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A Vernacular for Lincoln, Nebraska

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A Vernacular for Lincoln, Nebraska

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Abstract:

The contemporary vernacular architecture in the United States is a product of industrialization and globalization. One homogenous, mass produced vernacular has dominated nationwide and overshadowed the unique, contextual, and regional designs of the past. While the contemporary, industrialized vernacular has led to increases in the quality of life for many in the developed world, it has also left in its wake a homogenous and placeless environment devoid of environmental sensitivity or cultural references. There is a need for a set of new vernaculars that embrace modern building technologies while simultaneously responding more directly to local climatic needs and facilitating a renewed sense of regional identity and culture. These new vernaculars will be also crucial in the coming decades as a means of providing more sustainable designs that account for their environmental context without the need for energy intensive mechanical climate control systems. This paper seeks to identify the elements one of the aforementioned new vernaculars as it pertains to the context of Lincoln, Nebraska. By studying the history of design in the region and the climate conditions present in Lincoln, I was able to identify four design elements that respond well to the unique challenges presented by the Lincoln, Nebraska context and would contribute to a more contextual vernacular: summer shading, winter wind obstruction, natural ventilation, and solar heat intake.

Key Words: Nebraska, Vernacular, Architecture

Appreciation

Special thanks to my advisor Zachary Porter for his help both on this paper and throughout my education. You have played a crucial role in my undergraduate education and I am incredibly grateful.

Thanks also to my parents for being unconditionally supportive as I navigate my college career. Your love and support means the world, and I would not have been able to accomplish what I have without you both.

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The Current Vernacular

The term vernacular as it applies to architecture came into use in the nineteenth century to refer to buildings predating the industrial era. Over time, the term has grown to encompass all buildings that are most often neglected by traditional architectural history. Generally speaking, these are buildings that do not fall under any obvious architectural style or movement.[1] As of now, most buildings in America fall into this broad category, creating a broad "American vernacular" that perpetuates itself across the country. The American vernacular as it exists today can be described more simply as consumer architecture.[2] As a society, Americans have found a way to commodify every aspect of their lives and architecture is no exception.

Historically, vernacular architecture was reflective of a culture's need to respond to a certain set of demands defined by factors such as their environment, their social organization, or their livelihoods.[3] Today, vernacular architecture is primarily influenced by marketability. Much of modern vernacular architecture is occupied by trying to sell the products or services it houses, or in the case of literal houses, by trying to sell itself.[4] Developers implement trendy, standardized design elements that are easier to market and have a high chance of attracting buyers. This level of homogeneity becomes clear when comparing the floor plans of nationwide builders used in communities all over the United States. Despite dramatic regional differences between California, Maryland, Iowa, and Florida, one builder sells virtually the same home design in all four locations.

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[1] Dell Upton, "The Power of Things: Recent Studies in American Vernacular Architecture," *American Quarterly* 35, no. 3 (1983): p. 268, https://doi.org/10.2307/2712651.
[2] John Chase, "Unvernacular Vernacular: Contemporary American Consumerist Architecture," *Design Quarterly*, no. 131 (1986): p. 5, https://doi.org/10.2307/4091170.
[3] Ibid
[4] Ibid

The only meaningful difference between any of the homes in question is their front facade. Each region has its own unique theme tacked on the front of these otherwise identical tract houses. Ironically, these themes are often loosely rooted in the historic vernacular architecture of the region, implying the use of contextual design elements where none exist.

It is reasonable to conclude that one single design could never function optimally in four very distinct environments, but technology has allowed developers to cheaply and easily overcome this challenge. The advent of central heating and air conditioning systems in the twentieth century provided a crutch upon which even the most contextually insensitive design can provide comfort to its occupants, albeit at a markedly higher energy cost.

For most of human history, the design of vernacular architecture was a dialogue between people and their environment. This practical regard for climate and function created an architecture that is described by some as more beautiful, more authentic, or higher quality than the contemporary vernacular.[5] The modern builder often approaches not with the mindset of “What can the land do for me?” but rather “What can I do to the land?”[6] Common architecture is reduced to a technology, imposed upon the landscape and sold to the highest bidder. The modern vernacular of American architecture often results in inadequate and lower quality structures that increase the maintenance and

[5] Hilde Heynen, “Anonymous Architecture as Counter-Image: Sibyl Moholy-Nagy's Perspective on American Vernacular,” *The Journal of Architecture* 13, no. 4 (2008): p. 469, https://doi.org/10.1080/13602360802328008.
[6] Ibid, p. 473

operating costs for the owner.[7] The lowered functionality of generalized, market-driven architecture also often leads to users altering structures to fit their needs more directly.[8]

All of this paints a rather pessimistic view of the current vernacular of American architecture, which is not wholly my intent. I do not despise the contemporary built environment. On the contrary, I think that the current market for mass architecture provides a standard of living for its users that far surpasses that of almost every previous generation of humanity, no matter how contextual their construction was. Modern technologies and materials have allowed for huge leaps forward in the quality of the built environment over the last century. It would be impossible for me to argue that a sod house is superior to virtually any modern dwelling. My main critique is that, while the modern vernacular provides a lot of benefit, it also leaves much to be desired.

