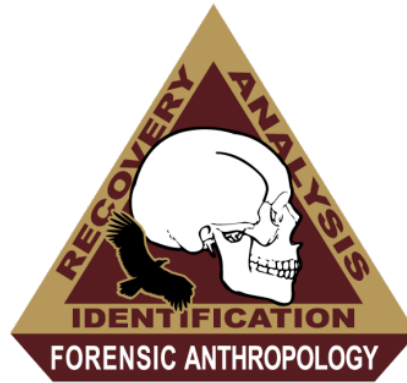


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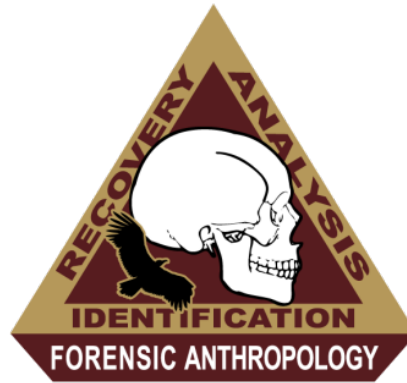
Workshop for Texas Justices of the Peace

Cause and Manner of Death: Skeletal Trauma and Taphonomic Issues

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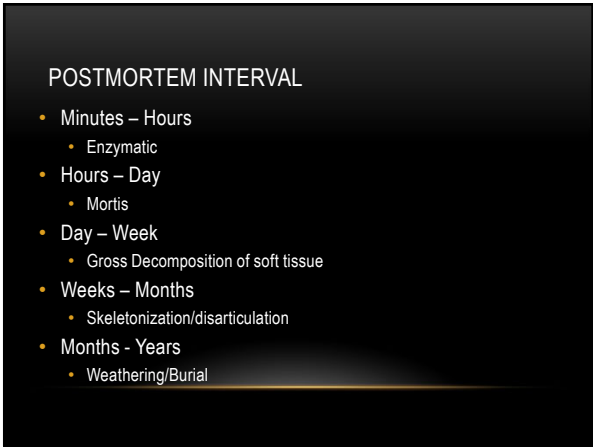


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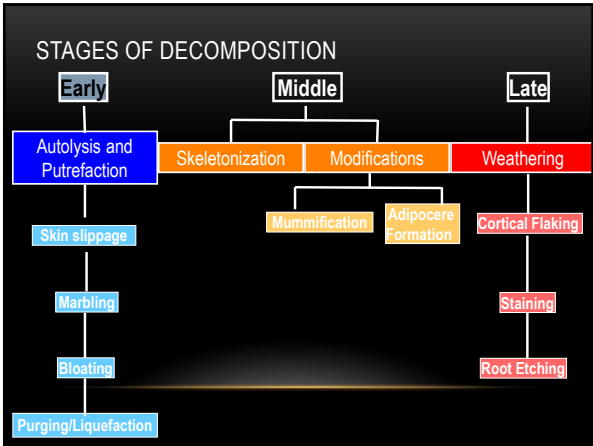
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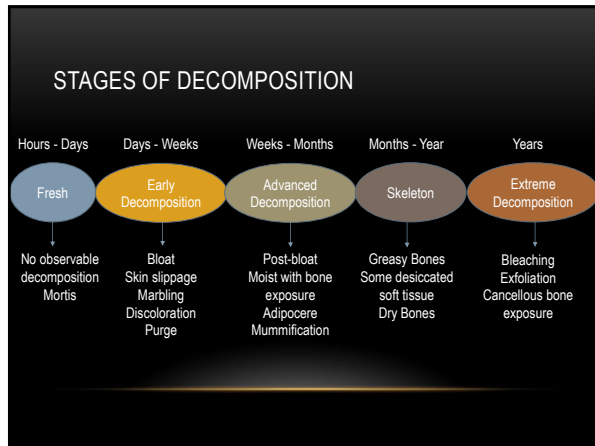
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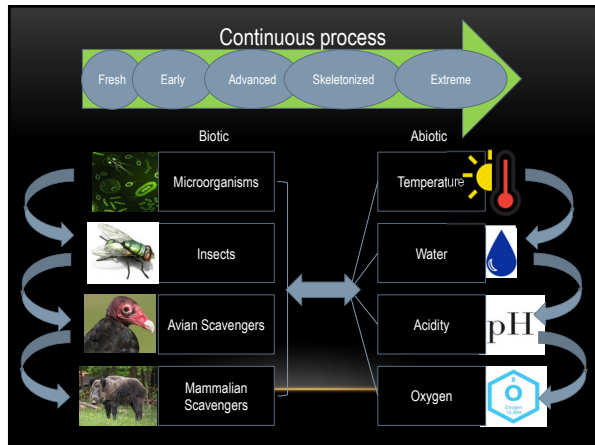
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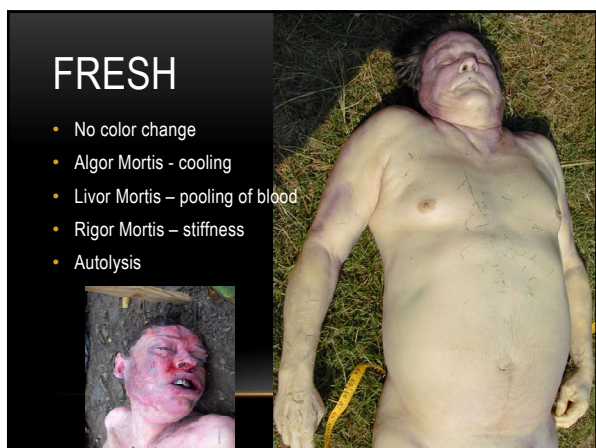
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13

