



WATER TREATMENT WATER TREATMENT IN THE FIELD

WATER TREATMENT

Filter

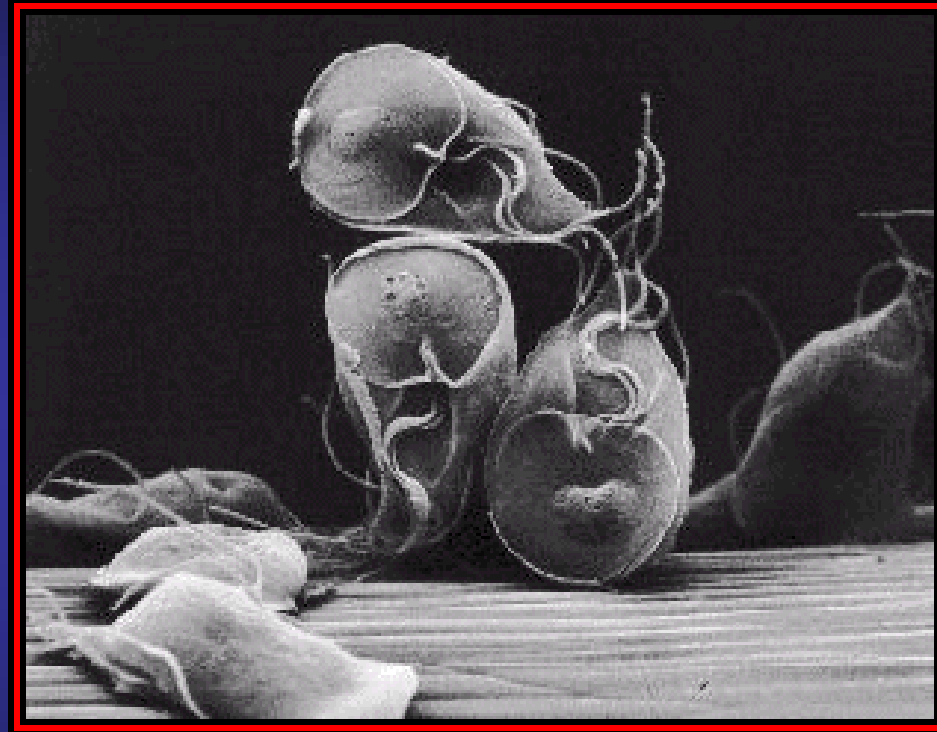
Disinfect

Purify

Or Sterilize?

