Outline for 3 hours

- Name game
- Presentation
- Lunch break
- Walkabout with Practicum, Tree ID, pruning, grafting & compost tea + Eco-Dorm
- Wrap-up
What’s your name?

where do you live?

what’s your favorite fruit? (or edible thing from a tree)
About Me, and the Noble Tree
Trees for all purposes

- Building & Furniture
- Burning, eg solid fuel
- Medicine & Food
- Recreation
- ‘Working Trees’, AGROFORESTRY
My Place

2.4 acre Edible Arboretum
Hill & Hollow @ 1900’, 37”
Dialectics

1.) The art of investigating the truth of opinions,
2.) inquiry into metaphysical contradictions and their solutions
3.) To see things broadly, unencumbered by narrow assumptions

~ Diet, politics, nature

~ “Some incredible Fruit”
   “Something works great somewhere for someone...!”

~ Gardening is 40 centuries old, in your blood, start with
good information to head in the right direction.
Change is Constant

• **North America, last 15,000 years:**
  - Glacial retreat; plant species dispersal
  - Human arrival, MegaFauna extinction
  - European Arrival, Native die-out
  - New dispersal of plants, species addition & decline
How Tree Crops Can save the Planet

Limits to Growth, UN report 2050 +/- 2 or 3 billion people. ‘Agroecology, Agroforestry’

Integrated Farming: Agro-forestry / Silvo-Pasture / carbon farming

Integrated living: Neighborhood food security: roadside fruits and nuts
Earth as an Apple

- How much land is actually growing all the food, fuel and fiber for people?
- Competition for land
- Soil Science 301, tobacco & corn, the diet debate & what is sustainable land use?
Today

~ Species Extinction

~ Endemic waste, e.g. plastic in our bodies

~ Insect Apocalypse, 
  October 2018 SCIENCE

~ Changes in agriculture, gene editing, data
  farming, ‘dropcopter’ drone pollenizing,
  breeding new plants 6 times faster
Today

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How we can help

- Reduce carbon footprint, *agriculturally*
- Planting for diversity, + conservation and regional food security
- Garden your land, *plant trees and build soil*
Permaculture

- Regenerative Design/ Descent
- “Everyone Gardens” w/ food choices
- combines the best of science, technology, indigenous wisdom, common sense, and traditional country thrift
- *integrated homestead / agro-ecosystem*
- Forest Farm
Getting Started
Your Goals

- knowing what you want, helpful but not necessary
- cost v benefit, budget/capacity and maintenance/enjoyment
- start small, making small mistakes in out of the way places
- observe the landscape in all seasons, and interact with it
- let go of stress, independent of the need for income generation
Meditation

~ Your landscape as an expression of your consciousness

~ Practical & Poetic merge

~ To have a knowledge of them, Love of plants is a must

~ Shady, walkable, park-like; Edible Arboretum
Assessing your site

- Identify beauty spots and transition points first, plant things there last and choose magnificent landscape fixtures to put there.

- Observe your property in all seasons for a period of time before designing and doing too much all at once.

- Water, soil and sun interactions + people’s movement through the landscape, and wildlife.

- Regulations?

- Septic lines, Walnut, Road Salt.
Elements of a Site

- Slope and Aspect, *sun angle and temperature*
  - *bottomland vs. ridge - difference between holler, hill and cove*
- Terrain type, *open v wooded*
- *Growing Degree Days & Seasonal light saturation*
- Distinguishable climate, e.g. -->
  - *rainfall: Brevard vs Weaverville*
Grass v. Trees

Grass light-rich, high pH, heavy root competition, easy to plant uniformly (rows)

Trees light-poor, low pH, established hyphae, difficult to plant uniformly due to roots
Bests for fruit & nuts

- Air drainage, plenty of sun, pruning
- Frost prevention: North or East slope, lake-side
- Pollination, not a problem in WNC
- Plenty of care and...
- Time!
Design your site

