

From Sleeping Porch to Sleeping Machine: Inverting Traditions of Fresh Air in North America

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This article examines how the meaning of a particular tradition — sleeping in the open air — has changed over time. The research focuses on the development and use of the sleeping porch and related constructs in the United States from the end of the nineteenth century to the start of World War II. During this time, arguments related to nature, health and modernity reframed the sleeping porch's traditions, which in turn recast knowledge of the body's relation to fresh air and nature. The article concludes that the development of the sleeping porch spurred a transition from an empirically defined tradition to one that was epistemologically driven — setting up modernist and mid-century arguments for new, conditioned relationships with fresh air, and between the inside and outside of the American house.

In the opening years of the twentieth century, physicians, politicians and architects exhorted the public to sleep outside on open porches. Outdoor sleeping was not new, as some architects contended; but the argument that laws of human health remained the same across diverse climatic and geographic contexts reframed the sleeping porch's traditions, which in turn recast knowledge of the body's relation to nature. This article examines the negotiation of climatic imperatives and the politics of health in the sleeping porch and related constructs to understand how both populist and avant-garde attitudes about air and about the broader relation between body and nature have shaped domestic space. The sleeping porch sustained and synthesized arguments for both health and modernity, and thus became emblematic of nascent modernist traditions of “life in the open.”

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Traditional practices of outdoor sleeping vary widely and, for the most part, are regional responses to particular climatic conditions. Thus, in the southern United States, architects and builders included sleeping porches in late-nineteenth-century designs, and homeowners appended open-air extensions to their sleeping quarters throughout the

early part of the twentieth century. The open porches were constructed so as to capture the slightest available breeze and increase sleeping comfort in the hot, humid climate. Typically, they extended from second-floor corners or rear facades to admit the greatest amount of wind yet provide a degree of privacy, despite their unavoidable exposure and sometimes precarious position.¹

Outside of North America, outdoor sleeping has been practiced both in other hot, humid climates and in arid regions in which diurnal temperature swings create cool nighttime conditions. Thus, in Iran, families have traditionally slept on the roofs of apartments and other urban dwellings to avoid interior spaces that remain hot into the evening because of the thermal lag created by day-long exposure of buildings to the sun. Shielded for privacy and from wind by tapestries hung from rooftop frameworks, sleepers could experience a cool — sometimes almost too cold — environment on clear nights with low relative humidity.²

Within the wider range of regional practices such as these, this article focuses on particular constructions that changed the way physicians, homeowners, designers, builders and inventors in the United States approached the domestic provision of fresh air. The discussion begins with the tent, a practical, archetypal dwelling, whose use was common particularly on the North American frontier. It then examines the idea of the sleeping porch and, more generally, the idea of open-air sleeping from the mid-nineteenth century through the end of World War II. During this time, sleeping in the open air occurred on porches, next to open windows, within “bed tents” and outdoor rooms, inside (or alongside) the California bungalow, and in association with some early-Modern houses. These constructs register various arguments and reveal how the meaning of “fresh air” and the traditional relation of air to dwelling were transformed at the start of the twentieth century and during the decades that immediately followed.

Making room for sleeping porches and related attachments or additions involved recollection, refutation, and, in some cases, reaffirmation of traditions of fresh air and sleeping outside. The article examines how these changing attitudes inverted customs, traditional practices, and regionalist influences to ultimately allow a movement from sleeping porch to sleeping machine.

The research draws on the full range of what “invert” means. In one sense, inversion brought a reversal, a “turning upside down,” of traditional approaches. In another, counter-arguments deployed in discussions of health and “modern” living inverted tradition by opposing new and old practices. With modernism, these exchanges resulted in the idea of fresh air, so that inverting implied a translation from readily accessible meanings to more metaphorical ones. Finally, inversion highlighted a “turning in” to a hermetic idea of the outdoors, framed through the glazed envelope and held within the highly conditioned air of the interior domestic spaces that became

widespread in North America after World War II. For example, the article covers the transformation of sleeping environments that came about under the aegis of environmental reform that played against traditional views of the environment and preconceptions about health. Along these lines, the concomitant generation of an idea of tradition opens up a displaced regionalism — a concept complicated by climatic variation and by universally defined concepts of fresh air.

With this understanding of “inversion” as an agent of change, the article seeks to answer two questions. How does the meaning of a particular tradition (in this case, sleeping in the open-air) change over time, and what forces cause it to change? And how did changing knowledge about the human body, and its relation to nature and air, influence traditions of sleeping outside?

To answer these questions, the article draws from examples found within popular journals, magazines, house-plan books, patent applications, and medical periodicals from the time. Within journals, in particular, the sleeping porch testimonial formed a kind of subgenre that provides a record of contemporary discussions (though, of course, not without being inflected by the views of magazine publishers, health-care factions, and homebuilder associations). In some cases, literature of the time also provides detail about what these spaces were like and how they functioned.

ON THE FRONTIER AND BACK TO NATURE: THE NORTH AMERICAN TENT

This frame, so tightly clad, was a sort of crystallization around me, and reacted on the builder. . . . I did not need to go outdoors to take the air, for the atmosphere within had lost none of its freshness. It was not so much within doors as behind a door where I sat, even in the rainiest weather.

— H.D. Thoreau³

Nature intended us to sleep in the open air. . . .

— C.M. D’Enville⁴

The relation of American dwelling to nature and frontier provides veins of tradition that serve as background to changing attitudes about household air. Henry David Thoreau, who would have agreed it was nature’s intention for us to sleep in the open air, outlined the naked primitiveness afforded by the tent. Its crystallization of home paralleled his mid-nineteenth-century shelter at Walden. For Thoreau, the tent linked its inhabitant to fresh air, and in the section of *Walden* quoted above he made a case for the dwelling’s direct connection between inside and outside. Prior to this passage, he had discussed the tent as a kind of archetypal equipment for dwelling.⁵

This idea of tent as permanent American home has parallels in the frontier narrative that defined the nation’s early



FIGURE 1. *Backyard tent: “If you prefer it, a simple tent in the back yard is excellent.”* Source: C.M. D’Enville, “*Sleeping Outdoors for Health: Outdoor Sleeping for the Well Man,*” *Country Life in America*, May 1909.

identity. Frederick Jackson Turner, chronicler of the American frontier, solidified the tent as a precedent (perhaps even a prototype) for the sleeping porch when he pitched one on the back porch of a Cambridge house during his teaching tenure at Harvard University. This collision of frontier and exposure to the open air — and by extension the link to the open spaces of the American West — defined a domestic life on the margins between outside and inside, nature and architecture, open air and conditioned environment (FIG. 1).

Where Thoreau invoked transcendentalist experience from the earlier necessities of tent life, a turn-of-the-century vacationing public sought the luxurious delights of fresh air. A 1906 article in the *New York Times* confirmed this American “devotion to tent life,” describing it hyperbolically as “delightfully informal.” In particular, it related how tents served as outdoor sleeping rooms for guests at the prestigious Saranac Inn in upstate New York. The article can also be read as promotional copy for the Inn; for example, it heralded how tent life was a “delightful feature” of Upper Saranac Lake, and how the tent colony’s fresh-air context was the setting for social gatherings and “impromptu card parties.”⁶ But three years later, in May 1909, an article in *Country Life in America* by Mabel Criswell Wymond identified the “favorably located” outdoor room as a convenient substitute for an expensive summer vacation — the domestic frontier offering the “full share of enjoyment, close to nature.” In another section of her article, Wymond spoke poetically of the fresh-air experience and the sight of “rosy morn” from her sleeping porch.⁷

In a sleeping porch testimonial in the same issue of *Country Life in America*, Julian Burroughs proclaimed open-air sleeping to be a way of connecting with nature. Although spending his entire work day in the open air, the farmer began the practice to “see what effect it would have on my health.” But he mainly wanted to “study the sounds of night.” In this regard, the sleeping porch afforded proximate access to nature and the activities of his neighbors. He heard the trapper checking his catch and sometimes smelled the

trapped skunk. He catalogued the birds that he heard with precise scientific terminology and learned the habits of a gray fox trying to access the hen house. Burroughs summarized this link to his natural context: “It has proved a delightful revelation to me in every way; I am stronger, can do more work, and have had no colds; further, I feel that I have come closer to nature and have won some priceless memories. A person who works all day has neither the time nor the strength to be prowling around at night studying nature. Sleeping out of doors brings nature to you.”⁸

FROM NIGHT AIR TO GOOD AIR: THE SCREENED DWELLING

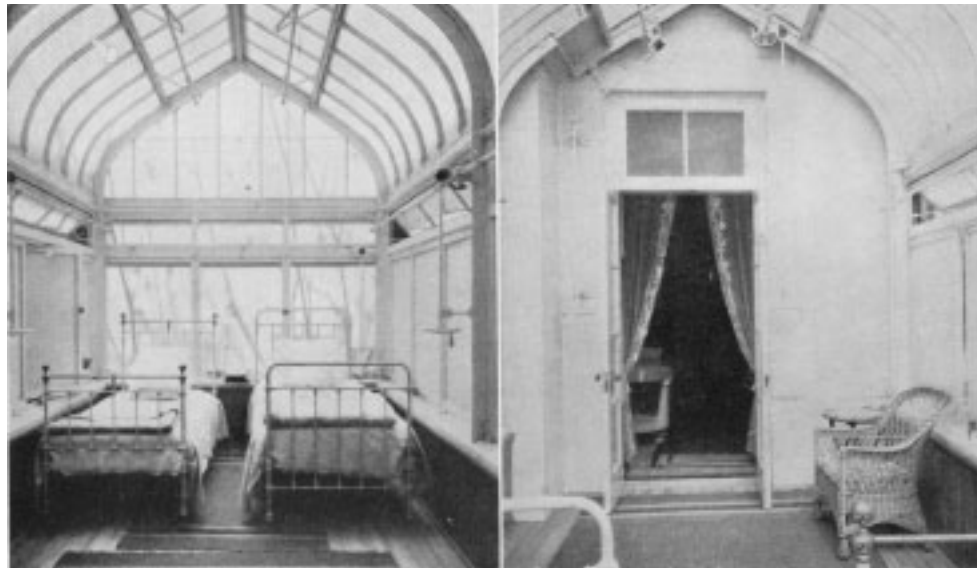
Two phases of what can be generally called “environmental reform” influenced the air in which nineteenth- and early-twentieth-century Americans slept. Paralleling what is also known as the fresh-air movement, each phase can be linked with a growing recognition of the sources and prevention of disease.

