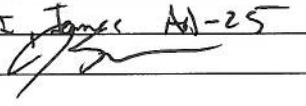


**STAFF SUMMARY SHEET**


	TO	ACTION	SIGNATURE (Surname), GRADE AND DATE		TO	ACTION	SIGNATURE (Surname), GRADE AND DATE
1	DFER	Approve	<i>Soltz James AD-25</i> 	6			
2	DFB	Action		7			
3				8			
4				9			
5				10			

SURNAME OF ACTION OFFICER AND GRADE	SYMBOL	PHONE	TYPIST'S INITIALS	SUSPENSE DATE
Lt Col King	DFB	333-6026	mdk	Not Applicable

SUBJECT	DATE
Clearance for Material for Public Release	USAFA-DF-PA- <i>2016-103</i> 20160222

**SUMMARY**

- PURPOSE.** To provide security and policy review on the document at Tab 1 prior to release to the public.
- BACKGROUND.**  
  
Presenters: Kevin Lougee (Denver Office of the Medical Examiner), James L. Caruso (Denver ME), Meredith A. Lann (Denver ME), and Laura Regan (USAFA/DFB)  
  
Title: Differential Taphonomy Based on Microenvironment: The Case of Botanical Boy.  
  
Release Information: This poster will be presented at the annual meeting of the American Academy of Forensics Sciences on Friday, 26 February.
- DISCUSSION.** N/A
- VIEWS OF OTHERS.** N/A
- RECOMMENDATION.** Sign coord block above indicating document is suitable for public release. Suitability is based solely on the document being unclassified, not jeopardizing DoD interests, and accurately portraying official policy.

  
 MARCUS D. KING, Lt Col, USAF, PhD  
 Deputy for Research, DFB

Tab  
1. Copy of Poster

*\* Add 'Distro A' statement.*

# Differential Taphonomy Based on Microenvironment: The Case of Botanical Boy

Kevin M. Lougee, DO\*<sup>AB</sup>, James L. Caruso, MD<sup>AB</sup>, Meredith A. Frank, MD<sup>AB</sup>, and Laura A. Regan, PhD<sup>C</sup>  
 Denver Office of the Medical Examiner, <sup>B</sup>University of Colorado Department of Pathology, and <sup>C</sup>United States Air Force Academy



## HISTORY<sup>1</sup>

- 1858- Denver established by General William Larimer
- Nov 1858- Gen. Larimer sets aside 320 acres for Mount Prospect Cemetery
- March 1859- First man buried in Mount Prospect Cemetery
- 1872- US gov't reclaimed land as federal land and sold to city of Denver for \$200
- 1873- Renamed Denver City Cemetery and separate areas were designated (Figure 1)
- Late 1880's- Cemetery falls into disrepair and seldom used
- Jan 1890- US Congress authorized the city to vacate cemetery. Senator Teller renamed area Congress Park, families given 90 days to remove remains. 40 acres sold to Catholic Church which was named Mount Calvary Cemetery
- March 1893- Undertaker E.P. McGovern paid \$1.90 to transfer each body to Riverside Cemetery
- 1894- Grading and leveling for park began
- 1907- Park finally completed
- 1909- Cheesman family donates marble pavilion and park designated Cheesman Park
- 1950- Catholic Church moved remains from Mount Calvary Cemetery and sold land back to city, which is now the location of the Denver Botanical Gardens
- 1966- The Denver Botanical Gardens were dedicated
- Nov 2008- Remains found during construction of parking garage (Red Arrow)
- Oct 2012- Remains found during road construction and irrigation repair (Blue Arrow)

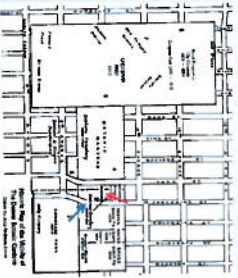


Figure 1. Historic Map Of Cheesman Park and Denver Botanic Gardens<sup>2</sup>



Figure 2. Google Map Satellite View of Cheesman Park and Denver Botanic Gardens today<sup>3</sup>

## OCTOBER 2012 DISCOVERY AND EXHUMATION

- Remains discovered adjacent to Denver Botanical Gardens (Blue Arrow)
- Multiple exhumations over a one week period by Chief Deputy Coroner
- Skeletal remains of a child fully clothed in an exceptionally well-preserved suit
- Coffin hardware and bits of wood associated with remains (Figure 4)
- No headstone with these remains but headstones nearby dated from 1878 to 1885
- Remains taken to Denver Office of the Medical Examiner



Figure 3. Construction location



Figure 4. Coffin hardware, bits of wood, crutches, and other suit emblems

## EXAMINATION

- Skeletonized remains with minimal amounts of desiccated tissue present in the forearm regions
- Well-preserved wool suit (jacket and knickers) (Figures 5 and 6)
- Intact cranium with hair affixed, combed, and parted (Figure 7)
- Remains in direct contact with the burial environment were relatively well preserved including the cranium, cervical vertebrae, long bones of the distal lower extremities, and bones of the hands and feet (Figure 10)
- Remains contained within the clothing were delaminated and friable including the thoracic and lumbar vertebrae, ribs, scapula, clavicles, pelvic bones, and the remaining appendicular elements (Figures 9 and 10)
- Large amounts of insect frass were present external and internal to the suit (Figure 8)



Figure 5. Remains as discovered, anterior view



Figure 6. Posterior view of suit



Figure 7. Cranium showing combed and parted hair



Figure 8. Insect frass on suit



Figure 9. Axial elements contained within the suit jacket



Figure 10. Skeletal remains removed from the clothing

## DISCUSSION

- Following anthropological examination, the remains were determined to be from a probable male (based on clothing and hair) child with an estimated age of 8 years ±24 months at the time of death
- Cause and manner of death were not definitely evident
- Within a single burial environment, there were two different microenvironments that demonstrated completely different taphonomy
- Remains exposed directly to the burial environment were well-preserved, something that is not uncommon in Denver owing to its arid climate
- Remains encased within the wool material of the suit showed a drastically altered microenvironment leading to significant degradation of most cortical surfaces that resulted in crumbling of the bones (Figure 11)
- We hypothesize that the autolytic tissue breakdown created an acidic environment within the wool suit that lead to differential hydroxyapatite dissolution of the enclosed osseous remains
- Wool is quite resistant to acid above a pH of ~2<sup>4</sup>, thus it would facilitate a low pH microenvironment while maintaining structural integrity itself

## CONCLUSION

- Remains will be reinterred locally at Mount Olivet Cemetery in Wheat Ridge, CO



Figure 11. Comparison of cervical vertebrae exposed to burial environment (left) and thoracic vertebrae encased within the wool clothing (right)

## REFERENCES

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4. Hanaweg, RC (2002) Degradation of clothing and other dress materials associated with buried bodies of archaeological and forensic interest. In *Advances in Forensic Taphonomy: Method, Theory, and Archeological Perspectives*, edited by WD Haglund and MH Song. CRC Press, Boca Raton, FL

