

How Do Self-Sufficient Housing Approaches Live In Synergy With The Land?



Figure 14, Self-sufficient greenhouse garden featured inside an Earthship. (Earthship Biotechure, 2023)



Figure 15, Earthship bedroom interior. (Earthship Biotechure, 2023)

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Introduction

In this essay I will be exploring how different self-sufficient housing approaches live in synergy with the land. To conduct this essay, I will be looking at three case studies from the last century firstly I will look at Helen and Scott Nearing in Vermont, then Micheal Reynolds and the Earthship community in New Mexico and finally I will look at the Lammas Eco Village Community in Wales. Throughout this essay I am interested to explore the ways how my chosen case studies thrive self-sufficiently and how they cultivate and produce everything they need to live independently from external sources. I will display my findings on their reasons for becoming self-sufficient, how they produce human necessities, how and what their home is made from as well as addressing the challenges they have faced. To conduct this essay, I am going to use secondary research methods that include quotes, photographs, documentaries, books, and articles. In my conclusion I will give a comparative analysis of my chosen case studies.

My fascination with self-sufficiency has grown in the last couple of years whilst I have been studying Interior Design at university and I have become aware that for around 150 years since the industrial revolution, society has become distant and disconnected with our mother earth so, I feel it is my duty as a designer to find and follow a path that recognises the need for regenerative design. My interest in self-sufficiency guided me to a documentary called Garbage Warrior about Earthships and the architect's (Micheal Reynolds) journey. This led to me wondering if this example of self-reliant architecture could be habitable in the United Kingdom, and yes, it is possible there is a working Earthship in Brighton (See Fig 01 & 02). During my visit to the Earthship Brighton I was in awe of how this building thrives even in the unpredictable weather. They use wind turbines, solar panels and recycle all water to ensure that the building is self-reliant on natural resources and works in synergy with the land. The structure itself is made from recycled materials such as tyres, cans, and rammed earth which displays how every aspect of this design lives in synergy with the land.

Understanding the Concept of Self-sufficient Living and its Growing Popularity

Self-sufficiency is a term that refers to an approach that can be maintained independently by itself without external support. Reynolds (1993, p.6) highlights our basic human necessities as “Shelter, energy, food, water, air”. Renewable energy, autonomous buildings and permaculture are some of the practices that can facilitate these needs without relying on corporations. Off grid communities are considered self-sufficient as they are not connected to utility grids, and they implement a range of techniques that can provide all basic human needs independently from external sources.

The idea of self-sufficiency was appealing to people that started to distrust the new consumer temptations as they feared losing independence (Reed, 1975). As early as the late 19th century a series of financial crises led to people searching for alternatives to protect themselves from these reoccurring economic crises (Brown, 2011).

“Shelter, energy, food, water, air”.



Figure 01, Photograph of angled Earthship greenhouse in Brighton. (Taken by Millie Lawrence)

In the early 1970s the back to the land movement attracted thousands of people whose aim was to figure out how to live simply but comfortably on the land, away from the powerful corporations that control the US economy (Reed, 1975). In the present day there is still a large population of people searching for freedom from the conditions of modern society. A common theme throughout history is the need for people to find alternative ways of living that connect them to the land and their ancestral roots. As technology evolves, humanity is becoming more reliant on external forces and becoming less self-reliant. This is driving a wedge between our intuition and ancestral knowledge. Time again we are seeing people searching for ways to connect them back to the earth and tradition.

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Figure 02, Photograph of Earthship in Brighton. (Taken by Millie Lawrence)

Case Study 1: Helen and Scott Nearing The Good Life

Helen and Scott Nearing were considered the “grandparents” of the back-to-the-land movement, having moved to farmland in Vermont from New York City during the Great Depression in 1932, they established a rural life based on self-sufficiency and good health. With no agricultural or architectural experience, they independently constructed and maintained their home and farmland for more than 50 years providing themselves and with a self-subsistence strategy (Gaglio and Maniaque-Benton, 2016). Before settling on their farmland, they had experimented with living in several different places but continued to face the same challenges in differing degrees: artificiality, pressure, and high overhead expenses. Thus, after giving it some thought, they concluded that living in the country as opposed to any city or suburb would allow them to have a more ethical, peaceful, and meaningful existence. They looked for a way that they could make a living with their own hands that would support themselves while having plenty of time for recreational activities (Nearing, 1989). They documented their entire experience in the hopes of educating like-minded people and enriching their life with the beauty of simplicity, which they did. Their numerous books and teachings proved pinnacle for many that dreamed of

this slow and simple life, and this directed them on their way to self-reliance.

