Critical Care: Farming and
Building as if the Earth Mattered

by

Emily R. Thorpe

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Contents

Abstract

Such is the critical condition of our earth that reuniting building and farming is an urgently needed form of care for planetary well-being and survival. Lessons from utopias, communes, and nature are used in this thesis to reimagine modern architecture and industrial agriculture seeking to enhance human presence in agricultural landscapes, foster biodiversity and connection to the fertility of our earth.

Standards in commercial greenhouse structures and formations are reassembled into an agro-architectural ecology tested in the context of Southern Ontario, Canada where care is envisioned with three aspects: "care about" diet, food, and planetary health motivated by the events of the COVID-19 pandemic; "care for" knowledge and resources of existing local farming communities; and "care with" the next generation of the earth's stewards. Describing building and farming as interdependent terrestrial challenges, care of the earth is intrinsically tied to the care of people it sustains.

Acknowledgements

Chapter 1: Introduction

We are in an epoch of belief and incredulity that comes with many names: Capitalocene, Anthropocene, Chtulucene, Ecocene, Gynocene, Plantationocene, Plasticocene. Various wordings are simultaneously too big and not big enough to demonstrate the ongoing precariousness of living on, and well, with our shared home, the earth.

The multiplicity of terminologies used to describe the condition of our world are a critical part in what we need to collectively engage with as they draw attention to various systems at war; for instance, the Capitalocene with its economic model demands unfettered expansion meanwhile the earth, our planet and climate, to avoid collapse requires contraction in humanity's use of its resources. Indeed, climate change and its impacts are described by atmospheric scientist Katherine Hayhoe in military terms as a threat multiplier: "whether its our food production, our crops, our economy, the safety of our homes, our health, the economy itself, our political stability...climate change takes all of these things and exacerbates the risks and challenges we already face making them worse" (Hayhoe 2019).

In the context of the fourth industrial revolution and sixth extinction, we are in a stage of evolution and criticism of anthropocentrism in the Anthropocene. The idea of human supremacy, a central species that control all the others, is collapsing with challenges we face with diminishing biodiversity that is essential for continued human health and the health of the planet. The understandable discontent caused today, the shared burden of the Anthropocene-Capitalocene, and issues of increasing urbanization is similar to any other revolution - however the capital function

is much changed with our economy at war with all forms of life on earth - the Ecocene (Braidotti 2019b; Fitz and Krasney 2019).

But where to begin to confront the major issues threatening the health and continued life of the earth often invokes a sense of helplessness and despair in my generation. We lament upon our lack of individual control and freedom from within an evolving capitalism that refuses to collapse as Marxist analyses believed it would. The dominant solutions that are perpetuated throughout the media can be harmful to the economy, focussed on reduction and restriction that are seen as negative or punitive towards our current lifestyles rather than solutions that can be beneficial to our health, regenerative, or diversifying to the economy (Hayhoe 2019). The political, and ethical resistance and simultaneous creation that is needed as an alternative seemingly requires the immense and exhaustive effort of a social revolution; yet such alternation is often accompanied by violence and a fascism that has the propensity to perpetuate the very issues it intended to solve (Arendt 1977; Tireneh 2014, 5; Paige 2003; Huntington 1968).

I prefer the option presented by Braidotti of active activism, education, and a detoxification of ourselves as 'consumers': "the point is to put distance between ourselves and these mistaken consumer models. It is like an exercise in detoxification. We have to detoxify our bad habits, in our way of consuming and of relating with others" (Braidotti 2019b). The thinking of Rosi Braidotti, philosopher and post-humanist, focuses not on an impending apocalypse, but on what is necessary in our becoming: Trapped within a consumer model we recognize to be part of the problem, therefore we must become part of the solution, suggesting

a reconnection to our sources of production (Braidotti 2019a; Braidotti 2019b). No matter how we prefer to define the condition of our planet, anthropologist Anna Tsing also invites us to consider the "problem of living despite economic or ecological ruination" in order to take the next step towards individual recuperative or reconciliatory behaviour which can transform into collective action (Tsing 2016, 19).

Collaborative criticism and collective action from within the structure of capitalism can create step by step collective change - distance between ourselves and models of consumption can bring us closer to our practices and means of production for solutions. We need solutions that allow for individual change to lead to system wide change and we need accessible solutions that are framed in short term benefits as well as long terms ones that can encourage better communication in the polarization of climate change discussions. For if we do not talk about global climate change, why would we care about our shared earth? If we do not care about our earth, why would we choose to locally act?

Indeed this thesis is as much about the divide between consumption and production, as it is about our individual responsibility to care and movement towards collective action; repercussions of an individualistic or independent state of mind are so critically costly to our interdependent condition of being. This thesis assumes that the reader is aware of global warming which threatens our survival and its correlation to earth's fertility; the ground on which we stand nourishes all our lives and, as civilizations have risen and fallen on the quality of the soil, so will we (Herring and Wirick 2018). It aligns with feminist theorist and historian of science Donna Haraway who introduces

"mutli-species assemblages" to envision possible survival with the Chthulecene, derived from chthon, meaning "earth" in Greek that is associated with things that dwell in, under, or with the earth (Haraway 2015, 162). Correspondingly, this thesis examines the disabling binary impasses that separate consumption and production, urban and rural, the city and countryside, economy and ecology, believing such divisions confound our sense of place and belonging as earth dwellers and within our shared home; thus our interdependent responsibilities of how we can *care.*

Rather than focusing on an impending apocalypse, this thesis adapts the work of Angelika Fitz and Elke Krasny who remind us that when confronted with the earth at its tipping point, in times of catastrophic ruination, "critical care is a starting point for not giving up on the future entirely" (Fitz and Krasney 2019,12). The thinking of Fitz and Krasny discusses architecture and urbanism with the ethics of care to be the most important perspective for the future recuperation and repair of the earth; and, this thesis argues architecture and agriculture, with equivalent (if not more) relevancy.

Thesis Question

Our consumption and production of our food constitutes our primary and shared engagement with the natural world - it connects our health and diet to the fertility of the earth and to the biodiversity on the entire planet. How can architecture reconnect us to this source of production, but beyond combining architecture with food, how can both architecture and agriculture foster a building and farming culture that is committed to earth's regeneration and care?

Modernism in architecture and industrialization in agriculture have become separate industries of power and capitalism

but we need agriculture as much as we need architecture and we need food as much as we need shelter: we need not only a better view of both building shelter and farming food, but a working method by which the least of us can ensure that the production of one is not the consumption of another, nor the degradation of our shared earth. It is not a choice of either agriculture or architecture: both are essential, but today it is food which dominates our lives and how agriculture, beleaguered in the country and too scarce in the city, is managed by 2050 will determine our future livability on earth; and about this, we need to care.

The Caring With Objective

Definitions of agriculture, architecture, and care are provided in the next section, but it is important to note that care is always an activity, a practice, and this thesis works with definitions and aspects of care presented by Joan C. Tronto and caring theory - *caring about*, *caring for*, and lastly *caring with* (Tronto 2019, 29-31). These aspects are repeated throughout this thesis helping to explain the nature of care practices and targeting the elusive *caring with* - care that is reliable over time becoming a condition of interdependency and connectedness with others, all human and non-human (Bellacasa 2017, 70).

To investigate a question as large as an alternative caring and interdependent means for providing basic human needs of both shelter and food in a way that does not render the earth uninhabitable, the research focussed on issues of building and farming in the Central Canadian province of Ontario. Ontario is Canada's most populous province with more than half of all Canada's prime agricultural land concentrated in the southern region (Statistics Canada 2014;

Statistics Canada 2016). Urbanization and prioritization of industrial agricultural practices are accelerating independent lifestyles increasingly disconnected from food sources and thus our point of engagement with the earth - mystifying the link between our food, diet, biodiversity and planetary health. As a region deemed lacking in care, this thesis also acknowledges necessary changes to building and farming practices in the region would be accompanied by lifestyle changes. This would require a transitory approach, sensitive to both temporal and spatial dimensions of life; needless to say, a *caring with* the earth is intrinsically tied to the caring of the people that it sustains.

The project proposes an alternative pattern of building and farming that evolves in phases: particularly beginning at the level of the individual where caring about the environment and climate change can be addressed by caring for ones own consumptive and productive needs through growing food; next at the level of the community, where care giving and receiving is intimately tied to how the community cares for one another; and finally at the level of the region, where the experience and knowledge of the community has transferred to successive generations and inspires propagation with more education, awareness, and platforms for continued action and caring with the earth.

Case studies and proposals that seek an alternative to building and farming, of agriculture and architecture, are presented in the next chapter and inform several design guidelines for the work. The exploration of Utopias, Sitopias, and Communitas, led to the three part design method and process: first, unique and replicable designs; second, designs that respond to economy and ecology of place; and

lastly, designs that can adapt with individual and communal requirements.

The architectural proposal uses the agricultural building language of the region seeking to make unproductive or monocultural agricultural fields uniquely interconnected with public life. Standards in commercial greenhouses are uniquely adapted into several building types or the proposed agro-architectural ecology and framework. This framework is developed for its potential to be implemented at different scales of farming operations and sites; and, much like diversity in planting varieties, the diversity in building types are hopeful in their ability to inspire diverse socio-ecological and socio-economical resilient settlements. This is tested on a small scale farm near the city of Toronto with the framework and building types demonstrated in a phased approach that responds to the current and future needs of the existing farming community.

The Caring With Subjective

When beginning this architectural thesis I did not intend to so passionately argue for agriculture. I come from four generations of vegetable farming in southern Ontario and our family farms have been appropriated by city development and urbanization in the past. I was told that farming had no future, and taught in my childhood that the harder I worked as a farmer, the less I would make and as such pursued education and a life elsewhere. It was only in my studies of architecture at Dalhousie, through this thesis and the encouragement of the people around me, that I was able to see the greater global ramifications in the separation of architectural and agricultural professions - their relative influences over the trajectory of our earth,

terrestrial contingencies, and imagine the power of what could be an equal emphasis of both building and farming to care for people and earth. The bad habit of urban areas to bite the rural farming hands that want to feed them is just as bad as the habit of rural farmers who rely on increasingly arduous and expensive farming practices which leads to more reliance on industrial food chains and the degradation of our most significant non-renewable geo-resource: fertile soil and the ground on which we stand.

Perhaps this thesis could be dedicated to finding a profitable and regenerative alternative for our farming communities, encourage the next generation and farm succession while also fighting for food sovereignty, justice, and security in our urban environments. Perhaps the best place to address the urgency of earth's need of critical care was right back where I came from; and what better way to study the reconciliation of the earth's ecology and economy as these words are both derived from the Greek OIKOS sharing a basic orientation to "home" (Todd and Todd 1994, 3).

Contemporary Architecture and Agriculture

Today, both architectural and agricultural industries are caught in what McDonough and Braungart describe as an attitude of regulation and restraint: we see earth's limited capacity, increase efficiency, increase standardization, and increase specialization (McDonough and Braungart 2002, 6). Introduced with the following images, this subsection discusses the disconcerting divisions yet similarities between architectural and agricultural industries. Further, modernism in architecture with the latest shifts in sustainable building design are compared to industrialization in agriculture with the terrestrial challenges of farming today and in 2050.

DIVIDE AND THRESHOLD OF URBAN AND RURAL / BUILT AND FARMED LANDSCAPES (Maclean 1996-2011).
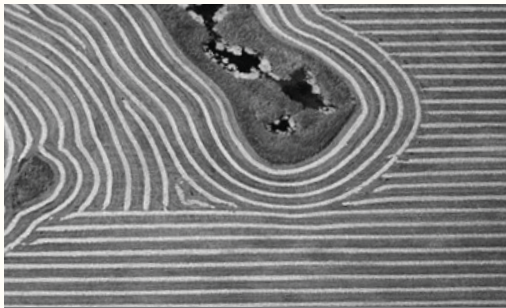
FARMING PATTERNS AROUND STREAM (Maclean 1996-2011).

SUBURBAN BUILDING PATTERNS AROUND ROADS (Maclean 1996-2011).
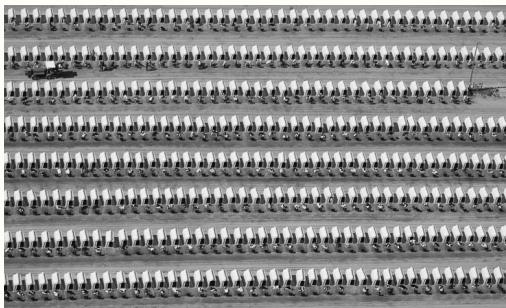
LIVESTOCK (VEAL) PENS (Maclean 1996-2011).

HUMAN (URBAN) HOUSING (Maclean 1996-2011).

The division and separate cultivation of built and farmed environments in the Global North, 1996-2011; photographs by Alex Maclean (Maclean 1996-2011). With similarities in their concerns for efficiency, standardization, densities and/or yields, modernism and industrialization has created separate yet homogeneous building and farming landscapes.

PHOTOGRAPH OF THE KIMBELL MUSEUM, "WHAT DOES THIS BUILDING WANT TO BE?" (Eylul 2018).

PHOTOGRAPH OF INDUSTRIAL GREENHOUSES, "WHAT DOES THIS FARMING WANT TO BE?" ("Selecting and Building a Commercial Greenhouse" n.d.).

Top: photograph of the Kimbell Museum (Eylul 2018). Bottom: photograph of standardized industrial greenhouses ("Selecting and Building a Commercial Greenhouse" n.d.). The architecture is described as a series of connected concrete vaults that shimmer with light to create a subtle luminosity that Louis Kahn compared to a "silvery powdered moth's wing" and spurred the renowned question "What does this building want to be?" The agriculture is described as a series of connected polycarbonate vaults that shimmer with light to create a subtle luminosity that farmers compare to the "silvery powdered chemicals residuals on plants" spurring the question "What does this farming want to be?"

Modernism in Architecture

Modernism in architecture is rectilinear, precise, contained; man-made materials that are mass produced, modular and exert control over nature and adaptation to machines; there is no accommodation to degradation, perfect materiality is the ideal, with function and utility as primary values; sustainable shifts in the building industry are intended to make architecture more sensitive to its surroundings and its environmental impact. While these shifts are important, they are being institutionalized and confounded with different accolades or commodifications such as LEED, standards focussed more on things and materials used, and measuring the efficiency in what goes into a building rather than in monitoring ongoing effects and greater terrestrial contingencies (Tronto 2019, 28; Moe 2020). Calculations of square footage, life cycles, materials re-used, specifications for even the arbitrary locations of recycling and garbage bins, are all used today to assess 'sustainable architecture'; amongst all other fundamental requirements for human life included in designing - such as calculations of mechanical air, light, or water systems - the most basic form of energy the "calorie", is not accounted for (Bohn and Viljoen 2014).

Even in future sustainable economic advancement plans, "smart cities", these green building accreditations, and more surprisingly in discussions of holistic environments or resiliency, food is still largely unacknowledged even though it has more impact, from the scale of the household to the scale of the planet, on overall emissions, energy reduction, human and non-human health (Steel 2009a; Bohn and Viljoen 2014; Pollan 2006).

The mentality of "cities first, rural development later" still dominates architectural considerations of sustainable building - the majority focussing on urban environments, density planning, and relegating the necessity of food. Here is where the victimization of our earth is the greatest - among those of us who live in urban areas or who, through living in a rural setting have adopted urban or suburban (non-agricultural) lifestyles (Olkowski et al. [1991] 2008, 2-15); Jacobs 1970, 3). It is quite a known fact that for every calorie of food produced by this industrial agriculture, it takes 10 equivalents of fossil fuel energy to sustain this urban/ suburban human life; but we continue to sustain ourselves through this industrial food chain, which has evolved to be the most destructive industry on the planet and greatest threat to the continuity of life in, under, or with the earth (Hawken 2017; Herring and Wirick 2018).

Further, considering the relative influence of architecture and agriculture on earth (depicted spatially on the next page in terms of habitable surface used) the absence of agriculture and food in professions that mark their distinctiveness in the temporal and spatial dimensions of life represents a massive blind-spot in how we care for the health of people and the health of the planet. Being the biggest industry agriculture creates our biggest terrestrial challenges and a critical opportunity for care. As terrestrial professionals, our best chance for survival and fighting global warming stands by caring about our most valuable, non-renewable geo-resource - which is earth itself- and thus caring with its biggest stewards - our farming communities (Viljoen 2005; Baracco, Wright and Tegg 2019, 65).
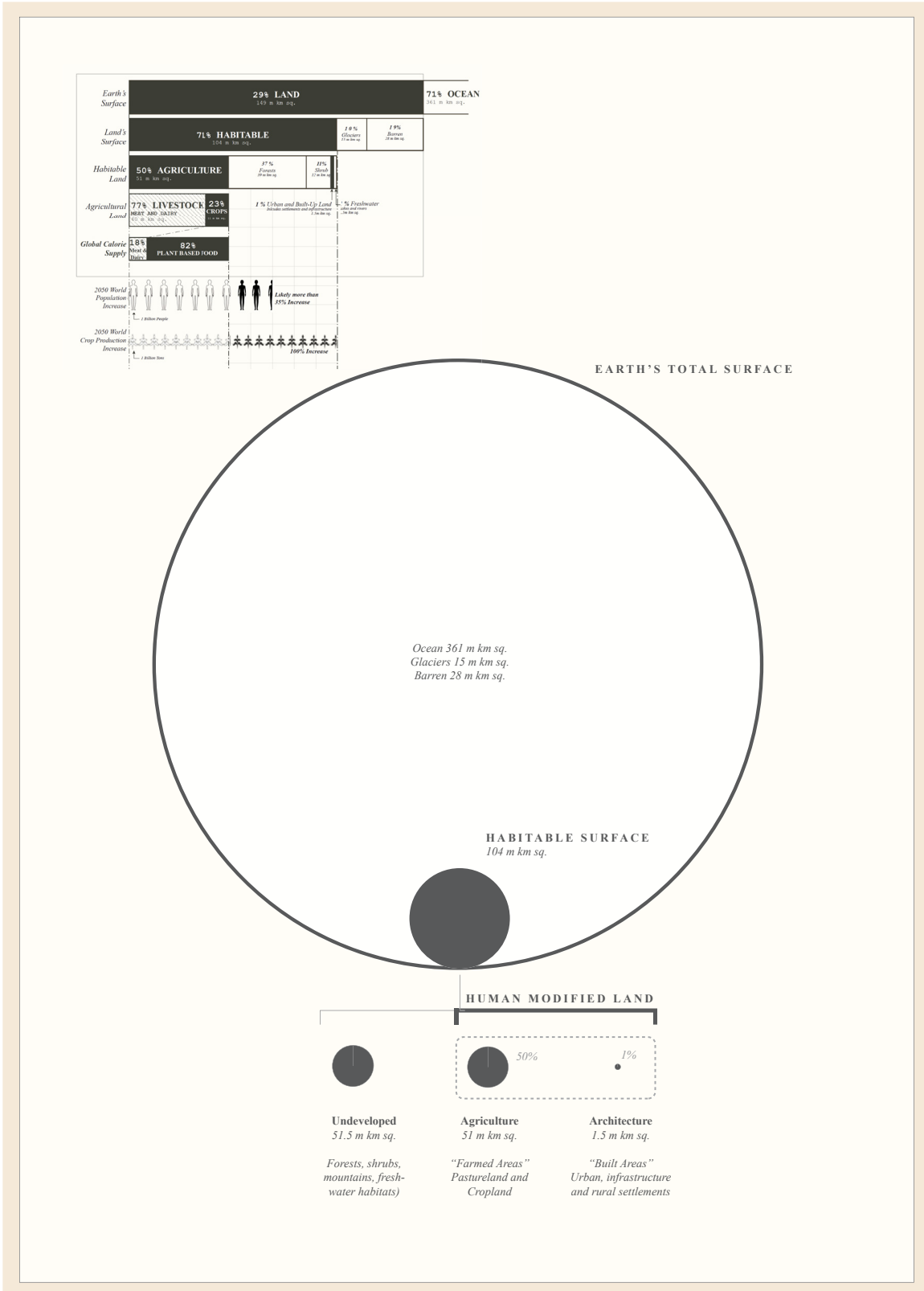
Global land use for food production, with 2050 population projections and required crop production increase (Diagrams adapted from: Ritchie and Roser 2019; Foley 2014; UN 2019b).

Industrialization in Agriculture

The agricultural industry that sustains us consumes half of all habitable land on earth to do so: 50% earth's habitable surface is required for industrial agriculture; leaving only 48% percent for forests, grasslands, shrubs and terrestrial wildlife; one percent as freshwater; and surprisingly our built-up urban areas which includes cities, towns, villages, roads and other human infrastructures account for the remaining one percent (Ritchie and Roser 2019; Ranganathan et al., 2018; Foley 2014). The future expansion of agriculture is one of the greatest threats to our earth, yet the agricultural industry faces significant challenges to meet food demands of growing populations and increased urbanization (Ranganathan et al., 2018; Foley 2014). Divided, the professions of architecture are asking, "how do we house everyone by 2050 as efficiently as possible" and professions of agriculture is asking "how do we feed everyone in a way that does not render the earth uninhabitable?" (Ditzler 2020, 300; Koolhaas 2020).

The world population, currently 7.8 billion people is projected to reach 9.7 billion (UN 2019). To outpace the growth and feed nearly 10 billion people by 2050 requires the agricultural industry to double crop production; and should agricultural production continue through existing methods of expansion, this would require the conversion of 593 million-hectares of remaining forests to agricultural land - roughly twice the size of India (Ranganathan et al., 2018; Foley 2014).

Industrialization in agriculture attempts to address these challenges however argues the same as sustainability in architecture: more efficiency. Rather than capitalizing on sustainability standards in building and energy efficiency,

instead environmental commodification in agriculture pertains to yield efficiency: how many of the same plants can be packed into an acre of land. The industrial oligarchy, "The Big Six" (BASF, Bayer, Dow Agrosciences, DuPont, Monsanto and Syngetna) chokehold the global agricultural agenda, concentrating the seed, agrochemical and biotechnology market over any other farm input sector and play a tremendous role in socioeconomic justice and the socio-ecological security of the world that is both largely unknown, yet inescapable for the majority of the increasingly urbanized population (Steel 2009a; Shand 2012).

Like practices of sustainability in architecture, standards in capitalist agri-business have become about things: focused more on materials or equipment used and is more successful in measuring what goes into farming than in monitoring the ongoing effects. Indeed, the solutions for 2050 proposed by industrial agriculture have not changed since the first industrial revolution - maximized efficiency to increase production and meet demand - through more mechanization, enhanced fertilizers and agrochemical distribution via drones, improved genetics for higher monocultural yields, climate and disease-resistant crops, and now vertical farms, and synthetic lab-grown meat (McDonough and Braungart 2002; Pollan 2006). The mentality is harvest-based and extractive but has been substantiated with the global overall decline of agricultural land use person - per capita agricultural land use is less than half its value in 1961 due to yield efficiency (Ritchie and Roser 2019).

Yet our most significant non-renewable geo-resource is productive land and fertile soil: "Soils store more than 4000 billion tonnes of carbon. By way of comparison, the forests store 360 billion tonnes of carbon as woody biomass, and

the atmosphere more than 800 billion tonnes in the form of carbon dioxide" (UNCCD 2012). Global agriculture causes an estimated 24 billion tones of fertile soil to erosion per year - "3.4 tonnes lost every year for every person on the planet" or 30 soccer fields of soil are lost every single minute (UNCCD 2014; Herring and Wirick 2018). These efficiency practices are causing land degradation and desertification threatening diverse fertile life which threatens us all but it also causes yield loss over time which the farmers pay to ameliorate by additional chemical fertilizers; reinforcing a cycle in which the industry operates on large expanses of diminishing and inferior soils at the price of much capital investment. "The Big Six" economic payoffs are rising, but the overall quality of every ecological aspect of their system is in decline with its energy, water, and fossil fuel consumption, soil erosion, diminishing biodiversity, and fertility lifespans (Ritchie 2021; Shand 2012).

Our soil health and agricultural consumption of land to meet food production demands is further exacerbated by land loss due to urban expansion onto prime agricultural land. Today at least 55% of the world's population lives in urban areas and 80% of all food produced globally is destined for consumption in urban areas (FAO 2020). By 2050 over 68% may be living in urban areas; this will not only require more imports of food, longer and more fragile food chains, and dependency on distant sites of industrial agriculture but urban growth further overtakes fertile productive lands and contributes to our scarcity of natural resources (UN 2018; FAO 2020; Penner 2019, 2).

In this way modernism and sustainability in architecture and industrial agriculture are not careful: architecture is certainly blind to its own dependence on the food chain

which endorses an agriculture that is blind to the fertility of the earth that it is predicated upon. Neither modernism and sustainability efficiency in architecture, nor yield efficiency in agriculture is accounting for how our earth can reliably and healthily provide nourishment and be our home over space and time.

Canadian Consumption and Production

In Canada, an average of 365 acres of open land and 46 acres of farmland are lost to urban sprawl hourly, or that nearly one million hectares of "dependable agricultural land" has disappeared from cultivation over the past 10 years; again, most of it subsumed by development around Canada's biggest cities (Macleans 2014; Walton 2003, 7; Gilham 2002, 75; NFU 2011, 2). Furthermore, this growth is overwhelmingly suburban: over two-thirds of the population live in the suburbs, and the periphery of metropolitan regions have five times as much population growth than urban cores (Gordon, Hendricks and Willms 2017, 4). This is visualized with the map of Canada on page 20.

While dependable agricultural land is disappearing it is also degrading. A million dollars annually is invested in soil fertility and conservation programs while lost yield due to soil erosion and diminished fertility costs Canadian farmers over three billion a year; this does not include the cost they pay of additional chemical fertilizers and inputs to make up for lost fertility. "Soil is the third leg of the stool that people need to think about. If we don't get urban people involved in that, we're going to fail. We're not going to have the pressure on urban governments, industry, and (other groups) for people to consider soil health to be equal to air and water

in the minds of Canadians. Climate change presents an opportunity and a threat" (Kienlen 2019).

Canadians in particular have the highest average cropland use per person - more than double the land of any other region due to dependence on global food chains and industrial practices (Ritchie and Roser 2019). The average Canadian diet requires 3.3 acres per person, over two and a half football fields a year; for reference, if everyone managed agricultural production and consumption like a Canadian, then with our current human population we would require the equivalent of over three earths to sustain us (Ritchie and Roser 2019; Lappe 1991, 69).

Canada's per capita land footprint is much higher than the world average of approximately half an acre per person and is attributed to the overconsumption of animal based foods that are more resource intensive than plant based foods, the proportion of crops fed to livestock and biomass rather than allocated to human stomachs, food waste, reliance on global exchanges and high value foods from increasingly industrialized and distant sources (Ranganathan et al., 2018; Ritchie and Roser 2019; Foley 2014; Hawken 2017, 39). Of the many solutions to reduce Canada's per capita land footprint and environmental impact, the following are consistently listed amongst the top three: shifts in diets to focus on plant-based foods; changes in education to incorporate climate change, global warming, and to debunk food industry myths; lastly, accessibility to the sources of our food production and increased opportunities for building human-nature relationships (Hawken 2017, 39; Ranganathan et al., 2018; Ritchie and Roser 2019; Foley 2014, Pollan 2006).

Canada	**3.3 ACRES** 1.52 hectares
United States	**1.2 ACRES** 0.47 hectares
Brazil	**0.9 ACRES** 0.4 hectares
Latin America and the Carribbean (excl.Brazil)	**0.7 ACRES** 0.28 hectares
Europe (excl. Russia)	**0.7 ACRES** 0.28 hectares
Africa	**0.6 ACRES** 0.25 hectares
World	**0.5 ACRES** 0.22 hectares
India	**0.3 ACRES** 0.13 hectares
China	**0.2 ACRES** 0.09 hectares

CANADA
3.3 acres of arable land per person

NORTH AMERICA
1.4 acres of arable land per person

Not possible with global land
Greater than currently used
Less than currently used
No Data
No Data

SHARE OF GLOBAL HABITABLE LAND NEEDED FOR AGRICULTURE IF EVERYONE HAD THE DIET OF...

The actual proportion of habitable land used for agriculture is 50%, if the total world population was to adopt the average diet of any given country, values greater than 100% are not possible within global land constraints.

Total cropland per person over the long-term and share of global habitable land needed based on diet. (Graph and map reproduced from: Ritchie and Roser 2019; Ritchie 2017).
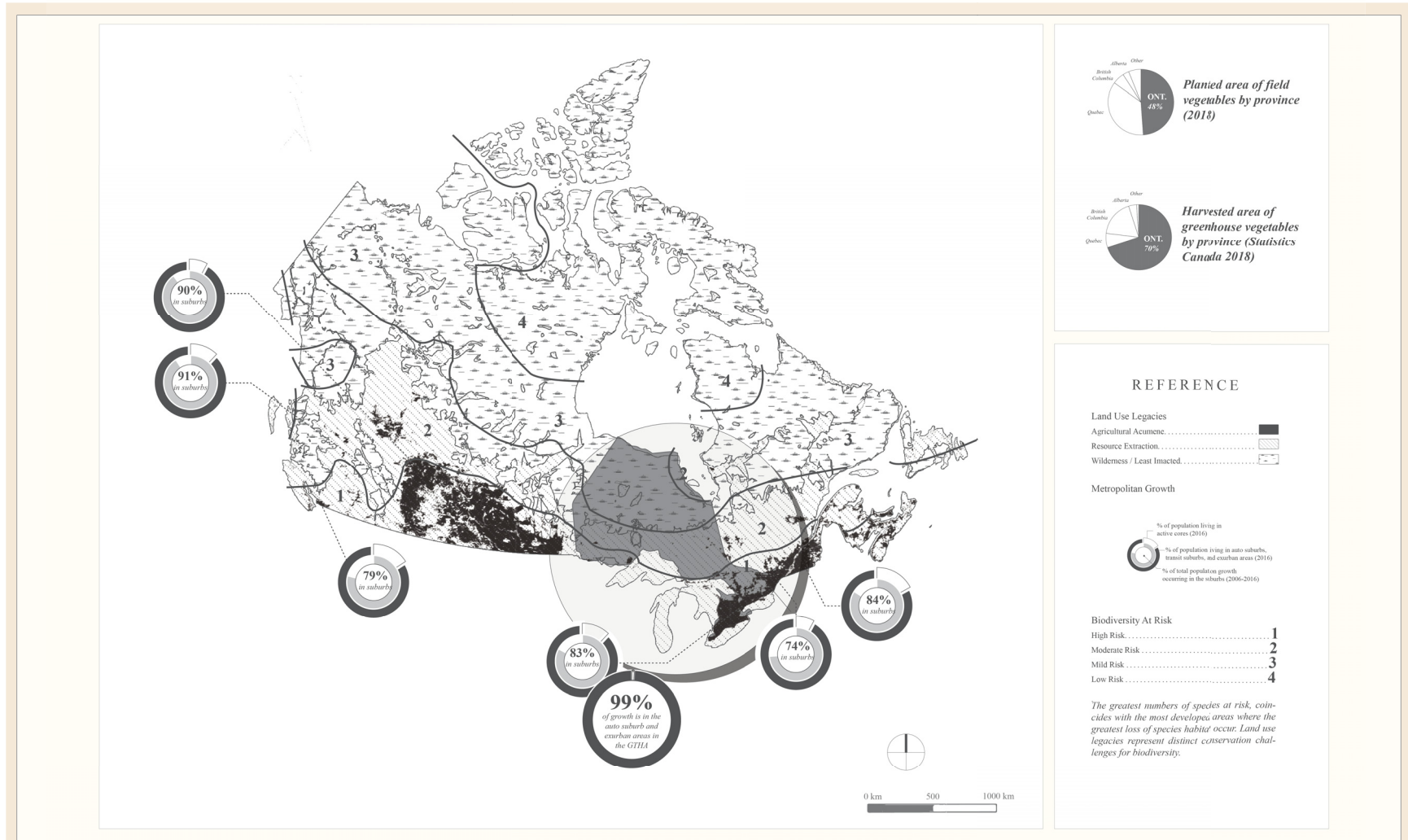
Canadian metropolitan growth into agricultural ecumene, highlighting suburban growth as coinciding with the greatest challenges to both farmland and biodiversity (Hendricks and Willms 2017; Statistics Canada 2018; Weiss, Cillis and Rothwell 2008). In Ontario this growth is consuming the land of our plant based and high value food production (Statistics Canada 2018).

These solutions acknowledge that while it is unworkable and untenable to force people to change their diets, much can be done to change the food environment to increase education, accessibly and affordability of plant-based foods — this is truly the point in uniting consumption and production, urban and rural, building and farming, and the professions of architecture and agriculture.

Food Environment in Southern Ontario

The food environment in Ontario is what this thesis approaches: it is Canada's most populous province, where over two thirds of Canada's high value plant-based food production occurs in fields and in greenhouses, and the region is losing 175 acres of farmland every day to urban development (Statistics Canada 2018; Walton 2003; OFA 2020):

> This conflict is easily explained. Ontario was initially an agrarian society. Settlement was most successful in good agricultural areas. The successful agricultural communities attracted service industries and the area grew. When development occurred, level farmland with good soils provided the best sites for development. The very resource that attracted settlement, is ultimately being consumed by it. (Walton 2003, 14)

Known for its highest quality farmland, also known as dependable agricultural land, major urban growth has been confined almost entirely to the southern parts of the province in the metropolitan complex known as the Golden Horseshoe. The Golden Horseshoe sprawls along Lake Ontario shore and includes the Greater Toronto Hamilton Area (GTHA) which has seen the largest increases in settled area and decreases of arable land (Statistics Canada 2016; Statistics Canada 2018). The greatest loss of prime farmland has occurred in the GTHA, with a direct relationship between proximity to Toronto and decrease in acres farmed (Walton 2003; Deaton and Vyn 2010). The development has

NUMBER OF FARMS 1921 - 2006, 2019

200,000
150,000
100,000
50,000

1921 1931 1941 1951 1956 1961 1966 1971 1976 1981 1986 1991 1996 2001 2006 2019

ECOSYSTEM SERVICES | **CAROLINIAN ZONE**

SOIL & CLIMATE | **SOUTHERN ONTARIO**

URBAN GROWTH | **GOLDEN HORSESHOE**
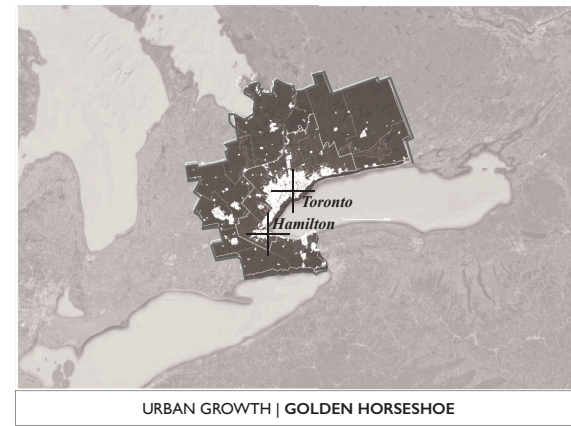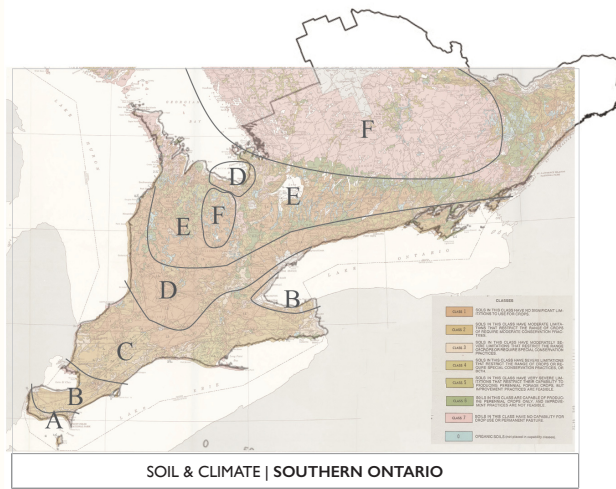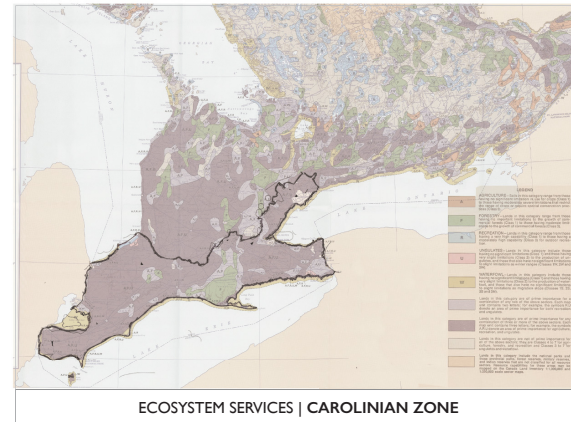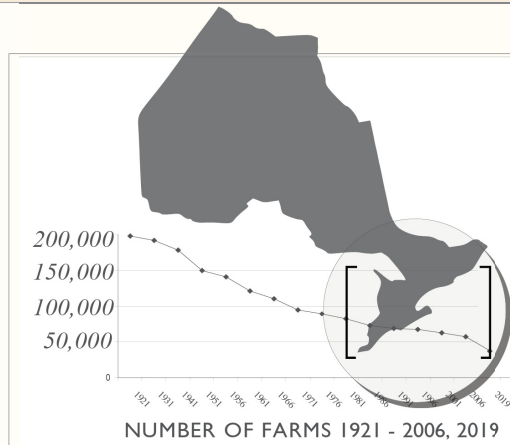
Toronto
Hamilton

Southern Ontario Food Environment Conditions. Prime agricultural and ecosystem areas overlap with Greater Golden Horseshoe which contains 60 per cent of Ontario's population, over eight million people, and contains the Greater Toronto and Hamilton Area (GTHA) and city of Toronto (E.R.A Architects 2010; Statistics Canada 2018).

also caused major concerns for biodiversity - the southern region alone in the Carolinian Belt has lost more than 70% of wetlands, 80% of forests, and 98% of grasslands, with an increasing amount of invasive species onto farmlands (Ontario Biodiversity Council 2015).

As more of this prime farmland is subsumed to development, Canada's increasing reliance on the importation and high value foods will also increase; city growth is tied to growing global dependencies which presents significant vulnerabilities and threats to the country's health, sovereignty, and self-sufficiency (National Farmers Union 2011, Statistics Canada 2009; Walton 2003, 19). More high value foods such as fruits and vegetables from distant sources diminishes nutrient quality, requires more energy, logistical requirement, and the imbued vulnerability that comes with telecoupling will cause those of low to middle socioeconomic status to be most affected by oscillating food prices (Canada's Food Price Report, 2019; Hull and Liu 2018). The effort it takes our superstores to perpetrate an appearance of abundance while significant farmland is being lost is largely hidden from us as the consumers, as well as the which helps us to forget how much our health and resilience depends on it (Steel 2009a, 64-67).

North American children's drawings of farms, 1960-1970 (Arthur and Witney, 1972, 31).

Accelerating Anachronisms

We also forget that this loss of this prime agricultural land accompanies the loss of its infrastructures that are tied to our farming heritage. At Confederation, eighty-five out of every hundred persons lived on a farm and soon the same figures will be true for those who live in cities (Macleans 2014; Arthur and Witney 1972, 7). While most Canadians still retain a deep emotional connection to the country's farming history,

Ontario child's drawing of "Life on a farm", 1995. Provided by anonymous.

Southern Ontario community trailer ride for annual end of season tomato fight, 2015.

farmers now comprise less than two percent of the entire population, and 56% in Ontario are over 55 years of age and older (Statistics Canada 2015; Macleans 2014). What many of us do not realize, is that the small scale farms and homesteads we conceptualize in children's rhymes or are used as visual propaganda in the supermarkets today, are almost extinct and the farmers working them near retirement; 92% are without succession plans and feel forced to sell their lands often to development to afford their retirement (Statistics Canada 2015; Arthur and Witney 1972, Statistics Canada 2018; Cross 2017).

