Biodynamic Farming: Between the Plate and the Planet

Design Thesis
Kyle Lunke
Farmer Kyle?
Are there concerns with industrialized agriculture?

There are growing concerns with how food is raised in developed counties; moreover, people must become aware of the consequences poor food choices may have on themselves and our planet.
Premises:

Food is fundamental to human survival and therefore we must be conscious of how food is raised, prepared, and eaten.

To decrease junk, fast, and standardized food, we must learn that the way we raise food may have major implications on our health, culture, and planet.

In every culture since people first walked the earth, food has been rich in tradition and quality of life. However, our social and health respect for food has been diluted in the past century because of our fixation on ‘fast paced’ consumption.

Theoretical premise/unifying idea:

In order to reduce agricultural concerns in developed countries, it is important to have farming models that teach people a better way of living for themselves and our planet.
The Site

Madeline Island, WI
The Site
The Site
The Site
Bayfield/Madeline Island Traditions and Activities

Warm Weather Activities
- Kayaking and canoeing
- Fishing
- Sailing, Sailboat rides
- Ferry rides
- Scuba diving
- Berry picking
- Biking
- Camping
- Hiking
- Lighthouse tours
- Outdoor music performances

Cold Weather Activities
- Dog Sledding/Mushing
- Snowmobiling
- Ice fishing
- Ice skating
- Sledding
- Snowshoeing
- Downhill skiing, tubing, snowboarding

The Apple Festival
Case Studies

FLW Taliesin West - Midway Farms

Hugo Haring - Gut Garkau Farm

Brian MacKay Lyons - Ghost Lab
Design Process
Design Process
Design Process

Midterm
Design Process
The Farm

What kind of farm is this?
Research

Michael Pollan

The Botany of Desire

Joel Salatin: Polyface Farms

The Omnivore’s Dilemma

A Natural History of Four Meals

Michael Pollan

Author of The Botany of Desire
It’s a Grass Farm!

The premise of this farm is to enhance biodiversity, fertility, and growth in plants and animals by understanding the intricate symbiotic system nature has to offer. The important principle is that every organism is contributing to some sort of ecosystem service. This natural model heals the land, thickens the forage, reduces weeds, stimulates microorganisms, reduces pathogens, and increases nutritional qualities in plants and animals. The mission is to create an ecologically, economically, and emotionally enhancing agricultural prototype and facilitate it around the world.

The grass takes care of the animals and the animals take care of the grass.
Grass inspired studies
Grass needed a trim..
Grass inspired sketches
Well how does the farm work?

The goal is to capture as much solar energy and grow as much grass as possible. There is an all out effort to take the nutrients produced by the animals and put it back to feed the soil that would then more effectively capture solar energy and produce biomass in the form of grass.

**Industrial Farming**
- Industrial
- Annual species
- Monoculture
- Fossil energy
- Global market
- Specialized
- Mechanical
- Imported fertility

**Eco-friendly Farming**
- Pastoral
- Perennial species
- Polyculture
- Solar energy
- Local market
- Diversified
- Biological
- Local fertility
Symbiotic Relationships

6 examples

- Cow + Hen
- Cow + Pig
- Forest + Pig
- Hen + Rabbit
- Turkey + Garden
- Ponds + Environment
The farmer moves the cows in a different quarter acre paddock every day by electric fencing. The idea is to mimic the moving, mobbing, and mowing of herbivorous herds in nature (for example, the American buffalo or the wildebeest on the Serengeti). When the herd is fenced in a small area the cows will instinctively graze on all species of grass. This is important because cows are selective grazers when left to an open pasture. This gives the chance for the lower successional plants to grow and get stronger leaving the pasture to debilitate to unpalatable species instead of succeeding and healing to better species. Creating an equal opportunity for plants is significant for a well-rounded diverse micro-ecosystem.

The Salad Bar
white clover, orchard grass, timothy, blue grass, red clover, ground ivy or violet, wide leaf plantain, dandelion, narrow leaf, queen anne’s lace grass.

Examples
Wildebeest on the Serengeti
Caribou in Alaska
Bison on the American range
Reindeer in Lapland

Portable electric fencing

Root/shoot ratio
Grass + Cow = Dung + Hen
Grass + Cow = Dung + Hen = more Grass
The laying and broiler hens travel in their mobiles three days behind the cows in the same vacated paddocks. They act as the sanitation crew on the farm. When the hens are moved into the paddock they are let loose to dig into the cow patties to find a tasty lunch consisting of protein rich fly larvae that has accumulated and fattened after the third day. Not only are they eating 20 percent of their diet for free, but also spreading the manure out on the pasture land, sanitizing and reducing repugnancy zones, producing their own nitrogen rich manure, and controlling the fly population on the farm.