The Nearing’s moved to in Maine in 1952 where they could put their primary principles into action; these were to earn a livelihood without the need for paid labour markets; to preserve and enhance their health through organic farming and home-grown food; and to free themselves from exploitation of the environment for financial gain (Coleman, 2020). The Nearing’s did not rely on refrigeration and instead used the process of fermentation to preserve their hand grown produce which extended their shelf life by months or even years (Bullfrog Films, 2010). They did not keep livestock and maintained a vegetarian lifestyle by eating simple and organic food that they grew themselves (See Fig 03). They also fasted once a week for cleansing of the body and occasionally ate animal products when they were away from home but did enjoy cheese on a regular basis (Nearing, 1989). They believe it is “selfish” to consume caucuses (Nearing, 1989). This describes how the Nearing’s sustained a simple life and shows the reader their core principles in which they lived by.

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With an abundance of wood on their property it was only logical to use wood as the primary source of energy. The Nearing's heated their home using wood burners and stoves for cooking, this made their energy independent from any imported energy (Nearing, 1989). The Nearing's used wood from their land and used this to live in synergy with the nature around them. The Nearing's sustained a simple life but decided to still have a freezer after they were given it as this was useful to them so they could preserve their

overstocks of home grown produce for the long haul proving a vital modern-day appliance. "We could live happily without electricity for lighting, but we find the freezer of considerable assistance in keeping certain few foods" (Nearing, 1989, Page 261-262). This shows how the couple decided it was in their best interest to keep the second-hand freezer rather than discarding as it was an asset to them and reiterates how they would create no waste.

"We could live happily without electricity for lighting, but we find the freezer of considerable assistance in keeping certain few foods"



Figure 03, Photograph of the Nearing's wooden bowls and simple food. (Johnson, 2023)

The Nearing's knew exactly what they needed on their land when it came to choosing suitable land to reside. It must include fertile soil, water and be remote. There was a natural spring on the property which supplied them with plentiful freshwater. The spring water was pumped by gravity into the house (Nearing, 1989). This demonstrates how the Nearing's knew exactly what they needed to live in synergy with their land.

In the main house they had a compost toilet, and, in their outhouse, the waste was disposed via a wooden shutter. They mixed their waste with a generous amount of sawdust and soil to create an odourless compost, they preferred to use sawdust and wood more than ashes as it was more effective for this purpose. They would use their waste as fertiliser for all their plants, this gave back to the land and illuminated waste completely (Nearing, 1989).

This details how they live in synergy with nature and implemented a no waste system that gives back to the land.

In both Vermont and Maine, they built their houses using locally acquired stones, metal for the roof, and concrete for support. Over the years they had built a multitude of various structures that utilised different materials these included log cabins, workshop, a woodshed, stone walls (See Fig 04), greenhouses, a garage, a sugar packing room, many guest accommodations where even long-term loggers resided on their land. Helen was always the one to do all the stonework and pointing as this would make all the buildings look uniform in appearance (Nearing, 1989). The final house in Maine was two stories which consisted of two bedrooms upstairs with balconies, a kitchen, bathroom, a sloping roof, and pine panelling.



Figure 04, Photograph of the Nearing's constructing a stone wall. (Johnson, 2023)

The house included a cellar that run under the kitchen, the bathroom and hallway. The house was completed in 1975. “Helen designed the house to fit into the landscape” (Nearing, 1989, Page 334) (See Fig 05). Incorporating natural resources blended their house into the landscape.

The Nearing’s would often go for periods of time without seeing anyone, but they would also welcome visitors with open arms. The endless visitors would get first-hand experience at the property where they could practise the good life for real. They would help and join in with building, maintaining the land, cooking, and in return they would be able to stay with the couple in the guest homes on site (Nearing, 1989). This shows how the Nearing’s would welcome community into their home with open arms as they wanted to teach people how to be self-reliant and show them the good life.