The modern vernacular is no longer reflective of the cultural or ecological conditions of the site on which it resides. Artificial lighting and air conditioning systems render a space placeless, immune to the unique fluctuations of local lighting and climatic conditions.[9] This placelessness transcends beyond the interior with the common practice of flattening irregular topography to create a standardized site condition capable of accepting a universal design.[10] When these “advances” towards a placeless, modern existence are allowed to go on unchecked, society is left with a rather bleak and commercial environment. Hills, forests, and streams are razed, leveled,

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[7] Ibid, p. 478
[8] Dell Upton, “The Power of Things: Recent Studies in American Vernacular Architecture,” *American Quarterly* 35, no. 3 (1983): p. 275, https://doi.org/10.2307/2712651.
[9] Kenneth Frampton, “Toward a Critical Regionalism: Six Points for an Architecture of Resistance,” in *Anti-Aesthetic: Essays on Post Modern Culture*, ed. Hal Foster (Port Townsend, WA: Bay Press, 1983), p. 27.
[10] Ibid, p. 26

and paved until people are disconnected from the natural environment that is so crucial to their well being. Billboard architecture dots the landscape with box stores and franchise restaurants until people can no longer identify with the community in which they live. This vernacular of placeless homogeneity must be the unavoidable by-product of the transition to the modern era, right? Surely a society cannot move into the future while simultaneously clinging to the methods of the past?

The tendency of the modern vernacular, and of contemporary culture as a whole, to wipe out all traces of history or context in favor of technological progress and standardization has become so commonplace that to many fail to question if there is indeed another way. In 1981, however, Kenneth Frampton did just this in his essay, “Toward a Critical Regionalism: Six Points for an Architecture of Resistance”. Before the end of the twentieth century the impacts of modernization were already becoming clear. Globalization had taken root and a universal culture was already dominating the landscape. In this rapidly developing landscape, it became difficult for the seeds of a unique culture to take root.[11] Frampton called for a new method of modernization, another way of doing that strikes a compromise between the relentless march of modernization and the maintenance of local culture and tradition. This new method, critical regionalism, calls for the supplementation of industrialized building systems with elements derived from the unique qualities of a particular place such as light quality, climate, or topography.[12] Frampton believed that only a middle ground stance between the old and the new design methodologies such as this, “has the capacity to cultivate a

[11] Ibid, p. 17
[12] Ibid, p. 20

resistant, identity-giving culture while at the same time having a discreet recourse to universal technique."[13]

While the development of a more locally-conscious vernacular certainly has potential to reinvigorate the built environment with a unique sense of identity and culture, Frampton's ideas on critical regionalism are also relevant in addressing the ecological, economical, and political challenges facing the field of architecture today, forty years later.[14] For instance, in light of the ecological transition taking place as a result of climate change, contextual design practices are becoming necessary to develop more sustainable building typologies. A vernacular based on climate, context, and local material and construction culture has value today not just because these values oppose globalization, but because, as BC Architectects of Brussels puts it, "of their importance for the long-term wellbeing of humankind."[15]

Upon recognizing the need for a new vernacular that more adequately reflects the distinct characteristics of a place, I noticed a general lack of research into the design considerations relevant in different regions. Often, the task of finding contextual design strategies is left up to the architect on a per project basis. Architects practicing long enough in one region may develop their own innate sense of the region's idiosyncrasies, but this does little to benefit the profession as a whole. A series of studies consolidating some of the contextual design considerations of specific regions would no doubt go far in aiding architects in implementing the values of critical regionalism into a more localized vernacular architecture.

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[13] Ibid
[14] Veronique Patteeuw and Lea-Catherine Szacka, "Critical Regionalism for Our Time," *Architectural Review*, November 22, 2019, p. 94.
[15] Ibid, p. 96

Before establishing the goals and methods in this study I feel that it is important to briefly mention a few works that dive further into the theory of vernacular architecture than I will in this paper. “Houses without Names: Architectural Nomenclature and the Classification of America’s Common Houses” by Thomas Hubka[16] is a book that addresses the lack of vocabulary for describing the most common, working class housing typologies present in the United States. Hubka advocates for a broader reach of architectural interpretation methods to include these common houses so that their impact on American culture is not ignored. Another title, “American Vernacular: Buildings and Interiors, 1870-1960” by Herbert Gottfried,[17] interprets the modern vernacular architecture as it develops with the industrialization of building materials. Gottfried also identifies key elements of the modern American vernacular and describes their origins.