Throughout the nineteenth century, one impediment to practices of living out of doors, or at least close to nature — both claimed as American traditions — was the fear of night air. So-called “miasmatic” theories linked moisture-laden night air with maladies and death. Those who slept unprotected in the open air were thus thought to be susceptible to malaria and yellow fever. Neither disease was linked to mosquitoes until the late 1890s and 1900s. As a result, throughout the nineteenth century an anxious sleeping public understood “mal-aria” literally, as derived from the Italian word for “bad air.”⁹

The invention of woven mesh insect screening, however, allowed the fresh-air and back-to-nature movements (and their invocations of tradition) to better integrate themselves with the dwelling. Insect screening originated in the U.S. with the Gilbert and Bennett Manufacturing Company (now Belleville Wire Cloth Company) of Georgetown, Connecticut, which in the 1830s produced iron-wire sieves derived from earlier horse-hair ones. In the early 1860s, the Civil War forced the closure of the company’s southern plants, leaving a surplus of woven iron-wire cloth. This led the company to apply gray paint to the cloth and introduce an early version of “insect wire screening.”¹⁰

In spite of its mass production, quality netting remained expensive in the 1860s (as much as \$16 for a canopy bed covering), and it was not until after 1870 that improvements in quality paralleled price reductions. But other versions of window screening soon followed, and Gilbert and Bennett exhibited many of its inventions (including those for wire fencing and galvanized poultry netting) at the 1893 World’s Columbian Exposition. From the 1860s to the 1910s, production of iron-wire cloth increased by nearly one hundred times, from 5 million square feet to 350 million square feet.¹¹

FIGURE 2. Outdoor bedroom of Mr. A.G. Paine, Jr., on the roof of the extension of his New York residence. “The bedroom is of regular greenhouse construction.” Source: H.S. Adams, “Pretty Nearly Sleeping Outdoors,” *Country Life in America, Homebuilder’s Supplement*, March 1911.



The realization that malaria was spread by mosquitoes and the increasing availability of quality window screening liberated nature-loving sleepers. It also helped provide a curative (and subsequently preventative) environment for those affected by tuberculosis. Other discoveries were also made at the turn of the century concerning the science of air, as attempts were made to define and quantify environmental influences on human behavior.

Raymond Arsenault has identified a scholarly tendency among geographers and sociologists in the first three decades of the twentieth century to link climate and culture in a cause-effect relationship.¹² One example was geographer Andrew Palmer’s broad 1917 survey of climate and American architecture: “Only within recent years, however, has a new emphasis been placed upon climate in that it has been studied from the point of view of its influence upon man himself. In approaching the element of climate as an influence on man, his immediate environment and his daily activities, a new and interesting vista is presented to view.”¹³

Arsenault’s own conclusion was that “climate may not be the key to human history, but climate does matter.”¹⁴ Indeed, this view helps frame the argument in this article that climate holds multiple traditions. Ironically, however, it was Palmer, who provided a more open framework by which to rethink the roots of this climatic tradition: “From time immemorial man has been interested in the weather, primarily because of its influence upon those things which support and sustain him, his field-crops, his fruit-trees and his cattle.”¹⁵

It is the idea of a curative environment for health and good living, rather than the more problematic overarching claims for behavior, that I will follow in the next section. Eventually, the former evolved into a full-fledged effort toward environmental reform (and related transformations of the North American dwelling), while the latter displaced aca-

demical discussions about nature and habitation well into the second half of the twentieth century (FIG. 2).

FROM FOUL AIR TO FRESH AIR: THE OPEN WINDOW

The Window was open . . . and I, who was an invalid and afraid of the Air in the night (blowing upon me), shut it close. Oh! says Franklin don't shut the Window. We shall be suffocated. I answered I was afraid of the Evening Air. Dr. Franklin replied, the Air within this Chamber will soon be, and indeed is now worse than that without Doors: come! open the Window and come to bed, and I will convince you: I believe you are not acquainted with my Theory of Colds.

— John Adams¹⁶

With this eighteenth-century “theory,” Benjamin Franklin began an early refutation of the argument that night air was bad air, and he foreshadowed later determinations that fresh air provided a curative, healthy environment for sleep. Even in the middle of the nineteenth century, with miasmatic theories in full force, popular journals echoed Franklin’s call for the opening of windows. In 1850, Harriet Martineau wrote a “mock-serious” article for *Harper’s Monthly* in which she instructed the reader how to make an unhealthy bedroom. Instructions included the following directive: “Cover the fireplace up so foul air cannot escape during the night; likewise shut the window.”¹⁷

In 1884, an anonymous writer for *Ladies’ Home Journal* dramatized the benefits of opening the window to admit fresh air into her children’s bedroom, with its smoldering fireplace: “Up went that sash to its highest limit for a brief half hour, and as the snow and deliciously pure air came

rushing in and the impurities out, my little people snuggled contentedly under their blankets, and as they fell asleep, I thought it is one step gained toward a future, pure, chaste life, when a child has learned to detect even in his sleep, a vile atmosphere."¹⁸ Though at the same time cautioning against foul night air, Harriet Beecher Stowe and Florence Nightingale offered similar advice in their respective publications, *An American Woman's Home, or Principles of Domestic Science* (1869) and *Notes on Nursing* (1898).¹⁹

By the last decades of the nineteenth century, the open window was firmly entrenched as the preferred method of ensuring healthy bedrooms. Kate Upson Clark, writing in *Ladies' Home Journal*, stated unequivocally: "Windows in sleeping-rooms should be kept wide open as much of the time as possible when the apartments are unoccupied; and, while other chamber work should be done as soon as it can be managed after breakfast, beds should be left to air several hours, if they can be conveniently allowed. The air in bedrooms is often obscurely foul, because the bed does not get proper airing."²⁰

Physicians, politicians and architects all urged the public to sleep outside at the beginning of the twentieth century. Prominent within Irving Fisher's 1915 treatise *How to Live* was the argument that night air was good air. In the decades preceding this publication, physicians had begun to prescribe fresh air for tuberculosis patients and to recommend outdoor sleeping as a preventative practice. Sanatoria across the globe employed open windows and sleeping porches to provide fresh-air recuperative, and sometimes curative, environments for tuberculosis patients. In the two decades that would follow, a generation of Californians spent their nights

on sleeping porches. In addition to being a remedy for diagnoses of tuberculosis, "outdoor treatment" was also recommended for ambiguous afflictions such as "grippe" and "throat affections."²¹

Whether or not the open window can be understood to approximate the parted tent flap, various health regimens also appropriated and transformed the tent as a vehicle for recuperation. A 1904 article cited as beneficial the choice by the Austrian army in Hungary in 1854 of tents instead of readily available permanent hospitals as a way to treat patients from early spring until late fall. The Boston City Hospital, from the turn of the century, followed a similar model to increase by sixty the number of beds for patients during the nonwinter seasons. The 1904 article professed the benefits of the open-air environment: "... there is an especial air of cheerfulness pervading this department, showing the beneficence of sunshine and pure air. Among the patients an air of comfort prevails... [and] surgical cases have proved anew the old doctrine that pure air is required for the prompt healing of wounds."²²

In some cases, perceived novelty prevented recognition of long-held regional practices of sleeping outside. "But what do the doctors think of it?" asked C.M. D'Enville. "The answer is that outdoor sleeping is too new and revolutionary to be taken up generally by medical men without cumulative proof."²³ In this same article, however, D'Enville quoted physicians who were advocates of outdoor sleeping, including Dr. Livingston Farrand (Executive Secretary of the National Association for Study and Prevention of Tuberculosis). Farrand also emphasized the sleeping porch's significant role in the prevention movement, the growth of which "in all parts of the country, is very rapid" (FIG. 3). Likewise,



FIGURE 3. Interior view where a conventional bed chamber serves as a "desirable adjunct" for dressing. Source: C.M. D'Enville, "Sleeping Outdoors for Health: Outdoor Sleeping for the Well Man," *Country Life in America*, May 1909.

Philadelphia's Dr. Lawrence F. Flick stated decisively that houses of the near future "will be built with the idea of making outdoor life possible at least at night, if not in daytime."

Other, more skeptical, physicians such as Dr. John B. Hawes saw the practice as a "fad" — although one that was "very excellent."²⁴ However, writing in *Scientific American* in December 1909, Katherine Louise Smith seemed to respond to this contention: "Fresh air at night and plenty of it is the cry that is going up among those who are determined to subdue the 'Great White Plague,' and with these persons it has become more than a fad, a necessity."²⁵

When former President William Taft wrote in the Foreword to Fisher's 1915 treatise that the provision of fresh air would be fundamental to the country's public health, he was reinventing a preexisting American tradition. By 1911, practices of sleeping out of doors had been presented as an "established custom." An article by A.W. Henderson in *Country Life in America* looked specifically at Colorado Springs, a popular destination for those recuperating from pulmonary disease, where at least 40 percent of the houses had sleeping porches (FIG. 4). The author traced recognition of the health benefits of sleeping outdoors to overland travelers on the Santa Fe Trail the century before. During these journeys, "attention was first drawn to the advantages of sleeping in the open air, when it was noticed that members of the party who left the East in poor health began to pick up in health and spirit as a result of the outdoor life."²⁶ Harkening back to combinations of frontier and nature, Henderson also attributed the growth of Colorado Springs' sleeping porches — an outgrowth of this open-trail custom — to "pioneer physicians" there who began encouraging patients to sleep outdoors in the early 1880s.