“Helen designed the house to fit into the landscape”

The challenges they faced seem to be situations rather than problems, in the event of a challenge arising they would find a suitable solution and proceed with it. The challenges they ran into all revolved around the preparation and planning when building the infrastructure. This is apparent when they say “when we tackled it, we faced some formidable tasks. The trees, including apple and white ash, stood close together and were deep rooted in the silt” (Nearing, 1989, page 63). The Nearing’s would never hire contractors and instead did all the work themselves, on occasion they worked with friends who were also skilled in a certain trade such as a carpenter or draftsman (Nearing, 1989). This is why all the challenges they encountered would always be directly related to construction or their land.



Figure 05, The Nearing's home constructed with local stone to blend with the landscape. (Johnson, 2023)

Case Study 2: The Earthship Biotecture Project

The Earthship Biotecture Project in New Mexico started in the 1970s when Micheal Reynolds saw the need to create a home that provided sustainable architecture using local or recycled materials, be independent from the utility grid and rely only on natural resources and be attainable for a person to build without any specialized construction skills (Garbage Warrior, 2007). Reynolds saw that New Mexico would be the ideal location to experiment with the construction of Earthships as historically this area has been used for atomic bomb and aeroplane testing so he knew this would be the perfect area for home testing this is apparent when he states (Reynolds, 1993)

“We spend our time and money developing faster cars, taller buildings, better TV’s, and so on while people are freezing, starving and shitting in the streets of our polluted and dying cities”. Like many activists of the back-to-the-land movement Reynolds saw the situation the world was turning into and decided he had enough of paying into big corporations and instead developed a home that would remove the burden of paying utility bills which meant money no longer had to be spent on the human necessities and instead could be spent on leisure and evolving. The Earthship Biotecture Project is still flourishing today and has evolved into a thriving community with homes that have extended further than New Mexico and have adapted to different climates all over the world.

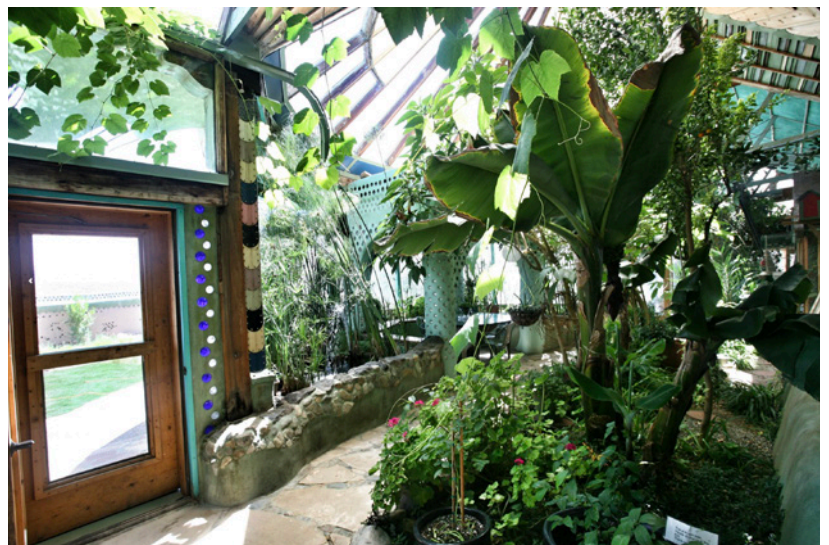


Figure 06, Greenhouse inside Earthship. (Earthship Biotecture, 2023)

The Earthship utilises the earth's resources and eliminates the reliance on public utilities and fossil fuels making it a sustainable and self-sufficient precedent for future designers and architects. The innovative design principles and sustainability features of the Earthship homes has gathered hundreds of like-minded volunteers over the years, who join the team to be taught first-hand by Reynolds and build on site. For over 50 years Reynolds has been building and designing Earthships which takes roughly 4 weeks to build and typically costs around 50,000 to 600,000 dollars depending on materials and size (Shawntavius ,2014). Although the initial investment price can be compared to a conventional home price, consider that residents would never need to pay a utility bill and would still be able to enjoy all their modern appliances using only renewable energy sources, this is truly sustainability with no sacrifice.