In an effort to contribute to a more contextually sensitive design landscape, the ultimate goal of this study is to identify relevant design characteristics of a new vernacular for Lincoln, Nebraska. In order to limit the scope to a more manageable level, I will focus primarily on single family residential architecture. This typology makes up a large percentage of the built environment in Lincoln and thus carries a disproportionate influence over the city’s character. That is not to say, however, that the resultant vernacular elements do not apply across multiple building types. In fact, since they will be rooted heavily in the context of the city of Lincoln, they might prove relevant in many other project types. Rather, I simply mean to acknowledge that, due to my

[16] Thomas C. Hubka, *Houses without Names Architectural Nomenclature and the Classification of America's Common Houses* (Knoxville, TN: University of Tennessee Press, 2013).
[17] Herbert Gottfried and Jan Jennings, *American Vernacular Buildings and Interiors 1870-1960* (New York, NY: W.W. Norton & Company, 2009).

focus on the single-family residential typology, various other building typologies in Lincoln may stand to benefit more or less from the design elements I am proposing in this paper.

I will begin by looking into the history of past vernacular constructions in the Nebraska region to gain an in-depth understanding of how previous generations responded to the peculiarities of the region in a time before standardization. I will then analyze the environment to better understand how to respond to the unique challenges it presents. Armed with this knowledge I will then be able to propose a series of vernacular design considerations that directly acknowledge and complement the eccentricities of Lincoln, Nebraska.

The History of the Nebraska Vernacular

The first people to live in Nebraska were rotating tribes of Native Americans. Groups of Native Americans came and went over the centuries as the plains cycled through wet times and droughts.[18] The earliest of these native people groups were nomadic, such as the Lakota who lived in tepees on the plains and followed the animal herds they hunted for food.[19] Later people groups however, settled in more permanent villages. Tribes such as the Omaha and Pawnee built villages of earth lodges, primarily along Nebraska's many rivers. These lodges were circular, and primarily faced East (presumably to let in the light from the morning sun). The earthen lodges were held up by post and lintel structures interwoven with smaller branches. Sod was then overlaid to form a windowless facade with a single roof vent for smoke ventilation and light intake.[20] These earthen native villages were likely the inspiration for the sod homes of early American settlers.

Early settlers to the Nebraska Territory found themselves in an environment that was incredibly foreign to that which they left behind in the Eastern United States and Europe. In eastern Nebraska, along the Missouri River and its tributaries, the first pioneers were able to source enough wood locally to build the more traditional log cabin homes they were familiar with. As new settlers continued west, however, the number of trees quickly diminished to virtually zero and what few groves of trees could be found were often soft cottonwoods that warped badly as they dried out.[21] These early

[18] Frederick C Luebke, *Nebraska: An Illustrated History* (Lincoln, NE: University of Nebraska Press, 2005), p. 11.
[19] Ibid, p. 12
[20] Ibid, p.14
[21] Ibid, p. 123

Nebraskans adapted to their new environment by drawing upon the only thing the prairie provided for them in abundance: sod.

Sod houses quickly became the default first shelter for most settlers across the Great Plains region. Rows of sod were cut into strips one and a half feet wide and three feet long. These strips were then layered in parallel rows with seams staggered like bricks, creating incredibly thick walls of earth.[22] The uniformity of these sod strips was vital to the structural integrity of the house, as strips with varying thicknesses would settle unevenly and compromise the structure.[23] After completion of the walls, wood poles were used to frame out a roof. This rough framing was then thatched with prairie grass and covered with sod creating a somewhat ineffective roof. These roofs would absorb rainwater and thus become considerably heavier, sometimes to the point of collapsing. Further, a sod roof might drip muddy water for days after a storm as the soil drained its retained moisture.[24]

These sod houses were initially intended to be temporary dwellings until a frame house could be afforded. Beyond their leaky roofs, they were dark, often lacked adequate ventilation, were difficult to keep clean, and attracted pests.[25] Despite all of this, sod houses actually provided a lot of contextual benefits that prompted their transition to becoming more permanent farm dwellings. The thermal mass of sod houses allowed them to stay cooler in summer and warmer in winter. Further, sod was much less likely to be blown over by the strong prairie winds. Sod houses were also