Ontario has seen a gradual decline in the number of small scale farms and their structures that were centers of community life and of the countryside (NFU 2011); the suburban environment sustaining the growth of Ontario's metropolitan regions and is criticized for a lack of social identity and placelessness continues to build upon the farms and farmlands that are strongly associated with our physical and psychological regional identity (Hough 1990). The suburb functions as a site of consumption and disassociation - "a wallpaper of development rolled on the landscape" - threatening with the same homogeneity that extinguishes as much ecological diversity as industrial farming operations (McHarg 1971, 80; Hough 1990, 80-92; McDonough and Braungart 2002). Indeed, at a time when seventy percent of us are now attempting to live on one percent of earth's habitable land, the farm that was both producer and consumer is being eliminated through both sprawl or through incorporation into larger holdings further away from urban centres and on less capable soils (Arthur and Witney, 1972, 11; NFU 2011). And unlike before, where farms offered more than mere economic means such as

CONSTRUCTION USING REGIONALLY AVAILABLE MATERIALS: EARTH PACKED FLOOR; HEAVY THATCH AS INSULATOR FOR WINTER AND SUMMER; WALLS OF COB, WILLOWS, WATTLE AND DAUB (Arthur and Witney 1972, 10).
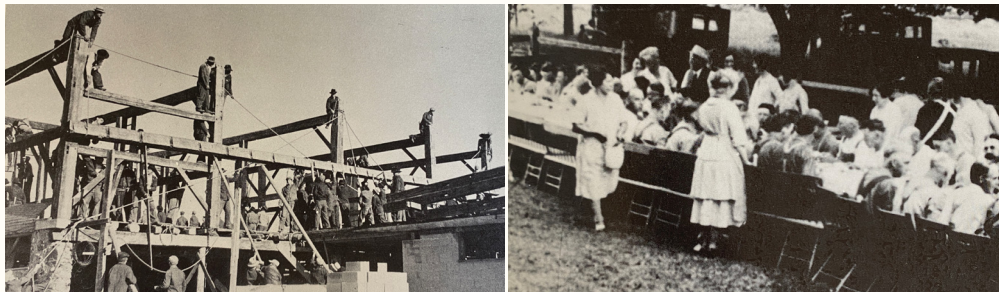
COMMUNITY BUILDING PROCESS OF A BARN; AFTER THE RAISING, THE FARM OWNER(S) WOULD PROVIDE SUPPER FOR THE FAMILIES INVOLVED (Arthur and Witney 1972, 219-222).

Photographs of early farms in Ontario (Arthur and Witney 1972).

community dinners, events, and space to exchange local knowledge, today's prefabricated structures are largely inaccessible to the public (Arthur and Witney 1972, Cardwell 2020).

Many assume that if agricultural land is bought up, the farmer can simply move further from the urban area and start an operation elsewhere. But a farmer is as much a limited resource as prime agricultural land, and once lost, cannot

PUBLICLY INACCESSIBLE INDUSTRIAL VEGETABLE GREENHOUSE EAST OF TORONTO, ONTARIO 2020.

PUBLICLY INACCESSIBLE INDUSTRIAL VEGETABLE BARN EAST OF TORONTO, ONTARIO 2020.

PHOTOGRAPH OF PUBLICLY INACCESSIBLE INDUSTRIAL POULTRY BARN (Cardwell 2020)

Top: Vegetable production away from urban centers in Ontario, 2020. Bottom: Photograph of prefabricated Canadian poultry barn with restricted access; industrial farmers are encouraged to "make your barn look uninviting" and proposed new Ontario law includes fines of up to $25,000 for trespassing on farms (Cardwell 2020).

AERIAL LOCATION OF PHOTOGRAPHS, WATERDOWN (Google Maps 2021).

SPRAWL ON FARMLAND EAST OF TORONTO, ONTARIO 2020.

ABANDONED GREENHOUSES EAST OF TORONTO, ONTARIO 2020.

COLLAPSED BARN EAST OF TORONTO, ONTARIO 2020.

Investigation of sprawl and farmland close to design proposal site; aerial photograph of Waterdown, Ontario (Google Maps 2021).

be replaced. Even at a small scale, farming is complicated occupation that requires time and the experience of many years to understand the unique characteristics of a specific place and the earth to successfully produce certain crops. The Golden Horseshoe may be renowned for its orientation, temperatures, presence of microclimates and levels of precipitation that cater to its agricultural productivity and quality of its soils; nevertheless, it is the experience of these

farmers, proximity to urban markets, social conditions and networks they have established in the region that enable them to share resources and access services which makes their operations more successful (Macleans 2014; Walton 2003). The experience, knowledge, and resources required for success are site specific and make it nearly impossible for a farmer to relocate operations elsewhere. Prime agricultural lands can only be considered as dependable lands when taken into account with the experienced farmers that have depended on them: this thesis aims to provide an alternative to building and farming that keeps farming communities on their land, and can generate more diverse sources of income needed to support their retirement.

The continued loss of our farmers, land, and their structures with increasing industrialization and urbanization is shortsighted: Canada's growing dependence on imports of high-value foods creates a striking vulnerability in our food system for food sovereignty and our individual health. The farming communities close to urban centers are as rare resources as the earth they steward; their proximity may be our last lines of communication and point of connection to the fertility of the earth.

Defining Caring Practices

Going beyond the ideas of "what the client wants" beyond sustainable" architecture, means we must too go beyond ideas of "what the consumer wants" beyond industrial agriculture - both focussed on increasing efficiency and consumption demands and doing "less bad" (McDonough and Braungart 2002). What we need now is an architecture and agriculture that fulfills basic and fundamental human and non-human rights - sharing in the responsibility of caring

Collage of the suburban edge and found building and farming thresholds in southern Ontario. Monocultural fields and homogeneous buildings define the hard edge; images included were taken from an abandoned barn and agricultural property recently sold to developmental expansion. Images of farming tools in the foreground were provided by a farming operator in the region who, when interviewed, described them as, "too old just like me".

of our world; an architecture and agriculture that is sensitive and committed to the regeneration and maintenance, for all forms of life in, under, or with the earth. This type of architecture and agriculture may be inclusive in a definition of care:

> Care [is] a species activity that includes everything that we do to maintain, continue, and repair our world so that we can live in It as well as possible . That world includes our bodies, our selves, and our environment, all of which we seek to interweave in a complex, life-sustaining web. (Tronto 2019, 29).

This definition is broad as care is part of almost all aspects of our lives; it is a practice enmeshed with people, plants animals, and all other natural and artificial things that aligns with the thinking of Donna Haraway (Haraway 2015). "So that we may live in [the earth our world] as well as possible" sets a standard depending upon different societies and communities views of "as well as possible." Joan C. Tronto writes that "To evaluate whether care occurs well or badly then, requires attention to the purpose of living well and to the purpose of care. This concern is highly political then. What we care about determines what kind of a society we are" (Tronto 2019, 30).

Rather than independent from the earth and at war with earth's limited resources, using care as a critical concept will require a fundamental reorientation of attitudes in both the disciplines of architecture and agriculture towards seeing interdependent relational conditions; caring practices of building and farming that existed before modernism or have pre-industrial origins - arguably postindustrial in the way that they align with nature.

Origins of Farming and Building Nature-Culture

The word architecture contains "builder" ('arkhi') and building in its broadest sense provides shelter - to be sheltering is an act of care. "On the Origin of the Dwelling House" in Vitruvius's *The Ten Books on Architecture*, working with nature and learning from nature was the source of building shelters, "Some made them [shelters] of green boughs, others dug caves on mountain sides, and some, in imitation of the nests of swallows and the way they built, made places of refuge out of mud and twigs" (Vitruvius [30BC] 1960, 38). What building does is nested within the practice of care of being sheltering in a way that imitated nature, and was fully imbedded in nature and its ecosystems while it was to be protecting from its forces. Protecting and providing support for everyday living - is care giving - and "arkhi" builders and architects are care givers. Elke Krasny notes Vitruvius dividing nature from culture in the section on the "Education of the Architect," where "Vitruvius moves on to set apart protective dwellings, rooted in nature, from real architecture, based in culture," listing geometry, history, philosophy, music, medicine, law and astronomy as the important fields an architect has to study and know" (Krasny 2019, 35). In separating nature from culture, the knowledge that building is part of caring practices that are immersed in nature, has become erased.

Agriculture in its broadest sense provides food indispensable to the continuation of human life and survival. This is evidently a form of care. The word agriculture itself, encapsulating the field ('agri') and direct action to grow ('culture') or cultivate, is as much about tending the earth as it is about advancing an idea, the collective identity, or the culture of a place. Rather than a noun, agriculture or *farming* is a verb -

acknowledging the human organism as an active participant interdependent with its economies and ecosystems. What farming does is nested within the practice of care of being provisioning with nature: nature giving the resources and ways of knowing and in return, to be farming was receiving and tending to the diversity of nature's lessons. Unlike the industrial mentality that is harvest-based, this agriculture is rooted in regenerative practices and an economy that is life-based. These origins of farming are often symbolized with the earth as a shared and nourishing bowl or dish: open, both giving and receiving care to and from earth dwellers who in return ensure that the bowl would never be empty - as its the a source of vitality for all (Pollan 2006, Horwitz and Singley 2006). Farming and agriculture were synonymous with growing food, identity, and a culture of a place constituting our primary engagement with our earth and its fertility; much has been done through industrialization in agriculture to remove it from its natural origins and from everyday lives (Bohn and Viljoen 2017, 169; Steel 2009a, 152).

Nature no longer teaches the industrial farmer, and nature no longer teaches the modern architect; from the caring practices of both farming and building in the move towards the culture of today, the knowledge that both are part of nature has been erased. This is depicted in Bill Mollison's drawings on the next page.

Building and Farming For Post-Industrialism and Post-Modernism

Writing this thesis from within the discipline of architecture it is perhaps more known how western modernity became built on the tabula rasa claim, erasing and not starting from the given, which is our earth and nature (Krasney 2019, 35).
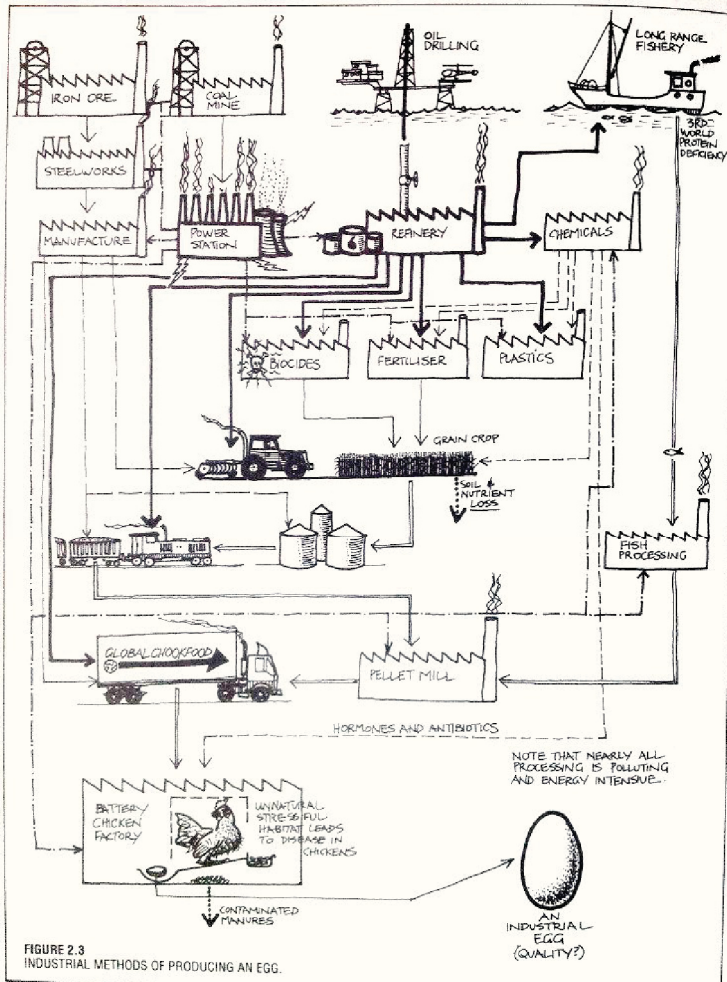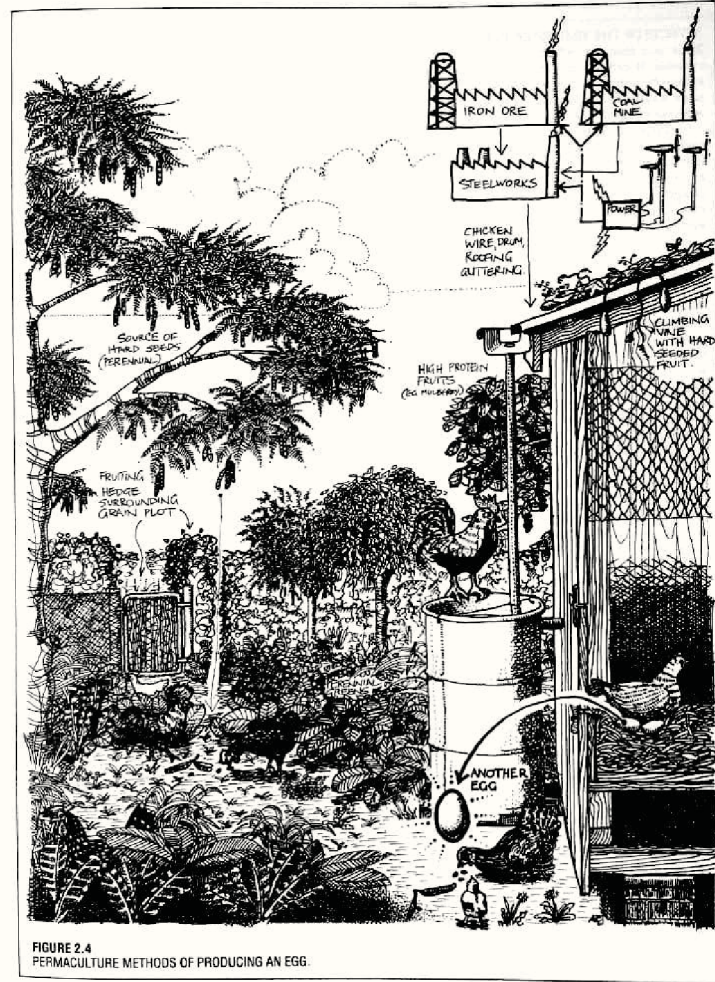
Drawings of how to produce an egg with or against nature by Bill Mollison (Mollison 1997).

Exploring the discipline of agriculture has too revealed the tabula rasa claim in industrial agriculture, a deeply colonial mechanism that annihilates nature and will annihilate everyone and everything that existed on the earth before should it continue through existing methods; but nature is the premise of regenerative, biodynamic agriculture and occurs today in mostly small-scale farming practices.

Small-scale farming is countering industrial agriculture's claims of efficiency; showing an increase in yields through biodiverse practices and regenerative techniques on smaller portions of land that improve soil fertility without synthetic fertilizers pesticides, or increased mechanization (Rhodes 2012; Foley 2014). These regenerative techniques include biodynamic silvopastures and intercropping to improve yields, plant nutrient cycling, which have been shown to reduce soil erosion (Foley 2014; Hawken 2017). In *Drawdown: The Most Comprehensive Plan Ever Proposed to Reverse Global Warming*, these techniques have more affect on total atmospheric CO_2 reduction than any changes to our buildings and city infrastructure combined — not to mention at a fraction of the financial cost (Hawken 2017, 224). One of the challenges of implementing these techniques at a large industrial scale is that farming is a risking business - farm profitability the utmost concern for producers and trying something perceived as new (but we know that it is in fact based in practices existing before the industrial revolution and residing in nature) is inherently a risk. Small and medium scale farms that are implementing these techniques have become the testing ground for entrepreneurs and researchers, central to agricultural debates on climate change, and their profitability stimulating conversation about how they can in fact help to de-risk

Aerial photograph of Les Jardins de la Grelinette by Parafilms (Market Gardener 2019). The 10 acre micro farm in Quebec, Canada founded by Jean Martin Fortier and Maude-Helene Desroches grosses more than $100 000 per acre and feeds more than 200 families through SCA shares and farmer's markets. "My mission is to inspire, educate and empower people to work together towards multiplying the number of small ecological farms all over the world. This I believe, is how we can replace the poison and destruction of industrial agriculture with a food system based in nature and community. Food grown with care, by and for people who care" - Jean Martin (Market Gardener 2019) .

the farming business through their emphasis on natural processes, human-scale regenerative agriculture, and generation of biodiversity (Hayhoe 2020; Ditzer 2020).

Local and small-scale farms are offering the greatest solutions in terms of food sovereignty and environmental impact, but increasing urbanization and overwhelming suburban development is forcing them into extinction, industrial agriculture is forcing farm consolidation, and the durability of the monoculture mentality persists (Goodman and Goodman 1960; Arthur and Witney 1972). Environmental scientist Lenora Ditzler's work with pixel farming strives to find a method and way of working with biodiversity that can exist at high-resolution on small farms and scale these practices to larger fields. Ditzler describes however that the monoculture mentality is seemingly indestructible:

> We've fine-turned the paradigm for centuries, and it's embedded into every link of the food chain. Our crops are bred to thrive in monocultures, our machines are designed to cultivate monocultures…our grocery stores are organized to sell monocultures, our eating habits are adapted to demand monocultures, and our polices are developed to reward monocultures. (Ditzler 2020, 300).

Our blind dependency on globalized industrial distribution chains and practices combined with our prioritization of urban environments is most concerning in our efforts to be more sustainable and resilient in the face of our climate crisis; and, considering that these chains and practices afford a city three-four days worth of food at any given time, with very few of us having the education or experience in growing our own food, any climatic, financial or socio-political crises makes the consumer model very susceptible to disruption (Steel 2009b, Herring and Wirick 2018; Kolodziej 2014, 4).

1s = cabbage; 2s and 4s = cereal-legume mixtures; 3s = potato varieties; 5 = clovers
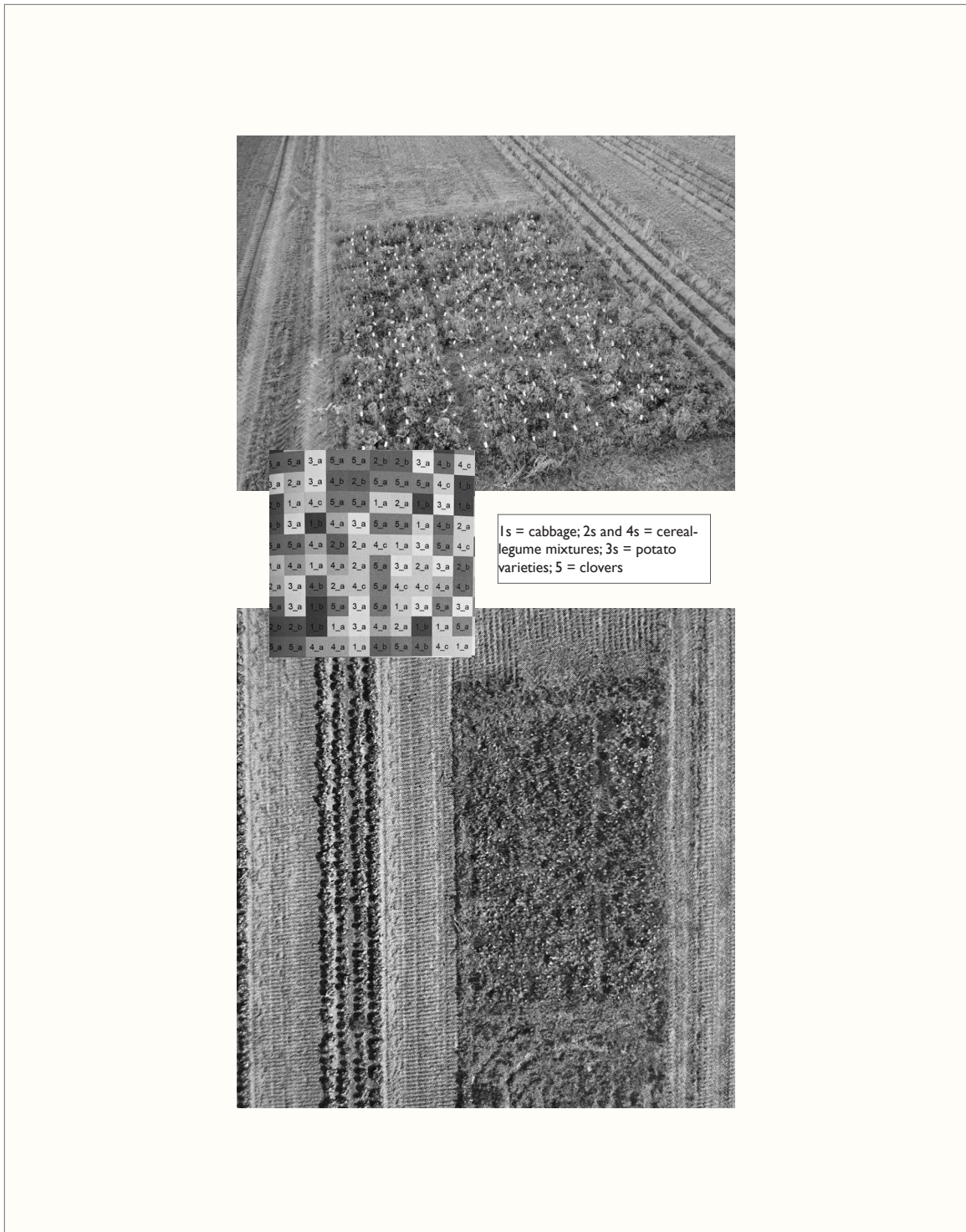
Photograph of pixel cropping next to agricultural strips by Peter van der Zee (Ditzler 2020, 303). Research by Lenora Ditzler on pixel farming is grounded in high-resolution spatial, temporal, and genetic diversity "attracts more functional biodiversity, the plants seem to have less pest damage, and the crop yields appear to be, for the most part comparable to our monoculture references" (Ibid., 321). Pixel plots are not creating agricultural fields but a living ecosystem of space, time, and biodiversity that at the right resolution could produce enough food for human without relying on agrochemicals or fossil fuels.

Challenge and Opportunity of the Covid-19 Pandemic

The severe acute respiratory syndrome coronavirus (SARS-CoV)-2 responsible for the COVID-19 pandemic has substantially disrupted this consumer model - having equally profound effects on global, national, community and individual scales. The food industry that normally operates behind the scenes to supply our urban consumption and demands became strikingly exposed and has re-awakened us to our global interdependencies and a way of seeing earth's resources as being intimately linked to our health, resiliency, and to each other (Steel 2020).

Fortinos Superstore, emptied shelves during COVID-19 pandemic, Ontario, 2020.

Major challenges to the global food system and Canadian agri-food supply chains - farmgate to consumer - has resulted in closures of food production and distribution centres, labour shortages, and with this more transparency and shifts in consumer demand. In the global north, we were first able to experience this fragility in the system by the empty shelves at the supermarkets; while we largely do live in ignorance of the effort the food industry secretly endures to supply our consumption, the pandemic helped to reveal the stranglehold not over just the grocery sector but the entire infrastructure that supplies our food (Steel 2009a). The uncertainty and volatility of supermarket supplies and grocery stores has otherwise invigorated alternative food networks (AFNs) and motivated people to begin growing their own food. "Pandemic gardening" surged, and Dalhousie University's Agri-Food Analytics Lab (AAL) reports that of the Canadian gardeners surveyed, nearly one in five (17.4 per cent) started growing their own food for the first time during COVID-19 (AAL 2021).

Opinion: COVID-19 has put Canadian farmers in the spotlight. How can we make the most of it?

Karn Manhas   May 22, 2020

Politics

The pandemic is creating a season of anxiety in hard-hit farm sectors

Coronavirus: Food supply chains 'need a rethink'

By Caroline Evans
BBC News

⏱ 3 May

ONLY 1 IN 3
CANADIANS THINKS THE FOOD SYSTEM IS HEADED IN THE RIGHT DIRECTION

TOP CONSUMER CONCERNS

62%
Keeping healthy food affordable

58%
Rising health care cost

50%
Climate change

49%
Food safety

39%
Having enough food to feed Canada

91%
Know little or nothing about modern farming practices

91%
Are concerned about misleading food labels or descriptions for the purpose of marketing

3 in 5
Canadians are interested in knowing more about agriculture and modern farming practices

96%
agree Canadian farmers are good stewards of the environment

WORLD ECONOMY

Global food prices have been rising during the coronavirus pandemic, hitting food security

PUBLISHED WED, SEP 9 2020-12:38 AM EDT

HEALTH

Coronavirus: Food prices to rise across Canada as COVID-19 pandemic continues

As Food Supply Chain Breaks Down, Farm-To-Door CSAs Take Off

By ERIC WESTERVELT • MAY 10, 2020

teens pick crops, buck stereotypes

Local youth step up to fill labour shortage and get a lesson in what it takes to grow food

APPLE GROWERS MANAGING THROUGH COVID, DRY SEASON

GROWERS HAVE SEEN LABOUR SHORTAGE PROVINCIALLY: OFVGA CHAIR

"This farm is responsible for producing a lot of Norfolk's and other areas' food, so I feel like helping out really does contribute to the food that we'll see in the coming year."

said they grow Golden

GROWERS HAVE BEEN FORCED TO ADAPT AMID ONGOING PANDEMIC

How small farms found new customers during the coronavirus pandemic

PUBLISHED FRI, JUL 17 2020-11:58 AM EDT | UPDATED FRI, JUL 17 2020-3:36 PM EDT

Pandemic gardens have caused 'unprecedented' demand for seeds

Coronavirus Is Worsening Seed Shortages For Farmers And Gardeners

By CHELSEA STANFIELD • MAY 11, 2020

Collage of local newspaper headlines and online articles beginning March 28, 2020.

The growth in AFNs and food growing initiatives during times of uncertainty are well documented as bottom-up responses to the unsustainable and volatile food systems, empowering communities by bringing producers and consumers together through transparent food supply chains to share in the risks and rewards of growing food locally (Mert-Cakal and Miele 2020; Hinrichs 2000; Steel 2020). Here the concept of food sovereignty as not just access to food, but also the control a community exercises over what that food is, can be addressed by AFNs, as well as the reduction of risk in the farming business with food subscription and shares models. While its neither possible or desirable to feed cities solely through AFNs, in times of uncertainty food localization provides resilience and sustenance to the population, engage communities with their local (small-scale) producers, and point to the need of coordinated interrelationships between local food networks and international agriculture. According to Bohn and Viljoen, designing for food sovereignty in our urban environments can lead to a more environmentally sustainable and equitable system (Bohn and Viljoen 2014, 7).

From the community scale, our personal experiences during the pandemic are changing our consumptive behaviours - the link between food and diet having profound effects on our immune system and disease susceptibility is our first line of defence in states of crisis (UNICEF 2020; FAO 2020; Mayasari et al. 2020, 2). We are becoming more vigilant of our food, consumer choices, how we relate to one another, and to nature - a new emphasis on holistic health has emerged. Returning to our initial definition of care, our concerns for our individual resiliency and community health through our food and diet is what we as a society are defining

what we care about - we must anticipate the irrelevancy of architecture should it continue to relegate these concerns; now more than ever, what is designed is far less important than how people live, work, eat, and connect to one another in them.

Agents of Care

While more renowned experimental architectural projects intending to provide a healthier or holistic life, fundamentally interrelating living, working, building and farming are discussed in the next chapter, this subsection is for describing the agents of care, an overview and summary of individuals I met throughout the duration of this work and launch point for the design proposal. It returns us back to the thesis question how can both architecture and agriculture foster a building and farming culture that is committed to earth's regeneration and care. Culture, a word as linked to plants as it is people, is a collective cultivation, and how care about individual health and diet shifts to how we collectively care with our earth and sustains their care over time - the point of this research.

Returning home for the pandemic allowed me to experience not only the fragility of our consumer model but the fragility of producer model from having conversations with farmers and their working communities: large-scale farms had crops left to rot in their fields due to the restrictions in acquisition of seasonal workers; and conventional agricultural practices, like the ones I am most familiar with and connected to through my family, were experiencing exacerbated competition in their acquisition of animal feed, fertilizers, seeds and other inputs. I saw first hand how small-scale farmers became particularly overworked and overwhelmed

due to the incredible changes in consumer demand for AFNs such as food boxes and CSAs (Hendrickson 2020; Gustin 2020; Mert-Cakal and Miele 2020); however, I also had the unique experience of watching how these small-scale farms were better positioned than their industrial or conventional counterparts to adapt; and, as it is in nature and the renowned phrase of Darwinian evolution: "It is not the strongest of the species that survives…it is the one most adaptable to change."

Many of these small scale farms with their proximity to urban markets, social conditions and networks they have established over generations, enable them to share and pool resources and access services which makes their operations more successful - especially in the event of market closures and supply disruptions (Macleans 2014; Walton 2003). Closures meant many farming communities switched to online markets and food box schemes - many even giving their produce to other farms with already established online platforms experiencing the exponential demand, or trading resources such as equipment and farming supplies.

Part of my role as the younger returning-home generation was to help the aging demographic of farmers get their produce online, fill-in for labour needs, or perform the additional pandemic induced labour such as the construction of "end-of-the-road" markets seen in the images on the next page.

There is also another aspect to the pandemic experience that I am not sure made the newspapers or media - I got to see how readily these small scale farmers not only offered alternative sources of food to consumers, but their knowledge, assistance, and in some cases infrastructure

"END-OF-ROAD" MARKET STAND CONSTRUCTION, ONTARIO 2020. THE STAND WAS ASSEMBLED USING SALVAGED MATERIALS AND TESTED THE FEASIBILITY OF THE PALETTE FOUNDATION USED IN THE THESIS DESIGN PROPOSAL OF THE SHED (see page 129).

What does this building want to be?

REPURPOSING GREENHOUSE FRAMES, ONTARIO 2020. WORKING WITH THE LOCAL COMMUNITY, UNUSED GREENHOUSE FRAMES FROM A LOCAL FARMER WERE RELOCATED AND REASSEMBLED TO MAKE TEMPORARY LIVING ACCOMMODATIONS.

Top: Local community and returning-home generation help to build an "end-of-road" market stand due to public market closures, 2020. Bottom: Returning-home generation helping to repurpose greenhouse frames to make temporary living accommodations for those coming to the farm from the city and offering helping hands, 2020.

What does this farming want to be?

LOCAL FARMING SOCIALLY DISTANCING WHILE TEACHING CUSTOMER HOW TO SEW SEEDS DIRECTLY IN THE EARTH OF A GREENHOUSE, 2020.

AN UNCOVERED GREENHOUSE THAT BECAME TOO EXPENSIVE TO HEAT IN WINTER USES SNOW AND STRAW TO INSULATE PRODUCE AVAILABLE TO THE SURROUNDING COMMUNITY, 2020.

Top: Local farmer allowing customer from the city to use greenhouse and teaching how to direct sew seeds, 2020. Bottom: Local farmer overwintered spinach (it is very deliciously sweet) and carrots available to the community through fall and winter as pick-your-own; demonstration of knowledge, generosity, place-related skill, 2020.

to those during the pandemic. Plan-B Organics, a small scale farm outside the City of Hamilton who established McQuesten Urban Farm in the downtown, amplified their support by combining their experienced labourers with the new wave of volunteers - the "pandemic gardeners". My uncle, who operates a small-scale organic farm, began giving away unused greenhouse frames and coverings to other farms and people in the suburbs wanting to begin their own food growing initiatives. Other farms encouraged their previous customer-base in the cities to use their property for recreational space or as an escape, some even beginning their own informal allotments in exchange for labour.

These skills embedded in generational place-making, the networks of sharing and exchanging resources, and extended communities of our small scale farms are why these farms if lost cannot be recreated elsewhere. Relocation has negative ramifications for the place related skill which is enhanced by the farming community's place-related experience - once their ground is lost, so is this skill, resources, and farming community.

Further, as agricultural infrastructure on the urban fringe continues to decline and be sold for development, the availability of services such as farm equipment and network that enables farmers to share resources also declines making it more difficult and expensive to farm. For new operations and younger workers coming into the farming industry many are unable to begin their own businesses for these same reasons. They face many barriers such as high capital costs, access to land, the competition with larger scale operations, investments in equipment and infrastructure, and further lack the specialized education and experience of older farmers (Walton 2003, 25). "While

an omnibus protection of all farmland is difficult to defend, the protection of the best soils in a metropolitan area would appear not only defensible, but clearly desirable" (McHarg 1971, 60). What McHarg fails to mention that there is no point in protecting our fertile land base if there is no younger generation of skilled operators encouraged to continue farming and care for it.

To combat the lack of education and high capital costs and ensure the continuation of a viable agricultural sector, a series of recommendations have been made which includes, but is not limited to:

- More public education on the role of agriculture in the region, the value it adds to quality of life, implications related to its loss, and role the industry plays in food security, sovereignty, and climate change (Hawken 2017; Bohn and Viljoen 2014).

- Improving the access to privatized agricultural land, technology and local facilities and resources to attract young farmers and encourage local food production (Miller 2010, 24).

- Providing a mechanism for the long-term succession of farm properties to encourage the next generation to enter the industry (Walton 2003, 27)

These recommendations and multi-generational exchanges I experienced and witnessed during the pandemic are precedents to the three agents of care for the proposal: the lifestyle agent, concerned about health, diet, and climate change; the local agent, caring for the increase in food and changes to lifestyle demands; and the return agent, caring with the older generations in this unprecedented time of

crises. Each of these agents and their context within the GTHA are elaborated upon - the who is caring about what, and who is caring for who - and the architecture intends to foster their interrelationships and interdependencies for care beyond the pandemic and into their future efforts fighting climate change.

The Lifestyle agent: "Care about health and climate change"

Lifestyle-seeking agents of care are not primarily profit orientated; they are largely urban or peri-urban dwellers with an affinity to the outdoors, nature and recreation. Lifestyle agents were particularly motivated by their concerns for individual health and the circumstances created by the COVID-19 pandemic to care about climate change; they possess a willingness to help and share knowledge with local communities as they are curious about what they can do in their current living situations to make a positive impact within their daily lives. They are seeking meaningful connections, wanting to support local businesses, and reconnect with their food sources and local farmers. They are interested in new entrepreneurial ideas, unique outdoor experiences and adventures as an escape from the city.

The Local Agent: "Care for accessibility, knowledge, experience, and food"

Farmers and their working communities which have extensive knowledge and experience growing. Farm owners have property and infrastructure, but making a living solely on farming has become increasingly arduous and low profit. These local agents became overwhelmed during the pandemic - competing for seeds, chemicals and fertilizers, and other farming inputs like never before. Circumstances of the COVID-19 pandemic and unprecedented demand for

local food sources encouraged local agents to diversify their products, and practices. But with farm owners increasing in age, farm debt, and facing developmental pressure from our cities, local agents wonder how long they can keep going before the land is sold. For farm owners it does not seem as if their children are interested in taking over the business and the majority do not have farm succession plans.

The Return Agent: "Care with the next generation"

The next generation who left rural properties and families to pursue education and careers elsewhere. They are now thinking of their aging parents and are seeking homes nearby to help in their care; at the same time, they are wanting to apply new skills and explore creative business opportunities. Return agents have an emotional connection to the farmland increasingly subsumed by development - and the pandemic offered a unique opportunity in which they were able to reconnect to their local communities and combine their experienced support with fresh ideas and ambition.
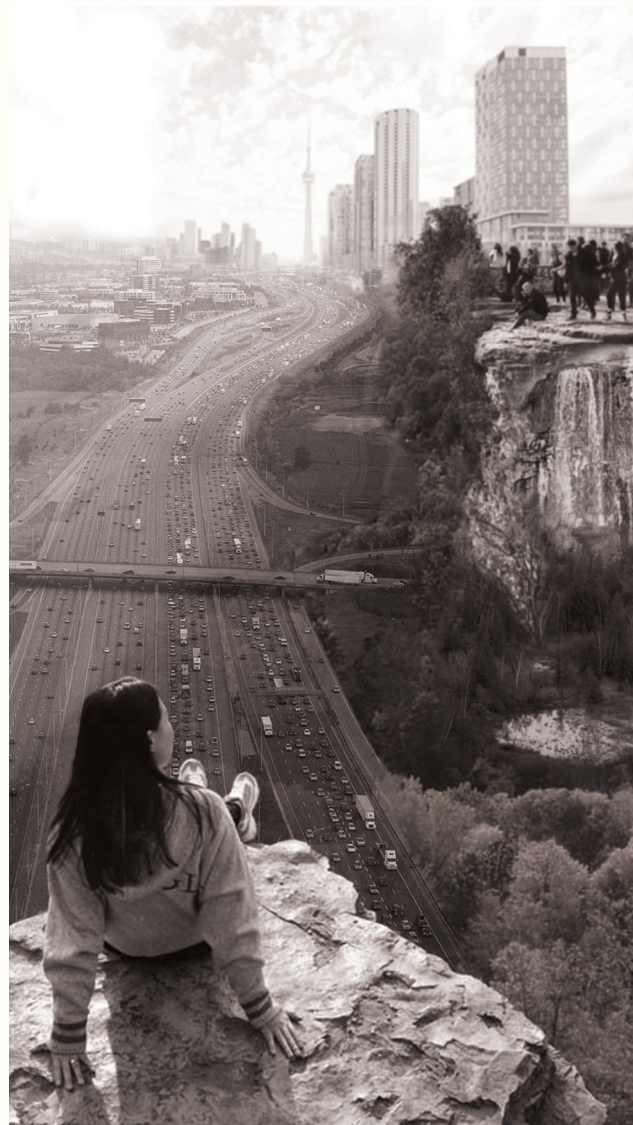
LIFESTYLE AGENTS

Collage of the lifestyle agents seeking entrepreneurial adventures, and unique outdoor experiences as an escape from the city. They are motivated by the circumstances of the COVID-19 pandemic and food chain disruptions to care about health, diet, food, and have been making efforts to support local. Residing in urban or suburban settings, they wonder about climate change and how they can make a difference in their daily lives.

LOCAL AGENTS

Collage of the local agents: farm owners and working communities. Local agents have extensive knowledge and place-related experience. Farm owners have property and infrastructure, but farming has become increasingly arduous and low profit, and deters the next generation from entering the business. Local agents wonder how their operations can become less ecologically degrading without jeopardizing farm profitability and increasing the risk of the business.

RETURN AGENTS

Collage of the return agents who left farms for careers in the city and are now seeking homes to be close to family. They have new business skills and want to explore new opportunities while taking care of aging parents. They retain knowledge and have deep emotional connections to farmland - wanting to reunite with their local communities and reconnect to the land.

INDEPENDENT AGENTS OF CARE		LIFESTYLE	LOCAL	RETURN
	Concerns and Cares	Diet, health, recreation, the environment and climate change	Food; the quality of the soil; profitability of the farming business; retirement and future of farmland	Aging parents and home close to family; cultural and nostalgic ties to farmland; new business opportunities
	2020 Covid-19 Pandemic Disruptions	Alternative food networks, Supporting local, growing own food, "Pandemic Gardening", unique outdoor spaces for recreation	Volatile food chains and increased interest in food boxes, food shares, community supported Agriculture (CSA) schemes	Providing 'technological' and remote networking skills to older generation; helping hands to fill in for labour shortages

INTERDEPENDENT AGENTS OF CARE

RECREATION & OUTDOORS → RURAL LANDSCAPE

FOOD GROWING & EDUCATION ← KNOWLEDGE AND EXPERIENCE ← INTER- GENERATIONAL LEARNING / EXPERIENCED FARM HANDS

Improve access to privatized agricultural land

BUSINESS IDEAS, CAPITAL, & ONLINE SOCIAL NETWORK → SUPPORT, LABOUR & PROFITABILITY → BUSINESS SKILLS / NEW OPPORTUNITY

* *More public Education on role of agriculture*

ECOLOGICAL MINDSET & NEW IDEAS → NEW PRACTICES & LEARNING / PROPERTY & INFRASTRUCTURE ← CONNECTION TO LANDSCAPE & KNOWLEDGE OF LANDS

* *Mechanism for succession to encourage next generation*

TRANSITORY APPROACH TO CARE

Care About →

Covid-19 Pandemic Disruptions and increased Awareness about diet, health, and climate change

Care For →

Support to Local Communities and Alternative food sources; new ways of engaging with farmers and food

Care With →

Attracting next generation with new business opportunity and appreciation of nature and each other

Summary of the agents of care. The thesis fosters interdependencies between individuals starting from the changes in consumer behaviour of the lifestyle agents incurred from pandemic events, continued through the support and involvement of local agents, and attracting return agents back home to support their families.

Chapter 2: Literature Review

The understandable discontent caused today, the shared burden of the Anthropocene-Capitalocene, and issues of increasing urbanization is similar to any other revolution - however the capital function is much changed with our economy at war with all forms of life on earth. Aforementioned, Haraway's Chthulucene introduces "multi--species assemblages" to envision possible survival which like Braidotti, suggests step by step collective action to "join forces to reconstitute refuges, to make possible partial and robust biological-cultural-political-technological recuperation and recomposition…" (Haraway 2015, 152; Braidotti 2019a).

To better understand that there are differentiated ways in which architecture and agriculture relate to capital, this thesis research is well situated in debates of consumption and production, which divide culture from nature, economy and ecology, urban from rural, polarize city and country, individual and collective, and thinking of the future and the past - preindustrialism and postindustrialism. Likened to the terminology defining our era, these disabling binary impasses and classifications are endless and have been throughout architecture and agriculture's coevolutionary history. This chapter examines case studies that found a middle ground and medium to living and survival: proposals of alternatives that did not require the immense and exhaustive effort of a social revolution yet inspire transformation in our way of thinking, consuming, and of relating to others and nature (Arendt 1977; Tireneh 2014, 5; Paige 2003; Huntington 1968).