Every Earthship can have unique aesthetics depending on how the resident would like it but ultimately the design principles are the same. Earthship homes are distinctive in appearance as they encase incredible greenhouse gardens with tropical plants and vegetation that provide the home with their own self-sufficient garden (See Fig 06 & 14). All Earthships are south facing as the sun is the main source of power which is collected through solar panels that are situated above the green house.

“We spend our time and money developing faster cars, taller buildings, better TV’s, and so on while people are freezing, starving and shitting in the streets of our polluted and dying cities”.

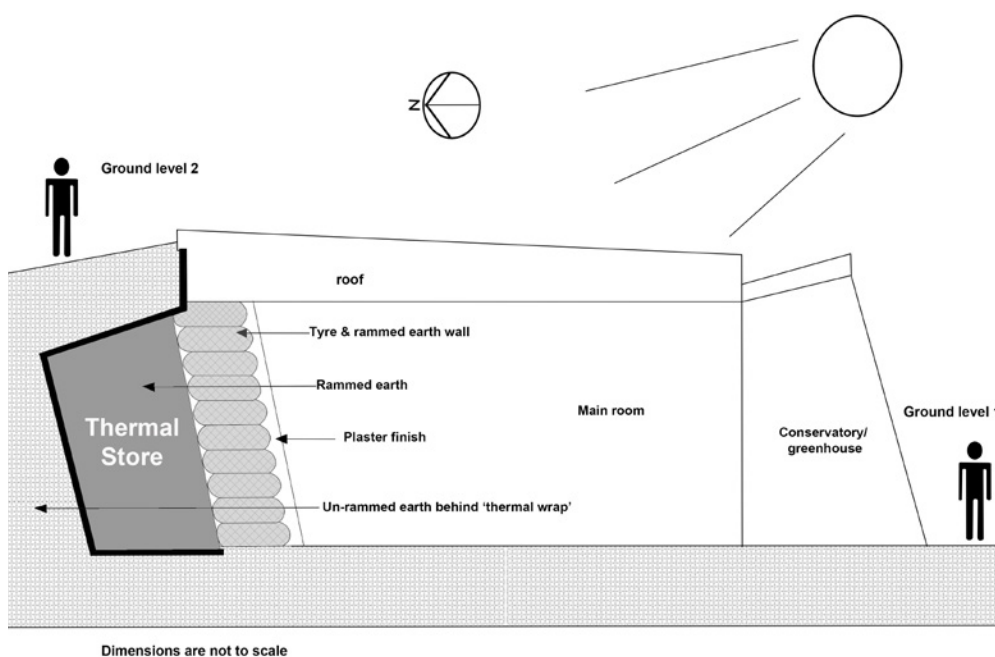


Figure 07, Section of an Earthship. (Diagram by Millie Lawrence)

The green house facade is angled at 70° and is almost entirely made from glass (See Fig 01, 02 & 07) which creates the perfect conditions and space for growing fruits and vegetables (Shawntavius ,2014). The green house is supplied with grey water from the showers, kitchen and tap water sources. This is an example of how they live in synergy with the land.

Water for the property is provided by rain or snow (depending on climate location) which is collected on the roof and gravity fed into cisterns that can hold up to 6,000 gallons. The rainwater is reused four times, after washing the grey water is then sent to the planters, then it is pumped to the toilet, the black water is then pumped to the plants outside where its journey ends (Shawntavius ,2014). This demonstrates how Earthships maximise the earths resources whilst giving back to nature by recycling the collected water 4 times.

Earthships have a natural ventilation system that uses no electricity. It works by putting a metal vent into the living area ensuring the air can move freely from the exterior through to the interior. When the skylight is open it naturally suctions the warm air out on the cool air in through the room (Shawntavius ,2014). Although these homes include natural air conditioning, they do have electricity and this is added when construction starts, they set up the power and battery system box which is connected to solar panels which means they have electricity on site. This same power system is used to power the home (Shawntavius ,2014). From the first day on site this home is powered by the earth's resources and from then continues to live in synergy with nature.

