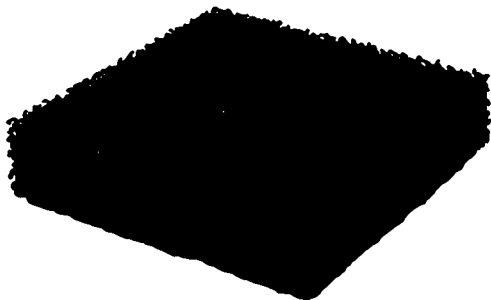


Gardening Electricity Handbook



Tools for Gardening Electricity

Carbon Felt



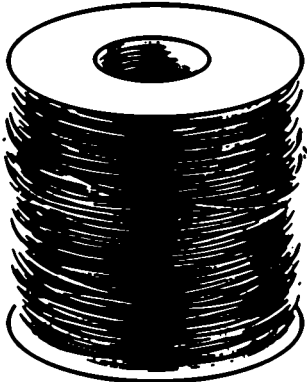
Watering Can



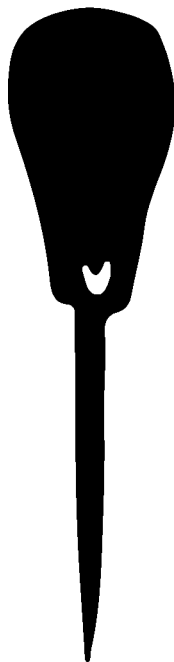
Stainless Steel Sponge



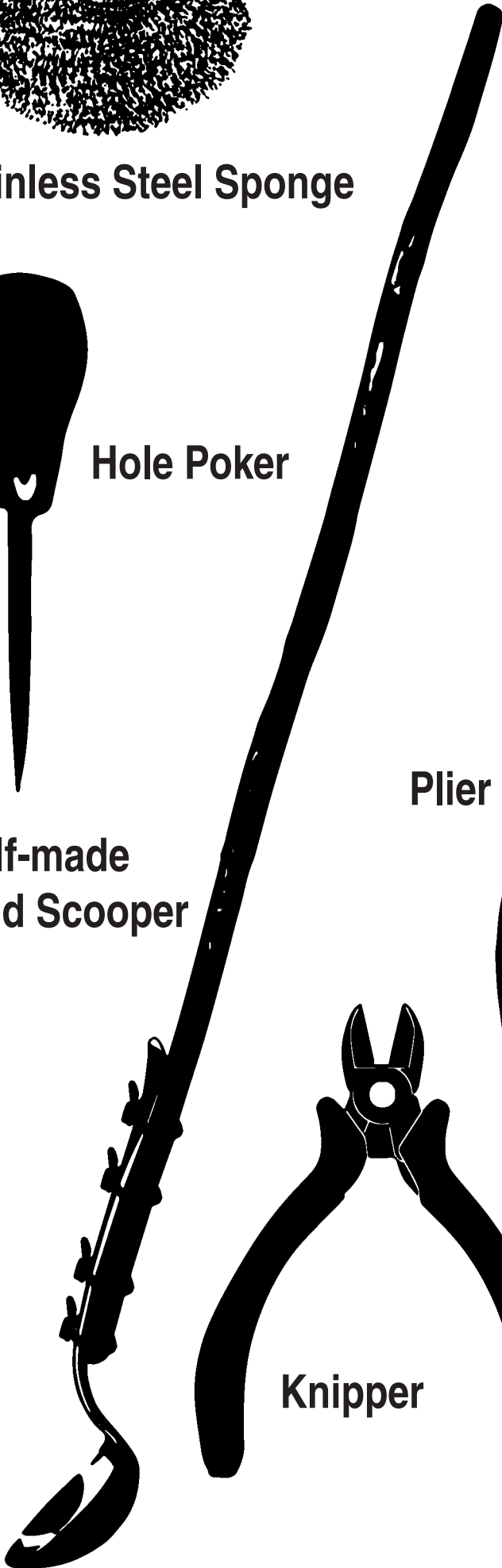
