

2018 jan 09 Peter Wohlleben Hummel Tim Flannery Foreward
 The Hidden Life of Trees Epilogue Dr. Suzanne Simard 1997 1st report of fungal communication
 2016 feb Prof Forest Ecology, U.BritishColumbia, VanCouver
 back door oak; wolves better stewards than hu

2 chlorophyl in tree trunk
 3 forest: superOrganism V.Turin Massimo Maffel: roots interact

234 GreatBear Rainforest BritishColumbia W coastal 25k sqMi
 235 yearn unDistrubed Nature Species Appropriate Manner j: optimal

241 German 1990: animals not objects
 244 VA Healing Harvest Forest Fnd break moral barrier <> plants & animals
 245 siliviCulture Japan: leaves > ocean > plankton

249 Nature v388 - 1997 Simard - woodWideWeb aka mycorrhizal network
 4 conditional Love > affection > caring
 6 trees communicate by scent
 7 warning gas ethene aka ethylene H2C=CH2
 10 electrical signals move 1cm/s 1 tsp soil: many miles of hyphae > mycelium
 1 fungus over 100 yrs: many sq Miles - landWhale!

12 olfactory, electrical, visual > nerve cell at tip of root > sound
 15 tribal
 17 tree is strong as forest around it
 20 "mast years" non-Annual seed-bearing
 32 tree rearing its young in Sun deprivation - less vulnerable
 33 maternal trees
 47 Dr Monica Gagliano: mimosas are sensitive plants
 48 ultrasonic - scream of thirst
 49 tribal fight for SUN and water
 50 fungus is border: plant <> animal. cell wall is chitin - like insect
 mycelium do not PhotoSynthesize

51 trees nourish fungi with sugar (leaf photosynthesis); symbiotically providing 1/3 of nutrient production
 fungi produce plant hormone sequester heavy metals > mushrooms poreini cepe bolete

53 fungi support tree species diversity
 64 bark on south more prone to crack
 true old-Growth forest: 200-300 > 500 years old Dr. Zoe Lindo, McGill U. Montreal

69 oak v. beech oak happy alone > 70 500+ yrs
 75 spruce 76 yew 1000 yrs 65'
 77 hornbeam birch 78 alder

80 coppicing stump
[regularly coppiced tree will never die of old age](#) stumps aged multi centuries.
 Age of a stool estimated from its diameter, some 18 ft -been continually coppiced.

81 roots 10,000 yrs 82 Brain / root tips smart cells. Baluska: elec impulses
 83 signaling pathways >> plant ~ animal johnTree: [every cell has religion](#)

86 teaspoon soil: many miles hyphae >> time >> humus >> coal
 87 beetle mites springTails pseudoCentipedes
 88 oribatida > .04" .2 - 1.4mm ubiquitous aka: moss mites or beetle mites
 nothing that doesn't have its corresponding beetle mite! enabling decay/reprocessing deadLife
 some predatory. none parasitic. weevils < 6mm beetle pest: grains, cotton..
 never mentions - EarthWorms!! hermaphrodites

97 older trees grow faster - old Tree beats global warming

108 Filson Woods
 113 nature is ruthless ... safeGuards corps greedy > take too much
 115 sap-sucking pests: aphids oak: OakLeaf phylloxera
 116 LadyBugs eat aphids

- 117 Gall midges & wasps - very little actual damage (Hackberries here ?)
- 120 Light (SUN) > sugar > deer
- 121 honey fungus mushroom on Fall stumps - None do trees good! Oaks especially vulnerable
- 125 birds, marins, bats <- woodPecker > woodChips
- 127 nutHatch - small wPecker > mud close big hole- squirrels
- 131 Martin Gossner > pyrethrum > insectsX
- 147 colder winter > early leaves. will see this year! Osage Orange is last to drop and last to sprout
- 150 SUN Light heretofore he only refers to light!
- 156 pytoncides
- 158 rings
- 162 SUN
- 163 wood anemones > spring
- 164 ivy XX'
- 165 honeysuckle
- 166 mosses - 167 OK
- 168 lichen = fungus/algae symbiotic combo
- 173 don't trim low branches (have resisted on my redOak here)
- 174 urban trees
- 175 tree roots > pipes
- 176 Europe: oak Processionary Moth
- 180 "pioneers" - grow well without Mom... street planting 2010 "frontier elm" 3126 Hulbert 41017
poplar; quaking Aspen; silverBurch; pussyWillow - not tasty bark; betulin - good fireStarter
anti-viral / anti-biotic
- 182 cooperative beneficence
- 183 quaking Aspen
- 187 Jay transports furthest
- 189 American Beech - large-leafed *fagus grandifolia*
- 191 German hunters feeding large mammal > sport hunt
- 192 spruce: red/brown bark
- 198 intraSpecie gene variation humans alike
- 216 Asian long-horned beetle
- 218 japaneseKnotwood cultivated here but not near the garden!
- 223 Albrecht von Haller: bloodPressure rises under conifers; but falls under oak [phytoncides](#)
many phytoncides helpful for human well-being
- 229 SUN.white includes SUN.green-NotUsed by leaf- is reflected.
- 230 anthoCyanin blocks SUN.red - reflected in some species not as robust
same anthoCyanin drives autumn colors. Note: buildingBlock molecule in healthful: OPCs <http://opcs.us/>
- 233 yearn for unDisturbed Peter prefers stability over "diversity".
- 234 GreatBear Rainforest wCoast B.C. N of VanCouver
Spirit Bear - white but not polar bear: Black Bear / whiteFur.
Sarayaka Ecuador Kichwa: forest: "most exalted expression of life itself."
- 235 **Process Conservation**
- 236 ecologically more valuable: deciduous forest.
restart > barkBeetles > kill conifers > ghosts ... next... deciduous
- 238 social structure of the forest > deciduous fully > equilibrium 500 yrs; sooner if partial dvpt start
- 242 research: flies dream
- 243 ok to use wood - if allowed to live optimally until its natural death among social youngins
- 244 [VA: Healing Harvest Forest Fnd](#) breaking moral barriers <> plant/animal
"allowed to develop in a species-appropriate manner" > longTerm benes optimal!
Nature vol 388 1997 Wood Wide Web Mothers communicate & nurture
ecology.com