, and ironing, which are done with the help of a part-time maid. She has no preconceived ideas as to what a house should be, provided it allows fulfillment of function necessary
to the needs of her family. However, if the budget permits, she would like to have an all year long air conditioned home. Her negative reaction to warm humid weather demands this. The Patanes entertain only on a modest scale, a few close friends; usually a late supper after the theater.

The oldest daughters are twins, age fifteen, in their sophomore year in high school. They are vivacious girls, alert to the growing world about them. On occasion they entertain their teen-age friends at home by informal snacks and playing of popular recorded music and dancing. They like television, radio, reading, and need an area where they can do their school work free from the intrusion of their two younger sisters. The youngest daughters, ages eight and six, are in grammar school. Their activities are those of energetic growing children.

Dr. Patane is a busy surgeon and works more or less constantly under high pressure and nervous strain. While not a nervous person himself, he reacts to the demands of his profession by becoming tense and irritable at times. At home he needs a sense of relaxation, an impression of serenity, a corner where he can read, listen to recorded music or play the piano or organ; where he can on occasion chat with friends or confer with colleagues, free from the noise and trivia of domesticity and growing children. He dislikes feeling cooped-up or restrained by physical barriers. He is conscious of the interplay of colors in his environment and is sensitive to their modulation. By virtue of his scientific background, he is logical and analytical in his approach. He is not mentally conditioned to adhere to accepted forms, and is sufficiently critical of irrational social customs or taboos to deviate as radically as he feels the situation requires. He is intolerant of hidebound conservatism, and
annoyed by prejudice in any sphere. Having once reached a conviction he will defend it with sufficient aggressiveness.

His daily living pattern is modeled closely to his professional life. His home must of necessity be within the city confines, at a reasonable distance from his office (two miles at most) since he has lunch at home after morning hospital work, and then goes to his office for afternoon hours. In this respect, a further consideration is that he returns to the office after dinner three evenings a week for evening hours, and moreover once home after the day's work may inevitably have to go out again to make a house call. The need for quick accessibility to local hospitals precludes Dr. Patane living in an urban area. The location of his home must not create a transportation problem.

Prior to his decision to contact an architect (not in his area) for advice, Dr. Patane purchased a portion of land approximately one acre in size, after carefully scrutinizing and evaluating the available sites in the residential suburbs of Biddeford where his new home was to be. The environment consists of post-war single family dwellings loosely scattered, built by realtors and contractors untrained in design. These buildings are difficult to describe and for all intents and purposes they range from "genuine" Cape Cods to conglomerate variations of other styles. Our site, fortunately, lies on the northwestern fringe of this residential development and occupies the farthest locale of this area, which is bounded by U.S. Route 1 on the east, and the Boston and Maine railroad on the west. The railroad tracks are located three hundred feet west of the plot in a twenty-foot deep ravine which drops off fairly rapidly. The general impression gained is that it would be undesirable to live near such surround-
ings. However, two hundred other families do not seem to mind it. This area is considered to be one of the newer and most desirable residential developments according to Biddeford standards. The homes are in the $12,000 to $20,000 category and are owned by the conservative group of the middle class of Biddeford who occasionally display the desire to be "modernistic". The roads through this area are paved with the exception of the one extending into our site. The city has provided adequate sewerage, water, and electricity to the eastern end of the plot. Generally it can be said that the area is sparse in trees, and those which do exist mark the boundaries of previous farm lands. Winds are usually gentle, about 8 m.p.h. from the south, and the recommended design temperatures are: Summer, 90° F. Dry Bulb, and 73° F. Wet Bulb; Winter: -5° F. Dry Bulb. The soil appears to be a mixture of sand and gravel with a clay base; an occasional rock ledge can be found.

The site proper is three times longer than it is wide, extending approximately north to south in its long dimension. It measures 350 by 120 feet, is flat in its southern sector, and slopes gradually to the east in the central and northern portions. On its northern and eastern sides it is bound by a long narrow strip of hard wood trees and tall shrubs arising in a ravine to which the property extends. In the late Fall, Winter, and early Spring, the gentle upward sloping farm land which lies on the eastern side of this ravine can be seen. This, if anything, should permeate our vistas and be considered in our design determinants.
Throughout the design process a conscious attempt was made to duly consider all the determinants which became apparent and pertinent to the development of a functional and livable scheme. It is impossible to describe the details of my analytic and intuitive processes which were commensurate to every decision. However, it can be said that I approached the problem withstanding no dogma (Internationalism) exemplified in eclecticism, "disciplinary and archeological modes and modernistic compromise" or on the other extreme, the "creative and nostalgic modes" of Empiricism. My efforts were directed to the cause of good design, entailing the integration of the psychological, functional, and expressive qualities with its structural, economic, and practical problems. The approach can best be described by quoting Mr. Kennedy's "relaxed design technique" of allowing all "ambient forces to exert their full energy, unmitigated by extraneous or personal redirection. These forces might be summarized as follows:

1. The ethos of the country, region, state, and locality.
2. The character of the neighborhood.
3. The characteristic combinations of sun, cloudiness, air temperature, wind, precipitation, and humidity, which results in climate.
4. The character and behavior of ambient noise sources.
5. The size, location, use, character, shading effect, style, etc. of the surrounding structures.
6. The character, material, and protective efforts of the topography, and flora.
7. Access and egress, of people, vehicles, and utilities.
8. Laws, covenants, and restrictions.
10. The effects of the new structure on the status quo."

