

WHAT IS TODAY'S OBJECTIVE?

**TO OBSERVE THE
EFFECTS OF WATER
ON THE BODY;
TO DETERMINE HOW
BODY GOT IN WATER**



godotal:

omgbuglen:

How to use sand to freak people out

Imagine if some guy was tripping and saw the woman, runs up to help her and she just crumbles apart in his hands. That's gonna take the trip south.

PATHOLOGICAL FINDINGS

1. FOAM IN THE AIRWAYS

WHITE FROTH or **FOAM** seen exuding from mouth & nostrils.

Foam is also found in the trachea & main bronchi

- *Indicates victim was **alive** @ time of submersion*

FOAM = mixture of proteinaceous liquid derived from the lungs & air whipped up by terminal respiratory movement

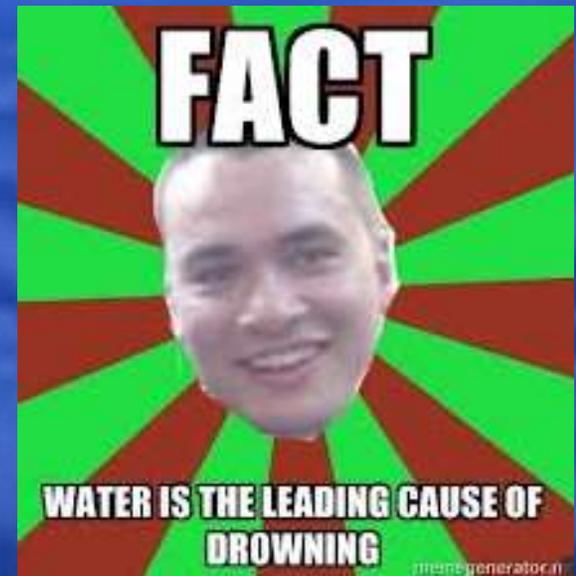
- Lungs are often hyperinflated and meet at the midline, partially obscuring the pericardial cavity when the thorax is first opened at autopsy

2. EMPHYSEMA AQUOSUM

- Lungs are voluminous/bulky/ballooned
 - Pleural surface has a marbled appearance
 - Lungs feel doughy

3. FOREIGN MATERIALS IN AIRWAYS, LUNGS, & STOMACH

- Sand, silt, weed, etc
- Large amnts of water & debris in stomach suggest immersion during life



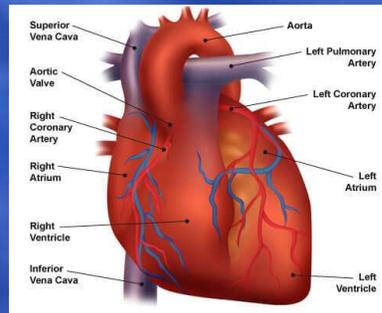
4. CONJUNCTIVAL HEMORRHAGES

- occasional small conjunctival hemorrhages may be seen

- *multiple petechials found in asphyxia deaths are NOT seen in drowning*

5. VENOUS CONGESTION & FLUID BLOOD

- engorgement of right side of heart and large veins
- the blood is fluid & thin lacking its normal sticky consistency



6. FOREIGN MATERIAL IN HANDS

- Victims struggling in water may clutch at objects which are then found grasped in hand after death
- object fixed in hand by **cadaveric spasm** (*instantaneous rigor*)

7. WASHER WOMAN HANDS

- Hands are wrinkled and bleached due to loss of skin tone
- After submersion in water for 12-18 hours

The effects of water on the skin

- **MACERATION** (softening of skin) begins w/in minutes after immersion in water
- Hands & feet are 1st to appear macerated (*b/c of their thick keratin layer*)
- After removing body from water, wait for it to dry before looking for blunt injuries or abrasions

DEGLOVING: The epidermis of hands and feet can get separated (like a glove/stocking) after 2 weeks of immersion

8. SHOULDER-GIRDLE BRUISES

- victims bruise muscles of the shoulder girdle, neck, & chest
- hemorrhages tend to follow the lines of the muscle bundles
- Present in 10% of cases
- Strong indicators that victim was alive in water

SIGNS OF DROWNING

- Body floats **face down** w/ head lower than rest of body
 - **Lividity** most seen on head, neck, & anterior chest
 - **Lividity** blotchy & irregular
- **Putrefaction** begins 1st w/in areas of **lividity** (*head, neck, anterior chest*)

SIGNS OF DROWNING

Body in water will usually sink

- NOTE: clothing effects buoyancy

Once body sinks, it will stay sunk until **putrefactive** gas formation decreases specific gravity of body & body floats



If a victim is not promptly retrieved at death, then, without exception and no matter how deep or how swift the water may be, their corpse will continue to drift downward until it reaches the bottom.