A long tradition of architectural agrarianism that seeks to find a happy medium to living in the reconciliation of the city and county is examined throughout the early 19th and 20th century in historical utopian models and today in urban-agricultural models (Tenhoor 2010; Bohn and Viljoen 2014). These revolutionary organizational schemes, utopia or "no-places", are authoritative, top-down, and ambiguous in their approach to diverse landscapes and the unique knowledge and experience embedded in existing communities; but particularly caring about social relations and food supply through these designs alone does not ensure that caring for needs and a caring with will be reliable over time. This is corroborated in sitopias, sitos "food - places", a term borrowed from food-architect Carolyn Steel, and describes bottom-up approaches that care for sustenance agriculture in times of crises or scarcity (likened to our current COVID-19 pandemic). While sitopias provide community resiliency in contexts of social, political, or economic upheaval and inspire urban agricultural movements globally, they are often circumstantial and lacking in their commitment and care over time as well.

Lastly and more pertinent to the thinking of Braidotti and Haraway, this chapter discusses the creation and coexistence of diverse ecologies of "alternative" noncapitalist" circular economies, that begin from the premise of their interconnectedness: communitas; which in this document refers to communes, ecovillages, and intentional communities. Despite stigmatization, communitas offer collaborative criticism and collective disassociation from within the structure of capitalism to demonstrate that collective change is possible through active activism, education, and a detoxification of ourselves as 'consumers'.

Utopias, Sitopias, and Communitas

"Non ● Place"   *"Food ▲ Place"*   *"Their ■ Place"*

SETTLEMENT

BUILDING TYPE

GROWTH

ELEMENTS

ECONOMY / PRACTICE

PROCESS

| COMMUNAL LIVING | "CONNECTORS" | INDIVIDUAL INNOVATION | INWARD FACING BLOCK | MULTIPLE NUCLEI | CLOSED LOOP | TOWER | REPLICABLE LANGUAGE | PUBLIC EDUCATION | BIOREGIONAL MEANS |

INDIVIDUAL & COMMUNAL   *ECONOMY & ECOLOGY*   *UNIQUE & REPLICABLE*

COMMUNITAS   **SITOPIAS**   **UTOPIAS**
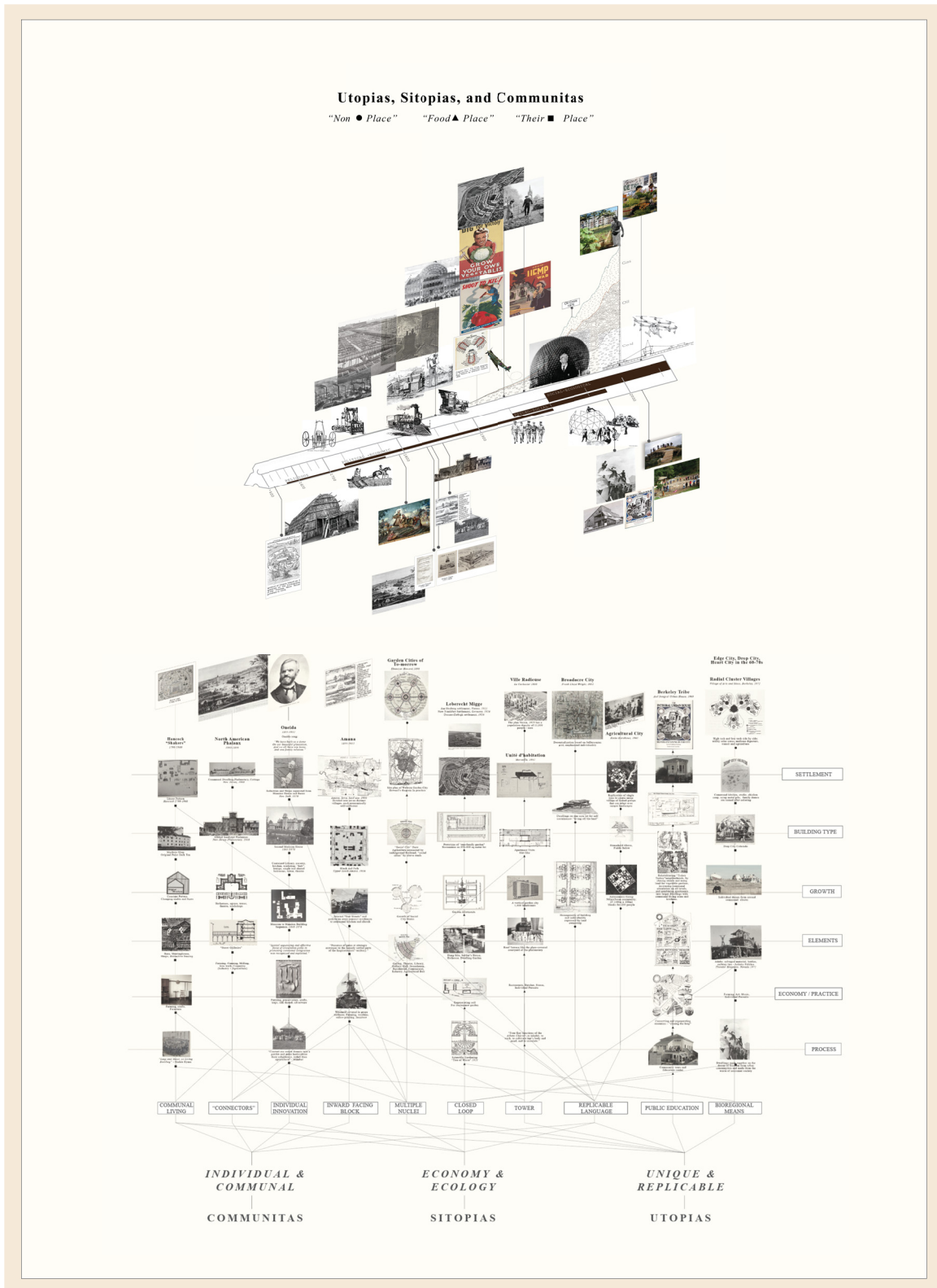
Timeline and selected case studies shows the coevolutionary history of agriculture and architecture; utopias and sitopias coincide with periods of war, social, economic or political upheaval while communitas continue to form and evolve regularly over time (see the scale ruler).

UTOPIA: EBENEEZER HOWARD 1989

SITOPIA: NEW FRANKFURT, 1926

COMMUNITAS: DROP CITY, 1976

REFORM: INTERDEPENDENCE, EQUALITY, N/A

REORGANIZE: DEPENDENCE, INEQUALITY, FRAGILITY

REJECT: INTRADEPENDENCE, EGALITARIAN, SELF-RESILIENT

"No ● *Place"*
City
UTOPIAS
Country

"Food ▲ *Place"*
Consumption
SITOPIAS
Production

Separation
Return

Individual
COMMUNITAS
Collective
"Their ■ *Place"*

STRUCTURE

ANTI-STRUCTURE

Overview of utopias, sitopias and communitas for the theoretical foundation.

Representing innumerable experiments that resist the dominant industries of power and capitalism to form agrarian based settlements, case studies can provide architectural professions with substantial experience of the ecological resolutions and rewards of integrating building and farming, and the design proposal incorporates several guidelines from their literary examination. The analysis of utopias, sitopias, and communitas builds the theoretical foundation for developing the design methodology of the thesis project.

"No places": Agrarian Utopian Models

Sir Thomas More invented the word *utopia*, where society was founded and remained as "non-place" and a "nowhere" but also meaning "good place" concerned about how people should live better lives (Tod & Wheeler 1978; Schaer 2000, 8). Utopias are intellectual exercises and in their reassessment of society's organization Tod and Wheeler (1979) describe that they are concerned with three main relationships: people's relationships with each other, people's relationship with nature, and people's relationship to their work (Tod and Wheeler 1979, 7-10). I am fascinated by utopias, as they demonstrate and particularly illustrate what their creators are caring about, and how they imagine care to be replicated. Utopian exercises and publications are frequently associated with periods of great social upheaval, much like the world we find ourselves living in today, only the stakes are greater and might well be "utopia or oblivion" (Scaheir 2000; Tod and Wheeler 1979, 7) .

Ebenezer Howard's concept in *Garden Cities of To-morrow* is one of the most notable strategies suggesting the amelioration from the "wen" of cities and excessive consumption arising from the industrial revolution (Howard [1902] 2008). This is illustrated by the diagram of "The Three Magnets", in which Howard asserts that the sharp divide of agricultural production from the industrial pursuits and consumption of cities are fallacy: rather than two alternatives, the combination of town and country can incorporate all the advantages of a social town life with all the beauty of country living.

Howard cared about the redistribution of the population to secure healthier surroundings and more regular employment
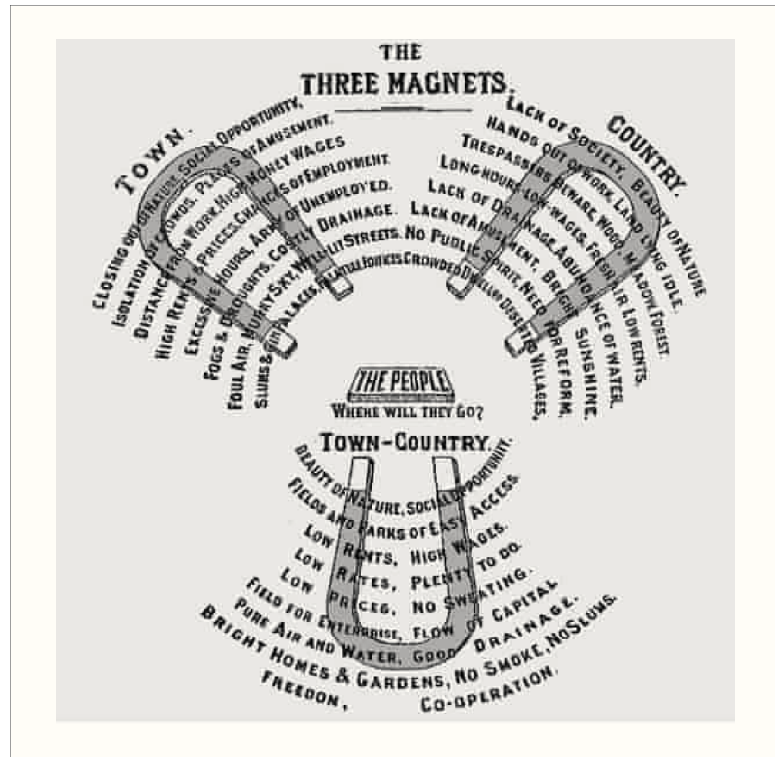
"The Three Magnets" from *Garden Cities of To-Morrow*: Town-country combined industry, social opportunity and production. Howard's concept to create balance between consumption and production by redistributing the population through a third magnet (Howard [1902] 2008, 6).

so that one need not "stifle their love for human society" by living in the country or on the other hand "forgo almost entirely all the keen and pure delight of the country" by living in the city (Howard [1902] 2008, 4-12). While the Town-Country concept cared for both social and economic opportunities, Garden Cities were envisioned to prevent city expansion into the countryside with the formation of replicable independent city states surrounded by an agricultural green belt. How Howard's ideas were realized to some extent in the form of greenbelt cities are extensively criticized for becoming dormitories for working commuters — reinforcing the disconnect of domestic and productive life and beginning the impulse towards suburbs (Penner 2019, 24; Goodman

and Goodman 1990, 8; Hayden 2004). Theses criticisms are substantiated in Ontario's Greenbelt with suburban developmental pressures and in an international context having various impacts on housing affordability (Carter-Whitney 2008). It is however important to recognize that Howard believed in a new civilization where town, a symbol of society and co-operative relations could be combined in the country, a symbol for nature, all that we are, have, and source for all health (Howard [1902] 2008, 10).

Prior to the end of World War II, Le Corbusier and Frank Lloyd Wright also considered food production in their visionary plans and agrarian awakenings (Tenhoor 2010). In the Radiant Farm (1934-35), a companion plan to the Radiant City, Corbusier sought to combine industrialization with the more natural agriculture of citizens and kitchen gardens. Frank Lloyd Wright developed Broadacre City to criticize
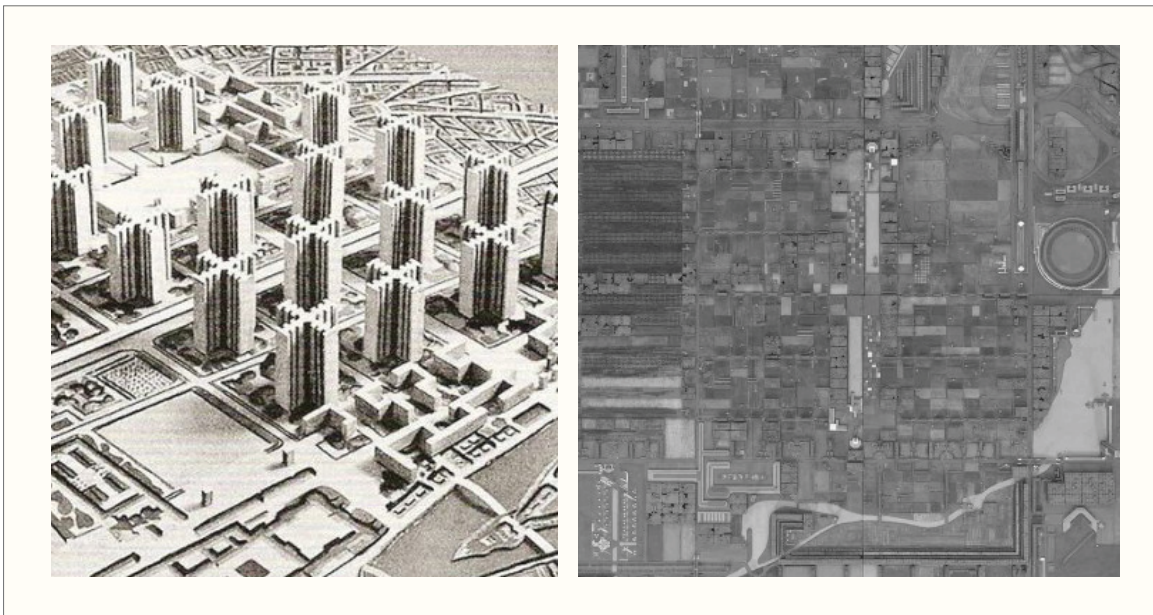
Left: Image of Le Corbusier's "Radiant Farm" designed in the 1920s (Etiennegblog 2018). Right: Photograph of Frank Lloyd Wright's "Broadacre City" (1935); 12 by 12 foot model representing a hypothetical four square mile community. Decentralization and individuality were a focus in the development of architectural forms ("Broadacre City" 2019).

the modern industrial city, conspicuous consumption, and emphasized the importance of individuality and agrarianism through the allocation of one acre lots (Tenhoor 2010). Both Corbusier and Wright attempted to unite both industry and production emphasizing human presence in an agricultural landscape. Incorporating human presence into agricultural landscapes is key in these proposals - almost likening agricultural diversity with human diversity and thus biodiversity. These models are nevertheless represented in an unending and ambiguous landscape more akin to architectural fantasy than a useable replicable framework for the limited space and natural resources of our earth today.

While the design proposal does not aim to reinforce the impulse towards the suburbs it aligns with Howard's ideas of co-operative relations between city and country through how it envisions interdependencies forming between lifestyle agents and local agents of care. These interdependencies, because they are based on people, would be particular to different contexts and conditions of cities and practices of agriculture in countries around the world. I believe the notion of the kitchen garden, mentioned in Corbusier's work, captivate the importance of outdoor growing spaces for individuals; historic kitchen gardens were incredibly productive, enhanced the experience of nature through human participation in seasonal changes, and fostered connection to the earth while creating opportunities for exchanges with neighbours and others (Neering 2005, 41; Duncan 2006, 123). The inclusion of the kitchen garden in Corbusier's utopia as representing an ideal allocation of earth and growing space per individual is lost in the representation of the utopian vision; likened

to urban areas today pursuing both building and population density, these "*sky*"- scrapers are devoid of areas that can foster to an individual's connection to the *ground* and our earth. Growing food in skyscrapers requires access to rooftops or the implementation of vertical production and hydroponic systems that are energy consumptive and may not be affordable nor feasible in many contexts. The design proposal aims to foster an individual's connection to the ground, our earth, by growing directly in it and through the seasons with the program of rentable farming allotments (see Phase I: Allotments in Chapter 5: Design Proposal). Further, these allotments are envisioned to not only emphasize human presence and diversity in an agricultural landscape but the corresponding architectural diversity to encourage it - unlike Frank Lloyd Wright's envisioned utopia with ubiquitous and childless dwellings.

"Food Places": Sitopian Circumstances

As the century progressed from these utopian models, in general the trend was towards increasing industrialization and modernization reinforcing the separation between the land of production, and the people of consumption, nature and culture (Nasr, Komisar, Gorgolewski 2014, 24; Steel 2009a). Sitopia is a word borrowed from food-architect Carolyn Steel who describes the transformation of how society eats and the disconnect from the sources of our food today. In this thesis research, sitopias or food places are used to describe circumstantial exceptions with the emergence of co-operative initiatives and increases in local food production due to disruptions in food systems, global chains, real and anticipated shortages.
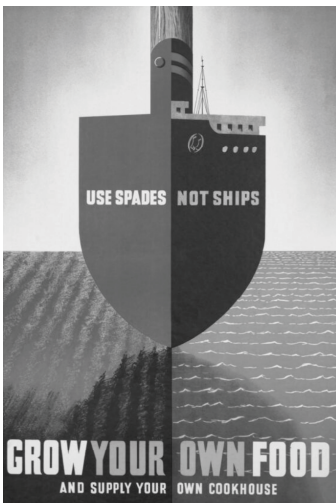
Second World War propoganda in Great Britain (IWM n.d.).

Allotments in Kensington Gardens, London as part of the "Dig for Victory" scheme in 1942 (IWM n.d.).

Samples of wartime propaganda with food as ammunition and cultivating the earth is likened to a battle ground (IWM n.d.).

This is perhaps best known during the World Wars where "victory gardens", "war gardens", or kitchen gardens and community gardens proliferated in cities. At first glance, it would seem that the self-sufficiency, collective participation, and high-yielding successes of these wartime gardens that could be cultivated in urban areas are at odds with the postwar focus on industrial agriculture; yet propaganda emphasized food as ammunition and the cultivation of the earth was likened to a battleground - rather than a caring practice rooted in nature. After the war, wartime technologies turned onto the earth to modernize farms and therefore linking modern warfare to industrial agriculture and ultimately to the destruction of our planet; self-sufficiency was no longer cared about and the earth as we have discussed was not being cared for by human hands in our cities (Tenhoor 2010; Bohn and Viljoen 2014; Pollan 2007).

Another case of sitopia is Havana, Cuba where the dissolution of the Soviet Union in the 1990s created severe shortages

Organiponico in Centro Habana, Cuba, 2019. Visits to production sites revealed a decline in number, upkeep and productivity.

Fig 2: How to make a CPUL City.
1. Bring your own city.
2. Map all your existing open spaces and connect them through green infrastructure.
3. Insert agriculturally productive land. (Note: you may wish to alternate between 2 and 3.)
4. Feed your city!
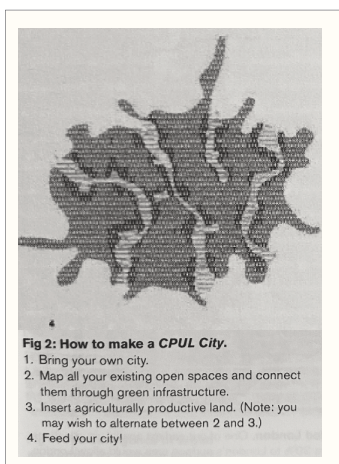
The CPUL theoretical model that strives to make urban space more productive for cities without considering aspects of care and how the labour of cultivating earth and provisioning food is maintained over time. (Bohn and Viljoen, 2014, 13).

and economic distress that resulted in the adoption of organic agriculture from the absence of international trade. How Cubans adapted to integrate more ecological practices inspired many urban-agricultural movements and initiatives today; however these ecological techniques practiced by Cubans have gradually subsided as conditions for trade have improved (Bohn and Viljoen 2014). Victory gardens and urban agriculture in Cuba which demonstrate food localization as key to resilient design precede many of the lifestyle changes and considerations for food and holistic health we have made throughout the COVID-19 pandemic. Caring about local food sources beyond war and periods of crisis for long term maintenance and care about the earth with greater global cooperation is ironically the new frontier in the biggest threat modern humans have ever faced: climate change. Phrases of our current pandemic such as "back-to-normal" are concerning when we need our awareness, attention and care for our planet to persist and accelerate into the future.

The direct connection between scarcity, abundance, and triggering for food-growing enterprises is also noted by Bohn and Viljoen, proliferating the utopian-sitopian hybrids such as CPULs (Continuous Productive Urban Landscapes), Five Fingers, and concept of the Foodshed (Bohn and Viljoen 2012; Bohn and Viljoen 2014). Related to the previous section of utopias, these schemes also do not address the unique regional character of place and assume that the care for food production with the knowledge of *how* to grow food is inherent and will be consistent and maintained over time. The social relations of how this care becomes reliable is missing and how we shift from individualistic mindsets is why there is an increasing tendency for contemporary urban

agriculture to gentrify the very same areas and populations it intends to support (Sbicca, 2019; McClintock et al., 2017; Carolan 2019). Rather than entrenching inequalities in rapidly changing cities, architects and planners must go beyond caring about food needs and merely combining architecture with food; food is not an ad-hoc solution nor is it a program for 'users'; food is human and non-human nature and its interdependent economical, ecological, and social considerations essential in using a lens of care.

The most influential outliers to the general trends of sitopias are described by Bonnemaision and Macy (2016) in their search of experimental projects that brought biology and architecture together in the provision of a healthier ecological and economical framework. The example of the New Frankfurt Settlement, the work of German landscape designer Leberecht Migge, as well as the Antigonish Movement and co-operative in Tompkinsville, Cape Breton, demonstrate the potential of fundamentally interrelating aspects fundamental to every day life (Bonnemaison and Macy 2016):

> Overall, the co-op movement in Cape Breton was aimed at empowering the ordinary person within a commercial network of production and consumption... In the realm of grassroots action, the combination of the study group and co-operation empowered participants, increased their self-respect, and they could draw strength from it. Over bottomless pots of coffee, participants planned the construction of their homes. When they were not discussing houses, they strategized how to start small entrepreneurial ventures, such as co-op stores and credit unions. (Bonnemaison and Macy 2016, 103).

Tompkinsville, which began with only eleven houses built in 1939, was the first co-operative housing project to demonstrate that adapting to a scarcity of resources, learning farming and building together can lead to lasting

"Women Study Housing Plans," Thompkinsville, Cape Breton, 1938. Houses were built by co-operative efforts while interiors were personalized for the individual (Bonnemaison and Macy 2016, 100)

"Joe Laben's Garden," Tompkinsville, 1941. Food-growing parcels provided freedom from a cycle of dependency caused by industrial conglomerates and working conditions after World War I (Bonnemaison and Macy 2016, 98).

influence and foster solidarity and trust among people that extended over decades:

> The movement became one of the leading co-operative movements worldwide claiming the political medium or middle road and, in principle favoured commercial exchange. Co-operative credit unions were willing to lend money to small local businesses and co-operative ('co-op') stores connected farmers to consumers without a middleman. In hundreds of small communities, the credit unions and co-op stores strengthened the local economy and raised the standard of living for co-op participants. (Bonnemaison and Macy 2016, 99).

Leberecht Migge

The work of landscape architect Leberecht Migge, proposed a revolution of gardens not as a nostalgic return to nature but a synthesis of garden, dwelling, and communal space that embraced the latest developments in technology and could solve all social and economic problems of the german nation (Bonnemaison and Macy 2016; Haney 2007, 202). For Migge, the garden was a tool for social and economic reform and argued for comprehensive landscape planning for the betterment of society; I would add, comprehensive agricultural planning for the betterment of not only society but all earth dwellers. Migge's "Green Manifesto" was published during the Land Reform and settlement movement of 1918 in Germany. The manifesto was as a practical manual on settlements that called individuals to action with the collective ownership of land (Haney 2007, 202).

Migge responded to Howard's "Three Magnet" diagram by translating "country-city" into "Land-Stadt" (City-land) aiming to remove polarizing tendencies between the country and city by emphasizing the land itself and proposing a new synthesis:

> The city may not only take from the land,
> The city must also give to the land....

Photograph of allotment sheds in Romerstadt Section, and interior from the Vienna Archives (Bonnemaison and Macy 2016, 93-97).
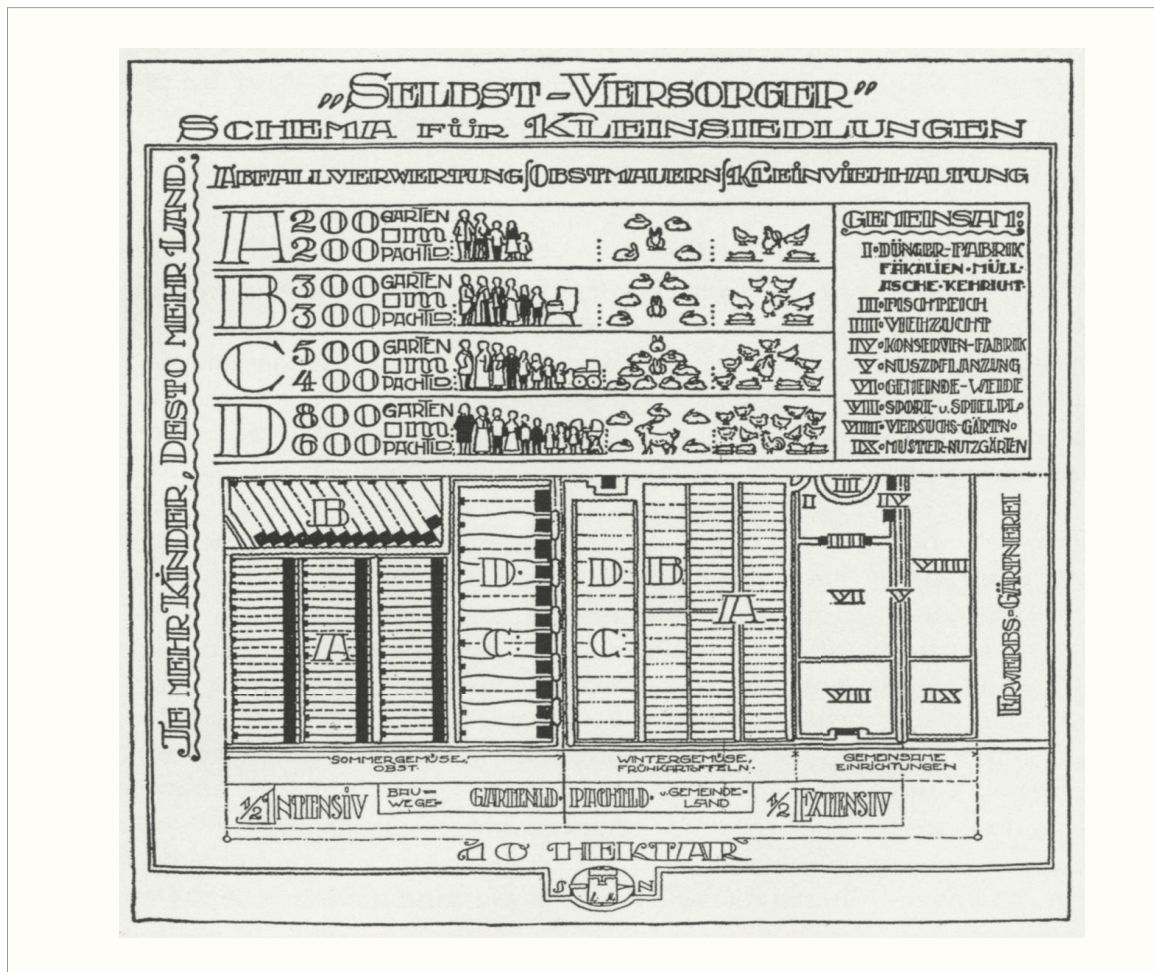
Leberecht Migge's schematic plan for the self-sufficient settlement includes a high degree of specificity and with required areas and nutritional needs according to family size (Haney [1918] 2007, 208).

All city waste to the land. Unify city and land.

We should create our own "earth" (Migge 1919, 915).

A new kind of "unity" of connectedness and interdependency between the German people which were to "bring the city back to the land" and involved the economy of waste-as resource to act in the rejuvenation of the earth. Rather than utopian models, Migge's revolutionary plan was not aggressive in reorganization, nor regressive calling for a return to the medieval village or commons, but believed that ideal social and economic environment could be based on

allotment and communal gardening (Haney 2007; Migge 1919). The New Frankfurt settlement tested these ideals, and Bonnemaison and Macy (2016) include in their research that "residents supported the gardening program, raising fruits and vegetables, and tending ornamental potted plants and blooming vines" which continues to this day (Bonnemaision and Macy 2016, 94). Further, Bonnemaison and Macy (2016) mention that while the residents of New Frankfurt value the outdoor space as an extended living room and as an attractive complement to their diets, they describe the land parcels reserved for gardening to be only half the size needed to support a family of four (Bonnemaision and Macy 2016). Perhaps it is the knowledge of experienced farmers, their support, and particularly the expertise of those growing at small-scale that prove yields similar to Migge's gardening descriptions that is missing in making the transition to farming lifestyles most successful.

"Their Places": Communitarian Experiments
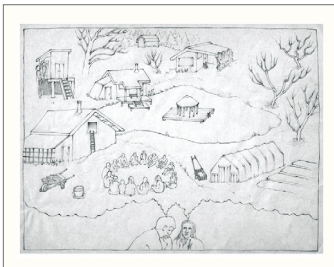
"How to begin the design of a new community" drawing by Kim Scheidt, 2016 (Scheidt 2016).

Considering this, communitas - communes, intentional communities, and today more commonly *eco-villages* - were formed by "farmers, and artisans, some immigrants, some native born" and their collective organization advanced agricultural knowledge and achieved distinctive architectural styles (Hayden 1979, 321-323). More than times of uncertainty or forced through need in sitopias, individual members of these groups choose to join and choose to remain in these groups and in this way the commitment to communitas first precedes the communal arrangement that then evolves - this is why their study is so paramount to the research (Kanter 1972, 2).

Photograph of picking oranges, Kibbutz Na'an central Israel, 1938 (Schultz n.d.). Most agriculture is used for community sustenance whereas tourism and hospitality industry constitutes most of the kibbutz income.

The New Alchemist's Bioshelter in winter and production greenhouse (Todd, 1977).

Impetus for these groups and communitas has tended to stem from the desire to live in harmony with the built and cultivated landscapes in major themes: religious and spiritual values, rejecting the sinfulness of the established order and ills of urbanization; politico-economic, a call to reform society and reject the injustice and inhumanity of capitalist society; psychosocial, rejecting the isolation, loneliness and alienation of contemporary society; and socio-ecological and "ecotecture", a combination of ecology and architecture using alternative technologies, natural or recycled materials, for a closed systems approach to live lightly on the earth (Kanter, 1972; Mannell 2018). Although the motivation for their establishment may diverge, communitas recognize that their individual ability to exert change in the world and in their environment is lower than that of their collective power. Coming together in pursuit of common, interconnected goals, members of these communities form a co-operative guild - establishing self-sufficient settlements, based on both industry, sociality, and agriculture - aiming to live with the advantages of both city and country in balance, without the exploitation of nature or each other (Hayden 1976). Underlying the main question of the thesis is whether or not an architectural proposal could similarly attract individuals to come together in pursuit of care of the earth and develop interdependences encouraging their sustained and collective commitment.

Generally communitas, and particularly those labelled as communes, have been mistakenly perceived as groups isolated from the larger society and therefore irrelevant in the globalization of economic society today (Hayden 1976, 8-31; Kanter 1972); it is the freedom of individual choice and expression cultivated in these self-sufficient communities

Photographs of harvesting at Twin Oaks Community Seed farm (Twin Oaks Community n.d.). Members grows open-pollinated and heirloom vegetable seeds on six acres of certified organic land, set a aside for research and seed saving. They have formed a seed cooperative with other farms in the pursuit of the quality and availability of regionally-adapted open-pollinated seeds.

Community Hub building at centre of Lammas Ecovillage, Pembrokeshire, UK (Lammas n.d.). The village offers series of education, creative, and recreational activities for visitors and volunteers. Community members in village can choose to offer programs in the hub or on their own plots.

however, that makes their study in an ever increasing capitalist world so imperative to building resilience in the design of communities today. While it is recognized that communes and intentional communities are designed and built by members themselves, case studies and relational paradigms can provide architectural professions with substantial experience of the ecological resolutions and rewards of building for a more egalitarian society.

Building often takes a subsidiary role to agriculture, even in site planning and organization to allocate the best soils and conditions for growing. This is often because these groups were not able to choose ground on the best soils, but generally most seek any land or existing housing available and within their limited financial means. For historic communes, this meant the frontier, land between the wilderness and the increasing industrialization occurring in cities. This 'middlescape' could not be too far from the metropolis for recruitment or networking, nor too close to in order to escape its ills (Hayden 1976; Kanter 1972).

Scientific methods of agriculture and horticulture were studied diligently to transform often inferior soils and ground into fertile places; thus a culture of care and cultivation of the earth allowed for their permanent liveability, this practice is known as permaculture. In permaculture building and growing are verbs — states of being — that form ecological connection to the landscape and create strong relationships between community members. Agricultural production provides not only sustenance but growing was seen as a practical art. Most communities cultivate crops suitable to the soil and climate and redeemed soils through careful closed systems cycling of water and wastes - human presence enhances natural systems rather than detracts. Many well

Postcard, "Working in the Bee Garden", North Family Shakers, Mount Lebanon, New York, ca. 1915 (Shaker Museum 2018). The Shakers established communal farms that were regionally specialized to unique environments (Murray and Cosgel 1998). Agriculture was studied diligently - scientific methods, experiments and techniques were also conducted and published public guides to farming and gardening (Hayden 1976, 17-19).
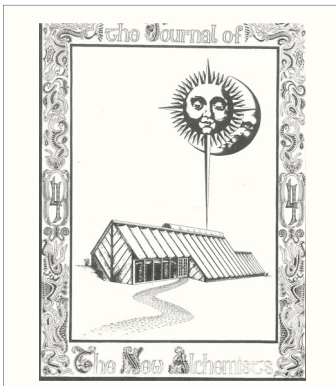
Excerpts from the journal of the New Alchemists, published 1977. The New Alchemy institute published its research and activities in a variety of scientific journals to embody their "design-DNA" , integrating research with everyday life. The mix of intimate and scientific content made the journal successful to a wide audience (New Alchemy Institute 1977; Mannell 2018, 40).

known groups such as the Shakers and New Alchemists published guides to farming and gardening journals that were intended to engage and be accessible to the wider public (Mannell 2018; Hayden 1979).

The result of integrated building and growing in communitas has created innumerable successes globally that this paper cannot begin to encapsulate even through the next subsection; however, they provide invaluable insight for architectural and agricultural professions with an interest in resilient, regenerative, co-operative and committed design (Hayden 1976; Kanter 1972).

Design Guidelines

Emphasizing process over product, a collage mentality can be a generative tool for architecture and collage method can compose individual potentialities into a new composition, while still being an accessible representational tool reflecting varied contributions, interests, and in this instance, case studies (Shields 2014, 2-9). This was the purpose to generating collage to explore design guidelines for communitas as well as artistic representations of a similar spirit. This informs the architectural proposal and method of representation and is closely related to the process of bricolage, the primary method governing the design process as discussed in the next chapter. The following design guidelines are elaborated with collage:

1. Socio-Ecological: Celebrate regional means, creativity, and seasonality rather than complication or expense.

2. Socio-Economical: Encourage education, innovation, and transition towards more interdependent ways of relating to one another.

3. Psycho-Social: Maintain needs for private space and but do not create isolated space.

4. Socio-Political: Closed-Loop participatory designs and boundaries help regulate the human presence in ecological processes rather than isolate from surrounding community life.

These guidelines are referenced in the design proposal and are considered a summary of the version included in the appendix.

Summary and Comparisons of Care

We can compare and measure how selected utopian and sitopian models care about earth and natural resources per capita land footprint: Howard's Garden City exceeds the excessive consumption of Canadians designating 32,000 people per 9,00 acres (3.5 acres per person); and Wright's Broadacre city aligns to the world diet average of 0.5 acres per person designating "One acres for each childless family" (Howard [1902] 2008; Tenhoor 2010, 5). The share of global earth needed for agriculture by 2050 if everyone had the diet of these utopian proposals would be greater than what is currently used, and in the case of the Garden city would not be possible with all the global land on earth. Meanwhile, Migge's allotment and communal gardening plans were portioned for self-sufficiency and the nutritional needs of different sizes of families. Migge claimed to be able to feed a family of four on 200 square meters of garden, 200 square meters of leased land, and also land gardened "together". This is roughly 0.025 acres per person and while Bonnemaison and Macy report these proportions were not large enough to feed the suggested family sizes (Bonnemaision and Macy 2016, 94), these proportions do

I CELEBRATE REGIONAL MEANS AND SEASONALITY

Collage of design guideline includes natural building techniques and New Harmonist meditation garden combined with productive raspberry bushes. When agriculture is considered as much an art as it is a science, the landscape is alive in all seasons and there is enjoyment and more participation in the processes that sustain life such as food, energy, shelter. Participating in the processes of production and consumption ultimately creates human-nature relationships while localized solutions foster place-based relationships and generate unique and creative designs (Clark 2017). The collage contrasts the agriculture of communes with the industrial fields that sustain our cities, offering an opening to another way that celebrates daily life and work.
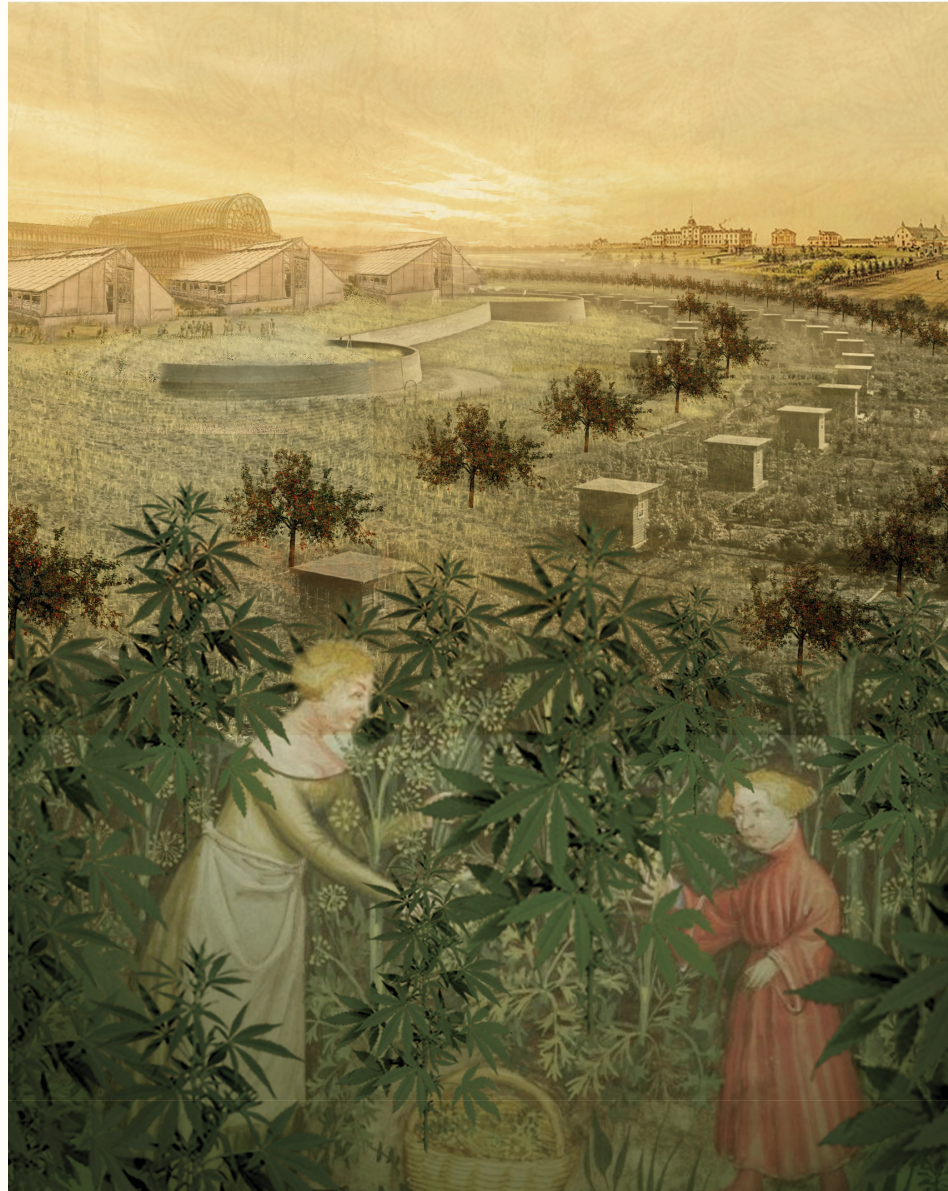
II ENCOURAGE EDUCATION AND INNOVATION

Collage of design guideline includes the Crystal Palace, associated by many commune groups with the Garden of Eden, and shown with greenhouses and the allotment sheds of New Frankfurt. The allotments provide space for individual innovation and experimentation (shown with growing hemp). The Crystal Palace and greenhouses provide co-operative shared ancillary space for education and knowledge exchange, informed by contemporary communes where becoming a member in a community takes one to four years - beginning with visiting communal spaces, participating in workshops, volunteering, or part-time stays (FIC., n.d.)