Henderson's account also provides an indication of the rapid mechanization and domestication of the porch. His article outlined a genealogy from makeshift beginnings to a



FIGURE 4. Colorado Springs house with four sleeping porches, captioned "fresh air is the greatest tonic." Source: "Outdoor Sleeping the Year Round," *Country Life in America*, January 1911.

more technically proficient and planned construction. "At first a cot was moved out on the porch every night, and beside it was erected a wind-break. From this has been evolved the present-day sleeping porch, equipped with electric lights and electric bed-warming pans, made comfortable with the best furniture, easily accessible to the bath or dressing-room, and fitted with roller curtains which may be adjusted after going to bed."²⁷

The perfection of the open window and the evolution of the sleeping porch reinvented the tent and the dwelling's indoor-outdoor connections; but, for some, these practices also suggested a better living standard. In his 1909 testimonial, physician Luther H. Gulick argued that sleeping with fresh outdoor air "increases not only the power to resist disease, but *raises the level of living itself.*" Appearing to invoke John Dewey and a related pragmatist position, Gulick ended his essay by describing open-air sleeping as the "highest level of most vivid living, thinking, feeling and doing."²⁸

FROM OPEN WINDOW TO PATENTED SLEEPING PORCH: THE INDOOR BED TENT

With your lungs outside when your body is inside.

— L.H. Gulick²⁹

Practitioners of outdoor-sleeping soon sought alternatives to the expense and complication of the \$20 sleeping bag. In the transition between warm room and exposed porch, on the way to climbing into the bag's cocoon of warmth, many "fresh-air enthusiasts" found that they lost all body heat and "caught cold." As a result, devices were invented to allow only the head to be exposed to the fresh air while the bed could be "adjusted in such a way that undressing and passing to the bed could be conducted in a warm room."³⁰

Within the larger heading of "indoor bed tent," Katherine Louise Smith divided these inventions into two categories: one in which the sleeper's head stuck out the window, and another inverting the tent's awnings to project into the bedroom space (FIG. 5). In the first design, an ordinary hospital bed, with legs adjusted 18 inches back from the head and set at a height to bring the frame directly over the window sill, was rolled over to an open window. The window's lower sash was then raised to correspond to the closure provided by a frame and awning that was pulled over the sleeper's head. An exterior awning, projecting outside the building envelope, protected the sleeper from inclement weather, and strips of felt sealed the window frame's edges to keep the bedroom's interior as climatically controlled as possible. Two aspects of this design proved problematic, however: the sleeper's vertiginous feeling, particularly within second-floor bedrooms, and the visibility of the bed tent from the exterior. As a result, the second design, in which the fresh-air tent was folded entirely within the bedroom space,

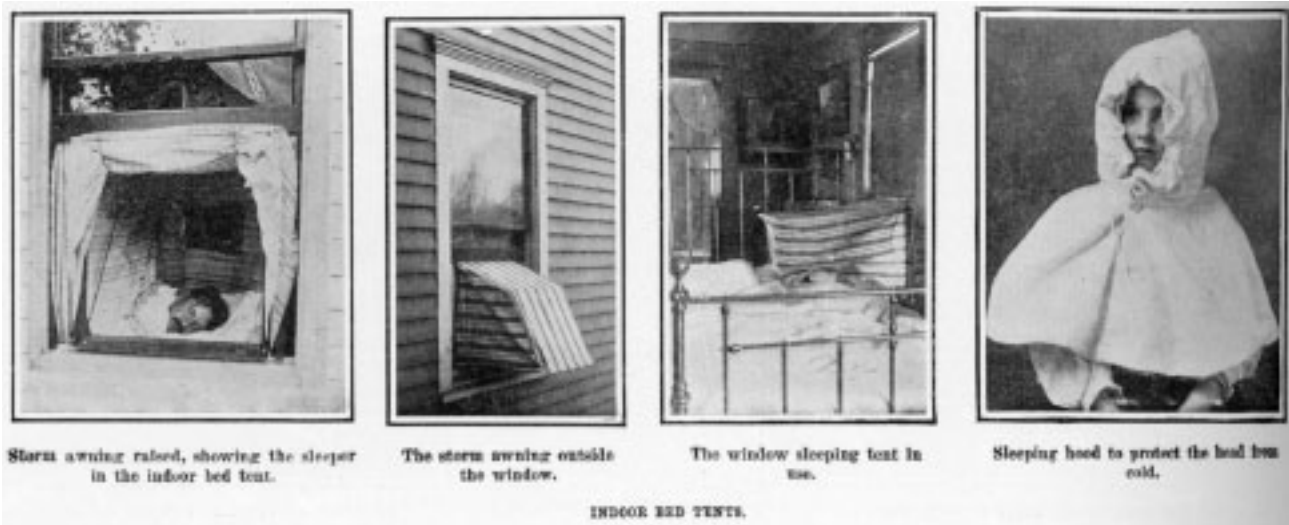


FIGURE 5. Illustration of indoor bed tents and sleeping attire in 1909. Source: Katherine Louise Smith, "Indoor Bed Tents," *Scientific American*, n.s. 101, December 1909.

gained popularity. With this less conspicuous version, the side of the bed was placed next to the open window, and a heavy canvas awning was placed over the sleeper's head and tucked under the pillow. The awning frame's depth allowed greater distance (up to three feet) from the exterior envelope, if wind and extreme cold proved uncomfortable. And a small "celluloid window in the side of the tent next to the room allows the user to look out and to converse with those in the room" or with a bed partner who did not share the fresh-air advocate's conviction.

Smith cited six reasons for using the indoor bed tent: decreased nighttime sweating, alleviated insomnia, increased appetite, strengthened resistance to disease, blood purification, and the prevention of consumption. Smith also supported the "theory of keeping the head in the cold and the body warm" with current physiological principles that the body loses 80 to 90 percent of its heat through the skin by radiation.³

The United States Patent Office's archives catalogue a wide range of inventive approaches to the provision of fresh air to the sleeping public (FIG. 6). In many cases designs expanded the scale and complexity of the indoor bed tent and open window, including both detailed window treatments and entire sleeping porch constructions. Orlan Vancamp's "Fresh-air Bed," filed in 1915 and patented in 1918, sought to improve on the tent and the sleeping porch with a version of the indoor bed tent that allowed for the rapid conversion from open air to protected bed. Vancamp acknowledged the many previous iterations of tents and sleeping porches for healthful sleeping, but cited his as a more publicly available solution and a more useful alternative in urban conditions where space was limited and rapid deployment essential. Five years later, Henry Charles Trost patented a sleeping

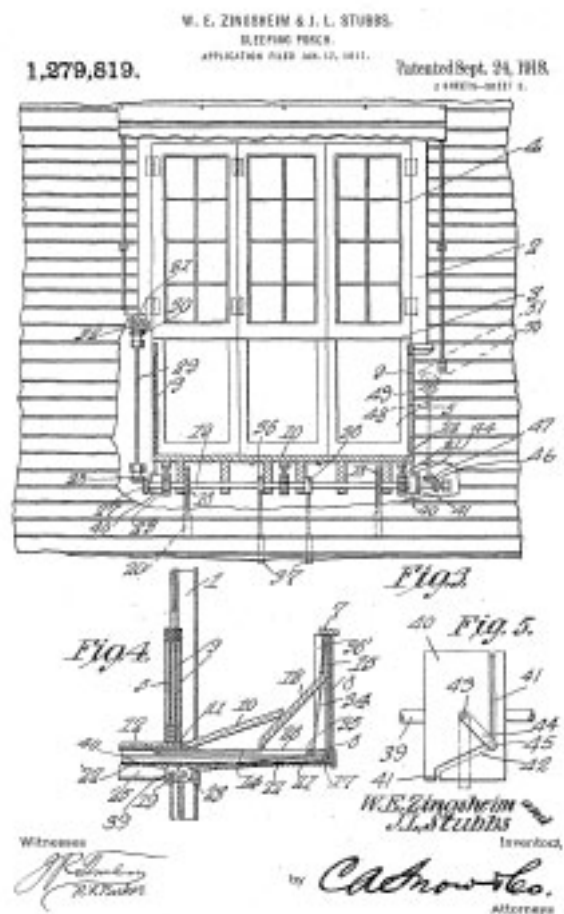


FIGURE 6. William E. Zingsheim and John L. Stubbs, "Sleeping-Porch," patent applied for in 1917 and granted in 1918. Source: United States Patent and Trademark Office.