Early Decomposition

- **Autolysis** - breakdown of tissue by tissue-produced enzymes
 - **Skin slippage**, Discoloration, Marbling
- **Putrefaction** - decomposition by microorganisms
 - Discoloration of Skin
 - Marbling of skin
 - Bloat - swelling from gases
 - Odor
 - Purge
- **Colonization by insects**

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EARLY DECOMPOSITION

Skin Slippage

Gloving

15

EARLY DECOMPOSITION

Marbling

Breakdown of red blood cells and their reaction with hydrogen sulfide made by bacteria



16

EARLY DECOMPOSITION - BLOAT

Uncontrolled growth in bacteria and fungi

Face tends to swell first; abdomen distends

Bloat position



17

EARLY DECOMPOSITION



18

EARLY DECOMPOSITION - PURGE

Excessive gas pressure in abdominal cavity forces fluid out of lungs and airways through orifices



19

EARLY DECOMPOSITION - PURGE

Tissues and organs break down becoming soft and unrecognizable

Known as wet decomposition



20

EARLY DECOMPOSITION - PURGE



21

EARLY DECOMPOSITION - PURGE

Toxins released during liquefaction kill vegetation and stain surrounding environment

Cadaver Decomposition Island



22

ADVANCED DECOMPOSITION

- Sagging of the flesh – occurs when putrefaction ends
- Moist decomposition with bone exposure
- Mummification
- Adipocere development
- Purge ends



23



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ADVANCED DECOMPOSITION



25

ADVANCED DECOMPOSITION - MUMMIFICATION

Depends on the success of the early stages of decomposition

Dehydration on outer surface of remains

Extreme heat, low humidity, high solar radiation and air currents can lead to mummification



26

ADVANCED DECOMPOSITION

- **Adipocere Formation**
 - Breakdown of fatty tissue into a greasy substance
 - Warm, moist, anaerobic



27

SKELETONIZATION

- Bone exposure
- Bone has greasy appearance
- Bones may have desiccated tissues covering less than half of the skeleton
- Dry bone



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SKELETONIZATION



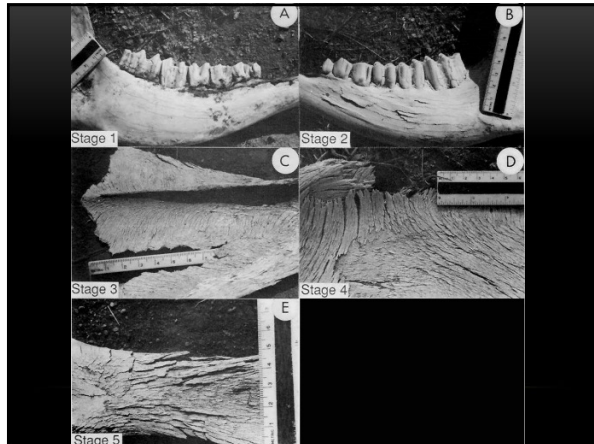
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EXTREME DECOMPOSITION