III NEEDS FOR PRIVATE SPACE NOT ISOLATED SPACE

Collage of design guidelines include dome homes in the spirit of Drop City with the Amana settlement inward facing block structure, and Charles' Fourier's ideas of connectors or "galleries of association". Individual and private dwellings create an inward facing block inside greenhouse frames with footpaths paths to encourage interaction, and formation of social bonds while maintaining needs for private space and territory (Schaer et al., 2000; Hayden 1976).

IV CLOSED LOOP PARTICIPATORY DESIGNS AND BOUNDARIES

Collage of design guideline includes Shaker willow basket weaving and herb harvesting, willow dwellings, and a tower for defining communal territory like the Inspirationalist Community in Iowa. The scale of all systems must be carefully considered so that they can be fully participatory and that members are aware how they are reintegrated at end use. In the New Alchemy's motto: "Ecosystems must be enhanced by human presence...living, organic processes must be substituted for energy consuming and polluting processes" (Todd 1977; Mannell 2018, 39). Gates, and hedgerows were used by communities to help define the boundaries for these processes and an actual physical tower was a vantage point from which to observe community activities (Hayden 1976, 362).

align with the productivity achieved and experienced on small scale farms and homesteads.

This is the utopian ideal of the project which believes that if a similar proportioning were to be adopted by everyone with the knowledge, resources, and experience of our farmers, the result would reduce per capita land footprint in which a massive global regeneration of earth's resources could occur. Moreover than city and country, this thesis considers the interdependencies between the agents of care: lifestyle agents that care about diet and climate change but may not have the space or know how to grow their own food, local agents that care for food production, and return agents that care with the next generation of farming. This thesis believes these interdependences would allow for this regeneration through the integration of human presence into existing agricultural fields that may be under-utilized or currently operated with industrial monocultural practices . Incorporating human diversity in the cultivation of the earth we are already using correspondingly brings the biodiversity shown by small scale farmers to increase profitability, soil fertility, and reduce risk in the business. While the per capita proportionings of individual and communal farming are based on contemporary research and requirements for self-sufficiency, they further correspond to building types that could attract and support diverse growing initiatves. Further and if used in combination, building types could create a gradual approach in which individuals could transition to more agrarian or co-operative lifestyles. Similar to communes which provide a transitory framework for integrating into an existing community, building types must pay careful attention to individual needs for space in ultimately co-operative and collective efforts.

CARE FOR EARTH	EBENEEZER HOWARD DIET 32,000 poeple / 9,000 acres	STANDARD CANADIAN DIET	WORLD AVERAGE	BROADACRE CITY 1 acres / "each childless family"	REQ. HEALTHY OMNIVORE	REQ. HEALTHY VEGAN	MIGGE DIET
ACRES / PERSON	*3.5*	3.3	0.54	*0.50*	0.28	0.14	*0.06*

GLOBAL DEFORESTATION & DEGREDATION

GLOBAL REFORESTATION & REGENERATION

■ *Not possible with global land*　　■ *Greater than currently used*　　□ *Less than currently used*

GLOBAL ARABLE LAND REQ. IN "EARTHS" FOR 2020

7.6 billion people / 7.9 billion acres of arable land

GLOBAL ARABLE LAND REQ. IN "EARTHS" FOR 2050

Required land for 9.7 billion people

THESIS PROPOSAL BUILDING TYPES

ACRES / UNIT

Maximum capacity to be based on the value of 0.14 acres / person

	F	E		D	C	B	A
	N/A	0.56 - 1.12		0.28- 0.56	0.14-0.28	0.07-0.14	0.035-0.07

Comparison of total cropland per person of and share of global habitable land needed based on diet and population. Healthy plant-based or a Migge diet could allow for global regeneration of earth's habitable surface.

Chapter 3: Bricolage Method and Process

As farming and building are both nouns and verbs, bricolage is a combinatorial method describing a creative and social process and activity. The concept of bricolage in architecture, originating with Claude Levi-Strauss, is described as a science of "found" objects" that works with existing forms, structures and landscapes (Johnson 2012). Further, Levi-Strauss's concept of "social bricolage" has been related to communitas, subcultures and countercultures like Drop City and the ecological movements in the 1970s (ecotopias), describing a process by which people create novel solutions using resources that already exist in their collective social consciousness to create new cultural identities associated with place (Sadler 2006). The community is then represented in the process itself; and, the metamorphosis into a new identity while simultaneously synthesizing both material and intellectual content already in existence operates very much like collage (Shields 2014, 6).

The bricolage begins with mapping areas of tension in southern Ontario to identify existing sites of agricultural production. By using structures and cues from the region this is how the architecture aims to become context, and context becomes architecture in a way that is replicable (Turner 1976, 67). A bricolage approach can further attend to the creation of place-based relationships using localized solutions, skills, and abilities within unique communities and sites. This thesis then looks at an existing farming community drawing upon the practices, localized solutions and abilities seeking to form place-based ecological and economical relationships. Lastly, bricolage operates under

the assumption that true potential has scarcely been tapped and combines the regional and community building and farming languages and patterns into various building types that can encourage a transition to self-sufficient lifestyles.

More specifically the bricolage process outlines:

1. A response to utopias at the regional scale - developing a unique building language from existing structures and cues that could therefore be replicated at multiple farming sites.

2. A response to sitopias at the community scale - economical and ecological strategies for implementing the building language that responds to the existing farming languages and practices unique to existing communities and the COVID-19 pandemic experience

3. A response to communitas at the building scale - various building types that foster the interrelationships between individual agents of care and encourage the transition of the individual towards collective efforts through individual and collective programming.

Building Language: Unique and Replicable

In Thomas More's original *Utopia* published in 1516, "there are fifty-four splendid big towns…all with the same language, laws, customs, and institutions" (More 1961, 70). Emphasizing the urban environment and behaviour of its citizens, More's fifty-four towns, spaced out regularly are "all built on the same plan, and, so far as the sites will allow, they all look exactly alike" (ibid). From other utopian Illustrations, uniformity and frequently geometric layouts subliminally convey the rationality that regulates their social, political, and economical organization; the pursuit of ideal human-nature
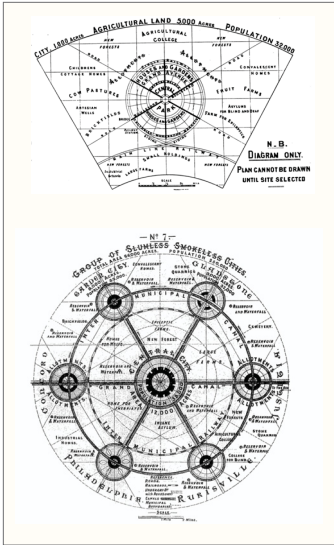
Ebenezer Howard, 1898; Image of agricultural "social city states" showing unit type and organizational pattern (Howard [1902] 2008,6).
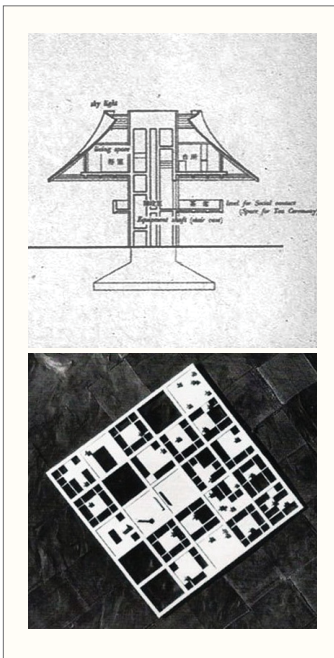
Kisho Kurokawa, 1961; image of agricultural city showing unit type and organizational pattern of 25 (100m x 100m) blocks for 200 people.

and agricultural relationships, or city-country, often takes the symbolism of the closed circle and sphere representing self-sufficient entities; and of equality, often represented as a square assuming division and multiplication (Gervereau 2000, 357).

In many proposals, the circle, orb, sphere or globe captures the objective which is not to reproduce nature, but to propose an idealized version that has been reimagined and reorganized by the human hand and mind (Ibid.). Visually the square expresses equality, taking into account only a single repeated dimension, as well as the multiplied square; "Its use of repetition suggests the purportedly harmonious structures of the insect word (the beehive being a frequent metaphor), artificial structures built in defiance of a thriving vegetation" (Ibid., 360). Comprehensive similarity rather than individual comprehensive difference is implicit in all intellectual utopian exercise that pursue egalitarian society in harmony with nature (Ibid.; Tod and Wheeler 1972).

This thesis also seeks a unique configuration that cares for nature and the earth, that is also replicable. Rather than give rise to imagining a new architecture for the masses based on similarity however, it believes in difference - biodiversity and interdependency critical in nature as they are in practices of care. Furthermore, it uses bricolage as a primary method that works with existing forms, structures and landscapes; and, since critical care is being examined in Ontario, existing agricultural patterns were identified in the region (Johnson 2012).

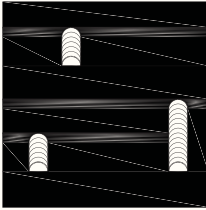## Mapping Patterns: Agricultural Building Patterns at the Regional Scale
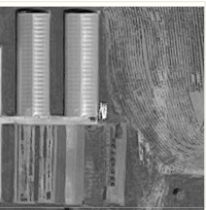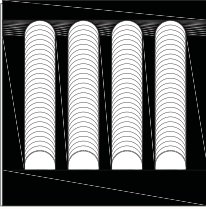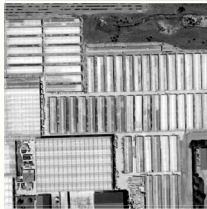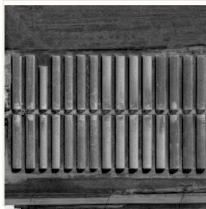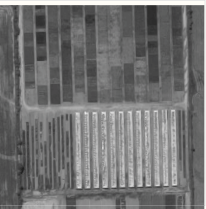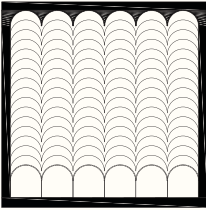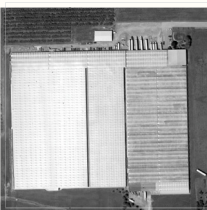
Aforementioned are the areas in need of care in Ontario: in southern Ontario, that contains the best agricultural conditions and has a concerning loss of small scale farms; in the Carolinian Zone and "banana belt" of biodiversity, which has a high level of threatened and endangered plant and animal species; and in the Golden Horseshoe, which concentrates the human population and has a high degree of urban and suburban growth particularly in the GTHA (Statistics Canada 2018;Statistics Canada 2016; Statistics Canada 2014; Ontario Biodiversity Council 2015; Horn and Wise 2019; NFU 2011).

Exploring these overlapping areas, I visited several sites of agricultural production noticing particularly the "artificial structures built in defiance of a thriving vegetation" to be commercial greenhouses that have regular formations and standard building conventions. In other words, these greenhouses have a replicable and identifiable language in the region; and this thesis, using bricolage, operates under the assumption that their true potential, uniqueness, and diversity has scarcely been tapped. This is how the architecture aims to become context, which is unlike utopian visionaries and more likened to communitarians as "… it should allow the possible evolution of a small, [network of] decentralized communities" as context becomes architecture (Turner 1976, 67; Hayden 1979, 325).

These formations and commercial greenhouse sizes are largely dependent on the scale of the farming operation: large industrial scale, medium conventional scale, or small scale farms. While greenhouse roof types vary, for simplicity

Drift map exploring 42 sites of agricultural production. The drift route examined the overlapping region between the Golden Horseshoe and Carolinian Belt in Southern Ontario.

BUILDING LANGUAGE		PLANS - AERIAL VIEW			ELEVATION - STREET VIEW

Small Scale - Integrated Individual Hoop Houses
12   01   08   14   10

Med. Scale - Conventional Individual Panel Houses
22   05   06   33   22

Large Scale - Industrial Gutter Connected Houses
39   26   21   19   41

Sample aerial images (Google Maps 2021) of the 42 visited agricultural sites. Numbers pertain to the sites on the drift map on the preceding page. Mapping revealed a very common and replicable building language for the thesis design proposal.
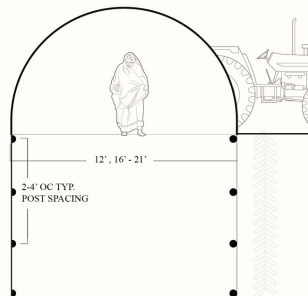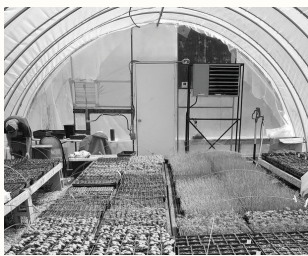
SMALL HOOP HOUSES

BUILDING SCALE

12', 16' - 21'

2-4' OC TYP. POST SPACING

CONVENTIONAL FREE STANDING PANEL HOUSES

BUILDING SCALE

Arches joined at ridge

Isle permits access of large machinery or location for oil tanks

Oil Tanks to heat greenhouses; generally require 1 tank / house to operate furnaces in winter

16'-24'

24'-28'   12'-16'

4' OC TYP. POST SPACING

INDUSTRIAL GUTTER CONNECTED HOUSES

BUILDING SCALE

Roof Vents

Gutter Connected

> 24'

24'-48'

12' OC TYP. POST SPACING
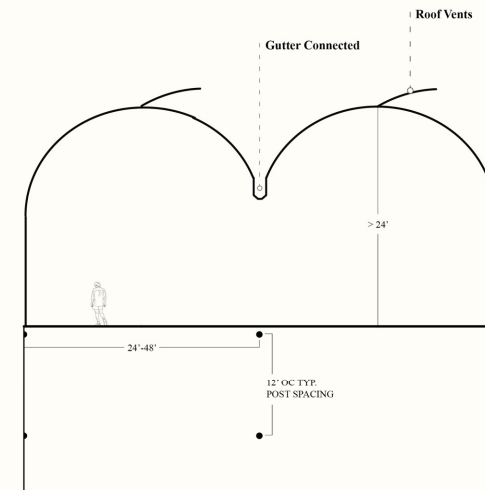
Simplified diagrams of greenhouse formations and approximate range of dimensions; length of houses too variable and often dependent on the scale of farming operation; any combination of houses exist on any farm but the lengths are significantly reduced.

Common Roof Types

QUONSET   **GABLE**   **GOTHIC ARCH**

Common Formations

INDUSTRIAL GUTTER CONNECTED HOUSES

CONVENTIONAL FREE STANDING PANEL HOUSES

SMALL SCALE HOOP HOUSES
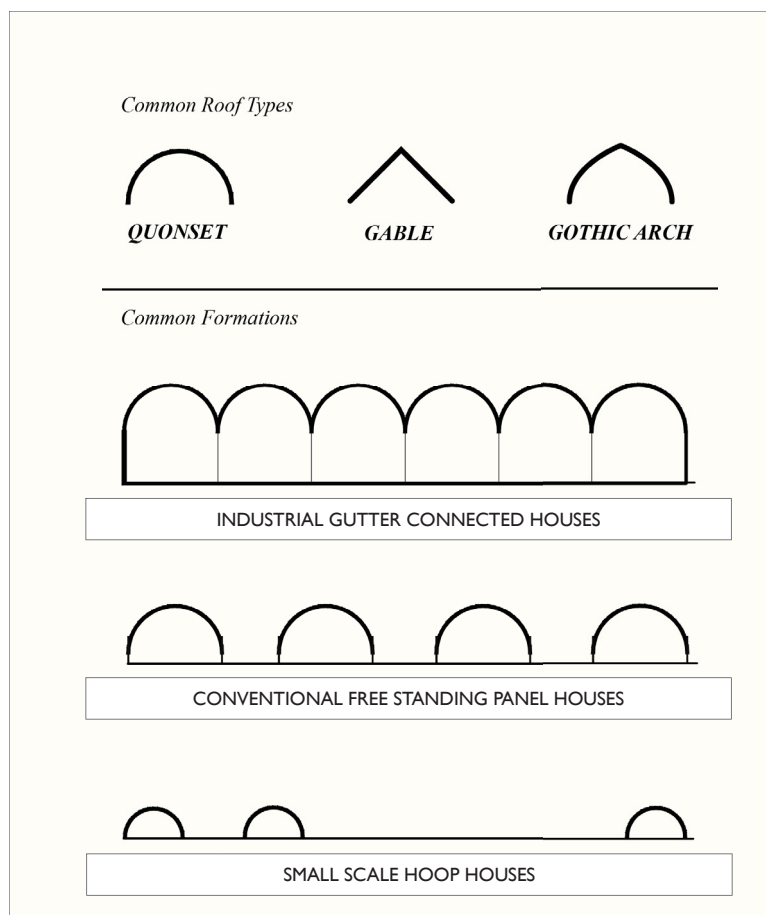
Elevations of agricultural building conventions. Commercial greenhouse structures for plant based production generally exist in three types that often correlate to the scale of the operation: industrial gutter or ridge and furrow connected, conventional free standing, or small-scale hoop houses.

they are illustrated with the common quonset form; greenhouse buildings are either gutter connected, arranged in free-standing strips or panels, or are free standing and informally arranged.

Site Selection and Description

The proposal chooses a smallholder farm, one that I have access to, and feel deeply obligated to make positive contributions in the community. With the age of the existing farming stewards (two brothers over the age of 70 who share the property) productivity has significantly declined: Of the 46
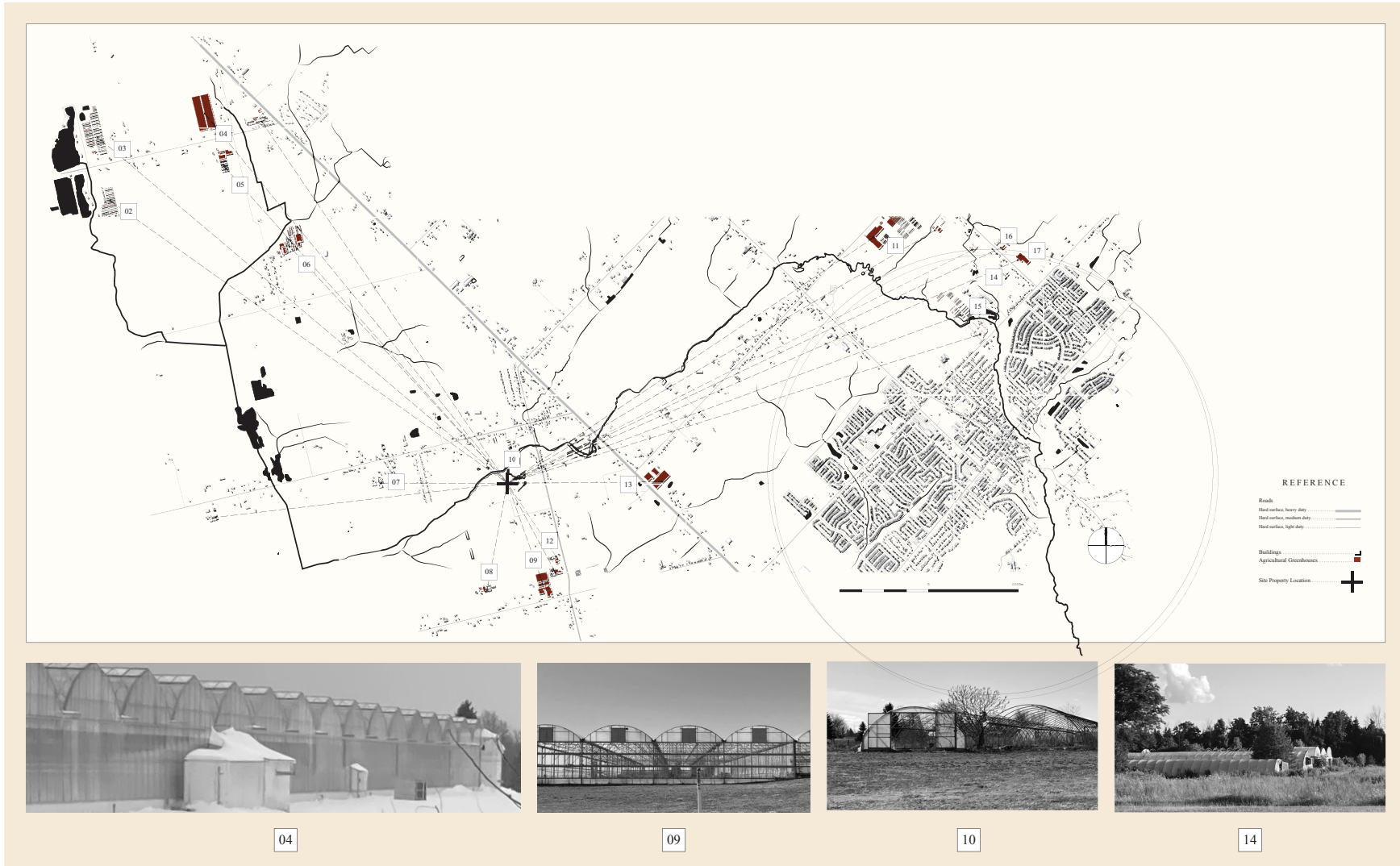
Production and consumption around site. The chosen site has the potential to become a hub of agricultural exchange, knowledge, and resources with its adjacency to other farms while being accessible to suburban areas and major highways that connect to the cities of Hamilton and Toronto.

acres of arable prime agricultural land, under ten acres are currently maintained for sustenance and livelihood. There is an abundance of unused greenhouse infrastructure in and surrounding the site, and like the majority of farm owners, the site stewards do not currently have a succession plan. The site is being approached by suburban development to the east, and is within proximity to several other industrial farms and small scale greenhouse operations.

Mapping the abundance of farms in the region and surrounding the site perhaps it has become clear to the reader that in this particular region of the global North, it is perhaps not that we need to produce more food - but moreover produce and practice farming in a better way that ensures the continuation of a viable agricultural sector aligned with our future livability on earth. The site is therefore positioned in an area with the potential to become a hub for local and return agents to exchange knowledge, resources, and practices with its adjacency to other farms; combined with the farmers' networks and its proximity to suburban areas and the cities of Hamilton and Toronto, the site did become an attraction for lifestyle agents during the COVID-19 pandemic searching for AFNs and a place to escape the city.

Farming Language: Economy and Ecology

Agricultural greenhouse building formations and conventions often parallel conventions used in planting fields of agriculture; and, these agricultural practices need not be so vague nor complicated when analogous to conventions in architecture. For instance, when architects express ideas in their practice, they often do so in plans, sections, and elevations; their ideas drawing upon and requiring the

deployment of various material and human resources. When farmers express ideas or plant in their practice, they often do so in fields, panels (also known as strips), and rows; these too drawing upon and requiring the deployment of various amounts of material and human resources. Several planted row comprise a panel, and a couple of panels may comprise a field; however, how a farmer goes about planting species of plants, whether in fields, panels, or rows often has much to do with the scale of the operation and is indicative of the practices they adopt.

In *The Timeless Way of Building* by Christopher Alexander, "there is a fundamental inner connection between each pattern of events, and the pattern of space in which it happens…each pattern in the space has a pattern of events associated with it" (Alexander 1979, 90-92). While Alexander is referring to the built environment, this chapter maps the farmed environment and patterns in planting around the site and practices of the community in this regard.

Mapping Patterns: Agricultural Farming Conventions at the Community Scale

This mapping helps to identify a multi-nucleic approach to the site strategy that is corroborated by cognitive mapping; this focuses the architectural response to the community's depictions of space. Beginning with conventional heteroculture, then intensive monoculture, and biodynamic polyculture, each drawing and diagram conveys the patterns of farming ranging from the most capital, inputs, and labour required to the least. The north nucleus includes the conventional heterocultures and panels of unused greenhouse infrastructure. The south nucleus includes the biodynamic polycultures that are the farmers main source of
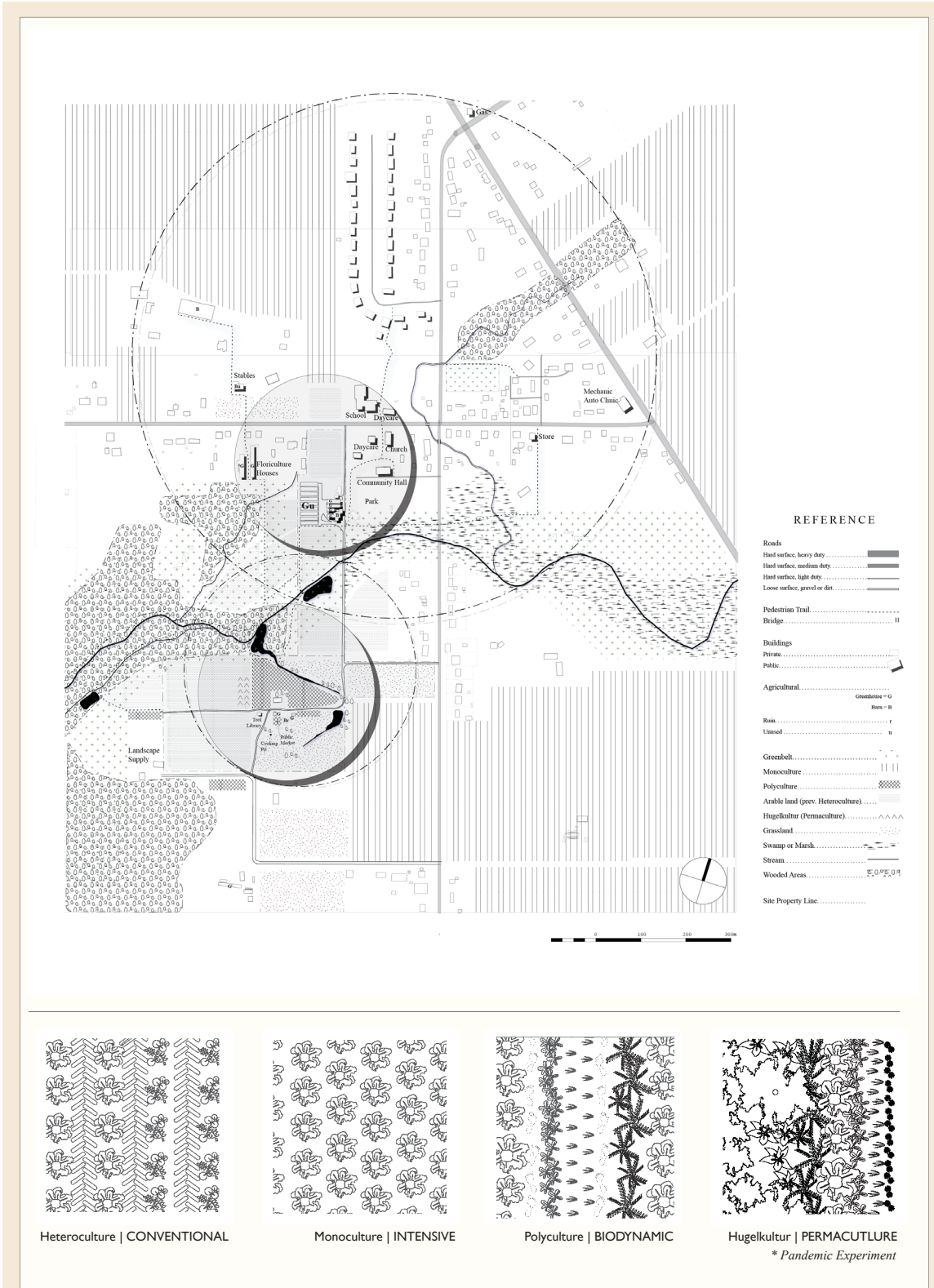
Map of agricultural farming conventions at the community Scale. Patterns and hatches on the map respond to different planting practices in agricultural fields. These observations focussed the thesis proposal into a multi-nucleic approach to the north and south.

NORTH NUCLEI DRAWN BY RETURN AGENTS

SOUTH NUCLEI DRAWN BY LIFESTYLE AGENTS
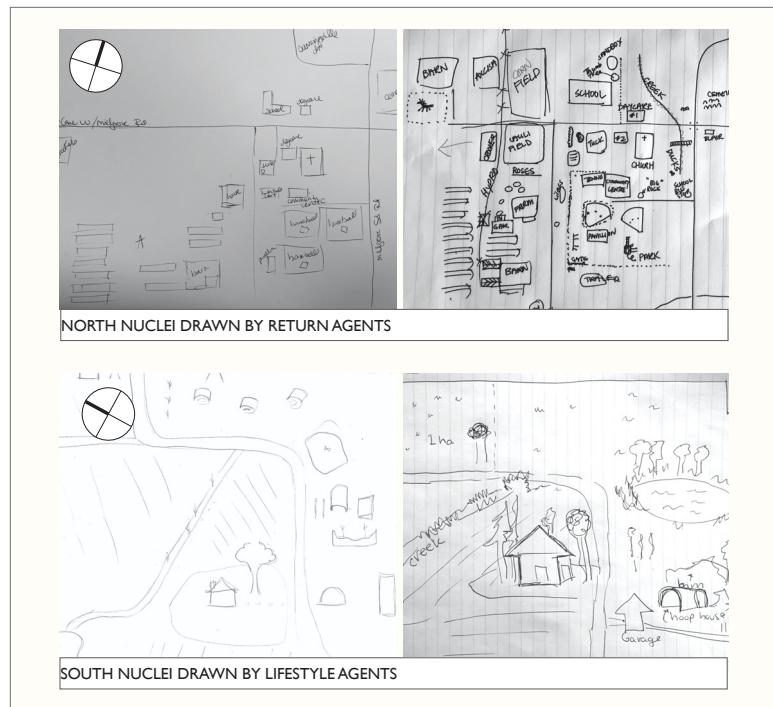
Sample of return and lifestyle agents cognitive mapping when asked to draw "the farm". The north nuclei is drawn by return agents with the existing neighbourhood with conventional panel greenhouses leaving empty or labeling monocultural fields. The south site is drawn by lifestyle agents with hoop houses and defines row or polycultural planting by drawing lines.

income sold on-site or distributed to other farms for food box subscriptions. This south nucleus attracted lifestyle agents during the pandemic which motivated the experimentation and implementation of hugelkultur - the creation of ecological guilds that look to nature for intelligent solutions - known in permaculture (Aranya 2012).

The making of the permaculture guild or hugelkultur on-site required the cooperation of the lifestyle agent and local agent; together, they logged damaged ash trees from the nearby woodland and collected unwanted woody organic matter readily available around the property. Gathering the woody matter locally for its construction saved energy that would otherwise be used in disposing it; and potentially, be
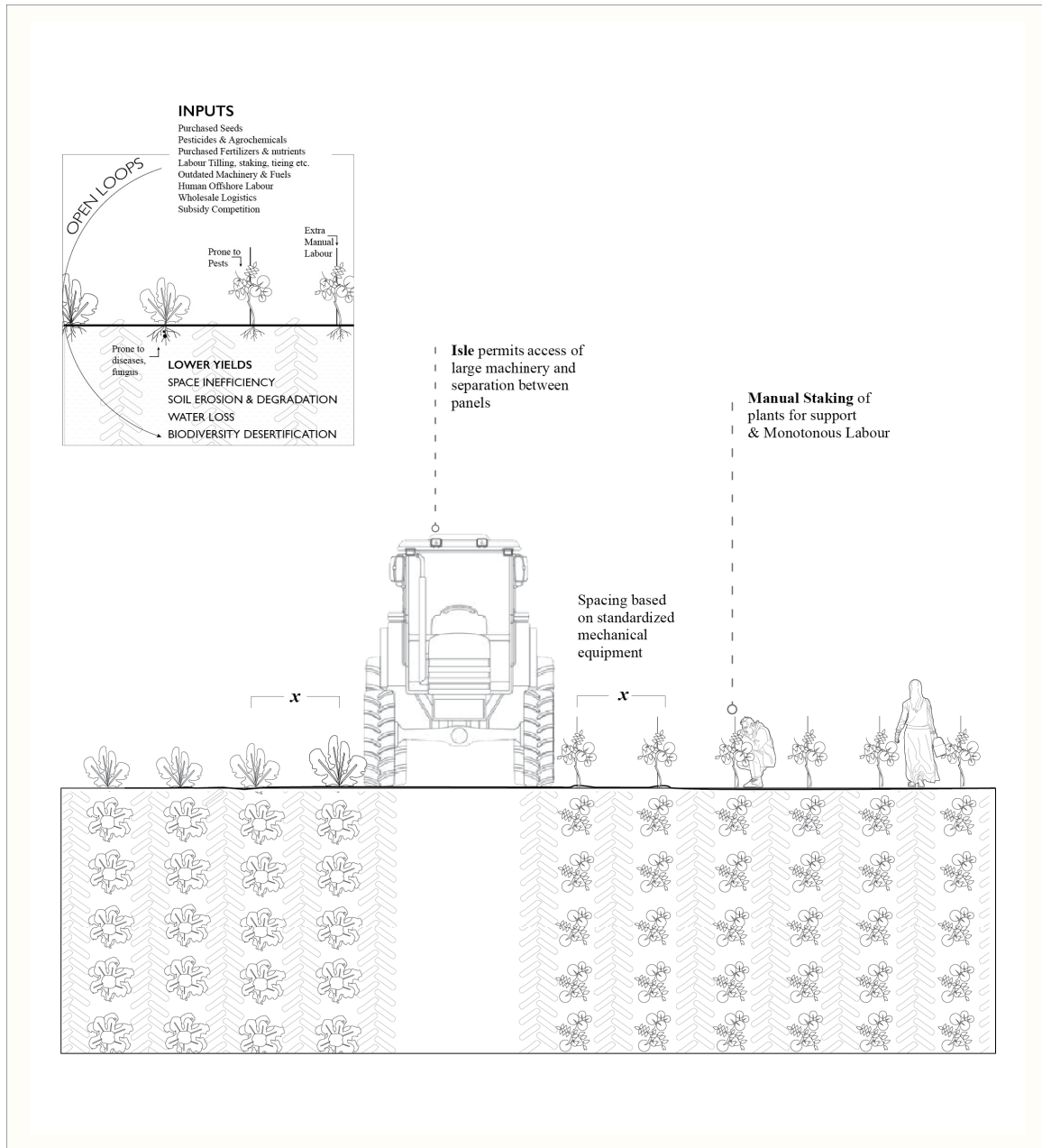
Diagram of conventional heterocultural agriculture.

Diagram of intensive monocultural agriculture.

Labour & Time
Purchased Seed

CLOSED
LOOPS

Nutrient
cycling

Reduced
Labour
Pest
Resistance

No Tilling

Soil
Conservation

High &
Diverse
Yield

WATER LOSS

**Companion Planting
& Practices with
Indigenous Roots**
Corn supports beans,
beans add nitrogen to
soil, squash shades out
weeds

**Diverse activities
of caring & labouring**

Integrated
Hoop House

COMPANIONS FOR PEST CONTROL

Inter-spacing to
increase density

x
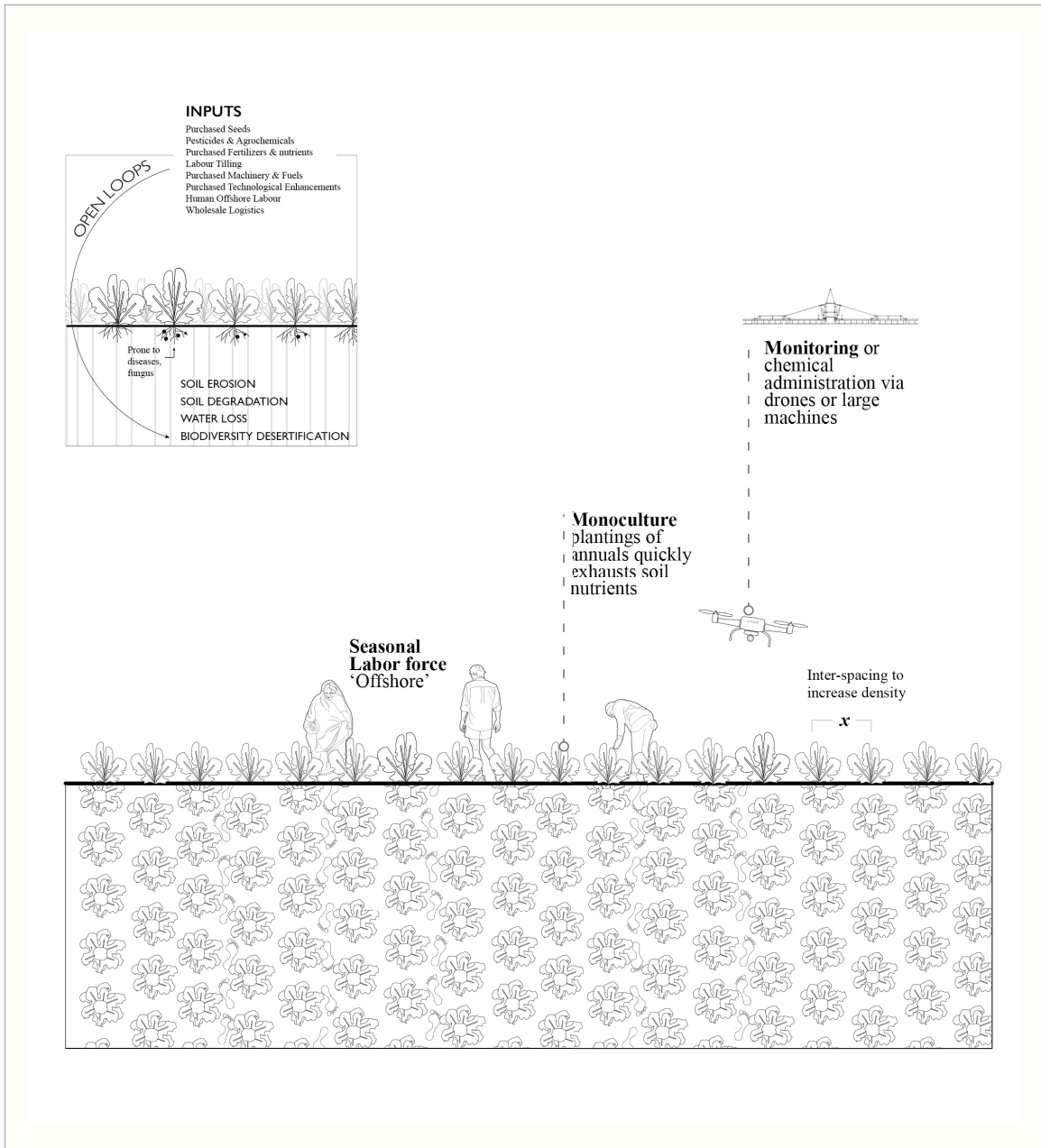
Diagram of biodynamic polycultural agriculture.