Stainless Steel Wire



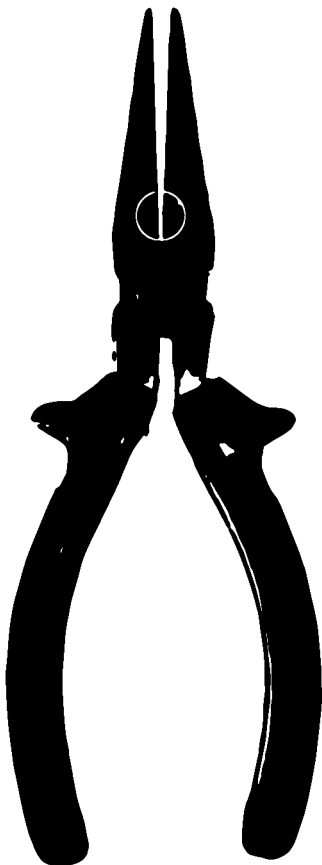
Hole Poker



Self-made
Mud Scooper



Plier



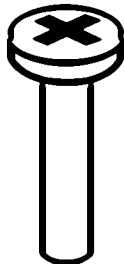
M4 Nut



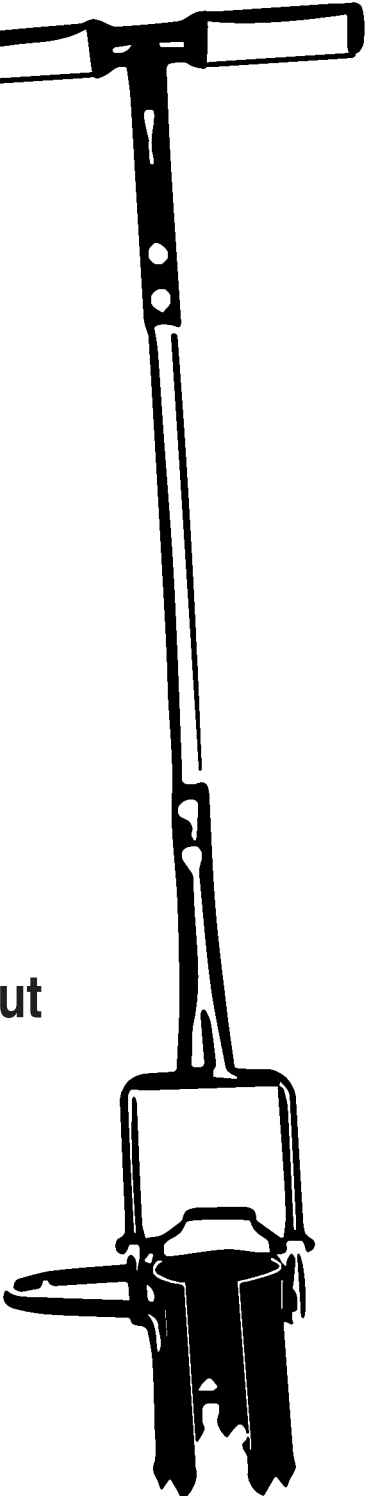
Gardening Shovel



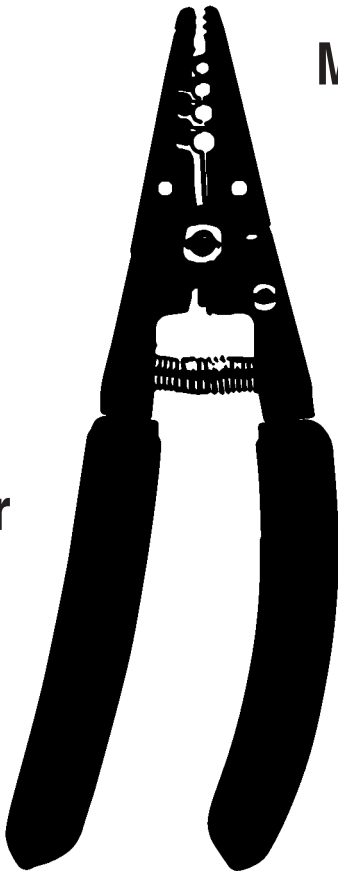
M4 Bolt



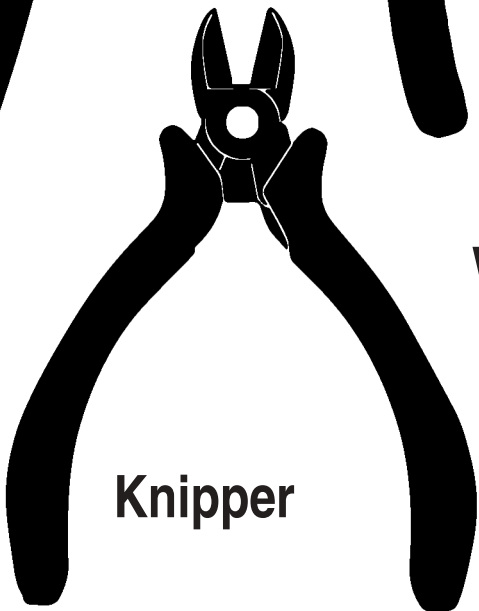
