Design Build Begins at Home:
Constructing Our Own World at the Alexandria Center

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INTRODUCTION: HAROLD AND THE PURPLE CRAYON

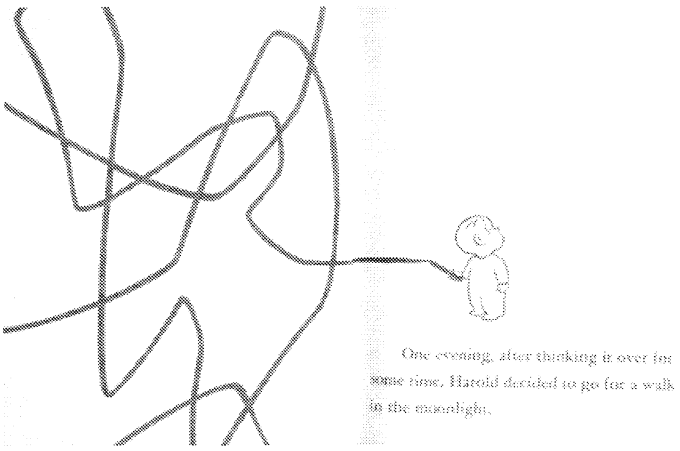

Fig. 1: From "Harold and the Purple Crayon

> *One evening, after thinking it over for some time. Harold decided to go for a walk in the moonlight. There wasn't any moon and Harold needed a moon for a walk in the moonlight.*
>
> *And he needed something to walk on. He made a long straight path so he wouldn't get lost. And he set off on his walk, taking his big purple crayon with him...*
>
> —From *Harold and The Purple Crayon* by Crockett Johnson

We all inhabit a world not of our own making. What architect hasn't shared Harold's dream of drawing his own world? At Virginia Tech's Washington Alexandria Architecture Consortium, we do make our own world through extending the cycle of translation from idea to drawing to constructing. Like Harold with his purple crayon, we imagine the world we want and set about constructing it through our design/build program. Harold himself was a design/builder; but his was a curious form of design build, as the instrument of his design was also the instrument of building. His purple crayon served as both allowing Harold to inhabit his drawings the way we inhabit our studio projects. The immediacy and transparency of Harold's construction of his world exists only in the imagination of the architect, where the drawing is the construction of a world of its own. But a reader of Harold's story will notice that there are fears and near catastrophes that follow from his drawings. For Harold each line constructs a world full of consequences, from which his next lines must extricate him.

THE WASHINGTON ALEXANDRIA ARCHITECTURE CENTER

The Washington-Alexandria Architecture Center (WAAC) is a part of Virginia Tech's College of Architecture and Urban Studies. It serves a dual purpose; it is the urban extension of the College, which is located in Blacksburg Virginia and also a consortium of architecture programs from other universities with students and faculty from around the world. As such, the Consortium offers a one-of-a kind synergy of ideas and perspectives on architecture and urbanism. This paper also serves a dual purpose for in it we will discuss the acquisition of knowledge through action as an introduction to design/build and follow with a presentation of our design/build program.

Founded in 1980 to serve as an urban extension for the College, the Center expanded into a consortium in 1985. The members schools indicate the diversity of cultures represented: California Polytechnic State University of San Luis Obispo, Florida A&M University in Tallahassee, Miami University of Ohio, Oxford-Brooks in Oxford England, The Bauhaus University and Hannover University, both of Germany, Yokohama National University of Japan, and Texas A&M in College Station, Texas. Other participants in the Consortium have included North Carolina State University, and universities from Ukraine, Poland, Estonia, and Armenia. Each participating school sends fourth and/or fifth year students and one faculty member for a semester or an academic year.

The Center experiences the benefits and tribulations of its location far from the main campus. We are a "center" but also a satellite, in the middle of things and at the margins. Among the benefits of this frontier-like location is a sense of stewardship and ownership of our own building, often referred to as our "house" by students. This sense of shared domesticity is very different from the attitude of students toward typical university buildings and it depends on and is supported by an environment and pedagogy built on free-

dom and responsibility. The acceptance of this freedom of exploration and concomitant responsibility forms the social and professional contract among the faculty, between the faculty and the students, and among the students themselves. This contract of individual freedom and responsibility permeates the entire structure of the Center, from the self-selection of studio projects to how our facilities are run. It is crucial that the student learn freedom and responsibility as an inseparable pair, for that is part of the exercise of professional judgment. In this way, "pro-practice" is enacted day by day. The field of action where this is most immediate is the ongoing design build program where we live with the consequences of our ideas and action, and those of previous generations of students. Our building becomes a constructed narrative of the needs, desires, and actions of generations of students, an instrument of tacit knowing.