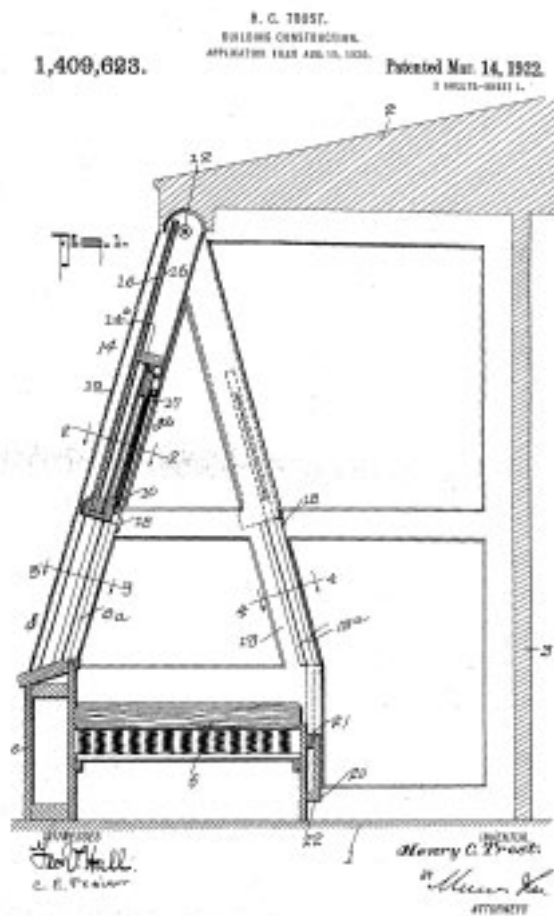


FIGURE 7. Henry C. Trost, “Building Construction,” patent applied for in 1920 and granted in 1922. Source: United States Patent and Trademark Office.

porch that mobilized the window wall to form a bed integrated with a parapet (FIG. 7). His patent, titled “Building Construction” (1922), did not make the same sweeping claims for public availability, but the invention did facilitate the indoor-outdoor connection of sleeping porches.

The technical fine-tuning of sleeping porches, sleeping rooms, and bed tents continued well into the 1920s, with many patent applications filed before World War II. In 1925, Ernest T. Heinson filed a patent that was indicative of the continued interest in improving open-air sleep. Heinson sought to combine closure with openness and to gain greater privacy without sacrificing air flow and the provision of fresh air. He summarized the project: “This invention aims to provide a novel means whereby the occupants of different compartments in a sleeping porch may obtain privacy and protect themselves against undesirable weather conditions, it being possible to maintain all of the advantages of an open air sleeping porch.” The invention’s novelty lay mainly in the multiple degrees of privacy it afforded by a variety of screening devices, including two rolling screens, two opaque clo-

sure panels, and a standard window screen. Heinson also promoted his invention, structured by the conventions of the house window, as a universal solution to resolve fresh air with privacy, one that “may be employed wherever desired.”³²

OPEN-AIR FOR ALL: THE COLLISION OF SLEEPING PORCH AND BUNGALOW

The combination of bungalow and sleeping porch proved to be an effective model for populist living, interweaving two traditional approaches to housing. This was true both in California’s mild climate and burgeoning development and in the Midwest’s expanding suburban districts. The fusion of bungalow and sleeping porch linked similar traditions amidst a rhetoric of old and new promulgated by architects, builders, and fresh-air advocates. This integration also expanded the popularity of outdoor sleeping and promoted the rapid geographic dispersion of the sleeping porch.

Where the sleeping porch originated from myths and practices of outdoor life as well as health mandates, the bungalow emerged from the popularization of a British colonial building type and the demand for inexpensive houses for migrants to California’s mild climate. Clay Lancaster has claimed that the term “bungalow” was first derived by the English in India to describe the association between their cottage dwellings and the Bengali *bānglā*, which were “low house[s] with galleries or porches all around.”³³ The recessed veranda that was typically found at the rear of the *bānglā*, also called *dāk-bungalow*, can be compared to bungalow plans found in *Authentic Small Houses* and other bungalow monographs.³⁴ In these early-twentieth-century designs, screened porches, sleeping areas, or extensions for cooking activities assimilated outdoor rooms within the bungalow’s simple volume. Its straightforward footprint, relatively small domestic scale, and the programmatic flexibility of its spaces made the bungalow a suitable receptor for incorporating fresh air and outdoor life.

Though less specific in terms of historical derivation, Henry Wilson described the “California Bungalow” as a “direct descendant of the original attempts at architecture” in the region, and by 1910 it had become a house type “known and talked about the world over.”³⁵ At the same time, Wilson defined this permutation of the bungalow as a “radical departure from the older style of cottage, not only in outward appearance, but in inside arrangement.”³⁶ In plan No. 476, Wilson created a bungalow with an 18-foot by 18-foot courtyard flanked by the kitchen on one side and a “sleeping room” on the other. Wilson described the resulting airiness in this one-and-a-half-story dwelling, and playfully hinted at his clients’ zealous penchant for openness and ventilation: “The most enthusiastic fresh-air crank would be delighted by the result of this court plan, giving windows on three sides of the kitchen and screen sleeping-room; the hall is benefited by the window inserted upon the court.”³⁷

In other designs, Wilson pointed toward the easy integration and suitability of the outdoor sleeping spaces within the typically rectangular footprint of the bungalow. The low-slung No.483 managed to bring a roof-level “screen sleeping room” into the plan by capturing attic space under the rear gable above the plate line. As a result, the house retained Wilson’s simple footprint (50 feet by 40 feet) while still accommodating a “good sized” sleeping porch.³⁸ The sleeping porch also meshed with the bungalow’s scale and economic use of space. No.636 included a relatively large “screen room” (12 feet 6 inches by 14 feet 6 inches). But, unlike No.483, the room provided connection to the exterior through one wall of screening, and thus provided more of a fifth bedroom than an open-air, well-ventilated option for sleeping.³⁹

In another plan with a rear corner dormer (No.657) Wilson carved out roof space for the sleeping room, accessed by a winding stair at the center of the plan (FIG. 8). Wilson used this particular plan to promote the California bungalow as a broad North American type — “equally at home among date palms and banana trees” as “under the sheltering branches of maple or oak.” It also demonstrated the bungalow’s “cosmopolitan nature” and appropriateness for many climates: the “widely projecting roof of this bungalow would lose none of its inviting appearance, even though it may be covered with snow.”⁴⁰

The sleeping porch’s spaces in the bungalow also accommodated a wide range of programmatic uses — a breadth and

flexibility soon found in California’s early-Modern projects. In some of Wilson’s plans, the “screen sleeping room” aligned and worked directly with the rear first-floor bedroom both in its formal configuration and through two French doors.⁴¹ Also on the first floor’s rear corner and in alignment with a rear bedroom, plan No.720’s screen room provided a large sleeping space measuring 12 feet 6 inches by 16 feet. Here, Wilson catalogued the programmatic range allowed by the large floor area and closet: “gymnasium-nursery,” conservatory, singular bedroom, and adjunct to conventional bedroom.⁴² Similarly, the first floor plan of No.728 includes a screen bedroom that “by reason of its relation to kitchen and living-room, would serve equally well as a breakfast-room.”⁴³

Henry H. Saylor chronicled the bungalow’s eastern migration. Although he drew bungalow examples from across the United States, and although his classification system included a range of uses from temporary to permanent and from leisure to primary residence, he wrote from an eastern perspective, thus giving a sense of how sleeping porches were understood outside of California in 1911.⁴⁴ In the porch section of the chapter devoted to the bungalow “plan,” Saylor wrote: “Then too, do not forget the sleeping-porch. It would be a very easy matter indeed to arrange for a sleeping porch in conjunction with almost any of the bedroom wings shown among these illustrations of plans.”⁴⁵

Saylor also identified the tent-house as an auxiliary version of the bungalow — in his classification system, the

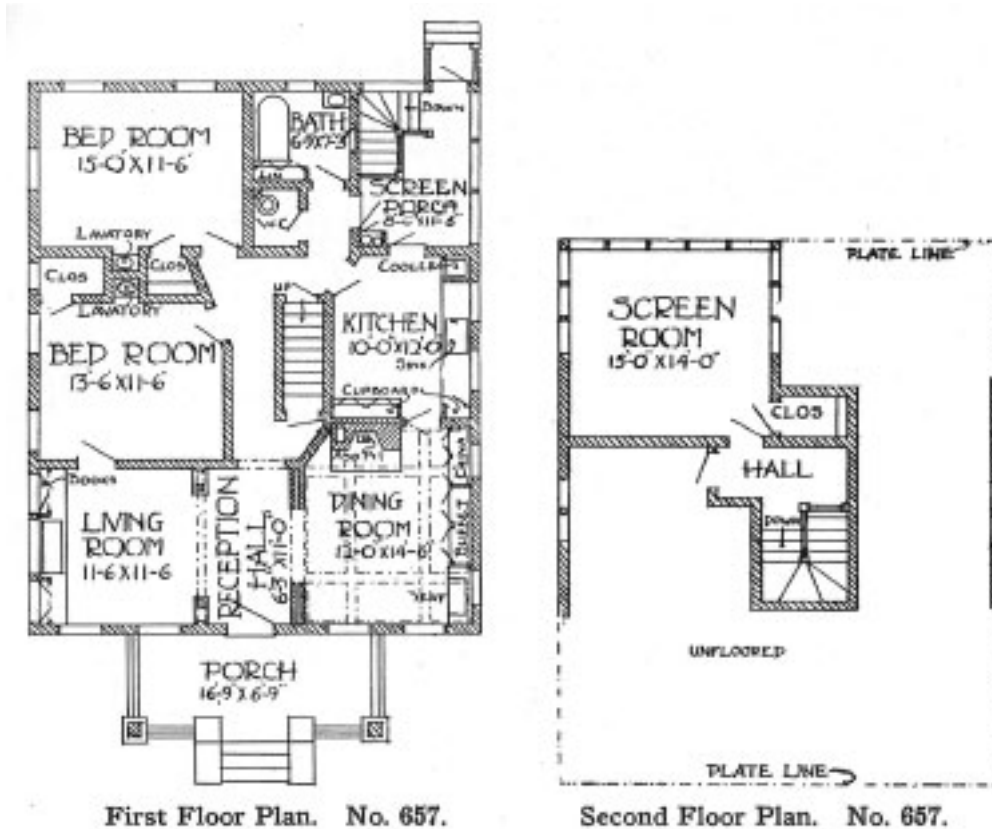


FIGURE 8. Henry L. Wilson, Bungalow Plan No.657 with screened sleeping area. Source: *The Bungalow Book*, Chicago, 1910.

fourth of ten types — as a “small shack intended only for temporary use.” In southern California, this type had side walls made of frame-stretched canvas.⁴⁶ Saylor had noted earlier that the California bungalow was “used chiefly as a permanent home, but on account of the ideal climate of that section of the country the permanent home does not have to be so snugly built as the permanent home of the East.”⁴⁷

But by the end of the next decade, in 1929, Robert T. Jones saw an easier transition from tent to cottage to permanent bungalow in his *Small Homes of Architectural Distinction*. A house plan titled “A Bungalow Today, a Cottage Formerly” translated the summer cottage house type into a permanent, year-round dwelling. With a “sun and sleeping porch” (measuring 9 feet by 11 feet) on its rear corner, the house’s interior confirmed the programmatic flexibility of the outdoor spaces: “From the hall opens one large bedroom, bathroom, linen closet, and a combination sun and sleeping porch. This last is generously supplied with windows on two sides, making it possible to convert it into a more or less open porch in summer and a sleeping porch for night use. A large closet and a closet bed make provision for this purpose, affording in this way two complete bedrooms.”⁴⁸ Such flexibility, and the possible conversion of the sleeping porch, allowed Jones to promote its exceedingly small floor area (770 square feet) as a two-bedroom house.