Bulb Planter



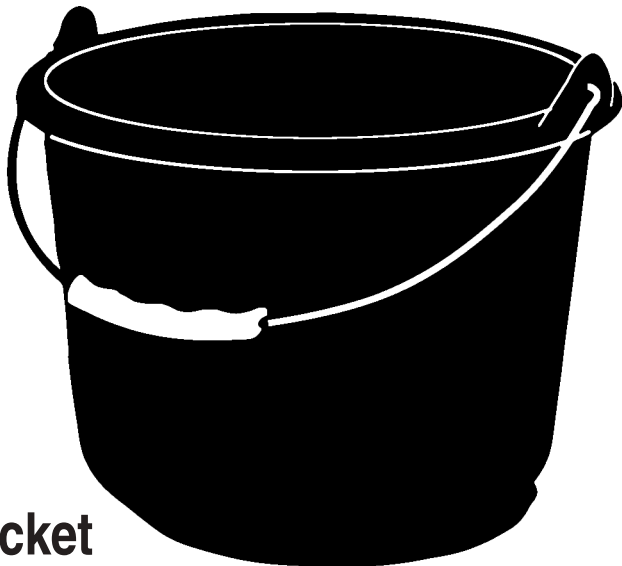
Wire Stripper



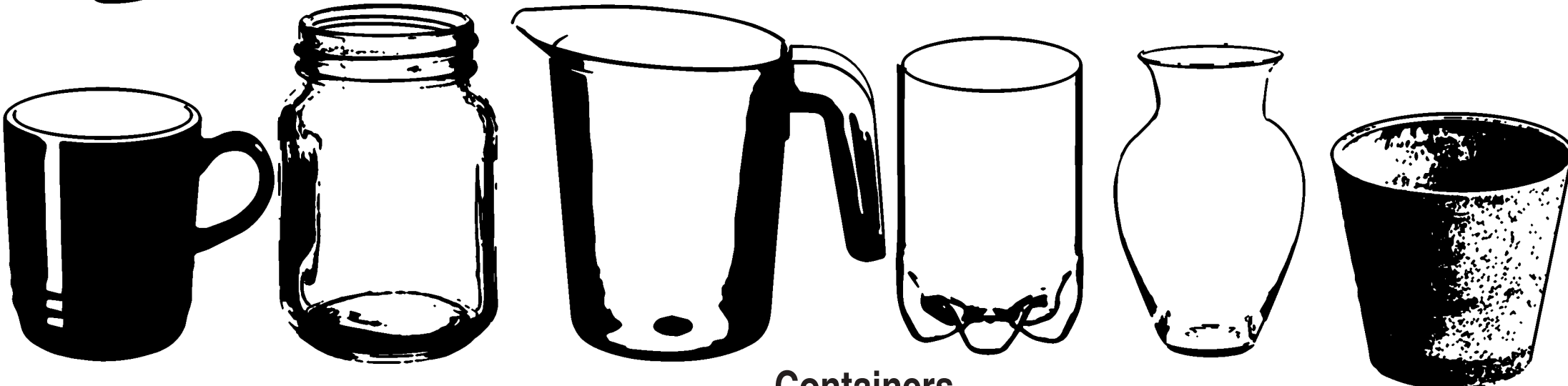
Knipper



Bucket



Containers

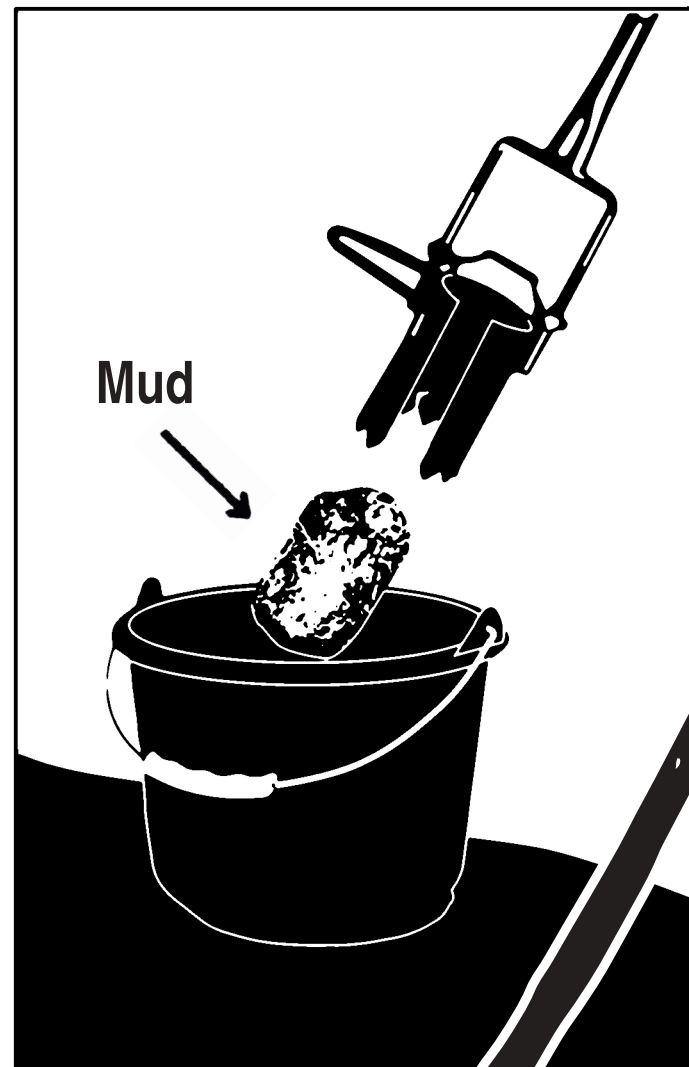
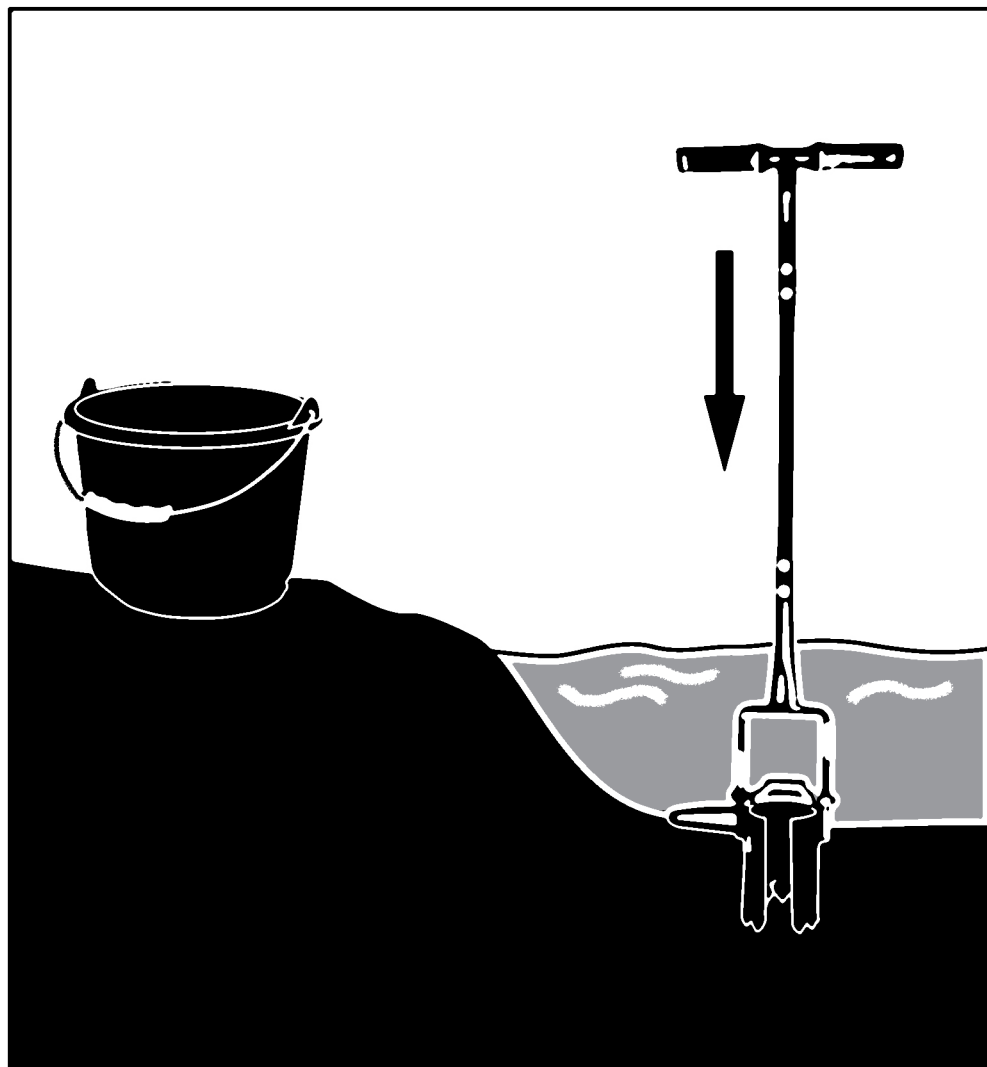




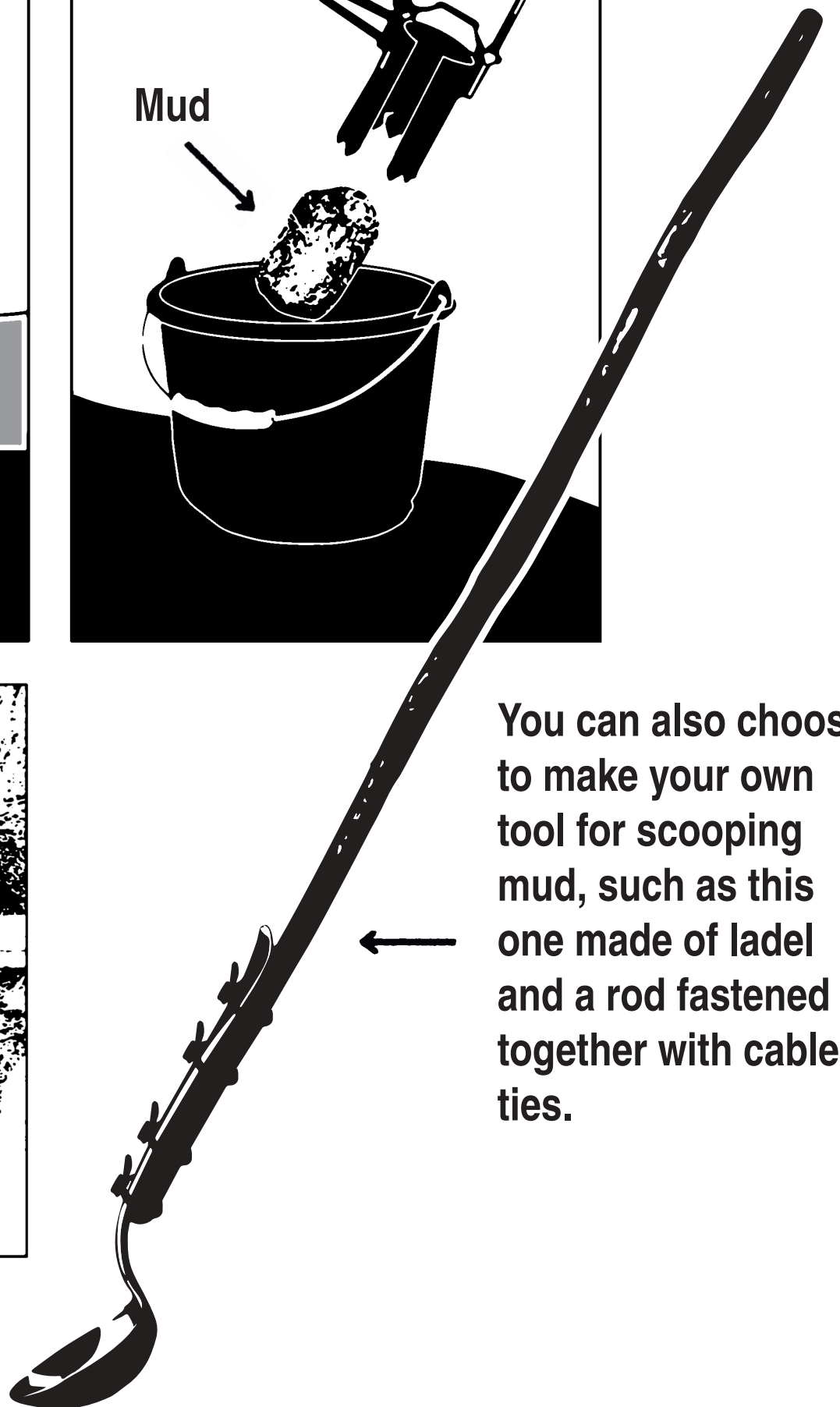
1.