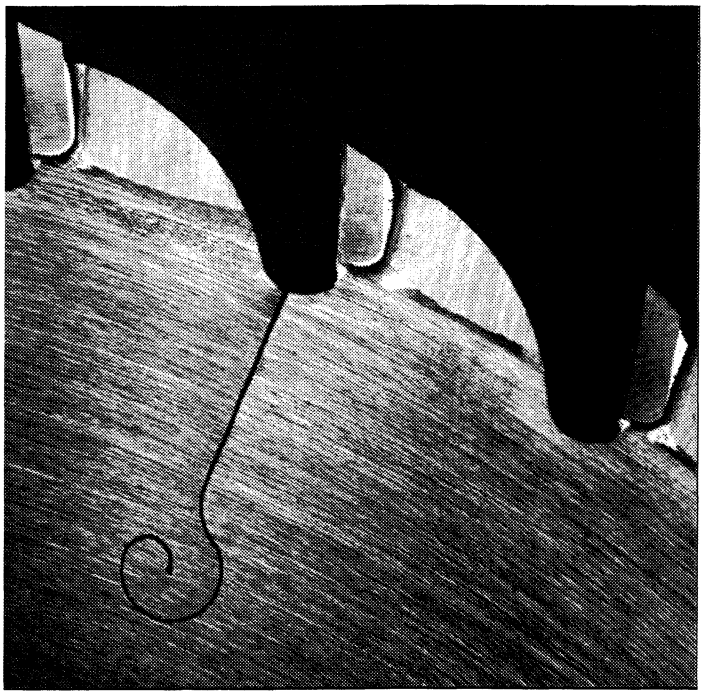

Fig.2: Table saw blade. photo by Steve Small

TACIT KNOWING

The concept of tacit knowledge is familiar to readers of Donald Schoen's The Reflective Practitioner where it is given a somewhat cursory treatment (p.52, 240), but it is philosopher Michael Polanyi who originated the term "tacit knowing" and describes it in detail in his book *The Tacit Dimension.* Too easily condensed into the glib aphorism "learning by doing," tacit knowing is a way of knowing the world and arguably the primary way that architectural knowledge is transmitted. Knowing tacitly means, "we know more than we can say." The relevance of Polanyi's theories to architectural pedagogy deserves a more extended treatment than it will be given here, but its essence is germane to design/build as a way of architectural knowing. Many of Polanyi's themes are echoed, though unreferenced, by neurologist Frank Wilson in his book *The Hand: How its Use Shapes the Brain, Language, and Human Culture.* We will address both of these authors' contributions to the acquisition of knowledge through action and follow with a presentation of WAAC's design/build program.

Polanyi's thesis is that "we know more than we can say." (p.4) He distinguishes between "knowing what" and "knowing how" and it is these two ways of knowing that we "know" more commonly as theory and practice. But Polanyi's point, and Wilson's, is that things are not quite so tidily divisible; the "how" and the "what" talk to each other. He explains: "...An explicit integration cannot replace its tacit counterpart. The skill of a driver cannot be replaced by a thorough schooling in the theory of the motorcar; the knowledge I have of my own body differs altogether from the knowledge of its physiology; and the rules of rhyming and prosody do not tell me what a poem told me..." (P20)

The territory of tacit knowing is the territory of architecture, of design in general and design/build in particular, with its "...problems and hunches, physiognomies and skills, the use of tools, probes, and denotative language." (P29) With this mapping of tacit territory, Polanyi takes us to the question of the architectural problem, the definition and clarification of which is often in the hands of the critic in traditional design studio projects. But we all know...even if we cannot say...that the program for a project can never account for the architecture, nor can the project itself be derived from its programmatic description. Polanyi in his discussion of emergence and innovation suggests that design problems are true discoveries in that the "uncaused action which evokes them is usually an imaginative thrust toward discovering these potentialities." (P89) The character that results from this uncaused action is more often than not a set of things and places we didn't know we needed until we had them, which are both more than and other than the initial hunch.