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[22] Ibid, p. 124
[23] Everett Newfon Dick, *The Sod-House Frontier, 1854-1890: A Social History of the Northern Plains from the Creation of Kansas & Nebraska to the Admission of the Dakotas* (New York, NY: D. Appleton-Century Company, 1937), p. 113.
[24] Ibid, p. 114
[25] Ibid, p. 115

fireproof, an important advantage over frame houses when confronted with the constant risk of prairie fires.[26] As railroads spread across the region, lumber was able to be brought into the region. With new lumber yards popping up in many rural towns, farmers who had the means to do so began constructing new, frame houses. Frame houses were viewed by many at the time to be superior to sod houses as well as status symbols.[27]

The new frame farmhouses were a product of farmers adapting standard construction systems to meet their individual needs.[28] Farmers built houses focused on utility first and foremost. Many of these houses were built in stages, allowing families to adapt their home as their needs changed and as they were financially able to do so.[29] Rather than clearing the landscape and forcing trending design styles onto it, most farmers sought to adapt to the local conditions to maximize their own wellbeing.[30]

Many farmers, however, opted instead to make improvements upon their existing sod houses. The addition of prefabricated doors and windows, as well as new wooden floors, helped to make sod houses more livable. The replacement of sod roofs with hipped, framed roofs also served to dramatically improve the livability and longevity of sod houses by keeping the interior dry and distributing weight more evenly across the

[26] Ibid, p. 115
[27] Frederick C Luebke, *Nebraska: An Illustrated History* (Lincoln, NE: University of Nebraska Press, 2005), p. 124.
[28] Dell Upton and John Michael Vlach, *Common Places: Readings in American Vernacular Architecture* (Athens: University of Georgia Press, 1986), p. 443.
[29] Ibid, p. 438
[30] Ibid, p. 444

walls than a gabled roof which allowed the house to settle more evenly.[31] The addition of plaster to smooth and seal sod walls also did wonders to improve occupant comfort.[32]

As infrastructure and lumber supply chains expanded and the frontier age in Nebraska largely came to a close in the 1890s, most new construction defaulted to the balloon frame construction techniques common in other parts of the United States. Existing sod houses remained a fixture in the poorest rural areas for some time, but in the twentieth century other forms of construction replaced sod and the building method became a relic of the past. As American culture homogenized in the 1900s, the architectural landscape of Nebraska became more and more congruent with that of the rest of the country. Cheap, framed suburban housing became the norm, and standardization of building materials and methods all but eliminated most regional design differences beyond ornamentation. Nebraska today heavily subscribes to the nationalized American vernacular that depends on property insurance and mechanical systems to compensate for regional design inadequacies.

[31] Frederick C Luebke, *Nebraska: An Illustrated History* (Lincoln, NE: University of Nebraska Press, 2005), p.127.
[32] Everett Newfon Dick, *The Sod-House Frontier, 1854-1890: A Social History of the Northern Plains from the Creation of Kansas & Nebraska to the Admission of the Dakotas* (New York, NY: D. Appleton-Century Company, 1937), p. 113.

Local Environment

Due to its far inland location, Nebraska is subject to dramatic seasonal weather shifts that make designing in the region more challenging. Nebraska's position between the Rocky Mountains to the West and the Appalachian Mountains to the East makes it effectively a wind tunnel for south bound polar winds and north bound tropical winds. As these winds collide, the polar jet stream that separates them fluctuates north and south across the Midwest creating volatile and quickly changing weather patterns that are highly subject to outside influence.[33] As warm, humid winds from the Gulf of Mexico gain the upper hand, Nebraska will see rising temperatures and increased precipitation. When the cold, dry polar air pushes back, however, Nebraska experiences cold snaps. This fluctuation can happen rapidly, causing dozens of degrees in temperature variation in the course of just one day.[34]

The annual variations in these two opposite winds also mean that Nebraska's seasonal changes are quite dramatic. Bitterly cold and dry winters often necessitate design solutions that stand in direct opposition to those necessitated by the hot and humid summers. To put this change into perspective, Nebraska's annual average high is around 88 degrees Fahrenheit and its average annual low is 15 degrees Fahrenheit. These numbers can be misleading though, as they are just averages. It is not uncommon to see summer temperatures in some years approach, and sometimes

[33] Nebraska Game and Parks Commission, *NEBRASKAland Magazine's Weather and Climate of Nebraska* (Lincoln, NE: Nebraska Game and Parks Commission, 1996), pp. 18-19
[34] Ibid, p. 22

exceed, 100 degrees Fahrenheit. It is also not uncommon to see winter temperatures dip below zero degrees Fahrenheit for days or weeks at a time.[35]

Beyond temperature extremes, the battle of polar and tropical air over Nebraska brings about extreme weather events on a regular basis. Thunderstorms, tornados, and blizzards are all regular fixtures in the lives of Nebraskans and their buildings must be built to withstand them. Thunderstorms batter the region with damaging winds, hail, flash flooding, and lightning, yet are mild compared to their destructive offspring the tornado. Tornados can create wind speeds of over 200 miles per hour,[36] causing immense and potential fatal damage to cities in the state. While many tornadoes do not exceed 165 mph, such high wind speeds put structures under immense shear stress that can cause them to fail.[37] Blizzards also put structures in Nebraska under stress. Blizzards bring with them the strong wind characteristic of thunderstorms, but rather than rain and hail, they drop snow. So much snow, in fact, that if not accounted for it can cause weaker roofs to collapse under the weight.