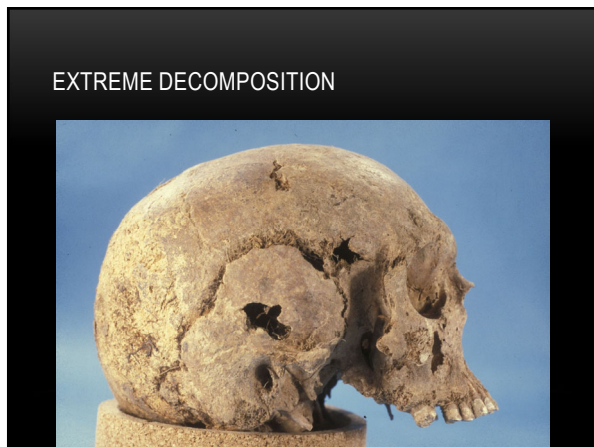
- Occurs after skeletonization
- Visible changes in in the outer cortex of bone



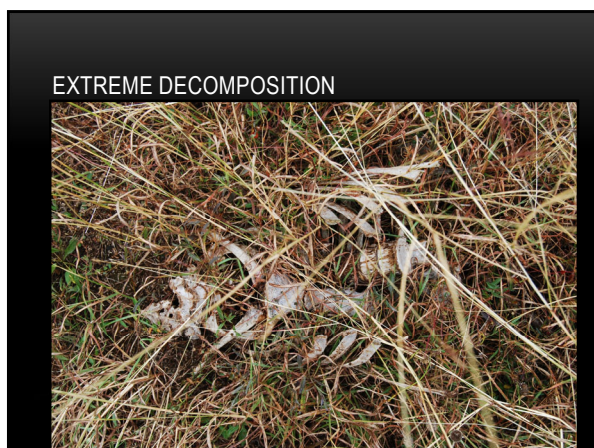
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FACTORS EFFECTING DECOMPOSITION

- **Environmental**
 - Temperature, humidity, weather exposure, soil pH, fire
- **Biological**
 - Insect colonization, scavenger access, plant activity, body size, trauma
- **Cultural**
 - Clothing, burial, embalming, closed structures, fire



34

DEPTH OF BURIAL

- **Surface**
 - Insect activity
 - Animal activity
 - Temperature fluctuations
 - Weathering
- **Shallow**
 - Some insect activity
 - Some animal activity
 - Some weathering
- **Deep**
 - Cool temperatures
 - Little insect or animal activity
 - Little weathering
 - Soil ph

35

ENVIRONMENTAL FACTORS..

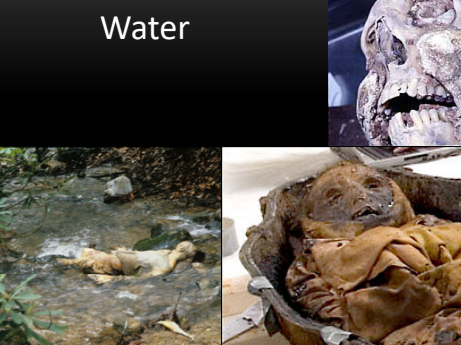
- ☠ Temperature
- ☠ Water
- ☠ Oxygen
- ☠ pH
- ☠ Insect access
- ☠ Carnivore access