WTF fun fact #2229

Drowning in salt water is different than drowning in fresh water. It takes longer, and salt water draws blood out of cells into the lungs. You drown in your own blood.



SIGNS OF DROSSNING

GUIDELINE for RESURFACING TIMES

June to Aug: 2 days

April, May, Sep, & Oct: 3-5 days

Nov, Dec: 10-14 days

Jan, Feb: possibly no resurfacing

DECOMPOSITION GASES

~2-3 days: body starts to swell

~5-6 days: abdom swells & skin blisters

~2 weeks: abdom *very* tight & swollen

~3 weeks: tissues soften, organs & cavities burst

~4 weeks: soft tissues liquify & face
unrecognizable

ACTUAL RATE VARIES DEPENDING ON TEMP

Video: Caged Pig

NOT SIGN OF DROWNING

- Putrefaction destroys any foam in airways & makes a reddish-brown pseudo foam instead

NOT SIGN OF DROWNING

More effects of water on the skin

- ANSERINA CUTIS (*goose bumps*)

- Roughening or pimpling of skin

- No diagnostic significance b/c it can occur not from drowning

- (Sign of decomposition, not drowning)*

- Adipocere = soap-like transformation of subcutaneous fat

- Shows up after months of immersion

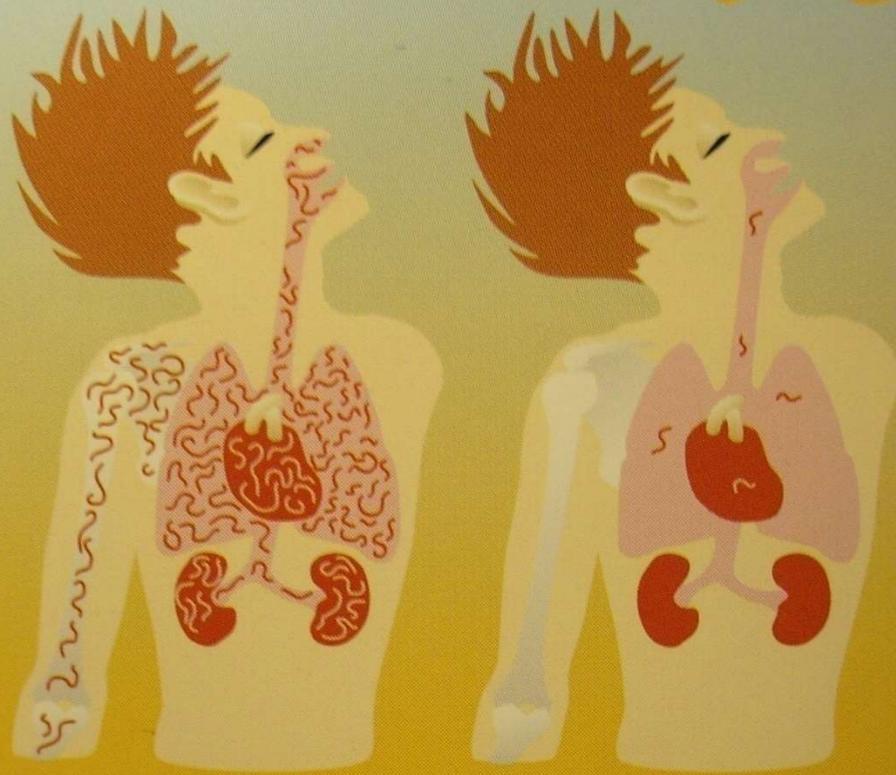
SIGNS OF DROWNING

The effects of water on the body

- Body cools in water about 2x as fast as in air ($\sim 20^{\circ}\text{F/hr}$)
- Body reaches temp of water in $\sim 5-6$ hrs (nearly always w/in 12 hrs)