- Beauty spots
- Access, water, buildings
- What plants you want, and where to put them

Understanding their needs: fertility, spacing, management (pruning, ipm, amendments)

Understanding characteristics: pollination, rooting, when they leaf-out, sensitivities

Scalability, to your budget and capacity

Start small, you can always change things later and discover new functions for old stuff

Zones, Home, garden, propagation & experimental space, food forest, animals
Finding space on small property

- Old Pasture, property lines
- Garden perimeter, creek-side / riparian areas
- Roadsides, fences embankments
- Below large trees, prune lowers branches -> partial sun
- Clearing out a forest edge, good wintertime activity
About Plants

- Vigor, Precocity, growth form
- Diecious/Monoecious, pollination
- Potted/Bare-root (retail/wholesale)
- certified disease-free
- grafted/seedling
- ‘Nurse tree’, green manure

Suggestion: Learn to identify fruit trees based on growth form, leaf, bud & bark and observe them in all seasons in order to understand how they’ll look in your yard or farm
The Forest Garden

~ Capstone of Permaculture
~ ‘to have your landscape and eat it, too!’
~ Regenerative Living / Agro-Ecosystem
~ ‘No one is fertilizing the forest’
~ ‘Conservation IS the cropping system’, Shepard 2013
~ ‘Nature does not hurry; yet everything is accomplished’ ~ Dao De Ching

Planting trees on field edges as windbreak and along roadsides is a great first step
Famous Examples

~ Robert Hart -  
  *Wenlock Edge, Shropshire ~ Wales*  
  500sq.meter / 0.12 acre

~ CRMPI, ‘Climate Battery’  
  use in Greenhouse

~ Asheville, former trash heap now feeds low-income neighborhood
Eastern North American Native Forest Farming

- Population density, possibly 10-25 million people

- Corn culture, 10 +/- yr rotation, girdling trees years before, planting then fallow

- Fire, seasonal large-scale land management -> Nuts & wild game

- Stone Walls: 252,000 linear miles in Central & Southern NE: native construction hypothesis(!?) Use as firebreaks land drainage, land orientation
Amazonia

‘Terra Preta’ & ‘Terra Mulatta’
Amazonian dark soils

“Persistent Effects of Pre-Columbian Plant Domestication on Amazonian Forest Composition”, published in SCIENCE March 2017 by 40 co-authors with 80+ years of research:

“Human societies increased the abundance and distribution of useful species. This can also be used to preserve the forest...and this information can be used to reduce the impact of deforestation”
7 Layers

- **Overstory** Tall, open-canopy, nuts, N+ fixers, timber trees
- **Understory** small trees, shade-tolerant, fruit
- **Shrub** edge, intercrop, hazelnut, *ribes*
- **Herb** medicinal, flowers, food, complementary
- **Ground Cover** fertilizer, food, ornamental
- **Root** nutritious edibles in more sun, valuable medicinal in shade
- **Vine** fruits hanging in the open canopy of large trees

‘Blue Atlas Cedar’ specimen planting for evergreen interest and winter privacy
Ecology

- Nature-as-model, *succession* and self-supportive nutrient cycling

- Substitution of wild species for improved* ones

- Build a forest garden: Attraction of beneficial relationships and discovery of what does best

Everything growing together: 10 yr old Chestnut stem at center, with perennials: Comfrey, Horseradish, Sage, 8-oclocks, sunchokes and annals: Corn, tomatoes and Ginger

Thursday, September 5, 19
‘Nuclei that merge’

~ Well maintained areas planted to a diversity of species, *Rings of intensive planting minimum 50% perennial, mulched*

~ Chronology, *early light gives way to shade inside of a year, also over many years*

~ Simultaneous planting, *Trees, herbs, shrubs, annuals at once*

~ Intuitional plantings, *address each area uniquely*

Dasheen, Corn, Sunflower, plus 2 trees for eventual shade
look,

1st Island: Banana, Crepe Myrtle, Nanking Bush Cherry, Dahlia, beets, Lupines, sunflower, pumpkin
2nd Island: Juneberry, ‘Jane’ Magnolia, sunflowers, Cannalily, purple Coneflower, Beets and Carrots
Key to understanding (and utilizing) ecology & succession, which species thrive or eliminate by:

What are they?
Fire, flood, mulching, plowing, planting, harvest, hunting, all forms of land management also non-management + simply walking (seed introduction)

These = how your land is stewarded, aggregately = the whole human footprint on earth
Prep your site

Clear the site!!

remove brush / mow grass in order to do:

- Orchard Layout,
- spacing & stakes
- Special needs,
- fertility, pH, fencing
- Planting & Disturbance:
  - tillage, hand-dig, mulch

Thursday, September 5, 19
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Thursday, September 5, 19
Earthworks + Irrigation

- Water: 1 time/week when dry, saturate soil
- Over watering makes trees lazy
- Irrigation: 4-16 psi for emitters and hose, Catchment: 0.43 psi per ft drop (top of tank)
- Natural irrigation: Swales or ditch & berm
Contour Planting

- Level or Keyline
- 1.) A-frame, 2.) *Bunyip*, OR 3.) Laser

Thursday, September 5, 19
Contour Plowing
How-to-plant-a-tree

- Dig, bigger than the root-ball is wide, loosen to a depth
- Save the soil, cardboard, tarp, uphill
- Rootbound? cut or loosen
- Bare-root, Shade from direct exposure to UV light! trim the roots or clear-the-way for each rootlet
- Not too deep, high is better than too low.
- Water and Mulch*
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~ **Water and Mulch**

Thursday, September 5, 19
Other tricks

- lifting after planting
- facing the union
- How to mulch?
- ‘Boomerang berm’
- Companion planting, *rhubarb, horseradish, comfrey, onions and garlic, mints, burdock, other herbs.*
- midslope, waterside ~ *frost prevention*
Protection

~ Weedwhackers

~ Deer: as much about habit as method

~ Burrowers: yard dog, urin, gravel

~ Wind: wire guard, shelters
Mole Beans
Amendments

~ **Conditioners:**
  Greensand, Rotted Leaves, Manure, Wood Mulch

~ **Macro:** Rotted leaves, Manure, Blood (Nitrogen) Bone Meal (N, P) Rock Phosphate (P), Potash (K), Fish Emulsion (NPK)

~ **Micro:** Kelp, Azomite, Sulfur (Holly-tone, pellets, gypsum)

~ **IMO’s/EM:** beneficial organisms and incorporation of mycorrhizal agents
Lasagna Orchard

99 trees of 17 species planted 2019 in Mars Hill
Plant families

- **Rosaceae** - apples, pears, stone fruits, ribes, rubus
- **Fagaceae** - chestnuts, oaks,
- **Erikaceae** - blueberries + azalea, rhodo, sourwood
Apples

‘Ugly Apples Taste Better’

Very productive (6-8 bushels)

leaf-out mid-late march, graft from march 1

shade tolerant*

Mulch and gravel

standard / dwarf / semi-dwarf, spacing

Borer and Blight

Site considerations, N or E-facing, large ponds

Huge amount of varieties

Seed saver’s exchange index book
Aronia, chokeberries

well-adapted sun/shade, wet/dry

6-8’ shrub attractive bronzy-red fall color and white umbles

Not tasty, juice blend & jam

spacing - blueberries

understory to pawpaw
Blueberries

- Tough and productive
- No-problem pollination
- Prune back diseases and old stems, height as desired
- Pick the right varieties, northern highbush and select rabbiteye (cold tolerant ones)
- Spacing 4-6’ in-row, 9-10’ between-row
- Fertilize only in spring and midsummer, Holly-tone for S, NPK, compost and peat-moss as conditioner
- Guild: Strawberries / Russian Olive / Serviceberry
Guild, *Strawberry / Eleagnus*