The main construction material used is old tyres (See Fig 08), they use this as they are a readily available recycled material



Figure 08, Construction method using recycled tyres and aluminium cans. (Earthship Biotechure, 2023)

that doesn't rot, keeps termites out, holds up in earthquakes, and harbours thermal mass. To create thermal mass walls, they lay cardboard or plastic inside the base of a tyre, they filled the tyre with dirt whilst pushing and compressing using a sledgehammer until the tyre is rammed. On top of the tyre wall, they use aluminium cans and place them down by joining them in formation using cement to stack them together (Shawntavius ,2014). The Earthship's structure is built from recycled and natural materials that together create a home that lives in synergy with the land and clears up waste on the earth.

The angled roof is made from multiple layers to serve as shelter, insulation, and a rain catcher. The first layer is made with shaved logs that are placed as beams unsecured using steel bars. The next layer is when they add insulation and a wooden decking on top of the beams

The final layer of tar paper and Styrofoam is placed on top. Inside, the walls are constructed using cans and adobe which consists of local organic material and water. Where natural sunlight is needed to be utilised, they use glass bottles using the same method which creates a beautiful stained glass window detail (Shawntavius ,2014) (See Fig 09 & 14). This shows how they construct the home to fully utilise the earth's abundance of natural resources whilst sparing no effort to ensure the design is beautifully hand crafted and unique.

This case study of a self-reliant community displays that living in synergy with the land can be luxurious and sustainable if the inhabitants are prepared to provide the necessities for themselves. It appears that the most challenging aspect about creating a community as self-sufficient as this one is the initial cost and planning involved to build the unconventional Earthship.

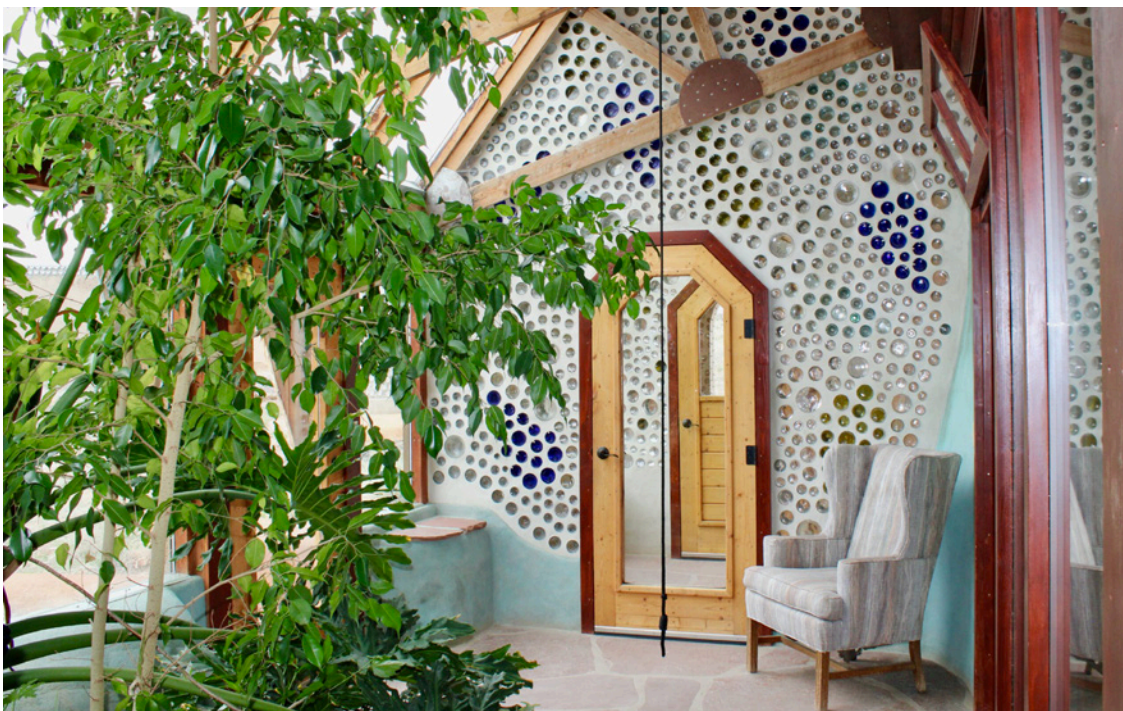


Figure 09, Stained glass window detail made from recycled glass bottles. (Earthship Bioteecture, 2023)