Diverse nectar sources for bees throughout growing season with varied flowering

Legume roots pull nutrients from the soil and fix nitrogen at the same time

Swale periodically floods bringing water and nutrients that are absorbed and redistributed through the guild

MAY-SEPT SUN

Chickens eat harmful insects, clean up fallen fruit while fertilizing the guild

MAIN WIND DIRECTION

PERENNIAL PLANTINGS WITH MORE NEED OF WATER AT BOTTOM AND DRYER CONDITIONS AT TOP

LONGER GROWING SEASON FOR VEGETABLES AND ANNUAL PLANTINGS

STONES STORE HEAT

Nutrients slide to irrigation swale

HEAT RISES

EARTHWORMS, FUNGI, BACTERIA, PROVIDE FERTILIZER AND HEAT

Nutrients slide to irrigation swale

SWALE; water direction & absorption of nutrients

Large trunks to rotting branches, roots, straw, then covered with compost and soil

1 FOOD FOR US
Fruits, annual vegetables, nuts, legumes, annuals

2 FOOD FOR SOIL
Nutrients, organic matter, decomposers

3 REJUVINATORS
Utilize soil nutrients; plant roots and insects that reach into the soil and pull up minerals

4 STABILIZERS
Perennial or rotational plantings that stabilize the soil by preventing erosion, weeds, and provide cover to keep from dying out

5 PROTECTORS
Herbs, sensory plantings, flowers, phytoremediation or water tolerant plants in swales that deter pests (onions, garlic, pungent flowers, spice) and thorny or sharp plants that create habitat for natural predators such as frogs, birds, and beneficial insects while creating living fences for other husbandry

6 CLIMBERS
Maximize vertical space (beans, cucumbers, peas, gourds)

7 SUPPORTERS
Provide structure for the climbers (fruit trees)

Diagram of hugelkultur in permaculture. Otherwise known as an ecological guild, beneficial groupings of plants support one another in many functions; the intent is to develop the earth into nourishing places with symbiotic relationships between both humans and non-humans. Diagram adapted from Sepp Holzer (Feineigle 2012).

a way for municipalities to form partnerships with farms and their green waste programs (i.e., tree clearing around power lines, or roadsides, which could offer a free local source of waste material to build hugelkulture on other farms that have cleared forested areas). The partnership between the local and lifestyle agent, as well as studying the efficiencies and interdependencies created by hugelkulture, informed the reinterpretation of utilitarian commercial greenhouse infrastructure in this thesis proposal.

Hugelkultur as an Agro-Architectural Practice

In hugelkultur or in ecological guilds productivity is created through exchanging nutrients, water efficiency, physical buttressing, the promotion of diversification and redundancy in the system - sharing resources or acting as resources for one another - which makes this type of farming almost entirely self managing, rather than labour and resource intensive as in conventional or industrial practices. The study of hugelkultur interdependencies and symbiotic relationships informed how the greenhouse architecture, rather than sterile or monocultural like environments, could be deconstructed taking the common quonset greenhouse frames to imitate different parts within the guild ecology. A number of building types were developed for the proposal seeking to create an agro-architectural ecology adaptive to the existing building language while allowing for the integration or diversification to motivate unique public or community life.

SPACE EFFICIENCY

Increases surface area available to plant

Maximizes vertical height

Form can double surface area of conventional row agriculture (with a 4' base, the optimum growing area is at least 8').
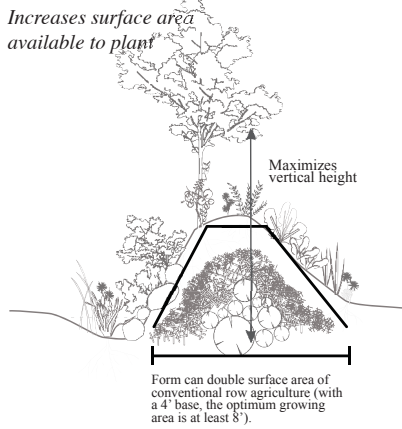
WATER EFFICIENCY

Drought and Flood Tolerant Plants allocated from wet to well drained growing conditions

SEASONAL
Annual Harvesting

Driest / Well drained

Moist conditions

Wet conditions

WATER COLLECTION
and/or swale filtration
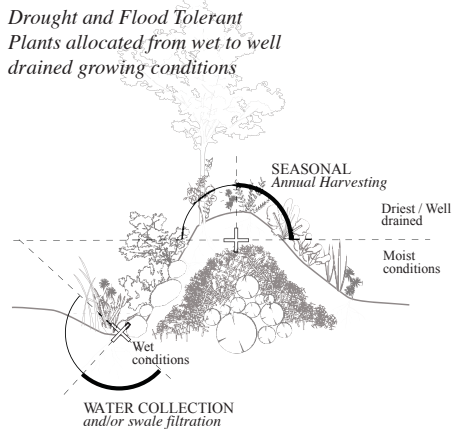
NUTRIENT CYCLING

Erosion Prevention and gradual soil improvement

Nutrients slide from mound to swale

Nutrients slide from adjacent slope

Swale nutrients absorb into the woody layers

Nutrients and moisture slowly absorbed back through plant roots
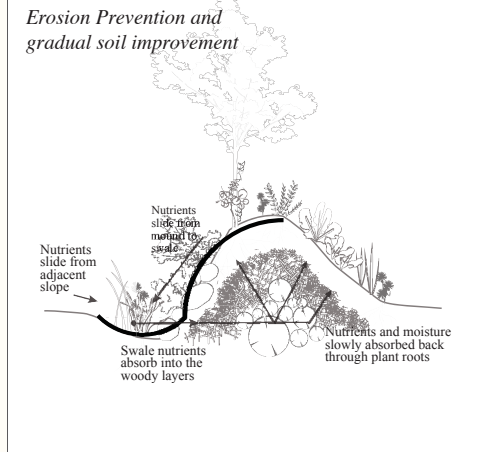
ORIENTATION & HEAT

Extends annual growing season; protects from severe weather events

MAY-SEPT SUN

Prevailing Winds;
Fruit trees & plantings reduce velocity on annual plants on adjacent guild ; extends growing season

STONES STORE HEAT

EARTHWORMS, FUNGI, BACTERIA, PROVIDE FERTILIZER AND HEAT

Some Heat provided from inital decomposition

EXTENDED SEASONALITY
All seasons gathering & Harvesting
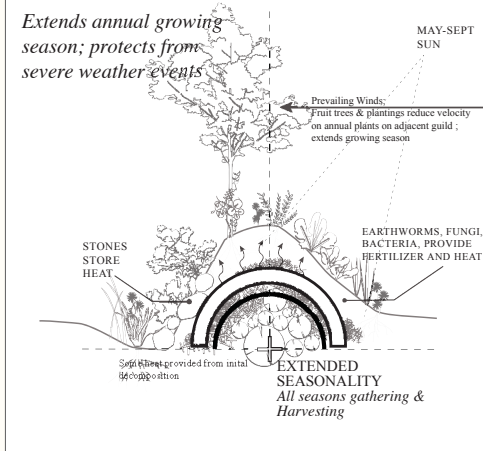
LAYERS OF CONSTRUCTION

Uses green waste material and unwanted woody organic matter

Straw, leaves, compost

Topsoil & finished compost

Branches, roots, shrubs

Stones

Large logs and trunks
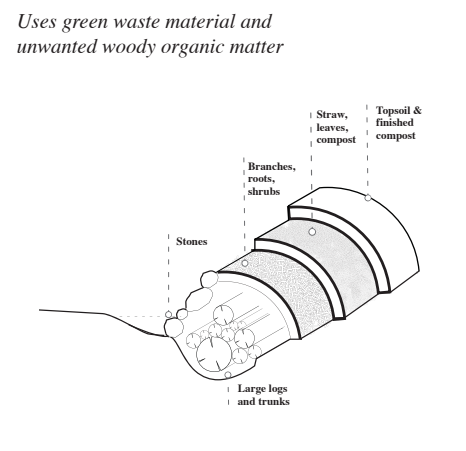
PLANTING ZONES

Plant and root relationships evolve over time and space

PERENNIAL

ANNUAL

SWALE
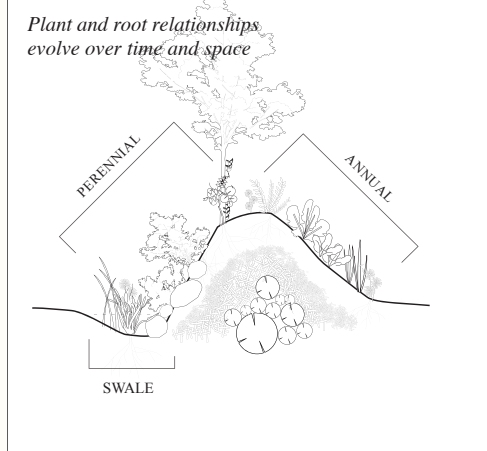
Diagram of hugelkultur lessons.

FARMING LANGUAGE

WATER EFFICIENCY NUTRIENT CYCLING ORIENTATION & HEAT SPACE EFFICIENCY LAYERS OF CONSTRUCTION

*Hybrid

*Hybrid

*Hybrid

BUILDING LANGUAGE

1/2 ARCH FULL ARCH GUTTER CONNECTED

1/2 arch
from center
supports

1/2 arch
from ridge

0. Manure loaded manually
1. Hot ox. rich air blown down into pile
2. CO_2 production
3. Bio filter for ammonia + CO_2
4. "water" ammonium

5. Ammonium to nitrate
6. Bacteria → nitrite
7. Plants absorb nitrate + CO_2
8. Plants release O_2 → compost pile

Building and farming typology matrix. Sample sketch demonstrates a hybrid type, a compost heated greenhouse where airflow follows the nutrient flows in the hugelkultur ecological guild.

Summary

The introduction of this document addressed big challenges in architecture and agriculture: in building, how to shelter or house everyone by 2050 with population increases; and in farming, how to feed everyone on an already overwhelmed earth in a way that does not render it inhabitable. This thesis emphasizes the importance of not considering these challenges and the proposed solutions as mutually exclusive. While this thesis does not address density in housing, the whole idea with caring practices, and often behind regenerative biodynamic practices in farming (at the scale of the row), is that we can address both challenges of shelter and of food that foster our connection with nature and our condition of interdependence on earth.

At one time, industrial monocultures and conventional heterocultures were considered more scalable with the use of more efficient technology and machines; yet with our current global agriculture and pandemic, their susceptibility to system disruption and destruction to our earth, are out of alignment with what can be sustained leading into 2050. The goal, then, becomes bringing the productivity and biodiverse practices of the row that have indigenous roots (i.e., Companion planting, kitchen gardens, "square foot gardening", and Cuba's organoponicos), and localized functionalities (i.e., the Huglkultur permaculture guild in this proposal) to the scale of the field in keeping with Lenora Ditzler's work with pixel farming (Ditzler 2020, 300-321). While these biodiverse practices are contextually different, they share foundational principles rooted in nature and care - a diversity of species creates both a diversity and redundancy of functions within the system. The architecture adapting commercial greenhouses, seeks to do the

same. It deconstructs and reassembles the standards and conventions collected from the greenhouse building language in the region to imagine more diversity, to make sure all functional bases are covered, and redundancy in case one of these functions fails. By adapting standards and conventions in building found at a variety of farming scales (from the large scale industrial fields to the small scale biodynamic row) to the lessons of guild in permaculture, the building types developed in the design proposal could thus be implemented in a variety of different ways, improving the economical and ecological diversity and resiliency at any scale on any farm.

Lifestyle Language: Individual and Collective Programming

Unique to each farm, in the essay by New Alchemists, "Redesigning Communities," the benefits of bricolage must "accrue first to residents of the immediate community and subsequently to others who are attracted by the change" (Todd and Todd 1994b, 108). Prioritizing the specific community and guided by the unique values, and customs, can help to foster commitment or in this case, retention with care. In this way, the proposal and building type programming seeks to prioritize local agents and subsequently attract the return agents of care. The lifestyle agents are catalysts for this attraction, helping to monetize the farming practices of the local agents while the proposal, similar to many communes, has the potential to suggest a framework for their transition into the local community through increasing care through their time and space in the earth.

Aforementioned, the building types are developed and proportioned into a framework at the human self-sufficiency scale providing individual and collective farming and building. Rather than a nostalgic return to nature, this framework creates an agro-architectural ecology; the agricultural and architectural proportioning and programming a synthesis of allotment farming, dwelling, and communal space meant to transition individual consumptive behaviour towards collective productive action.

Building and Farming for Individual and Collective Sustenance

The allotments begin by enhancing the communication between local and lifestyle agents of care; the access to experienced support and to rentable land create the potential means for a lifestyle agent to produce all their plant-based food in one season. The dwellings are portioned similarly, providing all year living, working, and indoor growing greenhouse space. The dwellings, while they create a ration of land per individual house to be quite high for today's density requirements, combined with agriculture, the ration of land per individual house for the global land required to feed that individual is astonishingly low and far below the excessive standard Canadian diet, accommodating the dietary needs of four-six people (on plant based diets) per panel. All portioning is based on regenerative earth per capita values as corroborated by the productivity of small scale farms and research on self-sufficiency and plant-based diet specificity (Peters et al. 2007; Peters et al. 2016). Communal space includes building and farming spaces that are ancillary to the allotments and housing; improving their productivity through community run workshops, events, research and technical knowledge, or simply practical shared spaces for

INDIVIDUAL - COLLECTIVE
TRANSITORY FRAMEWORK
HUMAN-SCALE

C.

B.

A.

D.

ALLOTMENTS

ROW - FIELD
REGENERATIVE INTEGRATION

H.

ABODES

BUILDING & FARMING SCALE

ANCILLARY

E.

G.

F.

ALLOTMENTS

A   THE APP
0.035 - 0.07 ac. allotment
0.07 ac. Hugel-land
1-2 Hrs / Week

B   THE SHED
0.07 ac. allotment
0.07 ac. Hugel-land
3-4 Hrs / Week

C   THE STUDIO
0.14 ac. allotment
0.14 ac. Hugel-land
5-8 Hrs / Week

D   THE SOJOURN
0.28 ac. allotment
0.28 ac. Hugel-land
10 - 16 Hrs / Week

ABODES

E   THE SANCTUARY
0.56 ac. allotment
0.56 ac. Hugel-land

ANCILLARY

H   THE SURVEYOR
Locating & Wayfinding
Hugel-land Observation
Kids Play Fort

G   THE SOILER
Compost House
All-Seasons Greenhouse
Shared Tools &
Experimental space

De-centralized

Centralized

THE SAVANT
All-Seasons Greenhouse
Event / Market Space
Communal Living
Communal Learning
(workshops, research,
marketspace, events)

F

The agro-architectural ecology deconstructs and reassembles the common quonset greenhouse frames to diversify the existing building language of the region while creating a replicable framework within its bounds. Proposing a method of integration into commercial greenhouse formations, the framework could exist in different combinations at various farm operational scales. While any one of these programs could be incorporated at any farm, the proposed ideal creates a synthesis of allotment farming proportioned for self-sufficiency, dwelling (abodes), and communal farming and building spaces (ancillary).

regeneration such as the soiler (a composting greenhouse) and other community initiatives which could lead to more interest and engagement with the allotments.

While the building types are general enough to be implemented in various combinations de-centralizing, monetizing, and improving public access on privatized land at any farm, how the agricultural self-sufficiency proportioning functions has more utopian and communitarian intentions: to provide a step by step change within a system of capitalism with incremental lifestyle changes towards collective efforts. This is shown by the proportioning increasing in time, space, and thus distance from current individualistic consumptive models - reconnecting individuals to production and care with the earth. How the benefits accrue to the specific individuals, our agents of care, is discussed through their narratives and project phasing in the following chapters.

Chapter 4: Design Master Plan and Phasing

This chapter details how the general agro-architectural ecology framework developed from the regional building language is integrated on the specific site and responds to the agents of care. The representation draws upon utopian and communitarian styles, intending to be legible by a wide audience and provide clarity in spatial layout for the potential replication at alternative farms. It demonstrates the implementation of the agro-architectural ecology in three phases: Phase I, the allotments; Phase II, the abodes; and Phase III, the ancillary. Each of these phases incentivizes and provides the necessary capital for the next. It is important to begin with the note that the design does not propose building or farming on land or within infrastructure currently being used by the local agents. The project integrates only
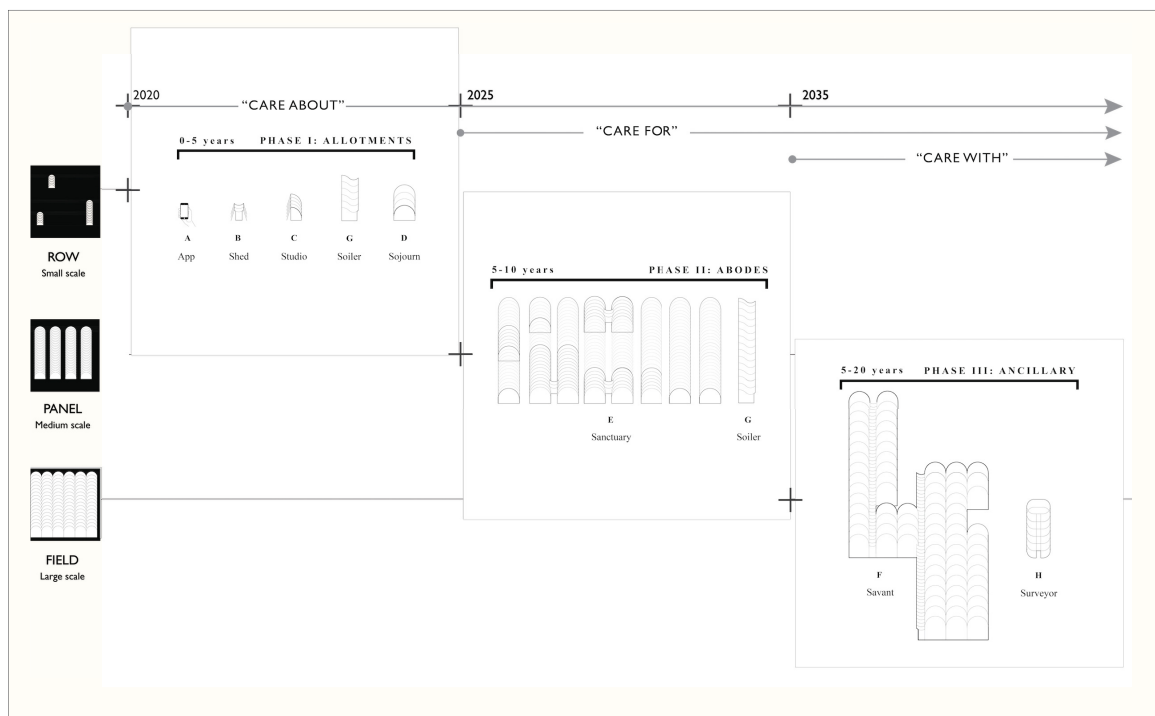
Project phasing on-site implementing the agro-architectural ecology of allotments, abodes, and ancillary types.

in unproductive land and unused infrastructure which is precedented by the existing activities and events from the COVID-19 pandemic on site and in the region.

The first phase of the allotments is already underway and estimated to evolve over the next five years. The allotments focus on transforming the currently unused arable fields to monetize the current farming business, capitalizing on the growing trends of the pandemic, while bringing in human diversity to enhance the biodiversity of currently unproductive agricultural fields. The proportioning of the small-scale allotments are intended to be combinatory in a pixelated pattern that is similar to Lenora Ditzler's work; however growing in space and commitment in time as lifestyle agents, supported by the experience of local agents, develop their skills, knowledge, and care with the earth. This phase and demand for the allotments would generate the income for phase II, the abodes, which seeks to provide live-work housing for return and local agents who are attracted by the changes and new business opportunities. The construction of the abodes involves the adaptive reuse of panel greenhouse infrastructure and is estimated to take anywhere from five to ten years, perhaps overlapping with phase III. There is potential, as particular lifestyle agents become acquainted over time with the local and return agents, to invest in their development. Phase III features new large-scale construction of the ancillary buildings which provides fully accessible communal living and includes the learning centre adjacent to the allotments. The learning center creates a hub for local, lifestyle, and return agents to network, exchange knowledge and resources, market, host workshops and events. This would be invested by

PHASE I: ALLOTMENTS   PHASE II: ABODES   PHASE III: ANCILLARY
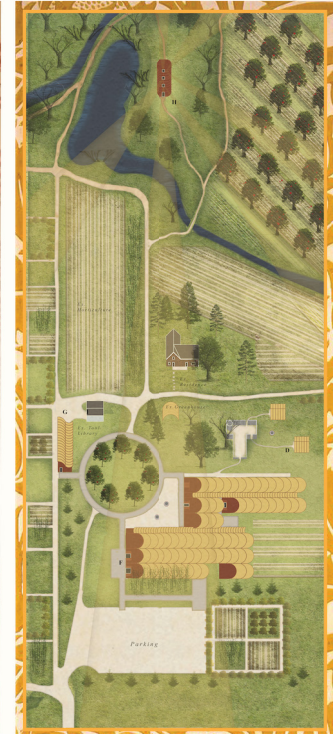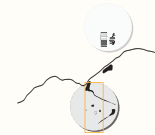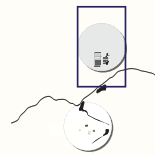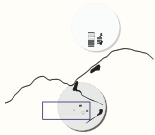
Overview of project phasing and multi-nucleic location on site. The second phase plan has been rotated 90 degrees.

PHASE I: ALLOTMENTS

Phase I: Allotments 2020-2025. Shed (B), studio (C), sojourn (D), and soiler (G) building types are located at the south nucleus.

internal and external capital, including agricultural research or climate or carbon action grants.

Phase I: Allotments 2020-2025

The allotments are located to the south nucleus that currently generates most of the farm's income through biodynamic farming, food box schemes, and has previously hosted public markets. During the pandemic, lifestyle agents seeking AFNs and that had established customer relationships with the farmers frequented the south site, borrowing tools, asking questions about food growing, and some began growing their own food or experimenting with permaculture on the unused lands. The first phase capitalizes on these existing activities and exchanges, portioning the large unused fields adjacent to the tool library for individual seasonal growing and implementing the app (A), shed (B), and studio (C) types. These allotments would have 'open' hours during the day determined by the local agents to monitor and provide assistance to lifestyle agents when they visit the site. The interest and fast demand of these allotments generates the income to build and equip the soiler (G), a composting greenhouse for the shared use of the allotment renters, and the sojourn (D). The sojourn, originally construed as an allotment type, is adapted to be used as an overnight stay separate from the allotments and closer to the outdoor cooking pits. It generates other sources of income through bookable overnight stays and eco-tourism available throughout the year.

Phase II: Abodes 2025-2035

The rising allotment business and tourism brings capital and attracts more return agents to help the local agents. Thinking about new business opportunities and motivated

PHASE II: ABODES

Phase II: Abodes 2025-2035. The sanctuary (E) and soiler (G) are located at the north nucleus.

by some of the additional interest and commitment of invested lifestyle agents, the housing for the return agents in phase II of the abodes begins to develop in the north nucleus. The north nucleus is close the social amenities of the existing neighbourhood: the school, the daycares, the church, park, and community centre which hosts food drives and fundraisers for the school. While informal pedestrian footpaths perforate this neighbourhood to access these public amenities, a gate from the adjacent park parking lot is suggested for public access that is separate from the main laneway. This would allow the inhabitants of the sancturary housing types (E) to control and manage public operating hours to the soiler (G), the composting greenhouse. Further, since the sanctuary housing is designed to accommodate a flexible live/work environment, visitor and public parking would not impede upon the existing operation of the farm yard.

As an ancillary building type, the soiler is intended to support the return agent's agriculture or work, provides food waste disposal from the school and community centre, and can collect manure from the nearby stables. This compost house would also benefit the existing and public next door floriculture business. It is to be determined by the return and local agents if the currently unused front field (shown with hugelkultur fruit trees) should become a public-u-pick garden for the school and neighbourhood or provide additional sustenance and income for the inhabitants of the site separate from the 0.58 acres allocated per panel.

The abodes are precedented by the pandemic use of the greenhouses between the main residence and barn as socially distant hangout spaces and workspaces. As these greenhouses are thus considered still in use, the abodes

Local precedent and use of greenhouse as socially distant hangout and workspace, north nucleus, 2020.

Labels on image: E, G, Ex. Barn & Cooler, Ex. Greenhouses, Ex. Residence, Proposed Gate Entry, Park

In the second phase of the proposal, the housing types of the sanctuary (E) and the soiler (G) integrate into the existing panel formation of greenhouse infrastructure. Seen on the following pages, the proposal integrates into pattern of disuse of these greenhouses. The proposal re-builds the panels while creating an inward facing block for inhabitants.

are re-built into the pattern of disuse in west panels of greenhouses. Imagining that the residents of the abodes would be both living and generating income through their individual pursuits, this capital as well as the continued capital from the allotments would assist in the funding of phase III.

1975
Site Purchased

1990
Production height

2005
Production decline

2016
Production decline

2020
Current conditions

2024
Proposed re-building

2028
Proposed re-building

2032
Proposed re-building
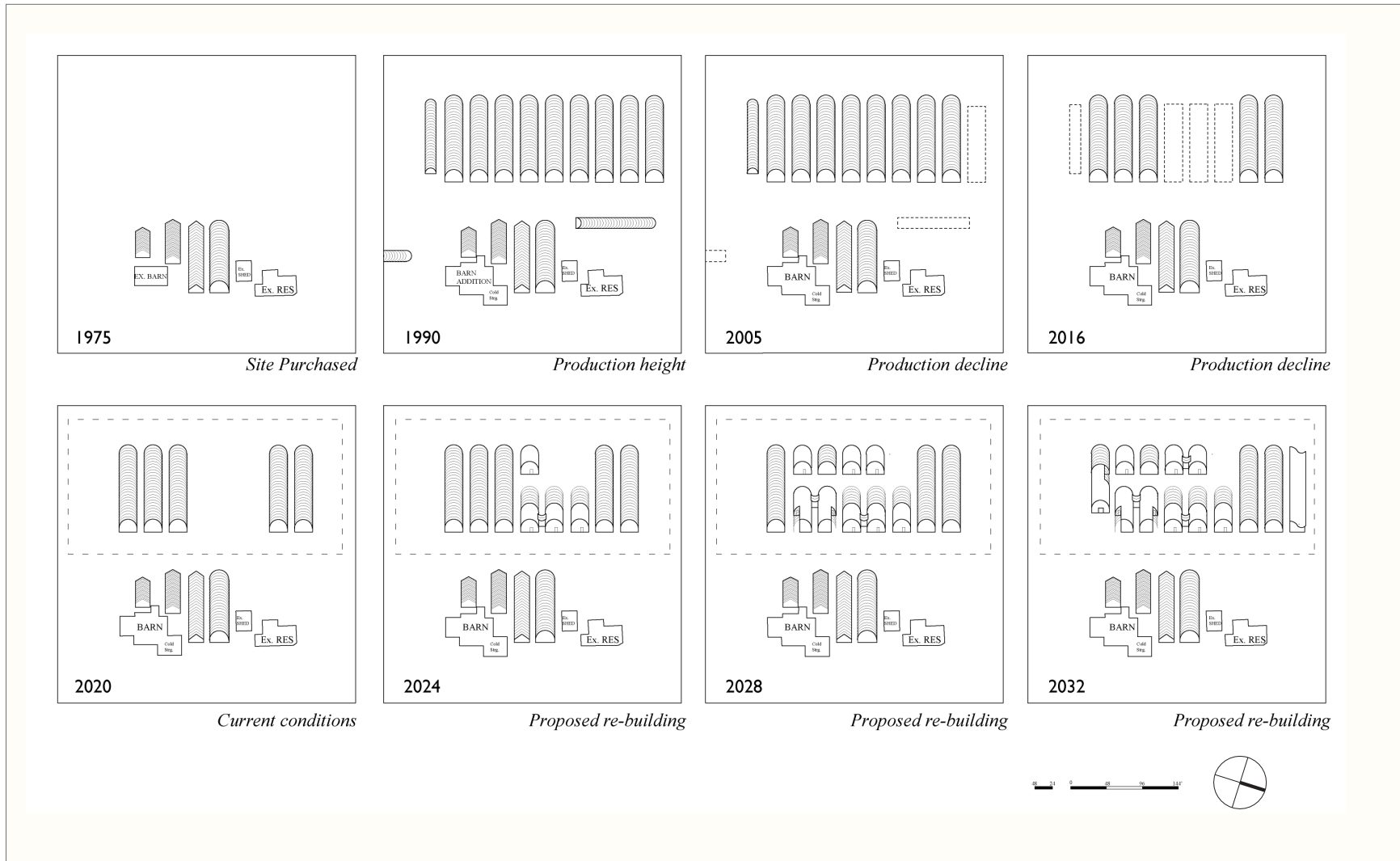
Second phase abodes integrates into the pattern of disuse. The greenhouses, all oriented east-west, are no longer used for production in the furthest west panels and dash lines indicate the area of the plan on the following page.

The plan for the abodes show the sanctuary building type (E) and the soiler type (G). The sanctuary demonstrates a random combination of replicable and rotatable housing types (which would be determined by individual preferences for shared space) that create an inward facing block. The inward facing block, precedented by the Amana commune, encourages sociality with internal footpaths to individual dwellings but would be expressed differently throughout the seasons as more space is enclosed by flexible greenhouse coverings in colder months. Add-ons are provided for extra bedrooms or an optional mudroom creates a shared entry off a foraging bioswale that makes use of the space between panels to naturally filter grey water and channel resources towards the strip farming that supports family sustenance. Section included on the following page and on page 138.

E   THE SANCTUARY

Enclosed Greenhouse

Swales provide diverse habitats and sources of nectar for bees

FLEXIBLE SEASONAL EXPANSION

GREENHOUSE FRAMES PROVIDE FLEXIBLE EXPANSION & ADAPTATION OF INDOOR-OUT-DOOR SPACE

Chickens eat harmful insects, clean up fallen fruit while fertilizing

Rack and pinion chain operated ventilating gear

Continuous gathering opens onto mudroom roof

SHARED MUDROOM

LIVING ROOM

WOOD STORAGE

RAINWATER FILTRATION & STORAGE

Continuous gathering empties into naturally filtering bio-swale

FORAGING SWALES Contain medicinal shrubs or materials for crafts

0"   4   12"

The house types of the sanctuary integrate into the panel formation of frames providing options for independent lifestyles or interdependent care giving or receiving needs through shared connectors or additional mudrooms. Each panel can create flexible live, work, and grow spaces throughout the length of each panel to suit family and inhabitants' needs; the combined building footprint and farming foodprint on the master plan equalling 0.56 acres per residence and adjacent hugelkultur fields allowing for 0.56 acres of foraging or shared farmland for residences.

THE ABODES SUPPORT INDIVIDUAL AND COMMUNITY GROWING INITIATIVES THROUGH COVERED GREENHOUSE AREAS AND SHARED OUTDOOR GROWING AREAS IN UNCOVERED GREENHOUSE AREAS.
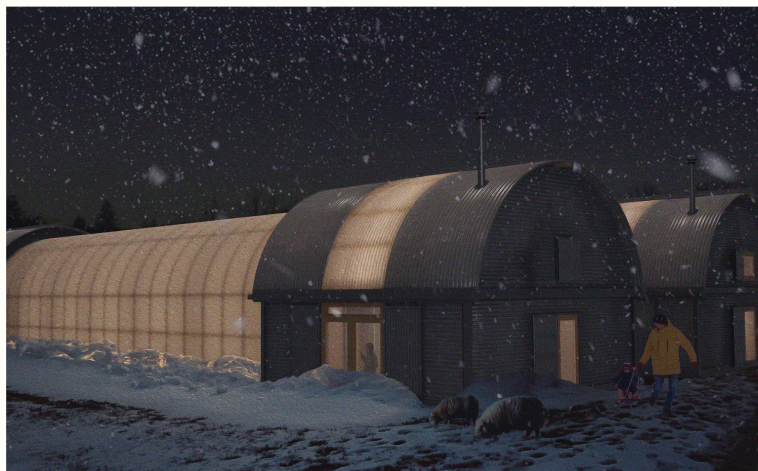
EXPANSION OF COVERED GREENHOUSE AREAS IN WINTER MONTHS CREATES MORE INDIVIDUAL LIVING AND GROWING SPACE

Renderings of the seasonal qualities of the sanctuary types. Greenhouse areas are retractable in warmer months and towards the end of the growing season providing shared outdoor growing areas within the internal block formation. During the winter months, the original panel formation is restored with covered greenhouse areas extending over the full the length of panels to creates additional living and indoor growing space for each unit.
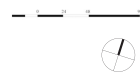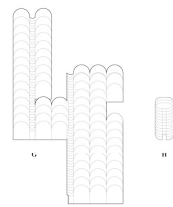
Phase III: Ancillary 2035-2050. The savant (F) and surveyor (H) are located at the south nucleus.

Phase III: Ancillary 2035-2050

The investment in the ancillary provides a learning centre and communal living that is intended to be used by all lifestyle, local, and return agents of care at the south nucleus. The savant type and industrial gutter connected roofs shelter programs that create an agricultural hub with potential research, a seed bank, and collaborative culinary spaces while providing additional support for lifestyle allotment growers. Many rooms blur the line between outdoor and indoor areas with flexible furniture for events or for entrepreneurial spirits to experiment with new business endeavours and offer workshops.
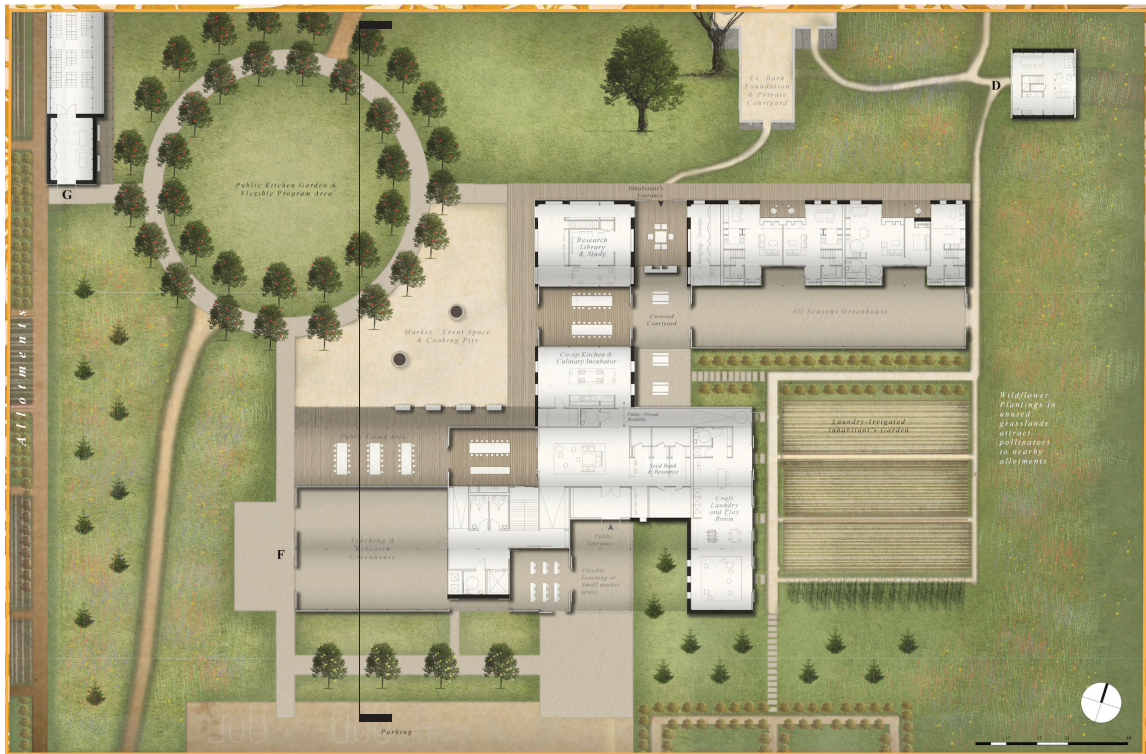
The plan for the ancillary learning center adapts the savant building type and is located next to the allotments. The public entrance to the south and public programming can be kept separate from the inhabitants entrance to the north with sliding doors and access controls; the co-op kitchen and culinary incubator space function as a public/private buffer zone and is located adjacent to market areas and outdoor cooking pits. Section distributed on pages 118-121.

Old barn foundation, found condition, south nucleus, 2021.

Old barn foundation, vine removal and uncovered potential, south nucleus, 2021.

While the indoor growing spaces of the learning centre can be used all year by lifestyle, local, and return agents, the outdoor growing areas celebrate the seasonality of the site for markets generating more seasonal tourism and public growing initiatives to the south nucleus. The circular design of the communal kitchen garden adjacent to the soiler creates a central meeting area, optional u-pick programs, outdoor workshop area, and winter skating. The design also centralizes the tourism and public activity at a distance further from the main residence than its current public market. The section of the communal kitchen garden is depicted on page 119.

The communal living wing to the north of the plan fosters the continuation and formation of old and new networks between people. It can support the farming retirement of the local agent, provide alternative accommodation for return agents, or perhaps provide accommodation for events. All the living units share an all-seasons greenhouse and have access to research spaces, laundry and daycare, and the shared co-op kitchen. The foundations of the old barn become a private outdoor courtyard shared with the sojourn types which, as previously mentioned, function like an Airbnb (D).

The surveyor is positioned on the highest point of the property marking the transition between the south and north nucleus - the private abodes to the north and the more public programming of the south. The surveyor overlooks the hugelkultur and allotment fields providing a navigational aid for those foraging, farming, or look-out tower for locating husbandry on the property. The surveyor is described with more illustrations in the following chapter.

The section for the savant and learning center located at the south nucleus. The savant type, using the industrial gutter connected greenhouse frames, creates spaces for public programming demonstrated as a communal kitchen garden, market space which includes the shed type, covered eating and/or workshop area, and research greenhouses.

F

Woodstoves serve as emergency heat backup - offering local, responsive supplemental heat to living units and gathering areas.

DEC-APR | MAY-NOV

DWARF APPLE / PEAR / and/or PLUM TREES

Natural building & farming crafts [depicted willow trellising]

Rosemary, basil, oregano, thyme, chives

RHUBARB, BLUEBERRY + RASPBERRY BUSHES Beans/Peas

Decking provides extra informal seating around market areas.

OPEN

PRODUCE WASH & EXTERNAL STORAGE

OUTDOOR WORKSHOP SPACE / EVENT EXPANSION SPACE / CAMPING SPACE

OUTDOOR WORKSHOP SPACE / EVENT EXPANSION SPACE / CAMPING SPACE

KITCHEN GARDEN PLANTINGS

Part 1: The circular design of the communal kitchen garden creates a flexible central area for outdoor seasonal activities such as building workshops, event or market expansion space, pick-your-own festivities, yoga, skating, etc. The walkway, shaded by fruit trees, corrals visitors away from the existing residence and has connecting pathways to the communal living area, designated market space and co-op kitchen, the soiler and allotments to the west.

SOLAR PANELS FOR
HEATING & HOT WATER

Placed on quonset roofs arranged to maximize solar gain in December and early January. Heated water stored in linked insulated tanks below roofs with inverted quonset frames. A smaller tank serves day-to-day heating demands, while large tanks provide seasonal storage for winter months.

Woodstoves serve as emergency heat backup - offering local, responsive supplemental heat to living units and gathering areas.

KITCHEN
COMMERCIAL
GREENHOUSE

PUBLIC COVERED
EATING AREA +
WORKSHOP AREA

HAMMOCK
HOOKS BETWEEN
STEEL-POLE
MEMBERS FOR
REST SPACE

Decking provides extra informal seating around market areas

RHUBARB, BLUEBERRY + RASPBERRY BUSHIES
Beans Peas

PRODUCE
WASH &
EXTERNAL
STORAGE

JUICE BAR

OPEN

Cylindrical "sun-tube" solar pond fish tanks (hold 500-700 gallons ea.) provide high quality protein and algae growth enhances pond's capacity to absorb and re-radiate solar energy

KITCHEN GARDEN PLANTINGS

COVERED MARKET CREATED BY ATTACHING SHED GRASS SCREENS

ROCK VAULT
FOR HEAT
STORAGE

Part 2: The market space is outside the co-op kitchen and is defined by the wood decking that surrounds the commercial greenhouses. The market itself is created by the relocation of shed types from the nearby allotments (described further in the next section). On non-market days, the sheds would be returned to the allotments and the area becomes a transitory space for day-to-day activities.

SOLAR PANELS FOR
HEATING & HOT WATER

Placed on quonset roofs arranged to maximize solar gain in December and early January. Heated water stored in linked insulated tanks below roofs with inverted quonset frames. A smaller tank serves day-to-day heating demands, while large tanks provide seasonal storage for winter months.

PUBLIC COVERED EATING AREA / WORKSHOP AREA

HAMMOCK HOOKS BETWEEN STEEL POLE MEMBERS FOR REST SPACE

Cylindrical "sun-tube" solar pond fish tanks (hold 500-700 gallons ea.) provide high-quality protein and algae growth enhances ponds' capacity to absorb and re-radiate solar energy.

Aquaponic teaching systems

RESEARCH COMMERCIAL GREENHOUSES

Continuous Guttering rainwater collection & Storage

Wildflower and perennial herb plantings deter unwanted pests and attract pollinators to nearby alchemists

Landscape areas include low-maintenance companion plantings for "pick-your-own"

Aluminum Vents

ROCK VAULT FOR HEAT STORAGE

GREENHOUSE ROCK STORAGE SYSTEM

Metal duct and fan harvest solar-heated air from greenhouse, the rock heat storage vault, and distribution ducts back to the greenhouse. A "thermal flywheel" is created by heating the rock and cooling the greenhouse by day, then reversing the heat flow (but not the airflow) at night.