By allowing these forces to operate freely and properly coordinating their characteristic interdependencies, the form which is to be begins to emerge. It is by this conscious analytical method that my decisions were encouraged, and seemed obvious in their respective interpositions. The problem was in becoming aware of their significance and weighing them objectively.

With this and with an inherent subjective intuitive knowledge, a solution was to follow.

After a primary analysis of the living habits of the Patane family and their demands with respect to areas, it was calculated that a home 3500 square feet in area would suffice. However, budgetary means did not allow it to surpass 2500 square feet, estimating the cost of construction at $11.00 per square foot according to local building men. This dictated that space-function duplication was necessary and flexibility inevitable. In the interest of availing the maximum space when so needed for socials and the like, flexibility was very much desired. On the other hand, people zoning was of the utmost in importance with the noise of boisterous youngsters displacing the quietude demanded by their resting parents. The problem of television and phonograph versus classical interludes on the grand piano and organ existed. It was vital to separate the two age groups in their respective areas to minimize the harassing annoyances which one faction could inflict on the other. Then the problem of isolating the master bedroom area from the rest of the house and yet maintaining a close connection to the music area. Our "zones" now needed intermediary links which had no
one specific purpose, and could be described as buffer zones. These buffers were necessary if our flexibility scheme was to supply the desired privacy of a family structure. Two such zones developed. The accompanying diagram shows the flow pattern which finally resolved itself to the satisfaction of both the client and myself.

The flow diagram crystalized into its final physical form after a conscious effort was made to extend the plan and spatial relationships into the vertical as well as into the lateral directions, the object being to provide additional interest and privacy and to adjust to the contour of the site. The slope was not inclined enough to warrant a whole second deck; however, it was enough to exclude the idea of a flat plan. Considering also the importance of ground surface modeling as the flow pattern relates to it, it seemed that the floor plan should respect this condition. This determinant suggested the form of our roof, after which an attempt was made to analyze the relation of this form to the surrounding physical environment and to adjust it, if need be. However, it was realized that to adjust the form only, without considering the other aspects of exterior surface and planar texture would be only partially meaningful. The effort to sustain a visual continuity between the house and its surroundings was essential. To negate the physical environment would not enhance either of the two.

A two-car garage was to be included in such a manner as to allow its space, when not occupied by the cars, to be used as a semi-outdoor sheltered area for relaxing, children's play, and outdoor dining. Since the garage was now to be used as additional outdoor living space, its position was predetermined to be at a close proximity to the house and to act as an outdoor buffer between the street and the house proper. If the
link between the garage and the house were sheltered, it would provide protection when going to and fro in rainy weather. The vistas seen from the indoors were carefully calculated to the eastern direction wherein stretched a beautiful panorama. By placing the garage as mentioned, on the southwest, we not only stimulated more privacy but further eliminated seeing the conglomeration of speculators' homes on the south side. House orientation, in conjunction with the seasonal soltaces and exterior glass exposures, was of great significance after deliberating on the possible inclusion of an all year long air-conditioning system. The decision to have a combined cooling and heating system was made after weighing the advantages and costs of the house with and without such a device. If summer cooling was to be employed, then it meant the omission of all the opening window sash, and the use of fixed double-windows set into milled wood sections. If summer cooling were not contemplated and opening sash with frame was used, then a cost of approximately $600.00 was estimated over and above that of the cost of using fixed glass. The difference in cost between a combined heating unit air cooler, and a simple heater is given to be $1000.00. Analyzing the combinative possibilities: a house with all year air-conditioning employing fixed glass; and a house with opening window sash employing only a heater, made it apparent that the air-cooler would actually cost only $400.00 over the cost of a heater. With the advantages that this heater-cooler arrangement offered and its relatively nominal overall cost, it was decided that the house should be all year long air-conditioned. This conclusion seemed to solve another problem: that of accoustically insulating the building from the possible noises of the railroad, since we were now to have a completely sealed
building employing fixed double windows.

Structure-type, structural and exterior surfacing materials were decided upon after carefully investigating their availability and relative prices with respect to their erection and labor costs. Generally it seemed that lumber could be had at lower prices than masonry materials, and that steel, for structural purposes, was unheard of in house construction. In the interest of economics-to-space efficiency, the obvious solution was an all-frame house. If done simply and direct, with labor costs comparatively low (masons and master carpenters receive $1.75 per hour) an additional savings was in view. An efficient structural system along with a floor plan which required a minimum of exterior surface to enclose it became the goal. In a further analysis it seemed feasible to use a slab on grade in which plumbing and clay tile air ducts would be included, a crawl space thus being eliminated.

Detailing of the structural system, of the interior and exterior wall, and of the roof was never subordinated to the other factors in the design. Integration of the detail to the general anatomy of the building was continuously thought of as being as essential as the overall concept itself.

I sensed throughout that the design must approach the plane of visual and functional integrity in which the Windsor chair and the primitive bower can be classified, if it was to achieve a certain humbleness which interwove itself in a strong fabric of beauty.
Designing is a complex and intricate task. It is the integration of the technological, social and economic requirements, biological necessities, and the psychophysical effects of materials, shape, color, volume, and space: thinking in relationships. The designer must see the periphery as well as the core, the immediate and the ultimate, at least in the biological sense. He must anchor his special job in the complex whole...

MOHOLY-NAGY
references
The abstracts which appear in this text are as follows:

2. ibid, p. 417
3. ibid, p. 417
4. ibid, pp. 480, 481

Illustration for section iii: *Andreas Vesalius Bruxellensis Icones Anatomicae*, Library of the University of Munich and the New York Academy of Medicine (History of Medicine Series, No. 3), 1934

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