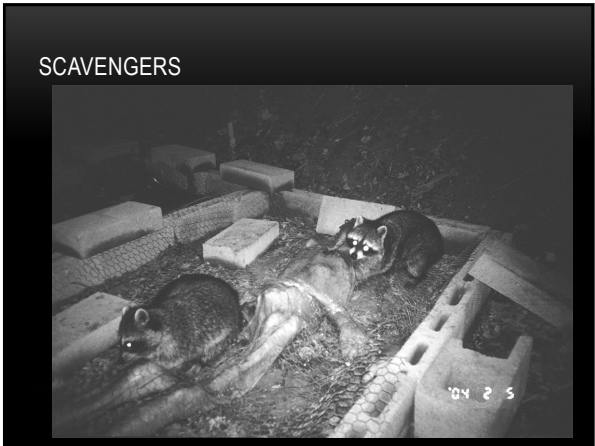


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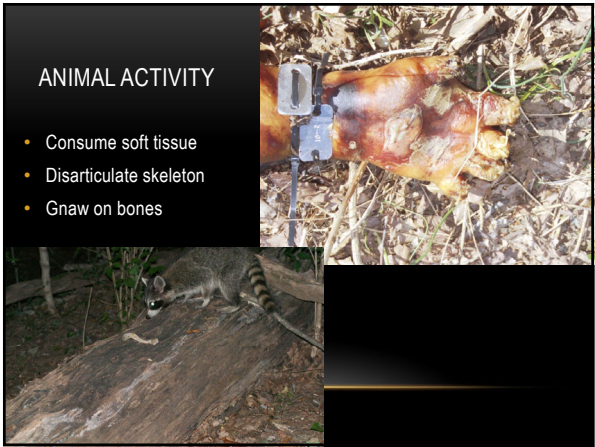


Water

A collage of three images related to water and death. The top right shows a close-up of a human skull with an open mouth. The bottom left shows a body floating in a river. The bottom right shows a body in a coffin.



40



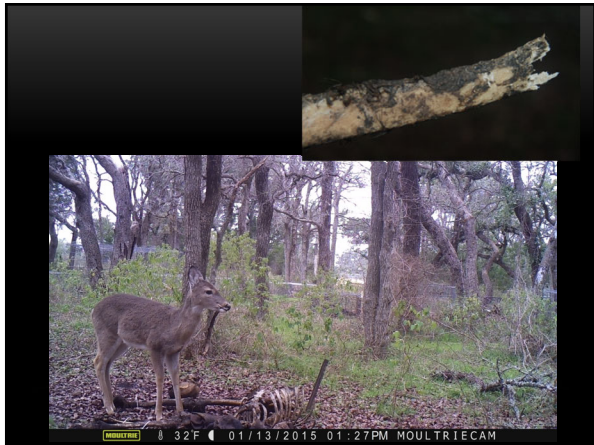
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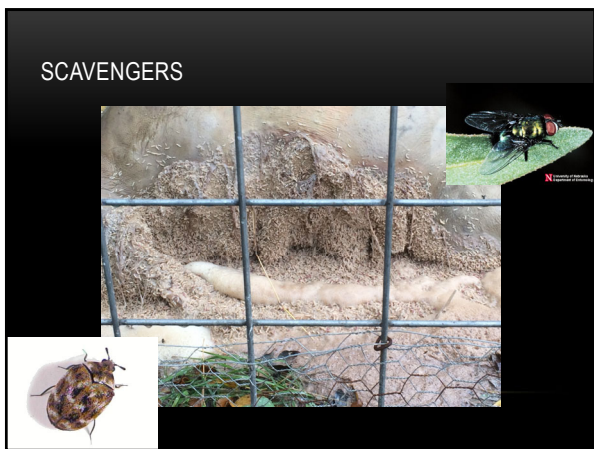
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45

INSECT ACTIVITY

- Life cycle stages
- Succession
- Correlation between insect activity and temp/humidity



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47



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ESTIMATING THE POSTMORTEM INTERVAL

- Fresh – cooling, rigor, lividity, others
- Early – microbial diversity, insect succession and development, gross morphology
- Advanced – Gross morphology, microbial, botany, soil analysis
- Skeletal – weathering, radiocarbon, soil analysis

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Paper ID JFS2004017
Available online at: www.astm.org

Mary S. Megyesi,¹ M.Sc.; Stephen P. Nawrocki,² Ph.D., D.A.B.F.A.; and Neal H. Haskell,³ Ph.D.