The Chickmobile
The Chickmobile
During the winter months when the soil becomes dormant the manure from the animals must be treated in a different way than spreading it on the land. The idea is to take the winter generated nutrients in the manure and contain it with a carbonation “diaper” until the right time to use it as fertilizer in the spring. When a layer of manure begins to accumulate in the hay barn the farmer will spread anything carbonaceous (wood chips, old hay, sawdust, leaves) on top that will soak up the nutrients. Corn is also added to the mix. As the bedding builds up and the cows hooves stomp the oxygen out, it simply becomes an anaerobic fermenting pack that is warm, dry, clean, and biologically active. Once spring arrives and the cows are back to grazing, the pigs are moved into the hay barn. The pigs use their nose as a plow and turn up the bedding in search for the yummy fermented corn. In doing this, it turns the fermented bedding into a fresh aerobic compost pack. The pigs do the work! They become a fellow laborer, a co-contributor to the great land healing process. The compost will be spread on the field in the appropriate time to feed the soil.
The fermented bedding can climb to a foot and half by the end of winter. To accommodate the extra feet the feedboxes are set on tracks and are adjustable to correlate with the accumulation during the winter.
The pigs are in the forest for one month only. While in the forest rooting, eating bugs, weeds, forage, etc it creates a temporary disturbance in the woods that helps indigenous grasses to germinate on the forest floor. This disturbance actually renovates and freshen the forest to higher successional species. It also supports more soil building, forage reconstruction, and diversified plants.

Forest advantage:
- It helps promotes wild birds for pest control
- It helps create shade for the animals.
- It helps hold moisture in the grassland.
- It helps block strong winds.
- It helps create a rich savanna like environment that encourages biodiversity.
- Used to make carbon material: woodchips.
When the hens and rabbits are sheltered during the winter the two animals work together to benefit the farm. When farming rabbits indoors the farmer must be aware that the urine from the rabbits can become toxic to their bodies. Breathing in the high levels of ammonia in the urine can damage their lungs and leave them vulnerable to illnesses. To address this problem the rabbit cages in the barn are raised above the floor over a bedding of carbonaceous material in which the broiler hens are free to scamper. The rabbit’s urine is able to sprinkle down from their cage onto the carbon bedding. Meanwhile the hens are constantly scurrying about and turning the bedding which helps induces the carbon material to soak up the nitrogen rich rabbit urine. It also helps to capture the nutrients from their manure while at the same time defending against pathogens. The carbon bedding is stored and turned into a fresh compost to give back to the land at the right time.
Four seasons garden: Mobile Greenhouse

spinach, chard, carrots, sorrel, turnip, kale, and scallions, arugula, claytonia, minutina, tatsoi, mache.
The Ponds

• Living Machine
• Gravity feed water systems are used for the animals and farm.
• The aquatic environment fosters biodiversity.
• The greater the variety of plants and animals the greater the stability.
• Ponds encourage frogs and toads which are great insect predators.
• Birds that eat bugs are drawn to the ponds.
• Cattails and other hydrological plants filter out toxins from surface runoffs.
• Cooler in the summer and warmer in the winter. Water protection.
The Final Design

Architectural focus
• Wind driven forms
• Locavore architecture
• Animal comfort
• Eco-friendly
• Grass
A. Horse Stable
B. Storage/Work Barn
C. Hay Barn
D. Milking Parlor
E. Summer Shelter
F. Pig Shelter
G. Hen/Rabbit Shelter
H. Silo/Water Tower/Viewing deck at top
I. Outdoor Court
A. Horse Stable
1. Individual horse stalls
2. Outdoor paddock
3. Wash space below, Hayloft above
4. Tack room

B. Storage/Work Barn
1. Public bathrooms
2. Large shop/tractor and chickmobile storage
3. Shop extension/broilermobile storage in
C. Hay Barn
1. Hay storage
2. Winter shelter
3. Calves
4. Bull stall

D. Hay Barn
1. Waiting space
2. Step-up platform
3. Ramp

E. Summer Shelter
F. Pig Shelter
1. Entry storage
2. Sows and their piglets individual stalls
3. Large free stall
4. Outdoor paddock

G. Hen/Rabbit Shelter
1. Broiler hens at floor level and rabbit cages above
2. Broiler hens at floor level and Laying hens above
3. Outdoor paddock

H. Silo/Water Tower/Viewing deck
at top

I. Outdoor Court
Eco-friendly design

50% wind from SW, SSW, and W

Wind cowls are utilized for maximum ventilation

Planted roofs

3 phase Living machine ponds

water tough

Sun and wind control

holding pond

cleaning pond

settling pond

Local Materials

50% wind from SW, SSW, and W

Wind cowls are utilized for maximum ventilation

Planted roofs
The Grass Experience
The Milking Parlor
Final Images
Final Images
Final Images
Final Images
What does all this mean?
If interested..

**Books**
- Omnivore’s Dilemma - By Michael Pollan
- Sustainable Agriculture - By John Ikerd
- Salad Bar Beef - Joel Salatin
- Slow Food: The Case for Taste - Carlo Petrini

**Documentaries**
- The Botany of Desire
- Fresh
- Food Inc.
- Dirt: The movie
- King Corn