

## Earthwise Groundwork: Preparing a great garden bed

### **I. Great gardens are not about plants, but soil.**

It's anchorage, stability, nutrition, and delivery system for air and water.

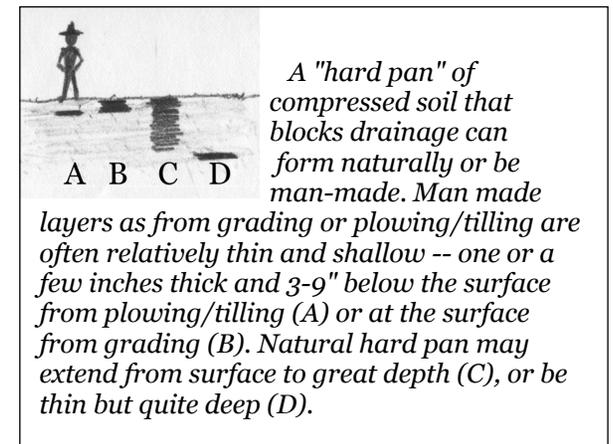
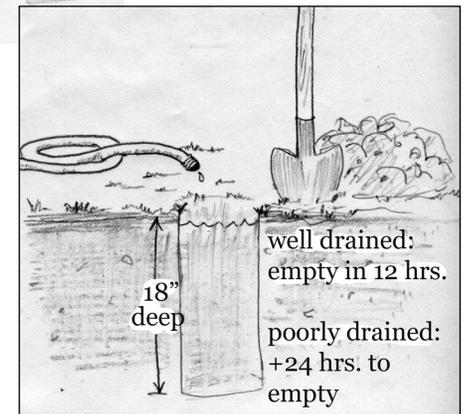
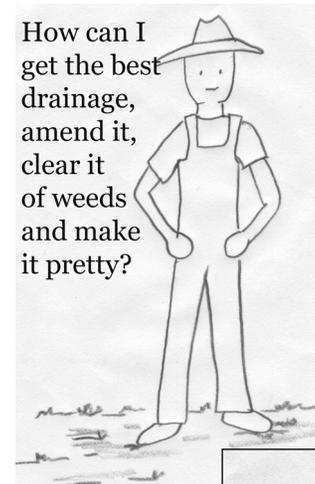
- Aim for deep and wide.
- Don't think you can fool the plants!

Respect and enlist Nature as you prepare a bed.

### **II. Four objectives: Drainage, amendments, a clean bed, a pretty bed.**

**A. Drainage** is the first thing to consider; often the biggest barrier to growth.

1. Drainage describes how water *and air* move through the root zone.
  - a) Roots need both air (oxygen) and water
  - b) Ideal soil is 50% solid, 25% air, 25% moisture clinging to solid particles.
  - c) Too much water, it's soggy. Roots die.
  - d) Most roots need 18" of well drained soil to be healthy.
  - e) Some species tolerate poor drainage, a lesser depth of aerated soil.
2. To check drainage:
  - a) Dig or drill an 18" deep hole. Fill with water, and let it drain.
  - b) Note how long for all water to drain from that 18" hole in moist soil.
    - If the soil was quite dry: Fill twice and time the second draining.
  - c) Drainage terms describe the results:
    - Well drained: All water's gone before 12 hours passes.
    - Fair drainage: Water takes 24 hours to drain.
    - Poor drainage: Water remains more than 24 hours.
    - Excessively drained: Hole won't fill or drains in less than 6 hours.
3. Correct drainage problems or accept limited plant choices & growth issues:
  - a) Poorly drained soil
    - Hard pan, near surface?
      - Dig, knife or drill to break it. Amend to prevent recurrence.
      - Or raise bed as high as water was deep after 24 hours.  
Rough up surface before piling soil, avoid perched water table.
    - Too much surface water running in from adjacent areas?
      - Block it, divert it, install drains, or raise the bed.



- b) Excessively drained soil, moist only immediately after watering/rain
  - Amend the soil or install physical barriers to slow water loss.
  - Water only a little at a time, frequently, always apply mulch.

**B. Amending the soil** is the second consideration.

1. Generally needed amendments:

- a) Air! Any soil -- clay, silt or loam, -- may be packed to airlessness.
- b) Organic matter, in the form of compost or raw materials
  - Improves water/air/nutrient retention in any type of soil.
  - Keeps heavy soils broken up.

Humus forms, holds solid particles in loose "friable" crumbs.