PARKING

0'   4   12'

Part 3: The learning and research greenhouses are suggested with integrated heating and climate systems articulated as sub-systems, with attention to heat management time scale: Hot water flat plat solar collector and water storage tanks, long-term (multi--seasonal) storage; "suntube" solar ponds, medium-term (multi-day) storage; greenhouse rock storage "heat flywheel", short-term (day to night) storage; wood stove, immediate heat supply in communal living units. These heating and climate systems were tested and explored by the New Alchemists as an alternative to fossil fuels in the Ark (Solsearch 1980).

APPROACH TO THE MARKET, LEARNING CENTER EVENTS, AND WORKSHOPS THROUGH WILDFLOWER FIELDS.

DAY-TO-DAY OPERATIONS PICTURED THROUGH THE FRUIT TREES OF THE ADJACENT KITCHEN GARDEN.

Renderings of the savant type, approach and exterior of the learning center, located at the south nucleus.

COMMUNITY DINNER IN THE HYDROPONIC GREENHOUSE.

EVENING MARKET ATMOSPHERE UNDERNEATH SHED GRASS SCREENS.

Renderings of the savant type, interior and market atmosphere, located at the south nucleus.

Chapter 5: A Building and Farming Culture

The agro-architectural ecology and framework is represented and discussed in the preceding chapter as it generally relates to design phasing and a wide range of the agents and aspects of care. Particular to this project however, are types that were inspired by real individuals encountered through this journey and imagined to be part of an interdependent culture of caring; truly, a successful bricolage can listen to and identify the voices of a place as expressed through its inhabitants. This is what is intended at the building scale and through the identification of individual narratives, unique precedents, and intentional community design. In this chapter, the following types will be described in further detail: the app, the shed, the studio, the sojourn, the sanctuary, and the surveyor.

The App

The idea for the app was generated throughout the beginning of pandemic disruptions when myself and other return agents worked to get farming businesses online and sell their produce in lieu of public market closures. The overwhelming increase in demand for food box subscriptions as well as the questions and preferences of new customers created back ups for producers as well as more logistical requirements to fulfil these demands. While food boxes are a desirable scheme allowing producers and consumers to share in more of the risks and rewards of the farming business, talking to the south site owner and other CSA farmers, the majority of subscribers are middle aged and older. There is a desire to make food boxes more appealing to younger generations, inform individuals about the importance of local varieties,

and bring more awareness to the seasonal availability of certain crops.

The proposed app builds upon the food box scheme and already existing and popular farming applications used by younger generations such as FarmVille, Farm Story, Farm On!-Raise crops & Build, Hay Day etc. In these applications, users can place objects, planting beds, and choose from a variety of plants and get points or rewards at each harvest. There is in-game trading with other players and/or you can buy items you need from them or from the selection of items in the apps' stores.

Design

In the App for this proposal, small allotments on-site can be virtually rented and managed by players, growers, or consumers improving the accessibility to farmed land. The app allows all users and allotment renters to select plants and purchase items for their individual uses already pre-determined by the local agents or farm owners. This prevents unwanted or non-regional varieties from being planted in the allotments. The app provides a tool for all allotment growers to record and manage plantings, this management tool working to prevent cross-pollination between plots or generate beneficial soil micro-organisms from diverse rotations year to year. Further, since inputs and purchases are paid upfront for by app users and growers, more of the risk in the farming business than the food box scheme is compensated for, which would be encouraging to local and return agents performing the labour and fulfilling the logistical requirements. By receiving updates and tips on the allotment's progress from local and return agents, users gain knowledge of growth rates, seasonal availability, and

A THE APP
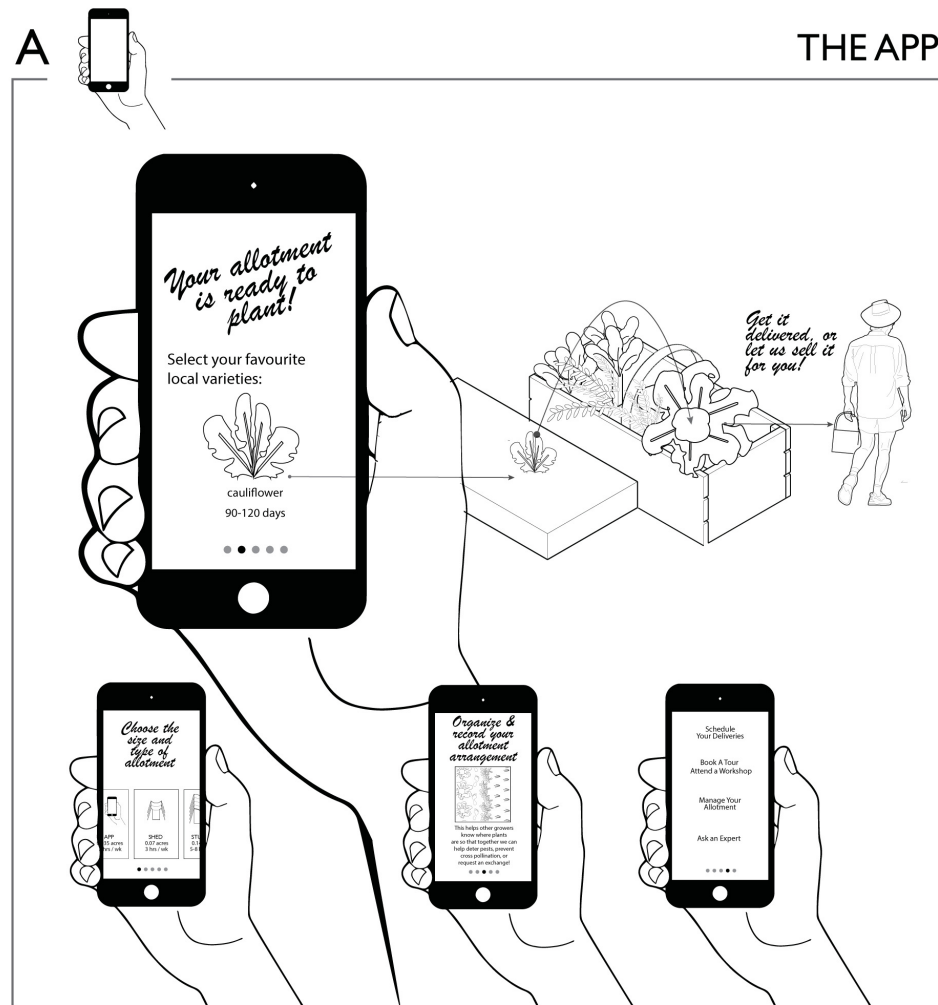
THE BIODYNAMIC BROTHER
Farmer and Site Owner
Age 75 | Hosts public markets and offers food box deliveries

The Biodynamic Brother has been farming using organic practices and polycultural techniques for half a century - "I was doing all this when it was considered backwards, I was the dirty hippie of the family. But now? You can sell an organic cauliflower in Toronto for $5.00 or more, whereas my brother could hardly gets 50 cents a head for wholesale." The Biodynamic brother is always wanting to push boundaries that are grounded in the earth, and would expand his current food box deliveries if his age would allow it. He hopes the younger generation could be more attracted to the profession, and the App creates a new opportunity and way of farming that can reduce risk by covering upfront costs with subscription and in-app purchases of seeds, trellising, etc., and incentivize his children that have since moved away from the farm.

THE BROWSER
Marketing & Human Resources
Age 31| Employed and living in Kingston, Ontario

The App's concept builds off the existing food box scheme, already existing and very popular farming applications. Rather than fully virtual however, App subscribers can remotely manage their allotment. The app interface allows farmers to choose the varieties of crops that are locally or regionally available, and users to arrange their allotment from this selection covering the costs of the seeds and other optional inputs or maintenance. App users also share in the reward of the produce grown, scheduling a delivery or requesting the produce to be sold at market.

The App can be used as a management tool for farmers, recording the produce grown each year and for other in-person allotment growers. Its concept is conceived with The Browser in mind, a third generation farmer who left for a career and home elsewhere, visiting once a month. The Browser still wants to participate in the farm business and help her family, and collaborating with the Barbizons and media professor may be a way to include her management skills with the app bookings, event scheduling and allotment organization. Aerial updates of allotments can be sent to App users collected from the wireless satellite dishes on the Surveyor; privacy controls, access and management of this technology would be within the Browser's and media professor's expertise.

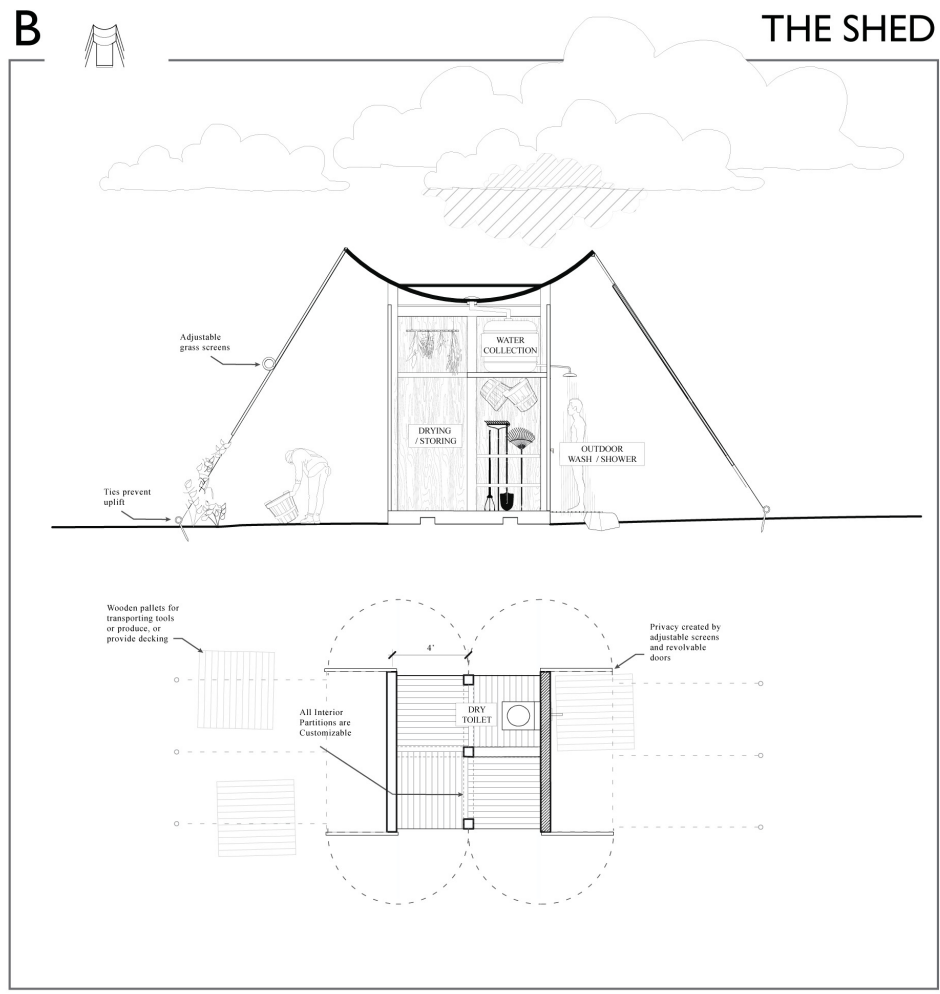Description of the App type with individual narratives and precedents.

are informed of both virtual and on-site workshops that may inspire more business opportunity and engagement with the earth. The yield from these allotments can be delivered to the allotment app subscribers or, if they choose, sold at the farmer's regular markets and monetary rewards from their sales returned.

The Shed

The shed supports lifestyle agents and growers like the Baker. The Baker is a restaurant owner from Toronto who has received food box delivers from the local farmers in the past and frequented the south site during the pandemic asking for space to grow fresh herbs. The south resident farmer obliged and I was present for their early conversations at the beginning of pandemic closures.

The local farmer offered advice, warning the Baker to resist planting until after the full moon in May where the risk of frost damage is low. The farmer told the Baker a story of when there was risk of frost in planted fields: stacks of wooden pallets would be transported by tractors and scattered amongst the rows and plantings. When the temperature dropped at night, the farmer and his children would light the wooden palettes on fire to protect the crops from the frost and kept feeding the fires by dragging out branches from the woodland until the danger had passed in the morning.

This story, as well as access to water that the Baker found was an issue working the earth and growing herbs on the farm, was the precedent to the shed's design.

B

𝄑

THE SHED

Adjustable
grass screens

WATER
COLLECTION

DRYING
/ STORING

OUTDOOR
WASH / SHOWER

Ties prevent
uplift

Wooden pallets for
transporting tools
or produce, or
provide decking

Privacy created by
adjustable screens
and revolvable
doors

4'

All Interior
Partitions are
Customizable

DRY
TOILET

THE BAKER

Vegan Activist & Chef
Age 32 | Restaurant
and catering Chef

The Baker has received food box deliveries to the restaurant by the resident farmers in the past. With the pandemic, disrupted food chains, and altered work hours, the Baker visited the farm, wanting to learn how to grow their own herbs and other specialty items desired by other restaurant cooks - intending to sell some of the produce as well.

The Baker will use the allotment shed during the weekday when the restaurant is not busy and is grateful for the app and communication with the local entrepreneurs when they need a reminder that their herbs are ready to harvest, or to re-schedule their food box deliveries on weeks they cannot make it to the farm. When the ancillary communal kitchen is open, the baker seeks to offer herb-growing and cooking workshops.

2018 ◯ Received food box deliveries to restaurant and catering business

2020 ◯ Pandemic disrupted regular work hours and baker visits farm and begins growing herbs

2021 ◯ The Sheds are constructed and the Baker invites other restaurant employees to enjoy and help on the allotment

2023 ◯ Expands allotment to include The Studio to grow, dry and process herbs on-site

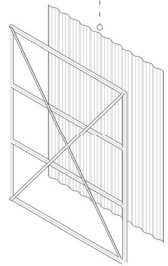2030 ◯ Offers cooking and herb growing classes in the co-operative kitchen

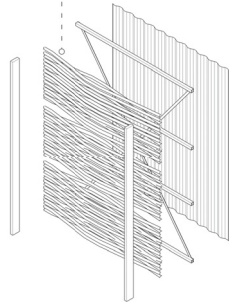Description of the shed type with an individual narrative and precedent.
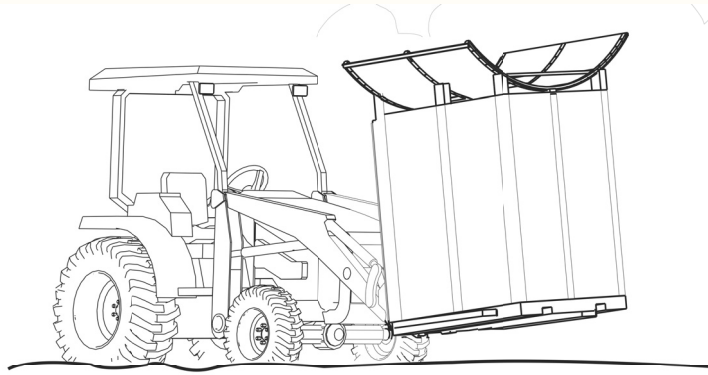
FOUNDATION TYPE
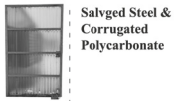
Salvged Steel & Corrugated Polycarbonate

Integrated Willow

Gatherable from woodland; customizable integration for preferred levels of privacy

Woven phragmites screen

Adjustable and customizable for seasonal integration; helps manage invasive species

WALL TYPE 1

CONVENTIONAL

Steel and corrugated polycarbonate

WALL TYPE 2

HYBRID

Gathered wood for iategrated screening
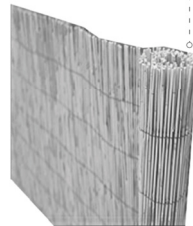
SCREEN TYPE 1

PHRAGMITES

invasive species management and custumizable shading

Construction of the shed type with rendering of the Baker.

Design

As per the agro-architectural ecology, the 8'x8' allotment shed is proportioned on land manageable with as little as 3 hours per week. The shed provides remote storage for tools, contains customizable interior partitions, an option for a dry compostable toilet, and it inverts greenhouse frames for water collection in the fields. The construction has two fixed walls - one of conventional greenhouse materials, and the other a hybrid creating more privacy with foraged wood from the adjacent woodland. Rollable grass matts and screens are attached to the cable ties which secure the inverted greenhouse frames from wind uplift. The adjustable screens are intended to be part of a management plan of an otherwise ecologically damaging species found on site.

The adjustability of the screens and movability of the pallet foundation allow these sheds easy relocation and combination which can create an option for growers to participate in the existing on site market, or potentially any field. In phase three of the proposal, depicted on page 120, the market space is adjacent to the communal kitchen gardens, outdoor workshop areas, and co-operative kitchen programming of the learning centre. The wooden elements and screens of the sheds create shade and an intimate atmosphere outside these large scale commercial greenhouses (rendering included on page 123).

The Studio

The grass screens are also present in the studio type which provides a flexible workspace or remote office that could be used in combination with the shed's functioning. The studio would support the Barbizons who are teaching professionals from Toronto who met the farm owners at the Artscape

Wreaths made by the Barbizon family from foraged wild grapevine on-site, 2020.

Regional precedent for half arch assembly, Grimsby Ontario, 2020. Commercial greenhouse quonset arches are often assembled using a half arch and connected with a steel ridge beam. This makes for easy adaptation and proliferation of studio types.

Local precedent for straw bale insulation, on-site, 2020. Local agents place straw-bale around openings of greenhouses during the winter months.

Wychwood Barns farmers market. With their professions, their children, and pandemic disruptions to class schedules, the 40 minute drive from the city to the farm made for an artistic day trip - a place to create, make a mess, and let the kids craft and play. The art teacher experimented with natural woven crafts with the children and wants to grow produce such as flowers and root vegetables to make natural paint pigments. The media professor helped to create the website for the farm and is currently working with local agents to help develop the farming app and interface.
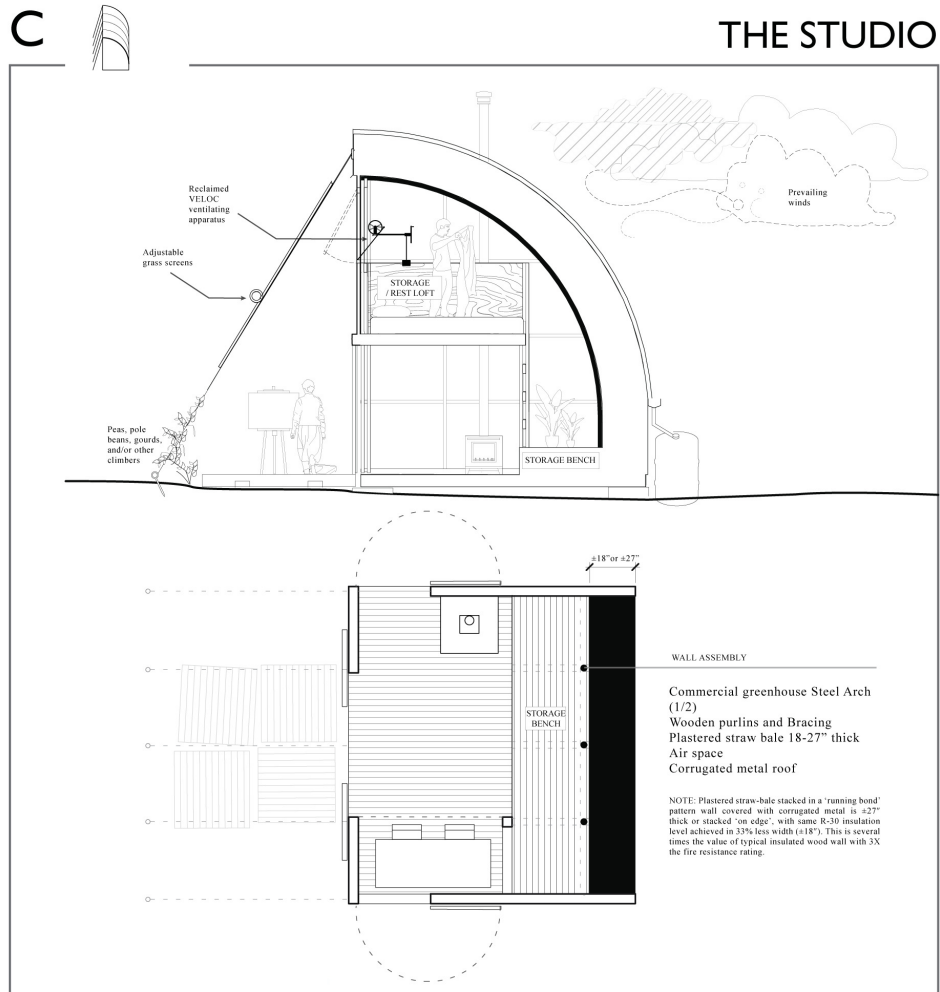
Design

The 12'x16' allotment studio is proportioned on ground and earth manageable within a day's work per week. It provides extra space for storage or resting, and could be furnished to suit individual preferences as a remote greenhouse or office space. Large operable windows, sliding doors, and flexible screenings capture breezes or control shading of mostly conventional greenhouse wall construction. The quonset greenhouse frames however, utilize half of the steel arch and are insulated with locally sourced straw bale - the construction itself closely resembling the layers in the ecological guild. With its modest size and proper orientation to east-west (the insulated straw bale arches towards the north), individuals renting a studio allotment could easily extend the use into the winter months and begin seedlings for their allotments in the early spring.

The Sojourn

The sojourn supports lifestyle agents like the Biologist. The Biologist is a university graduate attending Guelph's agricultural college, who's research on soil microbes would have otherwise been cancelled due to the pandemic if

THE STUDIO

C

Reclaimed VELOC ventilating apparatus

Adjustable grass screens

Prevailing winds

STORAGE / REST LOFT

Peas, pole beans, gourds, and/or other climbers

STORAGE BENCH

±18"or ±27"

WALL ASSEMBLY

STORAGE BENCH

Commercial greenhouse Steel Arch (1/2)
Wooden purlins and Bracing
Plastered straw bale 18-27" thick
Air space
Corrugated metal roof

NOTE: Plastered straw-bale stacked in a 'running bond' pattern wall covered with corrugated metal is ±27" thick or stacked 'on edge', with same R-30 insulation level achieved in 33% less width (±18"). This is several times the value of typical insulated wood wall with 3X the fire resistance rating.

THE BARBIZONS

*Art Teacher & Media Professor*

Ages 39-46 | Employed at a public school and college

The Barbizons met the local agents at the Artscape Wychwood Barns market in Toronto. They enjoy coming to the farm for "artistic outings", and with the pandemic frequented the site more often, foraging in the woodlands for craft supplies, and for taking family photos with their children.

The 40 minute drive is an escape from the city, and perfect for a day trip. They will use the studio allotment as place to create, make a mess, or bring the kids to play. The art teacher wants to experiment growing flowers to make natural paint pigments; she hopes this will be something she can explore as potential side or Etsy business, or sell crafts and flowers at market. The media professor is working with the local entrepreneurs to helps them develop their app technology and interface.

2010 ◯ Developed relationship with the local farmers from their market at Artscape Wychwood Barns, Toronto

2020 ◯ Pandemic disrupted teaching schedules and children's schooling; they visit the farm as an escape from their overcrowded townhouse

2021 ◯ Media professor is helping to develop the Allotment App with the Local Farmers

2022 ◯ Rent a studio for remote work & creative space

2029 ◯ Become full time residents and live in the Sanctuary which provides more affordable living, shared creative spaces, and is still close enough to the City

Description of the studio type with individual narratives and precedents.
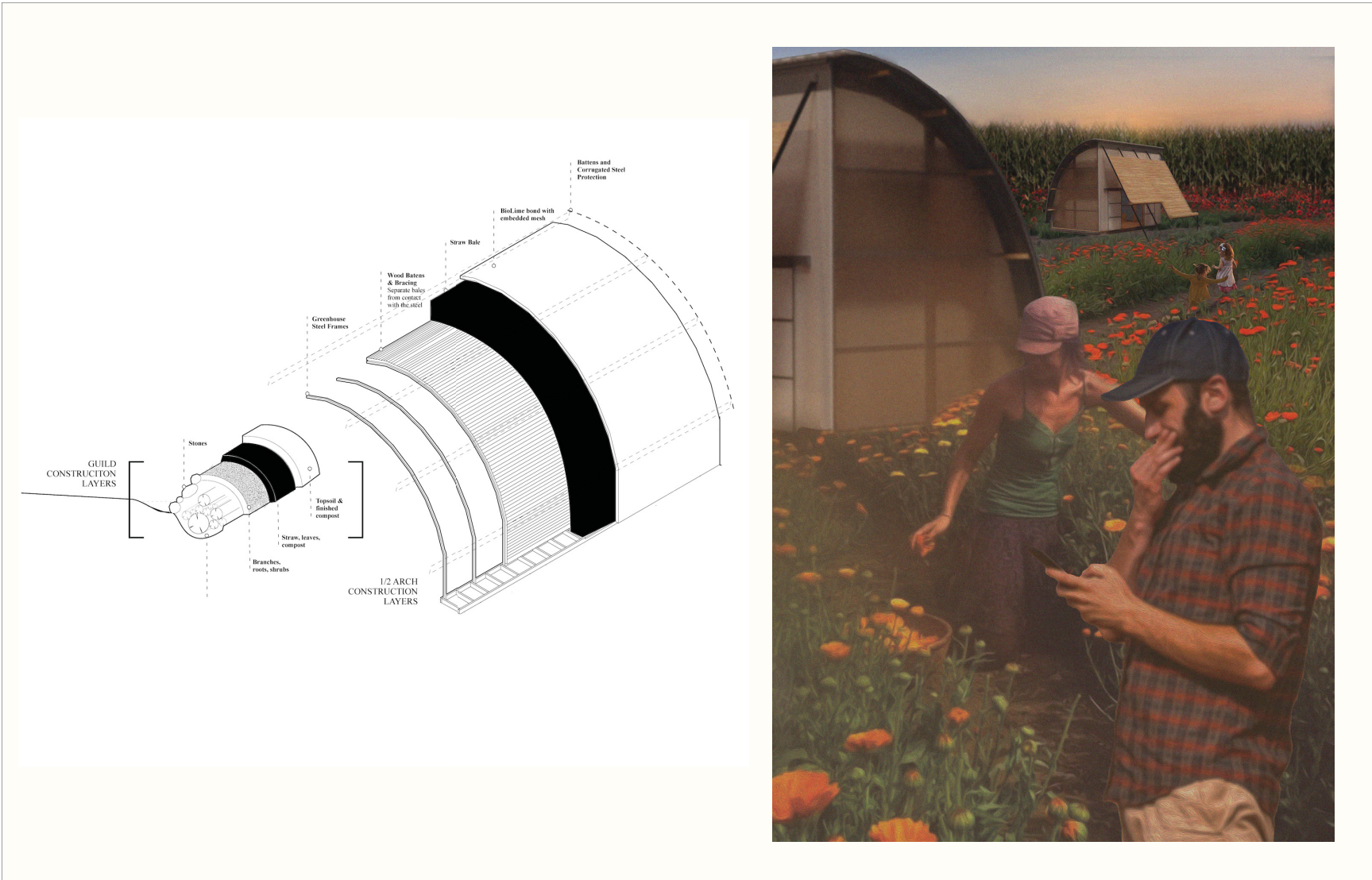
Studio layers of construction emulating the layers of hugelkultur or ecological guild. Rendering includes the Barbizons.

she had not found the ground of the farmers (the north residence owner a Guelph alumni) to adapt her experiment to. The Biologist used several small plots of land throughout the property for soil testing during the pandemic and often brought her own camping gear on weekends to stay overnight.
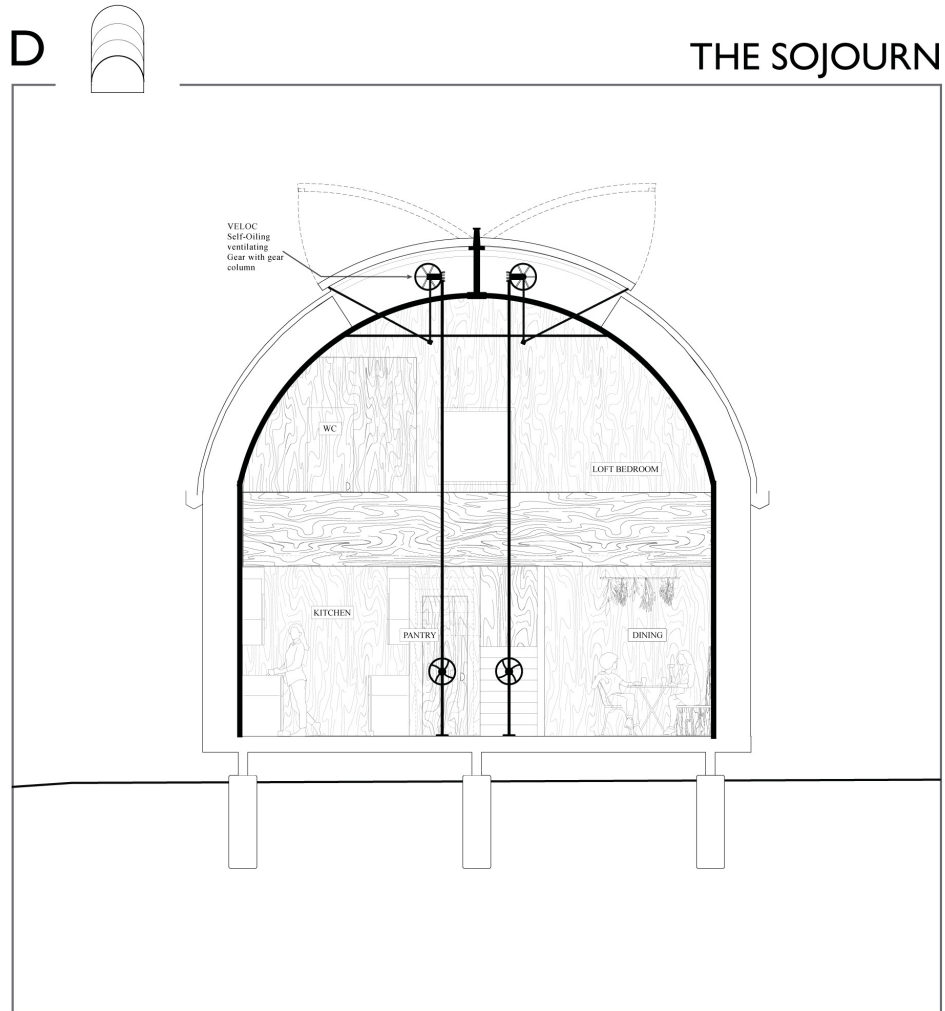
The Biologist preferred to camp closer to the main residence of the south nucleus to be in reach of the residence's wi-fi and close to the large outdoor cooking pits. Further, when the local agents were asked about previous market events and others who had overnighted on the farm, the locals responded that they preferred campers to stay close to the residences for safety but also for the sociality of the cooking pits.

Design

Regional precedent for 24' straight walled quonset, Hamilton Ontario, 2020.

The sojourn type, although suggested by the agro-architectural ecology to be used with allotment programming and in combination with shed and studio types, is shown on the master plan as separate and located close to the south nucleus residence. Its programming is adapted to function as an Airbnb, providing a collaborative stay and work space that could be separately rented for overnight stays to allotment growers, return agents visiting home, and could also attract more independent ecotourism. The sojourn's construction is similar to the studio; however, insulating the full quonset arch with straw bale to provide all seasons accommodation and repurposing outdated greenhouse ventilating gear. The 24'x 24' square plan is shown on page 116, and sojourners share the barn foundation courtyard with local inhabitants, have access to the laundry and cooperative kitchen areas of the learning centre or savant type.

D   THE SOJOURN

VELOC
Self-Oiling
ventilating
Gear with gear
column

WC

LOFT BEDROOM

KITCHEN

PANTRY

DINING

THE BIOLOGIST

Graduate Student
Age 28 | Environmental
Sciences at UofG

The Biologist was planning a research experiment studying soil microbes in Ghana when COVID-19 restricted movement across borders. Rather then reformulate a new experiment , the Biologist wanted to adapt the experiment locally, and asked one of the local agents if they could use some of their unused land for creating soil test plots.

The Biologist and other colleagues at the University use several small allotments and occasionally book overnight stays at the Sojourn. The sojourn provides an intimate atmosphere for the biologist's remote workspace and is flexible to accommodate several overnight guests - functioning as an Airbnb. The local agents and Biologist are hopeful that research partnerships with the university can continue and accelerate the construction of the ancillary learning center which will provide more research space.

2020 ○ COVID-19 travel restrictions prevented overseas research on soil microbes and UofG alumni connections introduced the farmers and their land make it feasible to adapt the experiment to local soils.

2021 ○ Uses small plots of land for testing and research sampling

2025 ○ Occasionally books overnight stays at the sojourn when sample collecting; other students from the university similarly conduct research on allotment land

2030 ○ Research partnerships with the university have provided funding for the research lab and greenhouse in the learning centre.

Description of the sojourn type with an individual narrative and precedent.

The Biologist and the local agents around the cooking pits with the nearby sojourns.

The Sanctuary

One of the local inhabitants or agents is the Builder - a solar technologist and travelling musician. The Builder currently lives on and off the farm getting help with child support when need be; however, foresees moving back more permanently in order to return the care to his aging dad, one of the farm owners. The housing types of the sanctuary were inspired by the Builder and his family: like the symbiotic plant relationships in the ecological guild, the sanctuary creates an environment for these human interpersonal relationships to evolve over time and space.
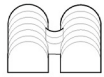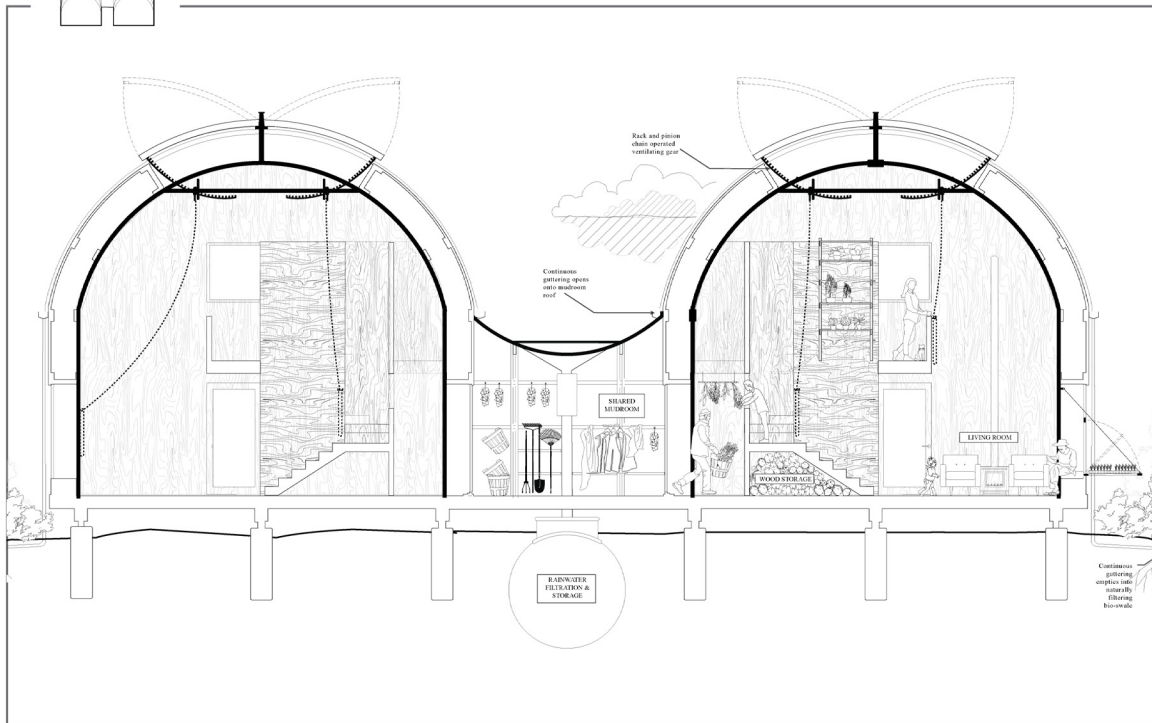
Design

On-site precedent of chain-operated ventilating gear, 2021. In this greenhouse, the hand-wheel was removed to leave the center space clear for carting in and removing soil.

The basic form is demonstrated using the common 24' wide straight walled quonset greenhouse as in the sojourn. The rack and pinion chain operated ventilating gear was chosen from reviewing common materials and ventilating apparatuses found in commercial greenhouse catalogues and on-site. The chains, rather than the fixed column gear repurposed in the sojourn, can easily be moved should the interior layouts of the sanctuary types be transformed to suit individual working or living needs. Although drawn distinctively on page 112, the sanctuary and abodes are imagined to evolve similarly to the Antigonish Movement and co-operative in Tompkinsville: while the houses would be built by co-operative efforts, individuals would personalize the interior arrangements and determine portioning of greenhouse spaces within the panel formations.

THE SANCTUARY

E

Labels in diagram:
- Rack and pinion chain operated ventilating gear
- Continuous guttering opens onto mudroom roof
- SHARED MUDROOM
- WOOD STORAGE
- LIVING ROOM
- RAINWATER FILTRATION & STORAGE
- Continuous guttering empties into naturally filtering bio-swale

THE BIODYNAMIC BROTHER
Farmer, Site Owner
Age 75

The owner of the south residence, the Biodynamic Brother has always been concerned about sustainable agriculture: When all farmers were specializing their crop production in Ontario, this brother pioneered organic farming when they first acquired the farm in the 1990s. Organic, then, was considered backwards and dirty. In 2013 this Biodynamic Brother set up a one-stop shopping market on the private farm, inviting entrepreneurs from Toronto and farmers from the surrounding area selling everything from vegetables to cheese, honey, and baked goods, all directly and informally from the farmers to people. It was a market that cut through much of the "politics" and "various business improvement associations" and costs for space rental at formal markets. Quoted in the local newspaper, this farmer said "I want this to be a learning center too. We need to learn what we've lost and what we need to keep" in growing our food. "people can walk around the property and see how things grow. The kids love that." (source ommited to preserve anonymity).

Now in his mid 70's this farmer with his children (the Builder and the Bookkeeeper) only grow produce to around the homestead, attending small markets, and fulfilling food box orders and deliveries - needing more help to keep things growing but with increasing farm debt, cannot afford to hire the labour. Further, the age of this farmer and physical health are conflicting with his entrepreneurial and pioneering spirit.

The Sanctuary would provide an on-site alternative to living in the current three-storey residence which is difficult for this farmer to maintain - close to his worked fields and close to his children for assistance - but maintaining his independence in his own home. The environment of the Sanctuary with internal pathways is meant to encourage spontaneous encounters with other local and return agents perhaps inspiring more working-living-growing business opportunities, collaboration ventures or innovation.

THE BUILDER & THE BROOD
Solar technician & musician with their kids
Ages 2, 31-36

The builder, his partner, and children have been living on and off the farm for several years - wanting their own home, but priced out of the market in the GTHA. They need help with child care as their jobs occasionally require travel.

The Sanctuary provides an affordable and flexible work/live/grow space that can evolve to suit needs for private space while not being isolated from family support. The Builder will use the adjacent space as a wood shop, helping to build the allotment sheds and studios with the lifestyle agents - offering workshops to teach some off-grid skills. Once the fields are at capacity, the builder will transform the connecting space for his sister - The Bookkeeper (who can share in the care of the kids) or can imagine an eventual house-swap with his dad (farm owner) who may want to downsize from living in the current three-story farmhouse and may need additional care. The sanctuary provides individual space that can be intimately shared for care-giving and receiving needs.

Description of the sanctuary types with individual narratives and precedents.