When trying to gain a better understanding of design challenges posed by the Nebraska climate, I felt an analysis of the vernacular architecture of similar climates in other parts of the world would be beneficial. The eastern portion of the state is classified as a Köppen climate classification Dfa, or humid continental, climate.[38] This climate type is uncommon outside of North America, but a small region of the Dfa climate type

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[35] "Climate Consultant 6.0," (University of California Los Angeles, 2020), http://www.energy-design-tools.aud.ucla.edu/climate-consultant/request-climate-consultant.php.
[36] "Enhanced Fujita Tornado Damage Scale," Enhanced Fujita Tornado Damage Scale (National Oceanic and Atmospheric Administration, 2006), https://www.spc.noaa.gov/efscale/ef-scale.html.
[37] Nebraska Game and Parks Commission, *NEBRASKAland Magazine's Weather and Climate of Nebraska* (Lincoln, NE: Nebraska Game and Parks Commission, 1996), p. 37.
[38] Hylke E. Beck et al., "Present and Future Köppen-Geiger Climate Classification Maps at 1-Km Resolution," *Scientific Data* 5, no. 1 (2018), https://doi.org/10.1038/sdata.2018.214.

exists in the Tohoku region of northern Japan. Builders in this region of Japan incorporated many contextual design elements in response to their environment that might transfer well to Nebraska.

The japanese responded to their climate in a variety of ways. Structures were designed with wide eaves in order to protect windows from direct sunlight and rain.[39] South facing engawa, or verandas, were oriented to take in winter sunlight and warm interior spaces.[40] Layers of blinds and sliding doors were used to help improve interior comfort by offering varying degrees of ventilation and light infiltration. Roll up blinds, or sudare, blocked the hot sun while allowing air to pass through and cool interior spaces. Translucent doors, or shoji, allowed warming light in while blocking cold winds and opaque doors, or fusuma, blocked both light and air when necessary.[41] Trees and trellises were also used so that the plant's leaves would provide shade in summer but fall in winter allowing in warm sunlight.[42]

The interiors were also designed to take advantage of their environment. Light colored floor finishes reflected diffused sunlight into a room, improving daylighting conditions.[43] Space under the floor for air to flow kept rooms warmer in winter by allowing colder air to sink out of the room.[44] Further, raw wood finishes absorbed the summer humidity from the air dehumidifying the interior spaces. Come winter, the wood would then release this moisture again into the dry winter air, serving the opposite function of humidifying the space. Earthen walls covered in clay or plaster had similar

[39] Courtney Angen (Connecticut College, 2013), p. 44.
[40] Ibid, p. 43
[41] Ibid, pp. 43-44
[42] Ibid, p. 44
[43] Ibid, p. 43
[44] Ibid, p. 65

humidity adjusting properties and were both long lasting and recyclable.[45] Interior ventilation was a key part of comfort, and most buildings made use of vents over doors to allow passive air flow even with the doors closed, if desired.[46] In more urban contexts, machiya homes took advantage of corridors from the front to the rear of the house to provide cross ventilation, and interior courtyards that provided both vertical air circulation to second floor spaces and a means for hot summer air to rise out of the house.[47]

Beyond weather, the soils in Nebraska provide some of the only suitable building materials in the predominantly treeless region. The original settlers used sod as a construction material as discussed previously, but sod would never pass the test of modern living standards. The majority of Nebraska's soil is made up of a silty clay soil[48] that, on its own, is not an ideal building material. When silty clay is combined with a stabilizer such as lime, sand, or gravel however, it becomes suitable for rammed earth and pressed block construction.[49] This suitability of the soil for the manufacture of building materials is made even more evident by the presence of a brick manufacturing industry in Lincoln. The local soil may very well have something to offer in the form of durable and cheap building material.