While Polanyi describes many forms of tacit knowing, such as those that make a chess player or a poet, it is the tacit knowledge that belongs to architecture that interests us here and the instrument of that knowing is the hand and its extensions, tools. The hand and its extensions operate at every level of architectural study. The act of drawing is a metaphoric construction; the building of a model, a construction of a metaphor. Frank Wilson's thesis is that far from our brains instructing our hands in what to do; our hands return information to our brains. Thus the tacit knowing that accrues to the student in the design build class (as well as to the faculty and students who participate indirectly) is in the completion of the sequence that begins in studio from idea to drawing to material of building, to dwelling, and of course back again. To borrow a familiar phrase from Schoen, the reflective conversation here is a material conversation, arising in a Polanyian imaginative leap into possibilities that are already inscribed and circumscribed by material.

In design/build, or "hands-on architecture" as Architecture Record's Robert Ivy describes it in an intuitive nod to Wilson's thesis, the hand and its extensions, tools, are the conduits of tacit learning. Wilson himself never cites Polanyi, so the application of

Polanyi's terminology to Wilson's descriptions is our own. He quotes an engineer whose dissertation topic was juggling: "Simply *telling* someone the idea *won't do.* No matter how sincere the inquiry, a great deal of practice, and a special kind of practice, is necessary for real understanding." (P.104) Wilson describes this practice as "intelligent rehearsal," distinguishing it from play. (Wilson's focus on juggling is not so far from design activity is it might seem; Le Corbusier compared the architect to an acrobat in his poem "The Acrobat")

DESIGN BUILD AT WAAC

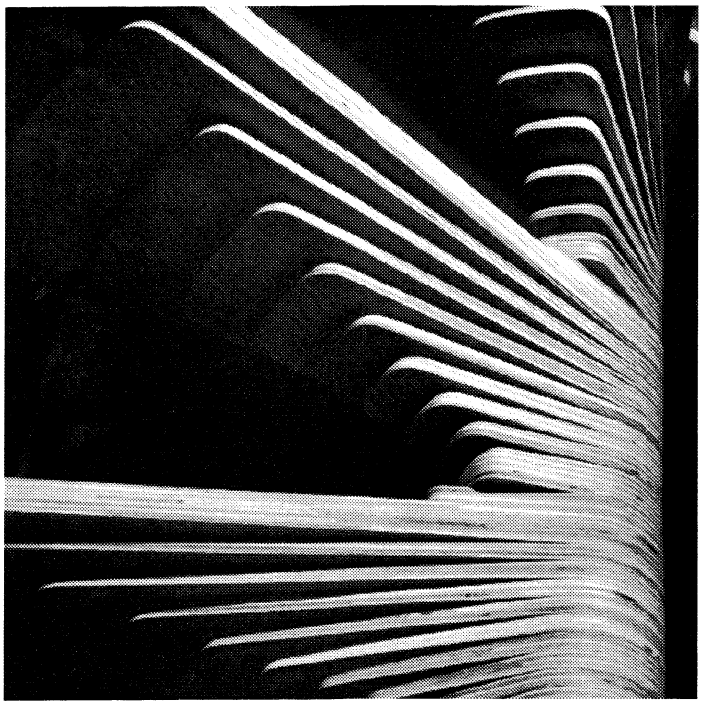

Fig. 3: Stacked plywood spiral stair: photo by Steve Small

What we do would not be possible without the cooperation of our patient and generous building. Built in 1923 as a school, 1001 Prince Street has load-bearing brick walls and wood floors. The building was renovated and converted to office uses in the mid-80's. There are many and complex reasons why its life as an office building was brief, but one of them surely derives from the typology of the building itself. To say that it looks too much like a school to be anything else sounds like a glib tautology, but there is truth to the aphorism that function follows form. Virginia Tech bought 1001 in1990 and the faculty and students of the Center have spent the last decade turning a school back into a school, into *this* school.

