



## Pathology/Biology Section - 2016

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### H1 From 3 Years to 3,000 Years: Forensic Taphonomy of Human Remains From the Irish Peatlands

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The goals of this presentation are to: (1) present the forensic analysis of three cases of remains recovered from Irish peatlands from the perspective of both forensic pathology and forensic archaeology; and, (2) provide an overview of the forensic taphonomy of human remains in the context of waterlogged anaerobic acidic environments.

This presentation will impact the forensic science community by providing a knowledge basis for future investigations into the micro-environment of peatlands and their effect on postmortem decomposition. This presentation illustrates the value of a multidisciplinary approach to death investigation, particularly when dealing with concealed remains.

**Introduction:** Bog bodies are human or animal remains with preservation of non-bony tissue. Since the 17th century, Northern European peatlands have revealed the remains of more than 1,400 individuals dating from prehistory up to recent times. Preservation of these remains can be staggering. The reasons for this lie in the specific physical and biochemical composition of the bogs and of the bodies themselves.

This study examines the postmortem results of three cases of human remains exhumed from Irish peatlands ranging in date from 3 years to 3,000 years of age. This study is uniquely presented from the combined perspectives of both forensic pathology and forensic archaeology.

**Methods and Materials:** Several types of peatland environments occur throughout Northern Europe. The cases in this study were exhumed from raised bogs which generally occur 130m below sea level and would expect an annual rainfall between 800mm and 900mm. The remarkable preservative qualities of peatlands are attributed to a number of conditions including temperature, waterlogged anaerobic conditions, acidic pH, and antimicrobial factors (e.g., the polysaccharide sphagnum found in sphagnum moss).

This study presents three cases from departmental files in which human remains have been recovered from these unique environments. Included in this presentation is a discussion of the postmortem changes, their association with the environment, and pertinent external findings. Identifying features have been excluded to ensure anonymity.

**Cases:** Postmortem reports, images, and ancillary investigations from human remains exhumed after 3 years, 30+ years, and nearly 3,000 years were reviewed. The most recent case (Case 1) retained soft tissue, hair, and nails and external injuries and identifying marks were visible. There was also prominent adipocere formation and autolysis of organs. Case 2 from more than 30 years ago showed complete loss of soft tissues; however, adipocere formation was also prominent. Hair bearing skin was still attached to the skull. While the skeleton was incomplete, there was adequate material for positive identification. The most extraordinary preservation occurred in the remains exhumed from peatland after nearly 3,000 years (Case 3). Soft tissues and organs were retained with readily identifiable external marks and injuries; however, adipocere was not present in this case.

**Discussion:** Decomposition is a sophisticated multi-step process that takes place at macroscopic and cellular levels, eventually returning the constituents of a lifeless body to the ecosystem. Clothing and the body itself play significant roles in the degree of preservation. The outer integument and keratin structures are frequently the only identifiable surviving structures — these structures are remarkably well defined in Case 1. Adipocere formation is the result of the interaction of fat with a watery environment and was seen in the more recent cases (Case 1 and Case 2). Bony destruction is mainly a consequence of decalcification, a sequestering process which occurs more rapidly in the acidic conditions of peat bogs. Even in the advanced state of decay, the body surface may reveal evidence of trauma. Identification using various techniques was possible in all three cases.



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**Conclusion:** This presentation provides a unique review of three cases of bog bodies recovered from Irish peatlands, buried for approximately 3, 36, and nearly 3,000 years, respectively. Each bog is unique in its micro-environment with variations in soil chemistry that lead to variations in preservation and survival of organic remains. Special emphasis is provided on their decomposition and preservation status, along with other anthropological discoveries relevant to their time. The preservative factors of peat environments are not completely understood. This presentation provides a knowledge basis for further studies involving the processes and factors influencing the decomposition of bodies buried in peatlands.

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### **Bog Bodies, Forensic Taphonomy, Forensic Pathology**