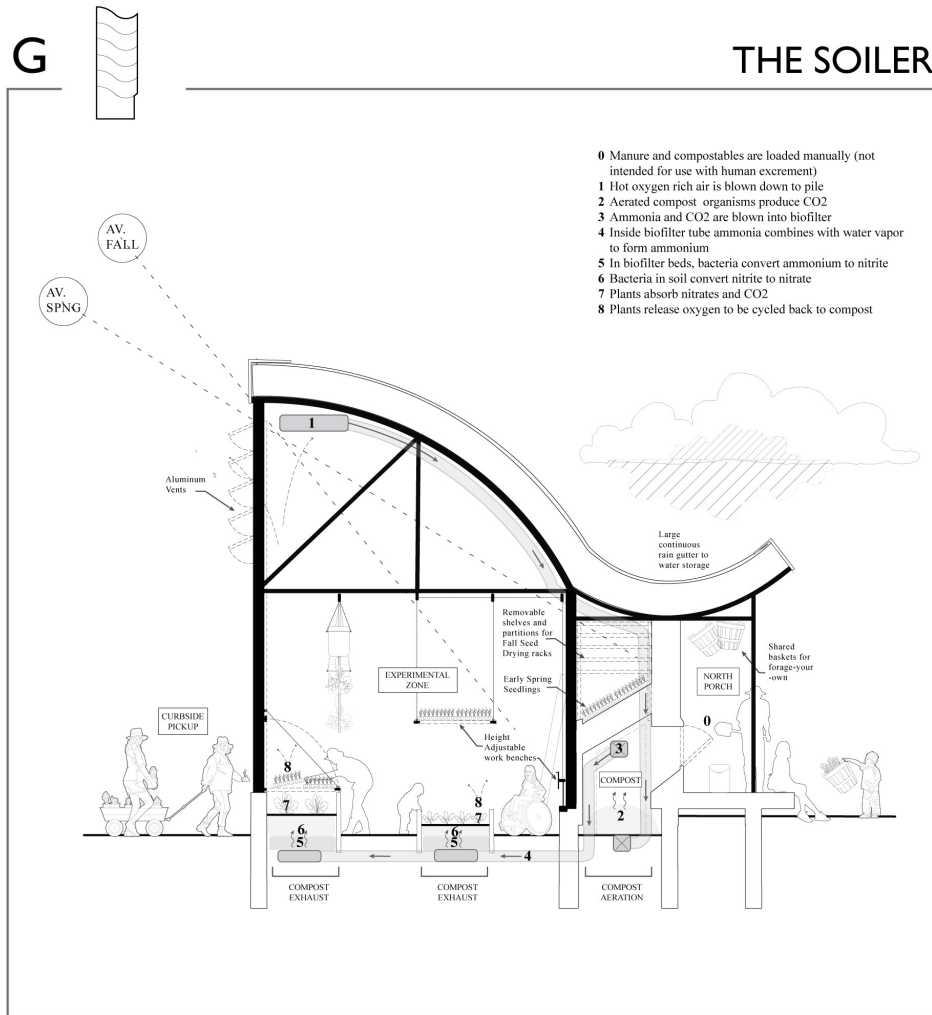The Builder and son approach the sanctuary from hugelkultur fields which support family sustenance.

The Soiler

The soiler is a soon to be collaboration between a youth climate activist attending the local school, myself, and one of the farmer's daughters who's career as an engineer is currently paying for the farm operational costs. While it is typical for small-scale farm owners to pursue off-farm income due to rising operational costs and farming debt, the soiler's concept hopes to alleviate the dependence of the local agents on purchased seeds and soil amendments.

Design

The soiler type has a distinctive roof shape created by combining half of the large industrial-scale quonset arch and an inverted arch for water collection. The adjustable length is oriented east-west, with tall walls on the southern exposure using regular steel and polycarbonate materials for ample sunlight to penetrate the greenhouse space. The roof and north walls are insulated with straw bale, enclose the compost, and create a front porch for the community to drop off their compost. The enclosed compost generates heat and carbon dioxide which is repurposed to enhance the production of greenhouse crops and eliminate fuel costs normally required for heating and all-year greenhouse operation.

The New Alchemy Institute research project in Massachusetts created a moderately-sized 576 square foot composting greenhouse that produced more than 100 tons of compost and tens of thousands of seedlings in its first full year of operation (Fulford 1986). This soiler would be seen as a continuation of this research testing the practical application at two different scales at the north and south nucleus. To the north, the soiler creates a local community composting

G THE SOILER

0 Manure and compostables are loaded manually (not intended for use with human excrement)
1 Hot oxygen rich air is blown down to pile
2 Aerated compost organisms produce CO_2
3 Ammonia and CO_2 are blown into biofilter
4 Inside biofilter tube ammonia combines with water vapor to form ammonium
5 In biofilter beds, bacteria convert ammonium to nitrite
6 Bacteria in soil convert nitrite to nitrate
7 Plants absorb nitrates and CO_2
8 Plants release oxygen to be cycled back to compost

AV. FALL

AV. SPNG

Aluminum Vents

Large continuous rain gutter to water storage

Removable shelves and partitions for Fall Seed Drying racks

EXPERIMENTAL ZONE

Early Spring Seedlings

NORTH PORCH

Shared baskets for forage-your-own

CURBSIDE PICKUP

Height Adjustable work benches

COMPOST

COMPOST EXHAUST

COMPOST EXHAUST

COMPOST AERATION

THE BRAINS
Youth Climate Activist
Age 12 | Elementary School Student

THE BRICOLEUR
Return Farmer
Age 29 | M. Arch at Dalhousie University

THE BOOKKEEPER
Farmer, Engineer
Age 26 | Alleviates farm debt with own income

The Brains attends the local school. When the pandemic disrupted regular classes, the Brains asked the local agents if they needed extra help on the farm and if they could teach her more about plants and food. The local agents have taken the Brains and her parents on tractor trailer rides through the property, and have adapted work bench height so the Brains can help them sow seeds. She wonders why the farmers do not have a composting program with her school - advocating for better management of food waste which can help in the fight against climate change.

The Bricoleur returned to the local community during the pandemic and noticed the dependence of the local agents on purchased seeds and soil amendments but also the proximity of the site to rich sources of manure (the stables) and household food wastes. The Bricoleur has been talking to the Bookkeeper, the farmer's daughter, who is using her own career as an engineer to help offset farming operational costs and alleviate some of the family's debt. Motivated by the enthusiasm of the Brains, together they are currently collaborating to re-purpose one of the greenhouses and create a community soil center and space to sow and save seeds.

The Soiler provides this experimental shared space for the local community to the north nuclei, while the soiler located to the south nuclei functions with the allotment programming and ancillary co-op kitchen. The Brains hopes that the local and return agents will be able to offer elementary and public school class tours for hands-on learning in the future.

The Bricoleur intends to create more accessible farm infrastructure and continue working with the Bookkeeper to make the soiler a profitable strategy for selling plant seedlings while also promoting productive and sustainable soil amendments.

Description of the sojourn with individual narratives and precedents.

Exterior and interior renderings of the soiler. The exterior shows the north porch and compost drop-off. The interior demonstrates day-to-day operations of seedlings in the soilers potting and storage area with atmospheric qualities of the large south glazing in the greenhouse area.

and experimental space. Its day-to-day operations would be shared by the inhabitants of the sanctuary to support their own individual pursuits as well as provide amenity space to those in the surrounding neighbourhood. It would capitalize on its proximity to rich sources of horse manure, access to food wastes from the local schools and daycares. To the south, the soiler provides additional amenity space for farming allotments. Later, the development of the savant or learning centre can provide more food wastes and compost material (especially with the market and co-op kitchen) which may warrant expansion of the south soiler than currently drawn on the master plan. Excess seeds saved from the community from both north and south soilers can be stored in the storage and potting area (plan included on page 112 and 116) or the savant seed bank - a repository and exchange for all farming communities and individuals visiting the site.

The Surveyor

The last type is the surveyor and its precedent comes from studying building types and monitoring strategies common in communes but and further from the regional warning symbol - the obsolete grain silo depicted on the following page. The grain silo is one of the many accelerating anachronisms of diminishing small scale farms and represents the stories from farmers of lands they've lost, or that were superseded by industrial operations.

Design

As part of the building infrastructure across all farms, the quonset greenhouse frames are arranged vertically as an exoskeleton. The interior structure and height provided by an industrial grain leg core and support tower -the sheathing
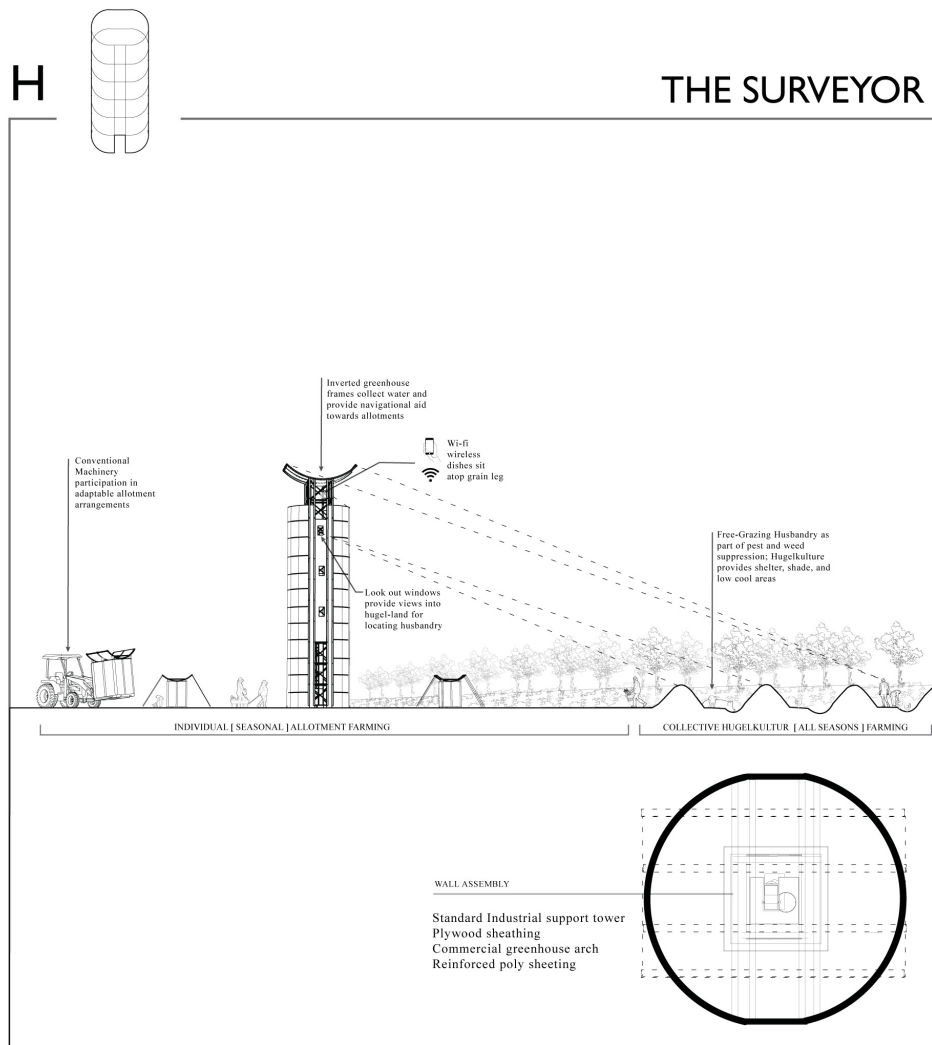
UNUSED GRAIN SILO NEXT TO CORNFIELD, GTHA, 2020.

PHOTOGRAPHS OF INDUSTRIAL GRAIN LEG AND SUPPORT TOWER (Whitcomb Brothers Grain Systems Inc. n.d.).

Top: unused grain silo, GTHA, 2020. These obsolete structures are a common site in the region, superseded by their industrial counterparts. Bottom: photographs of industrial grain towers, grain leg and support tower (Whitcomb Brothers Grain Systems Inc. n.d.).

of the tower mimicking its predecessor and creating views to locate husbandry (as per their use in early communes) between ecological guilds. Further and in the modern adaptation, the surveyor contains the wi-fi and aerial equipment needed to operate the app type while allowing all growers to enjoy their sheds or studios like an extended living room or remote office.

H

THE SURVEYOR

Inverted greenhouse
frames collect water and
provide navigational aid
towards allotments

Wi-fi
wireless
dishes sit
atop grain leg

Conventional
Machinery
participation in
adaptable allotment
arrangements

Free-Grazing Husbandry as
part of pest and weed
suppression; Hugelkultur
provides shelter, shade, and
low cool areas

Look out windows
provide views into
hugel-land for
locating husbandry

INDIVIDUAL [SEASONAL] ALLOTMENT FARMING

COLLECTIVE HUGELKULTUR [ALL SEASONS] FARMING

WALL ASSEMBLY

Standard Industrial support tower
Plywood sheathing
Commercial greenhouse arch
Reinforced poly sheeting

THE BRIMMED BROTHER

Farmer and Site Owner
Age 70 | Conventional farmer, Only
maintains acreage for farm tax rate.

The owner of the north residence talked at length of farms that had been appropriated by city growth or that were either consolidated or superseded by industrial operations. At the suggestion of allotments in the unused fields, the brimmed brother expressed concerns for "city folk" getting lost and metaphorically "not knowing their way back to the barn".

The surveyor typology is precedented by one of the many accelerating anachronisms of diminishing small scale farms and similar stories from farmers of the lands they have lost. It uses the industrial grain leg core and its sheathing mimics its concrete and obsolete predecessor. Openings create views to locate any husbandry between ecological guilds, or way-finding for those foraging. Further, the surveyor contains the wi-fi and aerial equipment needed to operate the App typology while allowing all growers the comfort of their personal devices and to enjoy sheds or studios like extending living rooms or remote offices.

As part of the building infrastructure across farms, the quonset frames arranged vertically, become a beacon of hope - a literal and metaphoric signal of change and biodiversity that comes by enhancing human presence in agricultural landscapes and attracting the next generation of growers.

Description of the surveyor type with an individual narrative and precedent.

Surveyor rendering with the Brimmed Brother. With quonset frames arranged vertically and supported by an industrial grain leg and support tower, the surveyor is both a warning to small-scale producers and beacon of hope and change.

The vertical greenhouse satisfies the interdependent nature of the agro-architectural ecology while becoming a beacon of hope to farms: a literal and metaphoric signal of change and biodiversity that comes by enhancing human presence in agricultural landscapes and attracting the next generation of growers.

Chapter 6: Conclusion

The agro-architectural ecology repurposes existing farming infrastructure and uses the common building language in the region of commercial greenhouses in order to make our farmed earth more accessible, diverse, and productive. It aims to cultivate the interdependencies between agents of care while also fostering an agrarian identity tied to place and unique farming communities. A caring culture over time and space is envisioned through diversity in building types and narrative descriptions that can keep existing farming communities on their land, promote entrepreneurial opportunities that attract the next generation, and increase the involvement and education of individuals within the surrounding cities and suburban developments. By operating at multiple scales - from the region, to the community, to site - an alternative approach to building and farming in the Greater Golden Horseshoe and specifically the GTHA was explored.

The agro-architecture ecology incorporates many ecological, social, and economical resolutions learned from communes and the nature of hugelkultur in permaculture; however, the on-site proposal does not romanticize the return to nature, pre-industrial beginnings, nor does it describe a socialist or autonomous settlement. Proposed agriculture focuses on polycultural practices rooted in nature that enhance yields and soil productivity while including and merging the industrial machinery and common commercial greenhouse standards with contemporary lifestyles and narratives. Meanwhile, the proposed architecture helps monetize the farming businesses integrating in unused or unproductive land and infrastructure. In this way, both agriculture and

architecture are hopeful in their adaptations to create step by step change from within a system and context of capitalism, modernism, and industrialization, towards more collective, and interdependent farming and building endeavours.

The thesis research and project was motivated by sitopian circumstances - a season of anxiety for both individuals and hard—hit farming sectors due to COVID-19 pandemic. Nonetheless, the urgency of sustaining motivation and awareness of our earth's critical condition and interdependencies cannot be more stressed. Kiel Moe also reiterates that as terrestrial professionals, architects and farming communities must begin to describe building and farming as terrestrial or earthly challenges, events, and processes or else - to professional and collective peril - they will operate outside the key environmental and political dynamics of this century (Moe 2020, 28-48).

While the proposal offers idealized versions arising from these dynamics is described on a specific site in its multi-nucleic approach, it is not an unachievable utopia or "no place". Rather, the project is live, ongoing, and optimistic in offering a practical and attainable framework that overtly merges care about the earth through its care for both food and shelter. Framed in terms of accessible solutions of short-term or seasonal rentals of allotment plots and the long term benefits accrued to locals though housing and the implementation of the savant or learning centre; in turn, it offers a way to begin to reason and imagine terrestrial architectures and agricultures that would better situate, support, and amplify diversity of humans and non-humans in agricultural landscapes and on this planet.

Architecture and agriculture's entrained binary descriptions of urban and rural, consumption and production, and divided modes of solutions to address climate change are directly related to - generators of - the manifold ecological and social degradations that result from and through modern and industrial patterns and practices. These degradations are inherent to our current economic models based on divided professions that provide fundamental human needs of otherwise constitutively conjoined earthly phenomena that our future survival is predicated upon.

As an alternative pattern and practice of description in the region - and as a response to these contemporary concerns of the planet - the implementation of the agro-architectural ecology must be assessed at alternative sites. By using the existing building language of the region a workable utopia can emerge with the agro-architectural ecology possible in different combinations at other locations to create an evolution or network of decentralized farming communities over the Greater Golden Horseshoe (GGH). This is only one way that the thesis reflects on a nonmodern nonindustrial composite description of building and farming that can engage cities, activate agricultural landscapes, and challenge building density to consider not only the area we build on, but the areas we eat from.

This challenge is further described by comparing the proposal to the density targets of the "A Place To Grow" (2020) growth plan of the GGH included in the appendix. But for final and concluding remarks, using less space as proposed by the growth plan and doing "less bad" as purported by sustainable architecture and agriculture is not adequate for building and farming in this century. Trapped within our consumer model we must realize what is necessary in our becoming
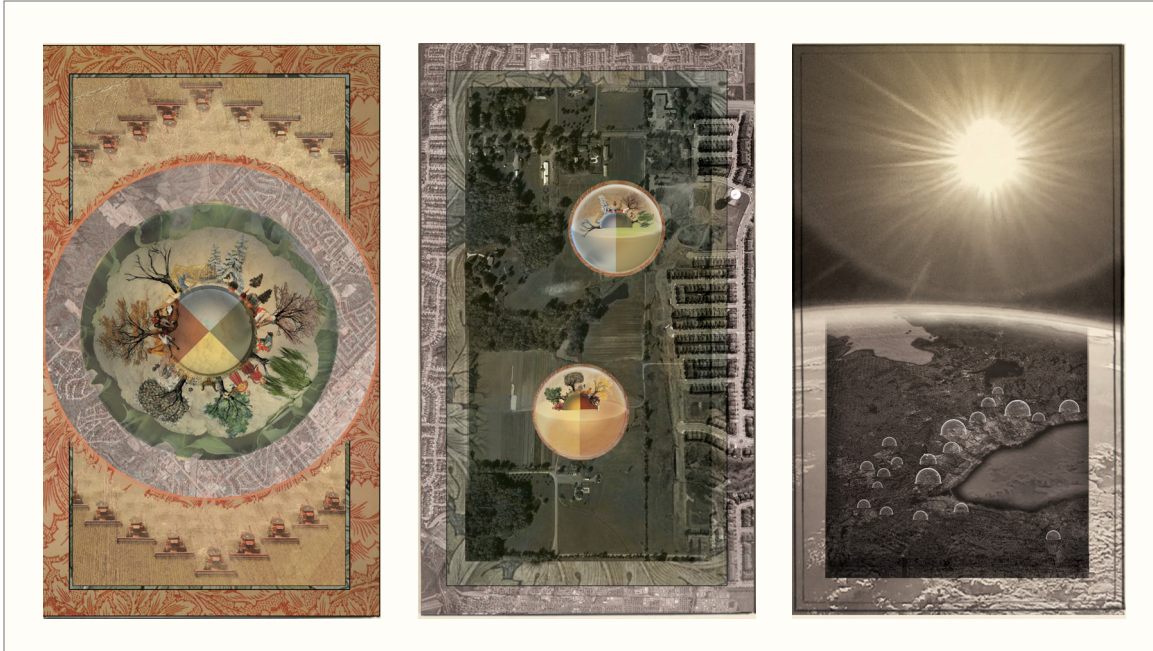
Concluding collages and reflections on the thesis research and proposal.

and to the bio-geographical process that supply and support the activity of life on this planet. The work of nature that is accounted for in theories and methods of caring practices must supplant the epistemic confusion and degradation of the modern and industrial basis of our culture in the global north. While agrarian lifestyles are not desired by everyone, the proposal works to identify opportunities for real critical engagement and real ways to address earth's degradation bequeathed to next generation of builders and farmers.

INDIVIDUAL AND COMMUNAL LIFESTYLE LANGUAGE

Like communitas, the project's architectural types respond to personal narratives intending to foster interdependencies and a unique collaborative culture committed to the health of the earth and each other. Rather than a nostalgic return to nature isolated from contemporary society, these types intend to provide more opportunity, support, and attract new growers and entrepreneurs to foster human diversity in agricultural landscapes.
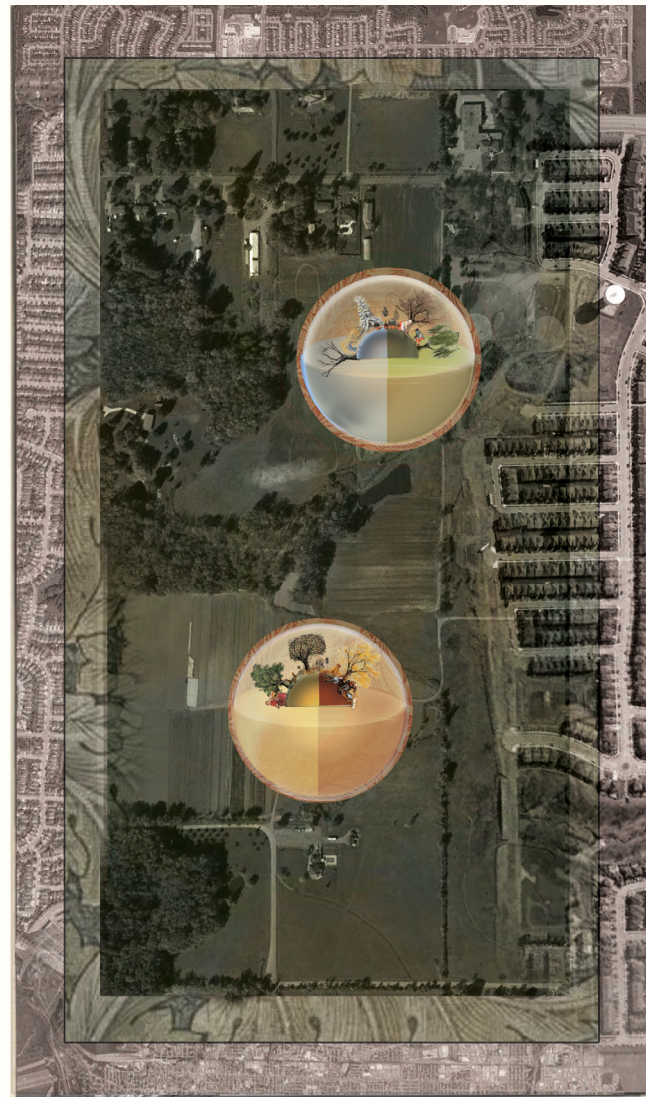
ECONOMICAL AND ECOLOGICAL FARMING LANGUAGE

Like sitopias, the project was conceived through the pandemic context of social, political and economic upheaval. In the proposal's multi-nucleic approach and focus on interrelationships between agents of care, it presents a means for self-sufficiency that can further become reliable over time, space, and beyond crisis. This project does not describe independent or autonomous settlements but unity between economy and ecology, urban and rural, consumption and production.
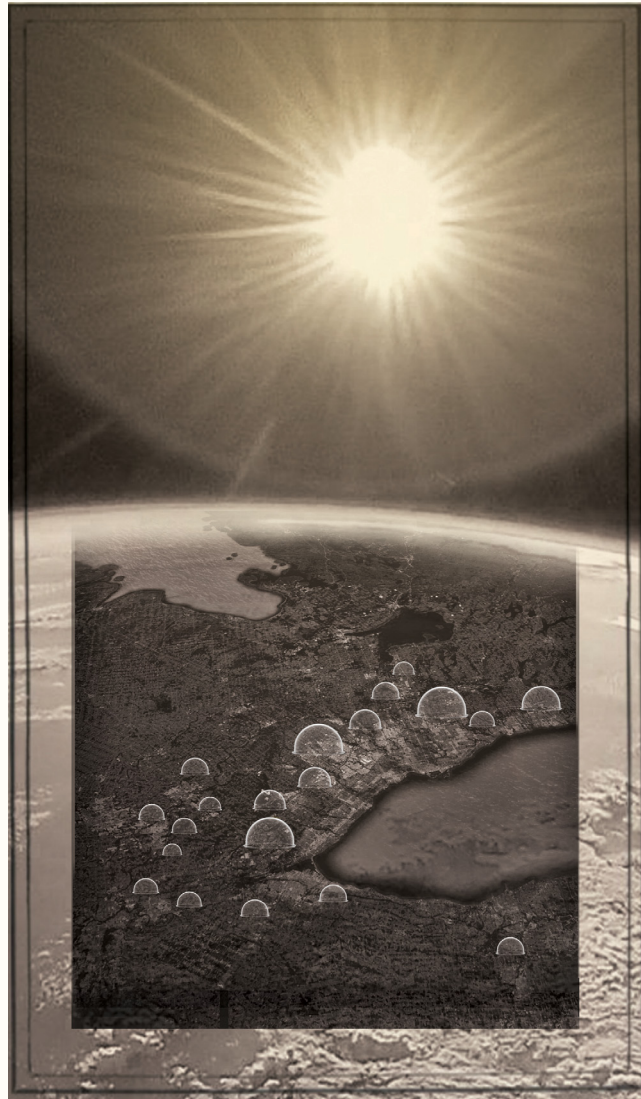
UNIQUE AND REPLICABLE BUILDING LANGUAGE

The project is utopian in its aspirations for the idea to form a network of decentralized farming communities in the Golden Horseshoe and southern Ontario; however, it differs in its approach by creating a unique framework that can integrate into an already replicated building language across the region. Rather than an unachievable "no place" the project is live, ongoing, and optimistic in its practical application.

Appendix A: The Growth Plan of the GGH

In "A Place to Grow" (2020) the current growth plan for the Greater Golden Horseshoe (GGH) region, the vision describes an approach that "will support the achievement of complete communities" that, similar to myopic urban and architectural concerns for building and population density, will increase the amount of housing available. The plan also proclaims that it will foster community health and individual well-being without the inclusion of agricultural and food production in its definition of definition of complete communities:

> Places such as mixed-use neighbourhoods or other areas within cities, towns, and settlement areas that offer and support opportunities for people of all ages and abilities to conveniently access most of the necessities for daily living, including an appropriate mix of jobs, local stores, and services, a full range of housing, transportation options and public service facilities. Complete communities are age-friendly and may take different shapes and forms appropriate to their contexts. ("A Place to Grow" 2020, 68)

For the site location in the GTHA, the achievement of complete communities targets a minimum density "that is not less than 50 residents and jobs combined per hectare" ("Place to Grow" 2020). For simplicity, and returning to comparisons of care as summarized in chapter two, the growth plan envisions a settlement of 20 persons per acre; which if substantiated by grocery stores that are supplied by industrial agricultural sectors and conglomerates, will in turn require an additional 3.3 acres per person of farmed earth on a standard Canadian diet. In essence, by failure to include food and diet in its growth plan, for every acre of development supported by the growth plan, 66 acres globally will be degraded by industrial processes

substantiating the diet of these persons alone. This type of increase in building density in the GGH will thus exceed the excessive consumption averages of Canada as previously researched in this thesis and included in the preliminary introductory chapter. The growth plan therefore exacerbates unsustainable growth beyond its boundaries compounding more issues of development and degradation redirected elsewhere. The interplay between settlement and agricultural capacity must be considered with greater terrestrial contingencies by policy makers in order to create more socio-economical and socio-ecological security in our interdependent world.

Settlement Capacity of the Proposed Agro-Architectural Ecology

The agro-architectural ecology while based on self-sufficiency and regenerative earth per capita values can be compared to the "A Place to Grow" plan by its proposal of an alternative agrarian "complete community" on the 46 acre site.

The master plan proposes the allotments on 14 acres of existing albeit unused designated agricultural land. While these allotments do not include the sojourn type to provide all-seasons living, the proportioning based on self-sufficiency and regenerative earth per capita values could support the plant-based diets and local entrepreneurial activities of approximately 200 individuals or persons. If these persons are currently substantiated by a standard Canadian diet, the allotments alone could allow 660 acres of arable land lost to industrial agricultural to be rehabilitated or undergo rewilding globally.

In the abodes, the master plan incorporates housing into six of originally ten panels of greenhouses located to the west of the north nucleus recorded at the site's production height. The ration of land per individual house is higher than regional standard and the density required in the GGH growth plan; however, the ration of land required for both food and shelter of individual inhabitants astonishingly low. The five acres allocated for the abodes supporting six units could provide sustenance for 71 individuals on plant-based diets living on or around the proposed development.

These values assume that the earth is worked with the knowledge and experience of small scale local agents and thus at the capacity and yield potential of biodynamic and polycultural practices described in chapter three; similar is the value of 3.3 acres per person assumed based on industrial substantiated Canadian diets and agriculture. Acknowledging that these yields and values are dependent on a variety of factors and are a broad simplification of a variety of unique practices and conditions, they do provide a method for comparison to argue the density of new "complete communities" and their terrestrial implications and global contingencies. The proposal believes there is potential to increase the overall density within existing agricultural land while enhancing yields and productivity of under-utilized fields without causing further agricultural expansion and degradation to occur globally.

Appendix B: Site Analysis
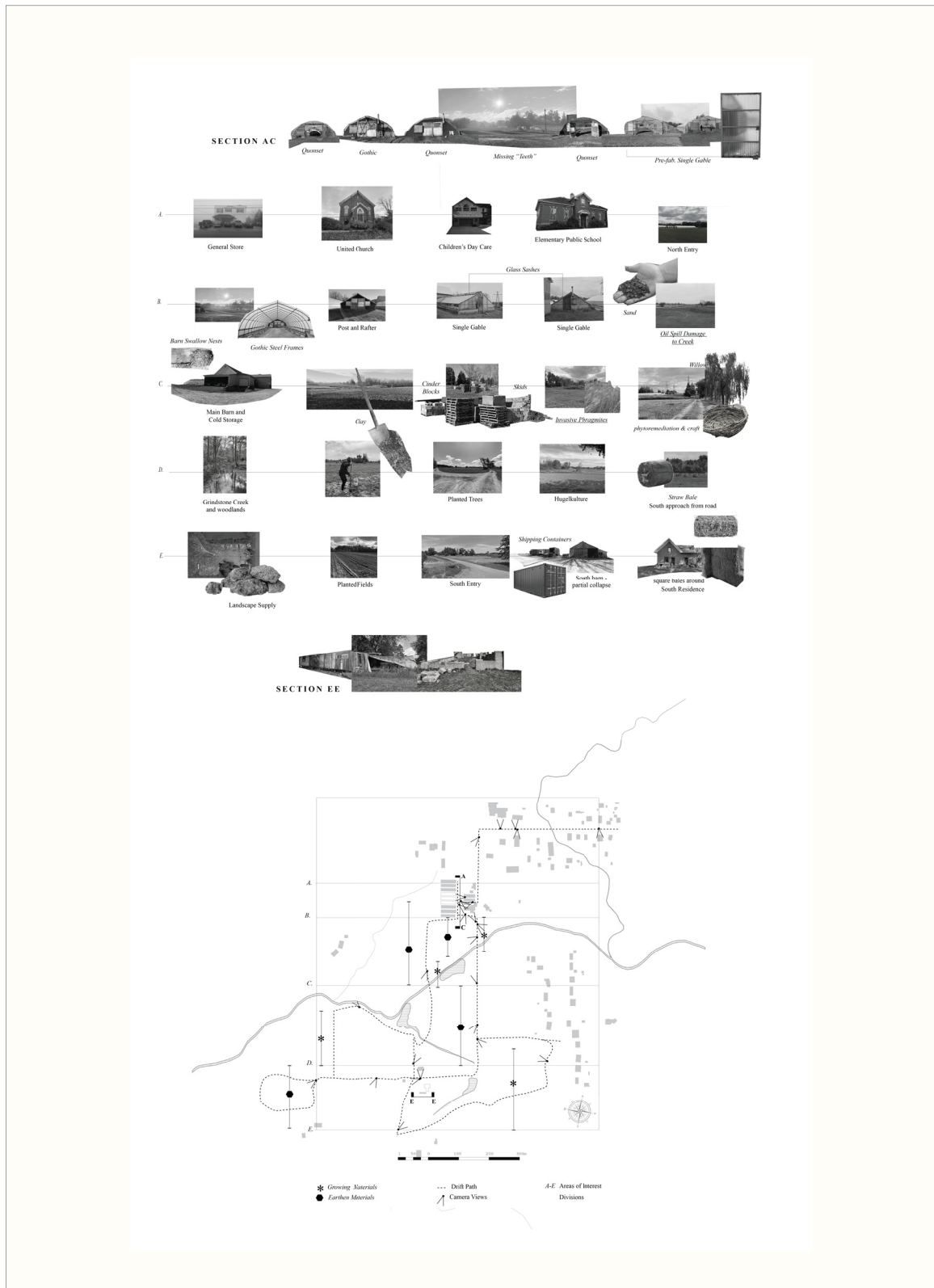
Preliminary site drift map and record of materials.

Appendix C: Expanded Design Guidelines and Communitarian Case Studies

Design guidelines summarized in the report resulted from the study of communes and communities of the past and present. These expanded guidelines are seen as an update and combination of Dolores Hayden's work and of The New Alchemists (Hayden 1976; Mannell 2018; New Alchemy Institute n.d.) - exploring the relationship between social organization, building process, and nature. Living, growing, and building are states of being in these communities that eliminate the difference between production and consumption. These innovative self-sufficient settlements empower individual expression and are responsive to unique needs and landscapes while within a collective framework; this is key to their proliferation throughout history, and today millions of communities successfully unite the spirits of place and liberate the self in a social process (Turner 1969; Bookchin 1971).

1. Flexible Designs

Flexible designs representing ongoing collective processes:

 Open ended plans with straightforward graphics can reflect varied contributions and interests rather than finished designs and representations which are the work of one designer. In design, a phased approach can facilitate changes year by year based on collective experimentation with the preceding additions. Open-endedness can encourage evolutions and additions over time as the politics and members of the community also develop. At the scale of the settlement, plans and spaces should be capable of the growth and change of both the community members and their environment. Considering this, an architect can assist in this process by making their knowledge more accessible with straightforward graphics and/or models with moveable parts.

Tents of the Redstone and Martin families: flexible shelters of Kaweah Colony in Advance, California 1889 (Smithsonian n.d.; O'Connell 1999).

a Dining Room
b Kitchen
c Cellar
d Parlor
e School Room
f Reception Room?
g Printing Office
h Small Tent Room
i Bedroom
j Tent Room
k Dormitory
l Bakery & Laundry
m Woodshed
n Sleeping & Sitting Rooms
o Sleeping "Compartments"
p "Piazza"

——— 1849 structure

——— Later additions

N

10 20   40
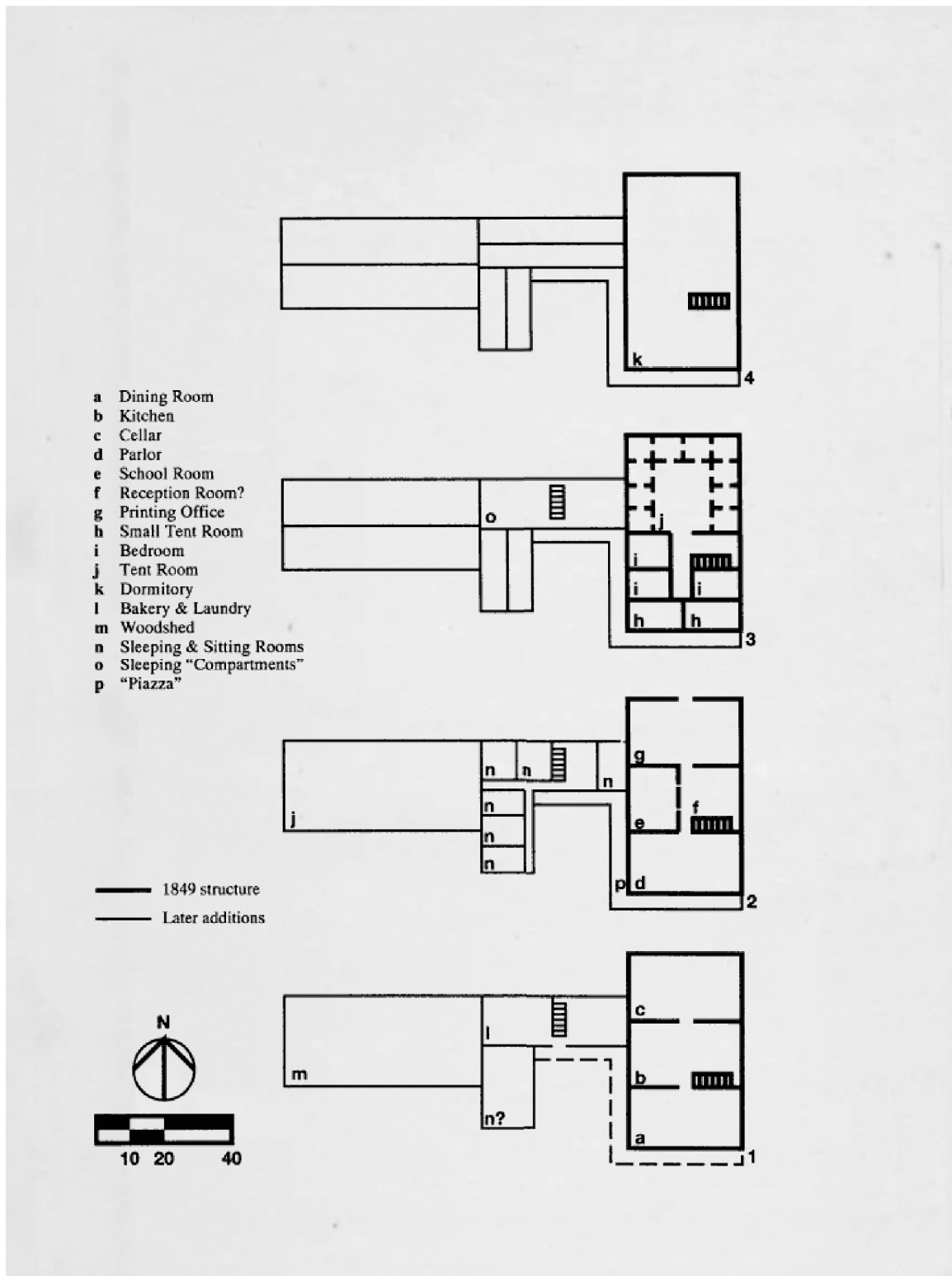
Janet R. White, diagrammatic plan of the Old Mansion House of the Oneida Community in 1851, New York (White 1996, 117). Oneida Perfectionists' process of design included a "tent room" that allowed for the experimentation of in living arrangements. Small and large tent rooms with flexible partitions were refined in their building efforts of mansion additions at later dates (Hayden 1976, 199- 351).
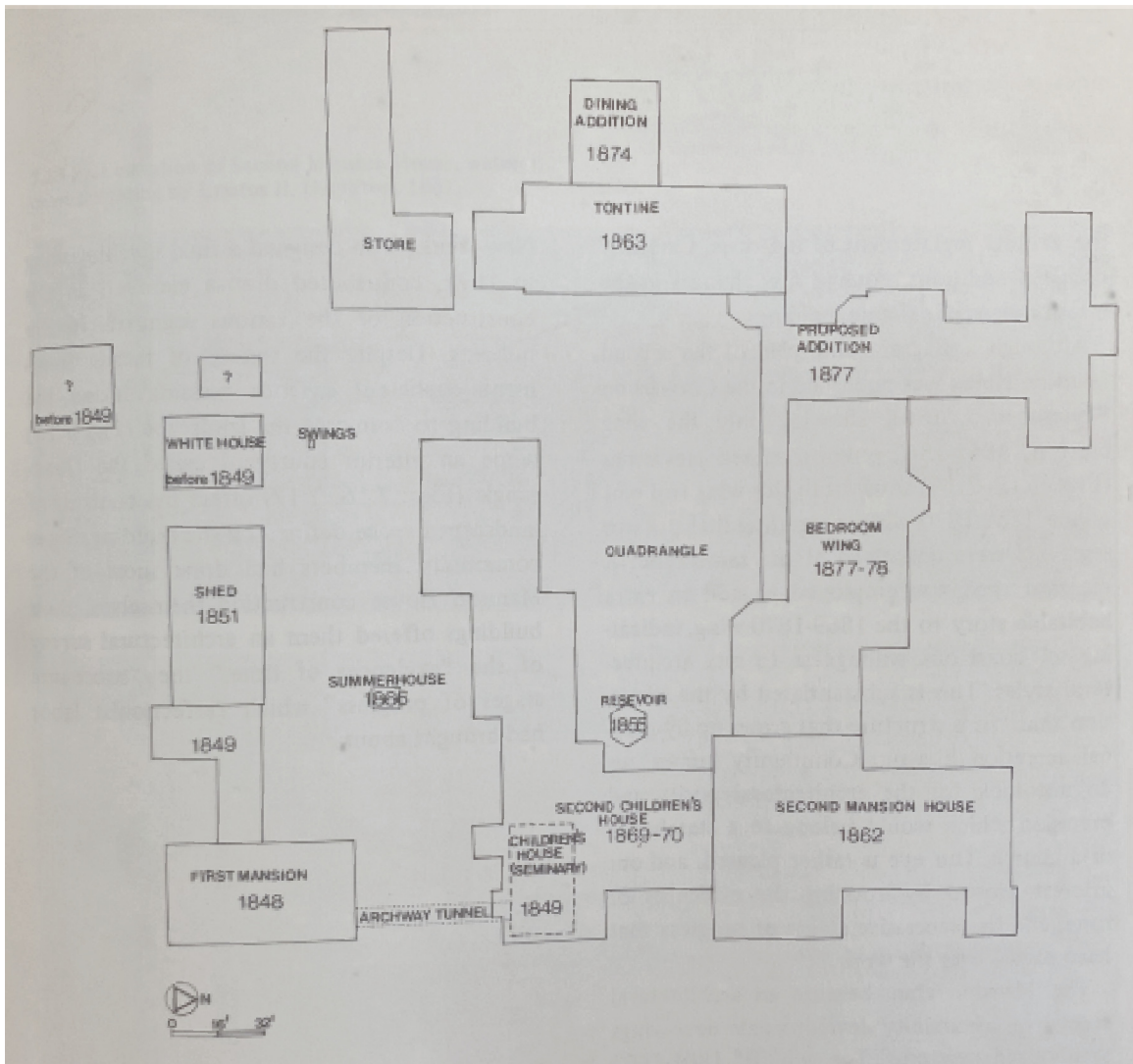
Dolores Hayden, diagram of Oneida Community building sequence, 1848-1878. Through "tent room" experiments, mansion additions became an architectural record of community development, "new wings symbolized new eras" and new ideals and were designed by an outside architect (Hayden 1976, 199-201).
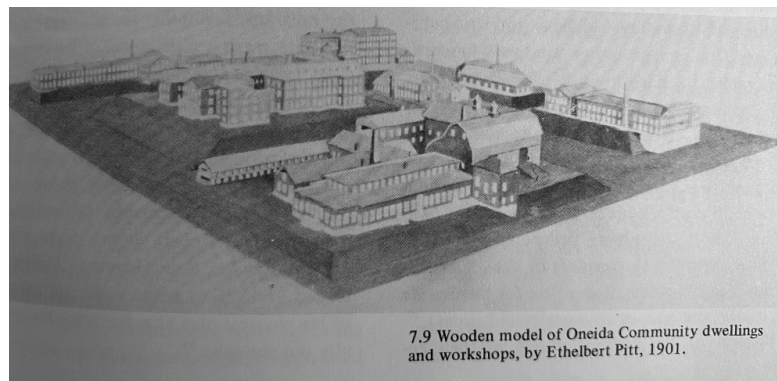