Go to a nearby pond.
You can also choose a lake,
a river, or a puddle.

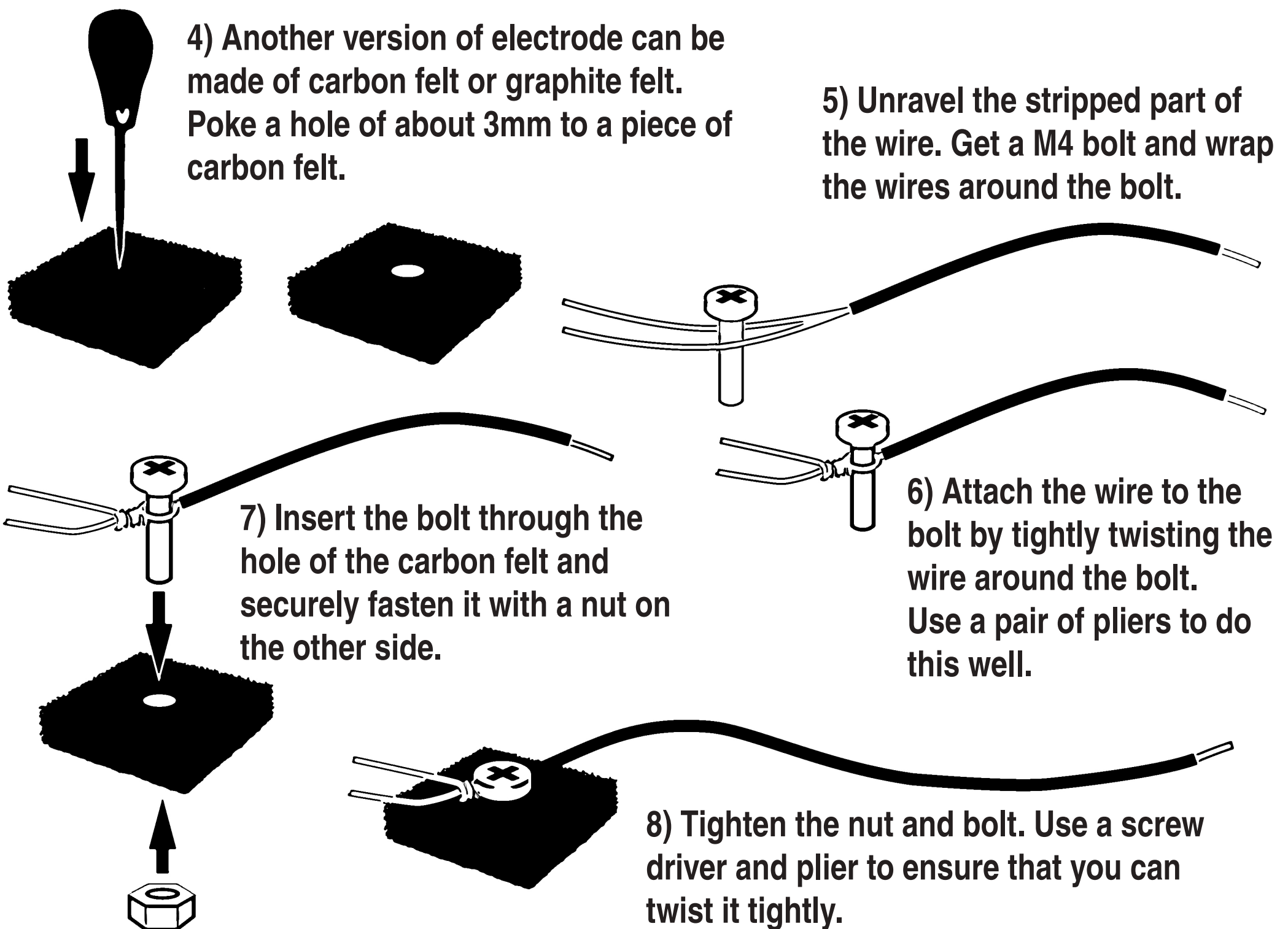
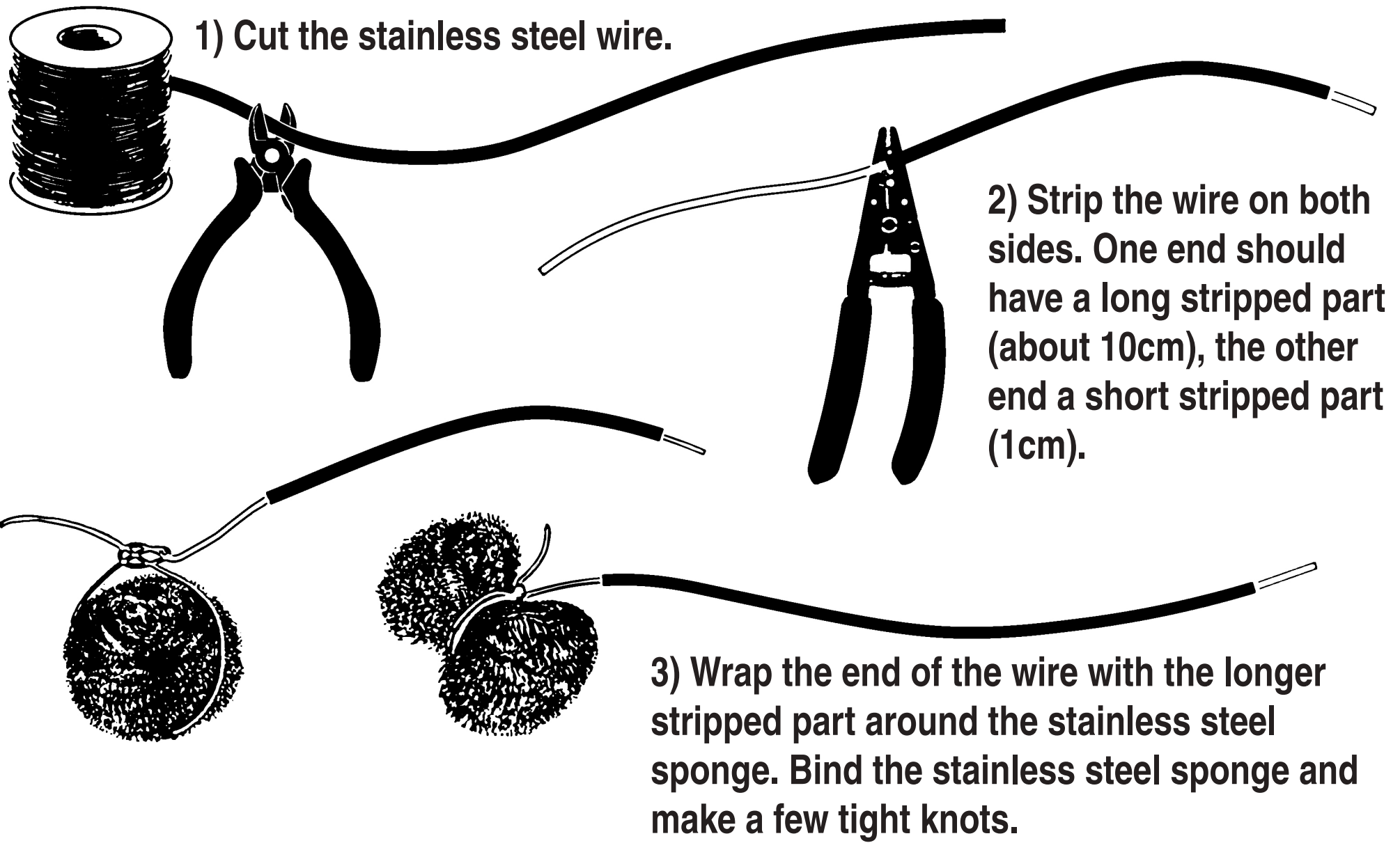
Find a shallow edge, and
scoop some mud from the
bottom of the water. It is easy
if you use a bulb planter as a
mud scooper.