Design/build programs have proliferated in architecture schools over the last decade and are, for many universities, hybrid programs serving both as community outreach and as education. Serving both of those masters requires constant attention by the faculty to avoid the obvious pitfalls of sacrificing education to serve a client, exploiting students as cheap labor, or sacrificing architectural integrity for convenience. There are also some less obvious pitfalls in design build programs, such as relying on competition rather than cooperation, and a lack of critical reflection on the educational value, rather than on the public relations value, of the design/build experience. There are three aspects of the design/build program at WAAC that we feel set it apart and are crucial to its success:

1. Design/build is not a studio.

2. We are our own clients.

3. We are inefficient.

Each of these requires explaining. First, the decision to offer design/build as a three credit elective rather than as a studio addresses several issues. Most important, by not displacing a year of design studio, we make a necessary distinction between the increasing architectural, technical, and programmatic complexities of a student's design trajectory and the relatively simple design problems of design/build. Like some of our other classes in printmaking, photography, and furniture design, design/build is a lab class where the primary goal is technical and material empathy, the acquisition of "know-how." We recognize that there is, and rightly should be, a significant disparity between what a student is capable of designing in fourth or fifth year, and what the same student is capable of constructing. This also allows students of vastly different design abilities and backgrounds to share equally in the design/build effort. Thus the culture of individual ownership of design studio projects is disarmed and replaced with the collective effort necessary for and characteristic of design/build projects.

It is made clear to all participants that the design/build class is a group effort and that all ideas will be listened to. It is also clear that the ultimate decisions will be made by the teacher, Joe Wheeler, and the Director of the Center, Jaan Holt, as the projects serve the larger community of the Center. And this brings us to the second aspect of the class: we are our own clients. While there are certainly many opportunities for design/build projects in the community, we have found that our in-house program allows a wonderful educational leakage to occur: watching, listening, offering unsolicited yet welcome opinions, being drafted to help on a small part of something, these bestow a sense of ownership in the process and the results even on students who do not take the class. Our building has become a collection of constructed stories where nearly every corner has in some way been altered. (Some of these are freelance design build efforts. Recently a few students decided that their room needed a bigger door to make it more open to the room next to it, so they cut away the partition. We assess no penalty on such thoughtful destruction...it did make the room better. In the Center's narrative tradition that door will no doubt become known as the McSorley Portal)

This leads to the third aspect, our lack of efficiency. Inefficiency of any sort is a luxury in contemporary culture, but tacit learning depends on it and if the education of the student is the primary concern, then the process is inherently inefficient. This in effi-

ciency requires patience on the part of the design/build faculty and on the part of the WAAC community itself. Among the lessons learned in design studio is that sometimes work done is undone and redone as part of the learning process. The concept of doing, undoing, and redoing, even to the point of failure, is an essential part of learning how to design. When a project is undertaken for an outside client, however, the responsibilities of professionalism discourage that mode of working. We have undertaken many projects with outside clients, such as managing international design competitions, where deadlines, budgets, and the collective public reputation of the school impose a professional discipline on the project team. Our in-house design/build program allows the students to work in an academic cocoon while learning the consequences of translating their lines into things.

We will now describe several projects in general, and finish with an in-depth discussion of our most complex and successful project, the distance learning room.