[45] Ibid, p. 72
[46] Ibid, p. 79
[47] Ibid, p. 55
[48] Web Soil Survey (United States Department of Agriculture), accessed March 13, 2021, https://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx.
[49] Lyle A Wolfskill, Wayne A Dunlap, and Bob M Gallaway, *Handbook for Building Homes of Earth* (Washington, D.C.: Peace Corps, Information Collection and Exchange, 1981), p. 24

Elements of a New Vernacular

A. Summer Shading

During Nebraska's brutally hot summers, solar heat gain is an unwelcome occurrence. Currently, the most common ways to minimize the heating of interior space involve either mechanical systems or supplemental shading devices. Air conditioners are a mechanical crutch to compensate for climatically obtuse designs that are both costly and energy intensive to run. This has impacts both for building owners and the environment as a whole thanks to the greenhouse emissions associated with increased energy consumption. Other solutions such as applied window awnings or the use of curtains and blinds work well to block sunlight, but detract from the architectural integrity of a building or block views to the outdoors respectively.

A more contextual design should account for adequate shading of windows during the summer months. Wide eaves and other architectural forms designed to block the high summer sun angles are very effective at preventing heat intake. The use of deciduous trees also serve to provide shading in the summer, while losing their leaves in the winter to allow the heat from the sun to warm those same spaces. (Fig. 1) Trellises with deciduous plants grown on them can also be used to similar effect.

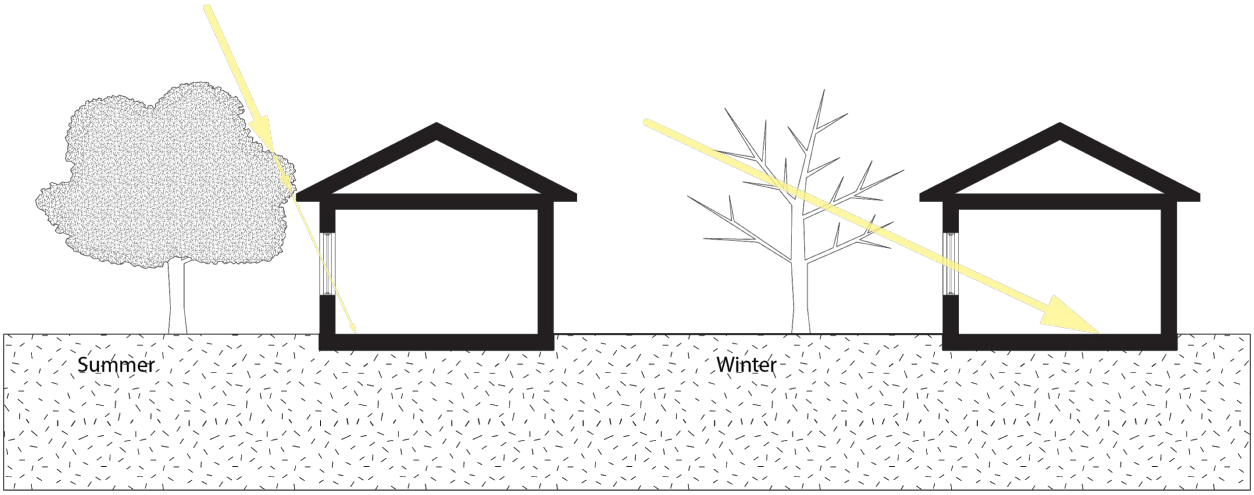

Figure 1. Seasonal Tree Shading

B. Winter Wind Obstruction

During the winter, winds from the north bring large amounts of cold, dry air into the region. This wind can pierce through leaky doors or windows causing unwanted heat loss and consequently higher heating demand. For this reason, minimizing apertures on northern facing facades is ideal in order to prevent unwanted infiltration of cold air to a building. (Fig. 2) Entrances should especially be avoided on a north facade. The opening and closing of doors already cause heat loss, so keeping entrances focused on the facades protected from northern winds can help to minimize this effect.