Benefit from regular mowing & Fertilizer

Varieties, *northern/southern highbush / Rabbiteye*
Cane Fruits

- Summer vs Fall-bearing, trimming ind. canes vs. mowing the patch
- Spacing, 2'-4' they'll fill-in gaps
- Diseases regular pruning, air flow, purchase disease-free plants
- Height and trellissing
- South side of a row of trees
- Nourse Farms Inc.
Cherry

- Sour varieties more resistant to birds
- Nanking (Bush), *prunus tomentosa*
Chestnuts

- American, Chinese, Korean, Italian, Japanese
- Carbohydrates with nutty flavor, nutritionally like rice
- Very well-drained soil, non-calcareous
- Phytophthora root rot, blight
- Mainly wind pollinated
- Dense shade, no pruning required except lower branches
Chestnuts

American, Chinese, Korean, Italian, Japanese

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Chesnut, Chinese, Korean, Italian, Japanese

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Thursday, September 5, 19
Elderberries

- Attractive hedge plant
- Use for URI
- Understory or forest edge
- Easy to propagate
- Messy
- Middle summer
Figs

- Biblically tasty
- Pollination, Ants
- Easy & Disease-free, but skin-irritating leaves
- Winter damaged, protection vs. site controls and STUN method
- Propagation is easy
- Chicago Hardy, Brown Turkey
- Summer + small fall flush*

Thursday, September 5, 19
Grapes

- Attractive and easy
- Trellis and prune
- Varieties, depends on taste, disease-resistance
- Border plant
- Late summer/fall
Grapes

- Attractive and easy
- Trellis and prune
- Varieties, depends on taste, disease-resistance
- Border plant
- Late summer/fall
Goumi

N-Fixer
Lycopene
Fatty Acids
May 10-30
Hazelnut

- Survive in the East, (EFB-resistant amer X euro hybrids)
- Tight-growing shrub spaced 3’-6’ apart, windbreak
- Tough, deep roots typically sold bare-root dormant
- Wind-pollinated
- Fall Harvest
Hazelnut

- Survive in the East, (EFB-resistant amer X euro hybrids)
- Tight-growing shrub spaced 3’-6’ apart, windbreak
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- Wind-pollinated
- Fall Harvest
Jujube, *Chinese Date*

- Ziziphus,
  Buckthorn family
- Drought Tolerant
- immature, taste &
  texture like apple
- Dries naturally
Juneberries

Amelanchier spp., *canadensis* preferred

‘Magniflora’, ‘Regent’
‘Smokey’

aka Serviceberry
Kiwi berries

- **Definite grower, many**
  varieties and new ones coming

- **Early-leafing, freezing**

- **Pollination, diecious:** plant
  1 male to every 5 females

- **Very productive, requires**
  a buff trellis w/ tensioned wire

- **Pruning, trim way down every**
  2nd or 3rd year
Kiwi berries

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- **Pollination, diecious: plant 1 male to every 5 females**

- **Very productive, requires a buff trellis w/ tensioned wire**

- **Pruning, trim way down every 2nd or 3rd year**
Mulberries

Wild tree, very nutritious

Dioecious, most seedlings seem to become female and fruiting

fast grower, fussy short-lived beautiful yellow wood

Messy, worth planting

May-July
Muscadine

~ easy to grow vines, similar to grape. Sweeter, ripens individually

~ Cold hardy varieties for Mtns ~
‘Katuah’ from Jewel of the Blue Ridge
Pawpaws

Rewarding, but difficult

Attractive tropical, dense foliage

Pollination needs distinct genetics, space tightly 8-10’

Tolerates moisture, not too much

Many varietals

September
Peaches

Better than Plums for NC mountains

Prune 30-50% each year, vase-shaped, removal of flower buds

Dry, sunny sites are best

Varieties, reliance, contender, red haven, suncrest, choose late blooming & disease-resistant