THE PROJECTS

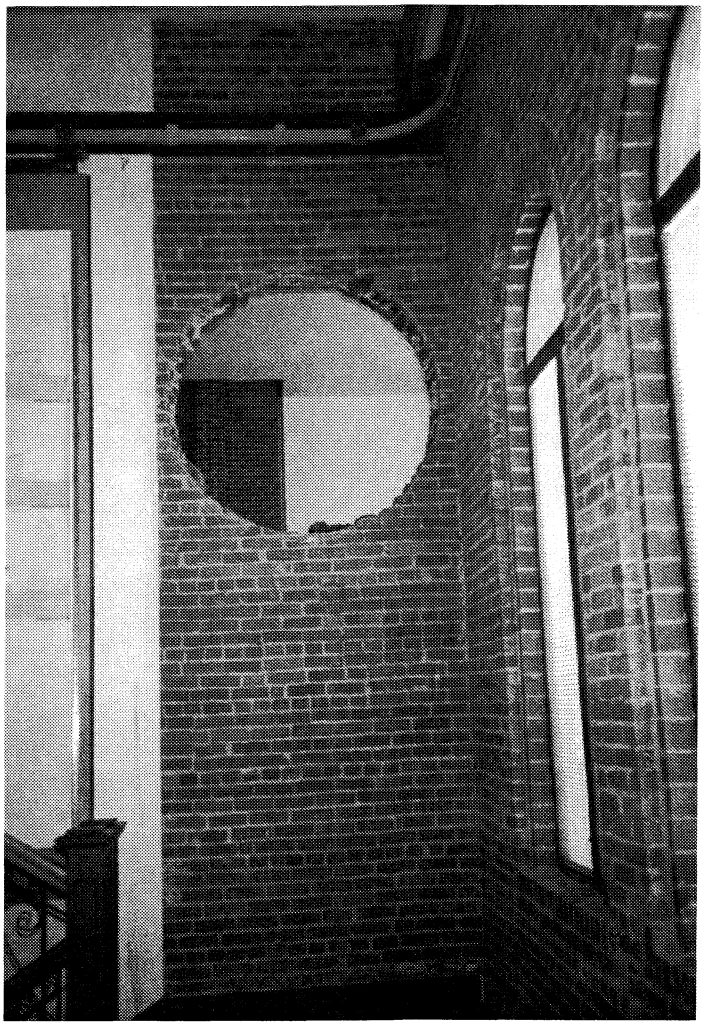

Fig. 4: New hole in the wall: photo by Susan Piemdont-Palladino

The workshops:

The first design build project at WAAC was in fact the construction of the wood shop...the purple crayon so to speak... from which all other construction would come. The discovery of a true masonry arch behind the drywall and metal door frame left over from the office renovation became the ritual beginning of the program as well as a tectonic theme for treating the rest of building. The building now reveals its rough brick in several places and a language of reveals and attachments, of skin and structure, has developed to give consistency to projects throughout the building. The masonry arch that now serves as threshold to the wood shop is a literal and a symbolic entry into the pedagogy of the Center. Its uncovering is a story shared each year with new design/build students as a way of inspiring them to attend closely to the conditions at hand. In fact, several other discoveries have since been made behind the veil of drywall.

Director's office, faculty offices and faculty conference room:

While turning the school building back into a school, we have also been engaged in turning offices back into offices. For these spaces the goal was to avoid the drywall default so the design and construction of the offices focuses mostly on sharing light through interior windows, making plywood shelves that also divide offices, and constructing new plywood paneled walls. Each office has acquired a slightly different character depending on what kind of light it receives and in what era of design/build class it was constructed.

The Library:

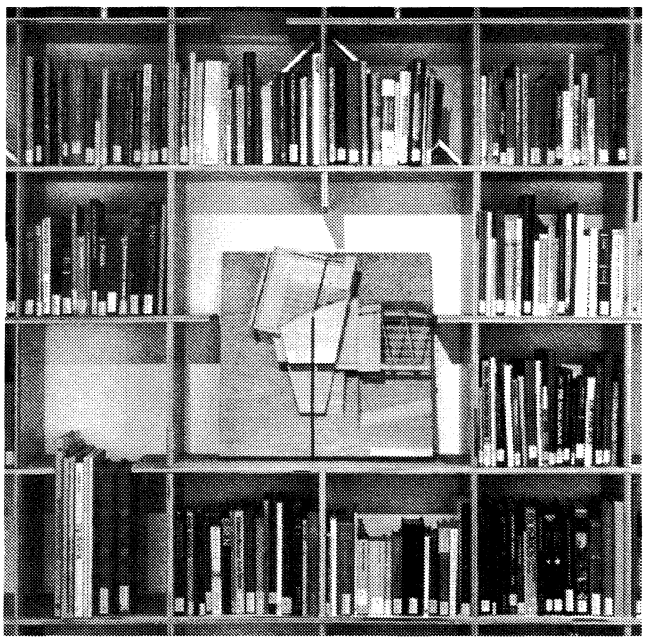

Fig. 5: Plywood shelves in library: photo by Steve Small

Currently the library is a single-storey room encased from floor to ceiling in plywood gridded shelves. As in many of the rooms, the floors has been uncovered and refinished to reveal the original maple. The corner of the room contains the stacked plywood stair, which leads to what will eventually be the second floor of the library. The library has been an ongoing project, its exceptionally disruptive work has often been undertaken in the summer. Its is a long and complicated story, mixed with larger issues and so we will not dwell on it here.

The Stair theater:

1001 Prince Street's character-defining element is its central stair hall. Entered at an intermediate level, the stair descends left and right symmetrically to the lower level and rises half a level to the main level. It splits again landing above the entry and then rises on center to the second floor. This space is the social heart of the school. The design includes two massive rolling panels to block the light from the three south facing windows on the landing and the installation of a motorized screen. As part of the furniture design class, two students from the Bauhaus designed bent plywood chairs for the steps.