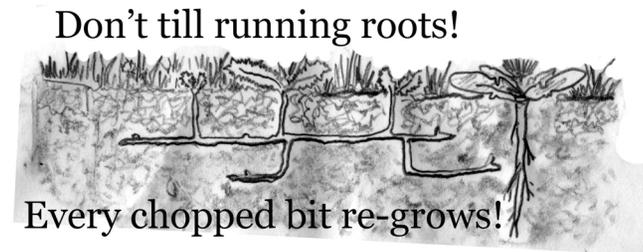
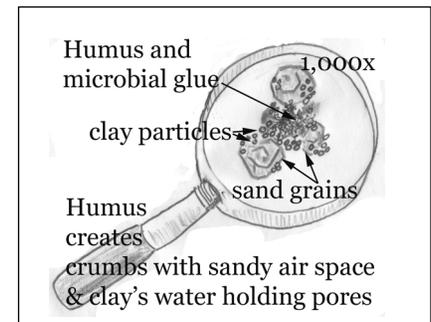
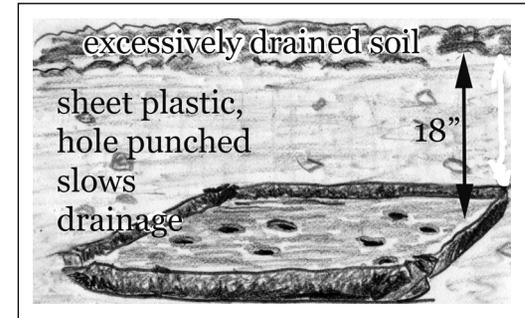
  - Aim for 5% organic matter; a 2-4" deep frosting, mixed by you or Nature.
- c) Gypsum in *SE Michigan* -- rarely useful, may even cause poor growth.

2. Amendments based on specific plants' needs:

- a) Fertilizers: Fast, slow, organic or synthesized.
    - For nutrient-poor soil *as determined by soil test*: Add to the top 3-4"
    - To correct the pH -- acidity/alkalinity. Determined per soil test.
      - Alkalinity (pH +7.0): Common in SE MI.
      - Correct with soil sulfur & organic matter.
    - Organic slow release forms almost always the best bet.
  - b) Soil test: Thru MSU Extension or by "reading" an existing plant community.
- 3) "Topsoil: Rarely an answer to any amendment need.
- It's filler only, commonly nutrient-poor and lifeless.
  - "50-50 mix" is better, 50% peat or compost, 50% screened topsoil

**C. Objective number 3: Make it a clean bed**, to assure easy maintenance.

1. Take no prisoners: get all the weeds out to start
  - Or kill them (and be sure they're dead. Many die hard.)
  - Don't till through running-root perennials -- the root bits grow!
2. Identify and eliminate the source(s) of weeds
  - Root barriers should be at least as deep as invading plants' roots.
3. In a bed that starts clean, a once a month weeding is all that's needed.
4. Give yourself ways to work *in* the bed: Include maintenance paths from the very start.



D. 4th goal: Make it a **pretty bed**. Sadly, many gardeners know only this objective.

- Has to do with the upper surface: More for *the gardener*, not the plants.
- Mulch smoothes over many ugly beds!
- Surface drains can become part of the design
- Raised bed fashioned so it doesn't look like a grave

### III. Applying the 4 objectives when you dig to make a bed

A. Single digging: Loosen the surface while removing all weeds

1. Where drainage is OK and primary concerns are weed removal and amending.
2. One shovel deep... or deeper if necessary to evict deep running roots.
3. Take care with tillers. Never till running-root weeds, and
  - Avoid over-tilling. It can ruin the drainage and soil's structure.

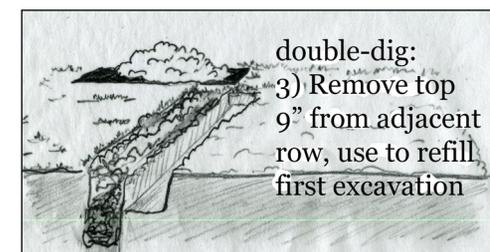
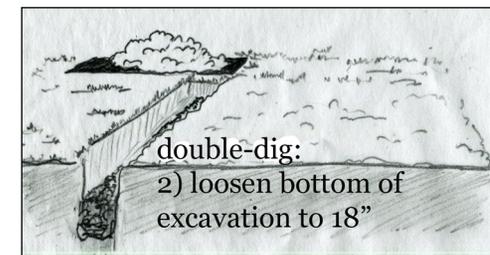
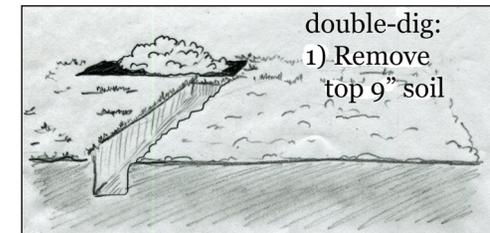
B. Double digging: Move the top layer out of the way to work on the deeper layer.