Case Study 3: The Lammas Eco Village Community in Wales

The Lammas ecovillage began in 2009 and is a collaboration of eco-smallholdings cooperating to establish and maintain a land-based, self-sufficient culture. It is required of residents to demonstrate that they can generate 65 percent of their living off the land (Heslop, 2015). They decided to settle in Pembrokeshire as this area has a very strong grassroots movement which supports low impact development (Living in the Future, 2014). The group is in favour of a permaculture method of land management, which views people as essential components of the ecosystem. Because of this, their strategy for managing the environment so that it cares for future generations as opposed to exploitation for immediate profit. Many of the residents at The Lammas Eco Village in Wales had similar motivations for choosing to live self-sufficiently, these included the desire to living “the good life” and be in synergy with nature, a place where they could raise their children in a close proximity to likeminded people whose values are sustainable and ethical (Clark, 2017). People with a likeminded ethos can create a community that lives in synergy with the land.

The Lammas Ecovillage was one of the first UK programmes that was granted the planning strategy for One Planet Development, which monitors their ecological footprint. Planning approval was originally granted for nine smallholdings on 74-acre plot of land and for a price ranging from £35,000 to £40,000, each family acquired a five-acre plot, and they had five years to build their holdings (The Guardian, 2014). A variety of additional developments have since added to the community here. As required by the planning requirements, smallholders submit an annual report to the Council outlining their achievements in relation to several performance parameters, including their ecological footprint, land-based production, and traffic generation (Lammas, 2023). Paul believes that providing the annual report to the council is useful as it provides a valuable resource for spectators to evaluate the productivity of projects like this one compared to conventional agriculture as well as helping to reinforce their initial reasons for starting this venture (Living in the Future, 2014). This shows how creating a self-sufficient community can face set back when planning of an unconventional strategy but by sticking to the requirements and providing annual reports it can better help to monitor its growth.

The wide variety of backgrounds that make up the ecovillage's occupants is reflected in their unique plots, which embody sustainable living practices. While some people prefer to keep to themselves, others are ready to share their knowledge by welcoming volunteers and offering courses and tours of their smallholdings. The plots are mostly used for food production, land-based enterprises, biomass growth, and the processing of organic waste. Water, trackways, and power are often handled collaboratively. Production of fruits and vegetables, cattle, bees, crafts made from willow and woods, value-added food production, and seed production are examples of their land-based businesses (Lammas, 2023). Many plots include a place of residential, covered growing spaces (such as greenhouses and polytunnels) (See Fig 10), barns, and/or workshop space for storage, crafts, and livestock. The remaining lands are separated into various regions according on the needs of the occupants and their means of subsistence (Lammas, 2023).

This shows how Lammas is a collaborative community that equally divides tasks and utilises individual skill sets to come together and produce products to sell on their land-based business.

Residents solely rely on wind turbines, solar electricity, and hydropower together with the use of a communal 27kW hydro generator. Electrical dump loads, which transform excess power into heat, or biomass plantations with short rotation coppices or waste wood from their woodland management are the two main sources of heating energy. Rainwater collection is the primary source of water for other uses, with domestic water coming from a private spring (Lammas, 2023). By relying solely on renewable energy sources, Lammas is a self-sufficient housing approach.



Figure 10, Inside poly tunnel at Lammas Village. (Lammas, 2023)

Pre-development, the area was a depleted pasture but since then, locals have changed the surroundings and put together a mosaic of several ecologies. To keep as much water in the landscape as feasible, trackways have been built across the property and water patterns have been meticulously monitored and utilised. Specific plants selected for their productivity and adaptability have been planted among wild plants and native trees (Lammas, 2023). The residents, with substantial support from volunteers, planned and constructed the dwellinghouses, workshops, and barns (See Fig 11). They are built primarily using recycled or organic resources found in the area. All their low impact buildings are inexpensive and utilise resources that are found around them, they incorporate materials such as clay, earth, stone, timber, and wool for insulation (Living in the Future, 2014).

All the settlements at Lammas vary in shapes and sizes but they all ensure that their homes work with the natural forces and don't require any fossil fuels to heat them (See Fig 11, 12 & 13).