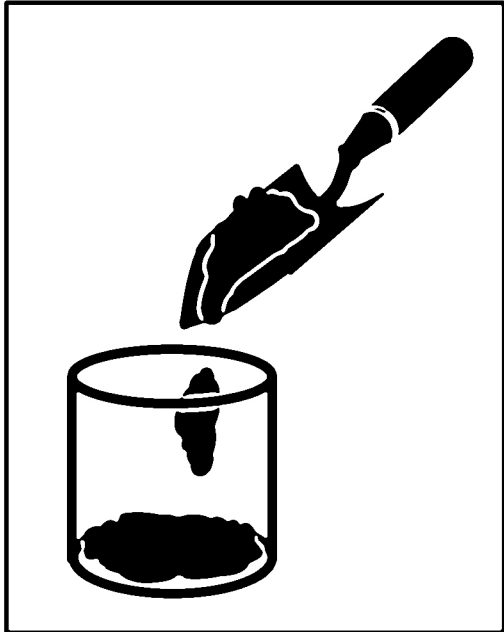
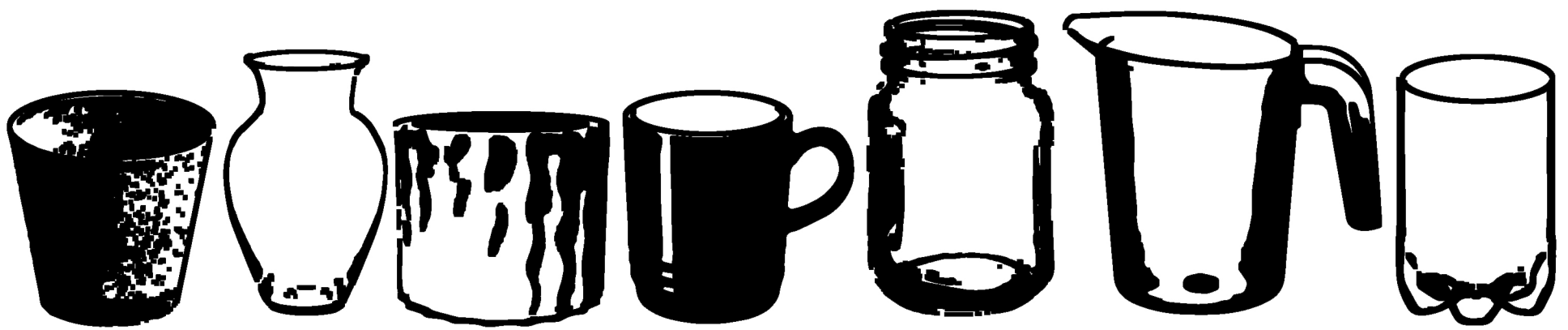
You can also choose
to make your own
tool for scooping
mud, such as this
one made of ladel
and a rod fastened
together with cable
ties.



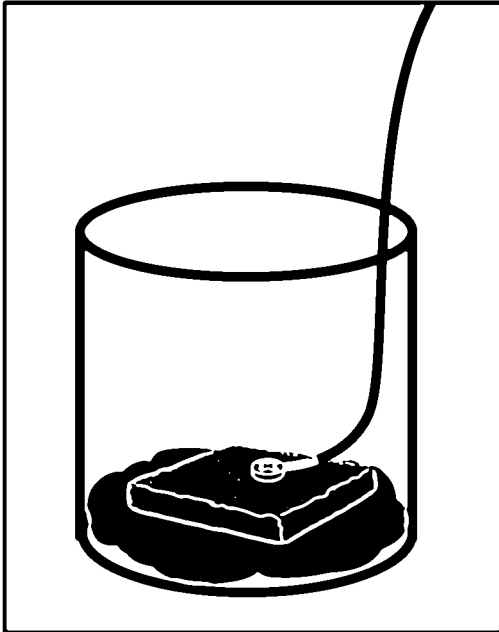
- 2.** Every cell will need two electrodes. Electrodes with more surface amount are better. Only use non-corrosive and conductive materials for the electrode.