Summer fruit
Pears

- Upright growth form, different from apple, easier
- Easy to grow, needs lot’s of training and yearly pruning +
- Crotching spreading the branches
- Asian varieties, 1000 more disease resistant, ripen earlier on the tree.
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Thursday, September 5, 19
Persimmons

- **Ebenaceae, proof of Pangaea**
- wild, dioecious, large tree
- **Asian types, zone 6 varieties**
  - Jiro, Great Wall, Saijo, Fuyu
- For grafting: high on rootstock
- **American types, tasty**
  - sometimes seedy. *Meader & Yates,*
  - *many more.* Hybrids: *Nikita’s gift,*
  - *Smith*
- Late-leafing, pollination no problem
- Astringency -- ‘frost-ripened’ not true
Plums

Wild Prunus americana
Ribes

~ Shade lovers, currants & corinthian grape (black currant)

~ Fuller Sun gooseberries - fine tasting pest-resistant fruits, some thorny

~ June ripening
Edible Dogwoods

Cornellian Cherry Dogwood, *Cornus mas.*
Yellow fruited cultivar available from

*Korean (Kousa)*

Bushes, Nanking cherry, honeyberry, eleagnus (Goumi, ‘Red Gem’, ‘Carmine’)

Thursday, September 5, 19
More Nuts

- Black Walnut, *Thomas*
- Carpathian Walnut
- Japanese Walnut, *Heartnut*
- Butternut
- Korean Stone Pine
Using Nurse Trees

- Aka, green manure
- \textbf{N-fixers:} for chop/drop method
  1. Trees; locust redbud, honey locust
  2. bushes; Eleagnus, pea shrub, sea buckthorn

- Trees need pruning, unlike annuals, which release their N+ after a year perennials must be chopped
Coppice Agro-forestry

Chop & Drop Green Manuring
Dense Plantings
Understory Management

Mowing, animals, planting, *nothing*

Herbal Companions: Comfrey, horseradish, rhubarb, asparagus. all sort of ‘Bee-food’ (Asters and mints) + Flowers/Bulbs

Alley cropping: agro-forestry / farm-scale technique of alternating rows of bushes & small trees with annuals crops

Chronology, *early light give way to shade. The grower utilizes mixed speciation, dense planting and timed disturbance regimes for optimal growth*
Animals in the Forest Garden

Best/easiest in this order, 1.) Chickens, 2.) Pigs, 3.) Cows 4.) Sheep 5.) Goats

Cut & Carry to animals in the Barn, avoiding damage to plants
Optimization

~ Dense planting, competition for root space and light

~ Soil nutrition, mulches feed worms/bacteria, while mineral amendments & foliar sprays feed plants directly

~ Maximum carbon fixation, means high carbohydrate output
Useful Plants

- Horseradish
- Rhubarb
- Bergamot
- Pumpkins
- Cactus
- Annuals
- Comfrey*
- Culinary Herbs
Sunchoke/
Jerusalem Artichoke
Farming Forest Gaps

~ Annuals inherently more productive than perennials, *though more destructive*

~ Full sun garden patches *ringed by a multi-storied orchard*

~ Low-tech soil prep ->
Yield...Yum

- The byproduct of design, careful installation & timed management
- An afterthought to the enjoyment of maintaining your beautiful garden
- Walk around, pick and make a dinner plan
- Weeds are a yield to the compost pile / mown grass a fertility boost
Low-Tech

Sustainability & Preparedness:

〜 Rainwater Catchment
〜 Develop Spring / Pond
〜 Store & Save Seed
〜 Store food, at least 1 year
〜 Use manure & mulch
〜 Hoop-house, Row-cover
〜 Woodstove + Warm-Weather Kitchen
〜 Root Cellar* or indoor storage w/ temp/ humidity control
〜 Plant Fruit & Nut trees 50/50
〜 Run fowl & Ruminants
〜 Composting Toilet
Discussion: Growing all your own Food*

~ **Bio-intensive Method**, not-so popular in practice, but its recommendations and research into what it means to grow all the annuals for a human:

~ 4,000 sq ft, 60% Grain, 30% Roots, 10% Vegetables

~ Steen’s Math for the self-sufficient homestead: 70% **Extensive**, *Orchards of half fruit / half nuts* + managed animals, 30% **Intensive** using the 60/30/10 of Bio-intensive method.
Soil preparation for Annuals

- **Lasagna method,** cardboard compost and mulches built up to the knee (18” minimum) let digest for 2-4 months.