In other cases, a more overtly stated stylistic adaptation characterized the sleeping porch’s appearance in a wide variety of house types and plans. A house plan titled “Reminiscent of the English Cottage: With a plan, however, distinctly American throughout” demonstrated a disconnect between external image and interior function and programming, an aspect confirmed by the plan’s subtitle, “the modern five-room home.” The “spirit of the style” came in the plan’s irregularity and the large window openings. But the sleeping porch added a bedroom without conspicuously adding space or increasing the number of rooms: “Besides the two bedrooms there is a sleeping porch generous enough for two beds, thus making the house practically one of six rooms.”⁴⁹ Here the sleeping porch was essentially a dormer space over the main porch roof.

Other stylistic permutations provoked a degree of irony from the plan sourcebook writers. For a plan labeled “With Front Porch and Sleeping Porch: in spite of the long, sloping roof there are two full stories,” Jones began with the following: “If no one will take it seriously, we will call this a Dutch Colonial home. No other way of describing it will do so well. Even so, it isn’t Dutch and it isn’t Colonial, but is clearly modern American.”⁵⁰ The sleeping porch (measuring 13 feet by 8 feet) was included on the rear, second-floor corner. In addition to the house’s three conventional bedrooms, it was “large enough to accommodate four or five standard cots.” Sinclair Lewis perhaps imagined his character Babbitt living and sleeping on a similar porch, a hermetic space of introspection, frame for real estate speculation (as he surveys the

Midwestern town Zenith’s building stock), and a conformist’s gendered escape from domestic life.⁵¹

As early as 1909, houses not directly linked with the bungalow form but with provisions to sleep outdoors were promoted for all climates and seasons. An article in *Country Life in America* by W.K. Shilling signaled this geographic dispersal. It described “A model house at a moderate cost, which includes open-air features adaptable to cold as well as warm climates” (FIG. 9). The interior of this house was inspired by Arts and Crafts and California bungalow treatments, but it was built of reinforced concrete. Named “Country Home with Outdoor Sleeping, Living, and Dining Rooms,” it had three outdoor sleeping rooms that connected directly to bathrooms and conventional bed chambers, “which later may be used as dressing-rooms . . . as the occupant may desire.”⁵² The article described how canvas shields could be used to replace insect screens for the winter months in cold climates — in this case likely to be that of architect Shilling’s home state of Ohio.

Such articles indicate how regional and climatic difference was flattened by perceived necessities of dwelling, health and comfort as the bungalow migrated eastward and was integrated with suburban growth. They also indicate how many of the “modern” attributes of providing fresh air and healthy living had already been framed and deployed in popular housing patterns just after the turn of the century.

FRESH AIR AND OPEN PLANS: SLEEPING MACHINES AND THE MODERN HOUSE

The usual open window creates a current of air through the room which does not efficiently affect the layers of air above the level of its lintel, below the level of its sill, and in the corners of the room.

— Rudolph Schindler⁵³

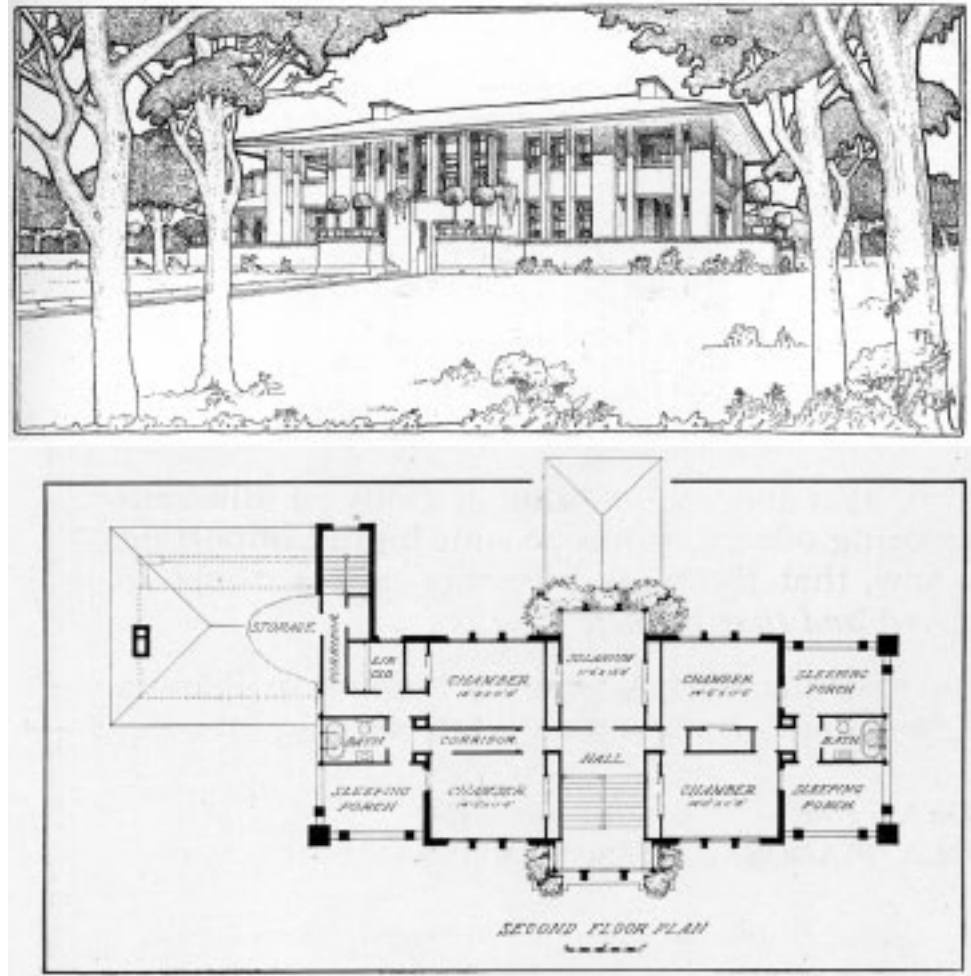
Each individual will want a private room to gain a background for his life. He will sleep in the open.

— Rudolph Schindler⁵⁴

Writing about health and architecture in 1926, the architect Rudolph Schindler called for greater connection between interior and exterior. In doing so, he reinvented a tradition that already existed. He also upended the traditionally marginalized bedroom so that, as the outdoor sleeping room, it might become a flexible site of modern domestic life.

These concepts were not new, and, indeed, had already been popularly presented, even if they were not already publicly well known or widely accepted. Well-circulated journals contained rhetorical information such as the following from *Country Life in America* (May 1909): “‘What difference does it make whether I sleep out of doors on some roof or porch, or have my window open? The result must be the same.’ Well,

FIGURE 9. W.K. Shilling, elevation and plan view of “Country Home with Outdoor Sleeping, Living, and Dining Rooms.” Source: *Country Life in America*, May 1909.



it isn't the same, for a number of very good reasons. No number of open windows will give the same uniform supply of pure air as the outside atmosphere. Inside air is dead unless the wind blows."⁵⁵

Just as the sleeping porch later afforded programmatic flexibility in the bungalow and related house types, the outdoor sleeping room was a multifunctional space that preceded Schindler's early-Modern call for flexibility. Perhaps a function of its open-air conditioning, Dr. Henry A. Cooke's sleeping porch allowed for dining, sleeping, and other activities: "I have slept on this porch for about a year. It serves not only as sleeping-room, but as a general living-room whenever the weather permits. Meals are taken there practically all the spring, summer, and fall. It is also a general lounging-room, writing-room, and playroom for the children — in short a genuine outdoor living-room."⁵⁶

For the architects Greene and Greene, the sleeping porch's possibilities exceeded the confines of the bungalow's modest envelope. In the Gamble House (1908), minor program became main living space, and the porous open-porch elements became the formal anchor for planning the house.

This dramatic spatial planning reflected a trend across the country for conventional bedrooms to become closets and dressing rooms; and for sleeping porches, no longer thought of as adjuncts to the house, to become the primary sleeping areas.⁵⁷ The Gamble House's porches, through their large scale, drew attention to and came to symbolize, quite polemically, the provision of fresh air.

At a far humbler scale, an article by C.G. Hoag in May 1909 presented an amateur designer's homemade "sleeping machine" and provided a summary of attitudes toward traditional open-air domestic living and sleeping. Hoag began by arguing against the "piazza," the traditional open-air court found in southwestern, Spanish-derived typologies. He noted that the piazza would work well for outdoor sleeping "if only it offered the requisite privacy," protection from insects, and access to breezes. He next took on the tent, critiquing the necessity to put it up and take it down, its vulnerability to high winds, its trapping of heat, and its openness to flies and mosquitoes. Hoag then described the design and construction of a "sleeping machine" that served as an "adjunct" to his permanent summer cottage in New England (FIG. 10).