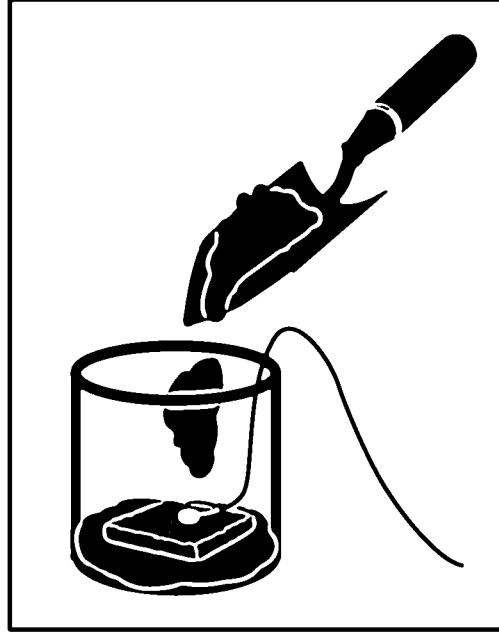
- 3.** Get all kinds of containers - jars, bottles, jugs, pots...
The containers should be non-conductive and waterproof.



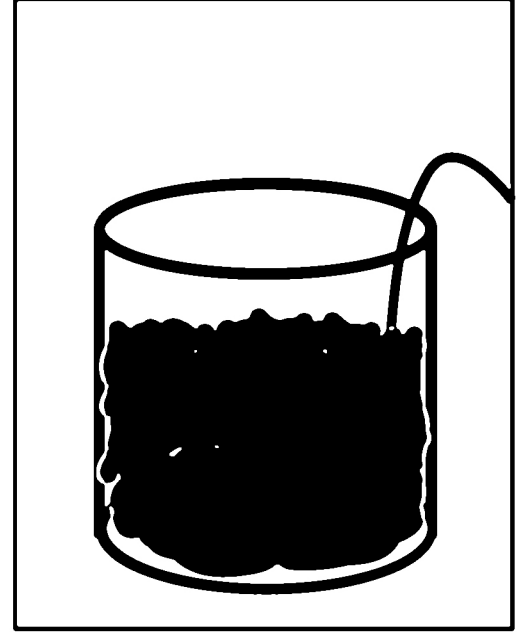
1) Put in a thin layer of mud at the bottom.



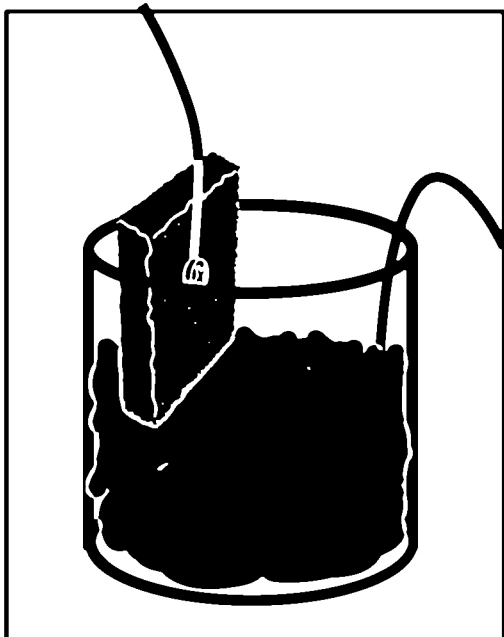
2) Place one electrode flat on the thin layer of mud.



3) Put more mud on top of the electrode (5 ~ 10 cm)



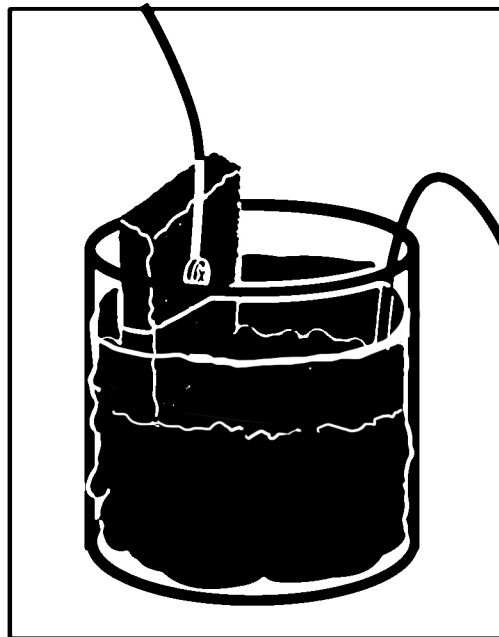
4) Press down on the mud to remove air pockets.



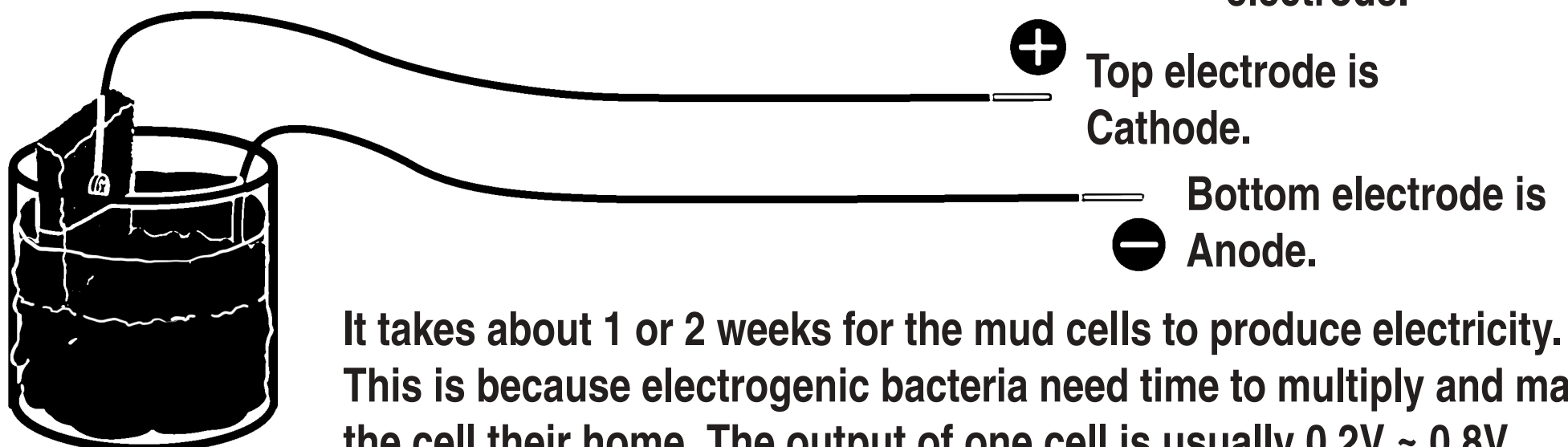
5) Place the second electrode vertically on top of the mud.



6) Pour water on top of the mud, enough to fully submerge the mud and partly keep the electrode exposed to air.