- **Traditional,** flip the sod with a shovel or plow, let sit 2 weeks then harrow or rake smooth, plant and mulch a month later.

- **Occultation,** Use of silage tarps, pond liner or billboard plastic to smother sod, then hoe/harrow smooth prior to planting.

- **Winter grain No-Till,** crimp or cut stems after milky-stage, let sit 2 weeks, then set out 6” high starts.
Grafting Practicum

- Cloning perennial woody
- Whip & Tongue
- V-notch/Cleft
Top-working
Pruning promotes flower and fruit production, controls growth and disease.

Winter, typical, controls vegetation and flowering patterns, direction of growth.

Summer, in order to direct growth, remove defective limbs, and dwarf the tree (diminishes nutrition headed for the roots) knocking fruit off, 'fist between each fruit'.

Thursday, September 5, 19
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*Fig. 1. Bell Curve.*
Pruning

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*Fig. 1. Bell Curve.*
Orchard ladder
‘Stokes’
‘Orchard House’ with Kiwi Arbor
Elements

24’x8’ sited SSEast ~
symmetrical endwalls + vent fan on thermostat

Washable & reflective steel walls &
block wall heat sink

‘Double weeping eaves’ -
condensation runs into exterior gutters
and onto interior flashed surfaces

Durable, triple-walled polycarbonate
glazing
Book Recommendations

- Edible Forest Garden, 1 & 2, Dave Jacke
- Botany of Desire, Michael Pollan
- Permaculture: Principles and Pathways, David Holmgren
- The Holistic Orchard, Michael Phillips
- Restoration Agriculture, Mark Shepherd
- Seed Saver’s book, If you wanna get geeky
- You Tube: ‘Organic Orchard’ + specific needs: trellising, pruning, pest management, growing particular crops
- Podcasts --
Books

- *Restoration Agriculture*, Mark Shepard
- *Trees Crops*, J. Russell Smith
- *The Holistic Orchard*, Michael Phillips
- *Changes in the Land*, William Cronon
- *Enriching the Earth*, Vaclav Smil
- *The Unsettling of America*, W. Berry
- *The Natural Way of Farming*, Fukuoka
- *Talking Walls*, Matt Bua

Web Links

- “Coppice Agro-forestry” [youtube](https://www.youtube.com) by Dave Jacke
- ‘VersaLand’, [youtube](https://www.youtube.com)
- world agroforestry center, propagate ventures, carbon farming institute
- watch ‘SYNTROPY’ on Vimeo
Nursery Recommendations

- Local is good, but consider the size of your planting
- **potted**: plant any time of year
- **bare-root**: plan your plantings in advance
- Cane Fruits, *Nourse Farms, Inc.*
- *Burnt Ridge Nursery*
- N-fixing trees, wild edibles, *MO, TN, NCFDR*
- Chestnuts & Hazelnuts, *Versaland & Forest-AG*
- Rootstocks, *Willamette Nursery OR Century Farm Orhards, NC or Cummins, nursery NY*
- Blueberries, *Dan Finch Nursery*
- Ornamentals: *evergreenplantsnursery.com thespringhousenursery.com*
Home Nursery

〜 Nut Cages
〜 ‘Healing in’ bare-root stock
〜 Raising in pots
〜 Digging from the wild
Contact, ravenridgefarm@gmail.com

Webpage, ravenridgeagroecology.com

2.4 Acre Edible Arboretum

AirBnB Experiences: ‘Tree ID of the Southern Mtns’ & ‘Growing Fruits and Nuts’