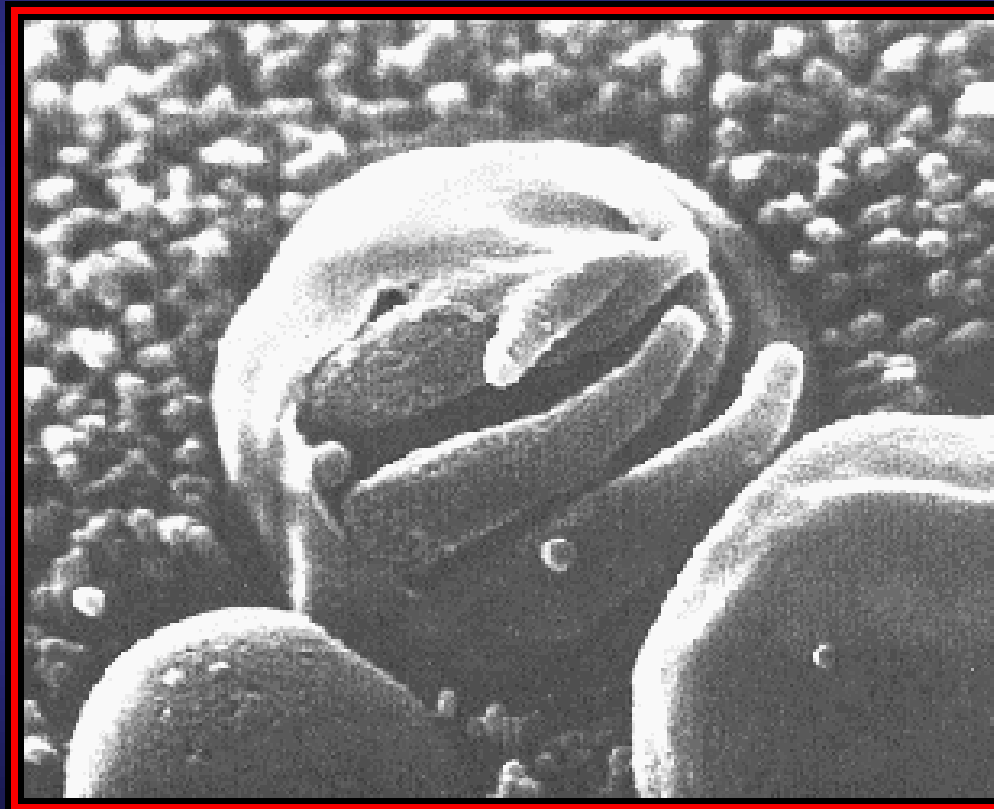
The Bugs

- Giardia
- Carried by both man and animal
- Found even in pools of fresh snow melt
- Sx of explosive, foul smelling diarrhea and gas can occur from days to months after infection and RECUR without treatment



Cryptosporidium

- NOT killed by iodine or chlorine
- Another enteric pathogen causing diarrhea
- One of the reasons to use a dual method of treating water other than boiling (most effective)
- Tends to be seasonal and very rare in the US (more of a problem in 3rd world)



E. Histolytica

Another enteric pathogen

MAY cause similar symptoms to Giardia but may also make you a nonsymptomatic carrier.



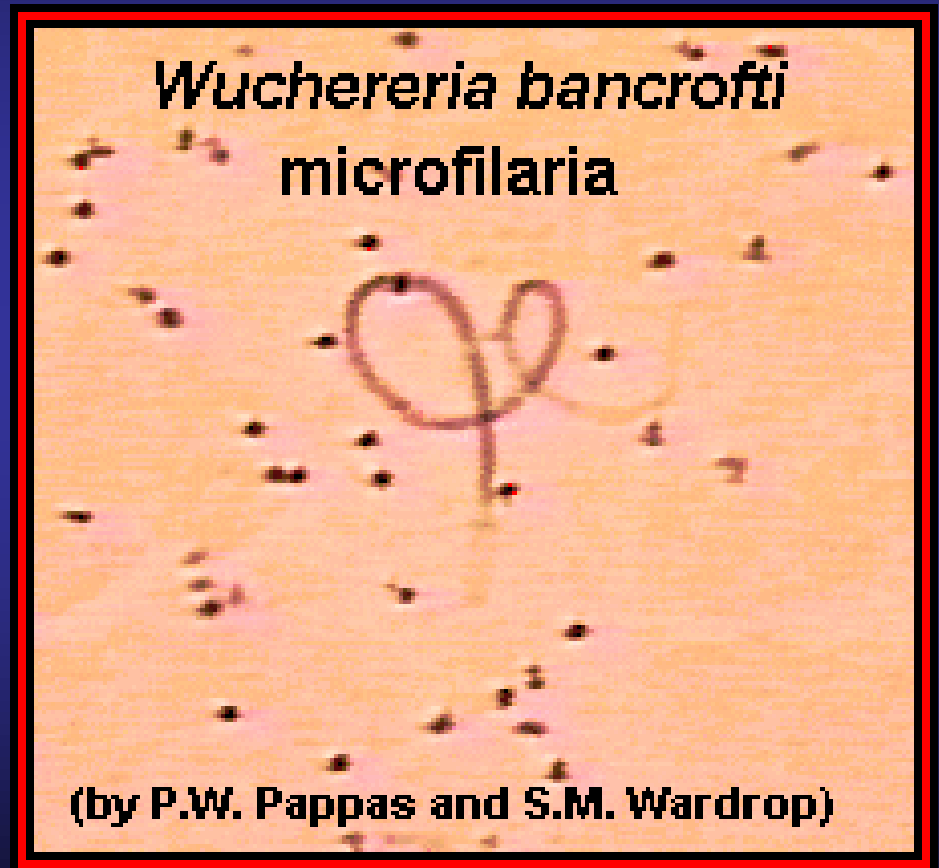
Nematodes (Worms)

- Ascaris (roundworm)
- More of a problem in dense urban areas of low socioeconomics
- Death, when it occurs, due to bowel obstruction