By offering both an instructional resource and a thriving example of low-impact development, the Lammas Ecovillage hopes to pave the path for future rural projects that are genuinely sustainable. In addition to increasing biodiversity and producing a higher but sustainable yield from the land, the development of the area aims to strengthen the synergy of the many ecosystems on the site (Lammas, 2023). We are reminded to slow down by one the residents when he says, "We've come to the conclusion that generally being happy is the most admiral thing that we can do in life, even if that means progressing slightly slower than we otherwise would" (Living in the Future, 2014).



Figure 11, Timber frame house under construction. (Lammas, 2023)

Removing oneself from the ‘rat race’ and finding joy in the simple things can bring pure joy and happiness. By doing this you can move at your own pace, make mistakes, learn from them, and evolve whilst immersing yourself in the process. Lammas provides their community with sustainability and synergy to nature as well as holding the space that allows for gratitude and true happiness.

This case study of a self-sufficient community proves that living in synergy with nature can be simple when one’s view is that all living things including the earth are equal and play their part in the eco system. This is apparent when the residents at Lammas state that “Human beings can live differently on the earth in a way that is beautiful and productive and not exploiting the animal Kingdom or plant Kingdom” (Living in the Future, 2014).

It seems that the most challenging part of setting up a self-reliant community like this one is the set back from council, however they have demonstrated that it can be done and that with persistence and a good cause it will thrive.

“Human beings can live differently on the earth in a way that is beautiful and productive and not exploiting the animal Kingdom or plant Kingdom”



Figure 12, One of the various styles of homes at Lammas Village. (Lammas, 2023)

Conclusion

Embracing self-sufficient techniques for a sustainable future

Through the exploration of my three chosen case studies, I have detailed how these case studies have independently created settlements that sustain a self-sufficient lifestyle which lives in synergy with the land. Throughout, I have noticed similarities between all case studies, by living in synergy with the land and utilising the earth's renewable resources they have all reduced their ecological footprint and they have all used local and natural materials to build their homes. All case studies prepare and grow their own organic food however they do not all keep livestock; in my opinion it is vital to incorporate animals as part of the ecosystem to live in synergy with the land. Both the Nearing's and the residents at

Lammas rely on a gravity fed natural spring for water whereas the Earthship Biotech Project rely on rainwater or snow collected on their roof. I have noticed that both the Earthship community and Lammas Village have faced setbacks in their initial planning proposals and with both case studies they have persisted for their dream of living within a self-sufficient settlement and the hard work has paid off as they are now both thriving communities. In conclusion, it is about finding a balance between ancestral living and modern-day technology as we see with the good life case study, they kept a freezer as this was vital to preserve and store their home-grown organic foods. It is important to include sustainable practices and it is possible to be self-reliant without sacrificing luxury (See Fig 16 & 17).



Figure 13, Hobbit style home at Lammas Village. (Lammas, 2023)

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Figures

Figure 01, Photograph of angled Earthship greenhouse in Brighton. (Taken by Millie Lawrence)

Figure 02, Photograph of Earthship in Brighton. (Taken by Millie Lawrence)

Figure 03, Photograph of the Nearing's wooden bowls and simple food. (Johnson, 2023)

Figure 04, Photograph of the Nearing's constructing a stone wall. (Johnson, 2023)

Figure 05, The Nearing's home constructed with local stone to blend with the landscape. (Johnson, 2023)

Figure 06, Greenhouse inside Earthship. (Earthship Biotecture, 2023)

Figure 07, Section of an Earthship. (Diagram by Millie Lawrence)

Figure 08, Construction method using recycled tyres and aluminium cans. (Earthship Biotecture, 2023)

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Figure 15, Earthship bedroom interior. (Earthship Biotecture, 2023)

Figure 16, Modern appliances integrated into Earthship kitchen. (Earthship Biotecture, 2023)

Figure 17, Luxurious Earthship bedroom interior. (Earthship Biotecture, 2023)



Figure 16, Modern appliances integrated into Earthship kitchen. (Earthship Biotechnology, 2023)



Figure 17, Luxurious Earthship bedroom interior. (Earthship Biotechnology, 2023)