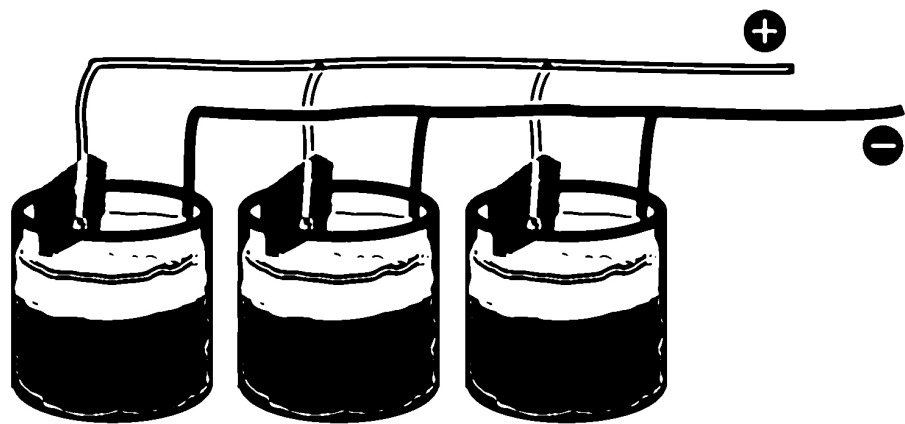
7) Plant a water plant. Its roots should not touch the bottom electrode.



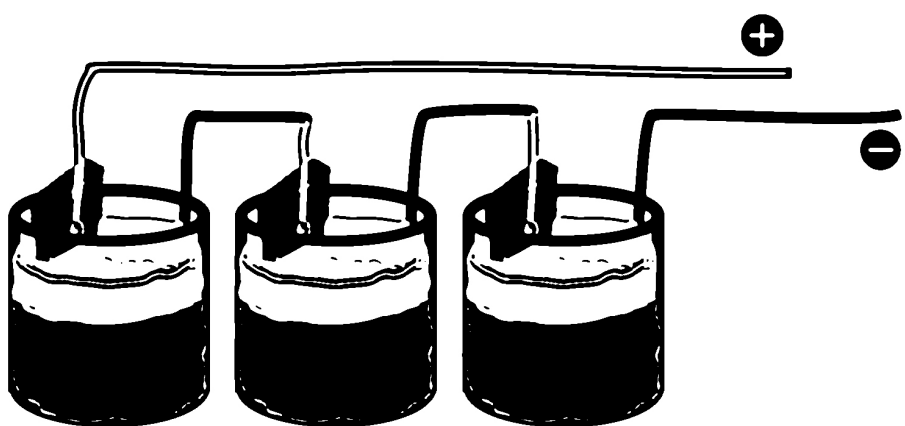
It takes about 1 or 2 weeks for the mud cells to produce electricity. This is because electrogenic bacteria need time to multiply and make the cell their home. The output of one cell is usually 0.2V ~ 0.8V.

4. Once each cell produces around 0.5 volts or more, you can connect them (parallel or in series) to increase voltage or current.

You can measure the cells' electricity output with a device called 'Multimeter.'



Parallel connection = increase current

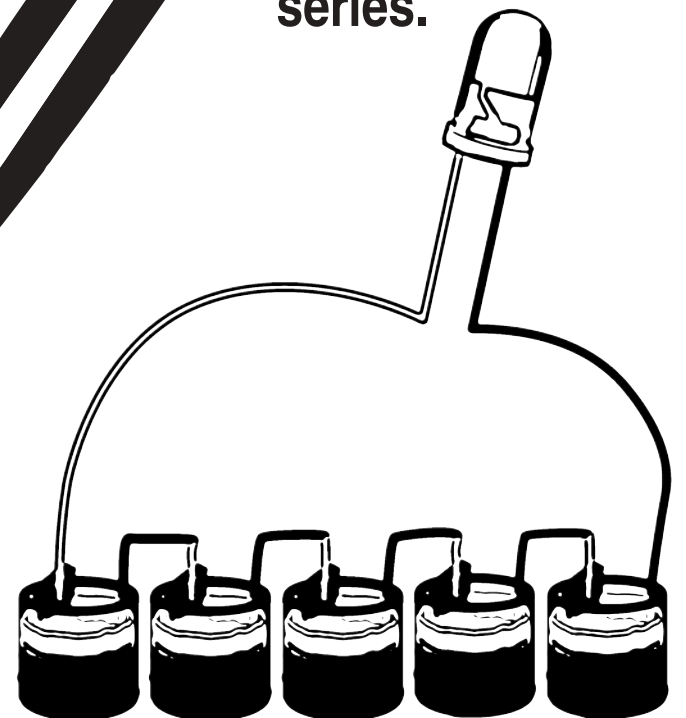


Series connection = increase voltage

The bacteria naturally living in wetlands are now starting to thrive in your mud cells. The anaerobic electrogenic bacteria prefer to live attached to a conductive surface. The electrode you placed in the mud becomes their home. Here, the bacteria decompose organic matter and emit electrons as waste. When you add plants to the mud cells, a symbiotic ecosystem emerges, where the plants provide nutrients for the bacteria to thrive. The cells should always have enough water: if the soil dries out, the electrogenic bacteria will die.



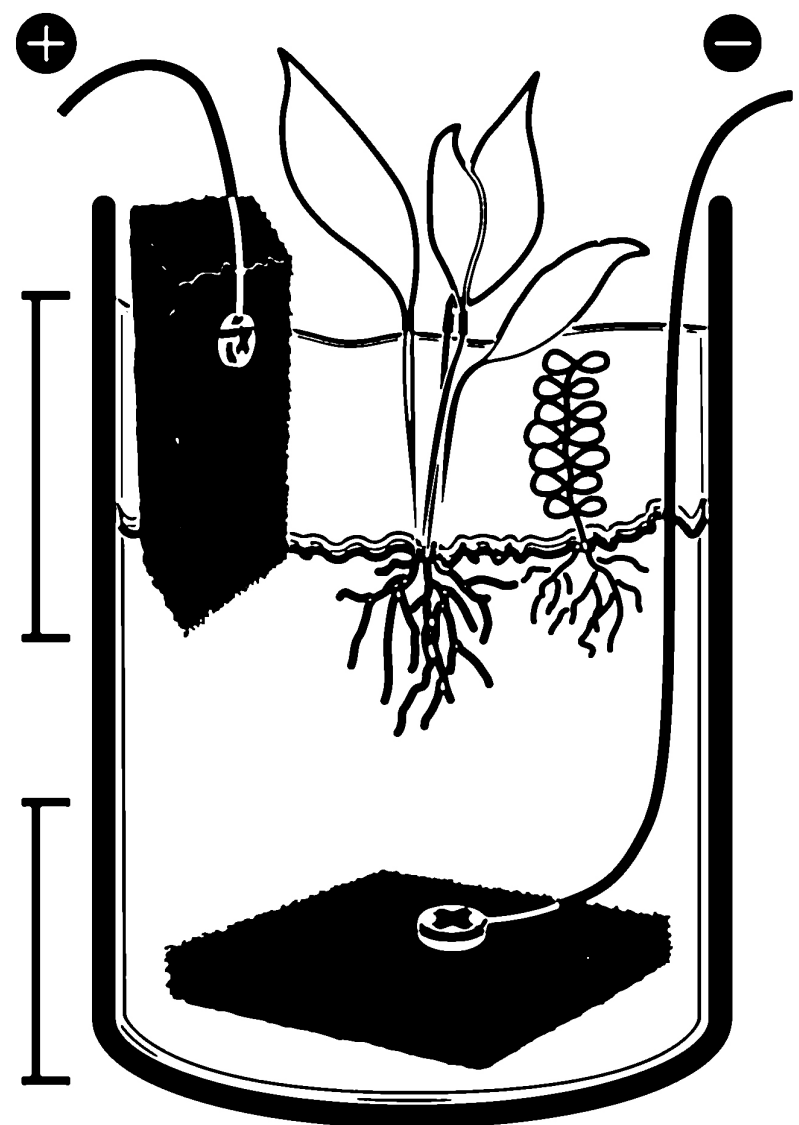
You can also power an LED with around 5 mud cells connected in series.