Distance learning classroom:

This project will be discussed in considerable depth as it was the most programmatically and technologically demanding of the design build projects and is perhaps the best example of design/build at WAAC. Virginia Tech, like many universities today, has committed itself to expanding its distance learning capabilities. Thus to establish a distance learning link with the campus in Blacksburg, the Center received 4 large television monitors and the necessary microphones, cameras, and computer equipment to send and receive classes at a distance. The technicians who install this equipment have clear preferences for how the spaces for this equipment should be built: wall to wall carpeting, acoustic tile ceiling, no windows, matte plastic surfaces to reduce glare, and neutral colored walls. While these specs may indeed be wonderful for the cameras and the machines, they are not for humans.

We originally located the equipment in our only available room, on the south side of the building facing Prince Street. With 14' ceilings, 10' windows, white walls and maple floors it was soon clear that this was not a suitable place. The students could clearly analyze the failings of the existing condition and begin to design for the preferred one. There were four main issues to correct:

1. Acoustics: the room was too hard surfaced and the street noise of traffic and sirens was disruptive.

2. Light: the southern light coming in the three huge windows was too bright and backlit the audience. The artificial lighting was also unacceptable.

3. Unruly machines, cables and wiring: the equipment and its umbilicals tended to dominate the room

4. No spatial hierarchy: the room as set up allowed no teaching space, no orientation.

The new space, the VTel Room, represents exactly the opposite of what was "required" in the specs and stands as a measured critique of the original program. The maple floor and the hard surfaces remain in the new room, but the floor has a carpet that floats free of the walls by a few feet and one wall is a canted maple plywood wall that deflects sound. There are still three large windows, but they face north bringing constant light into the room. The incandescent artificial light is diffused through the aluminum and muslin "cloud" that also serves an acoustic purpose, floating overhead directly above the carpet. The wiring and cables are all gathered into a new type of baseboard, one that not only protects the wall but also serves as a raceway. And a special place has been made for the teacher in a corner with a portion of exposed brick wall, a motorized screen for slides, and a desk with the equipment. In the corner sandwiched between plexiglas hangs an artifact uncovered by the students in the process of making the room. Behind the furred out drywall of the office renovation the students discovered the blackboard of the old classroom and on it, still legible, was a teacher's lesson. Written in different colors of chalk are the names of colors and above each a circle showing the color.

The participants in the VTel Room project included students from Texas A&M, Cal Poly, graduate architecture students and landscape students from Virginia Tech. The skills they learned and exercised in the construction of the room included rough carpentry, finish carpentry, drywall, electrical, electronics, metal fabrication, plaster removal, floor refinishing, space planning, and selection of finishes and furnishings. The result is a remarkably telegenic room as well as good room to teach in even without using the distance learning equipment.

CONCLUSION

The discovery of potentialities at WAAC in the design/build program comes through a Polanyian in-dwelling, a day-to-day experience with our building. Several needs have prompted imaginative thrusts toward discovery: the need for a place to put our small collection of books, the need to locate distance learning equipment in an amenable room, the desire for a place to show slides and videos. The need for *a* library, and now for *a* larger library, can never fully account for *this* library. Certainly the desire for a place to show slides and videos in no way can account for the strange animal we call the Stair Theater. Thus the discoveries have yielded new places and things: a stair theater and a bent wood seat to use there, a plywood masonry stair, the old brick walls and archaeological fragments of the past life of the building.

Harold exercises his freedom and his responsibility in his quest to find —*draw* closer to— his house. He learns as he goes, as he constructs. The illustration that opens the story, and this essay, shows a meaningless scribble, to which Harold is not attending. Rather he is looking into the emptiness that represents the world awaiting his construction, into the space of the book. Harold's

drawing only becomes meaningful when it serves the task of making place. The scribble has no consequences. Michael Polanyi's dense prose hints at the complexities of the architect's freedom and responsibility, and the professional choices the student learns to exercise in the territory of design/building at home: "All his existential choices are made in response to a potential discovery; they consist in sensing and following a gradient of understanding which will lead to the expansion of his mental existence. Every step is an effort to meet an immediate necessity; his freedom is continuous service." (P81)

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