7.9 Wooden model of Oneida Community dwellings and workshops, by Ethelbert Pitt, 1901.

Ethelbert Pitt, wooden model of Oneida Community dwellings and workshops, 1901 (Hayden 1976, 194).
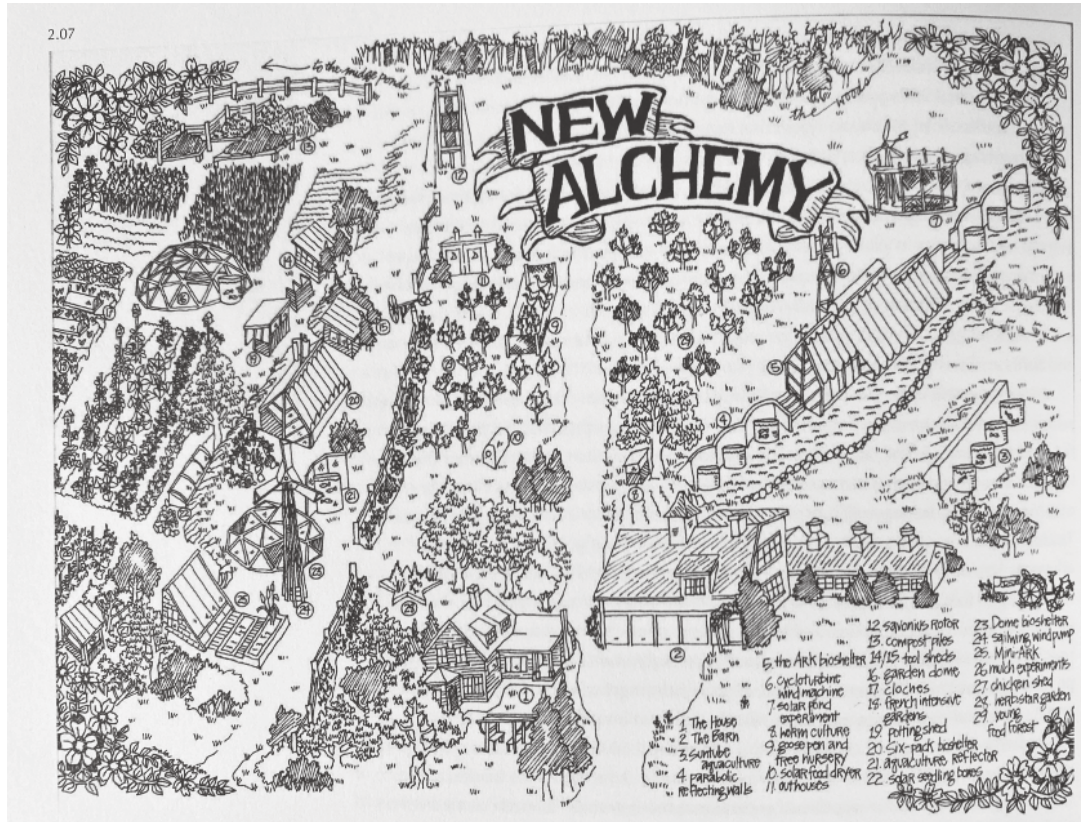
"New Alchemy site map" by Maia Massion from *The Journal of the New Alchemists* (Mannell 2018, 38). The New Alchemy Institute used black and white drawings printed on plain paper to reach a wide audience in their publications. In the site plan, easy to read graphics make the work readable, specific, yet casual to encourage additions and changes.
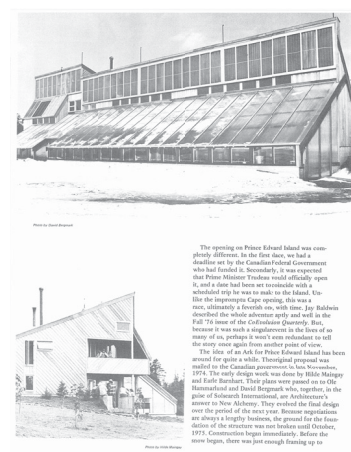
Excerpts from the journal of the New Alchemists, published 1977. The New Alchemy institute published its research and activities in a variety of scientific journals to embody their "design-DNA" , integrating research with everyday life. The mix of intimate and scientific content made the journal successful to a wide audience (New Alchemy Institute 1977; Mannell 2018, 40).

2. Individual Expression

Allow for individual expression and innovation:

Architects are to cultivate builders' and communards' capacities and encourage participation and innovation in design, construction, landscaping, and decorating. Self-expression within a collective framework can also be included in programmatic intentions in which individual expressive interests transect with overall community goals or economic pursuits.

"Alice Constance Austin showing model of house to Lano colonists, May 1, 1916" (Hayden 1976, 304). Austin, feminist and a self-trained architect, was not a community member, but began teaching in the community's school. She then went on to help design individual homes, and influenced by William Morris and the arts and crafts movement, encouraged that Llano's furniture be crafted in their local workshops. (Hayden 1976, 289-302)

Photographs of the Commune of Freetown Christiana, Copenhagen, founded in 1971 (Sweeney 2020). I visited the community in 2018, and the town attracts millions of tourists each year with its music restaurants, shops, markets and thrift stores. The community has this mission statement: "Our society is to be economically self-sustaining and, as such, our aspiration is to be steadfast in our conviction that psychological and physical destitution can be averted" (Seferou 2018).

3. Diverse Economic Base

Provide for communal industry and individual endeavors:

Communal industries such as workshops or barns should create opportunity for sharing knowledge or networking with other communities while also generating other income. Individual pursuits in craft making can also help diversify the economic base in addition to farming; incorporate collective amenity spaces that can encourage individual innovation.

Collection of advertisements from the Oneida community silverware and trap making industry (Hix 2016). The community could not support itself economically through horticulture alone, so members began to invent products that could be manufactured and sold. Sewell Newhouse developed the first trap line and it was sold internationally - the income helped launch other industries including the silverware manufacture in 1866 which remains profitable today.
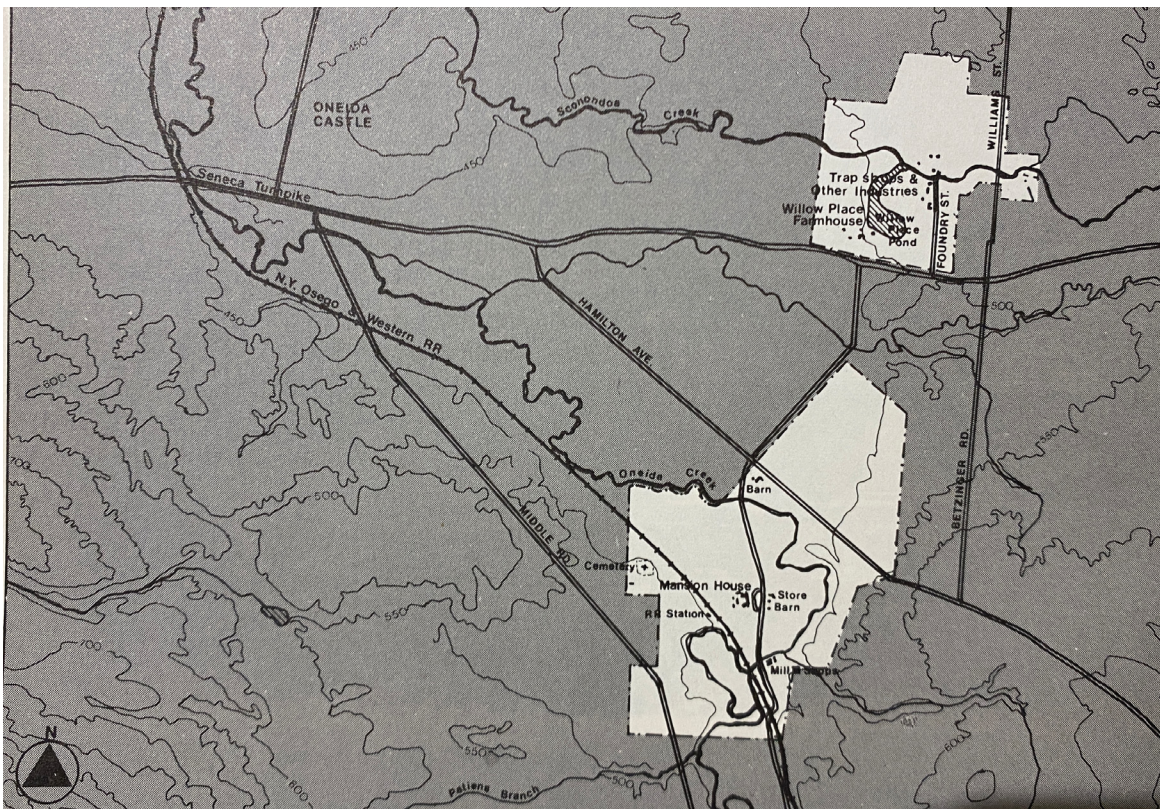

Oneida Community, site plan, ca. 1870, the community had a multi-nucleic approach with spaces for innovation and manufacturing to the north, and social gathering spaces and products sold to the south (Hayden 1976, 194).

"Shaker Broom Vise" revolutionized the production and form of brooms from round to flat and more efficient for cleaning; broom corn was grown around the 1800s on multiple shaker sites and was the most widespread of all Shaker Industries (Andrews and Andrews 1974). Hand labour, innovation, and craft was considered a sacred privilege and the Shakers became known for many inventions such as the circular saw by Sarah "Tabitha" Babbitt and for their quality furniture. (Andrews and Andrews 1974, 8); "The communitarians who believed in inventions developed supportive communal industries which enhanced creativity immensely" (Hayden 1976, 24).

Twin Oaks Economy is based on hammock making and tofu sales which grosses on average two million a year. (Pitts et al., 2015). The commune, on 450 acres, consists of 92 adults and 13 children. "They call their lifestyle clever poverty where each family lives below the poverty line and shares all the resources with each other" (Pitts et al., 2015).
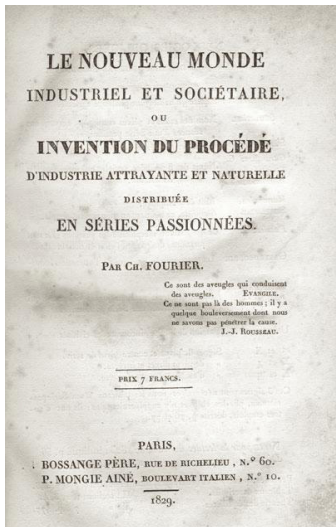
Publication by French Socialist Charles Fourier elaborated on theories of love and work, on uniting agriculture and industry. In phalanxes, landscape courtyards and buildings were connected by "galleries of association" between dwellings, workplaces, and meeting rooms to encourage interactions and help in the formation of social bonds (Schaer et al., 2000; Hayden 1976).

4. Private and Communal Connectors

Emphasize 'connectors' to promote social encounters:

Linking private and communal territory with circulation areas can promote casual and spontaneous social encounters. This can be achieved through both landscaping, building, and site strategy.
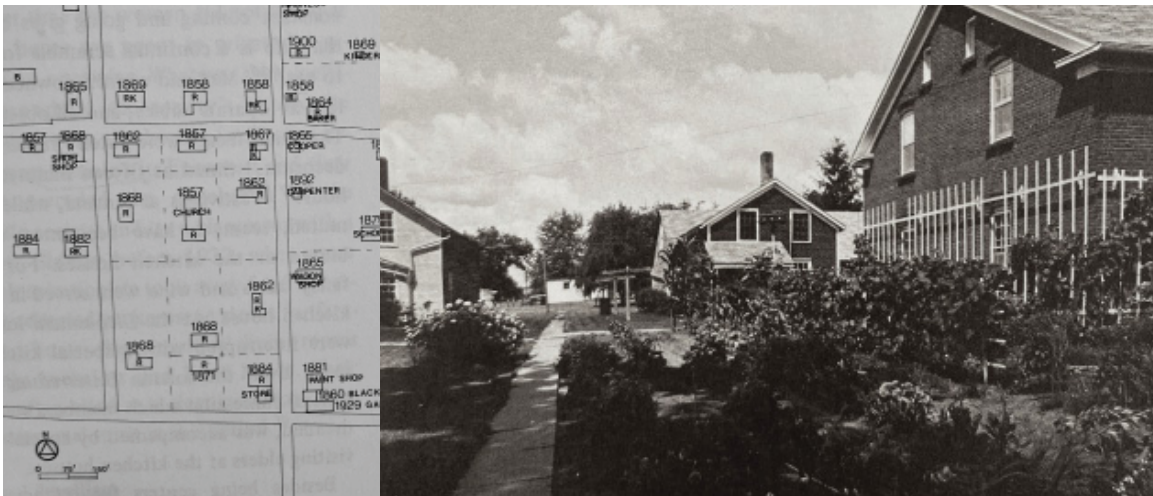
Plan and photograph of Amana settlements which took an inward turning block structure with communal kitchens, kindergartens, or churches in the center that were reached by "foot streets" shown as dashed lines (Hayden 1976,2 41-259). In effect these foot streets promoted the casual social meetings as purported by Fourier and were interlaced with gardens that supported the communal kitchens.

Photograph of windmill used as vantage point: Inspirationalist community, Amana, Iowa (Hayden 1976, 362)

5. Boundaries, Wayfinding, and Priorities

Identify communal territory and boundaries for members' activities and visitors:

Communes operate to first serve their own members and foremost their own ecologies. Clear boundaries can help foster and prioritize relationships among members and their environment before providing benefits to the surrounding community. Many communities use gates, fences, and hedgerows for defining boundaries; towers are common for an actual physical vantage point from which to observe community activities and locate husbandry. Clear signage and way-finding strategies such as colour coding are common and helpful for visitors and members.

Photographs of Brithdir Mawr Community, Pembrokeshire (Read 2020). Low impact eco community on an 80 acre farm frequently has like-minded volunteers. Signs help direct visitors to communal areas rather than private dwellings.
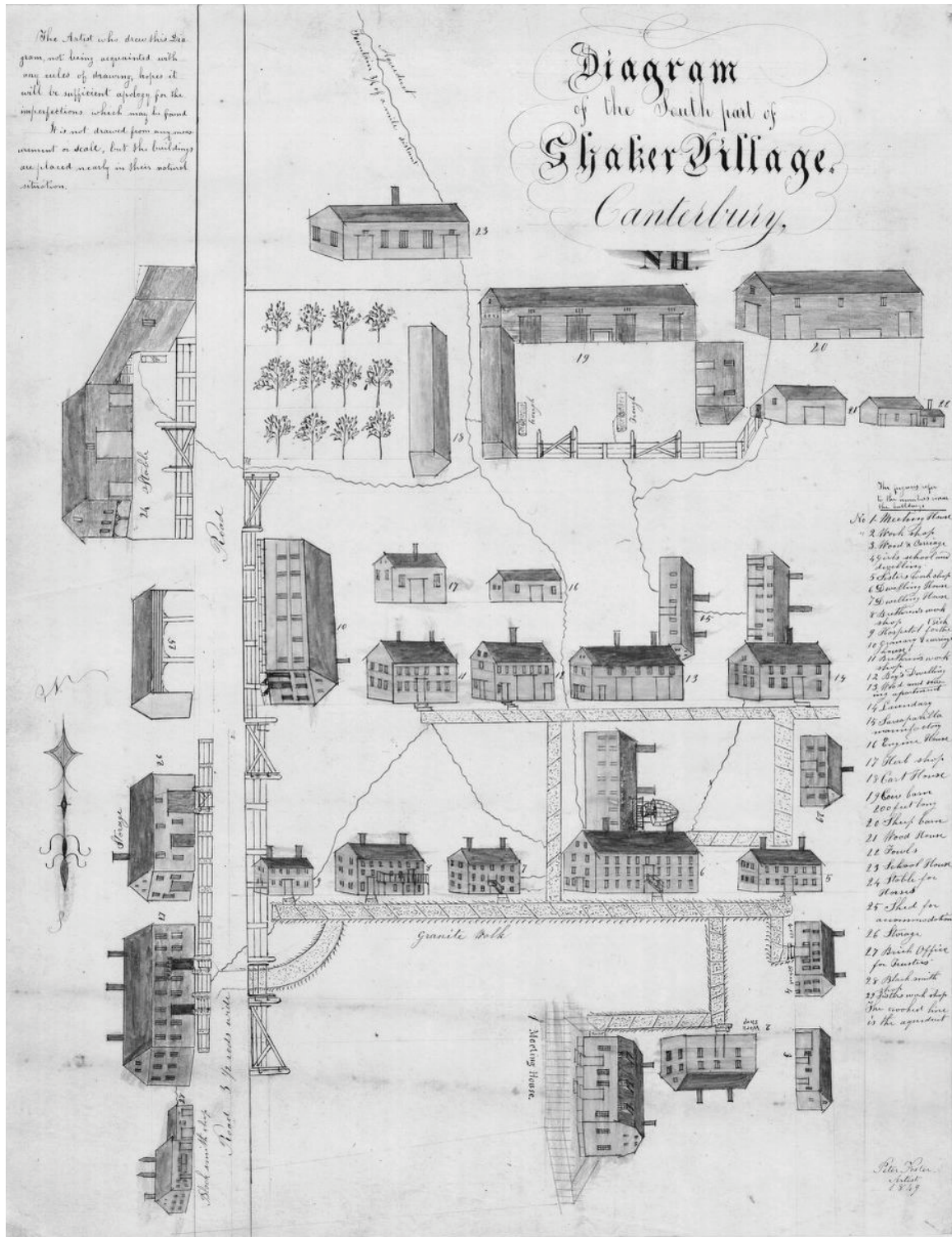
Plan of Shaker Village, Canterbury, New Hampshire (LOC 1849). The Shakers created a few standard building types according to function and colour coding further indicated types of services: "Barns and service buildings were dark colours, deep reds or tans; workshops and dwelling houses slightly lighter in colour, yellows or cream; and the meetinghouse, white" (Hayden 1976, 77).

Community natural building at Lammas Ecovillage, Pembrokeshire. Buildings use locally felled trees, straw bale, and cob construction (Lammas n.d.).

Brithdir Mawr community founded in 1994 (Brithdir Mawr n.d.). Building materials are sourced on the 80 acre property and techniques include thatching with reed and earthen roofs.

6. Localized Solutions

Attune building technology and materials to bioregion:

Rather than complication and expense, uniqueness can result from simplification and an economy of creative means. Localized solutions can also help foster place-based relationships or ecological connection to the landscape.

7. Participatory Human - Ecological Systems

Integrate members into the ecology of the site:

People must participate in the processes that sustain them such as food, energy, shelter, and manufacture. In closed-systems attention must be drawn to the scale of these systems so that they can be fully participatory and that members are aware how they are reintegrated at end use. In the New Alchemy's motto: "Ecosystems must be enhanced by human presence...living, organic processes must be substituted for energy consuming and polluting processes" (Todd 1977; Mannell 2018, 39). Participating in the process of production and consumption ultimately creates human nature relationships (Clark 2017).

Photograph of dome building process (Sadler 2006). Domes were picked up by the "counterculture" back to the land communes in the 1970s. They came to symbolize nature, critique on global interdependency and consumerism, and closing the loop in architecture in that "nature and culture were inextricably intertwined" (Macy and Bonnemaison 2003, 325)

Drop City domes and zomes, 1969 ("In the Spirit of Drop City" n.d.). Salvaged building materials and adaptive techniques lead to creative community efforts, but they also lead to replicable style used by other groups with similar ideology (Macy and Bonnemaison 2003; Hayden 1976, 399)

Figure 1-4. Habitat & Life Support System of an Integral Urban House
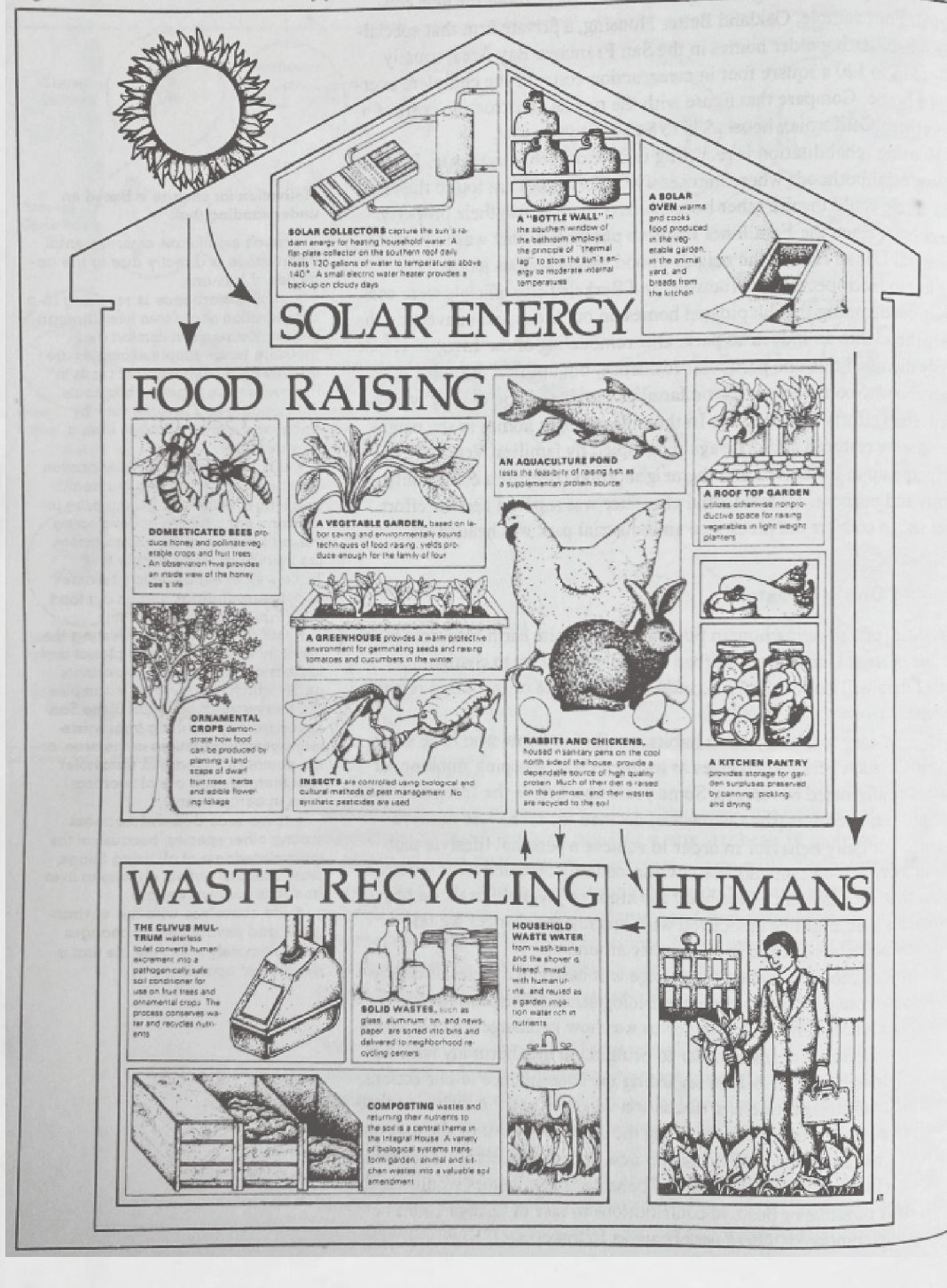
Helga Olkowski et al., ([1991] 2008) Integral Urban House rehabilitates an existing house to include human-nature relationships through the recycling of wastes and energy. The Berkeley Tribe articulate, "If we are not part of the solution, we are part of the problem and focus on emulating natures closed-loop processes, "Nature recycles, humans do not. Humans should!" (Olkowski et al., (1991) 2008, 10-13).

Community Hub building at centre of Lammas Ecovillage, Pemprokeshire, UK (Lammas n.d.). The village offers series of education, creative, and recreational activities for visitors and volunteers. Community members in village can choose to offer programs in the hub or on their own plots.
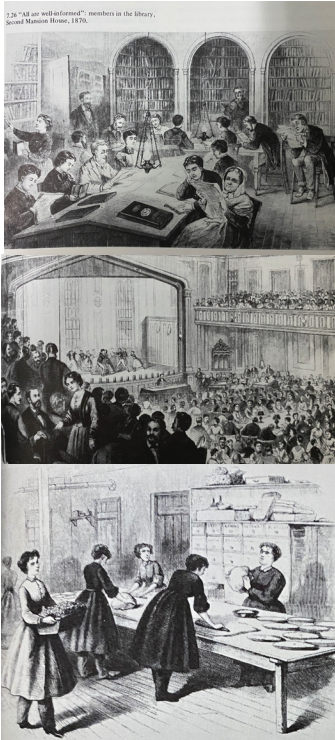
8. Framework for Initiation

Develop a system of initiation to communal territory:

Create a system of initiation by letting members gradually transition from private property to communal property - from individual lifestyles to more collective ways of living. The nature of the system should allow existing communards to determine who becomes a permanent living member within the community. In contemporary communes and eco-villages becoming a member in a community takes 1-4 years and begins with visiting and participating in workshops, volunteering, or part-time stays (FIC. n.d.).

Lammas Ecovillage offers natural building and "low impact experience week", craft fairs, and other workshops such as growing furniture, woodcraft and wine, willow basketry and sculpture classes (Lammas n.d.).

9. Needs for Private Space not Isolated Space

Needs for private space does not mean isolated space:

Avoid isolated family dwellings and include collective spaces, services, and facilities such as laundry, kitchens, workplaces, libraries, dining, or child care that could contribute to sharing labour, burden, or create participation in communal activities. Concentrate these amenities where community members could be drawn to them - do not take away private territory or space. "The experience of all historic and contemporary groups attempting to replace private property and territory with communal property and territory shows nothing so disastrous as forced deprivation of privacy" (Hayden 1976, 352). Other areas for private mediation, contemplation, or engaging in spirituality are encouraged.

Oneida Communal facilities in the Second Mansion House, 1870. Library, event space, and women in community bakery (Hayden 1976, 213-215).

Reconstructed harmonist garden maze with meditation hut, New Harmony, Indiana, founded 1814 (Indiana Museum n.d.). The art of landscape design was studied diligently and included both agriculture and horticulture for many successful communes (Hayden 1976, 18).

Photograph of picking oranges, Kibbutz Na'an central Israel, 1938 (Schultz n.d.). Most agriculture is used for community sustenance whereas tourism and hospitality industry constitutes most of the kibbutz income.

10. Planting and Diet Specificity

Coordinate planting of fruits, vegetables, and herbs according to group values:

Plantings are to meet dietary requirements as specified by the community and help improve the ecology of the site with regional varieties. Plant-based diets should be emphasized as they provide the highest yields per acre of land. Other plants may be specified for environmental value such as phyto-remediation, bioremediation, or erosion prevention. Further, plants of personal interest to communards or that could contribute to research, building, and craft should be considered to further the knowledge and development of the community.

Photographs of harvesting at Twin Oaks Community Seed farm (Twin Oaks Community n.d.). Members grows open-pollinated and heirloom vegetable seeds on six acres of certified organic land, set a aside for research and seed saving. They have formed a seed cooperative with other farms in the pursuit of the quality and availability of regionally-adapted open-pollinated seeds.

Photograph of fully vegan African American commune MOVE, in Philidelphia (Nielsen 2020). Its members are ecological activists that eschewed the killing and enslavement of animals; even though the settlement was firebombed in 1985 by the Philadelphia Police, MOVE members continue to advocate for animals and black liberation (Nielsen 2020; Macy and Bonnemaison 2003, 338)

Postcard, "Working in the Bee Garden", North Family Shakers, Mount Lebanon, New York, ca. 1915 (Shaker Museum 2018). The Shakers established communal farms that were regionally specialized to unique agricultural environments (Murray and Cosgel 1998). Agriculture and horticulture were studied diligently - scientific methods, experiments and techniques were also conducted and published public guides to farming and gardening (Hayden 1976, `17-19).

Table 7-3. Relative Light Requirements for Vegetable Plants

Requires Maximum Light	Slightly Tolerant of Shade	Moderately Tolerant of Shade
Tomatoes	Cabbage	Lettuce, endive
Corn	Broccoli	Endive
Squash	Kale	Spinach
Peppers	Collard greens	Sorrell
Cucumbers	Beets	Mint
Beans	Turnips	Herbs
Eggplant	Radishes	
	Onions	
	Carrots	

Table 7-4. Optimal Distance Between Plants in Beds

Plants	Beds
Artichoke	36"
Asparagus	12"
Beans, broad	8"
Beans, bush	4"
Beans, lima bush	6"
Beans, lima pole	8"
Beans, pole	6"
Beets	3"
Broccoli	12"/15"
Brussels sprouts	18"
Cabbage	12"/15"
Cantaloupe	12"/18"
Carrots	1"/2"
Cauliflower	12"/15"
Celery	6"
Chard	8"
Chinese cabbage	10"
Chives	12"
Collards	12"
Corn	12"/18"
Cress	3"
Cucumbers	12"
Dandelion	3"
Eggplant	18"
Endive	8"
Garlic	2"/3"
Horseradish	12"
Jerusalem artichoke	16"
Kale	16"
Kohlrabi	4"
Leeks	3"
Lettuce, head	12"
Lettuce, leaf	6"
Mustard	6"
Okra	12"
Onions	2"/3"
Parsley	4"
Parsnips	3"
Peas, bush	3"
Peas, pole	4"
Peppers	12"
Potatoes	12"
Pumpkin	30"
Radishes	1"
Rhubarb	24"
Rutabagas	6"
Salsify	2"
Scallions	1"
Shallots	6"
Spinach	2"
Squash, summer	12"/18"
Squash, winter	30"
Tomatoes	24"
Turnips	3"
Watermelon	18"/24"

Note: Beds may be three to six feet wide and as long as desired.

Source: Adapted from USDA Agricultural Statistics, 1972.

Table 7-5. Cool-Season and Warm-Season Crops

Vegetable crops can be divided roughly into two broad groups. The cool-season vegetables are those of which the vegetative parts—roots, stems, leaves, and buds or immature flower parts—are eaten. There are two exceptions to this, the fact that warm-season crops—sweet potato (root used) and New Zealand spinach (leaf and stem used). Those vegetables of which the immature or mature fruits are eaten are warm-season crops. Peas and broad bean are exceptions, being cool-season crops.

Cool-season crops generally differ from warm-season crops in the following respects:
1. They are hardy or frost tolerant.
2. Seeds germinate at cooler soil temperatures.
3. Root systems are shallower.
4. Plant size is smaller.
5. They respond more to nitrogen.
6. More attention must be paid to irrigation—usually plants must be irrigated more frequently.
7. Some, the biennials, are susceptible to premature seed stalk development from exposure to prolonged cool weather.
8. They are stored at close to 32°F., except the white potato. Sweet corn is the only warm-season crop held at 32°F. after harvest.
9. Harvested product is not subject to chilling injury at temperatures between 32 and 50°F. as is the case with some of the warm-season vegetables.

Cool-Season Vegetables*

Artichoke	Carrot	Corn salad	Jerusalem artichoke	Parsley	Scorzonera
Asparagus	Cauliflower	Cress, garden and upland		Parsnip	Sea kale
Bean, broad	Celery		Kale	Pea	Shallot
Beet	Celeriac	Dandelion	Kohlrabi	Potato	Sorrel
Broccoli	Chard, Swiss	Endive	Leek	Radish	Spinach
Brussels sprouts	Chicory	Florence fennel	Lettuce	Rhubarb	Spinach dock
Cabbage	Chinese cabbage	Garlic	Mustard	Rutabaga	Turnip
Cardoon	Chive	Horse-radish	Onion	Salsify	Watercress
	Collard		Pak-choi	Scolymus	

Warm-Season Vegetables†

Bean	Cowpea	Martynia	Okra	Soybean	Tomato
Bean, lima	(Southern pea)	Muskmelon	Pepper	Summer squash	Watermelon
Chayote	Cucumber	New Zealand spinach	Pumpkin	Sweet potato	Winter squash
Corn	Eggplant		Roselle		

*Minimum daily average temperature 50°F, maximum daily average temperature 85°F

†Minimum daily average temperature 75°F, maximum daily average temperature 115°F
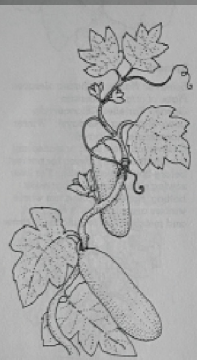
Cucumber

Scientific Name: Cucumis sativus
Place of Origin: Southern Asia
Garden Varieties: "Lemon" (65 days), for salads; "Sunny Brook" (60 days), for slicing; "Burpee Pickler" (53 days), for pickling; "Jampanes climbing."
Cultivation: Warm season crop sown directly into soil. Plant several varieties to provide for various uses. Use bush varieties in the middle of the garden and climbing varieties along the perimeter fence.

Helga Olkowski et al., (2008) collage of planting tables. The specificity in planting is similar to Migge's "Siedlung" settlements and unseen in contemporary urban-agricultural proposals today; this dedication to basic agricultural details, is a fundamental resource for unexperienced growers and first step into engendering participation in growing ventures. It can further empower individuals into expressive landscape and agriculture planting designs (Olkowski et al., [1991] 2008, 150-157).

11. Seasonality

Design for seasonal change:

Embrace seasonal expansion and contraction while providing for the celebration of daily-life in all seasons. This includes cold storages for preserves, winter gardens for all-seasons growing, seasonal interest in landscaping, and providing for community amenities that can encourage sociality and activity all year round.

Crystal Palace, Joseph Paxton, built for London's 1861 Great Exhibition (Telegraph 2016). Associated with greenhouses, many groups admired the palace and its connotations to or symbolism of the Garden of Eden; however it was not within communards' resources or means for a prototype as the geodesic domes were the 1970s.
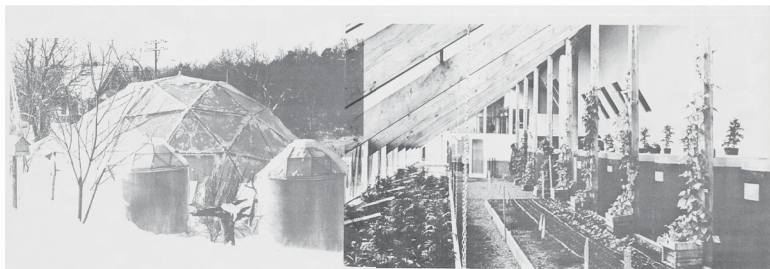

Bioshelter in winter and production greenhouse area of the New Alchemists (Todd, 1977).

12. Siting and Replicability

Consider the site as particular, rather than a unique place:

This can be accomplished through a realistic assessment of its resources - soil, water, climate, and possibilities for transportation and communication. This will in turn help to provide the community with an understanding of how to manage the resources that are uniquely theirs. Considering the site as particular rather than unique will help position the community as a model that can be replicated in other locations and managed by other unique groups (Kanter 1972; Hayden 1976). Standard methods of assessing site resources and repertoire of building types can lead to consistent resolutions and original adaptations.
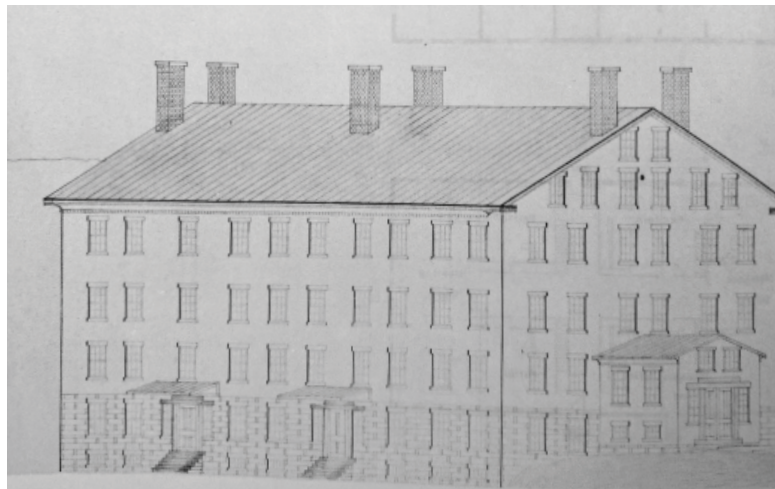
"Shaker axonometric drawing of a dwelling house," and other standard building types were carried by traveling Shaker builders and adapted to different sites, scales, and programs. Site planning emphasized the pattern of land use prioritizing agricultural organization but the consistent practicality of positioning of buildings according to functions created a systematic expression that created coherency across multiple settlements (Hayden 1976, 75-101).

In the words of Murray Bookchin, a communitarian theorist, "How does the liberated self emerge that is capable of turning time into life, space into community and human relationships into the marvellous" (Bookchin 1971, 44). Communitas that defy definition as conventional architecture and are posited as experiments of societal and environmental praxis, uniting the means of production and consumption can do just that.

While it is dually recognized that intentional communities, communes and eco-villages are not appealing to everyone, finding a way to reconnect the means of production and consumption and foster human-nature relationships in an increasingly interdependent society is key to building resilience in contemporary design. The guidelines from this research, while hopeful in their ability to alter the stigmatization of communes, may provide modes of working for designers who wish to work with unique groups, or in other community design projects.

Only when architects and designers become accessible and participatory with communities may they conceive of meaningful change - helping inhabitants reconcile unique life styles with life space and create a collective and committed identity within their environment. These innovative settlements are responsive to unique community needs, yet in their practicality, replicable models of the sustainable integration of production and consumption, of agriculture and industry, intuitively integrating ecology, innovative technology, agriculture and permaculture, with each other in daily life.

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