FIGURE 10. C.G. Hoag's design for a "sleeping machine" that "possesses all the good qualities of a tent, with none of the drawbacks." Source: *Country Life in America*, May 1909.

Named for its quality of producing "sleep in wholesale quantities," the eight-foot by five-foot covered platform of planed-lumber construction cost less than \$20. Its variably sized, movable panels captured east winds while also blocking direct morning sun. The west exposure was partially fixed to allow for privacy and to engage infrequent, but welcomed, breezes from that direction. The south wall was completely hinged for maximum shading and light intake, and the north wall was fixed to protect from cold winds and to provide areas for storage. Hoag stopped short of proposing the unit for year-round use, but he did hint at other seasonal functions while emphasizing its flexibility: "It stays 'put'; it is tight in any thunder shower; it will outlast three or four tents; it can be screened

most conveniently; it is perfect in respect to breeze and morning sun; it is movable; and it is very inexpensive."⁵⁸

Schindler also reinterpreted the tent to design a site for "modern living" and outdoor sleeping. His Kings Road house, completed in 1922, included three-inch-wide vertical slots that approximated the parted flap of a tent. A camping trip to Yosemite National Park a few months before breaking ground inspired not only this formal structure but also an archetypal way of living. Schindler modeled Kings Road's indoor-outdoor living spaces on the protected back, open front, and centralizing fire of the campsite. Each of the house's two sleeping porches (also known as sleeping "baskets") was elevated above the otherwise one-story building.

Schindler included sleeping porches in other house designs, but the sleeping porches for the Lovell Beach House (completed 1926) exemplified his beliefs and approach and at the same time confirmed the difficulties with the modern provision of fresh air (FIG. 11). His client, Dr. Philip Lovell, who also commissioned Schindler to write a series of 1926 news articles on the "Care of the Body," sought to live naturally and exercise in the open. The Beach House's most prominent feature, apart from its five structurally imposing concrete frames, was a continuous gallery on its third-level that formed a projecting sleeping porch. Each of the four bedrooms opened out onto this north-facing porch.

In this design, Schindler concretized his vision that ancient customs must be reframed, and that in the modern house distinctions "between the indoors and the out-of-doors will disappear. The walls will be few, thin, and removable."⁵⁹ Nevertheless, by the 1930s the Lovells had glazed the sleeping



FIGURE 11. Rudolph Schindler, *Lovell Beach House*, Newport Beach, California, 1926. Photograph taken in 1968, showing the enclosed third-floor sleeping porch. Source: *Historic American Buildings Survey*. Photo by Marvin Rand.

gallery, citing drainage problems, but perhaps also influenced by the high degree of exposure to the coastal elements. In spite of Schindler's vision, along with its innovations and advances, the sleeping porch's relatively uncontrolled environment could not sustain (or counter) the parallel transformations in mechanical conditioning and the altered expectations of comfort and domestic control over the interior climate.

FROM OPEN-HOUSE AIRINESS TO THE OPEN PLAN'S TRANSPARENCY

It's common sense, that's all. We can get up earlier every morning and feel thoroughly refreshed, which would not be the case if we slept in closed or poorly ventilated rooms. Nature intended us to sleep in the open air, and if her behests were more universally followed there would be less sickness.
— C.M. D'Enville⁶⁰

Some times in all places, and all times in some places, the modern reversion to the primitive idea of sleeping out of doors is far more beautiful in theory than in practice.
— H.S. Adams⁶¹

Never mind if you are no longer young — this will rejuvenate you; and never mind your climate — whatever it is, you have the same air indoors as out, plus a quantity of air which has been used over and over again.
— M.C. Wymond⁶²

At the turn of the century, open-air sleeping grew as a common-sense — and what seemed to be an unavoidably universal — practice for healthy living. It emerged from the nineteenth-century transformation of traditionally accepted concepts of air. At the same time, the sleeping porch affirmed historically documented customs, and the health community advocated fresh air for its curative and preventative properties.

In his 1909 article, D'Enville presented the testimonial of two Woman's College medical students who decided to sleep on the roof of their apartment. His text, as quoted in the first epigraph to this section, reflected one strain of logic found in the sequence of sleeping porch development: a pragmatic approach, with many past permutations, that afforded a promise of wellness to the "modern dweller" and elicited from "open air" a universal cure for disease. But with its modern applications, the provision of fresh air became more rhetorical and emblematic. The title of a May 1909 article in *Country Life in America* proved prophetic and indicative of this transformation: "Sleeping outdoors for health: A phase of modern living that science demands and that is bound to become universal."

Displaced by the science of health and promulgated by commentary in the rapidly growing print media, the "modern reversion to the primitive idea" of open-air sleeping

moved the practice away from its climatic and geographic roots. Initially meant to amplify the qualitative (even poetic) experiences of fresh air, experimentation with the sleeping porch spurred the transition from traditional practices of sleeping outside to the climate-controlled hermeticism of the typical present-day North American house.⁶³ Thus, the invention of systems to manufacture and regulate interior air quality supplanted the immediacy of fresh air and the benefits proven by the science of the time, replacing cross-ventilation with calculated air exchanges. These technologies also inverted the relation between inside and outside; while window screens maintained and allowed for openness, mechanical conditioning called for closure.

But internalization of domestic life was not simply the result of air conditioning systems. Innovations tied to sleeping porches and open windows in the 1910s and 1920s had provided a deeper influence: they taught people to temper air and consequently prepared the way for indoor life's new climate. Fortified with an understanding of air as both phenomenon and idea, inventors and architects sought to perfect the body's positioning on the margins of the house — simultaneously inside and outside. In many of these designs, features of the sleeping porch could be manipulated by the user so that he or she could respond to interior and exterior climatic and environmental conditions. With control of nature as the inflection point, the sleeping porch harnessed fresh air, but also blocked air flow. The science of hygiene corroborated with the science of sleep to absorb the sleeping porch into a technical apparatus that most efficiently delivered the best and healthiest slumber. The sleeping porch soon became a machine for sleeping — emblematic of the larger project of the climate-controlled house.

Driven by the politics of health, the impetus to reinvent traditions of being outside, and the universal promises of modernism, "environmental reform" fused healthful imperative with the efficacy of both human-made and naturally defined environments, and moved beyond climatic awareness to invoke control. The development of the sleeping porch thus moved rapidly from empirically defined forms and processes, drawn from traditional and customary practice, to the idea that climate could be controlled for a society of mass consumers.

Modern architecture's interpretation of the sleeping porch exemplified one strain of this latter epistemological position. At the 1936 World's Fair in New York City, the demonstration House of Glass no.4 combined bedroom and sleeping porch to promote the production of clear, multifunctional glazing by its sponsor, Pittsburgh Glass. In this permutation, the sleeping porch was transformed into a glass box.⁶⁴ Through expansive areas of glazing, the inhabitant could see the exterior context, and the transparent envelope admitted visible sunlight while blocking invisible air. In this design, the glass porch offered a fully "conditioned" relation to air and a visually proscribed connection between in and out.

As a result of the collision of pragmatic climatic response and healthy-living epistemologies in the sleeping porch, traditional connections between climate and health were displaced, reconfigured, appropriated and confirmed. The recasting of knowledge about the dwelling's relation to nature opened up the capacity to manage climate to control its effect on the body — at first accessing and then tempering the air Americans breathed at home. This inversion — as a “turning upside-down” — resulted in a relatively new, and yet ironically old, problem. Interior air can be bad air, and the limitation of air exchanges to five cubic feet per minute with the 1973 oil embargo contributed to what came to be known as “sick-building syndrome” (SBS) and “building-related illness” (BRI). In 2004, the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) recommended air exchanges of fifteen cubic feet per minute, a return to rates typical of the 1950s.

To illustrate continuing concerns about indoor air quality, recent advertisements draw from outdoor sleeping practices and thus conflate the lingering circumstances of the sleeping porch — sleep, relaxation, natural ventilation, and hybrid programs (here, living and working) — with the modern anxiety about volatile organic compounds (VOC). In one advertisement for USG ceiling panels, a man dressed in short sleeves reclines on a hammock strung between two mature trees (FIG. 12).⁶⁵ Cast against a lightly clouded sky and sheltered by a canopy of leaves interspersed with manufactured ceiling panel sections, the prone figure appears to sleep peacefully while luxuriantly inhaling the



FIGURE 12. Advertisement for USG ceiling panels. Source: Architectural Record, March 2008.

scene's fresh air. Here, the domesticated space of sleep provides the site for dispelling fears of bad air (“Zero emissions. Zero worries.”) and for suggesting that the closure of a sealed building can approximate not only the fresh air but also the sense of openness found in time-honored traditions of relaxation and repose.⁶⁶

A further legacy of the sleeping porch lies in the ideas of fresh air and sleeping outside framed within the provisional out-of-door experience and twenty-first-century rhetoric of environmentalism and green building. Like the USG advertisement, recent architectural projects reinterpret traditions and conditions of being outside.

Next door to Rudolph Schindler's Kings Road house, architect Lorcan O'Herlihy has designed Habitat 825, a cluster of townhouses with elevated exterior spaces. The development's adjacency to the earlier Kings Road project underscores the ironies of marketing these units as “new forms for a new lifestyle.”⁶⁷ Schematic plans include areas labeled “private outdoor space” on the periphery of each townhouse. These indistinct zones diagrammatically hint at the provision of fresh air and outdoor living, but contrast with the rest of the floor plan's more thorough rendering — and, perhaps more starkly, with the richly detailed sleeping baskets of Schindler's neighboring project. In O'Herlihy's resolution of these ideas, each unit's outdoor space folds seamlessly out from the broken plane of the envelope, and successfully “incises natural light into living spaces in unexpected moments” (FIG. 13).⁶⁸ But the lifestyle suggested by the project's marketing is not new; and



FIGURE 13. Habitat 825. Lorcan O'Herlihy, architect. Photo by Lawrence Anderson.