- When buried "hard pan" must be broken or amendments mixed deep.

1. Remove sod and weeds in one strip across the bed
2. From that strip, lift out the top 9" (1 shovel deep) and set it aside.
3. Loosen lower 9-18" depth, remove weeds. Add amendments if needed.
4. Remove sod and weeds from adjacent strip's top 9". Lift out this layer and set it on top of deep section you just finished loosening.
5. Strip by strip, continue moving the top soil, loosening underneath, until whole bed is done. Then return top soil from strip #1 to the bed.
6. Rake to a rough level and finish with mulch to smooth the surface.

C. Raising the bed

1. Raise the bed as high as water was deep in the drainage test hole after 24 hours.
2. Rough up surface before piling soil, to avoid creating a perched water table.
3. Use 50-50 mix (topsoil screened together with equal parts compost)
  - Or make your own weed free mix: 50%-50% coarse builder's sand & clean compost



D. If this is a bed renovation rather than digging a new bed:

- Dig out desirable herbaceous plants. Clean each root ball remove weed roots. Transplant salvaged plants to a holding bed. Then dig as above or work with Ma Nature as below.

E. Digging beneath trees:

1. If you value the tree, determine how much damage will be done to its root system.
  - Root zone is: Roughly circular, 1-1/2 times as wide as canopy, 12-18" deep.
  - Don't dig into or bury deep more than 1/3 of the root zone.
  - Avoid cutting major roots within 1' of the trunk for every 1" of trunk diameter.
  - Don't raise the soil against the tree trunk.
2. If digging will significantly damage tree's roots, employ less intrusive soil prep (IV).

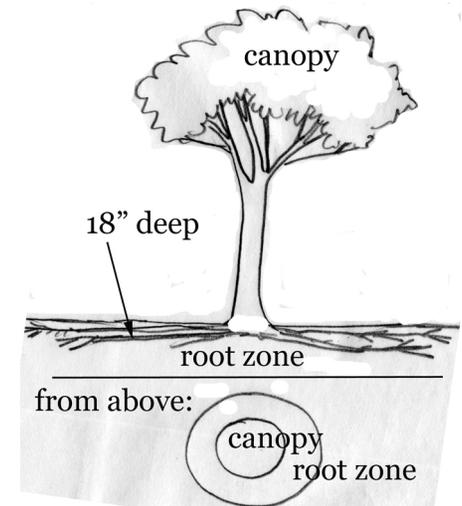
#### IV. Letting Mother Nature work for you

A. "Tiller worms/microorganisms" can work a bed for you, given time.

1. The bed must be moist and enriched with organic matter
  - 6" of whole leaves can disappear by spring
2. Worms, insects, fungi move organic matter from the surface to great depth
  - Trails of micro-manure are rooting hormone and natural fertilizer
  - Worm holes are air/water passages
  - Worms are non-native and thus problematic, but very useful in initial prep

B. Hard packed soil cannot stand up to time, or winter's freeze and thaw.

1. Soil so hard you can't dig it? To make it diggable:
  - Cover it thoroughly with organic matter. Keep it moist. Wait 6 months. Proceed to 2.
2. Break soil into chunks. Use a spading fork. Leave the surface rough.
  - Do not till unless once-over to mix amendments into already loose soil.
  - Never churn/till soggy soil. Thus, "Don't work a bed too early in spring."
3. Layer organic matter over the rough surface.
  - Chunks are held apart by organic matter, can't collapse back into a brick
  - In time and with freeze/thaw clay particles sheer off chunks, drop into the "organic stew" in the gaps
  - It's not yet great for digging, but plants don't care -- they love it!



C. Where sod, turf and weeds are more than you can dig to remove:

1. If the bed is surrounded by grass, groundcover, or suckering shrubs:
  - Trench around the outer edge, as deep as surrounding plants' roots are running.
  - To isolate plants in the bed; no restorative energy from not-smothered colony outside.
2. Turn sod from trench upside down within the bed.
3. Blanket the bed with a biodegradable horizontal barrier (examples at right).
4. "Frost" the bed with 3-6" of organic matter such as fall leaves or mulch.
5. Wait. Keep it watered. Be patient. Smother an area from September thru April or May thru September. If any plant emerges through the smothering layers, cut or pull it.



#### **Horizontal barriers for smothering:**

- Newspapers 3-ply or thicker, overlapped by half
- Cardboard or kraft paper, overlapping edges by an inch or more
- This layer forces plants to expend energy, exhaust themselves growing sideways before up.