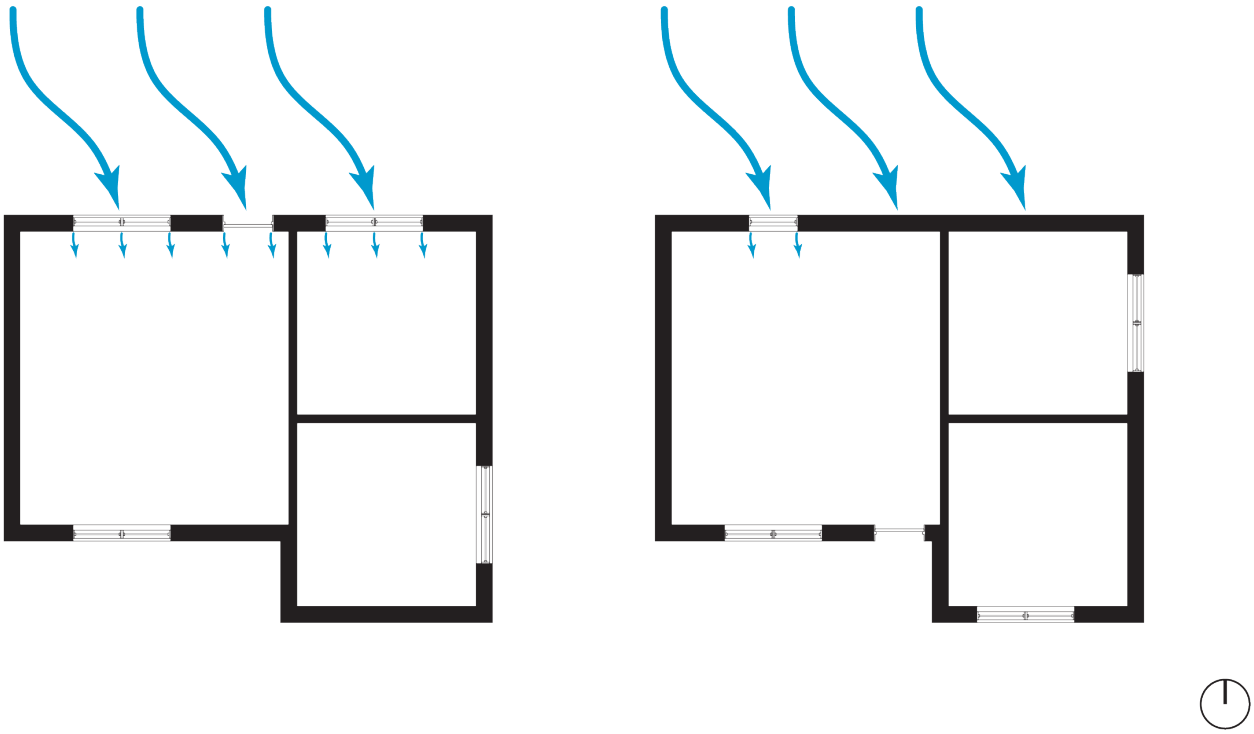

Figure 2. Winter Wind Infiltration

Along this same line of thinking, the implementation of vestibules in a design can help provide an extra barrier between the cold outside and warm inside that notably minimizes heat loss. Current design tendencies only implement vestibules in commercial settings, but the benefits of vestibules transcend building typologies and there are many historic cases of their implementation in.

C. Natural Ventilation

While air infiltration is generally best avoided in the winter, during the summer natural ventilation can actually be beneficial. By using a Climate Consultant 6.0 simulation calibrated to the weather conditions in Lincoln, Nebraska, I found that a comfortable interior environment could be maintained for 81% of the year through the use of natural ventilation to cool a building, assuming adequate heating for the entirety of the winter months. Due to the extreme nature of Nebraska's heat, an air conditioner

is still going to be necessary, but design meant to promote natural ventilation can minimize the days where it is needed.

Merely opening windows is the easiest way to achieve ventilation, but there are other design choices that can improve the cooling effects. Vents over interior doors can allow for cross breezes to flow through a building even when doors are closed. Further, a vertical opening between floors and/or the use of operable skylights or attic vents will allow summer heat to naturally rise out of the building, drawing cooler air through open windows or up out of a basement. (Fig. 3) Lastly, the implementation of exterior water features near windows can create an evaporative cooling effect that helps to decrease the temperature of summer air as it flows through open windows. It is best to bear in mind, however, that the humidity of summer air in Nebraska does limit the effectiveness of evaporative cooling compared to drier climates.