Using Accumulated Degree-Days to Estimate the Postmortem Interval from Decomposed Human Remains*

TABLE 2—Categories and stages of decomposition for the head and neck

A. Fresh (1pt)
1. Fresh, no discoloration

B. Early decomposition (2pts)
1. Pink-white appearance with skin slippage and some hair loss.
(3pts) 2. Gray to green discoloration; some flesh still relatively fresh.
(4pts) 3. Discoloration and/or brownish shades particularly at edges, drying of nose, ears and lips.
(5pts) 4. Purging of decomposition fluids out of eyes, ears, nose, mouth, some bloating of neck and face may be present.
(6pts) 5. Brown to black discoloration of flesh.

C. Advanced decomposition (7pts)
1. Caving in of the flesh and tissues of eyes and throat.
(8pts) 2. Moist decomposition with bone exposure less than one half that of the area being scored.
(9pts) 3. Mummification with bone exposure less than one half that of the area being scored.

D. Skeletalization (10pts)
1. Bone exposure of more than half of the area being scored with greasy substances and decomposed tissue.
(11pts) 2. Bone exposure of more than half the area being scored with desiccated or mummified tissue.
(12pts) 3. Bones largely dry, but retaining some grease.
(13pts) 4. Dry bone.

TABLE 3—Categories and stages of decomposition for the trunk

A. Fresh (1pt)
1. Fresh, no discoloration.

B. Early decomposition (2pts)
1. Pink-white appearance with skin slippage and marbling present.
(3pts) 2. Gray to green discoloration; some flesh relatively fresh.
(4pts) 3. Bloating with green discoloration and purging of decomposition fluids.
(5pts) 4. Postbloating following release of the abdominal gases, with discoloration changing from green to black.

C. Advanced decomposition (6pts)
1. Decomposition of tissue producing sagging of flesh; caving in of the abdominal cavity.
(7pts) 2. Moist decomposition with bone exposure less than one half that of the area being scored.
(8pts) 3. Mummification with bone exposure of less than one half that of the area being scored.

D. Skeletalization (9pts)
1. Bones with decomposed tissue, sometimes with body fluids and grease still present.
(10pts) 2. Bones with desiccated or mummified tissue covering less than one half of the area being scored.
(11pts) 3. Bones largely dry, but retaining some grease.
(12pts) 4. Dry bone.

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TABLE 4—Categories and stages of decomposition for the limbs

A. Fresh (1pt)
1. Fresh, no discoloration

B. Early decomposition (2pts)
1. Pink-white appearance with skin slippage of hands and/or feet.
(3pts) 2. Gray to green discoloration; marbling; some flesh still relatively fresh.
(4pts) 3. Discoloration and/or brownish shades particularly at edges, drying of fingers, toes, and other projecting extremities.
(5pts) 4. Brown to black discoloration, skin having a leathery appearance.

C. Advanced decomposition (6pts)
1. Moist decomposition with bone exposure less than one half that of the area being scored.
(7pts) 2. Mummification with bone exposure of less than one half that of the area being scored.

D. Skeletalization (8pts)
1. Bone exposure over one half the area being scored, some decomposed tissue and body fluids remaining.
(9pts) 2. Bones largely dry, but retaining some grease.
(10pts) 3. Dry bone.

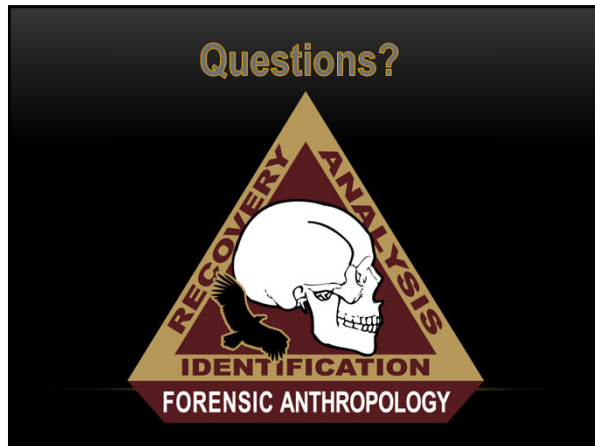
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ADD = 10^(3.61) ± 388.16

ADD = 4073.81 ± 388.16



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