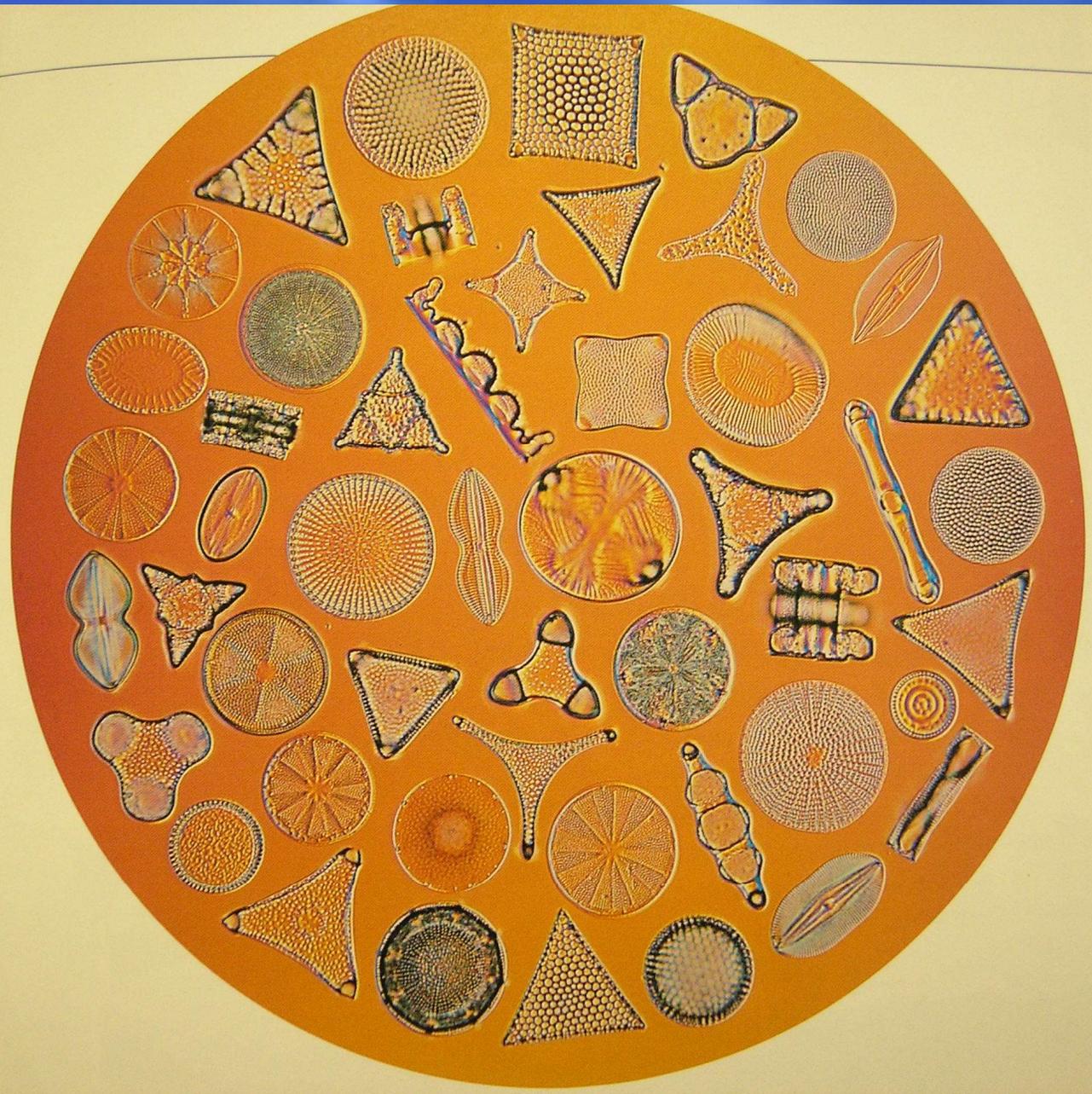
DIATOMS

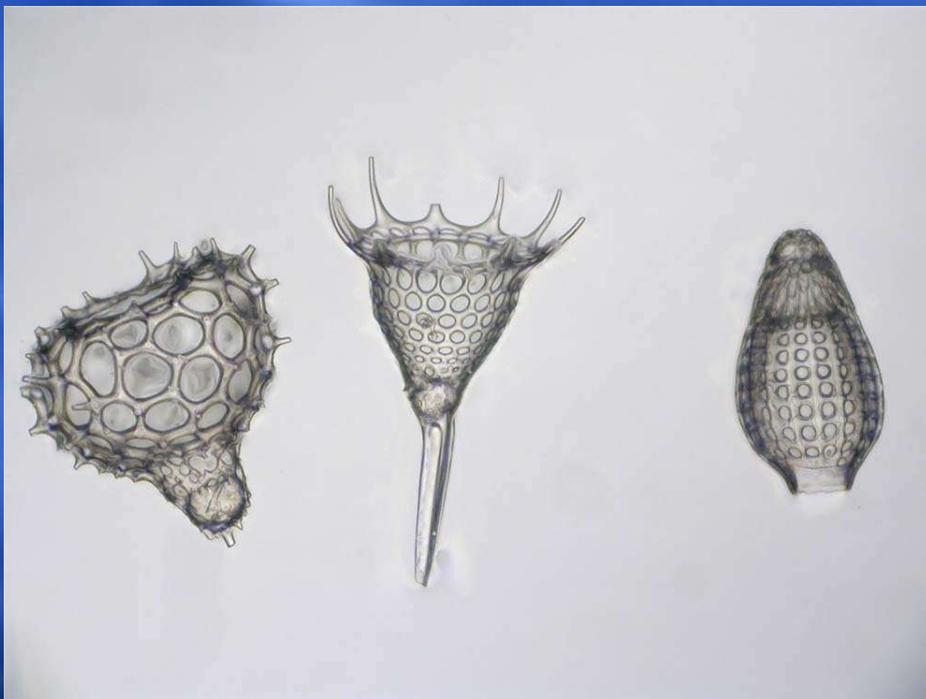
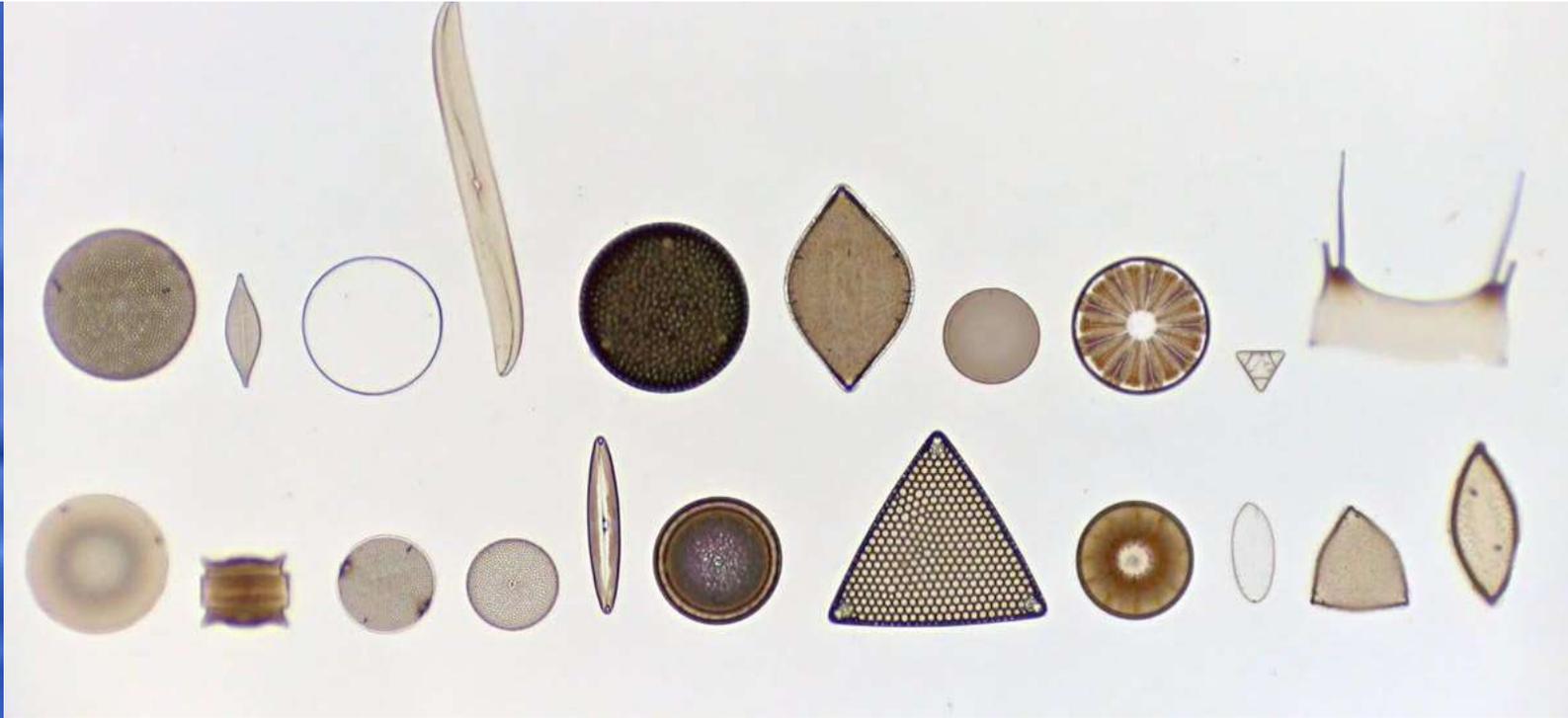
- Microscopic algae w/ a siliceous exoskeleton
- At least 10K species classified
 - Can be a unique finding/ determine if body moved
- When a person drowns in diatom-contaminated water, these microscopic algae are inhaled, penetrate the alveolar capillaries, and circulate to distant organs (*brain, kidney, liver, bone marrow*)



1 Live on entering the water—water is inhaled and diatoms pumped throughout the body

2 Dead on entering the water—few or no diatoms found in the body.





ON LEFT SIDE

Draw a body

**Label the 12
things we look
for in drowning
victims**

(where they are, what
they are, how reliable
they are, etc)