Filariasis

- Tropical or foreign bug
- The cause of elephantiasis



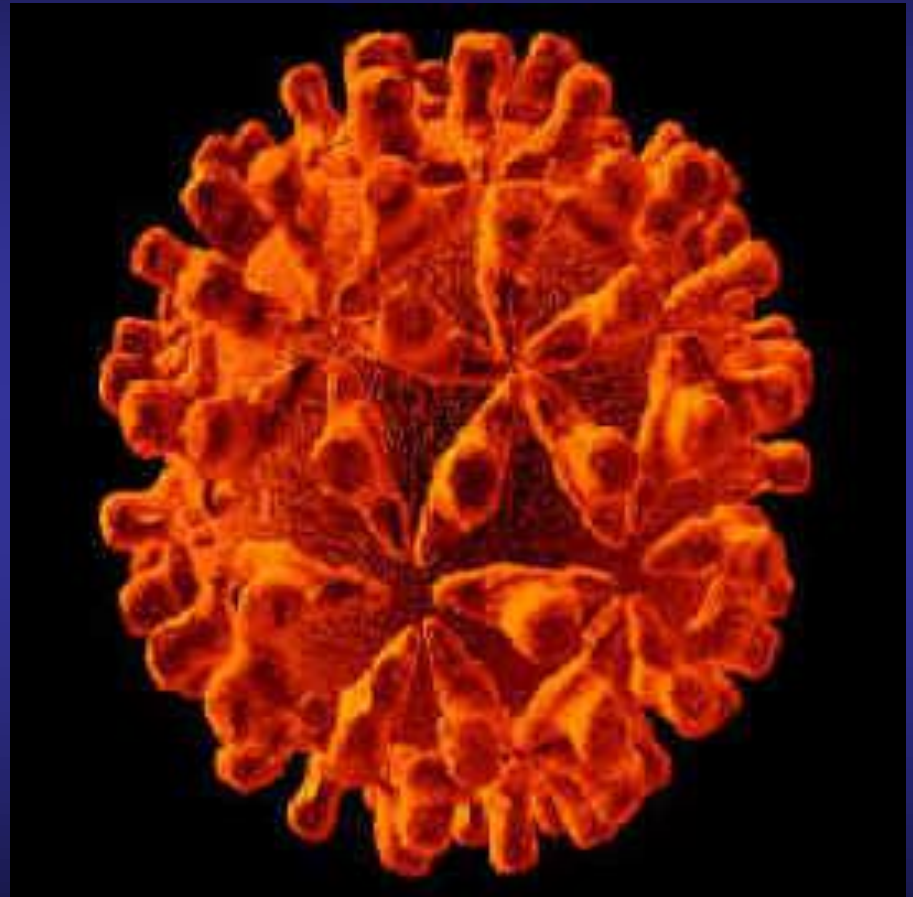
Bacteria

- Various strains of *E. coli*
- Sx range from GI to toxic syndromes depending on species
- Most common cause of cystitis (bladder infection)



Viruses

- Hepatitis A
- More of a concern in foreign countries
- Often cling to bigger “bugs” or clump together
- BUT if single will past thru any filter



Other Concerns

- ?Heavy Metals?
- ?Radioactive Compounds?
- ?Chemical Contaminants?

**The community bath...
as well as community
toilet...**



TREATING WATER

- BOILING
- FILTERING
- FILTERING PLUS IODINE
- CHEMICALS
- RADIATION?



BOILING

- **Gold Standard**
- **Kills Everything (including taste)**
- **Bringing to boil sufficient to “disinfect”**
- **Boiling for 5 – 10 minutes to “Sterilize”**
- **Makes water taste flat**
- **Requires time for water to cool**
- **Requires time and fuel to heat**

FILTERING

- Fairly effective for most everything but viruses
- Fast
- Weightier and Bulkier than chemicals
- Remember to treat intake hose as “contaminated”
- If sealed cartridge filters takes a significant impact, internal filter may crack allowing unfiltered water to pass through.
- Filter the cleanest water you can find.
- Prefilter with t-shirt, coffee filter, etc. if water is dirty or let it stand overnight.





Filter Brands and Types

Membrane Filters – use thin sheets with precisely sized holes that prevent objects larger than pore size from passing through.

-Less cleaning required but when clogged, it's c



Depth Filters – use thick porous materials (carbon or ceramic) to trap particles as water flows thru.

-Can be field cleaned but easier to crack and easier

g.



Other Types of Filters



Water Purifying Filters

- Filter plus some iodine treating component

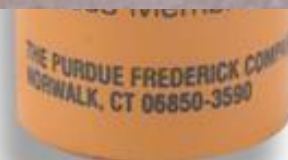


Chemicals

- Iodine and chlorine (iodine more effective)
- GREATLY affected by water clarity and temperature
- Does not kill cryptosporidia cysts
- Light and portable
- Requires longer contact time, adds “taste” to water
- CAN EXPIRE – UNOPENED bottle 4 yrs, or 1 year after opening a new bottle.
- Iodine should be avoided in: Shellfish allergies, thyroid disorders, pregnancy, or if on lithium.