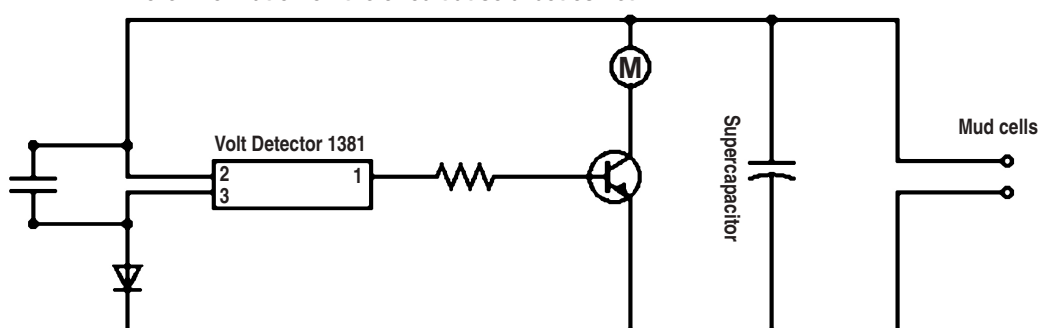
Measure the cells once a day to follow the bacterial activities and changes in electrical output.

Aerobic Environment

Anaerobic Environment
(Oxygen is toxic to electrogenic bacteria)



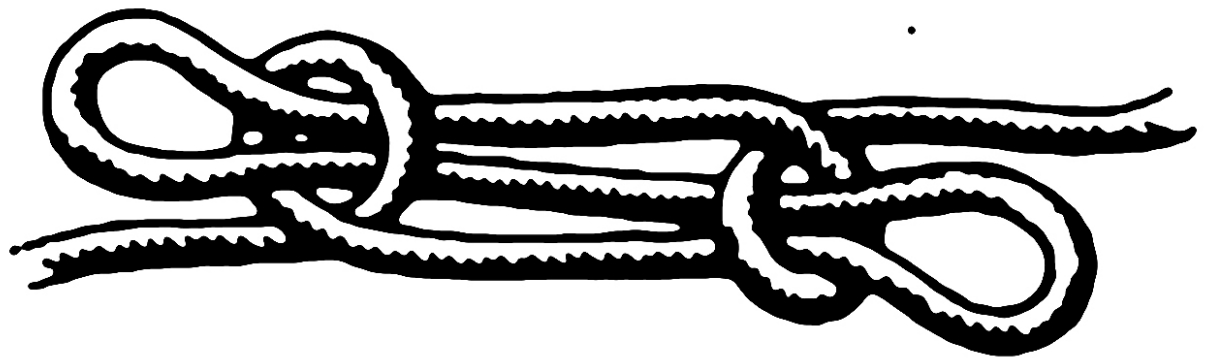
More information on the circuit at solarbotics.net



You can try making a Miller Solar Engine. This circuit will power a motor once the capacitors are sufficiently charged by the electricity produced in the mud batteries.

Making knots, entanglements.

Things that gardening electricity taught me:



Rearranging Temporality

- Decreased speed (slowness) rather than increasing it.
- Working with irregularity rather than time-precision.
- Understanding nature's systems and rhythms. Letting cues from nature influence artificial systems.
- Valuing durability and committing to regular, responsible maintenance.
- Embracing what is temporary — but compostable or easily recyclable.
- Becoming aware of geological and microbial time.

Rearranging Scale

- Considering how small bacteria are and seeing electricity as something precious.
- Designing smaller, lower-power, lower-resolution electronics.
- Writing efficient code.
- Letting devices sleep or turn off, embracing intermittent functioning.
- Acknowledging that sustainability greatly depends on the problem of scale.

Rearranging Demand

- Recognizing that mud cells are not a solution to capitalist demand, but a way to rethink and reorient our desires.
- Embracing longer waiting times, and designing for the experience of waiting.
- Freeing the garden and ourselves from human-made deadlines.
- Accepting that this cannot provide for everyone, everywhere, or all the time.
- Embracing uncontrolled providence — uncertainties, errors, lacks, and leaks.
- Embracing failures.

Rearranging Purpose and Value

- Treating electricity as something to care for. Entangling its use with the ecology of the garden.
- Questioning what we want to use this energy for — practical or artistic purposes?
- Letting the garden come before energy production; electricity as a by-product.
- Considering how the garden transforms us in return.
- Asking myself what my role is in this system. Am I an initiator? A performer? An actor, a steward, an engineer, or an artist?
- Recognizing how the garden shapes my labor and how my labor guides my engagement with non-human beings.

Rearranging Materiality & Spaces

- Blurring boundaries between indoor and outdoor spaces.
- Using more biodegradable materials as components in a system.
- Integrating analog systems alongside digital ones.
- Studying compostable materials and circular design principles.

Rearranging Electricity

- Understanding electricity as the movement of electrons — which are not only in our computers or wires, but fundamental to biological and chemical processes.
- Asking what human applications truly need electricity, and which do not.
- Using passive components, human labor, and nature's systems that already exist.

Rearranging Agency

- Asking: Who is in control? Who is influenced? Who embraces these influences?
- Considering not only when, why, and what to automate, but also what not to automate.
- Understanding that gardening electricity is a practice of relation-making.

Gardening Ecologies, Technologies for Transcendence

Caring for a garden takes more than a person.

Being in the mode of research becomes an even more insightful process when done as a collective.

Let's connect if you are interested in sharing:

1. Ecological & technical insights
2. Circuits useful for the project
3. Electronic applications suited for the mud cells
4. Imaginations around mudpunk ideas
5. Any artistic creations you've made, using mud cells
6. Suggestions, critiques, questions and references
7. New findings, and more...

Write or draw your thoughts in the collective database: www.electricgarden.xyz

Gardening Electricity Handbook

Put together by Sunjoo Lee on 10th March 2025

For more information about the Electric Garden, visit:

www.sunjoolee.com

www.tree-001-archive.xyz