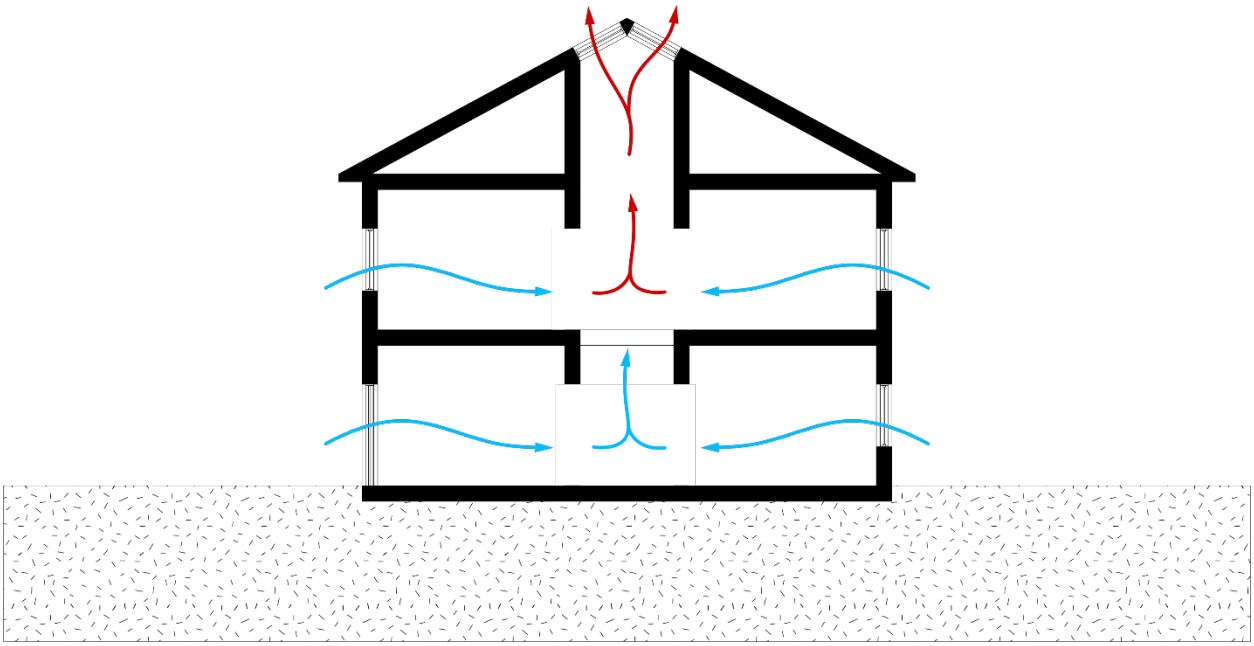

Figure 3. Cooling Air Flow

D. Solar Heat Intake

While during the summer it is imperative to prevent sunlight from infiltrating a building, during the winter this light is extremely welcome. South facing windows will catch the most winter sunlight, so a bias towards apertures on this facade can aid in heat gain. When designing shading elements for the summer, it is important that one is careful to still allow the lower angle of winter sunlight to pass under shading elements unobstructed. Interior materiality can also improve the effectiveness of solar heat gain in winter. The use of darker interior finishes with high thermal masses, such as concrete or tile, will absorb and retain heat from direct sunlight during the day and release this heatovernight to help regulate interior temperatures. (Fig. 4)

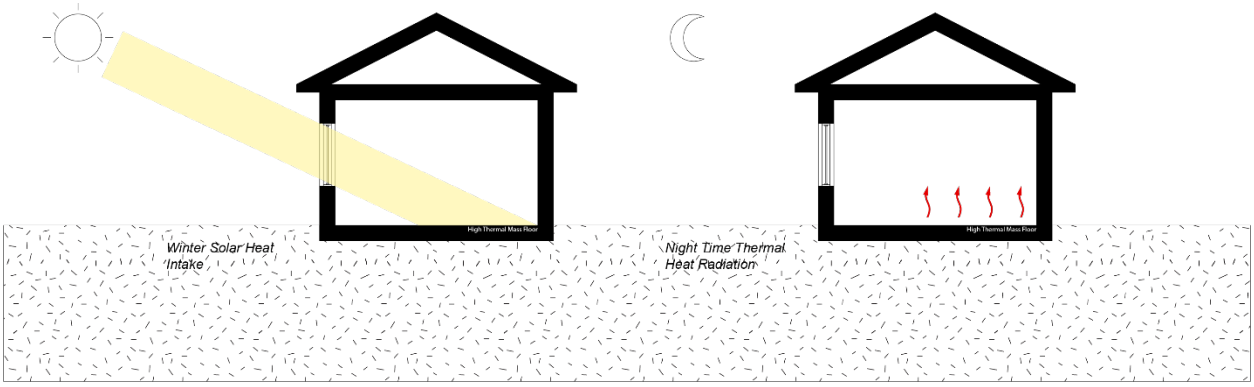

Figure 4. Solar Heat Intake and Release

Conclusion

The contemporary American vernacular architecture of mass production and mass consumption leaves much to be desired in the way of cultural and environmental sensitivity. A placeless and commercialized built environment has left little room for the development of a sense of identity beyond the globalized culture that pervades almost every aspect of modern life. Further, this contemporary vernacular blatantly ignores climatic concerns in favor of the economies of scale. To address these shortcomings, a series of new vernaculars are needed that provide a means of adapting standardized building technology to the unique context of the various cities, states, and regions of the world.

By identifying a set of vernacular design elements for Lincoln, Nebraska, I have taken a step towards addressing the faults of the current urban landscape and supported an approach to design centered on Critical Regionalism. Through the production and implementation of these new contextual vernacular styles, architects will be able to better understand, and react to, the specific context within which they are designing.

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