FIGURE 14. *Curtain Wall House*. Shigeru Ban Architects. Photo by Hiroyuki Hirai.



FIGURE 15. *Naked House*. Shigeru Ban Architects. Photo by Hiroyuki Hirai.

the outdoor uses of its external spaces, although well-lit, remain primarily in concept (the *idea* of air and openness) — in opposition to the highly programmed experiences of earlier porch traditions and their early-modernist interpretations.

An argument can also be made that the work of Shigeru Ban Architects demonstrates a “turning in” of the sleeping porch, in which the ideas of air and of sleeping outside are obscured by an ironic turn. Two examples of this play on words and building systems are designs for a Curtain Wall House and a Naked House (FIGS. 14, 15). In the former, the entire house can be radically converted from open urban pavilion to hermetic dwelling by closing the glazed wall panels — transforming airiness (comparable to the sleeping porch’s provision of fresh air) to monumental transparency.

The latter project combines the form of a warehouse with the translucent envelope of a greenhouse. Its short north and south window walls afford natural light, while its fifteen-inch-thick long east and west walls are super-insulated with extruded polyethylene noodles and layers of corrugated fiber-reinforced plastic, vinyl-bubble sheeting, and an internal nylon membrane. Here, exposure to the elements — metaphorically understood as the unclothed body’s exposure — occurs *through* a thick, highly insulated skin. Thus, it is *within* this project’s essentially hermetic volume that the experiences of nakedness and airiness occurs.

Meanwhile, residents sleep inside wheeled pods that parallel the way sleeping porches and their global variants once afforded private zones simultaneously attached to and detached from primary living spaces. In Shigeru Ban’s version, however, the sleeping areas must be rolled onto a terrace at the southern end of the house to engage the natural elements. Otherwise, they remain plugged into air conditioners mounted on the walls, which provide conditioned air to each based on individual requirements for comfort.⁶⁹

This twenty-first-century strategy internalizes and consequently inverts the spaces, the systems, and, for that matter, the social conditions that outdoor sleeping space traditionally exemplified. Symbolized by such aphorisms as “outside is the new inside,” the *desire* to sleep outside has replaced the know-how and the ability to do so.⁷⁰ More deeply, it has transformed the spatial framework for “sleeping in the open.”

REFERENCE NOTES

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Conversations generated at the International Association for the Study of Traditional Environment's 2008 conference in Oxford also proved very helpful in framing directions for this research.

1. Rooted in these domestic traditions of the Deep South, literary works recorded the architectonics and the socio-cultural meanings of these indoor-outdoor spaces. Among others, William Faulkner, Walker Percy, Zora Neale Hurston, and Eudora Welty included sleeping porches in their stories.
2. For example, Gertrude Bell described many of these practices of roof-top sleeping in correspondence from her travels to Iran in the 1890s and throughout the first two decades of the twentieth century.
3. H.D. Thoreau, *Walden* (Princeton, NJ: Princeton University Press, 2004), p.57.
4. C.M. D'Enville, "Sleeping Outdoors for Health: Outdoor Sleeping for the Well Man," *Country Life in America*, 16 (May 1909), p.46.
5. Another example of mid-nineteenth-century back-to-nature literature was Edmund Morris's *Ten Acres Enough: The Small Farm Dream is Possible* (1864).
6. "Devotees of Tent Life: Enjoying the Fresh Air in the Adirondack Mountains," *New York Times*, August 12, 1906. The article documented the events and social interactions among esteemed visitors to the Inn. The article began, "Tent life is one of the delightful features at Saranac Inn, where a score of tents and tent cabins dot the shore of the Upper Saranac Lake and are used as day camps and sleeping rooms by guests at the Inn. Tent life is delightfully informal, and the tent colony entertains its friends with impromptu card parties and 5 o'clock teas."
7. M.C. Wymond, "My Outdoor Living and Sleeping-Room," *Country Life in America*, 16 (May 1909), p.93.
8. J. Burroughs, "Outdoor Sleeping for the Nature Lover," *Country Life in America*, 16 (May 1909), p.92.
9. For an intensive analysis of this transformation, see P.C. Baldwin, "How Night Air Became Good Air, 1776–1930," *Environmental History*, Vol.8 No.3 (July 2003), pp.412–29.
10. For additional information, see Belleville's extensive website <http://www.bwire.com>, with historical archives.
11. Baldwin, "How Night Air Became Good Air," p.420. Baldwin also cites the reduction in cost for screening a window: from up to \$6 in 1869 to as little as \$1.25 in 1914. Plastic-coated wire cloth was introduced in 1941, and in late 1950s aluminum screen cloth became available.
12. R. Arsenault, "The End of the Long Hot Summer: The Air Conditioner and Southern Culture," *The Journal of Southern History*, Vol.50 No.4 (Nov. 1984), p.598. Arsenault also notes later scholars' rejection of this position as "monocausal climatological determinism."
13. A.H. Palmer, "Climatic Influences on American Architecture," *The Scientific Monthly*, Vol.5 No.3 (September 1917), p.270.
14. Arsenault, "The End of the Long Hot Summer," p.599.
15. Palmer, "Climatic Influences on American Architecture," p.270.
16. John Adams, from his autobiography, quoted in Baldwin, "How Night Air Became Good Air," p.412.
17. See H. Martineau, "How to Make Home Un-healthy," *Harper's New Monthly Magazine*, 1 (June–November 1850), pp.618–19; quoted in E.C. Cromley, "A History of American Beds and Bedrooms," *Perspectives in Vernacular Architecture*, 4 (1991), p.183. See also Cromley's "Sleeping Around: A History of American Beds and Bedrooms: The Second Banham Memorial Lecture," *Journal of Design History*, Vol.3 No.1 (1990), pp.1–17.
18. Anonymously written in "The Air of Our Sleeping-Rooms" (by a Journal Sister), *The Ladies' Home Journal and Practical Housekeeper*, Philadelphia (March 1884), p.3. *The Ladies' Home Journal* itself can be understood as a vehicle of environmental reform; see L.M. Roth, "Getting the Houses to the People: Edward Bok, the Ladies' Home Journal, and the Ideal House," *Perspectives in Vernacular Architecture*, 4 (1991), p.188.
19. In Stowe's work, see particularly the section titled "Sidenote: Air from the outside. Open your windows, shut your doors."
20. K.U. Clark, "Winter Ventilation of Our Homes," *The Ladies' Home Journal and Practical Housekeeper* (1884–1889) VI, No. 2 (January 1889), p.2.
21. See the May 1909 issue of *Country Life in America*. For a complete discussion of architecture and tuberculosis outside of North America, see Margaret Campbell, "What Tuberculosis did for Modernism: The Influence of a Curative Environment on Modernist Design and Architecture," *Medical History*, Vol.49 No.4 (October 2005), pp.463–88.
22. I. Washburne, "The Tent System of the Boston City Hospital," *The American Journal of Nursing*, Vol.4 No.8 (May 1904), pp.585–87.
23. D'Enville, "Sleeping Outdoors for Health," p.44.
24. *Ibid.*, pp.45,46.
25. K.L. Smith, "Indoor Bed Tents," *Scientific American*, n.s. 101 (December 1909), p.410. Outdoor sleeping was not without stigma. In 1907, Butterfield subtitled an article on outdoor sleeping rooms with the following: "the habit of sleeping in the open air is not for invalids alone — it is a luxury to be enjoyed by everyone who wills . . . so closely has the habit become associated with the life of an invalid that one has but to announce his determination to sleep in the open air and he will at once be covertly pitied as a consumptive in the last stages." See O.E. Butterfield, "Outdoor Sleeping Rooms," *Country Life in America*, Homebuilder's Supplement (February 1907), p.lxi.
26. A.W. Henderson, "Outdoor Sleeping the Year Round," *Country Life in America*, January 1911, p.cxc.
27. *Ibid.*, p.cxc.
28. L.H. Gulick, "How I Slept Outdoors," *Country Life in America*, 16 (May 1909), p.91 (italics in original).
29. *Ibid.*, p.91.
30. Smith, "Indoor Bed Tents," p.410. Mabel Criswell Wymond described head covering that could be used in association with the bed tent: "A cap should be made of material agreeable to the wearer. Nun's veil-

ing lined with very thin wash silk can be kept clean and will suit most people; it should fit closely around the face and have a circular cape to come down to the shoulders. Instead of woolen sheets and much covering, I find greater comfort in a muslin gown with a light-weight, all-wool French flannel kimono worn over it" (p.94). Other authors cite smaller nocturnal temperature swing as one of the main benefits of sleeping outside: "Another reason why we must sleep outdoors rather than indoors with windows open is this: our steam-heated bedroom may have a temperature of 70 degrees when we open the windows and retire, and when we awake in the morning, it will be lowered to 40 degrees. This drop of thirty degrees means that bed covering for seventy degrees will be utterly insufficient for forty degrees, and as a consequence we either begin the night too warm or end too cold" (D'Enville, "Sleeping Outdoors for Health," p.82).