4 Drops per Liter





The MIOX

\$130

**One set of batteries and
packet of salt last ~50gal.**

**Claims to be effective
against all agents
including crypto and
cyclospora.**

**Destroys viruses and bacteria
in 15 minutes, giardia in 30
minutes and cryptosporidia
in 4 hours**

Radiation?

Battery Dependent

Effectiveness?

**Claims all
organisms in
seconds**

Impact resistance?

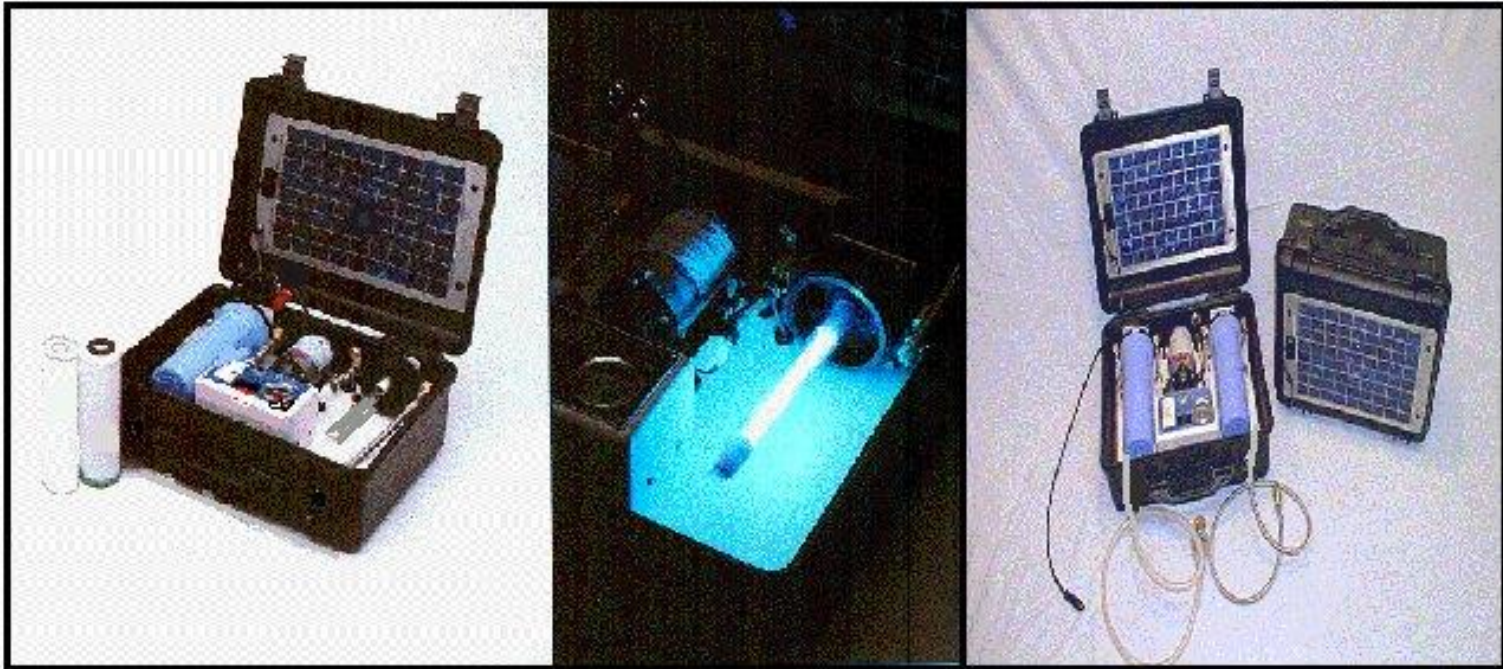
(~\$150)

Lightweight

Technique?

**Four alkaline AA batteries purify
20 to 40 16-oz. glasses of water**





~ 1 gallon / minute with electrical power source

~ 100 gallons / day on solar battery only

Weight: 38 lbs

Average Life: 40,000 gallons

Cost - ~\$4000

A hand is holding a white, cylindrical object, likely a water filter, horizontally. The object has a black band or cap on one end. The background is a rustic outdoor setting with wooden planks, a woven straw hat, and some greenery.

Filter Before



Filter after half gallon.