31. Smith, "Indoor Bed Tents," p.423.

32. E.T. Heinson, "Open-Air Sleeping Room," United States Patent Office, application filed December 31, 1925, and patented September 20, 1927; Serial No. 78,616; Patent number 1,643,070. It is interesting to note that the patent lists Heinson's residence as Mountain Iron, Minnesota. Other patents include the following: Joseph A. Conboie's fresh-air "Ventilator" (1942, 1944); Malcolm K. Graham's "Window Ventilator" (1932, 1933); Maggie Milliken McQuarrie's "Canvas Storm Screen" for sleeping porches (1936, 1937); a sleeping porch bed integrated with a parapet wall in Henry Charles Trost's "Building Construction" (1920, 1922); Mary Rutherford Jay's "Sleeping Balcony" that can be added to existing structures (1930, 1932); Orlan S. Vancamp's "Fresh-Air Bed" (1915, 1918); Willard C. James's "Screened Bed Having Vertical Pivots" (1913, 1920); William E. Zingsheim and John L. Stubbs's "Sleeping-Porch" (1917, 1918); Malcolm K. Graham's "Sleeping Porch Curtain" (1932, 1934); Irene Norman's "Sleeping-Porch" (1919, 1920); and Edwin Raymond Culver's "Sleeping-Porch" (1912, 1913).

33. C. Lancaster, *The American Bungalow: 1880-1930* (New York: Abbeville Press, 1985), p.19. The "bungaloes" or "hovels" were resting places along roads in colonial era. Materials for the rest-houses, tempo-

rary shelters, or "caravanserais" included unbaked bricks and thatch, with a veranda typically enveloping the rooms. The shelters were also referred to as "dāk-bungalows," in which the prefix means "post" or "relay." Sleeping porches introduced within the bungalow typology are variously labeled "screen porch," "sleeping room," and "screen sleeping room."

34. For comparison, see G.F. Atkinson, "Curry and Rice," *Country Life in America* (February 1911); and R.T. Jones, *Authentic Small Houses of the Twenties: Illustrations and Floor Plans of 254 Characteristic Homes* (New York: Dover Publications, 1987), reprint of *Small Homes of Architectural Distinction* (New York: Harper, 1929). See also Lancaster's illustrations, particularly those on page 21. Building on such derivations, a 1908 article in *American Architect and Building News* described the "dāk-bungalow" as "a house for travelers, such as are constructed by the Indian government at intervals of twelve to fifteen miles on the highroads in many parts of India."

35. Henry L. Wilson, *The Bungalow Book: Floor Plans and Photos of 112 Houses*, 1910

(Minneola, NY: Dover Publications, 2006), p.3.

36. *Ibid.*, p.4.

37. *Ibid.*, p.55.

38. *Ibid.*, p.57. Almost a decade later, Henry H. Saylor's publication *Bungalows* (New York: McBride, Winston & Company, 1920) demonstrated similar spatial integration within the bungalow's building envelope. In "A House of Many Windows: Rooms filled with sunshine offer varied comforts and conveniences" (4-B-12), the porch and sleeping porch (9'5" x 8'8") are stacked on the house's rear corner. In the as-built illustration for this design type ("home built from design 4-B-12"), both porches have been "incorporated into the body of the house" (p.26). The description follows: "The upstairs sleeping porch is accessible from both bedrooms, and if it is not required for sleeping will make a charming little sitting room. An upstairs room of this character is extremely cozy and often has greater charm and intimacy than is possible to achieve in the more formal living room."

Also, in "A Common Plan Uncommonly Handled." The sleeping porch (11'6" x 10'), with its own closet, is fully integrated within

the rectangular building footprint (p.190).

39. Wilson, *The Bungalow Book*, p.95.

40. *Ibid.*, pp.100-101. In No.496, Wilson stacks the sleeping porch on top of the main level screen porch, both of which read as attachments to an otherwise integrated rectangular plan (p.65). In No.658R, the screened sleeping room extends from the rear corner towards the back and side of the house, capturing breezes for cross-ventilation but at the same time creating a spatial relationship with the front porch and thus adding a degree of public connectivity to the open-air room (p.102). In No.540, a more formally integrated "open-air sleeping room" is paired with a balcony, with the former matching the first-floor kitchen's walls and the latter lining up with a screen porch and small lavatory (p.71).

41. See No.627 on page 88 and No.735 on page 134.

42. Wilson, *The Bungalow Book*, pp.122-23.

43. *Ibid.*, p.129.

44. The full title of Saylor's work is *Bungalows: Their Design, Construction and Furnishing, with Suggestions Also for Camps, Summer Homes and Cottages of Similar Character*.

45. Saylor, *Bungalows*, p.81. Saylor notes that the sleeping porch follows the screened porch's similar movement from west to east, not addressing the sleeping porches of the American South.

46. *Ibid.*, p.31.

47. *Ibid.*, p.19. Saylor continued in a later section, "Needless to say, the tent-house makes an ideal outdoor sleeping-room when arranged for that purpose, but its application to homes intended for other than merely occasional use is necessarily limited" (p.33).

48. Jones, *Small Houses of Architectural Distinction*, 1929, p.20.

49. *Ibid.*, p.49. The porch (7'8" x 10'9") latches onto a side bedroom, its extension into the room forming two flanking closets.

50. *Ibid.*, p.127.

51. Sinclair Lewis's novel *Babbitt* (1922) begins on the sleeping porch, which mirrors the main character's middle-class life: "He seemed prosperous, extremely married and unromantic; and altogether unromantic appeared this sleeping-porch, which looked on one sizable elm, two respectable grass plots, a cement driveway, and a corrugated iron garage." (New York: Penguin, 1996, p.2) For another com-

parison to Babbitt's house, see also "Another Variation of Dutch Colonial" — Design 6-A-75 in Jones's publication.

52. W.K. Shilling, "Country Home with Outdoor Sleeping, Living, and Dining Rooms," *Country Life in America*, 16 (May 1909), pp.71–72.

53. He goes on to compare this stratification to warm and cold ocean currents that sometimes do not mix for thousands of miles ("Care of the Body," *Los Angeles Times*, March 14, 1926). Note that Schindler is critiquing sources such as *Ladies' Home Journal* and, in a sense, reinventing domestic tradition.

54. Schindler, "Care of the Body," *Los Angeles Times*, May 2, 1926. Before this statement, Schindler invoked meaningful ritual as an antidote to "instigated fashion": "Our own everyday actions much achieve the dignity of the past ceremonials." And then later: "The house will be a form-book with a song, instead of an irrelevant page from a dictionary of dead form dialects. And life will regain its fluidity."

55. D'Enville, "Sleeping Outdoors for Health," p.46. He also argues that it doesn't matter whether the inhabitant resides in city or country; the goal of fresh air transcends location (p.82).

56. *Ibid.*, p.90.

57. See, for example, Jones's "Brick for the Large Small House" (Design 6-B-9), in which the sleeping porch at 11'6" x 8'3" is larger, or at least better proportioned, than the bedroom (7'10" x 13' and with a single window) from which it extends.

58. C.G. Hoag, "Sleeping Machine," *Country Life in America*, 16 (May 1909), p.102.

59. Schindler, "Care of the Body," *Los Angeles Times*, May 2, 1926. Schindler's viewpoint is framed around a paradox: sleeping out of doors certainly occurred previously, but how it occurred had changed. Many doctors saw the practice as essential to healthy living,

modernists appropriated it as something new, and many in the dwelling public sought closeness to nature. Schindler wrote: "Contrary to the custom of our ancestors, we are more and more aware of the beauty and healthfulness of sleeping out-of-doors. The bedrooms are slowly degenerating into dressing-rooms and our beds are placed on an open porch." ("Care of the Body," *Los Angeles Times*, March 21, 1926.)

60. D'Enville, "Sleeping Outdoors for Health," p.46.

61. H.S. Adams, "Pretty Nearly Sleeping Outdoors," *Country Life in America*, Homebuilder's Supplement, March 1911, pp.373–75.

62. Wymond, "My Outdoor Living and Sleeping-Room," p.95.

63. This process also follows transformations in the inhabitant's relation to the house. Just as the sleeping porch became a multifunctional space, many zones of the "modern" house, particularly the bedroom, became sites for programmatic flexibility. The sleeping porch transformed how early twentieth century home-dwellers thought about living in a house. Does the sleeping porch imply an expansiveness that occurs before a contraction in domestic space?

64. There are many other modernist sleeping porches from this time period, including Robert Mallet-Stevens's and Pierre Chareau's design for the *chambre de plein air* in the Noailles House at Hyères (1923–28).

65. In the Spring and Fall of 2008, the United States Gypsum Company's advertisement ran in many journals including *Architectural Record*, where it appeared facing an article on the Solar Decathlon House (see p.149 of the March 2008 issue).

66. An interesting counterpoint to concerns about sickness generated by sealed buildings is the passive house design first proposed by Wolfgang Feist in the early 1990s.

Subsequent houses associated with Darmstadt's Passivhaus Institut achieve uniformity of air and temperature with a highly efficient heat exchanger, south-facing windows, and minimal loss of air under pressure. Limited to regions without substantial cooling loads, the airtight houses avoid SBS and BRI by way of a sophisticated central ventilation system. In contrast to the traditional sleeping porch's open connection to the environment, the relation between body and external air is mediated by superinsulated glazing, filters, and ventilation systems, and is internalized and translated into a more intimate connection between internal air and body. Along with solar gain and appliances, the occupants themselves contribute to the minimal heat needed to warm the house's internal spaces.

67. The Habitat 825 proposal and marketing description can be found at the website <http://www.habitatgroup.com/habitat825.html>. See also the July 2008 issue of *Architectural Record* and the January 10, 2008, *New York Times* article "Remaking the Condo with Light and Air" for a discussion of the completed project.

68. For the complete description and imaging of Habitat 825, please see Lorcan O'Herlihy's website at <http://www.loharchitects.com>.

69. Here, the client's aspirations for flexibility, openness, and targeted climatic conditioning characterize the house's protected "nakedness." The four, nearly-square mobile sleeping rooms, based on tatami modules, each provide about sixty square feet of living area. With their open ends, the rooms approximate the configuration of the main rectangular volume. The Naked House was completed in 2000.

70. This aphorism appeared on the cover of the January 2008 issue of McGraw Hill's *GreenSource* magazine.